GENERAL CATALOGUE 2024 2025

Lovato electric

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NEW PRODUCTS

TRANSFORMER PROTECTION CIRCUIT BREAKERS SM1RT TYPE

SM1RT circuit breakers are designed for controlling transformers. The circuit breakers have the same structure of the SM1R motor protection circuit breakers, but with a higher magnetic tripping threshold compared to motor protection version, in order to avoid any unwanted tripping. This is due to the fact that transformers usually have high inrush currents (magnetisation). Except for the magnetic switching threshold, the SM1RT transformer protection circuit breakers have the same functional features and share identical accessories with the SM1R motor protection circuit breakers.

Sec. 1 • page 7

CONTACTORS 265A TO 400A AC-3 BF SERIES

These are very compact units: 140mm wide for the three-pole versions and 185mm for the four-pole versions; motor current at 400V from 265 to 400A and Ith thermal current from 450 to 600A. The control coil operates in both AC and DC with electronic control and a wide supply voltage range. The AC/DC coil also features low power consumption, only closes at the correct supply voltage and has a built-in surge suppressor. A wide range of accessories is available, including front- and side-mounting auxiliary contacts, mechanical interlocks, power terminal protection and connection kits for configuration of star-delta starters or changeover switches..

Sec. 2

SAFETY CONTACTORS BFS TYPE

In the field of safety applications, BFS contactors are fully compliant with the requirements "MIRROR CONTACTS" according to the IEC/EN 60947-4-1 standard and "MECHANICALLY LINKED CONTACTS" according to the IEC/EN 60947-5-1 standard. These contactors are therefore suitable for applications which need a high safety level according with the requirements of the ISO 13849-1 (Safety of machinery – Safety-related parts of control systems) and IEC/EN 62061 (Safety of machinery – Functional safety of safety-related control systems) standards. BFS contactors cover motor control current values from 9A to 38A AC-3 at 400V.

Sec. 2 • page 14

ELECTRONIC MOTOR STARTERS ME SERIES

A new series of compact starters in a 22.5mm wide enclosure for applications requiring a high number of starts and space savings inside the panel. They are built with hybrid technology, combining the advantage of the long life of a wear-free semiconductor device with the high robustness and low consumption of a mechanical relay. The range includes direct starters and reversing starters for motors up to 2.4 or 7A for systems up to 500VAC.
All models are powered by 24VDC and integrate motor thermal protection. Versions with STO (Safe Torque Off) also feature an emergency stop function with SIL3 and PLe safety levels.

Sec. 4 • page 2

SOFT STARTERS ADXT SERIES

ADXT is a soft starter with three-phase control for the gradual starting of three-phase asynchronous motors. It is mainly used for controlling heavy loads, thanks to the high torque available during startup, which allows overcoming the inertia of applications such as crushers, fans, conveyors, screw compressors, centrifuges, propellers, mills, band or circular saws, shredders and many others. The entire range from 34 to 554A is cULus approved and integrates a bypass contactor for the reduction of consumptions and the heating generated once the ramp is complete. ADXT is suitable for installations with voltages from 380 to 690V and can be installed either with traditional in-line connection or inside delta connection. With advanced features for motor control and protection, it is the ideal soft starter for applications requiring high performance, reliability and robustness.

Sec. 5 • page 6

SINGLE-PHASE VARIABLE SPEED DRIVES VLB1 SERIES

They expand the range of variable speed drives VLB series with 4 power sizes, from 0.4 to 2.2kW, with single-phase 200...240VAC power supply. They are provided with built-in EMC suppressor and braking chopper. The compatibility with the optional accessories of the three-phase VLB3 series, such as logic units with fieldbus, communication modules and the STO (Safe Torque Off) safety module, along with integrated advanced functionalities, realizes a single-phase drive with high-performance for the control of applications with medium-to-high complexity.

Sec. 6 • page 5

IO-Link

LOGIC UNITS FOR VARIABLE SPEED DRIVES VLB SERIES

The series of accessories for VLB series variable speed drives is expanded with three new logic units: VLBXL07 is the version without communication port, designed for applications that do not require interfacing with intelligent devices or supervision networks via fieldbus. VLBXL08 allows equipping the variable speed drives VLB series with an Ethernet port using Modbus-TCP protocol, a more modern and flexible solution compared to serial communication, to achieve speeds up to 100Mbps. Finally, VLBXL09 is the logic unit with IO-Link protocol, a standardized technology (IEC 61131-9) for communication between sensors and actuators, now extended to more complex devices such as motor drives.

Sec. 6 • page 7

SOLID STATE RELAYS HS SERIES

The solid state relays HS series further extend the range of LOVATO Electric products for controlling electric loads. Although the relays are especially suitable for resistive loads, they are also able to control inductive loads, including small electric motors. These devices are frequently used in the field of packaging machinery and food industry equipment. Solid state relays offer an electrical life that is theoretically infinite, they can support ultra-high operation frequencies, they generate no electric arcing and their operation is noiseless. The values range from 25A to 130A. Versions are available either with or without heat sink. The solid state relays are UL, CSA and VDE-certified.

Sec. 7

DOUBLE CONTACT ELEMENTS PLATINUM SERIES

Double contact elements include two contacts in the size of a single contact element, allowing for increasingly compact solutions in terms of overall dimensions inside the panel and higher numbers of contacts per operator. The new double contact elements are available in the following versions: 2NO, 2NC and 1NO+1NC. Additionally, new double contact elements can be used in plastic control stations of the LPZ type.

Sec. 8 • page 39

THREE-PHASE VARIABLE SPEED DRIVES VLG3 SERIES

VLG3 is a three-phase general purpose variable speed drive suitable for the control of conveyor belts, textile machines, escalators, lifts, pumps, fans, compressors, washers and mixers. The range comprises sizes from 0.4 to 22kW and integrates as standard an EMC suppressor, the braking chopper and an RS485 serial port with Modbus-RTU protocol. On the front panel, there is a keypad with LED display, a potentiometer for frequency adjustment and an RJ45 port for the connection of peripheral devices such as optional remote keypad and PC programming cable. Additionally, it's possible to equip the drive with an Ethernet communication port via optional module.

Sec. 6 • page 8

PUSHBUTTONS AND SELECTOR IN KITS SWITCHES PLATINUM SERIES Ø22MM

Simplicity and ease of ordering: the range of Platinum series Ø22mm pushbuttons and selector switches is extended with a selection of codes available in kits that include the most common operators (pushbuttons, mushroom pushbuttons, selector switches, double-touch/triple-touch actuators) complete with mounting adapter and several combinations of contact elements and LED elements that are available in several colors and supply voltages. Kits are available both for LPC plastic chrome type and LPS metal type for fixing on 22mm diameter holes.

Sec. 8

AUTO-MONITORING 1NC CONTACT ELEMENT PLATINUM SERIES

With a new design, the auto-monitoring 1NC contact function is accomplished within the same dimensions of a single contact element, thus with extra slot available to fit further contact elements on the mounting adapter. Additionally, new double contact elements can be used in plastic control stations of the LPZ type.

Sec. 8 • page 41

NEW PRODUCTS

EMERGENCY ILLUMINATED PLASTIC DISK Ø60MM FOR Ø22MM MUSHROOM HEAD PUSHBUTTONS

Completing the range of LOVATO Electric emergency signalling devices are the new illuminated disks. Their main function is to make the emergency button easily recognizable and identifiable in the event of its activation in non-optimal visibility conditions and identifying which actuator is operated in the presence of several emergency mushrooms in the same area. There are 3 different supply voltages (24VAC/DC, 110...120VAC and 220...240VAC), 4 specific markings in different languages and 2 light functions (steady or flashing light).

Sec. 8 • page 51

SAFETY RELAYS SRC SERIES

LOVATO Electric has expanded its range of safety relays with the SRC series. The new series is designed up to cat. 4 applications, PLe performance level. The units are compliant with the EN ISO 13849-1 Machinery Directive and are used to monitor and control in a safe way safety circuits in applications including emergency stops, safety access, safety magnetic switches, safety limit switches or electro-mechanical interlocks. Additional versions are available with push-in spring connectors for simpler wiring.

Sec. 11 • page 2

PROGRAMMABLE SAFETY RELAY SRP SERIES

The SRPMFA164 programmable safety relay is a standalone safety device that is able to handle all safety functions in a machinery or whole system. The relay is fully configurable via SRPSW01 software that is downloadable free of charge from the website LovatoElectric.com, thus allowing for simpler wiring and lower costs.

The SRPMFA164 safety module is able to monitor and control safety circuits in applications including: light curtains, photocells, laser scanners, emergency stops, electromechanical interlocks, access interlocks, safety magnetic switches, RFID sensors, sensing mats or edges, two-hand control devices, or mantained-action enabling pushbuttons. Complex systems can be handled through a multiplicity of I/O ports: 16 digital inputs are included, together with 4 single inputs for restart interlock, EDMs o single-input devices, 4 pairs of OSSD safety outputs, 4 status outputs and 4 test outputs.

Sec. 11 • page 5

CONTROL STATIONS FOR 40MM PROFILE RAILS

The new LP4 type plastic control stations, with their compact size, are suitable for installation over 40mm profile rails. The units allow for an easy and quick assembly due to the provided metal clip that fits in the slot of the profile rail. The control stations are provided with operators, contact elements and LED elements, connection is performed via built-in M12 connector. Control stations are also available with IO-Link connection, an advanced and versatile solution for controlling and monitoring industrial devices. Through the IO-Link technology, the communication between field devices and the control system allows for a smarter and flexible management of industrial processes.

IO-Link

Sec. 8 • page 61

MULTIFUNCTION SAFETY RELAY SRAMF21

The new SRAMF21 safety relay is a multifunction module that is designed for applications up to cat. 4, PLe performance level. The relay, compliant with the EN ISO 13849-1 Machinery Directive, includes all the main safety functions in a single product. Thanks to the front selector, the unit can be used to monitor and control in a safe way safety circuits in applications including emergency stops, safety access, safety magnetic switches, safety limit switches, electro-mechanical interlocks, or safety barriers.

Sec. 11 • page 3

RFID SAFETY SENSORS SSF SERIES

Provided with RFID technology, these sensors offer a high level of protection up to PLe / SIL 3, also when connecting 16 sensors in series. The SSF series sensors are available with two types of connectors, either M12 or pigtail with 15cm M12 connector, two coding levels (either generic or Teach-in) and then can be easily adapted to the specific needs of the application. The units are versatile and reliable, an ideal choice for a broad range of industrial applications. With a long life and simple use guaranteed, RFID SSF safety sensors offer the highest safety levels achievable.

Sec. 11 • page 5

MOULDED CASE CIRCUIT BREAKERS P5 SERIES

The moulded case circuit breakers P5 series with electronic trip units provide high tripping accuracy, wide flexibility when adjusting protection parameters and a wide range of currents covered by a single product code. The adjustable parameters are: the overload protection current, the tripping threshold for short circuit protection and small delay in short circuit tripping. In the four-pole version, the fourth pole can be set up with different switching levels from the main poles. Additionally, specific UL489-approved versions are available for the North American market.

Sec. 13

MOTORISED CHANGEOVER SWITCHES GL SERIES

The new GLCM type motorised changeover switches are available in three-pole and four-pole versions up to 315A. Additionally, cULus-approved versions are available according to the UL1008 standard with general use current values at 100A and 200A. The motor unit allows for three wide-range supply voltages: 24VDC, 110...125VAC/DC and 208...277VAC. The new motorised changeover switches include a slot for inserting EXP type expansion modules and adding further relay outputs or a RS485/Modbus communication module.

Sec. 14

SWITCH DISCONNECTORS FOR PHOTOVOLTAIC APPLICATION TYPE GLD

The selection of switch disconnectors from LOVATO Electric is now extended with a new type of specific products for photovoltaic applications up to 1500VDC. The new switch disconnectors can be used either with direct control or door coupling and feature a wide range of accessories to cover all installation requirements. LOVATO Electric has filed a patent application for the innovative power pole control technology. The contacts are designed to perform all operations in an extremely quick and safe way and are suitable for use within the DCPV1 category with loads up to 315A at 1500V. These devices are mounted either on a DIN profile rail or on plate with 4 screws with no restrictions of positions. The open or closed status of the power poles can be monitored through transparent windows provided on the front side of the switch disconnector. Specific UL98B-approved versions are available for the North American market.

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SWITCH DISCONNECTORS AND CHANGEOVER SWITCHES GL SERIES UP TO 1000A

The GL series of switch disconnectors and changeover switches now covers applications up to 1000A. The new construction size covers currents of 630A, 800A and 1000A. Switch disconnectors are also available in UL98 versions (600A and 800A). The handles, which are available with the highest degree of protection on the market (IP66, IP69K and NEMA 4X), allow for direct-operated versions or door coupling with the addition of a shaft extension. To complete the range, terminal lugs, auxiliary contacts, terminal covers, phase barriers and captive nut accessories are available.

Sec. 14

SWITCH DISCONNECTORS WITH FUSE HOLDERS TYPE GEF

The new switch disconnectors with fuse holders have a compact modular structure and include 3 different sizes: up to 100A, 125-160A and 250A. These switches are available either in three-pole o four-pole versions and include either NFC type fuse holders from 50A to 125A or NH from 63A to 250A. Additionally, the selection includes several new accessories, such as a new direct control handle, terminal covers and extension shafts for the door coupling handle.

Sec. 14

POWER DISTRIBUTION BLOCKS ACB SERIES

The power distribution blocks are accessories that provide a centralised point for routing and distribute efficiently the power supply to the circuits. An electrical panel that is properly arranged offers several advantages, such as higher safety, easy assembly and maintenance, quick troubleshooting and simple modifications. Power distribution blocks play a key role in industrial electrical panel, as they provide a structured, safe and efficient way to connect and handle the wiring.
The series includes distribution blocks in single-pole, two-pole and four-pole version with current ratings up to 520A.

Sec. 15

NEW PRODUCTS

UL APPROVED FUSE HOLDERS WITH STATUS INDICATOR LIGHT

The range of FB01F and FB01G type UL-approved fuse holders is now supplemented with the 2P and 3P versions with status indicator light.

Sec. 16 • page 3

SELECTIVE RESIDUAL CURRENT CIRCUIT BREAKERS

A selective residual current circuit-breaker mounted upstream of normal residual current circuit-breakers or residual current operated circuit breakers allows detachment on the individual faulty plant branch, avoiding the main protection trip. The intentional delay in tripping of the selective RCDs gives the time to the downstream protections to trip, avoiding simultaneous opening of both general protection and single section protection, thus avoiding disruption of the entire system. They are available in two-pole and four-pole version of 40A and 63A, with type A protection sensitive to both sinusoidal currents and "unidirectional pulsed" currents, with IΔn of 0.3A.

Sec. 17 • page 14

SURGE PROTECTION DEVICE WITH INTEGRATED FUSE AND "NO LEAKAGE CURRENT"

The surge protection device SA1F34A275R combines the performance of SPD type 1 and 2 into a single product. The presence of the integrated fuse does not require any backup protection. The "no leakage current" technology allows it to be installed upstream of energy meters as it does not influence the measurement of consumed energy.

Sec. 18 • page 4

SURGE PROTECTION DEVICES TYPE 1CA/ OPEN-TYPE 1 UL-CERTIFIED

The SG13PA...RUL surge protection devices have plug-in cartridges and are ideal in all small-size systems for protecting the main switch all down to the terminal equipment. As cULus-approved devices according to the UL1449 standard, 4th edition – Type 1CA / Open-Type SPD, these surge protection devices are suitable for installation in machineries and systems for the North American market.

Sec. 18 • page 5

SURGE PROTECTION DEVICES FOR DATA LINES

The range of C2-D1 type surge protection devices for data lines additionally includes the new SASD types, which are suitable to protect 24VDC bus lines (e.g., intercom) and telephone lines (110VDC).

Sec. 18 • page 7

SURGE PROTECTION DEVICES TYPE 1, 2 FOR PHOTOVOLTAIC APPLICATIONS UP TO 1500VDC

The selection of LOVATO Electric SPD is extended by a new type 1, 2 model with voltage rating Un 1500VDC.

Sec. 18 • page 7

EARTH LEAKAGE RELAYS A TYPE

The offer of type A earth leakage relays from LOVATO Electric is now extended with two new models with display screen. A backlit display with three different backlight options (red, yellow, or green) allows for continuously monitoring the relay status. Other versions with 1 or 2 adjustable switching thresholds are available.

Sec. 20 • page 2

EARTH LEAKAGE RELAYS B TYPE

The novel B type modular relay, featuring a display screen, is an ideal solution for applications involving DC leakage currents, such as inverters or UPS. This earth leakage relay has two adjustable switching threshold values: an alarm and a pre-alarm value. Matching toroids with diameters ranging from 35 to 210mm are also available.

Sec. 20 • page 4

INSULATION MONITORING RELAY

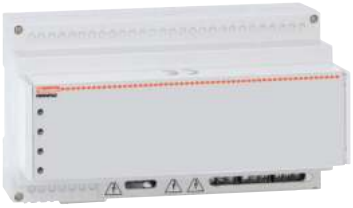
LOVATO Electric is launching a new insulation monitoring relay, the PMIB1A230 model. This device allows the monitoring of the insulation to earth in power supply networks up to 230VAC that are insulated from the ground (IT systems). The insulation level can be measured through the detection of the leakage current generated towards the earth. In addition to indications of device status (ON) and low insulation (TRIP), TEST and RESET buttons are provided on the front of the device. The switching threshold can be adjusted via a potentiometer. A changeover contact from a voltage-free relay is available in order to report the low insulation signal remotely.

Sec. 22 • page 11

INTERFACE PROTECTION SYSTEMS

The PMVF series of interface protection systems is renew by the PMVF52, PMVF81, PMVF61 and PMVF71 codes, all suitable for co-generation systems according to the connection requirements to power distribution networks for renewable energy generators specified by the CEI 0-21 (PMVF52), DEWA DRRG and SEC (PMVF61), ENA G98/G99 (PMVF71), VDE-AR-N 4105 and VDE V 0126-1-1 standards for low voltage, VDE-AR-N 4110 for medium voltage and VDE-AR-N 4120 for high voltage (PMVF81).

Sec. 22 • page 12



BACKUP POWER SUPPLY PMVFUPS02

The PMVFUPS02 unit is able to provide power for at least 5 seconds to interface protection systems and switches when the grid fails, as required (Low Voltage Ride Through) by the standards applicable to connections to co-generation systems. Since the energy is accumulated in capacitors, no maintenance is required for replacing batteries.

Sec. 22 • page 12

PMVF3000 INTERFACE PROTECTION SYSTEM

LOVATO Electric introduces the new PMVF3000 interface protection system according to the CEI 0-16 standard for medium voltage. The new PMVF3000 features a LCD graphic widescreen colour display as well as a built-in Ethernet port that allows the remote monitoring of the protection.

Sec. 22 • page 13

NEW PRODUCTS

PRIORITY CHANGE RELAYS FOR 3 OR 4 MOTORS LVMP30

They manage the alternation between 3 or 4 motors, with the purpose of making homogeneous operating time and wear. They are typically used in pumping systems where there may be more than two pumps to be controlled alternately. The presence of the keypad with display allows to set up the system configuration by selecting the number of motors to control, the setting of motor switch-on and switch-off delays and to monitor useful information such as the number of starts and operating hours of each motor.

Sec. 23 • page 10

PRE-ASSEMBLED INDUSTRIAL RELAYS HR SERIES

HR series relays are now also supplied already assembled on their socket. This solution combines the reliable performance of HR series relays with practically of a pre-assembled supply, simplifying management thanks to a single ordering code and speeding up the realisation of electrical panel. Each kit includes the relay, socket and retain/release clip. The HRA range of pre-assembled relays is available with screw terminals or push-in terminals and also includes kits with an integrated noise filter.

Sec. 24

ATEX-CERTIFIED INDUSTRIAL RELAYS HR80 TYPE

Propane gas is ever more widely used in refrigeration applications due to its high energy efficiency and eco-friendliness. However, this means that the electrical equipment installed in refrigerators containing the gas must comply with the ATEX regulations for potentially explosive atmospheres. HR80 relays are designed specifically for these applications, are rated for a current of 30A and are available for 2 NO contacts or 2 changeover contacts. They are equipped with Faston terminals and suited for screw mounting to the panel.

Sec. 24 • page 9

MICRO PLC LRK SERIES

Simple but functional, the new micro PLCs LRK series are the ideal solution for managing small automation tasks, both in civil and industrial sectors. The integrated Ethernet port allows programming from either a local PC or remotely and it can also be used for interfacing with a control and supervision system using Modbus-TCP protocol. Furthermore, through the integrated web server, it's possible to monitor the real-time status of the micro PLC and project variables directly from a web browser.
The program memory size is doubled compared to the LRD series, enabling the implementation of more complex programs. Base modules with 10, 12, or 20 integrated I/Os are available, with the possibility of expansion via modules LRE type.

Sec. 25 • page 6

MODULAR SWITCHING POWER SUPPLIES PSN SERIES

PSN is the new series of switching power supplies with single-phase input 100...240VAC, compact dimensions and a housing compatible with modular control panels. Available in versions with 12VDC or 24VDC output and power from 24 to 100W, they are designed for installation in both building automation and industrial sector to supply electronic and electromechanical devices with DC control such as contactors, time relays, sensors, PLCs, displays, SSRs and other equipment.

Sec. 26 • page 2

SWITCHING POWER SUPPLIES PSN SERIES

Switching power supplies designed for DIN rail mounting with single-phase input 100...240VAC and 24VDC output. Their main strength is their extremely compact dimensions, allowing installation in panels with limited space. Available in versions with output power from 120W to 480W, they feature active PFC function (except for the type PSN112024L), ensuring reduced losses and achieving a high level of efficiency. The range is cULus approved for sale in the North American market.

Sec. 26 • page 3

ENERGY METERS DMED311

The range of 3-phase energy meters from LOVATO Electric in now updated with the new direct insertion model DMED311, together with its MID-approved version with operating temperature extended to 70 °C. Its main features are as follows: 3-phase meter up to 80A with 4 modules only (72mm), MID-approved up to 70 °C, built-in RS485 communications port and input for rate selection.

Sec. 28 • page 14

ENERGY METERS DMED341

The new range of DMED341 energy meters from LOVATO Electric was conceived specifically for the world of charging stations for electric vehicles.
All codes are MID- and MIR-approved up to 70 °C (158 °F). Additionally, the DMED341MID7E codes are approved according to the German Eichrecht calibration regulation. Finally, the DMED341MID7ER code is also MID-approved for exported energy, in addition to imported energy.

Sec. 28 • page 15

POWER ANALYSER DMG9000 WITH DC AUXILIARY POWER

The DMG9000D048 power analyser with DC auxiliary power supply is used in applications where an analyser is mounted on board within the machinery, where an auxiliary supply line is provided, typically at 24VDC, or in electric panels of generating set systems, wherein power is usually supplied by 12VDC or 24VDC batteries and finally when a UPS system is provided. The built-in RS485 and Ethernet ports allow for an easy integration in supervision networks. A web server works as an access point for parameter configuration and measurement readout directly via browser, with no dedicated software to be installed on a PC and for managing the built-in memory, where historical data on the most important measures can be stored.

Sec. 28 • page 18

GATEWAY DATA LOGGERS EXCGLB SERIES

The EXCGLB series of gateway data loggers is suitable for energy monitoring in complex systems, for supervising power factor controllers or systems that are actuated by soft starters or by variable speed drives, for remote controlling of micro PLCs and furthermore, in versions equipped with a GPS function, in applications with generating set controllers and when geolocalisation of rented machines is needed. Communications with field devices is done via RS485 serial port or Ethernet, while connections to data collection software can be accomplished via wired Ethernet, Wi-Fi or cellular network. The system is open to accept connections to third-party devices or exchanging information with preexisting supervision software. With a 72mm modular housing, the logger is available in three different radio configurations:
• Wi-Fi • LTE (4G) and GNSS (GPS) • LTE (4G).

Sec. 34 • page 4

GATEWAY EXCCON02

The EXCCON02 gateway allows for data on a RS485 network to be transferred to Ethernet, thus favouring integration with serial ports in a corporate network. Through a Modbus-RTU to Modbus-TCP protocol conversion function, the gateway is able to optimize the exchange of data between communication masters and slaves.

Sec. 34 • page 5

REMOTE DISPLAY UNIT EXCRDU2

The EXCRDU2 units allows for controlling and monitoring up to 32 drives, either soft starters from the ADXL or ADXNP series or variable speed drives from the VLB series equipped with RS485 port, including mixed configurations. Through the front keyboard with LCD widescreen graphic color display and built-in RS485 port, the operator is able to start or stop motors, monitor their status and survey the main electric measurements. If used for controlling variable speed drives, the unit also allows for regulation of motor frequency, adjustment of PID control setpoint, or inversion of the motor rotation direction. The unit is provided with a RS485 connection cable (3m) and front seal for an IP65 protection level.

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1922

A long tradition of **style**

We have been managing energy since **1922**: we are in the fourth generation of a family that has led the company from the beginnings of electrical engineering to today's mix of electromechanics, electronics and software.

Our mission is to create **innovative**, **reliable products** and offer services to satisfy our customers' requirements.

Bergamo - ITALY

Sustainability

Responsible industrial development

Since its foundation, LOVATO Electric has operated with **passion and dedication**, according to **values and principles** that have guided the company's management for generations towards the goal of **industrial development that is attentive to people, the environment and society in general**.

A strategic approach to all ESG (Environmental, Social and Governance) aspects has been an integral part of the Company's business model for over 100 years.

Worldwide

100 COUNTRIES

14 INTERNATIONAL BRANCHES

90 IMPORTERS

International presence

Our successful business in Italy has enabled us to open 14 foreign branches (Canada, China, Croatia, Czech Republic, France, Germany, Poland, Romania, Spain, Switzerland, Turkey, United Arab Emirates, United Kingdom and USA) and set up a network of 90 importers to assure availability of **LOVATO Electric** products in over 100 countries worldwide.

The presence of **LOVATO Electric** in the major world markets is the result of its ongoing strategy of internationalisation.

The subsidiaries

UK **United Kingdom**
LOVATO ELECTRIC LTD

D **Germany**
LOVATO ELECTRIC GmbH

F **France**
LOVATO ELECTRIC SAS

E **Spain**
LOVATO ELECTRIC S.L.U.

PL **Poland**
LOVATO ELECTRIC SP. Z O.O.

CZ **Czech Republic**
LOVATO ELECTRIC S.R.O.

CN **China**
LOVATO ELECTRIC (SHANGHAI) CO LTD

TR **Turkey**
LOVATO ELEKTRİK LTD

US **USA**
LOVATO ELECTRIC Inc.

CA **Canada**
LOVATO ELECTRIC Corp.

UAE **United Arab Emirates**
LOVATO ELECTRIC ME FZE

RO **Romania**
LOVATO ELECTRIC SRL

HR **Croatia**
LOVATO ELECTRIC d.o.o.

CH **Switzerland**
LOVATO ELECTRIC AG

Production sites

In addition to its historic Italian headquarters in Bergamo, the company has **two factories**: one in the **Czech Republic,** which handles the assembly and testing of some electromechanical products, and one in **Croatia** which designs and manufactures rotary cam switches.

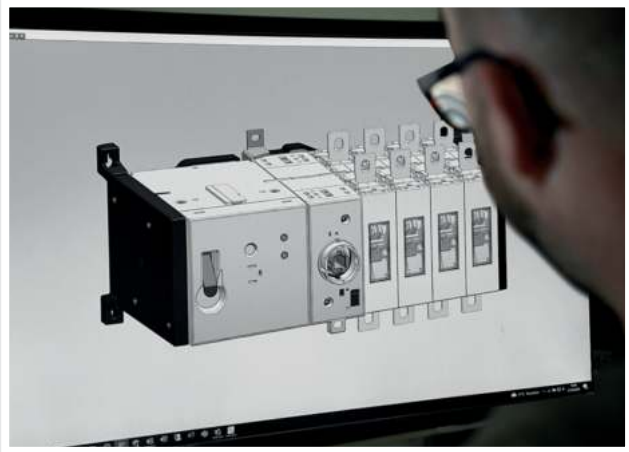
Pisek
CZECH REPUBLIC

Italian design

Italian design has always been our hallmark: our designers, researchers and engineering experts work in our Bergamo offices.

Research and development

A staff of experienced designers and researchers, based in Bergamo, develop innovative and reliable products using the most modern software available on the market today.



Lovato electric LAB

Products that are designed for the most diverse applications and installed all over the world need to meet high standards of reliability and stringent certifications.
The research and development laboratory is outfitted with modern equipment and works together with our design offices to reduce time to market for new products and grow our company know-how. The **LOVATO LAB** is recognised as a Customer Testing Facility by IMQ and is classified as a laboratory codified by ACAE for performing tests to obtain Certificates of Conformity according to international standards.

Quality

LOVATO Electric, striving for continuous improvement, invests in the professional growth of its employees and in advanced quality control instrumentation and software. Modern measurement systems are used to meet the most varied and stringent quality control requirements, and employ product validation (PPAP), risk analysis (FMEA) and problem solving (8D) methods to guarantee reliability and continuously improve our processes and products.

ENERGY MANAGEMENT
(SGE) ISO 50001: 2018

ENVIRONMENTAL MANAGEMENT
(ISO 14001: 2015)

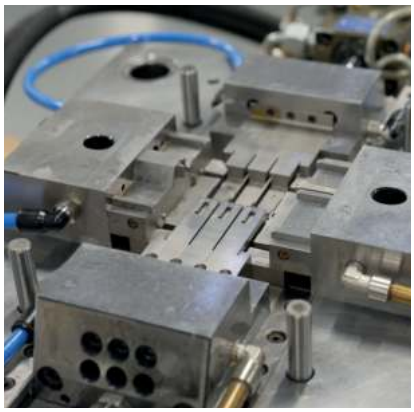
MANAGEMENT OF HEALTH AND SAFETY AT WORK
(ISO 45001: 2018)

QUALITY MANAGEMENT
(ISO 9001:2015)

Production

Mould construction

Our tooling department designs and fabricates the moulds we use to make our plastic components. The department, thanks to the know-how of its staff, automation and synergy with the design office, makes numerous new moulds every year.



Plastic moulding

The moulding department has always been one of the company's strategic resources. We have numerous presses, from 50 to 300 tons (both electric and bi-component), working 3 eight hour shifts around the clock.

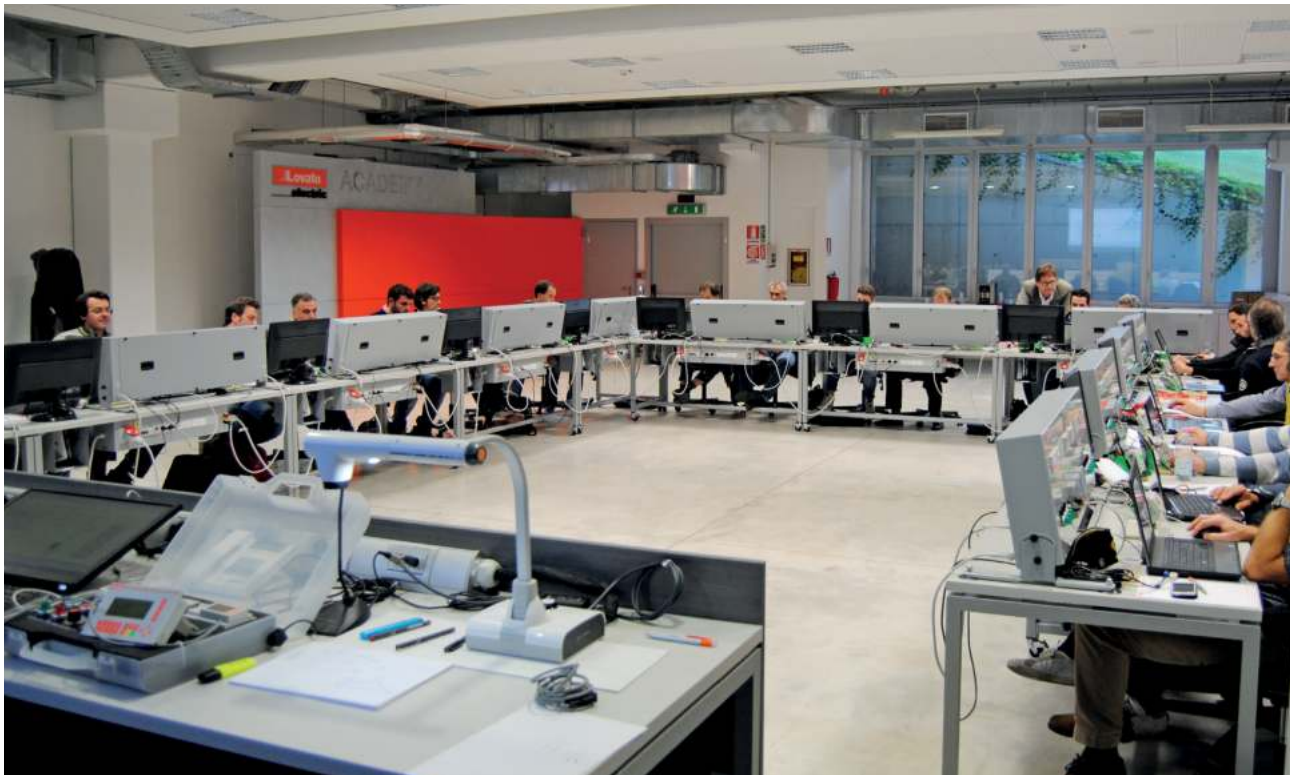
Electronic board construction

LOVATO Electronic is a state-of-the-art department dedicated to the production of electronic boards (SMT). It covers an Electrostatic Protected Area (EPA) and consists of intelligent warehouses with a capacity of more than 2,500 reels, static warehouses with humidity control for sensitive components and PCBs (printed circuit boards) alongside a board assembly line equipped with Pick & Place and 3D inspection machines for solder paste and board deposit control after remelting. An ICT (in-circuit test) station with 6 mobile probes and a system for complete traceability of electronic components complete the department's equipment.

Assembly

Our assembly department is housed in a large area. It features the most advanced assembly and testing lines. The machines are connected to the company computer system to enable continuous performance monitoring, production programming in line with the Industry 5.0 philosophy, and registration of tests and tracking data for each individual product.

Training



Experience and expertise

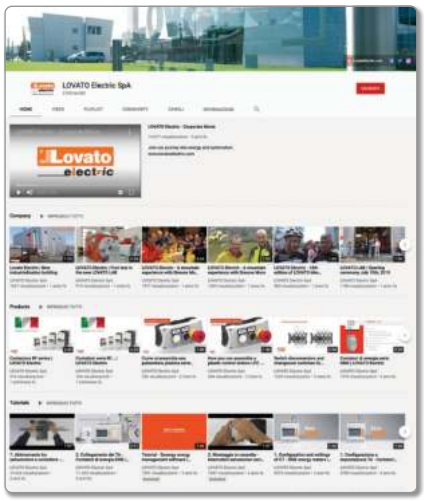
To meet the growing demand for technical training of industrial automation and energy management professionals, LOVATO Electric provides a full programme of courses through the LOVATO academy.

The offering includes, among others, courses on: micro PLCs and HMIs, **energy management**, electric motor starting and control, and surge arrestors.

Lovato electric ACADEMY

LOVATO Academy manages the technical training programme for the company's partners and customers.
Located at our Bergamo offices, the classroom is equipped with the most recent audiovisual aids and **interactive training benches**, and is the ideal place to learn about the use of our products and their programming and monitoring software.

LOVATO Electric's training uses various methods for delivering content in a blended learning approach, combining conventional methods with the teacher in front of the class with remote synchronous training and online tutorials.
For more details on our training programme, go to **academy.LovatoElectric.com**.



YouTube

Register with our YouTube channel to see the latest video tutorials and videos about our company.

Motor control and protection

Motor protection circuit breakers

- Wide adjustment range 0.1 to 100A
- IEC breaking capacity Icu 50kA (400V) up to 100A
- Suitable for isolation
- Certified UL Type E and Type F
- Comprehensive line of accessories
- Magnetic-only version
- Transformer protection version
- Automatic trip indicators
- High reliability and accuracy of tripping.

Motor protection circuit breakers — SEC. - PAGE

Type E and Type F combination motor controllers ..... 1 - 4
Motor protection circuit breakers SM1... up to 40A. Magnetic and thermal protection ..... 1 - 6
SM1PF... breakers. Fuse monitoring function ..... 1 - 6
Motor protection circuit breakers SM1RM... up to 40A. Magnetic protection ..... 1 - 6
Motor protection circuit breakers SM1RT... up to 25A. Transformer protection ..... 1 - 7
Motor protection circuit breakers SM2... and SM3... from 34 up to 100A. Magnetic and thermal protection ..... 1 - 7
Add-on blocks and accessories for SM1... ..... 1 - 8
Add-on blocks and accessories for SM2... and SM3... ..... 1 - 10

Dimensions ..... **1 - 15**
Wiring diagrams ..... **1 - 18**
Technical characteristics ..... **1 - 19**

Page 1-6

SM1P...
- Motor protection
- Push button control
- Ranges 0.1...40A (16 choices)
- IEC breaking capacity Icu at 400V: from 100 to 10kA
- Suitable for mounting in modular panels.

Page 1-6

SM1PF...
- Fuse monitoring function
- Push button control
- Fixed thermal protection: 0.2A
- Magnetic trip threshold: 1.2A.

Page 1-6

SM1R...
- Motor protection
- Rotary knob type
- Ranges 0.1...40A (16 choices)
- IEC breaking capacity Icu at 400V: from 100 to 20kA
- Thermal and magnetic trip indicator
- UL 60947-4-1 Type E, Type F.

Page 1-6

SM1RM...
- Starter protection (magnetic only)
- Rotary knob type
- Rated current from 0.16 to 40A
- IEC breaking capacity Icu at 400V: from 100 to 20kA.

Page 1-7

SM1RT...
- Transformer protection
- Rotary knob type
- Ranges 0.1...25A (14 choices)
- Magnetic tripping 20 x In.

Page 1-7

SM2R...
- Motor protection
- Rotary knob type
- Ranges 34...63A (2 choices)
- IEC breaking capacity Icu at 400V: 50kA
- UL 60947-4-1 Type E, Type F.

Page 1-7

SM3R...
- Motor protection
- Rotary knob type
- Ranges 55...100A (3 choices)
- IEC breaking capacity Icu at 400V: 50kA
- Thermal and magnetic trip indicator
- UL 60947-4-1 Type E, Type F.

IE3 READY

LOVATO Electric motor protection circuit breakers are suitable for new motors with high IE3 efficiency values

Lovato electric

IEC ratings - short-circuit breaking capacity

Motor protection (magnetic and thermal protection)

Starter protection (magnetic protection)

	SM1P... ❶	SM1R...	SM2R...	SM3R...	SM1RM...
Rated current	0.1...40A	0.1...40A	34...63A	55...100A	0.1...40A
Thermal protection	●	●	●	●	
Magnetic protection	●	●	●	●	●
TRIP position		●	●	●	●
Phase failure sensitive	●	●	●	●	
Padlockable in O	●	●	●	●	●

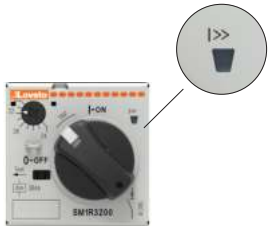
Range	230V		400V		440V		500V		690V		230V		400V		440V		500V		690V		230V		400V		440V		500V		690V	
	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics
[A]	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA
0.1...0.16	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.16...0.25	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.25...0.4	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.4...0.63	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.63...1	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
1...1.6	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
1.6...2.5	100	100	100	100	100	100	100	100	3	3	100	100	100	100	100	100	100	100	10	10	100	100	100	100	100	100	100	100	10	10
2.5...4	100	100	100	100	100	100	100	100	3	3	100	100	100	100	100	100	100	100	10	10	100	100	100	100	100	100	100	100	10	10
4...6.5	100	100	100	100	100	100	100	100	3	3	100	100	100	100	100	100	100	100	4	2	100	100	100	100	100	100	100	100	4	2
6.3...10	100	100	100	100	25	12.5	25	12.5	3	3	100	100	100	100	42	42	42	42	4	2	100	100	100	100	42	42	42	42	4	2
9...14	100	100	25	12.5	10	5	10	5	3	3	100	100	100	100	42	42	42	42	4	2	100	100	100	100	42	42	42	42	4	2
13...18	100	50	25	12.5	10	5	10	5	3	3	100	100	100	100	10	5	10	5	4	2	100	100	100	100	10	5	10	5	4	2
17...23	50	50	15	5	10	5	10	5	3	2	100	100	50	25	10	5	10	5	4	2	100	100	50	25	10	5	10	5	4	2
20...25	50	50	15	5	10	5	10	5	3	2	100	100	50	25	10	5	10	5	4	2	100	100	50	25	10	5	10	5	4	2
24...32	50	50	10	5	10	5	10	5	3	2	100	100	50	25	10	5	10	5	4	2	100	100	50	25	10	5	10	5	4	2
30...40	20	20	10	5	10	5	10	5	3	2	100	100	20	10	10	5	10	5	4	2	100	100	20	25	10	5	10	5	4	2
34...50	-	-	-	-	-	-	-	-	-	-	100	100	50	50	35	27	10	8	5	5	-	-	-	-	-	-	-	-	-	-
45...63	-	-	-	-	-	-	-	-	-	-	100	100	50	50	35	27	10	8	5	5	-	-	-	-	-	-	-	-	-	-
55...75	-	-	-	-	-	-	-	-	-	-	100	100	50	38	40	30	8	6	5	4	-	-	-	-	-	-	-	-	-	-
70...90	-	-	-	-	-	-	-	-	-	-	100	100	50	38	40	30	8	6	5	4	-	-	-	-	-	-	-	-	-	-
80...100	-	-	-	-	-	-	-	-	-	-	100	100	50	38	40	30	8	6	5	4	-	-	-	-	-	-	-	-	-	-

❶ The fuse monitoring version is also available (on page 1-6).

SM1P... MODULAR SIZE
- Mounting on front of panels or in modular panels for rapid access to buttons, avoiding the opening of the door by non-technical staff.
- Auxiliary contacts, indicator contacts and releases compatible with modular panels.

40A IN 45mm
- From 0.1A to 40A in a device just 45mm wide.
- High short-circuit breaking capacity up to 40A.
- Small, cost-effective starters.

SM1R... TRIP INDICATION
- Thermal and magnetic trip indication with trip position of knob.
- Specific visual indication for short-circuit tripping; guarantees maximum safety for operators and reliability of the system.
- Auxiliary trip indication contacts with ability to distinguish overload from short circuit.



SM1... HIGH-PERFORMANCE PLASTICS
- IEC/EN/BS 60335-compliant plastics for domestic and similar applications. Can be used in catering equipment.
- EN 45545-compliant plastics: fire behaviour and emissions of fumes. Suitable for railway applications.

DOOR COUPLING HANDLES
- Padlockable door coupling handles for the entire rotary knob type. Make systems compliant with safety regulations.
- Tough, easy and quick to install.

UL508 ratings - short-circuit breaking capacity (horse power ratings on page 1-4)

Transformer protection (magnetic protection 20 x In)

SM1RT...											SM1P...				SM1R...❹ - SM2R... - SM3R...									
0.1...25A											UL508 / UL 60947-4-1 Manual Motor Controller - Short circuit current in kA												UL508 / UL 60947-4-1 Manual Self Protected Combination Motor Controller (Type E) Short circuit current in kA (Type F ratings see on page 1-5)		
●											Motor Disconnect Group Motor Installation			Protection	Motor Disconnect		Group Motor Installation		Protection	Tap Conductor Protection				
●																								
●																								
●																								
230V		400V		440V		500V		690V			240V	480V	600V		480V	600V	480V	600V		480Y/277V	600Y/347V	240V	480Y/277V	600Y/347V
Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics															
kA	kA	kA	kA	kA	kA	kA	kA	kA	kA		kA	kA	kA		kA	kA	kA	kA		kA	kA	kA	kA	kA
100	100	100	100	100	100	100	100	100	100		50	50	50	❷	65	50	65	50	❷	65	50	65	65	50
100	100	100	100	100	100	100	100	100	100		50	50	50	❷	65	50	65	50	❷	65	50	65	65	50
100	100	100	100	100	100	100	100	100	100		50	50	50	❷	65	50	65	50	❷	65	50	65	65	50
100	100	100	100	100	100	100	100	100	100		50	50	50	❷	65	50	65	50	❷	65	50	65	65	50
100	100	100	100	100	100	100	100	100	100		50	50	50	❷	65	50	65	50	❷	65	50	65	65	50
100	100	100	100	100	100	100	100	100	100		50	50	50	❷	65	50	65	50	❷	65	50	65	65	50
100	100	100	100	100	100	100	100	3	3		30	30	30	100A Class J	65	30	65	30	❷	65	30	65	65	30
100	100	100	100	100	100	100	100	3	3		30	30	30	100A Class J	65	30	65	30	❷	65	30	65	65	30
100	100	100	100	100	100	100	100	3	3		30	30	30	100A Class J	65	30	65	30	❷	65	30	65	65	30
100	100	100	100	25	12.5	25	12.5	3	3		30	30	30	100A Class J	30	30	30	30	100A Class J	65❸	30❸	65❸	65❸	30❸
100	100	25	12.5	10	5	10	5	3	3		30	30	-	100A Class J	30	30	30	30	200A Class J	65❸	30❸	65❸	65❸	30❸
100	50	25	12.5	10	5	10	5	3	3		30	30	-	100A Class J	30	30	30	30	200A Class J	65❸	-	65❸	65❸	-
50	50	15	5	10	5	10	5	3	2		5	5	-	❷	30	30	30	30	200A Class J	30❸	-	30❸	30❸	-
50	50	15	5	10	5	10	5	3	2		5	5	-	❷	30	30	30	30	200A Class J	30❸	-	30❸	30❸	-
-	-	-	-	-	-	-	-	-	-		5	5	-	❷	30	30	30	30	200A Class J	10❸	-	10❸	10❸	-
-	-	-	-	-	-	-	-	-	-		5	5	-	❷	30	30	30	30	200A Class J	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-		-	-	-	-	50	10	50	10	❷	50	10	100	50	-
-	-	-	-	-	-	-	-	-	-		-	-	-	-	50	10	50	10	❷	50	10	100	50	-
-	-	-	-	-	-	-	-	-	-		-	-	-	-	40	10	40	10	❷	40	10	100	40	-
-	-	-	-	-	-	-	-	-	-		-	-	-	-	40	10	40	10	❷	40	10	100	40	-
-	-	-	-	-	-	-	-	-	-		-	-	-	-	40	10	40	10	❷	40	10	100	40	-

❷ Fuse or CB. ❸ Values valid for SM1RE... only. ❹ For SM1RT values see page 1-7.

ENCLOSURES

- Various types of plastic enclosures are available for rotating and button-controlled motor protection circuit breakers up to 40A.
- Surface and flush mount.
- Ideal for small machines and isolated motors.
- IP65 (UL Type 4X) protection rating and UV-ray resistant.
- Very robust plastics, IK07; pass even the strict UL "ball impact" test.
- UL-certified.

SM1... PADLOCKABLE

- All of the devices, in both the rotary knob type and push button controlled motor protection circuit breaker range, are padlockable.
  This provides greater operator safety during maintenance and bypassing of equipment.

UL Type E

- The entire rotary knob type is certified UL Type E except for the SM1R4000.
- Type E is a specific requirement of the UL standards that requires, of short-circuit protection devices, increased terminal isolation distances and strict breaking capacity tests.
- Eliminates the need for further short-circuit protection devices upstream of the motor protection.

UL Type F

- Type F starters are a combination of a motor protection circuit breaker and a contactor tested in specified short circuit conditions to verify their coordination.
- The SM1R motor protection circuit breakers are certified UL type F in combination with BG and BF contactors.
- A Type F starter is the most complete and preferred way to control and protect a motor.

UL ratings
Type E and Type F combination motor controllers

The UL standard indicates a combination motor controller, also called a combination starter, as equipment consisting of a protected starter incorporating an isolation function. The protection includes both thermal overload and short circuit.
In the standard of UL508 (now harmonized with IEC as UL 60947-4-1), we can find different construction types of starters stated as Type A, Type B, etc... composed of different type of devices intended to control, disconnect and protect a motor.
Type E and Type F controllers usually provide the best solution to control and protect a motor.

Type E

A Type E starter is a listed combination starter suitable for use without additional upstream circuit short-circuit protection. The typical Type E starter is a motor protection circuit breaker (MPCB), also known as manual motor protector that includes in a single device the following functions: manual motor control, disconnection, short circuit protection and motor overload protection.
A "NON Type E" motor protection circuit breaker, despite including short circuit protection, requires additional upstream short circuit protect ion.

FUNCTIONS:
- Disconnect
- Branch circuit protection
- Motor control
- Motor overload protection.

Type F

A Type F starter has the same functions of Type E but in addition to the motor protection circuit breaker (MPCB) commonly known as manual motor protector, also includes a contactor to have remote or automatic control of the motor.

FUNCTIONS:
- Disconnect (MPCB)
- Branch circuit protection (MPCB)
- Motor control (contactor)
- Motor overload protection (MPCB).

❶ Code SM1X9000R or SM1X9050.

CO-ORDINATION TYPE 1 AND CO-ORDINATION TYPE 2

The concept of co-ordination Type 1 and Type 2 was recently introduced in the UL 60947-4-1.
In the co-ordination Type 1, after a short-circuit, the starter shall cause no danger to persons or installation, but may not be suitable for further service and may need parts repair and replacement.
In the co-ordination Type 2, after a short-circuit, the starter shall cause no danger to persons or installation and is suitable for further use.
On the next page the co-ordination tables are provided.

TAP CONDUCTOR PROTECTION

SM... motor protection circuit breakers are also suitable as Tap Conductor Protection for Group Installation.
When manual motor starters are employed in group installations, in specified conditions by the standard, it is possible to reduce the wire sections.
The use of smaller wires reduces the cost of the panel and makes the wiring easier.
Furthermore, these motor protection circuit breakers can be used for control transformers protection instead of fuses or circuit breaker certified as UL 489.

Maximum UL/CSA horsepower ratings

		Single-phase		Three-phase, 3-pole			
		110V-120V	220V-240V	200V-208V	220-240V	440/-480V	550V-600V
		[HP]	[HP]	[HP]	[HP]	[HP]	[HP]
SM1R0016	SM1P0016	–	–	–	–	–	–
SM1R0025	SM1P0025	–	–	–	–	–	–
SM1R0040	SM1P0040	–	–	–	–	–	–
SM1R0063	SM1P0063	–	–	–	–	–	–
SM1R0100	SM1P0100	–	–	–	–	1/2	1/2
SM1R0160	SM1P0160	–	1/10	–	–	3/4	1
SM1R0250	SM1P0250	–	1/6	1/2	1/2	1	1.5
SM1R0400	SM1P0400	1/8	1/3	3/4	3/4	2	3
SM1R0650	SM1P0650	1/4	1/2	1.5	1.5	3	5
SM1R1000	SM1P1000	1/2	1.5	2	3	5	7.5
SM1R1400 / SM1RE1400	SM1P1400	3/4	2	3	3	10	10❶
SM1R1800 / SM1RE1800	SM1P1800	1	3	5	5	10	15❶
SM1R2300 / SM1RE2300	SM1P2300	1.5	3	5	7.5	15	20❶
SM1R2500 / SM1RE2500	SM1P2500	2	3	5	7.5	15	20❶
SM1R3200 / SM1RE3200	SM1P3200	2	5	10	10	20	30❶
SM1R4000	SM1P4000	3	7.5	10	10	30	30❶
SM2R5000	—	3	10	15	15	30	40
SM2R6300	—	5	10	20	20	40	60
SM3R7500	—	5	15	20	25	50	60
SM3R9000	—	7 1/2	20	25	30	60	75
SM3R9900	—	10	20	30	30	75	100

❶ SM1R... and SM1RE... only.

Combination Motor Controllers (Type F)

Coordination Type 1 - In the co-ordination Type 1, after a short-circuit, the starter shall cause no danger to persons or installation, but may not be suitable for further service and may need parts repair and replacement.

Motor protection circuit breaker type	Thermal setting range	Contactor types	SCCR in kA		
	[A]		240V	480Y/277V	600Y/347V
SM1R0016	0.1...0.16	BG06...BG12, BF09...BF38	65	65	50
SM1R0025	0.16...0.25	BG06...BG12, BF09...BF38	65	65	50
SM1R0040	0.25...0.4	BG06...BG12, BF09...BF38	65	65	50
SM1R0063	0.4...0.63	BG06...BG12, BF09...BF38	65	65	50
SM1R0100	0.63...1	BG06...BG12, BF09...BF38	65	65	50
SM1R0160	1...1.6	BG06...BG12, BF09...BF38	65	65	50
SM1R0250	1.6...2.5	BG06...BG12, BF09...BF38	65	65	30
SM1R0400	2.5...4	BG06...BG12, BF09...BF38	65	65	30
SM1R0650	4...6.5	BG06❶...BG12, BF09...BF38	65	65	30
SM1RE1000	6.3...10	BF09...BF38	65	65	30
SM1RE1400	9...14	BF18...BF38	65	65	30
SM1RE1800	13...18	BF18...BF38	65	65	–
SM1RE2300	17...23	BF18...BF38	30	30	–
SM1RE2500	20...25	BF25...BF38	30	30	–
SM1RE3200	24...32	BF32, BF38	10	10	–
SM2R5000	34...50	BF40...BF150	50	50	–
SM2R6300	45...63	BF50...BF150	50	50	–
SM3R7500	55...75	BF65...BF150	40	40	–
SM3R9000	70...90	BF80...BF150	40	40	–
SM3R9900	80...100	BF115...BF150	40	40	–

❶ BG06 not for 600Y/347V.

Coordination Type 2 - In the co-ordination Type 2, after a short-circuit, the starter shall cause no danger to persons or installation and is suitable for further use.

Motor protection circuit breaker type	Thermal setting range	Contactor types	SCCR in kA		
	[A]		240V	480Y/277V	600Y/347V
SM1R0016	0.1...0.16	BF26, BF32, BF38	65	65	50
SM1R0025	0.16...0.25	BF26, BF32, BF38	65	65	50
SM1R0040	0.25...0.4	BF26, BF32, BF38	65	65	50
SM1R0063	0.4...0.63	BF26, BF32, BF38	65	65	50
SM1R0100	0.63...1	BF26, BF32, BF38	65	65	50
SM1R0160	1...1.6	BF26, BF32, BF38	65	65	50
SM1R0250	1.6...2.5	BF26, BF32, BF38	65	65	30
SM1R0400	2.5...4	BF26, BF32, BF38	65	65	30
SM1R0650	4...6.5	BF26, BF32, BF38	65	65	30
SM1RE1000	6.3...10	BF26, BF32, BF38	65	65	30
SM1RE1400	9...14	BF26, BF32, BF38	65	65	30
SM1RE1800	13...18	BF26, BF32, BF38	65	65	–
SM1RE2300	17...23	BF26, BF32, / BF38	10 / 30	10 / 30	–
SM1RE2500	20...25	BF26, BF32, / BF38	10 / 30	10 / 30	–
SM1RE3200	24...32	BF32, BF38	10	10	–
SM2R5000	34...50	BF95, BF115, BF150	50	50	–
SM2R6300	45...63	BF95, BF115, BF150	50	50	–
SM3R7500	55...75	BF95, BF115, BF150	40	40	–
SM3R9000	70...90	BF95, BF115, BF150	40	40	–
SM3R9900	80...100	BF115, BF150	40	40	–

Motor protection circuit breakers SM1… up to 40A. Magnetic and thermal protection

SM1P…

SM1PF0020
Fuse monitoring function

SM1R…

❶ For SM1R... breakers, certified UL Type E, add E letter to the code. Ex. SM1RE1000.
❷ 10 x In max for 0.1...0.16A and 0.16...0.25A setting ranges.
❸ Intended specifically for monitoring the status of fuses:- rated current: 0.2A- magnetic tripping: 1.2A.

Order code	Thermal trip adjustment range	Short circuit breaking capacity at 400V Icu	Ics	Qty per pkg	Wt
	[A]	[kA]	[kA]	n°	[kg]
Push button control. For UL ratings see page 1-4.					
SM1P0016	0.1...0.16	100	100	1	0.240
SM1P0025	0.16...0.25	100	100	1	0.240
SM1P0040	0.25...0.4	100	100	1	0.240
SM1P0063	0.4...0.63	100	100	1	0.240
SM1P0100	0.63...1	100	100	5	0.260
SM1P0160	1...1.6	100	100	5	0.270
SM1P0250	1.6...2.5	100	100	5	0.300
SM1P0400	2.5...4	100	100	5	0.300
SM1P0650	4...6.5	100	100	5	0.300
SM1P1000	6.3...10	100	100	5	0.300
SM1P1400	9...14	25	12.5	5	0.300
SM1P1800	13...18	25	12.5	5	0.300
SM1P2300	17...23	15	5	1	0.300
SM1P2500	20...25	15	5	1	0.300
SM1P3200	24...32	10	5	1	0.300
SM1P4000	30...40	10	5	1	0.300
SM1PF0020❸	0.20	100	100	5	0.280
Rotary knob type. For UL ratings see page 1-4.					
SM1R0016	0.1...0.16	100	100	1	0.270
SM1R0025	0.16...0.25	100	100	1	0.270
SM1R0040	0.25...0.4	100	100	1	0.278
SM1R0063	0.4...0.63	100	100	1	0.278
SM1R0100	0.63...1	100	100	5	0.280
SM1R0160	1...1.6	100	100	5	0.280
SM1R0250	1.6...2.5	100	100	5	0.340
SM1R0400	2.5...4	100	100	5	0.340
SM1R0650	4...6.5	100	100	5	0.340
SM1R1000❶	6.3...10	100	100	5	0.340
SM1R1400❶	9...14	100	100	5	0.340
SM1R1800❶	13...18	100	100	5	0.340
SM1R2300❶	17...23	50	25	1	0.340
SM1R2500❶	20...25	50	25	1	0.340
SM1R3200❶	24...32	50	25	1	0.340
SM1R4000	30...40	20	10	1	0.340

General characteristics
SM1P... and SM1R... are modern circuit breakers with thermal and magnetic trip releases and high breaking capacity.
Motor control and protection of up to 22kW (400V) are possible by choosing the suitable adjustment range, 0.1 to 40A.
The dimensions of SM1P... breakers are compliant with the DIN 43880 standard, allowing them to be mounted in all modular enclosures on the market.
A magnetic trip indicator integrated on the SM1R... breakers avoids dangerous closing operations during short-circuit conditions, previously disconnected by the breaker.
SM1R... up to 32A breakers, with SM1X9000R or SM1X9050 accessory, are Type E-certified according to UL 60947-4-1; only for range from 6.5 to 32A the Type E version must be ordered with specific code SM1RE...❶. SM1R... motor protection circuit breakers combined with BG... and BF... contactors are Type F certified in compliance with UL 60947-4-1 standard (see page 1-4 and 1-5).
SM1P... and SM1R... motor protection circuit breakers are suitable for isolation in accordance with IEC/EN/BS 60947 standards and can be padlocked in OFF position without using accessories. Their high breaking capacity removes the need for protection fuses on the majority of the installations.

Operational characteristics
- IEC rated insulation voltage Ui: 690V
- IEC rated impulse withstand voltage: 6kV
- IEC rated frequency: 50/60Hz
- Maximum rated current: 40A
- Adjustment ranges: 16
- IEC breaking capacity: see table on page 1-2
- Heat dissipation per phase: 0.7...3.3W
- Magnetic tripping: 13 x In max❷
- Tripping class: 10A
- Phase failure sensitive
- Mechanical and electrical life: 100,000 cycles
- Mounting on 35mm DIN rail (IEC/EN/BS 60715)
- Mounting position: any
- IEC utilisation category: A
- Padlocking in OFF: Ø4mm/0.16”
- IEC degree of protection: IP20 on front.

Certifications and compliance
Certifications obtained: cULus, EAC.
SM1R... circuit breakers up to 32A are Type E and Type F certified (Self-Protected Combination Motor Controllers) according to UL 60947-4-1.
Certifications pending: CCC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-2, IEC/EN/BS 60947-4-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.
Plastic materials compliant with standards: IEC/EN/BS 60335 and EN/BS 45545.

Motor protection circuit breakers SM1RM… up to 40A. Magnetic protection

SM1RM…

Order code	Rated and magnetic trip current Rat.	Trip.	Short circuit breaking capacity at 400V Icu	Ics	Qty per pkg	Wt
	[A]	[A]	[kA]	[kA]	n°	[kg]
Rotary knob type. For UL ratings see page 1-4.						
SM1RM0016	0.16	1.6	100	100	1	0.270
SM1RM0025	0.25	3.2	100	100	1	0.270
SM1RM0040	0.4	5.2	100	100	1	0.278
SM1RM0063	0.63	8.2	100	100	1	0.278
SM1RM0100	1	13	100	100	5	0.280
SM1RM0160	1.6	21	100	100	5	0.280
SM1RM0250	2.5	33	100	100	5	0.340
SM1RM0400	4	52	100	100	5	0.340
SM1RM0650	6.5	85	100	100	5	0.340
SM1RM1000	10	130	100	100	5	0.340
SM1RM1400	14	182	100	100	5	0.340
SM1RM1800	18	234	100	100	5	0.340
SM1RM2300	23	299	50	25	1	0.340
SM1RM2500	25	325	50	25	1	0.340
SM1RM3200	32	416	50	25	1	0.340
SM1RM4000	40	520	20	10	1	0.340

General characteristics
SM1RM... are motor protection circuit breakers with magnetic tripping only and high breaking capacity.
They are typically used to protect starters where there is a thermal relay or other overload protection.
Starter control and protection of up to 22kW (400V) are possible by choosing the suitable adjustment range, from 0.1 to 40A.

Operational characteristics
- IEC rated insulation voltage Ui: 690V
- IEC rated impulse withstand voltage: 6kV
- IEC rated frequency: 50/60Hz
- Maximum rated current: 40A
- IEC breaking capacity: see table on page 1-2
- Heat dissipation per phase: 0.7...3.3W
- Magnetic tripping: 13 x In max❷
- Mechanical and electrical life: 100,000 cycles
- Mounting on 35mm DIN rail (IEC/EN/BS 60715)
- Mounting position: any
- IEC utilisation category: A
- Padlocking in OFF: Ø4mm
- IEC degree of protection: IP20 on front.

Certifications and compliance
Certifications obtained: cULus, EAC.
Certifications pending: CCC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-2, IEC/EN/BS 60947-4-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.
Plastic materials compliant with standards: IEC/EN/BS 60335 and EN/BS 45545.

Motor protection circuit breakers SM1RT... up to 25A. Transformer protection

SM1RT...

new

Order code	Thermal trip adjustment range	Short circuit breaking capacity at 400V Icu	Ics	Qty per pkg	Wt
	[A]	[kA]	[kA]	n°	[kg]
Rotary knob type.					
SM1RT0016	0.1...0.16	100	100	1	0.270
SM1RT0025	0.16...0.25	100	100	1	0.270
SM1RT0040	0.25...0.4	100	100	1	0.278
SM1RT0063	0.4...0.63	100	100	1	0.278
SM1RT0100	0.63...1	100	100	5	0.280
SM1RT0160	1...1.6	100	100	5	0.280
SM1RT0250	1.6...2.5	100	100	5	0.340
SM1RT0400	2.5...4	100	100	5	0.340
SM1RT0650	4...6.5	100	100	5	0.340
SM1RT1000	6.3...10	100	100	5	0.340
SM1RT1400	9...14	25	12.5	5	0.340
SM1RT1800	13...18	25	12.5	5	0.340
SM1RT2300	17...23	15	5	1	0.340
SM1RT2500	20...25	15	5	1	0.340

General characteristics
SM1RT... are circuit breakers with thermal and magnetic trip releases intended specifically for transformers control and protection.
The magnetic trip threshold of 20 x In enable the connection of transformers avoiding unintentional tripping due to the high in-rush currents.
The various adjustment ranges from 0.1A to 25A enable control and protection of transformers up to 17kVA (400V).

Operational characteristics
- IEC rated insulation voltage Ui: 690V
- IEC rated impulse withstand voltage: 6kV
- IEC rated frequency: 50/60Hz
- Maximum rated current: 25A
- Max. heat dissipation per phase: 0.7...3.4 W
- Magnetic tripping: 20 x In max (16 x In max for SM1RT0016, SM1RT2300, SM1RT2500)
- Mechanical and electrical life: 100.000 cycles
- Mounting on 35mm DIN rail (IEC/EN/BS 60715)
- Mounting position: any
- IEC utilisation category: A
- Padlocking in OFF: Ø4mm/0.16"
- IEC degree of protection: IP20 on front.

Certifications and compliance
Certifications obtained: cULus, EAC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-2, IEC/EN/BS 60947-4-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.
Plastics compliant with standards: IEC/EN/BS 60335 and EN/BS 45545.

UL 60947-1 characteristics
Short circuit breaking capacity as per UL 60947-1 at 240V and 480/277V:
– from SM1RT0016 to SM1RT0650 - 65kA
– from SM1RT1000 to SM1RT2500 - 30kA
Only from circuit breakers from SM1RT0650 to SM1RT2500: fuse protection 200A class J.

Motor protection circuit breakers SM2... and SM3... up to 100A. Magnetic and thermal protection

SM2R...

SM3R...

Order code	Thermal trip adjustment range	Short circuit breaking capacity at 400V Icu	Ics	Qty per pkg	Wt
	[A]	[kA]	[kA]	n°	[kg]
Rotary knob type. For UL ratings see page 1-4.					
SM2R5000	34...50	50	50	1	1.000
SM2R6300	45...63	50	50	1	1.000
Rotary knob type. For UL ratings see page 1-4.					
SM3R7500	55...75	50	38	1	2.200
SM3R9000	70...90	50	38	1	2.200
SM3R9900	80...100	50	38	1	2.200

General characteristics
SM2R... and SM3R... are modern circuit breakers with thermal and magnetic trip releases and high breaking capacity.
Motor control and protection, up to 55kW (400V) are possible by choosing the suitable adjustment range, up to 100A.
SM2R... and SM3R... breakers are Type E and Type F according to UL 60947-4-1.
The SM2R... and SM3R... types are suitable for isolation according to IEC/EN/BS 60947 standards and can be padlocked in OFF position without using accessories.
SM2R... and SM3R... have has a trip function which indicates thermal and magnetic tripping.
Their high breaking capacity removes the need for back up fuse protection on the majority of installations.

Operational characteristics
- IEC rated insulation voltage Ui: 1000V
- IEC rated impulse withstand voltage: 8kV
- IEC rated frequency: 50/60Hz
- Maximum rated current:63A (for SM2...); 100A (for SM3...)
- Adjustment ranges: 2 (for SM2...); 3 (for SM3...)
- IEC breaking capacity: see table on page 1-2 and 1-3
- Max. heat dissipation per phase: 7W
- Magnetic tripping: 13 x In max
- Tripping class: 10A
- Phase failure sensitive
- Mechanical life: 50,000 cycles
- Electrical life: 25,000 cycles
- Mounting on 35mm DIN rail (IEC/EN/BS 60715)
- Mounting position: any
- IEC utilisation category: A
- Padlocking in OFF: Ø4mm/0.16"
- IEC degree of protection: IP20 on front.

Certifications and compliance
Certifications obtained: cULus, EAC.
SM2... and SM3... circuit breakers are Type E and Type F certified (Self-Protected Combination Motor Controllers) according to UL 60947-4-1; for Type E and Type F, SM3 only with accessory SM3X9000R.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-2, IEC/EN/BS 60947-4-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

Motor protection circuit breakers

Add-on blocks and accessories for SM1...

SM1X11...

SM1X12...

SM1X1311

SM1X1311M

SM1X14...

SM1X15...R

SM1X15...P

SM1X16...

SM1X18200R

SM1X18S

SM1X9000R

BFX8901

SM1X8902

Order code	Characteristics	Qty per pkg	Wt
		n°	[kg]
Add-on auxiliary contacts.			
SM1X1120	Front mount 2NO	10	0.016
SM1X1111	Front mount 1NO+1NC	10	0.016
SM1X1220	Side mount 2NO	1	0.036
SM1X1211	Side mount 1NO+1NC	10	0.036
SM1X1202	Side mount 2NC	1	0.036
SM1X1311	Side mount. Contacts for thermal and magnetic tripping indication 1NO+1NC	1	0.036
SM1X1311M	Side mount. Contacts for magnetic tripping indication 1NO+1NC	1	0.036
Undervoltage trip releases.			
SM1X14024	24VAC 50Hz	1	0.130
SM1X14110	110VAC 50Hz; 120VAC 60Hz	1	0.130
SM1X1422060	220VAC 60Hz	1	0.130
SM1X14230	230VAC 50Hz	1	0.130
SM1X14400	400VAC 50Hz; 440VAC 60Hz	1	0.130
SM1X1457560	575VAC 60Hz	1	0.130
SM1X15024❶	With early-make contacts 24VAC 50Hz	1	0.140
SM1X15110❶	With early-make contacts 110VAC 50Hz; 120VAC 60Hz	1	0.140
SM1X15230❶	With early-make contacts 230VAC 50Hz	1	0.140
SM1X15400❶	With early-make contacts 400VAC 50Hz	1	0.140
Shunt trip releases.			
SM1X16024	24VAC 50/60Hz	1	0.130
SM1X16110	110VAC 50/60Hz	1	0.130
SM1X16230	230VAC 50/60Hz	1	0.130
SM1X16400	400VAC 50/60Hz	1	0.130
Adjuster sealing kit.			
SM1X1812	With wire and lead included	1	0.006
IP65 (4X) padlockable door coupling handle for SM1R...			
SM1X18200R	Red/yellow complete with rod length 200mm/7.87”	1	0.115
SM1X18B200R	Black complete with rod length 200mm/7.87”	1	0.115
SM1X18S❷	Support for rod >145mm/5.71”	1	0,030
Phase separation barriers for SM1R...			
SM1X9000R	For Type E and Type F as UL60947-4-1	5	0.016
Three-phase connection busbars 45mm/1.77” spacing.			
11SMX9032	For 2 breakers	10	0.028
11SMX9033	For 3 breakers	10	0.050
11SMX9034	For 4 breakers	10	0.071
11SMX9035	For 5 breakers	10	0.092
Three-phase connection busbars 54mm/2.13” spacing.			
11SMX9042	For 2 breakers	10	0.031
11SMX9043	For 3 breakers	10	0.056
11SMX9044	For 4 breakers	10	0.081
11SMX9045	For 5 breakers	10	0.090
Terminal block for busbar supply.			
11SMX9030	For all busbar types	10	0.048
SM1X9050	For all busbar types Type E and F as per UL508 / UL60947-4-1	10	0.050
Safety cover.			
11SMX9031	For unused terminals	10	0.004
Accessories for motor protection breaker fixing.			
SM1X8902	Metal bracket for fixing SM1... motor protection with screws	10	0.006
BFX8901	Universal plastic base for screw-fixing SM1... motor protection circuit breaker	2	0.016

General and operational characteristics

ADD-ON AUXILIARY CONTACTS
- Connectable to the left side of the breaker or on the front
- Maximum combinations: 3 SM1X... blocks with 6 auxiliary contacts in total of which 1 front block and 2 side blocks
- IEC conventional free air thermal current Ith: 10A (5A for SM1X11...)
- IEC rated insulation voltage Ui: 690V (300V for SM1X11...)
- Rated impulse withstand voltage Uimp: 4kV
- UL/CSA and IEC/EN/BS 60947-5-1 designation: A600 - Q600 (C300 - R300 for SM1X11...)
- Maximum tightening torque: 1Nm / 9lb.in
- Conductor cross section minimum-maximum (1 or 2 wires): 0.75...2.5mm² or 18...14AWG.
- Screw tightening tool: Phillips 2
- Maximum tightening torque: 1Nm / 9lb.in
- Width of side-mount auxiliary contacts equal to 0.5 DIN 46880 modules
- IEC degree of protection: IP20.

UNDERVOLTAGE TRIP RELEASES
- Snap on to the right side of the breaker
- Consumption inrush/holding: 12/3.5VA
- Release voltage: 0.35...0.7Us
- Operating voltage: 0.85...1.1Us
- Maximum tightening torque: 1Nm / 9lb.in
- Conductor cross section minimum-maximum (1 or 2 wires): 0.75...2.5mm² or 18...14AWG.
- Screw tightening tool: Phillips 2
- Maximum tightening torque: 1Nm / 9lb.in
- Width of side-mount undervoltage trip releases equal to 1 DIN 46880 module
- IEC degree of protection: IP20.

SHUNT TRIP RELEASES
- Snap on to the right side of the breaker
- In-rush consumption: 20VA
- Operating voltage: 0.7...1.1Us
- Conductor cross section minimum-maximum (1 or 2 wires): 0.75...2.5mm² or 18...14AWG
- Screw tightening tool: Phillips 2
- Maximum tightening torque: 1Nm / 9lb.in
- Width of side-mount shunt trip releases equal to 1 standard DIN 46880 module
- IEC degree of protection: IP20.

PADLOCKABLE DOOR COUPLING HANDLE FOR SM1R...
- IEC degree of protection: IP65
- Degree of protection according to UL: Type 1, 2, 3R, 12, 12K, 4, 4X; external use
- Adjustable rod from 48 to 212mm (1.89” to 8.35”)
- Ring-fixing in 22mm/0.87” hole.

THREE-PHASE CONNECTION BUSBARS
- Imax: 63A
- SMX903... 45mm/1.77” spacing to reduce the width to the minimum
- SMX904... 54mm/2.13” spacing to consent to fit one side-mount auxiliary contact block on the breaker.

TERMINAL BLOCKS FOR BUSBAR SUPPLY
- Imax: 63A
- Screw tightening tool: Phillips 2
- Maximum tightening torque: 2.3Nm / 20lb.in
- Conductor cross section minimum-maximum: 4...25mm² or 10...4AWG.

Certifications and compliance

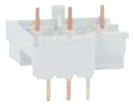
Certifications obtained: cULus (except terminal block for busbar supply), EAC.
Certifications pending: CCC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

❶ Complete the order code by indicating P for mounting on SM1P... motor protection circuit breakers, or R for SM1R... motor protection circuit breakers.
❷ Mounting also possible with side-mount auxiliary contacts SM1X12... and SM1X13...

Dimensions page 1-15 and 16
Wiring diagrams page 1-18

Motor protection circuit breakers

Add-on blocks and accessories for SM1...



SM1X30...

SM1X31...
SM1X32...

SM1Z1701P

SM1Z1702P

SM1Z1705P

SM1Z1715R

SM1Z1725R

SM1X1740P

SM1X1745P

SM1X1746P

SM1X17024R

Order code	Characteristics	Qty per pkg	Wt
		n°	[kg]
Rigid SM1 breaker-contactor connections.			
SM1X3040P	For motor protection breaker SM1P... with BG... mini-contactors	10	0.019
SM1X3141P	For motor protection breaker SM1P... with BF09..25A contactors	10	0.035
SM1X3241P	For motor protection breaker SM1P... with BF26..38A contactors	10	0.045
SM1X3040R	For motor protection breaker SM1R... with BG... mini-contactors	10	0.019
SM1X3141R	For motor protection breaker SM1R... with BF09..25A contactors	10	0.035
SM1X3142R	For motor protection breaker SM1R... with contactors BF09..25D and BF09...25L	10	0.044
SM1X3241R	For motor protection breaker SM1R... with contactors BF26..38A	10	0.045
Surface mount enclosures IP65 (4X) for SM1P...			
SM1Z1701P	Width 80mm/3.15"❶	1	0.235
SM1Z1702P	Width 80mm/3.15". With button for emergency stop	1	0.275
SM1Z1711P	Width 100mm/3.94"❶	1	0.315
SM1Z1712P	Width 100mm/3.94". With button for emergency stop	1	0.345
Flush mount enclosure IP65 (4X) for SM1P...			
SM1Z1705P	Width 87mm/3.42"❶	1	0.205
Surface mount enclosures IP65 (4X) for SM1R...			
SM1Z1715R	With rotary actuator red/yellow. Width 100mm/3.94"	1	0.350
SM1Z1710R	With black rotary actuator Width 100mm/3.94"	1	0.350
Flush mount enclosures IP65 for SM1R (UL type 4X)			
SM1Z1725R	With rotary actuator yellow/red Width 87mm/3.42"	1	0.245
SM1Z1720R	With rotary actuator black Width 87mm/3.42"	1	0.245
ENCLOSURE ACCESSORIES AND SPARE PARTS. For SM1Z...P enclosures.			
SM1X1740P	Emergency stop button. IP65 (4X)	1	0.044
SM1X1745P	Rubber membrane with rim. IP65 (4X)	1	0.016
SM1X1746P	Lockable block. IP65 (4X)	1	0.030
MX02	Earth / Neutral terminal	10	0.035
LED pilot lights IP65. Wire length 200mm/7.87".			
SM1X17024G	Green 24VAC/DC	1	0.007
SM1X17024R	Red 24VAC/DC	1	0.007
SM1X17400G	Green 110...400VAC	1	0.007
SM1X17400R	Red 110...400VAC	1	0.007
Plastic M25 to ½" NPT entry adapter.			
11LMM25PG16	For enclosures SM1Z1701P and SM1Z1702P	10	0.009

❶ Complete with rubber membrane.

General and operational characteristics

RIGID SM1 BREAKER-CONTACTOR CONNECTIONS

The SM1X3... connections electrically and mechanically fasten the motor protection breaker together with the contactor.
This forms a highly compact single-unit starter for quick installation on a single 35mm DIN rail.
The SM1X3... connections can also be mounted in combination with reversing and star-delta starters made with the rigid connections indicated in section 2.

SURFACE MOUNT ENCLOSURES

- Top or bottom cable entry:
  - SM1Z1701P and SM1Z1702P 4 M25-threaded knock-outs
  - SM1Z1711P and SM1Z1712P 4 knock-out with Ø20.5mm/0.81" or Ø26.5mm/1.04"
  - SM1Z1710R and SM1Z1715R 4 - knock-out with Ø20.5mm/0.81" or Ø26.5mm/1.04"
- Possibility of rear entry too
- Protection rating: IP65 (UL Type 4X)
- Holds a breaker, one front-mount auxiliary contact block either one shunt or undervoltage release and one pilot light; only for enclosures 100mm/3.94" width side mount auxiliary contact blocks can be fitted as well
- The SM1Z1710R and SM1Z1715R rotary actuators can be padlocked with a maximum of 3 padlocks Ø4...8mm/0.16...0.31"
- Earth/ground terminal included
- Operating temperature: -25...+60°C
- Storage temperature: -50...+80°C.

FLUSH MOUNT ENCLOSURES FOR SM1P AND SM1R

- Holds a SM1P breaker, one front-mount auxiliary contact block and either one shunt or undervoltage release
- Protection rating: IP65 (UL Type 4X)
- Earth/ground terminal included
- 70x115mm/2.76x4.53" cutout for SM1P
  70x143mm/2.77x5.65" cutout for SM1R
- Operating temperature: -25...+60°C
- Storage temperature: -50...+80°C.

ENCLOSURE ACCESSORIES

Emergency stop button:
- Turn to release
- Red button Ø35mm/1.38".

Lockable block:
- Prevents closing operation; 3 padlocks maximum Ø4...8mm/0.16...0.31".

Certifications and compliance

Certifications obtained: cULus except SM1X17024..., SM1X17400..., SMX90.... and 11LMM25PG16), EAC.
Certifications pending: CCC for rigid connections and enclosures (maximum current enclosures for cULus: 25A).
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

SM2X11...

SM2X12...

SM2X1311

SM2X14...

SM2X16...

SM2X18...

Order	Characteristics	Qty per pkg	Wt
		n°	[kg]
Add-on auxiliary contacts.			
SM2X1120	Front mount 2NO	10	0.020
SM2X1111	Front mount 1NO+1NC	10	0.020
SM2X1102	Front mount 2NC	10	0.020
SM2X1220	Side mount 2NO	2	0.040
SM2X1211	Side mount 1NO+1NC	10	0.040
SM2X1202	Side mount 2NC	2	0.040
SM2X1311	Side mount. Indicator contacts for thermal and magnetic tripping 1NO+1NC	2	0.040
Undervoltage trip releases.			
SM2X14230	230VAC 50/60Hz	5	0.100
SM2X14400	400VAC 50/60Hz	5	0.100
SM2X14440	440VAC 50/60Hz	5	0.100
Shunt trip releases.			
SM2X16024	24VAC 50/60Hz	5	0.100
SM2X16110	110VAC 50/60Hz	5	0.100
SM2X16230	230VAC 50/60Hz	5	0.100
SM2X16400	400VAC 50/60Hz	5	0.100
SM2X16440	440VAC 50/60Hz	5	0.100
Padlockable IP65 (4X) door coupling handle for SM2R... and SM3R....			
SM2X18200R	Red/yellow complete with rod length 200mm/7.87"	1	0.115
SM2X18B200R	Black complete with rod with rod length 200mm/7.87"	1	0.115
Phase separation barriers set for SM3R...❶			
SM3X9000R	For Type E as per UL60947-4-1	1	0.175

❶ Note: SM2R... motor protection circuit breakers are UL Type E without the need of phase separation barriers.

General and operational characteristics

ADD-ON AUXILIARY CONTACTS
- Insert on the top front or snap on the left side of the breaker
- Maximum combinations: 3 SM2X... blocks with 6 auxiliary contacts in total of which 1 front block and 2 side blocks❷
- IEC conventional free air thermal current Ith: 10A (5A for SM2X11...)
- IEC rated insulation voltage Ui: 690V (250V for SM2X11...)
- UL/CSA and IEC/EN/BS 60947-5-1 designation: A600 – Q300 (B300 - R300 for SM1X11...)
- Conductor cross section minimum-maximum (1 or 2 wires): 0.75...2.5m^2 or 18...14AWG
- Screw tightening tool: Pz 2
- Maximum tightening torque: 1Nm / 9lb.in
- Width of side-mount auxiliary contacts equal to 0.5 DIN 46880 modules.

UNDERVOLTAGE TRIP RELEASES
- Snap on to the right side of the breaker for motor protection
- Consumption in-rush/holding: 8.5/3VA
- Release voltage: 0.35...0.7Us
- Operating limits: 0.85...1.1Us
- Conductor cross section minimum-maximum (1 or 2 wires): 0.75...2.5mm^2 or 18...14AWG
- Screw tightening tool: Pz 2
- Maximum tightening torque: 1.2Nm / 10lb.in
- Width of side-mount undervoltage trip releases equal to 1 DIN 46880 module.

SHUNT TRIP RELEASES
- Snap on to the right side of the breaker
- In-rush consumption: 20VA
- Operating limits: 0.85...1.1Us
- Conductor cross section minimum-maximum (1 or 2 wires): 0.75...2.5mm^2 or 18...14AWG
- Screw tightening tool: Pz 2
- Maximum tightening torque: 1.2Nm / 10lb.in
- Width of side-mount shunt trip releases equal to 1 standard DIN 46880 module.

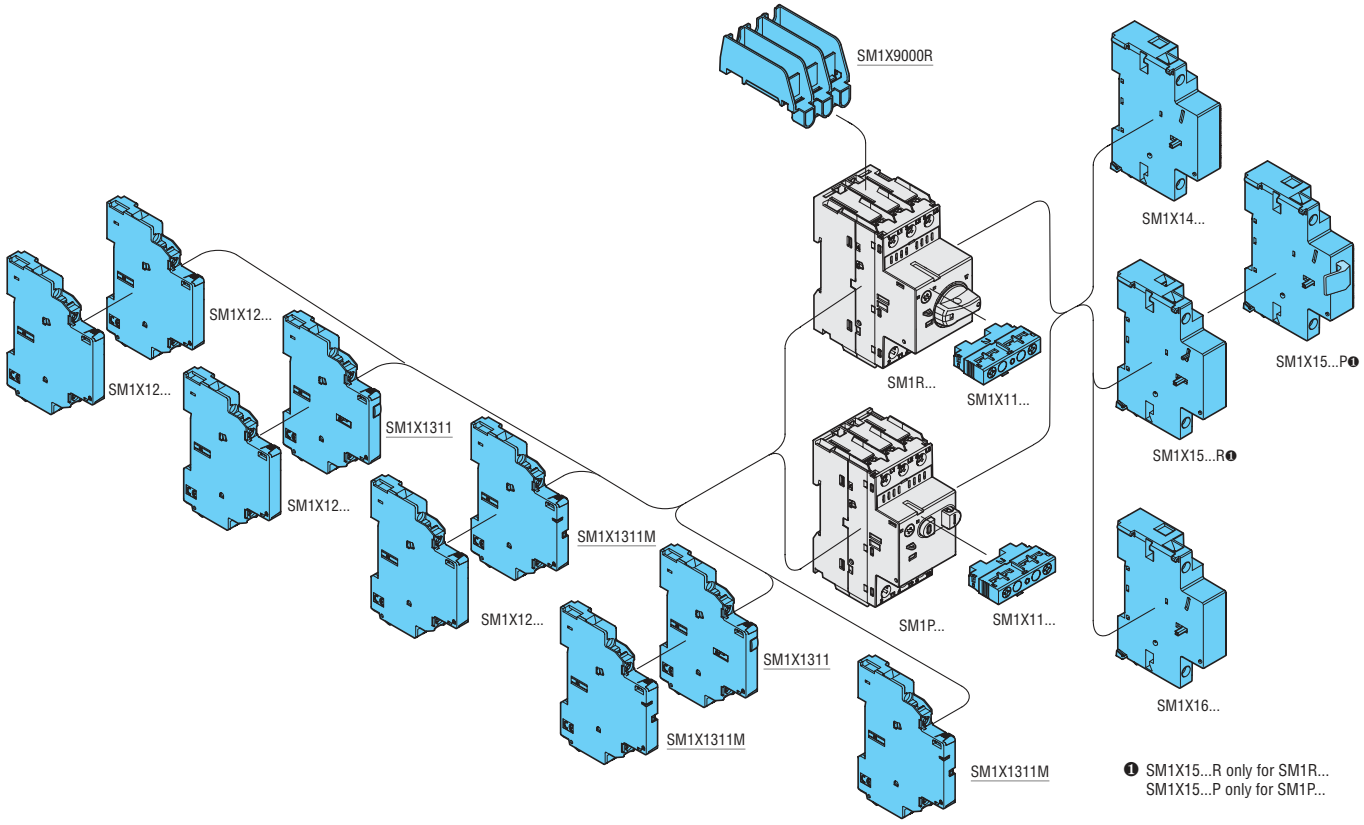
PADLOCKABLE DOOR COUPLING HANDLE FOR SM2R and SM3R
- IEC degree of protection: IP65
- Degree of protection according to UL: Type 1, 2, 3R, 12, 12K, 4, 4X; external use
- Adjustable rod from 48 to 212mm (1.89" to 8.35")
- Ring-fixing in 22mm/0.87" hole.

Certifications and compliance

Certifications obtained: cULus, EAC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

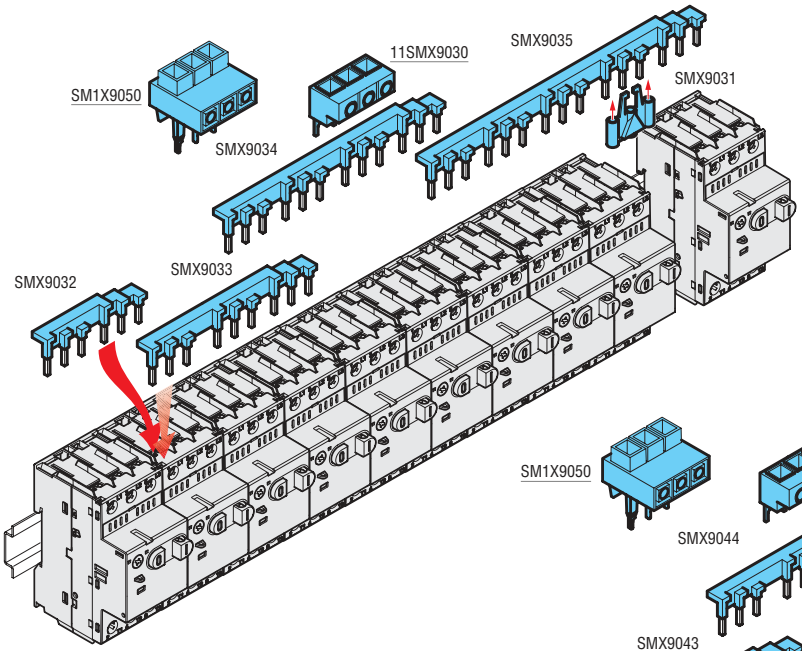
❷ Side blocks: n. 1 SM2X12... + SM2X1311.
It is not possible to mount 2 blocks SM2X12...

Combinations

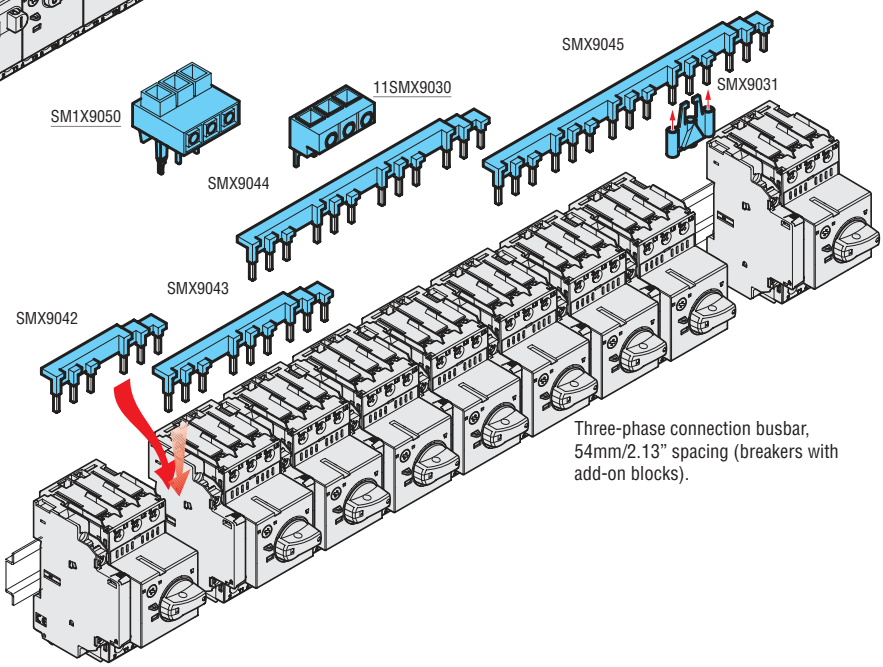


❶ SM1X15...R only for SM1R...
SM1X15...P only for SM1P...

Three-phase connection busbars.



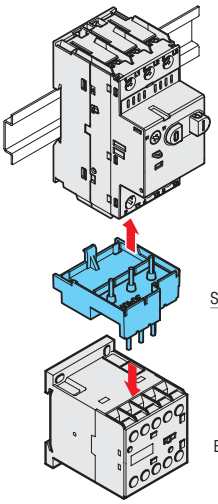
Three-phase connection busbar, 45mm/1.77" spacing (breakers without add-on blocks).

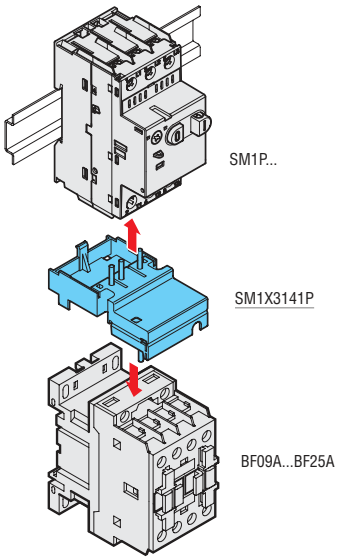


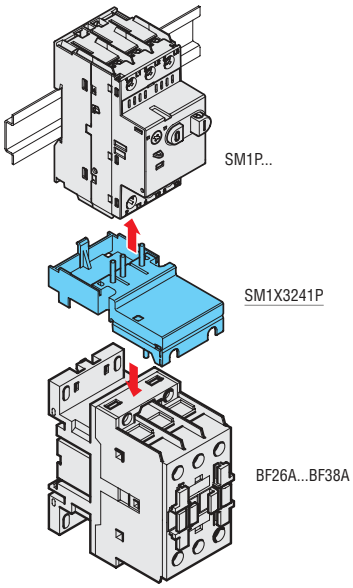
Three-phase connection busbar, 54mm/2.13" spacing (breakers with add-on blocks).

Combinations

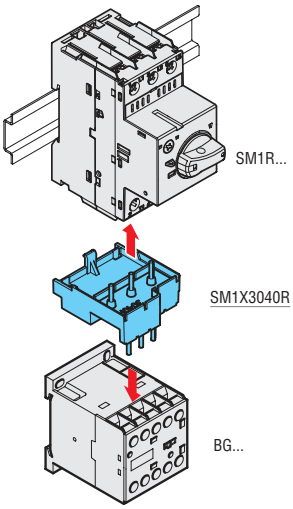
Rigid SM1P... breaker - contactor connections.

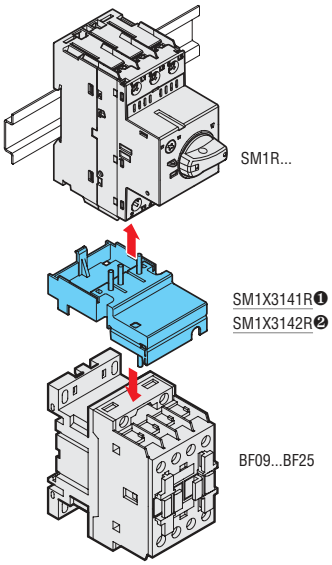


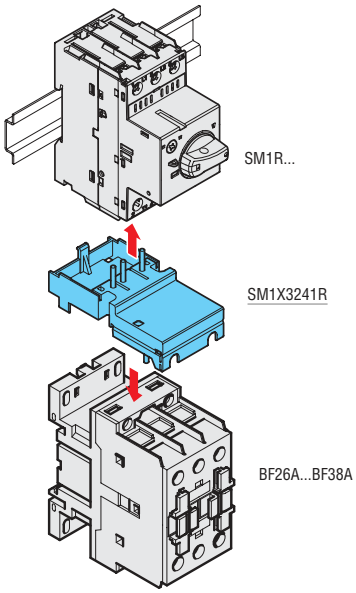




Rigid SM1R... breaker - contactor connections.

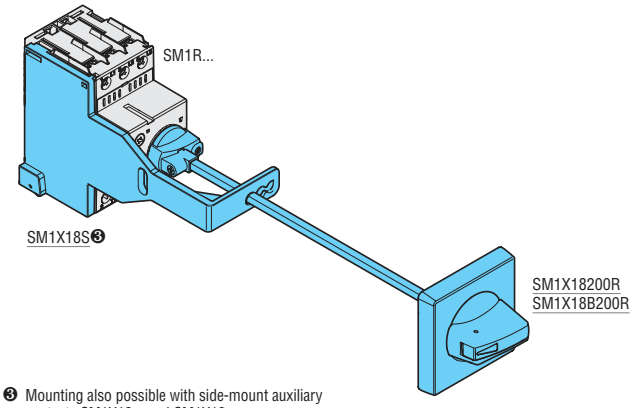






❶ For BF09A...BF25A contactors.
❷ For BF09D...BF25D and BF09L...BF25L contactors.

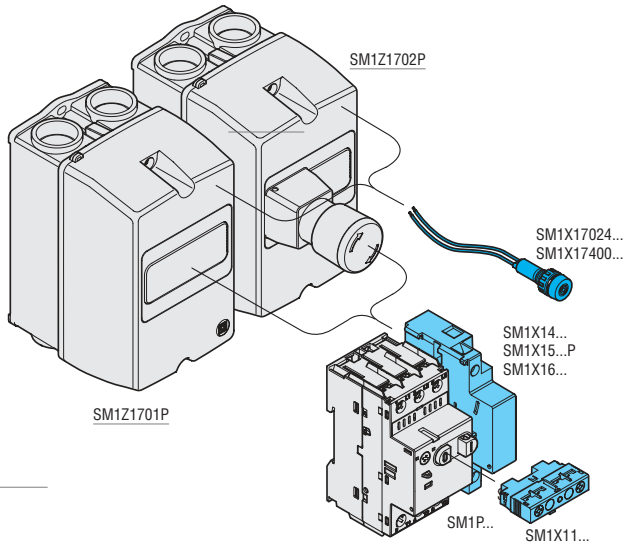
Padlockable door coupling handle.



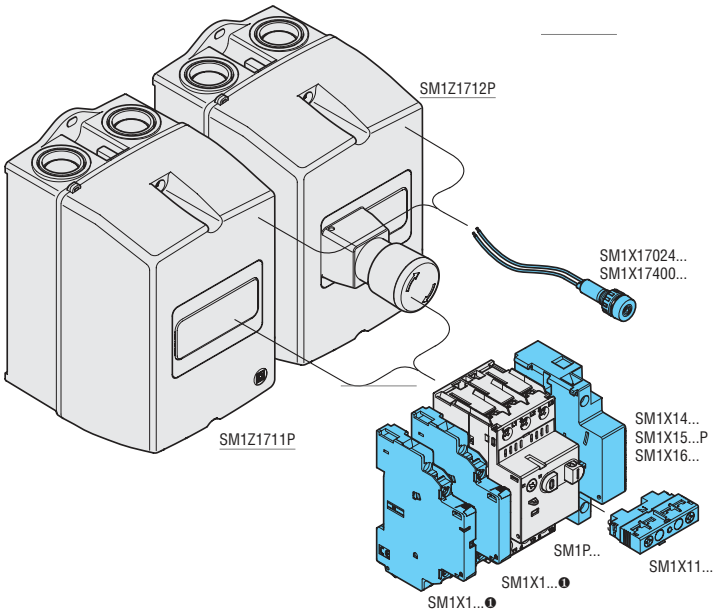
❸ Mounting also possible with side-mount auxiliary contacts SM1X12... and SM1X13...

Combinations

Surface mount enclosures for SM1P... Width 80mm.

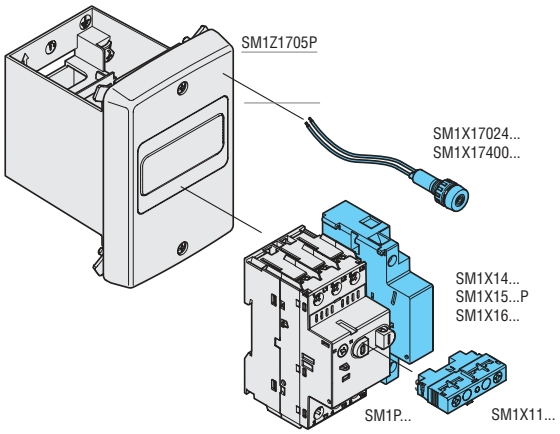


Surface mount enclosures for SM1P... Width 100mm.

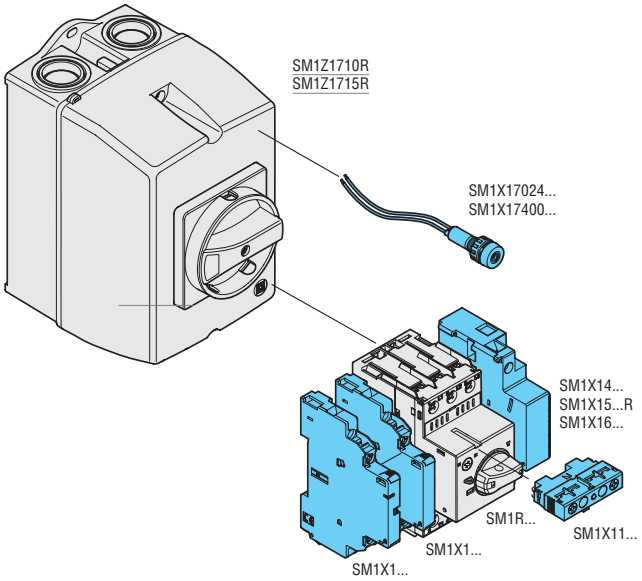


❶ Contacts for magnetic tripping indication SM1X1311M when mounted in SM1Z1711P and SM1Z1712P, can't be mounted alone, but shall be mounted in combination with SM1X12... on SM1X1311.

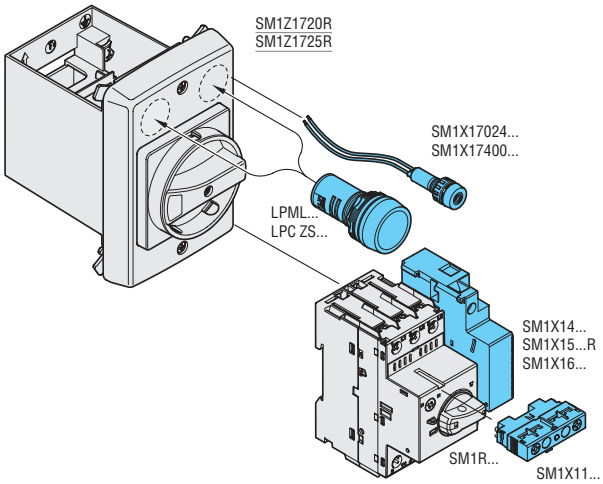
Flush mount enclosures for SM1P... Width 87mm/3.42".



Surface mount enclosures for SM1R... Width 100mm/3.94".

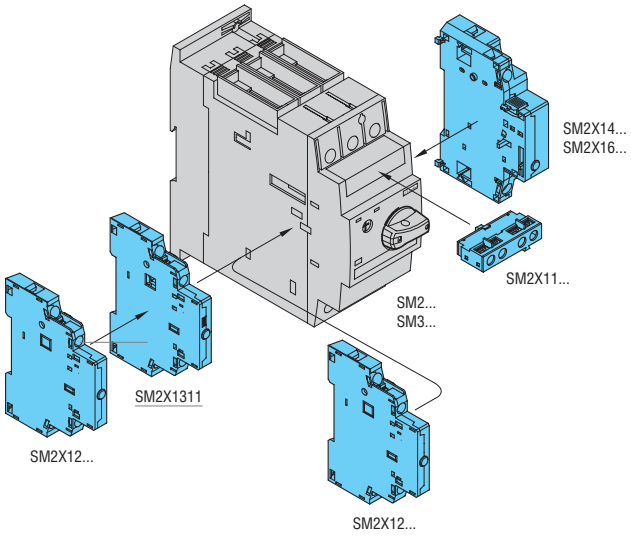


Flush mount enclosures for SM1R... width 87mm/3.42".

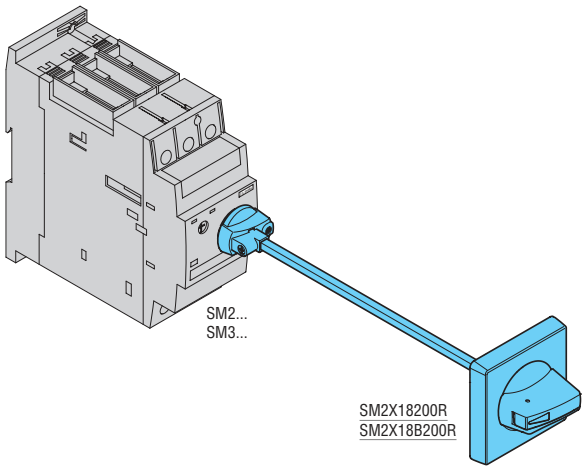


Combinations

Combinations of SM2... and SM3... motor protection circuit breakers.

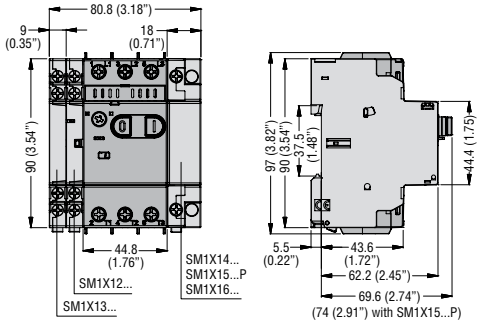


Padlockable door coupling handle.

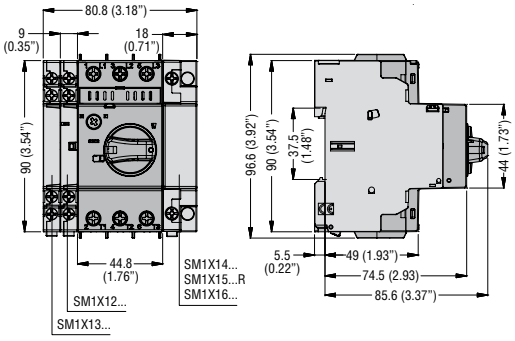


Motor protection circuit breakers
Dimensions [mm (in)]

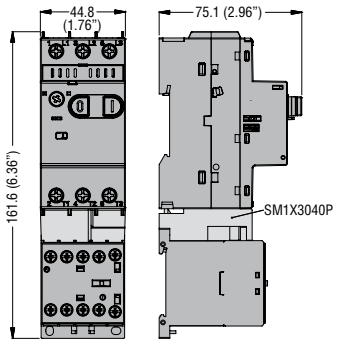
SM1P... with side-mount auxiliary contacts



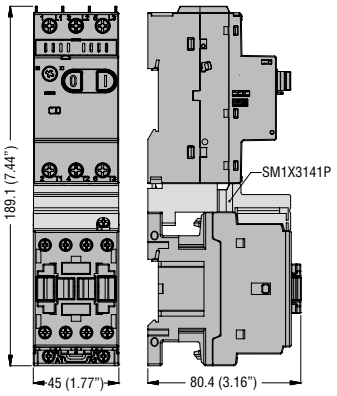
SM1R... with side-mount auxiliary contacts



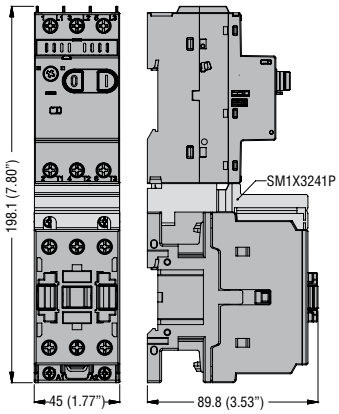
SM1P... with BG... mini-contactors and connection **SM1X3040P**



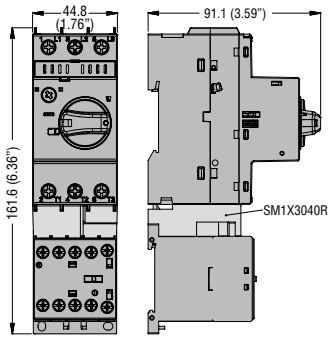
SM1P... with BF09 A...BF25 A... contactors and connection **SM1X3141P**



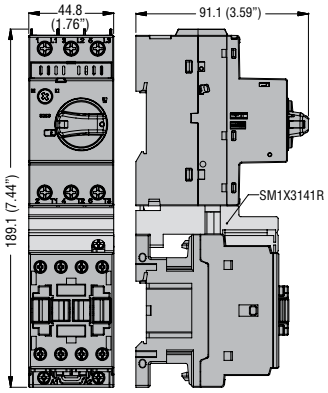
SM1P... with BF26 A...BF38 A... contactors and connection **SM1X3241P**



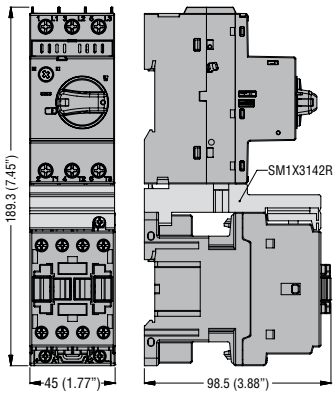
SM1R... with BG... mini-contactors and connection **SM1X3040R**



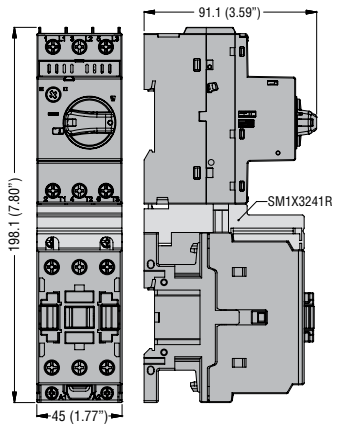
SM1R... with BF09 A...BF25 A... contactors and connection **SM1X3141R**



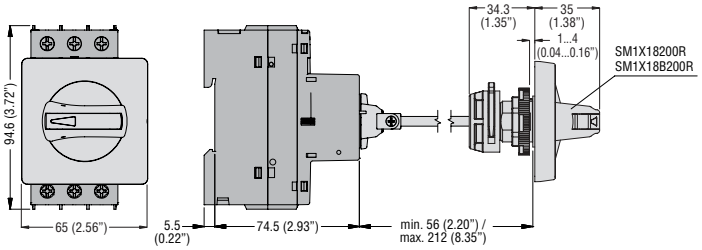
SM1R... with BF09 D...BF25 D... contactors BF09 L...BF25 L... and connection **SM1X3142R**



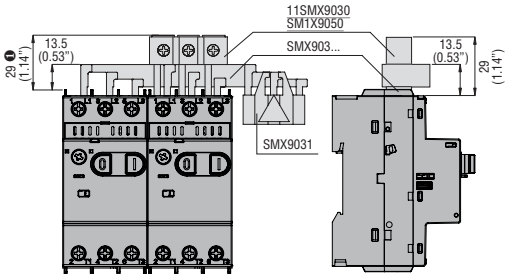
SM1R... with BF26 A...BF38 A... contactors and connection **SM1X3241R**



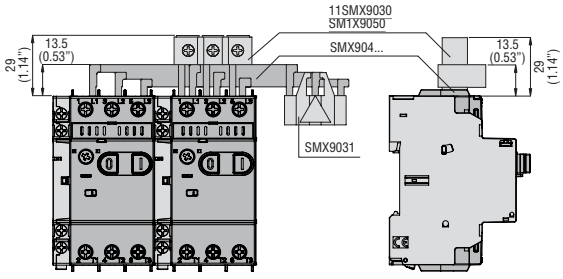
SM1R... padlockable door coupling handle **SM1X18200R** or **SM1X18B200R**



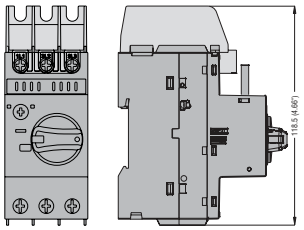
These elements mounted with **SM1… breakers**
without side-mount auxiliary contacts



These elements mounted with **SM1… breakers**
with side-mount auxiliary contacts **SMX12…** or **SMX13 11**

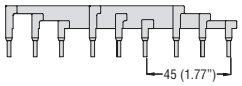


SM1X9000R

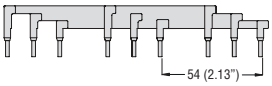


❶ 37mm (1.45") for SM1X9050

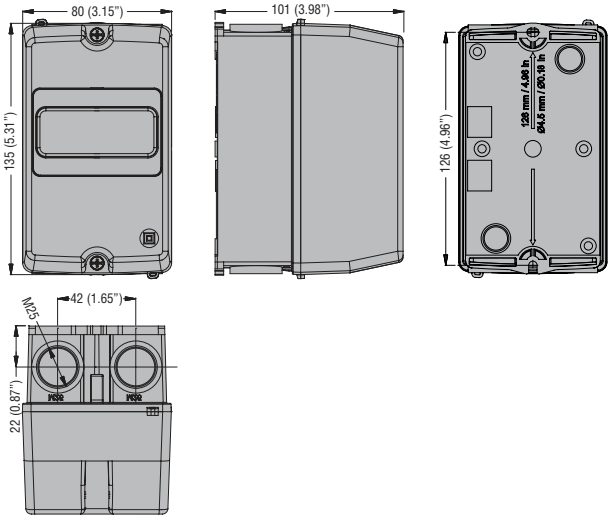
SMX9032 - SMX9033 - SMX9034 - SMX9035
Connection busbars – 45mm/1.77" spacing



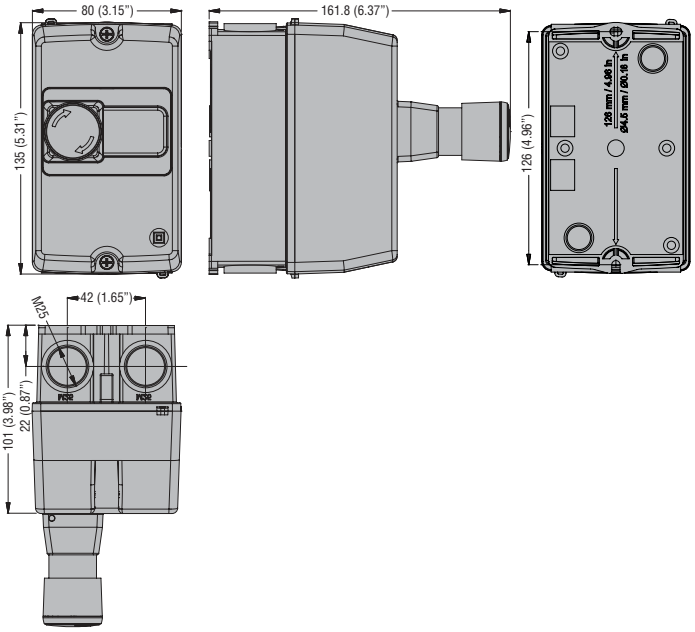
SMX9042 - SMX9043 - SMX9044 - SMX9045
Connection busbars – 54mm/2.13" spacing



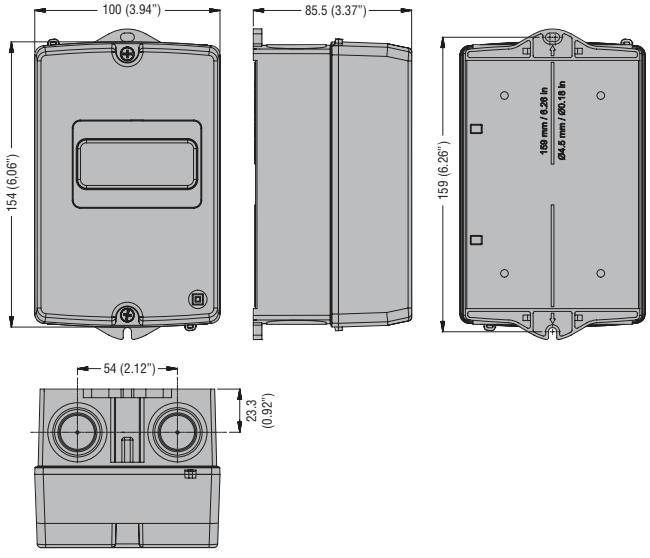
Enclosures **SM1Z1701P**



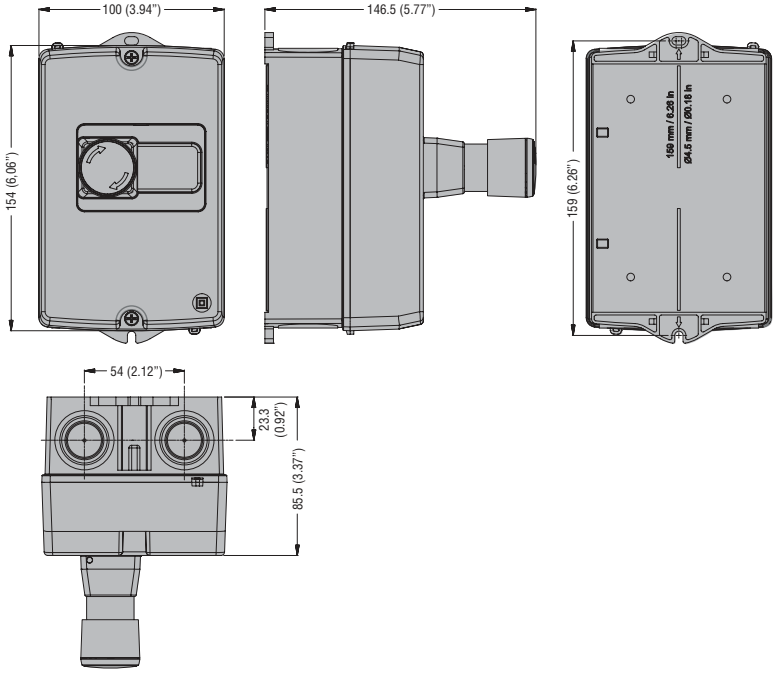
Enclosures **SM1Z1702P**



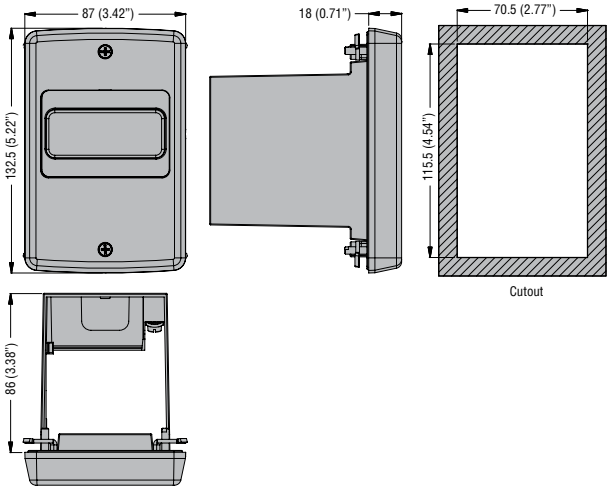
Enclosures **SM1Z1711P**



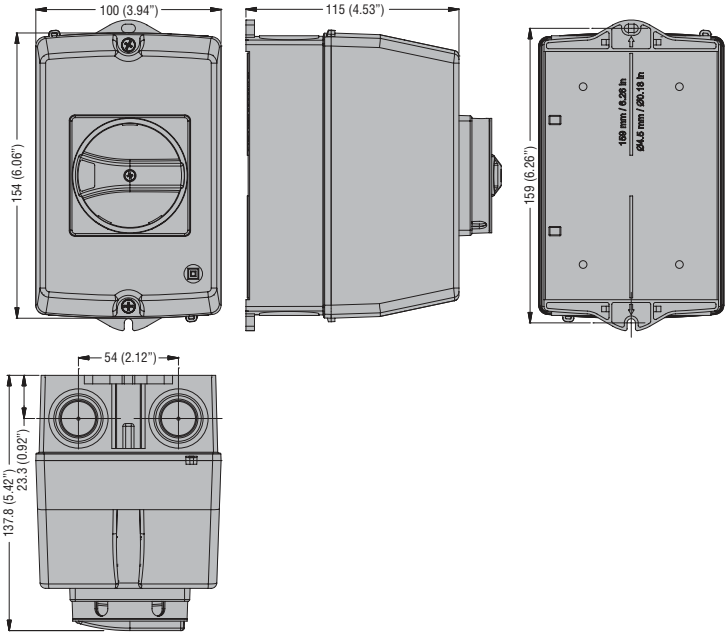
Enclosures **SM1Z1712P**



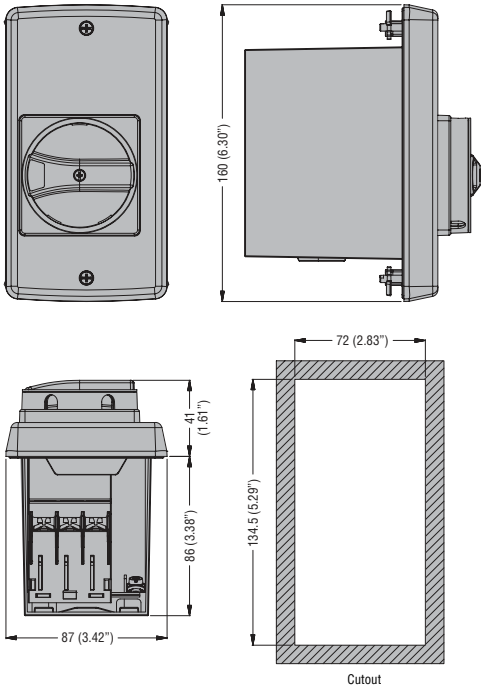
Enclosures SM1Z1705P



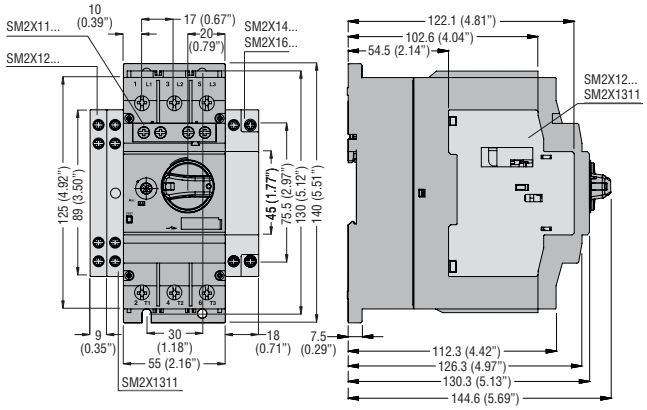
Enclosures SM1Z1715R and SM1Z1710R



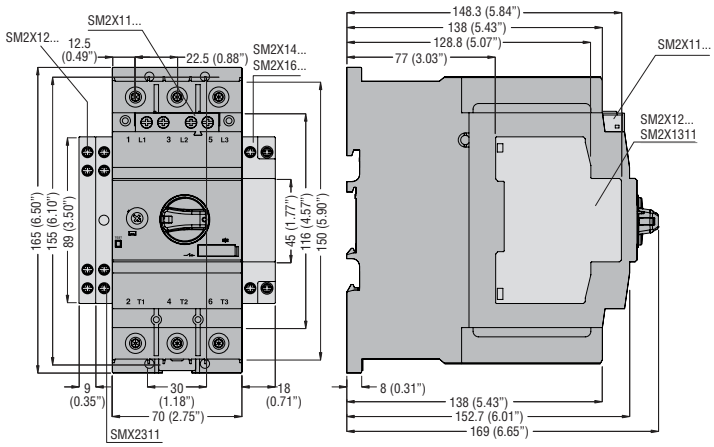
Enclosures SM1Z1720R and SM1Z1725R



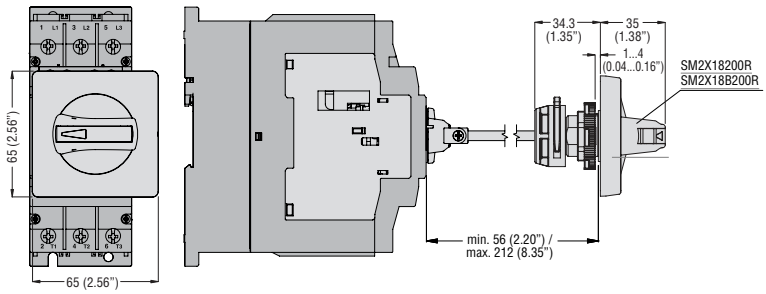
SM2… with side-mount auxiliary contacts



SM3… with side-mount auxiliary contacts



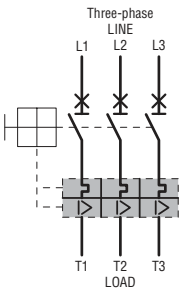
SM2… and **SM3…** padlockable door coupling handle
SM2X18200R or **SM2X18B200R**



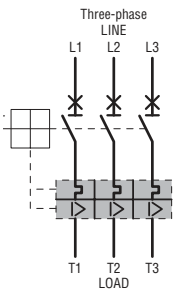
Wiring diagrams

MOTOR PROTECTION CIRCUIT BREAKERS

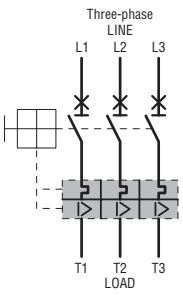
SM1P…



SM1R… - SM1RT… - SM2R… - SM3R… - SM1RE…

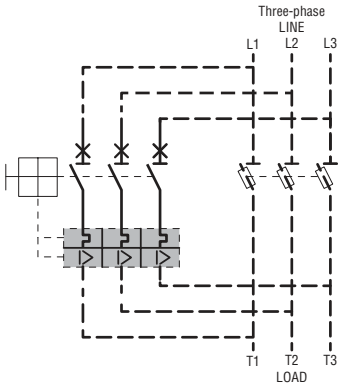


SM1RM…

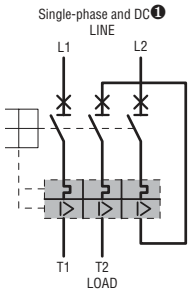


CIRCUIT BREAKERS

SM1PF…



For all motor protection circuit breakers

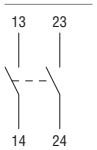


❶ Consult our Technical support for DC use.

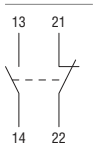
ADD-ON BLOCKS

For SM1... types
Front mount auxiliary contacts

SM1X1120

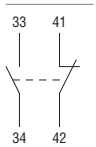


SM1X1111

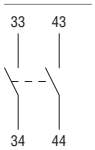


Side mount auxiliary contacts

SM1X1211

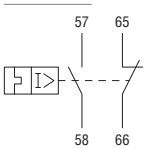


SM1X1220

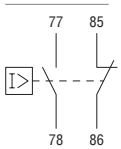


SM1X1202

SM1X1311



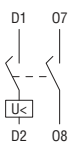
SM1X1311M



Side mount undervoltage trip releases

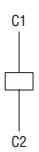
SM1X14…

SM1X15…



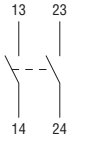
Side mount shunt trip release

SM1X16…

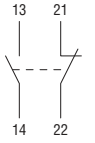


For SM2R... and SM3R... types
Front mount auxiliary contacts

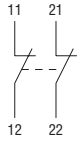
SM2X1120



SM2X1111

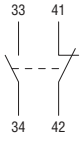


SM2X1102

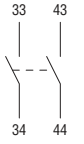


Side mount auxiliary contacts

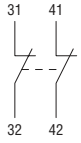
SM2X1211



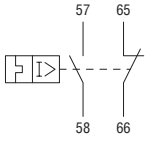
SM2X1220



SM2X1202



SM2X1311

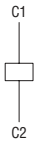


Side mount undervoltage trip release

SM2X14…

Side mount shunt trip release

SM2X16…



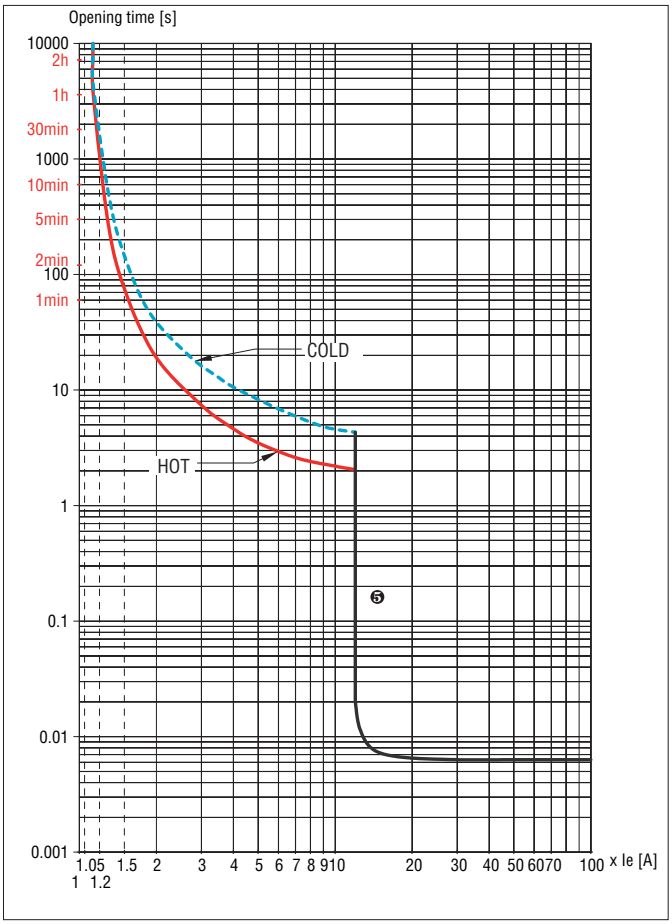
TYPE			SM1P...	SM1R...- SM1RM...	SM1RT...	SM2R...	SM3R...
Rated insulation voltage Ui		V	690			1000	
Rated impulse withstand voltage Uimp		kV	6				
Rated frequency		Hz	50/60Hz				
Maximum rated current		A	40	40	25	63	100
Number of adjustment ranges		No.	16	16	14	2	3
Total power dissipation at maximum current		W	2.1...18.3	2.1...18.3	2.1...10.2	6.1...21	5.4...18
Magnetic tripping		A	13 x In❶	13 x In max❷	20 x In max❸	13 x In	13 x In
Mechanical life		cycles	100,000	100,000	100,000	50,000	50,000
Electrical life (Ie max AC3)		cycles	100,000	100,000	100,000	25,000	25,000
Terminal tightening torque		Nm	2.5...3	2.5...3	2.5...3	3...4,5	4...6
		lb.in	22...26.5	22...26.5	22...26.5	36	53
		Tool	PH2	PH2	PH2	PZ2	Allen 4mm
Conductor section minimum and maximum (1 or 2 wires)	AWG	No.	16...8	16...8	16...8	18...3	10...1/0
Flexible without lug		mm^2	1...10	1...10	0.75...25	0.75...25	10...50
AMBIENT CONDITIONS							
Temperature	operating	°C	-20...+60❹	-20...+60❹	-20...+60❹	-20...+70❹	-20...+70❹
	storage	°C	-50...+80	-50...+80	-50...+80	-50...+80	-50...+80
	compensation	°C	-20...+50	-20...+50	-20...+50	-5...+40	-5...+40
Maximum altitude		m	3000				
Mounting position			Any				
Fixing			On 35mm DIN rail or screw via accessory			On 35mm DIN rail or screw	

E.g. PH = Phillips; PZ = Pozidriv; Allen is metric type.

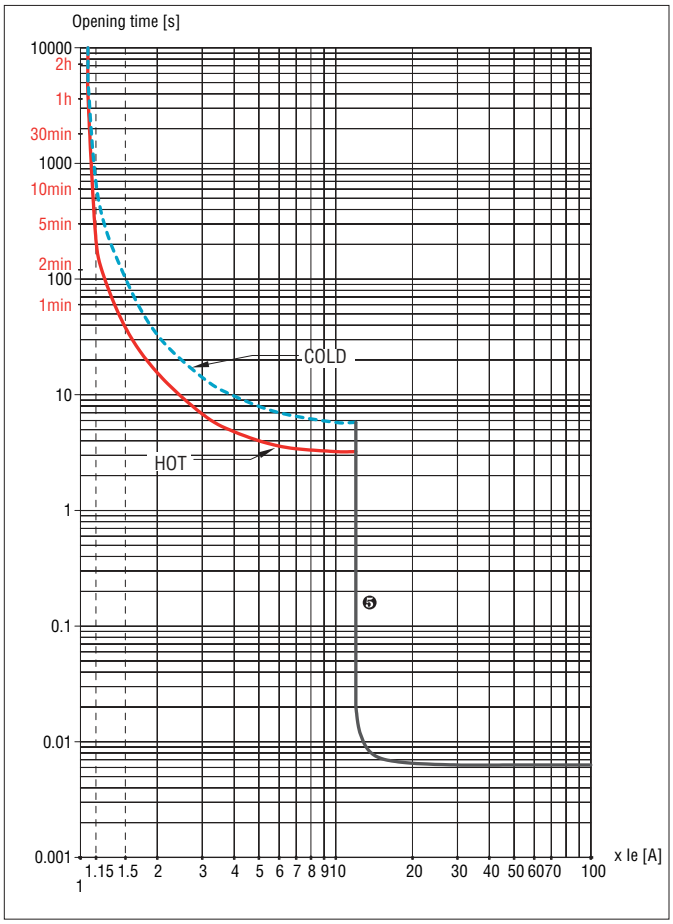
❶ SM1PF0020 has a single 0.2A thermal adjustment and magnetic tripping at 6 x In (1.2A).
❷ 10 x In max for 0.1...0.16A and 0.16...0.25A setting ranges.
❸ 16 x In max for 0.1...0.16A setting range.
❹ When fitting more than one breaker side by side, without leaving space between each to consent free air circulation on the breaker sides, and have simultaneous operation, the thermal trip adjuster must be positioned at a value 15% higher than the rated motor current.

THERMAL TRIPPING CURVE (AVERAGE TIMES)

Three-phase balanced operation



Two-phase operation (phase failure/single phasing)



Tripping times can have a ±20% deviation with respect to the average tripping curve value above.
❺ 20 x Ie for SM1RT....

Contactors

- Three-pole versions up to 630A in IEC AC3 duty
- Four-pole versions up to 1600A in IEC AC1 duty
- Three-pole safety versions up to 38A (AC3).
- Versions for power factor correction up to 100kvar at 400VAC
- Four-pole versions with 2NO+2NC or 4NC main poles
- Versions for photovoltaic application
- Versions with AC, DC or AC/DC control
- Low-consumption versions with DC control circuit for control relays and 9-38A contactors in IEC AC3 duty
- Extensive choice of add-on blocks and accessories
- Certified by primary international authorities.

SEC. - PAGE

Contactors
Three-pole ..... 2 - 6
Four-pole ..... 2 - 10
Safety contactors ..... 2 - 14
Four-pole with 2NO and 2NC poles or 4NC poles ..... 2 - 16
For photovoltaic applications ..... 2 - 17
For power factor correction ..... 2 - 18
Control relays ..... 2 - 19

Add-on blocks and accessories
For BG series mini-contactors ..... 2 - 20
For BF series contactors ..... 2 - 22
For B series contactors ..... 2 - 32

Spare parts
AC coils for BF series contactors ..... 2 - 34
AC/DC and DC coils for BF series contactors ..... 2 - 35
AC/DC coils for B series contactors ..... 2 - 36
Main contacts for BF and B series contactors ..... 2 - 37
Arc chutes for BF and B series contactors ..... 2 - 37

Dimensions ..... **2 - 38**
Wiring diagrams ..... **2 - 53**
Technical characteristics ..... **2 - 58**

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THREE-POLE CONTACTORS

- IEC Ith ratings in AC1 duty at ≤40°C: 16 to 1600A
- IEC Ie ratings in AC3 440V duty: 6 to 630A
- IEC Power ratings in AC3 400V duty: 2.2 to 335kW
- UL/CSA ratings: 3 to 500HP at 480V and 600V
- AC, DC, AC/DC and DC low-consumption coil.

Page 2-10

FOUR-POLE CONTACTORS

- IEC Ith ratings in AC1 duty at ≤40°C: 20 to 1600A
- IEC Power ratings in AC1 400V duty: 14 to 950kW
- UL/CSA general use: 20 to 1000A
- AC, DC, AC/DC and DC low-consumption coil.

Page 2-14

SAFETY CONTACTORS

- IEC Ie ratings in AC3 440V duty: 9 to 38A
- IEC Power ratings in AC3 400V duty: 4.2 to 18.5kW
- UL/CSA ratings: 5 to 30HP at 480V and 600V
- AC and DC coil.

Page 2-16

FOUR-POLE CONTACTORS WITH 2NO+2NC MAIN POWER POLES AND WITH 4 NC POLES

- IEC Ith ratings in AC1 duty at ≤40°C: 20 to 115A for type 2NO+2NC
- UL/CSA general use: 20 to 115A
- IEC Ith ratings in AC1 duty at ≤40°C: 32 to 45A
- UL/CSA general use: 20 to 55A for 4NC types
- AC, DC, AC/DC and DC low-consumption coil.

Page 2-17

CONTACTORS FOR PHOTOVOLTAIC APPLICATIONS

- Operational current up to 165A (DC1 600V at ≤55°C with 4 NO poles in series) for photovoltaic applications.
- AC, and AC/DC coil.

Page 2-18

CONTACTORS FOR POWER FACTOR CORRECTION

- With limiting resistors included
- IEC Power ratings at 400V: 7.5 to 100kvar
- UL/CSA ratings: 9 to 100kvar at 480V; 10 to 125kvar at 600V
- AC coil.

Page 2-19

CONTROL RELAYS

- AC, DC and DC low-consumption coil
- Screw or Faston termination
- 4, 8 or 11 auxiliary contact composition.

IE3 READY

LOVATO Electric contactors are suitable for new motors with high IE3 efficiency values

Lovato electric

THE IDEAL SOLUTION!

CONTACTORS WITH REDUCED WIDTH

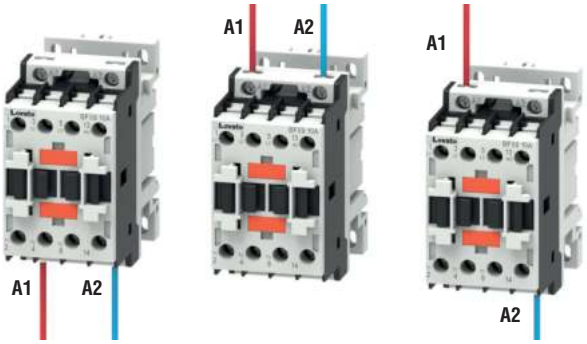
A considerable dimensional advantage in system design.
45mm width up to 38A in AC3 (18.5kW).
55mm width up to 95A in AC3 (45kW).
75mm width up to 150A in AC3 (75kW).

CONTACTORS WITH IDENTICAL WIDTH TO CIRCUIT BREAKERS

Dimensions in line with molded case circuit-breakers of the same current allows compact starters and facilitates the connection of power terminals.
105mm width up to 230A in AC3 (110kW).
140mm width up to 400A in AC3 (200kW).

4-TERMINAL COIL

For BF09...BF400 contactors, connecting cables can be coupled to the coil both on the line and load ends of the contactor.



ELECTRONIC COIL

Contactors from 40 to 400A AC3 can be equipped with AC/DC electronic coil with wide operating range.
Example: single 100 to 250V AC/DC coil.
They also offer low consumption in service and stability even in the presence of abnormal voltages.

BUILT-IN SURGE SUPPRESSOR

BF series contactors up to 150A AC3 with voltages in DC or AC/DC already have a built-in surge suppressor.

LOW-CONSUMPTION COILS

The BF...L contactors feature a 2.4W low consumption coil.
This characteristic widely allows their direct control by PLC outputs.

COILS WITH WIDE OPERATING RANGE

BF...D contactors are equipped with a wide operating range coil and are particularly useful in applications subject to considerable voltage variations, such as in electric traction railway equipment.

SUITABLE FOR AC-3e MOTOR CONTROL

All contactors comply with utilization category AC-3e referring to high-efficiency motors.

SAFETY VERSIONS

The BF series contactors up to 38A in AC3 are available with factory mounted auxiliary contacts with “Mirror contact” and “Mechanical linked contact” functions for the construction of ISO13849-1 and EN62061 compliant machines.

RAILWAY APPLICATIONS

Thanks to the compliance with IEC 61373 (shock and vibration) and EN 45545 (fire behaviour), LOVATO Electric contactors are suitable for railway applications. Consult Technical support for detailed information; see contact details on inside front cover.

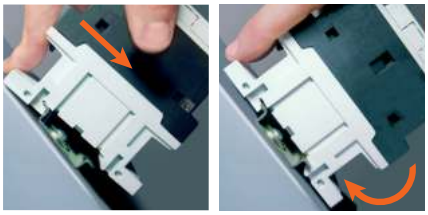
HOUSEHOLD AND COMMERCIAL APPLICATIONS

The plastic materials of the contactors comply with the EN 60335 standard typically applied in equipment for food industry and professional catering.
Consult Technical support for detailed information; see contact details on inside front cover.

PHOTOVOLTAIC APPLICATIONS

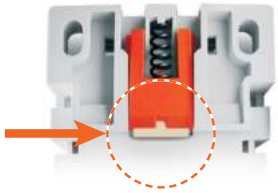
LOVATO Electric contactors are suitable for use in the various sections of the photovoltaic systems. In particular, there are specific contactors for use up to 1000VDC.

35MM DIN RAIL MOUNTING AND FIXING



Contactor mounting on and removal from a 35mm DIN rail are tool-less operations and are done by simply applying pressure on the contactor.

RUBBER PAD INSERT TO PREVENT DIN RAIL SLIDING

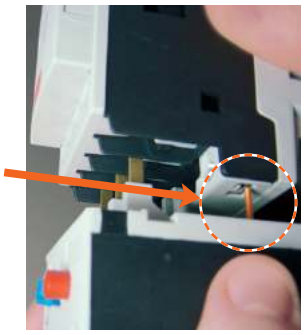


A rubber insert prevents the contactors from sliding on the 35mm DIN rail even when out of tolerance or mounted vertically.

SNAP-ON INSTALLATION

On the contactors, it's quick and easy to fit and remove auxiliary contacts and accessories, without using tools; the same applies to replacing the coil in the AC BF09...BF38 contactors.

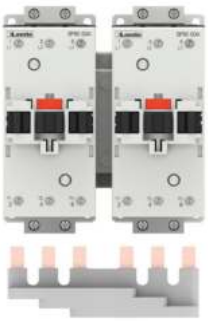
EFFORTLESS THERMAL OVERLOAD RELAY LINK RF38, RF82 AND RF110 TYPES



During the connection of the thermal overload relay to the contactor, its auxiliary contact is simultaneously linked to the contactor coil terminal rigid connector.
The complete overload relay fixing is obtained with one single operation and without other connections.

RIGID CONNECTION KITS FOR FAST WIRING WITHOUT MISTAKES

The assembly and wiring of electromechanical starters is extremely fast and reliable.
Versatile electrical and mechanical connecting systems provide easy and foolproof assembly of compact starters and changeovers.



Changeover

Reversing starter

Star-delta starter

BREAKER-CONTACTOR CONNECTIONS

The rigid connections between breaker and contactor allow complete compact starters to be created easily, quickly and with less space used in the panel.
It is fitted on a single DIN rail.

IP20 CONNECTION SECURITY

For BF09...BF38 contactors, the easy access and space for the terminals is combined with IP20 protection, preventing accidental contact with live parts.

IP20 ACCESSORY FOR CONTACTORS FROM 40A TO 150A AC3

IP20 protection can be obtained by adding a simple accessory.

SIDE ADD-ON FOURTH POLE

For the 45A to 165A AC1 ratings, a side-mount fourth power pole can be snapped on the three-pole contactor. This solution permits the optimisation of inventory.

MECHANICAL INTERLOCK

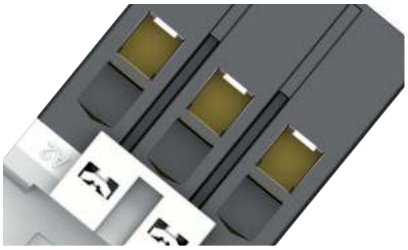
Various versions of mechanical interlock are available.
One type can be integrated in the contactors from 9 to 38A AC3 without increasing the overall dimensions.
They may have built-in contacts to also make the electrical interlock. The mounting position can be on the side or on the front of the contactors.

TERMINAL ADAPTABILITY

Terminals are suitable for every type of cable: flexible, rigid, according to AWG standards and interlocked with any type of cable terminal.
For BF09...BF38 contactors, a single type of screwdriver tightens the screws for the power contacts, auxiliary contacts and coil.

DOUBLE LUG TERMINALS

40 to 150A AC3 contactors are equipped with double lug terminals for easy, functional access for power cables.
It is extremely simple to create star-delta starters, reversing switches, changeovers and arrange parallel supply for several contactors.



INNOVATION IS CONTINUING....

AC/DC COIL WITH ELECTRONIC CONTROL

- Wide operating range: for example one single coil to cover 100...250VAC/DC range
- Low consumption during in-rush and in service
- No chattering in the event of irregular voltage
- Built-in surge suppressor filter.

COMPACT DIMENSIONS

- Three-pole contactors: 105mm width for currents up to 230A AC3 - 350A AC1 and 140mm for current up to 400A AC3 - 600A AC1
- Four-pole contactors: 140mm width for currents up to 350A AC1 and 185mm width for current up to 600A AC1
- Width identical with molded-case circuit breakers (MCCB) of equal current.

CONTACT STATUS FRONT VIEW

A front mechanical indicator allows to easily identify the status of the contacts.

HIGH POWER TERMINALS FOR EASY AND SAFE WIRING

High power terminals to ensure a safe isolation distance from the panel in case of wiring with double terminals or bars for parallel or changeover.

SIDE-MOUNTING AUXILIARY CONTACTS

Useful in the event that the panel depth may be critical. Up to 8 auxiliary contacts can be mounted.

FRONT-MOUNT AUXILIARY CONTACTS

Up to 6 NO or NC auxiliary contacts (up to 8 contacts on 4 pole version), with screw terminals, can be mounted without side dimensions increasing.

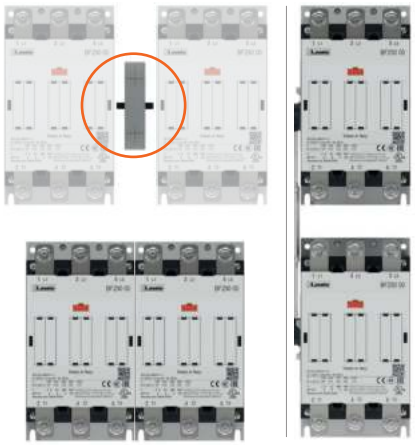
4-TERMINAL COIL

You can connect the connection cables to the coil either from the top or the bottom of the contactors.

The coil terminals are easy to reach with the screwdriver as they are interspersed with the power terminals.

HORIZONTAL AND VERTICAL INTERLOCK

Horizontal interlock with concealed mounting does not increase the dimensions.



POWER TERMINAL PROTECTIONS PHASE BARRIERS.

They guarantee the separation and protection of the power terminals and adjacent phases separation.

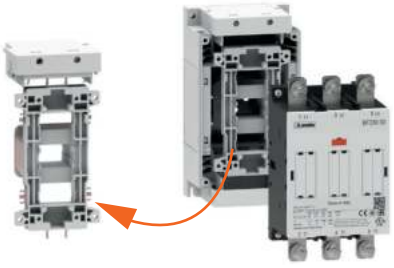
TERMINAL ENLARGEMENT

Extend the terminal pitch to allow easy wiring of standard flange lugs for large cable cross-sections.

CAPTIVE NUT

Accessory that allows even easier wiring of the terminals using a single wrench.

EASY COIL AND POWER CONTACTS REPLACEMENT



BG series mini-contactors

- AC and DC versions of same size
- Quick connect - snap on accessory mounting
- Distinct contact status indication
- Up to four auxiliary contacts can be mounted
- Mechanical interlock only 5mm depth
- Three-pole mini-contactors, 6 to 12A IEC AC3 duty / 3 to 7.5HP 480V - 3 to 10HP 600V UL/CSA
- Four-pole mini-contactors, 20A IEC AC1 duty
- Versions with 2NO+2NC main power poles
- Highly conductive auxiliary contacts with four contact points
- Coils with AC or DC supply
- Low-consumption DC versions
- Screw, Faston and rear PCB solder pin termination.

	3 poles			4 poles		
	Ie (AC3)	AC	DC	Ith (AC1)	AC	DC
BG06	6A	●	●	—	—	—
BG09	9A	●	●	20A	●	●
BGF09	9A	●	●	20A	●	●
BGP09	9A	●	●	20A	●	●
BG12	12A	●	●	—	—	—

BF series contactors

- Quick connect - snap on accessory mounting
- Distinct contact status indication
- Up to 12 auxiliary contacts can be mounted
- Mechanical interlock without overall dimensions increasing
- Three-pole contactors, 9 to 400A IEC AC3 duty / 5 to 150HP 480V - 7.5 to 200HP 600V UL/CSA
- Four-pole contactors, 25 to 600A in AC1 duty
- Three-pole safety contactors, 9 to 38A duty / 30HP 480V/600V UL/CSA
- Power factor correction contactors, 7.5 to 100kvar at 400V IEC / 9 to 110kvar at 480V UL/CSA
- Types with 2NO+2NC or 4NC main power poles
- Types for photovoltaic applications
- Highly conductive auxiliary contacts
- Coils with AC or DC supply
- Wide-range coils with electronic control for contactors from 40 to 400A AC3
- Low-consumption versions for control relays and 9-38A contactors in IEC AC3 duty.
- Screw terminals.

❶ Low-consumption version.
❷ Wide-range coil with electronic control.

		3 poles with coil type:			
	Ie (AC3)	AC	DC	DC❶	AC/DC❷
BF09	9A	●	●	●	—
BF12	12A	●	●	●	—
BF18	18A	●	●	●	—
BF25	25A	●	●	●	—
BF26	26A	●	●	●	—
BF32	32A	●	●	●	—
BF38	38A	●	●	●	—
BF40	40A	●	—	—	●
BF50	50A	●	—	—	●
BF65	65A	●	—	—	●
BF80	80A	●	—	—	●
BF94	95A	●	—	—	●
BF95	95A	●	—	—	●
BF115	115A	●	—	—	●
BF150	150A	●	—	—	●
BF160	160A	—	—	—	●
BF195	195A	—	—	—	●
BF230	230A	—	—	—	●
BF265	265A	—	—	—	●
BF330	330A	—	—	—	●
BF400	400A	—	—	—	●

		4 poles with coil type:			
	Ith (AC1)	AC	DC	DC❶	AC/DC❷
BF09	25A	●	●	●	—
BF12	28A	●	—	—	—
BF18	32A	●	●	●	—
BF26	45A	●	●	●	—
BF38	56A	●	●	●	—
BF40	70A	●	—	—	—
BF50	90A	●	—	—	—
BF65	100A	●	—	—	●
BF80	115A	●	—	—	●
BF95	140A	●	—	—	●
BF115	160A	●	—	—	●
BF150	165A	●	—	—	●
BF160	250A	—	—	—	●
BF195	275A	—	—	—	●
BF230	350A	—	—	—	●
BF265	450A	—	—	—	●
BF330	500A	—	—	—	●
BF400	600A	—	—	—	●

B series contactors

- Coil operates indifferently on AC or DC supply voltage
- Coil with low in-rush and holding
- Coil removable without disconnecting power wiring
- Red indicator when contactor is energised
- Safety feature prevents contactor to be energised without arc chute in place and locked
- Convertible auxiliary contact block (2NO + 1NC or 1NO + 2NC), maximum of 4 blocks per contactor for a total of 12 contacts
- Contactor terminals with bolt, washer and nut
- Simple horizontal or vertical interlock
- Three-pole contactors, 520A to 630A IEC AC3 duty
- Four-pole contactors, 700A to 1600A IEC AC1 duty
- 100 to 500HP 600V UL/CSA
- Coils with AC/DC supply
- Screw termination.

	3 poles			4 poles		
	Ie (AC3)	AC	AC/DC	Ith (AC1)	AC	AC/DC
B500	520A	—	●	700A	—	●
B630	630A	—	●	800A	—	●
B6301000	❶	—	●	1000A	—	●
B1250	❶	●	—	1250A	●	—
B1600	❶	●	—	1600A	●	—

❶ For AC1 / general use duty only.

BG06A...BG12A

BF09A...BF25A

BF26A...BF38A

BF40A...BF94A

BF95A...BF150A

BF160E...BF230E

new

BF265E...BF400E

	General use			Three-phase motor control in AC-3/AC-3e duty								UL/CSA details					
Order code	IEC operating current Ith (AC1)			Ie (AC3)	Maximum IEC power at ≤55°C (AC-3/AC-3e)							Maximum UL/CSA horsepower ratings					
												Single phase		Three phase			
AC coil	≤40°C	≤55°C	≤70°C	≤440V at ≤55°C	230V	400V	415V	440V	500V	690V	1000V	120V	240V	200V	240V	480V	600V
	[A]	[A]	[A]	[A]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]	[HP]	[HP]	[HP]	[HP]	[HP]	[HP]
11BG0601A❶	16	14	12	6	1.5	2.2	2.4	2.5	3	3	—	1/3	1	1 1/2	2	3	3
11BG0610A❶																	
11BG0901A❶	20	18	15	9	2.2	4	4.3	4.5	5	5	—	1/2	1 1/2	2	3	5	5
11BG0910A❶																	
11BGF0901A❶	20	18	15	9	2.2	4	4.3	4.5	5	5	—	1/2	1 1/2	2	3	5	5
11BGF0910A❶																	
11BGP0901A❶	20	18	15	9	2.2	4	4.3	4.5	5	—	—	1/2	1 1/2	2	3	5❼	—
11BGP0910A❶																	
11BG1201A❶❷	20	18	15	12	3.2	5.7	6.2	5.5	5	5	—	1/2	1 1/2	3	3	7 1/2	10
11BG1210A❶❷																	
BF0901A❶❷	25	20	18	9	2.2	4.2	4.5	4.8	5.5	7.5	—	3/4	2	3	3	5	7 1/2
BF0910A❶❷																	
BF1201A❶❷	28	23	20	12	3.2	5.7	6.2	6.2	7.5	10	—	1	2	5	5	7 1/2	10
BF1210A❶❷																	
BF1801A❶❷	32	26	23	18	4	7.5	9	9	10	10	—	1	3	5	5	10	15
BF1810A❶❷																	
BF2501A❶	32	26	23	25	7	12.5	13.4	13.4	15	11	—	2	3	7 1/2	7 1/2	15	15
BF2510A❶																	
BF2600A❶❷	45	36	32	26	7.3	13	14	14	15.6	18.5	—	2	5	7 1/2	7 1/2	15	20
BF3200A❶❷	56	45	40	32	8.8	16	17	17	20	22	—	3	7 1/2	10	10	20	25
BF3800A❶	56(60❿)	45(48❿)	40(42❿)	38	11	18.5	18.5	18.5	20	22	—	3	7 1/2	10	15	30	30
BF4000A❶	70	60	50	40	11	18.5	22	22	22	30	22	3	7 1/2	10	15	30	40
BF5000A❶❷	90	75	65	50	15	22	30	30	30	37	30	5	10	15	20	40	40
BF6500A❶❷	100	80	70	65	18.5	30	37	37	37	45	30	—	—	20	25	50	60
BF8000A❶❷	115	95	80	80	22	45	45	45	55	55	37	—	—	25	30	60	75
BF9400A❶	115	95	80	95	30	55	55	55	55	55	37	—	—	25	30	60	75
BF9500A❶	140	115	100	95	30	55	55	55	75	90	45	—	—	30	30	60	75
BF11500A❶	160	130	115	115	37	55	55	55	75	110	55	—	—	40	40	75	100
BF15000A❶	165	135	118	150	45	75	75	75	90	110	55	—	—	50	50	100	125
BF16000E❽	250	210	180	160	45	75	90	90	110	132	75	—	—	50	60	125	150
BF19500E❽	275	230	200	195	55	90	110	110	132	160	110	—	—	60	75	150	150
BF23000E❽	350	290	250	230	55	110	110	132	132	160	132	—	—	75	75	150	200
BF26500E❽	450	375	325	265	75	132	132	160	160	200	160	—	—	75	100	200	250
new **BF33000E❽**	500	415	360	330	90	160	160	160	200	250	200	—	—	100	125	250	300
BF40000E❽	600	500	435	400	110	200	200	200	250	315	220	—	—	125	150	350	400
11B50000❷❸	700	550	500	520	156	290	306	328	367	416	312	—	—	150❶	200❶	400❶	450❶
11B63000❷❸	800	640	540	630	198	355	368	368	368	440	368	—	—	200❶	250❶	500❶	500❶
11B6301000000❷❺	1000	850	700	—	For AC1/Resistive duty only. see page 2-10.							—	—	—	—	—	—
11B125024❺❻	1250	1050	880	—	For AC1/Resistive duty only. see page 2-10.							No UL	—	—	—	—	—
11B160024❺❻	1600	1360	1120	—	For AC1/Resistive duty only. see page 2-10.							No UL	—	—	—	—	—

❶ Complete order code with coil voltage digit or with voltage digit followed by 60 (if 60Hz).
Standard voltages are as follows:
– AC 50/60Hz 024 / 048 / 110 / 230 / 400V
– AC 60Hz 024 60 / 048 60 / 120 60 / 220 60 / 230 60 / 460 60 / 575 60 (V).
Example: 11BG0610A230 for mini-contactor BG06, three-poles, with one NO contact and 230VAC 50/60Hz coil.
11BG0610A460 60 for mini-contactor BG06 with one NO contact and 460VAC 60Hz coil.

❷ The coil of the contactor can be powered indifferently in AC or DC. Complete the order code only with the digit of the coil voltage. Standard voltages are:
– AC/DC 24 / 48 / 60 / 110-125 (indicate 110) / 220-240 (indicate 220) / 380-415 (indicate 380) / 440-480V (indicate 440).
Example: 11B50000110 for contactor B500, three-poles, without auxiliary contacts and with 110-125VAC/DC coil.
Other voltages available on request.

❸ If predisposed for mechanical latch (G495), the order code becomes 11B...SL00 ❷.
If already fitted with mechanical latch (G495), the order code becomes 11B...L00 ❷ ❹.

❹ Indicate rated voltage of the mechanical latch, preceded by the letter C if in DC. Available voltages are:
– AC 50/60Hz 48 / 110-125 indicate 110 / 220-240 indicate 220 / 380-415V indicate 380
– DC 48 / 110-125 indicate 110 / 220-240V indicate 220.
Example: 11B500L00110220 for contactor B500 without auxiliary contacts, with 110-125VAC/DC coil and mechanical latch powered at 220-240VAC.

❺ G495 mechanical latch cannot be mounted.

❻ Complete the order code with the digit of the coil voltage. For 110-125VAC (50/60Hz) indicate 110 or 220-240VAC (50/60Hz) indicate 220.
Example: 11B125024110 for contactor B1250, three-poles, with 2NO+4NC auxiliary contacts and 110-125VAC 50/60Hz coil.

❼ Maximum voltage is limited at 300V for UL. For certified type up to 600V, consult Technical support for information; see contact details on inside front cover.

❽ For voltages 024 / 230 / 400VAC 50-60Hz: 10 pieces/package.
For all other voltages: 1 piece/package.

❾ Highly conductive auxiliary contact.

Contactors

Three-pole contactors with AC control circuit

B500-B630

B6301000

B1250-B1600

		UL/CSA Short-circuit protection fuse, 600V⓬								
	UL/CSA General (purpose) use	High fault		Standard fault		Type of terminal	Incorpor. auxiliary contacts		Qty per pkg	Wt
		Short circuit current	Fuse	Short circuit current	Fuse					
	[A]	[kA]	[A]	[kA]	[A]		NO	NC	n°	[kg]
	16	100	30 (J)	5	30	Clamp-screw	—	1⓳	10	0.180
							1⓳	—	10	0.180
	20	100	30 (J)	5	30	Clamp-screw	—	1⓳	10	0.180
							1⓳	—	10	0.180
	20	100	30 (J)	5	30	Faston	—	1⓳	10	0.180
							1⓳	—	10	0.180
	20	100	30 (J)	5	30	Rear PCB solder pin	—	1⓳	10	0.197
							1⓳	—	10	0.197
	20	100	30 (J)	5	30	Clamp-screw	—	1⓳	10	0.180
							1⓳	—	10	0.180
	25	100	30 (J)	5	60	Clamp-screw	—	1⓳	1	0.367
							1⓳	—	❽	0.367
	28	100	30 (J)	5	70	Clamp-screw	—	1⓳	1	0.367
							1⓳	—	❽	0.367
	32	100	60 (J)	5	80	Clamp-screw	—	1⓳	1	0.367
							1⓳	—	❽	0.367
⓯	32	100	60 (J)	5	100	Clamp-screw	—	1⓳	1	0.367
							1⓳	—	❽	0.367
	45	100	100 (J)	5	100	Clamp-screw	—	—	1	0.437
	55	100	100 (J)	5	125	Clamp-screw	—	—	1	0.437
	55	100	100 (J)	5	150	Clamp-screw	—	—	1	0.437
	70	100	150 (J)	5	150 (RK5)	Double lug-clamp	—	—	1	1.020
	90	100	150 (J)	5	150 (RK5)	Double lug-clamp	—	—	1	1.020
	100	100	200 (J)	10	200 (RK5)	Double lug-clamp	—	—	1	1.020
	115	100	200 (J)	10	200 (RK5)	Double lug-clamp	—	—	1	1.020
	115	100	200 (J)	10	200 (RK5)	Double lug-clamp	—	—	1	1.020
	140	100	200 (J)	10	250 (RK5)	Double lug-clamp	—	—	1	2.020
	160	100	200 (J)	10	250 (RK5)	Double lug-clamp	—	—	1	2.020
	165	100	200 (J)	10	250 (RK5)	Double lug-clamp	—	—	1	2.020
	250	100	400 (J)	10	400 (RK5)	Screw-nut	—	—	1	3.000
	275	100	400 (J)	10	400 (RK5)	Screw-nut	—	—	1	3.000
	350	100	400 (J)	10	400 (RK5)	Screw-nut	—	—	1	3.000
	450	100	600 (J)	18	600 (RK5)	Screw-nut	—	—	1	4.600
	500	100	600 (J)	18	600 (RK5)	Screw-nut	—	—	1	4.600
	600	100	600 (J)	18	600 (RK5)	Screw-nut	—	—	1	4.600
	700	—	—	18⓫	1200 (L)	Screw-nut	—	—	1	18.000
	800	—	—	18⓫	1500 (L)	Screw-nut	—	—	1	18.620
	1000	—	—	18⓫	1500 (L)	Screw-nut	—	—	1	21.400
	No UL	—	—	—	—	Screw-nut	2	4	1	48.000
	No UL	—	—	—	—	Screw-nut	2	4	1	50.000

⓾ For use at this other current value, a 16mm² cable, headed with a fork terminal, must be used.
⓫ No UL/CSA ratings; data given for indication and reference purposes only.
⓬ Definite-purpose (DP) contactors are available. Consult Technical support for information; see contact details on inside front cover.
⓭ The contactor coil is controlled electronically; it can have either an AC or a DC supply and has a wide operating range.
Complete the order code only with the digit of the coil voltage.
Standard voltages are:
– AC/DC 024 = 24...60VAC/20...60VDC; 110 = 60...130VAC/DC; 230 = 100...250VAC/DC; 400 = 250...500VAC/DC.
⓮ The values in brackets indicate the class of the fuse to be used.
Where there is no value in brackets, any type of fuse can be used.
For protection with motor protection circuit breaker (type F combination motor controller) see chapter 1.

Certifications and compliance

Certifications obtained:

Type	cULus	UL	CSA	EAC	CCC	RINA
BG06A	●			●	●	
BG09A	●			●	●	
BG12A	●			●	●	
BGF09A	●			●	●	
BGP...A❼	●			●	●	
BF09A	●		●	●	●	●
BF12A	●		●⓯	●	●	●
BF18A	●		●	●	●	●
BF25A	●		●⓯	●	●	●
BF26A	●		●	●	●	●
BF32A	●		●	●	●	●
BF38A	●		●⓯	●	●	●
BF40A	●			●	●	●
BF50A	●			●	●	●
BF65A	●⓯			●	●	●
BF80A	●			●	●	●
BF94A	●					
BF95A	●⓯					●
BF115A	●⓯					●
BF150A	●⓯					●
BF160	●			●	●	
BF195	●			●	●	
BF230	●			●	●	
BF265	●			⓰	⓰	
BF330	●			⓰	⓰	
BF400	●			⓰	⓰	
B500	●			●		
B630	●			●		
B6301000	●			●		
B1250				●		
B1600				●		

● Certified products.

UL - UL Listed, for USA and Canada (cULus - File E93602) for BG... and BF09...BF400 types indicated, as Motor Controllers – Contactors, except for BGP09... types which are UL Recognized, for USA and Canada (File E93602 – Component - Products having this type of marking are intended for use as components of complete workshop-assembled equipment).
BGP is UL rated up to 300V; for type with rating up to 600V, consult Technical support for information – see contact details on inside front cover.
UL Listed for USA and Canada (cULus - File E172189) for B500... B6301000 and B500SL... B630SL types as Industrial Control Switches.

CSA - BF09...BF95 contactors are also CSA certified, for Canada only (File 54332).
In addition, BF12..., BF25... and BF38... types are CSA certified as "Elevator Equipment" (File 54332, class 2411); BF65..., BF95..., BF115... and BF150... are UL certified as "Elevator Equipment (File E 93602). See technical characteristics on page 2-72.

⓯ This contactor has also achieved elevator equipment certification.
⓰ Pending.

Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, UL508, CSA C22.2 n° 14; UL 60947-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.
Plastic materials are compliant with standards IEC/EN/BS 60335; for all BF09...BF38 versions only, add suffix V260 to the standard product order code.
Example: BF0910A230V260 for BF09, three-poles, with one NO contact and 230V 50/60Hz coil with compliant plastic materials.
Note: The contactors that have incorporated NC auxiliary contacts comply with annex F of the IEC/EN/BS 60947-4-1 standard "auxiliary contact linked with power contact" also known as mirror contacts.

BG06D…BG12D
BG09L

BF09D…BF25D
BF09L…BF25L

BF26D-BF38D
BF26L-BF38L

BF40E…BF94E

BF95E…BF150E

BF160E…BF230E

new

BF265E…BF400E

Order code DC coil	DC coil Low consumption	General use IEC operating current Ith (AC1) ≤40°C [A]	≤55°C [A]	≤70°C [A]	Three-phase motor control in AC-3/AC-3e duty Ie (AC3) ≤440V at ≤55°C [A]	Maximum IEC power at ≤55°C (AC-3/AC-3e) 230V [kW]	400V [kW]	415V [kW]	440V [kW]	500V [kW]	690V [kW]	1000V [kW]	UL/CSA details Maximum UL/CSA horsepower ratings Single phase 120V [HP]	240V [HP]	Three phase 200V [HP]	240V [HP]	480V [HP]	600V [HP]
11BG0601D❶	—	16	14	12	6	1.5	2.2	2.4	2.5	3	3	—	1/3	1	1 1/2	2	3	3
11BG0610D❶	—																	
11BG0901D❶	**11BG0901L❷**	20	18	15	9	2.2	4	4.3	4.5	5	5	—	1/2	1 1/2	2	3	5	5
11BG0910D❶	**11BG0910L❷**																	
11BGF0901D❶	**11BGF0901L❷**	20	18	15	9	2.2	4	4.3	4.5	5	5	—	1/2	1 1/2	2	3	5	5
11BGF0910D❶	**11BGF0910L❷**																	
11BGP0901D❶	—	20	18	15	9	2.2	4	4.3	4.5	5	—	—	1/2	1 1/2	2	3	5❽	—
11BGP0910D❶	—																	
11BG1201D❶⓬	—	20	18	15	12	3.2	5.7	6.2	5.5	5	5	—	1/2	1 1/2	3	3	7 1/2	10
11BG1210D❶⓬	—																	
BF0901D❶⓬	**BF0901L❷⓬**	25	20	18	9	2.2	4.2	4.5	4.8	5.5	7.5	—	3/4	2	3	3	5	7 1/2
BF0910D❶⓬	**BF0910L❷⓬**																	
BF1201D❶⓬	**BF1201L❷⓬**	28	23	20	12	3.2	5.7	6.2	6.2	7.5	10	—	1	2	5	5	7 1/2	10
BF1210D❶⓬	**BF1210L❷⓬**																	
BF1801D❶⓬	**BF1801L❷⓬**	32	26	23	18	4	7.5	9	9	10	10	—	1	3	5	5	10	15
BF1810D❶⓬	**BF1810L❷⓬**																	
BF2501D❶	**BF2501L❷**	32	26	23	25	7	12.5	13.4	13.4	15	11	—	2	3	7 1/2	7 1/2	15	15
BF2510D❶	**BF2510L❷**																	
BF2600D❶⓬	**BF2600L❷⓬**	45	36	32	26	7.3	13	14	14	15.6	18.5	—	2	5	7 1/2	7 1/2	15	20
BF3200D❶⓬	**BF3200L❷⓬**	56	45	40	32	8.8	18	17	17	20	22	—	3	7 1/2	10	10	20	25
BF3800D❶	**BF3800L❷**	56 (60⓫)	45 (48⓫)	40 (42⓫)	38	11	18.5	18.5	18.5	20	22	—	3	7 1/2	10	15	30	30
BF4000E❸	—	70	60	50	40	11	18.5	22	22	22	30	22	3	7 1/2	10	15	30	30
BF5000E❸⓬	—	90	75	65	50	15	22	30	30	30	37	30	5	10	15	20	40	40
BF6500E❸⓬	—	100	80	70	65	18.5	30	37	37	37	45	30	—	—	20	25	50	60
BF8000E❸⓬	—	115	95	80	80	22	45	45	45	55	55	37	—	—	25	30	60	75
BF9400E❸	—	115	95	80	95	30	55	55	55	55	55	37	—	—	25	30	60	75
BF9500E❸	—	140	115	100	95	30	55	55	55	75	90	45	—	—	30	30	60	75
BF11500E❸	—	160	130	115	115	37	55	55	55	75	110	55	—	—	40	40	75	100
BF15000E❸	—	165	135	118	150	45	75	75	75	90	110	55	—	—	50	50	100	125
BF16000E❸	—	250	210	180	160	45	75	90	90	110	132	75	—	—	50	60	125	150
BF19500E❸	—	275	230	200	195	55	90	110	110	132	160	110	—	—	60	75	150	150
BF23000E❸	—	350	290	250	230	55	110	110	132	132	160	132	—	—	75	75	150	200
BF26500E❸	—	450	375	325	265	75	132	132	160	160	200	160	—	—	75	100	200	250
new **BF33000E❸**	—	500	415	360	330	90	160	160	160	200	250	200	—	—	100	125	250	300
BF40000E❸	—	600	500	435	420	110	200	200	200	250	315	220	—	—	125	150	350	400
11B50000❹❺	—	700	550	500	520	156	290	306	328	367	416	312	—	—	150❶	200❶	400❶	450❶
11B63000❹❺	—	800	640	540	630	198	335	368	368	368	440	368	—	—	200❶	250❶	500❶	500❶
11B630100000❹❼	—	1000	850	700	—	For AC1/Resistive duty only, see page 2-10.							—	—	—	—	—	—

❶ Complete order code with coil voltage digit.
For BG09...D 24VDC version complete with built-in surge suppressor, add suffix **V120** to the standard order code.
The BF09-BF38D types already have a standard supplied built-in TVS (Transient Voltage Suppressor).
Standard voltages are as follows:
– DC 012 / 024 / 048 / 060 / 110 / 125 / 220V.
Example: 11BG0610D012 for mini-contactor BG06, three-poles, with one NO contact and 12VDC coil.
11BG0910D024 V120 for mini-contactor BG09, three-poles, with one NO contact and 24VDC coil, complete with built-in TVS (diode) suppressor.

❷ Low-consumption version.
No add-on auxiliary contacts or mechanical interlock can be mounted on BG... type contactors.
Complete order code with coil voltage digit.
The BF09-BF38L types already have a standard supplied built-in TVS (Transient Voltage Suppressor).
Standard voltages are as follows:
– DC 024 / 048V.
Example: 11BG0901L024 for mini-contactor BG09, three-poles, with one NC contact and 24VDC low-consumption coil.

❸ The contactor coil is controlled electronically; it can have either an AC or a DC supply and has a wide operating range.
The order code must be completed with the coil voltage digit.
The standard voltages are as follows:
– AC/DC 024 = 20...48V; 110 = 60...110V; 230 = 100...250V.

❹ The coil of the contactor can be powered indifferently in AC or DC. Complete the order code only with the digit of the coil voltage.
Standard voltages are:
– AC/DC 24 / 48 / 60 / 110-125 (indicate 110) / 220-240 (indicate 220) / 380-415 (indicate 380) / 440-480V (indicate 440).
Example: 11B50000110 for contactor B500, three-poles, without auxiliary contacts and with 110-125VAC/DC coil.
Other voltages available on request.

❺ If predisposed for mechanical latch (G495), the order code becomes 11B...SL00 ❹.
If already fitted with mechanical latch (G495), the order code becomes 11B...L00 ❹ ❻.

❻ Indicate rated voltage of the mechanical latch, preceded by the letter C if in DC.
Standard voltages are:
– AC 50/60Hz 48 / 110-125 indicate 110 / 220-240 indicate 220 / 380-415V indicate 380
– DC 48 / 110-125 indicate 110 / 220-240V indicate 220.
Example: 11B500L00110C48 for contactor B500, three-poles, without auxiliary contacts, with 110-125VAC/DC coil and mechanical latch powered at 48VDC.

Contactors

Three-pole contactors with DC and AC/DC control circuit

B500-B630

B6301000

	UL/CSA Short-circuit protection fuse, 600V⓬								
	UL/CSA General (purpose) use	High fault		Standard fault		Type of terminal	Incorporated auxiliary contacts		Qty per pkg	Wt
		Short circuit current	Fuse	Short circuit current	Fuse					
	[A]	[kA]	[A]	[kA]	[A]		NO	NC	n°	[kg]
	16	100	30 (J)	5	30	Clamp-screw	—	1⓽	10	0.214
							1⓽	—	10	0.214
	20	100	30 (J)	5	30	Clamp-screw	—	1⓽	10	0.214
							1⓽	—	10	0.214
	20	100	30 (J)	5	30	Faston	—	1⓽	10	0.210
							1⓽	—	10	0.210
	20	100	30 (J)	5	30	Rear PCB solder pin	—	1⓽	10	0.240
							1⓽	—	10	0.240
	20	100	30 (J)	5	30	Clamp-screw	—	1⓽	10	0.214
							1⓽	—	10	0.214
	25	100	30 (J)	5	60	Clamp-screw	—	1⓽	1	0.494
							1	—	1	0.494
	28	100	30 (J)	5	70	Clamp-screw	—	1⓽	1	0.494
							1	—	1	0.494
	32	100	60 (J)	5	80	Clamp-screw	—	1⓽	1	0.494
							1	—	1	0.494
	32	100	60 (J)	5	100	Clamp-screw	—	1⓽	1	0.494
							1	—	1	0.494
	45	100	100 (J)	5	100	Clamp-screw	—	—	1	0.559
	55	100	100 (J)	5	125	Clamp-screw	—	—	1	0.559
	55	100	100 (J)	5	150	Clamp-screw	—	—	1	0.559
	70	100	150 (J)	5	150 (RK5)	Double lug-clamp	—	—	1	1.050
	90	100	150 (J)	5	150 (RK5)	Double lug-clamp	—	—	1	1.050
	100	100	200 (J)	10	200 (RK5)	Double lug-clamp	—	—	1	1.050
	115	100	200 (J)	10	200 (RK5)	Double lug-clamp	—	—	1	1.050
	115	100	200 (J)	10	200 (RK5)	Double lug-clamp	—	—	1	1.050
	140	100	200 (J)	10	250 (RK5)	Double lug-clamp	—	—	1	2.060
	160	100	200 (J)	10	250 (RK5)	Double lug-clamp	—	—	1	2.060
	165	100	200 (J)	10	250 (RK5)	Double lug-clamp	—	—	1	2.060
	250	100	400 (J)	10	400 (RK5)	Screw-nut	—	—	1	3.000
	275	100	400 (J)	10	400 (RK5)	Screw-nut	—	—	1	3.000
	350	100	400 (J)	10	400 (RK5)	Screw-nut	—	—	1	3.000
	450	100	600 (J)	18	600 (RK5)	Screw-nut	—	—	1	4.600
	500	100	600 (J)	18	600 (RK5)	Screw-nut	—	—	1	4.600
	600	100	600 (J)	18	600 (RK5)	Screw-nut	—	—	1	4.600
	700⓫	—	—	18⓫	1200 (L)	Screw-nut	—	—	1	18.060
	800⓫	—	—	18⓫	1500 (L)	Screw-nut	—	—	1	18.620
	1000	—	—	18⓫	1500 (L)	Screw-nut	—	—	1	21.400

⓱ G495 mechanical latch cannot be mounted.
⓲ Maximum voltage is limited at 300V for UL. For certified type up to 600V, consult Technical support for information; see contact details on inside front cover.
⓳ Highly conductive auxiliary contact.
⓴ For use at this other current value, a 16mm² cable, headed with a fork terminal, must be used.
⓫ No UL/CSA ratings; data given for indication and reference purposes only.
⓬ Definite-purpose (DP) contactors are available. Consult Technical support for information; see contact details on inside front cover.
⓭ The contactor coil is controlled electronically; it can have either an AC or a DC supply and has a wide operating range.
Complete the order code only with the digit of the coil voltage.
Standard voltages are:
– AC/DC 024 = 24...60VAC/20...60VDC; 110 = 60...130VAC/DC; 230 = 100...250VAC/DC; 400 = 250...500VAC/DC.
⓮ The values in brackets indicate the class of the fuse to be used.
Where there is no value in brackets, any type of fuse can be used.
For protection with motor protection circuit breaker (type F combination motor controller) see chapter 1.

Certifications and compliance

Certifications obtained:

Type	cULus	UL	CSA	EAC	CCC	RINA
BG06D	●			●	●	
BG09D	●			●	●	
BG12D	●			●	●	
BGF09D	●			●	●	
BGP09D⓲	●	●	●			
BF09D - BF09L	●		●	●	●	●
BF12D - BF12L	●		●⓯	●	●	●
BF18D - BF18L	●		●	●	●	●
BF25D - BF25L	●		●⓯	●	●	●
BF26D - BF26L	●		●	●	●	●
BF32D - BF32L	●		●	●	●	●
BF38D - BF38L	●		●⓯	●	●	●
BF40E	●			●	●	
BF50E	●			●	●	
BF65E	●⓯			●	●	
BF80E	●			●	●	
BF94E	●					
BF95E	●⓯					
BF115E	●⓯					
BF150E	●⓯					
BF160E	●			●	●	
BF195E	●			●	●	
BF230E	●			●	●	
BF265E	●			⓰	⓰	
BF330E	●			⓰	⓰	
BF400E	●			⓰	⓰	
B500	●			●		
B630	●			●	●	
B6301000	●			●		

● Certified products.

UL - UL Listed, for USA and Canada (cULus File E93602) for BG... and BF09...BF400 types indicated, as Motor Controllers – Contactors, except for BGP09... types which are UL Recognized, for USA and Canada (cULus File E93602 – Component). Products having this type of marking are intended for use as components of complete workshop-assembled equipment.
BGP is UL rated up to 300V; for type with rating up to 600V, consult Technical support for information – see contact details on inside front cover.
UL Listed for USA and Canada (cULus - File E172189) for B500... B630 1000 and B500 SL... B630 SL types as Industrial Control Switches.

CSA - BF09...BF38 contactors are also CSA certified, for Canada only (File 54332).
In addition, BF12..., BF25... and BF38... types are CSA certified as "Elevator Equipment" (File 54332, class 2411); BF65..., BF95..., BF115... and BF150... are UL certified as "Elevator Equipment (File E 93602). See technical characteristics on page 2-72.

⓯ This contactor has also achieved elevator equipment certification.
⓰ Pending.

Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, UL508, CSA C22.2 n° 14; UL 60947-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.
Plastic materials are compliant with standards IEC/EN/BS 60335; for all BF09...BF38 versions only, add suffix V260 to the standard product order code.
Example: BF09 10 D024 V260 for BF09, three-poles, with one NO contact and 24VDC coil with compliant plastic materials.
Note: The contactors that have incorporated NC auxiliary contacts comply with annex F of the IEC/EN/BS 60947-4-1 standard "auxiliary contact linked with power contact" also known as mirror contacts.

BG09T4A

BF09AT4A…BF18T4A

BF26T4A…BF38T4A

BF40T4A…BF80T4A

BF95T4A…BF150T4A

BF160T4E…BF230T4E

BF265T4…BF400T4

new

IEC/EN/BS 60947-4-1 characteristics												UL/CSA details
Order code AC coil	IEC operating current Ith (AC1) ≤40°C	≤55°C	≤70°C	Ie (AC3) ≤440V at ≤55°C	Maximum IEC power at ≤40°C (AC1) 230V	400V	415V	440V	500V	690V	1000V	UL/CSA General (purpose) use
	[A]	[A]	[A]	[A]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]	[A]
11BG09T4A❶⑩	20	18	15	9	8	14	14	15	16	22	—	20
11BGF09T4A❶	20	18	15	9	8	14	14	15	16	22	—	20
11BGP09T4A❶	20	18	15	9	8	14	14	15	16	—	—	20❼
BF09T4A❶⑩	25	20	18	9	9.5	16	17	18	21	27	—	25
BF12T4A❶⑩	28	23	20	12	10	18	19	20	23	32	—	28
BF18T4A❶⑩	32	26	23	18	12	21	22	23	26	36	—	32
BF26T4A❶❽⑩	45	36	32	26	17	30	31	33	37	51	—	45
BF38T4A❶❽	56 (60❾)	45 (48❾)	40 (42❾)	38	21	36	38	40	45	62	—	55
BF40T4A❶	70	60	50	40	26	46	48	51	58	79	115	70
BF50T4A❶⑩	90	75	65	50	34	59	61	65	74	102	148	90
BF65T4A❶⑩	100	80	70	65	38	65	68	72	82	114	165	100
BF80T4A❶⑩	115	95	80	80	43	76	79	83	95	120	185	115
BF95T4A❶	140	115	100	95	53	92	96	101	115	159	230	140
BF115T4A❶	160	130	115	115	61	105	109	116	132	182	263	160
BF150T4A❶	165	135	118	150	62	110	113	119	136	187	271	165
BF160T4E❼	250	210	180	160	95	165	171	181	206	284	411	250
BF195T4E❼	275	230	200	195	104	181	188	199	226	312	452	275
BF230T4E❼	350	290	250	230	132	230	239	253	288	397	576	350
new **BF265T4E❼**	450	375	325	265	170	296	307	326	370	511	740	450
new **BF330T4E❼**	500	415	360	330	189	329	341	362	411	568	823	500
BF400T4E❼	600	500	435	400	227	395	410	434	494	681	987	600
11B500400❷❸	700	550	500	520	252	438	478	500	575	755	1100	700
11B630400❷❸	800	640	540	630	288	500	545	580	655	860	1250	800
11B6301000400❷❺	1000	850	700	—	350	600	630	725	750	1000	1600	1000
11B1250424❺❻	1250	1050	880	—	480	830	900	905	1100	1450	2000	No UL/CSA
11B1600424❺❻	1600	1360	1120	—	550	950	1000	1160	1200	1650	2500	No UL/CSA

❶ Complete order code with coil voltage digit or voltage digit followed by 60 if 60Hz.
Standard voltages are as follows:
– AC 50/60Hz 024 / 048 / 110 / 230 / 400V
– AC 60Hz 024 60 / 048 60 / 120 60 / 220 60 / 230 60 / 460 60 / 575 60 (V).
Example: 11BG09T4A230 for mini-contactor BG09, four-poles, with 230VAC 50/60Hz coil.
11BG09T4A460 60 for mini-contactor BG09, four-poles, with 460VAC 60Hz coil.

❷ The coil of the contactor can be powered indifferently in AC or DC. Complete the order code only with the digit of the coil voltage. Standard voltages are:
– AC/DC 24 / 48 / 60 / 110-125 (indicate 110) / 220-240 (indicate 220) / 380-415 (indicate 380) / 440-480V (indicate 440).
Example: 11B500400110 for contactor B500, four-poles, without auxiliary contacts and with 110-125VAC/DC coil.
Other voltages available on request.

❸ If predisposed for mechanical latch (G495), the order code becomes 11B...4SL00 ❷.
If already fitted with mechanical latch (G495), the order code becomes 11B...4L00 ❷ ❹.

❹ Indicate rated voltage of the mechanical latch, preceded by the letter C if in DC.
Standard voltages are:
– AC 50/60Hz 48 / 110-125 indicate 110 / 220-240 indicate 220 / 380-415V indicate 380
– DC 48 / 110-125 indicate 110 / 220-240V indicate 220.
Example: 11B5004L00110C220 for contactor B500, four-poles, without auxiliary contacts, with 110-125VAC/DC coil and mechanical latch powered at 220-240VDC.

❺ G495 mechanical latch cannot be mounted.

❻ Complete the order code with the digit of the coil voltage. For 110-125VAC 50/60Hz indicate 110 or 220-240VAC 50/60Hz indicate 220.
Example: 11B1250424110 for contactor B1250, four-poles, with 2NO+4NC auxiliary contacts and 110-125VAC/DC 50/60Hz coil.

❼ Maximum voltage is limited at 300V for UL. For certified type up to 600V. Consult Technical support for information; see contact details on inside front cover.

❽ Whenever the BF26T4 or BF38T4 types need to be mechanically interlocked with either the BFX5000 or BFX5001, the add-on fourth pole of one of the contactors needs to be removed from the right side and fitted on the left side.

❾ For use at this other current value, a 16mm² cable, headed with a fork terminal, must be used.

❿ Definite-purpose (DP) contactors are available. Consult Technical support for information; see contact details on inside front cover.

Contactors

Four-pole contactors with AC control circuit

B5004-B6304

B63010004

B1250-B16004

	UL/CSA Short-circuit protection fuse, 600V⓭								
	High fault		Standard fault		Type of terminal	Incorporated auxiliary contacts		Qty per pkg	Weight
	Short circuit current	Fuse	Short circuit current	Fuse					
	[kA]	[A]	[kA]	[A]		NO	NC	n°	[kg]
	100	30 (J)	5	30	Clamp-screw	—	—	10	0.180
	100	30 (J)	5	30	Faston	—	—	10	0.180
	100	30 (J)	5	30	Rear PCB solder pin	—	—	10	0.197
	100	30 (J)	5	60	Clamp-screw	—	—	1	0.367
	100	30 (J)	5	70	Clamp-screw	—	—	1	0.367
	100	60 (J)	5	80	Clamp-screw	—	—	1	0.367
	100	100 (J)	5	100	Clamp-screw	—	—	1	0.508
	100	100 (J)	5	150	Clamp-screw	—	—	1	0.508
	100	150 (J)	5	150 (RK5)	Double lug-clamp	—	—	1	1.240
	100	150 (J)	5	150 (RK5)	Double lug-clamp	—	—	1	1.240
	100	200 (J)	10	200 (RK5)	Double lug-clamp	—	—	1	1.240
	100	200 (J)	10	200 (RK5)	Double lug-clamp	—	—	1	1.240
	100	200 (J)	10	250 (RK5)	Double lug-clamp	—	—	1	2.420
	100	200 (J)	10	250 (RK5)	Double lug-clamp	—	—	1	2.420
	100	200 (J)	10	250 (RK5)	Double lug-clamp	—	—	1	2.420
	100	400 (J)	10	400 (RK5)	Screw-nut	—	—	1	4.000
	100	400 (J)	10	400 (RK5)	Screw-nut	—	—	1	4.000
	100	400 (J)	10	400 (RK5)	Screw-nut	—	—	1	4.000
	100	600 (J)	18	600 (RK5)	Screw-nut	—	—	1	6.135
	100	600 (J)	18	600 (RK5)	Screw-nut	—	—	1	6.135
	100	600 (J)	18	600 (RK5)	Screw-nut	—	—	1	6.135
	—	—	18⓫	1200 (L)	Screw-nut	—	—	1	20.910
	—	—	18⓫	1500 (L)	Screw-nut	—	—	1	21.880
	—	—	18⓫	1500 (L)	Screw-nut	—	—	1	25.620
	—	—	—	—	Screw-nut	2	4	1	57.500
	—	—	—	—	Screw-nut	2	4	1	58.400

⓫ IEC/EN/BS 60947-1 designation: Pillar terminal.
⓬ The contactor coil is controlled electronically; it can have either an AC or a DC supply and has a wide operating range.
Complete the order code only with the digit of the coil voltage.
Standard voltages are:
– AC/DC 024 = 24...60VAC/20...60VDC; 110 = 60...130VAC/DC; 230 = 100...250VAC/DC;
400 = 250...500VAC/DC.
⓭ The values in brackets indicate the class of the fuse to be used.
Where there is no value in brackets, any type of fuse can be used.
For protection with motor protection circuit breaker (type F combination motor controller) see chapter 1.

IEC utilisation current with poles in parallel
If the poles of the contactors are arranged in parallel, the operating current is the one indicated in the table multiplied by the **K** factor given below, which account for the unequal distribution of the current in the various poles.
To limit distribution inequality, it is advisable to use paralleling links (see pages 2-20, 2-25, 2-30 and 2-32).

2 POLES in parallel: **K** = 1.6
3 POLES in parallel: **K** = 2.2
4 POLES in parallel: **K** = 2.8

Certifications and compliance
Certifications obtained:

Type	c UL us	UL	CSA	EAC	CCC	RINA
BG09T4A	●			●	●	
BGF09T4A	●			●	●	
BGP09T4A⓱	c UL us			●	●	
BF09T4A	●		●	●	●	●
BF12T4A	●		●⓮	●	●	●
BF18T4A	●		●	●	●	●
BF26T4A	●		●⓮	●	●	●
BF38T4A	●		●⓮	●	●	●
BF40T4A	●			●	●	●
BF50T4A	●			●	●	●
BF65T4A	●⓯			●	●	●
BF80T4A	●			●	●	●
BF95T4A	●⓯					●
BF115T4A	●⓯					●
BF150T4A	●⓯					●
BF160T4E	●			●	●	
BF195T4E	●			●	●	
BF230T4E	●			●	●	
BF265T4E	●			⓯	⓯	
BF330T4E	●			⓯	⓯	
BF400T4E	●			⓯	⓯	
B5004	●			●		
B6304	●			●	●	
B63010004	●			●		
B12504				●		
B16004				●		

● Certified products.

UL - UL Listed, for USA and Canada (cULus File E93602) for BG and BF09...BF400 types indicated, as Motor Controllers – Contactors, except for BGP09... types which are UL Recognized, for USA and Canada (c UL us File E93602 – Component). Products having this type of marking are intended for use as components of complete workshop-assembled equipment.
BGP is UL rated up to 300V; for type with rating up to 600V, consult Technical support for information – see contact details on inside front cover.
UL Listed for USA and Canada (cULus - File E172189) for B5004... B63010004 and B5004SL... B6304SL types as Industrial Control Switches.

CSA - BF09...BF38 contactors are also CSA certified, for Canada only (File 54332).
In addition, BF12..., BF25... and BF38... types are CSA certified as "Elevator Equipment" (File 54332, class 2411); BF65..., BF95..., BF115... and BF150... are UL certified as "Elevator Equipment (File E 93602). See technical characteristics on page 2-72.

⓮ This contactor has also achieved elevator equipment certification.
⓯ Pending.

Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, UL508, CSA C22.2 n° 14; UL 60947-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.
Plastic materials are compliant with standards IEC/EN/BS 60335; for all BF09...BF38 versions only, add suffix V260 to the standard product order code.
Example: BF09T4A230V260 for BF09, four-poles, 230V 50/60Hz coil with compliant plastic materials.

BG09T4D

BF09T4D-BF18T4D
BF09T4L-BF18T4L

BF26T4D-BF38T4D
BF26T4L-BF38T4L

BF65T4E
BF80T4E

BF95T4E...BF150T4E

BF160T4E...BF230T4E

new

BF265T4E...BF400T4E

IEC/EN/BS 60947-4-1 characteristics													UL/CSA details
Order code DC coil	DC coil Low consumption	IEC operating current Ith (AC1) ≤40°C	≤55°C	≤70°C	Ie (AC3) ≤440V at ≤55°C	Maximum IEC power at ≤40°C (AC1) 230V	400V	415V	440V	500V	690V	1000V	UL/CSA General (purpose) use
		[A]	[A]	[A]	[A]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]	[A]
11BG09T4D❶	—	20	18	15	9	8	14	14	15	16	22	—	20
11BGF09T4D❶	—	20	18	15	9	8	14	14	15	16	22	—	20
11BGP09T4D❶	—	20	18	15	9	8	14	14	15	16	—	—	20❽
BF09T4D❶	**BF09T4L❷**	25	20	18	9	9.5	16	17	18	21	27	—	25
BF18T4D❶	**BF18T4L❷**	32	26	23	18	12	21	22	23	26	36	—	32
BF26T4D❶	**BF26T4L❷**	45	36	32	26	17	30	31	33	37	51	—	45
BF38T4D❶	**BF38T4L❷**	56 (60❾)	45 (48❾)	40 (42❾)	38	21	26	38	40	45	62	—	55
BF65T4E❸	—	100	80	70	65	38	65	68	72	82	114	165	100
BF80T4E❸	—	115	95	80	80	43	76	79	83	95	120	185	115
BF95T4E❸	—	140	115	100	95	53	92	96	101	115	159	230	140
BF150T4E❸	—	165	135	118	150	62	110	113	119	136	187	271	165
BF160T4E❹	—	250	210	180	160	95	165	171	181	206	284	411	250
BF195T4E❹	—	275	230	200	195	104	181	188	199	226	312	452	275
BF230T4E❹	—	350	290	250	230	132	230	239	253	288	397	576	350
BF265T4E❹	—	450	375	325	265	170	296	307	326	370	511	740	450
new **BF330T4E❹**	—	500	415	360	330	189	329	341	362	411	568	823	330
BF400T4E❹	—	600	500	435	400	227	395	410	434	494	681	987	400
11B500400❹❺	—	700	550	500	520	252	438	478	500	575	755	1100	700
11B630400❹❺	—	800	640	540	630	288	500	545	580	655	860	1250	800
11B6301000400❹❼	—	1000	850	700	—	350	600	630	725	750	1000	1600	1000

❶ Complete order code with coil voltage digit.
The BF09-BF38D types already have a standard supplied built-in TVS (Transient Voltage Suppressor).
Standard voltages are as follows:
– DC 012 / 024 / 048 / 060 / 110 / 125 / 220VDC.
Example: 11BG09T4D012 for mini-contactor BG09, four-poles, with 12VDC coil.

❷ Low consumption version. Complete the order code with coil voltage digit.
The BF09-BF38L types already have a standard supplied built-in TVS (Transient Voltage Suppressor).
Standard voltages are as follows:
– DC 024 / 048V
Example: BF09T4L024 for contactor BF09, four-poles, with 24VDC low-consumption coil.

❸ The contactor coil is controlled electronically; it can have either an AC or a DC supply and has a wide operating range.
Complete the order code only with the digit of the coil voltage.
Standard voltages are:
– AC/DC 024 = 20...48V; 110 = 60...110V; 230 = 100...250V.

❹ The coil of the contactor can be powered indifferently in AC or DC. Complete the order code only with the digit of the coil voltage.
Standard voltages are:
– AC/DC 24 / 48 / 60 / 110-125 indicate 110 / 220-240 indicate 220 / 380-415 indicate 380 / 440-480V indicate 440.
Example: 11B500400110 for contactor B500, four-poles, without auxiliary contacts and with 110-125VAC/DC coil.
Other voltages available on request.

❺ If predisposed for mechanical latch (G495), the order code becomes 11B...4SL00 ❹.
If already fitted with mechanical latch (G495), the order code becomes 11B...4L00 ❹ ❻.

❻ Indicate rated voltage of the mechanical latch, preceded by the letter C if in DC.
Standard voltages are:
– AC 50/60Hz 48 / 110-125 indicate 110 / 220-240 indicate 220 / 380-415V indicate 380
– DC 48 / 110-125 indicate 110 / 220-240V indicate 220.
Example: 11B500L00110C48 for contactor B500, four-poles, without auxiliary contacts, with 110-125VAC/DC coil and mechanical latch powered at 48VDC.

❼ G495 mechanical latch cannot be mounted.

❽ Maximum voltage is limited at 300V for UL. For certified type up to 600V consult Technical support for information; see contact details on inside front cover.

❾ For use at this other current value, a 16mm² cable, headed with a fork terminal, must be used.

Contactors

Four-pole contactors with DC and AC/DC control circuit

B5004-B6304

B63010004

UL/CSA Short-circuit protection fuse, 600V⓬								
High fault		Standard fault		Type of terminal	Incorporated auxiliary contacts		Qty per pkg	Weight
Short circuit current	Fuse	Short circuit current	Fuse					
[kA]	[A]	[kA]	[A]		NO	NC	n°	[kg]
100	30 (J)	5	30	Clamp-screw	—	—	10	0.220
100	30 (J)	5	30	Faston	—	—	10	0.220
100	30 (J)	5	30	Rear PCB solder pin	—	—	10	0.242
100	30 (J)	5	60	Clamp-screw	—	—	1	0.498
100	60 (J)	5	80	Clamp-screw	—	—	1	0.498
100	100 (J)	5	100	Clamp-screw	—	—	1	0.665
100	100 (J)	5	150	Clamp-screw	—	—	1	0.665
100	200 (J)	10	200 (RK5)	Double lug-clamp	—	—	1	1.280
100	200 (J)	10	200 (RK5)	Double lug-clamp	—	—	1	1.280
100	200 (J)	10	250 (RK5)	Double lug-clamp	—	—	1	2.460
100	200 (J)	10	250 (RK5)	Double lug-clamp	—	—	1	2.460
100	400 (J)	10	400 (RK5)	Screw-nut	—	—	1	4.000
100	400 (J)	10	400 (RK5)	Screw-nut	—	—	1	4.000
100	400 (J)	10	400 (RK5)	Screw-nut	—	—	1	4.000
100	600 (J)	18	600 (RK5)	Screw-nut	—	—	1	8.100
100	600 (J)	18	600 (RK5)	Screw-nut	—	—	1	8.100
100	600 (J)	18	600 (RK5)	Screw-nut	—	—	1	8.100
—	—	18⓾	1200 (L)	Screw-nut	—	—	1	20.910
—	—	18⓾	1500 (L)	Screw-nut	—	—	1	21.880
—	—	18⓾	1500 (L)	Screw-nut	—	—	1	25.600

⓾ No UL/CSA ratings; data given for indication and reference purposes only.
⓫ The contactor coil is controlled electronically; it can have either an AC or a DC supply and has a wide operating range.
Complete the order code only with the digit of the coil voltage.
Standard voltages are:
– AC/DC 024 = 24...60VAC/20...60VDC; 110 = 60...130VAC/DC; 230 = 100...250VAC/DC; 400 = 250...500VAC/DC.
⓬ The values in brackets indicate the class of the fuse to be used.
Where there is no value in brackets, any type of fuse can be used.
For protection with motor protection circuit breaker (type F combination motor controller) see chapter 1.

IEC utilisation current with poles in parallel
If the poles of the contactors are arranged in parallel, the operating current is the one indicated in the table multiplied by the **K** factor given below, which account for the unequal distribution of the current in the various poles.
To limit distribution inequality, it is advisable to use paralleling links (see pages 2-20, 2-25, 2-30 and 2-32).

2 POLES in parallel: **K** = 1.6
3 POLES in parallel: **K** = 2.2
4 POLES in parallel: **K** = 2.8

Certifications and compliance
Certifications obtained:

Type	cULus	UL	CSA	EAC	CCC	RINA
BG09T4D	●			●	●	
BGF09T4D	●			●	●	
BGP09T4D⓱	●			●	●	
BF09T4D - BF09T4L	●		●	●	●	●
BF18T4D - BF18T4L	●		●	●	●	●
BF26T4D - BF26T4L	●		●⓯	●	●	●
BF38T4D - BF38T4L	●		●⓯	●	●	●
BF65T4E	●⓯			●	●	
BF80T4E	●			●	●	
BF95T4E	●⓯					
BF150T4E	●⓯					
BF160T4E	●			●	●	
BF195T4E	●			●	●	
BF230T4E	●			●	●	
BF265T4E	●			⓮	⓮	
BF330T4E	●			⓮	⓮	
BF400T4E	●			⓮	⓮	
B5004	●			●		
B6304	●			●	●	
B63010004	●			●		

● Certified products.

UL - UL Listed, for USA and Canada (cULus File E93602) for BG and BF09...BF400 types indicated, as Motor Controllers – Contactors, except for BGP09... types which are UL Recognized, for USA and Canada (cULus File E93602 – Component). Products having this type of marking are intended for use as components of complete workshop-assembled equipment.
BGP is UL rated up to 300V; for type with rating up to 600V, consult Technical support for information – see contact details on inside front cover.
UL Listed for USA and Canada (cULus - File E172185) for B5004... B63010004 and B5004SL... B6304SL types as Industrial Control Switches.

CSA - BF09...BF38 contactors are also CSA certified, for Canada only (File 54332).
In addition, BF12..., BF25... and BF38... types are CSA certified as "Elevator Equipment" (File 54332, class 2411); BF65..., BF95... and BF150... are UL certified as "Elevator Equipment (File E 93602).
See technical characteristics on page 2-72.

⓯ This contactor has also achieved elevator equipment certification.
⓮ Pending.

Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, UL508, CSA C22.2 n° 14; UL 60947-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.
Plastic materials are compliant with standards IEC/EN/BS 60335; for all BF09...BF38 versions only, add suffix V260 to the standard product order code.
Example: BF09T4D024V260 for BF09, four-poles, 24VDC coil with compliant plastic materials.

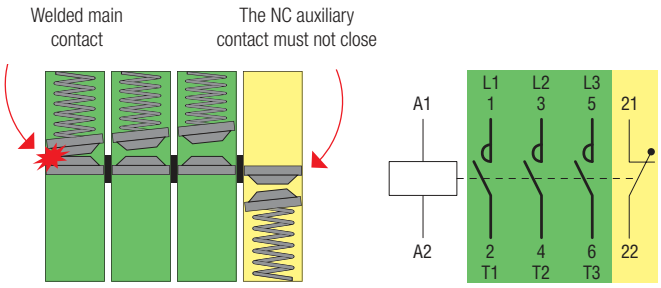
SAFETY FIRST!

BFS... CONTACTORS

Designed for applications requiring a high degree of safety.
In particular, they meet the requirements of ISO 13849-1 (Safety of machinery - Safety-related parts of control systems) and IEC/EN 62061 (Safety of machinery - Functional safety of safety-related control systems). The BFS... contactors cover motor control currents from 9A to 38A AC-3 400V.

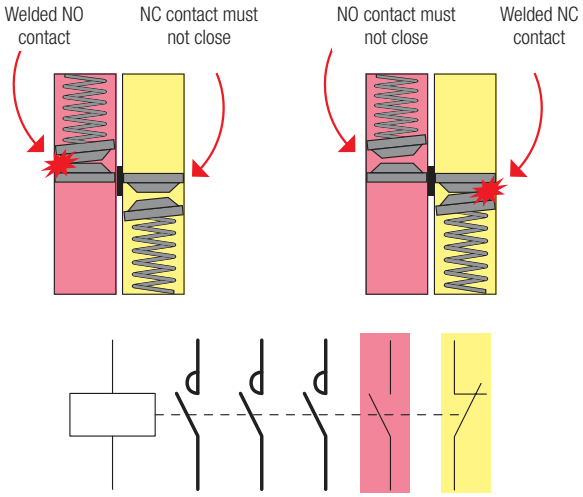
"MIRROR CONTACT" FUNCTION (IEC/EN 60947-4-1)

The NC auxiliary contact cannot be in the closed position at the same time as the NO main contact even in a fault condition (main contact welding).
A typical application of Mirror Contacts is to have highly reliable monitoring of the contactor status in the machine control circuit.



"MECHANICALLY LINKED CONTACTS" FUNCTION (IEC/EN 60947-5-1)

The NO and NC auxiliary contacts cannot be in closed position at the same time even in a fault condition (welding of NO or NC contacts).

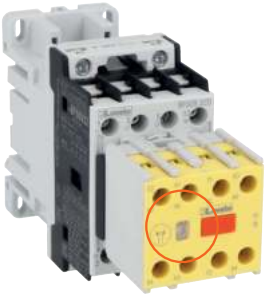


AUXILIARY CONTACT BLOCK WITH YELLOW COVER TO HIGHLIGHT DEVICES FORMING PART OF THE SAFETY CIRCUIT

AUXILIARY CONTACT BLOCK NOT REMOVABLE FROM CONTACTOR TO PREVENT TAMPERING

MANUAL OPERATION OR OPERATION WITH TOOLS PREVENTED BY GUARDS

CONTACTOR STATUS, OPEN/CLOSED, VISIBLE FROM THE FRONT



Safety contactors BF series

BFS3222A...

new

BFS0932D024

new

Order code	IEC/EN details			UL/CSA details					
	Ith (AC1) ≤40°C	Ie (AC-3/AC-3e) ≤440V ≤55°C	Power (AC-3/AC-3e) 400V ≤55°C	Motor control		Incorporated auxiliary contacts		Qty per pkg	Wt
				480V 3ph	General (purpose) use				
	[A]	[A]	kW	[HP]	[A]	NO	NC	n°	kg
AC COIL. Terminals: clamp-screw.									
BFS0923A❶	25	9	4.2	5	25	2	3	1	0.388
BFS1223A❶	28	12	5.7	7 ½	28	2	3	1	0.388
BFS2523A❶	32	25	12.5	15	32	2	3	1	0.388
BFS3222A❶	56	32	16	20	56	2	2	1	0.485
BFS3822A❶	56	38	18.5	30	56	2	2	1	0.485
DC COIL. 24V. Terminals: clamp-screw.									
BFS0923D024	25	9	4.2	5	25	2	3	1	0.542
BFS1223D024	28	12	5.7	7 ½	28	2	3	1	0.542
BFS2523D024	32	25	12.5	15	32	2	3	1	0.542
BFS3222D024	56	32	16	20	56	2	2	1	0.607
BFS3822D024	56	38	18.5	30	56	2	2	1	0.607

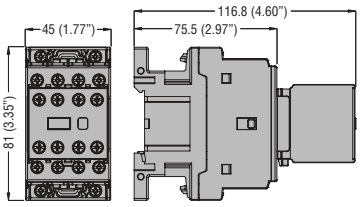
❶ Complete order code with coil voltage digit.
Standard voltages are as follows:
– AC 50-60Hz 024 - 048 - 110 - 230V.

Operational characteristics
All application and technical characteristics of the BFS... contactors are identical to those of the standard BF... contactors shown from page 2-58 onwards.

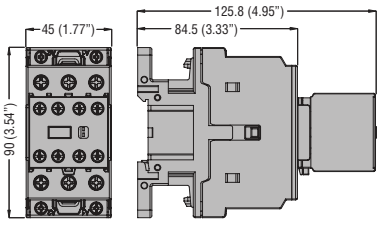
Certification and compliance
Certifications obtained: cULus; UL Listed, for USA and Canada (cULus - File E93602), as Motor Controllers - Contactors.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, IEC/EN/BS 60947-5-1, UL 60947-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

Dimensions [mm (in)]

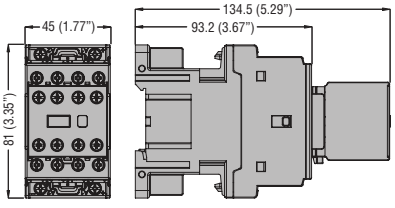
BFS0923A... - BFS1223A... - BFS2523A...



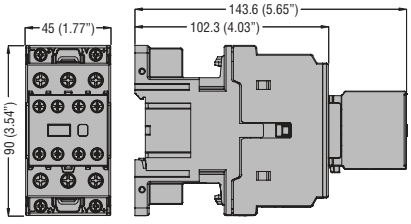
BFS3222A... - BFS3822A...



BFS0923D... - BFS1223D... - BFS2523D...

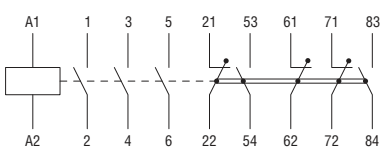


BFS3222D... - BFS3822D...

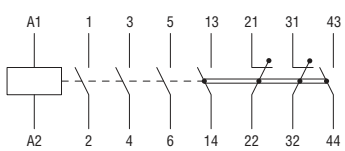


Wiring diagrams

BFS09...BFS25...



BFS32... BFS38...



Mini-contactor four power poles, 2 NO and 2 NC BG series

11BG09T2...

Order code	IEC rated conventional free air thermal current Ith ≤40°C	≤55°C	≤60°C	Qty per pkg	Wt
	[A]	[A]	[A]	n°	[kg]
AC COIL. Terminals: clamp screw.					
11BG09T2A❶	20	18	15	1	0.170
DC COIL. Terminals: clamp screw.					
11BG09T2D❷	20	18	15	1	0.175

Note: on 11BG09T2D, maximum 2 auxiliary contacts may be mounted.

Operational characteristics

Type	UL/CSA General use	Protection fuse IEC gG	Protection fuse UL K5	Conductor section	
	[A]	[A]	[A]	[mm²]	[AWG]
BG09...T2	20	20	30	0.75-2.5	18-12

Certifications and compliance
Certifications obtained: CCC, EAC; UL Listed, for USA and Canada (cULus - File E93602), as Motor Controllers - Contactors.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

Contactors four power poles,2 NO and 2 NC BF series

BF09T2...

Order code	IEC rated conventional free air thermal current Ith ≤40°C	≤55°C	≤60°C	Qty per pkg	Wt
	[A]	[A]	[A]	n°	[kg]
AC COIL. Terminals: clamp screw.					
BF09T2A❶	25	20	18	1	0.340
BF18T2A❶	32	26	23	1	0.340
BF26T2A❶	45	36	32	1	0.420
BF38T2A❶	56 (60❺)	45 (48❺)	40 (42❺)	1	0.420
BF80T2A❶	115	95	75	1	1.075
DC COIL. Terminals: clamp screw.					
BF18T2D❷❻	32	26	23	1	0.470
BF26T2D❷❻	45	36	32	1	0.540
BF38T2D❷❻	56 (60❺)	45 (48❺)	40 (42❺)	1	0.540
BF80T2E❹❼	115	95	75	1	1.125
DC COIL. Low consumption (2.4W). Terminals: clamp screw.					
BF18T2L❸❻	32	26	23	1	0.470
BF26T2L❸❻	45	36	32	1	0.540
BF38T2L❸❻	56 (60❺)	45 (48❺)	40 (42❺)	1	0.540

Operational characteristics

Type	UL/CSA General use	Protection fuse IEC gG	Protection fuse UL RK5	Conductor section	
	[A]	[A]	[A]	[mm²]	[AWG]
BF09T2	25	32	60	1-6	16-10
BF18T2	32	40	80	1-6	16-10
BF26T2	45	50	100	1.5-10	14-6
BF38T2	55	80	150	2.5-16	14-6
BF80T2	115	115	250	6-50	18-2

Certifications and compliance
Certifications obtained: EAC, CCC, RINA; UL Listed for USA and Canada (cULus - File E93602) and CSA certified for Canada (File 54332), as Motor Controllers - Contactors.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.
Plastic materials are compliant with standards IEC/EN/BS 60335; for all BF09...BF38 versions only, add suffix V260 to the standard product order code.
Example: BF09T2A230 V260 for BF09, 2NO+2NC main poles, 230V 50/60Hz coil with compliant plastic materials).

Contactors four power poles, 4 NC BF series

BF18T0...

Order code	IEC rated conventional free air thermal current Ith ≤40°C	≤55°C	≤60°C	Qty per pkg	Wt
	[A]	[A]	[A]	n°	[kg]
AC COIL. Terminals: clamp screw.					
BF18T0A❶	32	26	23	1	0.340
BF26T0A❶	45	36	32	1	0.420
DC COIL. Terminals: clamp screw.					
BF18T0D❷❻	32	26	23	1	0.470
BF26T0D❷❻	45	36	32	1	0.540
DC COIL. Low consumption (2.4W). Terminals: clamp screw.					
BF18T0L❸❻	32	26	23	1	0,470

Operational characteristics

Type	UL/CSA General use	Protection fuse IEC gG	Protection fuse UL RK5	Conductor section	
	[A]	[A]	[A]	[mm²]	[AWG]
BF18T0	32	40	80	1-6	16-10
BF26T0	45	50	150	1.5-10	14-6

Certifications and compliance
Certifications obtained: EAC, CCC, RINA; UL Listed for USA and Canada (cULus - File E93602) and CSA certified for Canada (File 54332), as Motor Controllers - Contactors.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.
Plastic materials are compliant with standards IEC/EN/BS 60335; for BF18 and BF26 versions only, add suffix V260 to the standard product order code.
Example: BF18T0A230V260 for BF18, four-NC main poles, 230VAC 50/60Hz coil with compliant plastic materials).

NOTE: The BF18-BF26T0D and BF18T0L types have a standard supplied built-in TVS (Transient Voltage Suppressor).

❶ Complete with coil voltage digit if 50/60Hz or with voltage digit followed by 60 if 60Hz. N.B.: For BF80T2, 50/60Hz coils are suitable for 50Hz only.
Standard voltages are:
– AC 50/60Hz 024 / 048 /110 / 230 / 400V
– AC 60Hz 024 60 / 048 60 / 120 60 / 220 60 / 230 60 / 460 60 / 575 60 (V).

Example:
– 11BG09T2A230 for mini-contactor BG09T2, 2 poles NO and 2 poles NC, with 230VAC 50/60Hz coil.
– 11BG09T2A46060 for mini-contactor BG09T2, 2 poles NO and 2 poles NC, with 460VAC 60Hz coil.

❷ Complete the order code with coil voltage digit.
Standard voltages are:
– DC 012 / 024 / 048 / 060 / 110 / 125 / 220V.
The BF18-BF26-BF38 T2D types already have a standard supplied built-in TVS (Transient Voltage Suppressor).
Example:
– 11 BG09T2D012 for mini-contactor BG09T2, 2 poles NO and 2 poles NC, with 12VDC coil.

❸ Low consumption version with built-in TVS. Complete the order code with coil voltage digit.
Standard voltages are:
– DC 024 / 048V.
Example:
– BF18T2L024 for contactor BF18T2, 2 poles NO and 2 poles NC, with 24VDC low-consumption coil, supplied with TVS.

❹ The contactor coil is controlled electronically; it can have either an AC or a DC supply and has a wide operating range.
Complete the order code with coil voltage digit.
Standard voltages are:
– AC/DC 024 = 20...48V; 110 = 60...110V; 230 = 100...250V.

❺ For use at this other current value, a 16mm² cable, headed with a fork terminal, must be used.

❻ Maximum combinations of add-on blocks are given on page 2-23.

❼ For BF80T2E... contactors, coil supply voltage must be AC or smoothed DC. For pulsating DC please consult our Technical support.

3 pole contactors to connect in series for photovoltaic applications BF series

BFD6500A - BFD8000A

Order code	Operational current at 600V in DC1 ≤55°C with 3 poles in series 600V	1000V	Qty per pkg	Wt
	[A]	[A]	n°	[kg]
AC COIL. Terminals: double lug clamp.				
BFD6500A❶	75	35	1	1.020
BFD8000A❶	80	60	1	1.020

4 pole contactors to connect in series for photovoltaic applications BF series

BFD80T4...

Order code	Operational current at 600V in DC1 ≤55°C with 4 poles in series 600V	1000V	Qty per pkg	Wt
	[A]	[A]	n°	[kg]
AC COIL. Terminals: double lug-clamp.				
BFD80T4A❶	100	80	1	1.100
AC/DC COIL. Terminals: double lug-clamp.				
BFD80T4E❷	100	80	1	1.100
BFD150T4E❷	165	100	1	2.550

❶ Complete with coil voltage digit if 50/60Hz or with voltage digit followed by 60 if 60Hz. Standard voltages are:
– AC 50/60Hz 024 / 048 /110 / 230 / 400V
– AC 60Hz 024 60 / 048 60 / 120 60 / 220 60 / 230 60 / 460 60 / 575 60 (V).

❷ The contactor coil is controlled electronically; it can have either an AC or a DC supply and has a wide operating range.
Complete the order code with coil voltage digit.
Standard voltages are:
– AC/DC 024 = 20...48V; 110 = 60...110V; 230 = 100...250V.

General characteristics
The contactors are specifically made with magnetic elements in the arc extinction chambers to obtain high DC load operational capabilities. They are used to disconnect and isolate the load between the photovoltaic panel and the AC/DC inverter.
For add-on contact blocks, accessories and spare parts, consider indications of the corresponding standard contactors without the D letter in the code.

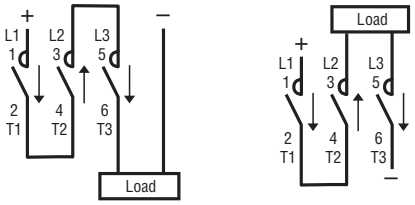
Italian Fire Department Directives
These directives provide for a disconnecting device for all current-carrying elements, that can be operated by remote control switch, placed in an easily reached and marked position, in order to safely isolate each part of the installation within the fire system compartment including the photovoltaic (PV) generator.
As an alternative, the PV generator must be installed, either externally of the fire system compartment or internally but in a dedicated compartment with adequate fire-resistant features. For such function, specifically designed contactors for on-load use in IEC DC1 duty up to 1000VDC are available.

Operational characteristics
Use in IEC DC1 duty

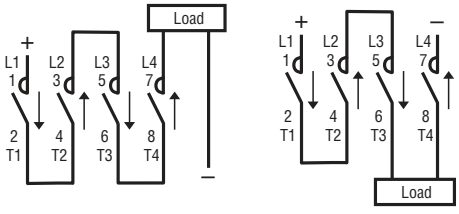
Type	Poles in series	IEC operational voltage Ue 400V	600V	800V	1000V
		IEC max current Ie in DC1 with L/R ≤1ms with 4 poles in series			
		[A]	[A]	[A]	[A]
BFD6500A...	3	100	75	45	35
BFD8000A...	3	100	80	65	60
BFD80T4A...	4	115	100	90	80
BFD80T4E...	4	115	100	90	80
BFD150T4E...	4	165	165	125	100

Certification and compliance
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

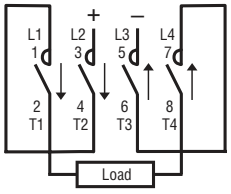
Wiring diagrams
Three-pole contactor BFD6500..., BFD8000...



Four-pole contactors BFD80T4...



Four-pole contactors BFD150T4E....



BFK contactors (including limiting resistors)

BFK...

Order code	Maximum IEC operational power at ≤50°C (AC-6b)❶ 240V [kvar]	400V [kvar]	440V 480V [kvar]	690V [kvar]	NO ❷	Qty per pkg n°	Wt [kg]
AC COIL.							
BFK0910A❸	4.5	7.5	9	10	1	10	0.413
BFK1210A❸	7	12.5	14	16	1	10	0.413
BFK1810A❸	9	15	17	20	1	10	0.413
BFK2600A❸	11	20	22	25	–	10	0.472
BFK3200A❸	14	25	27.5	30	–	10	0.472
BFK3800A❸	17	30	33	36	–	10	0.472
BFK5000A❸	22	40	41	46	–	5	1.080
BFK6500A❸	26	45	50	56	–	5	1.080
BFK8000A❸	30	50	56	65	–	5	1.080
BFK9400A❸❹	34	60	75	80	–	5	1.080
BFK9500A❸	34	60	75	80	–	5	2.095
BFK11500A❸	45	75	85	135	–	5	2.095
BFK15000A❸	50	100	115	150	–	5	2.095

❶ To use the contactor in the delta, consult our Technical support, see contact details on inside front cover..
❷ NO auxiliary contacts available.
❸ The order code must be completed either with the coil voltage digit if 50/60Hz or with the coil voltage digit followed by the number 60 if 60Hz. Standard voltages are:
-- AC 50-60Hz 024 / 048 / 110 / 230 / 400VAC
-- AC 60Hz 024 60 / 048 60 / 120 60 / 220 60 / 230 60 / 460 60 / 575 60 (V).
Example: BFK0910A230 for contactor BFK09 with one NO contact and 230VAC 50/60Hz coil.
BFK0910A46060 for contactor BFK09 with one NO contact and 460VAC 60Hz coil.
❹ **NOTE: the maximum thermal current Ith of the BFK94 contactor is 115A.**

UL/CSA details
Maximum UL/CSA kvar ratings

	240V [kvar]	480V [kvar]	600V [kvar]
BFK0910A	4.5	9	10
BFK1210A	7	14	16
BFK1810A	9	17	20
BFK2600A	11	22	27.5
BFK3200A	14	27.5	32
BFK3800A	17	33	36
BFK5000A	22	41	46
BFK6500A	26	50	56
BFK8000A	30	60	75
BFK9500A	40	80	100
BFK11500A	45	90	120
BFK15000A	50	100	125

Operational characteristics

Type	IEC rated operational current ≤440V [A]	IEC - UL/CSA protection fuse gG-SC [A]
BFK09	12	16
BFK12	18	25
BFK18	23	40
BFK26	30	40
BFK32	36	63
BFK38	43	63
BFK50	58	80
BFK65	65	100
BFK80	75	125
BFK94	90	125
BFK95	90	125
BFK115	115	160
BFK150	144	160

Ambient operating temperature: ≤50°C. For ambient temperatures higher than 50°C and up to 70°C, the maximum operating power values indicated in the table must be reduced by a percentage equal to the difference between the operating ambient temperature and 50°C.
E.g.: using a BFK2600 contactor at the ambient temperature of 60°C, the maximum operating power
(at 400V) of the contactor will be equal to 20kvar – 10% = 18kvar.
Operating cycle: ≤120 cycles/h
Electrical life: ≥400,000 cycles.

Add-on auxiliary contacts
The following contact blocks, can be fitted on the BFK contactors: BFX12..., 11G418..., 11G481..., 11G482... and 11G218.

Certifications and compliance
Certification obtained (BFK9400A excluded):UL Listed for USA and Canada (cULus - File E93602), as Motor Controllers - Magnetic Capacitive Switches; CCC, EAC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, UL508, CSA C22.2 n° 14.
Plastic materials are compliant with standards IEC/EN/BS 60335; for BFK versions only, add suffix V260 to the standard product order code.

Kit to assemble BFK contactors

11G46...

Order code	For contactor	Qty per pkg n°	Wt [kg]
11G460	BF0910A - BF1210A - BF1810A - BF2600A - BF3200A - BF3800A	1	0.072
BFX10K3	BF5000A - BF6500A - BF8000A - BF9400A	1	0.078
BFX10K4	BF9500A - BF11500A - BF15000A	1	0.080

General characteristics
To optimise contactor stock management, a kit is available to transform normal three-pole contactors into BFK types for power factor correction. The table to the left indicates which kits to purchase depending on the standard contactor in stock.

Control relays BG00 type

11BG00...

11BGF00...

Order code	Configuration and n°of contacts❺		Quantity per pkg.	Wt
	NO	NC	n°	[kg]
AC COIL. Terminals: clamp screw.				
11BG0040A❶	4	0	1	0.170
11BG0031A❶	3	1	1	0.170
11BG0022A❶	2	2	1	0.170
Terminals: Faston.				
11BGF0040A❶	4	0	1	0.160
11BGF0031A❶	3	1	1	0.160
11BGF0022A❶	2	2	1	0.160
DC COIL. Terminals: clamp screw.				
11BG0040D❷	4	0	1	0.175
11BG0031D❷	3	1	1	0.175
11BG0022D❷❻	2	2	1	0.175
Terminals: Faston.				
11BGF0040D❷	4	0	1	0.165
11BGF0031D❷	3	1	1	0.165
11BGF0022D❷	2	2	1	0.165
DC COIL. Low-consumption (2.3W). Terminals: clamp screw❼.				
11BG0040L❸	4	0	1	0.175
11BG0031L❸	3	1	1	0.175
11BG0022L❸	2	2	1	0.175
Terminals: Faston.				
11BGF0040L❸	4	0	1	0.165
11BGF0031L❸	3	1	1	0.165
11BGF0022L❸	2	2	1	0.165

Operational characteristics
- IEC rated insulation voltage Ui: 690V
- IEC rated conventional free air thermal current Ith: 10A
- UL/CSA and IEC/EN/BS 60947-5-1 designation:
  - BG types: A600-Q600
  - BF types: A600-P600
- Low-consumption version of BG types cannot accept additional contacts.

NOTE: no coil change or replacement is possible.

Certifications and compliance
Certification obtained: CCC, EAC, UL Listed for USA and Canada (cULus - File E93602), as Motor Controllers - Auxiliary contactors for all; RINA for BF00 types.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.
Plastic materials are compliant with standards IEC/EN/BS 60335; for BF00 version only, add suffix V260 to the standard product order code.
Example: BF0040A230V260 for BF00 control relay having 4 NO auxiliary contacts and 230VAC 50/60Hz coil with compliant plastic materials.

NOTE: the BF00...D and BF00...L types have a standard supplied built-in TVS (Transient Voltage Suppressor).

Control relays BF00 type

BF00...A...

BF00...D...
BF00...L...

Order code	Configuration and n°of contacts❺		Quantity per pkg.	Wt
	NO	NC	n°	[kg]
AC COIL. Terminals: clamp screw.				
BF0040A❶	4	0	1	0.340
BF0031A❶	3	1	1	0.340
BF0022A❶	2	2	1	0.340
BF0004A❶	0	4	1	0.340
DC COIL. Terminals: clamp screw.				
BF0040D❷❹	4	0	1	0.470
BF0031D❷❹	3	1	1	0.470
BF0022D❷❹	2	2	1	0.470
BF0004D❷❹	0	4	1	0.470
DC COIL. Low consumption (2.4W). Terminals: clamp screw.				
BF0040L❸❹	4	0	1	0.470
BF0031L❸❹	3	1	1	0.470
BF0022L❸❹	2	2	1	0.470
BF0004L❸❹	0	4	1	0.470

❶ The order code must be completed either with the coil voltage digit if 50/60Hz or with the coil voltage digit followed by the number 60 if 60Hz. Standard voltages are:
– AC 50760Hz 024 / 048 / 110 - 230 / 400V
– AC 60Hz 024 60 / 048 60 /- 120 60 / 220 60 / 230 60 / 460 60 / 575 60 (V).
Example: 11BG0040A230 (auxiliary mini-contactor 4 NO auxiliary contacts supplied at 230VAC 50/60Hz).
BF0040A46060 (auxiliary contactor with 4 NO auxiliary contacts supplied at 460VAC 60Hz).

❷ Complete the order code with coil voltage digit. Standard voltages are:
– DC 012 / 024 / 048 / 060 / 110 / 125 / 220V.
Example: BF0040D012 (auxiliary contactor with 4 NO auxiliary contacts supplied at 12VDC).

❸ Low-consumption version. Complete the order code with coil voltage digit. Standard voltages are:
– DC 024 / 048V.
Example: 11BG0040L024 (low-consumption auxiliary mini-contactor with 4 NO auxiliary contacts supplied at 24VDC).

❹ Maximum combinations of add-on blocks are given on page 2-23.
❺ All contacts are highly conductive.
❻ On 11BG00222D, maximum 2 auxiliary contacts may be mounted.
❼ Auxiliary contact blocks and mechanical interlock cannot be mounted.

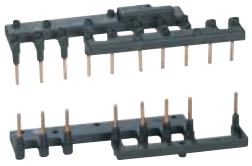
11BGX10... (20-11-02)
11BGX1111

11BGX10... (40-31-22-13-04)
11BGX1122

11BGXF...

11BGX77... -
11BGX78225 -
11BGX79...

11BGX5000



11SMX9021
11SMX9022

Order code	Characteristics	Max qty per contactor	Qty per pkg	Wt
		n°	n°	[kg]
Auxiliary contacts. Screw terminals.				
11BGX1002❶	2NC	1	10	0.021
11BGX1011❶	1NO + 1NC	1	10	0.021
11BGX1020❶	2NO	1	10	0.021
11BGX1004❷	4NC	1	10	0.028
11BGX1013❷	1NO + 3NC	1	10	0.028
11BGX1022❶	2NO + 2NC	1	10	0.028
11BGX1031❶	3NO + 1NC	1	10	0.028
11BGX1040❶	4NO	1	10	0.028
Auxiliary contacts for reversing and changeover assemblies. Screw terminals.				
11BGX1111❸	1NO + 1NC	1	10	0.021
11BGX1122❸	2NO + 2NC	1	10	0.028
Auxiliary contacts. Faston terminals.				
11BGXF1002❶	2NC	1	10	0.021
11BGXF1011❶	1NO + 1NC	1	10	0.021
11BGXF1020❶	2NO	1	10	0.021
11BGXF1004❷	4NC	1	10	0.028
11BGXF1013❷	1NO + 3NC	1	10	0.028
11BGXF1022❶	2NO + 2NC	1	10	0.028
11BGXF1031❶	3NO + 1NC	1	10	0.028
11BGXF1040❶	4NO	1	10	0.028
Mechanical interlock.				
11BGX5000❶	For BG...A and BG...D	1	10	0.008
Quick connect surge suppressors.				
11BGX77048	≤48VAC/DC (Varistor)		10	0.007
11BGX77125	48...125VAC/DC (Varistor)		10	0.007
11BGX77240	125...240VAC/DC (Varistor)		10	0.007
11BGX78225	≤225VDC (Diode)		10	0.007
11BGX79048	≤48VAC (Resistor-Capacitor)		10	0.007
11BGX79125	48...125VAC (Resistor-Capacitor)		10	0.007
11BGX79240	125...240VAC (Resistor-Capacitor)		10	0.007
11BGX79415	240...415VAC (Resistor-Capacitor)		10	0.007
Modular shroud.				
11BGX8000❹	IP40 front protection		20	0.006
Paralleling links.				
11G323❺	For 2 poles		10	0.009
11G324			10	0.009
11G325❺	For 4 poles		10	0.014
11G326			10	0.014
Rigid connecting kits.				
11SMX9021❻	Rigid connections for star-delta starter with BG... mini-contactors		10	0.040
11SMX9022❻	Rigid connections for reversing switches with BG... mini-contactors		1	0.026

❶ Cannot be used with BG...L types.
❷ Cannot be used with BG...D and BG...L types.
❸ Suitable for left-hand mini-contactor only of BGT and BGTP reversing and BGC changeover assemblies.
❹ The shroud can be used with BG... types with screw termination only and with no auxiliary contacts, surge suppressor or mechanical interlock mounted. It raises the front degree of protection of the mini-contactor when these are used in consumer switchboards.
❺ Cannot be used with BGX8000 shroud.
❻ Contactors with one NC auxiliary contact, 01 type, are usually used. The SM1 breaker can be directly fitted with rigid connector; type connection SM1X3040P for SM1P... breaker and connection SM1X3040R for SM1R... breaker. The relay cannot be directly mounted on the contactor. Use the RF38 type and the RFX3804 independent mounting base.

Operational characteristics

Type			BGX10... BGX11...	BGXF10...
IEC rated conventional free air thermal current Ith		A	10	10
IEC rated insulation voltage Ui		V	690	690
Minimum switching capacity			5V 10mA	
Terminals	Screw		M3	Faston 1x6.3mm 2x2.8mm
	Width	mm	6.9	6.9
Tightening torque		Nm	0.8...1	—
		lb.in	7...9	—
Conductor section maximum (with 1 or 2 cables)				
	flexible without lug	mm^2	2.5	2.5
	flexible with lug	mm^2	2.5	2.5
	AWG	n°	14	14
UL/CSA and IEC/EN/BS 60947-5-1 designation		AC	A600	A600
		DC	Q600	Q600
Mechanical life (million)		cycles	20	20

SM1 breaker - mini-contactor connecting kit
See page 1-9.

Certifications and compliance
Certifications obtained:

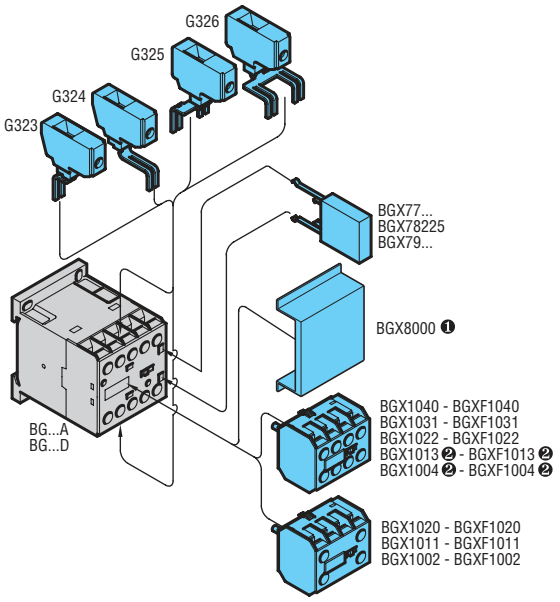
Type	UL	cULus	EAC	CCC
BGX10...	—	●	●	●
BGX11...	—	●	●	●
BGXF10...	—	●	●	—
BGX5000	—	●	●	—
BGX7...	—	●	●	—
BGX8000	—	—	●	—
G32...	—	—	●	—
SMX90...	ᴿᵁ	—	—	—

● Certified products.

ᴿᵁ - UL Recognized for USA only (File E197069) as Panel and Switchboard Accessories - Component. Products having this type of marking are intended for use as components of complete workshop-assembled equipment.
cULus - UL Listed for USA and Canada (cULus - File E93601) as Auxiliary Devices - Component.

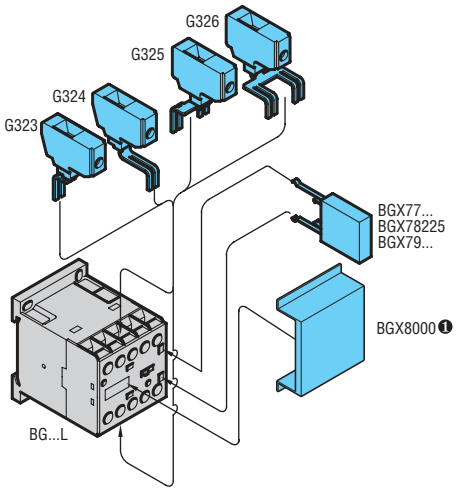
Compliant with standards: UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1; IEC/EN/BS 60947-1; IEC/EN/BS 60947-5-1 for auxiliary contacts.
The add-on auxiliary contact blocks 11BGX... and 11BGXF... comply with annex F of the IEC/EN/BS 60947-4-1 standard “auxiliary contact linked with power contact” also known as mirror contact. They also comply with annex L of the IEC/EN/BS 60947-5-1 standard “mechanically linked contact elements”.

Combinations: mounting position on BG...A and BG...D mini-contactors

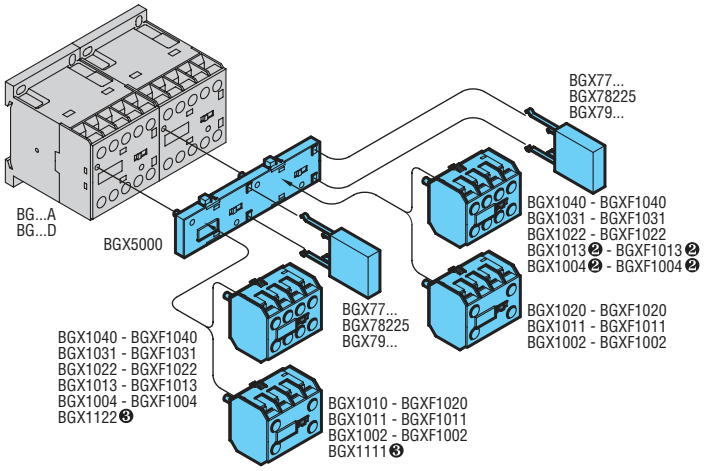


❶ Not suitable for mini-contactors BG... with auxiliaries contacts BGX10..., surge suppressor BGX7... and interlock BGX5000.
❷ Not suitable for BG...D types.

Combinations: mounting position on BG...L mini-contactors

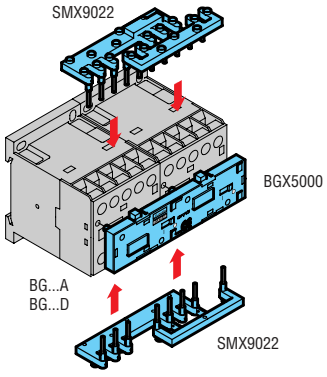


Combinations for reversing and changeover contactors assembled with BG...A and BG...D types

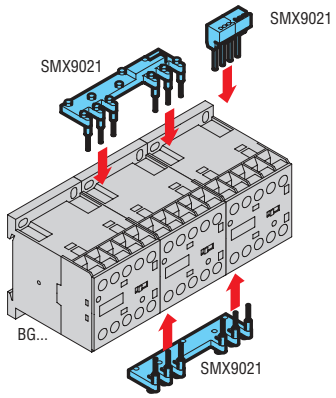


❷ Not suitable for BG...D types.
❸ For left-hand mini-contactor of BGT, BGTP and BGC contactor assemblies only.
See page 4-5.

Connections for reversing contactor assembly



Connections for star-delta assembly



BFX10...

11G484...

BFX10...

11G418...

11G218

11G481...
11G482

11G428...

BFX12...

11G485...
11G486...
11G487

Order code	Characteristics	Max qty per cont.	Qty per pkg.	Wt
		n°	n°	[kg]
Auxiliary contacts with front center mounting ❷. Screw terminals.				
BFX1002❶	2NC	1	5	0.030
BFX1011❶	1NO + 1NC	1	5	0.030
BFX1020❶	2NO	1	5	0.030
11G48403❶	3NC	1	5	0.039
11G48412❶	1NO + 2NC	1	5	0.039
11G48421❶	2NO + 1NC	1	5	0.039
11G48430❶	3NO	1	5	0.039
BFX1004	4NC	1	5	0.048
BFX1013	1NO + 3NC	1	5	0.048
BFX1022	2NO + 2NC	1	5	0.048
BFX1031	3NO + 1NC	1	5	0.048
BFX1040	4NO	1	5	0.048
BFX101111	1NO+1NC and 1EM❸+1LB❹	1	5	0.048
Auxiliary contacts with front lateral mounting. Screw terminals❽.				
11G41801	1NC	2	10	0.014
11G41801D	1LB❸	2	10	0.014
11G41810	1NO	2	10	0.014
11G41810A	1EM❹	2	10	0.014
Auxiliary contacts with front lateral mounting. Faston terminals❼.				
11G218	1NO or 1NC reversible	2	10	0.011
11G48102	2NC	2	10	0.013
11G48111	1NO + 1NC	2	10	0.013
11G48120	2NO	2	10	0.013
11G482❷❺	Changeover contact	2	10	0.013
Adapter for auxiliary contact side mounting.				
11G280	for G218	2	10	0.008
11G419	for G418	2	10	0.010
11G483	for G481 and G482	2	10	0.010
Auxiliary contacts with low side mounting. Screw terminals.				
BFX1202❷	2NC	2	5	0.044
BFX1211❷	1NO+1NC	2	5	0.044
BFX1220❷	2NO	2	5	0.044
11G42801	1NC	2	10	0.024
11G42801D	1LB❸	2	10	0.024
11G42810	1NO	2	10	0.024
11G42810A	1EM❹	2	10	0.024
Delayed auxiliary contacts 1NO + 1NC (pneumatic operation) on energisation for front center mounting ❶❽. Screw terminals.				
11G4853	3s	1	1	0.040
11G4856	6s	1	1	0.040
11G48515	15s	1	5	0.040
11G48530	30s	1	5	0.040
11G48560	60s	1	5	0.040
11G485120	120s	1	1	0.040
Delayed auxiliary contacts 1NO + 1NC (pneumatic operation) on de-energisation for front center mounting ❶❽. Screw terminals.				
11G4863	3s	1	1	0.040
11G4866	6s	1	1	0.040
11G48615	15s	1	5	0.040
11G48630	30s	1	5	0.040
11G48660	60s	1	5	0.040
11G486120	120s	1	1	0.040
11G487	70ms	1	1	0.040

❶ The contacts can also be fitted on B type contactors using the adapter G358.See pages 2-32 and 2-33.
❷ Highly conductive contacts.
❸ Normally closed late-break contact.
❹ Normally open early-make contact.
❺ Gold-plated contacts inside tight casing for use in pollutant environments.
The Ith value refers to 125VAC and 30VDC.
Minimum applicable load: 5VDC 1mA.IEC IP20 protection is warranted to equipment wired with insulated Faston terminals.
❻ IEC IP20 protection is warranted to equipment wired with minimum 0.75mm² conductor section.
Designation in DC is Q600 for G418 and G419 types.
❼ IEC IP20 protection is warranted to equipment wired with insulated Faston terminals.
❽ IEC IP20 protection is warranted to equipment wired with minimum 1mm² conductor section.
Mechanical life is 3 million cycles.
❾ 1.5mm² for insulated bootlace ferrules.

Operational characteristics for add-on auxiliary contacts

Type			G418❻ G428❻ G485❽ G486❽ G487❽	G484 BFX10 BFX12	G218❼ G481❼	G482❺
IEC conventional free air thermal current Ith		A	10	10	10	0.1❺
IEC rated insulation voltage Ui		V	690	690	690	690
Minimum switching capacity			5V 10mA			5V 1mA
Terminals	Screw		M3.5	M3	—	—
	Width	mm	7	7	—	—
	Faston		—	—	1x6,35 2x2.8	1x6,35 2x2.8
Tightening torque		Nm	0.8...1	0.8...1	—	—
		lb.in	7...9	7...9	—	—
Conductor section maximum with (1 or 2 cables						
	flexible w/o lug	mm²	2.5	2.5❾	—	—
	flexible c/w lug	mm²	2.5	2.5	2.5	2.5
	AWG	n°	14	14	14	14
Terminal protection per IEC/EN/BS 60529			IP20	IP20	IP20❼	IP20❺
UL/CSA and IEC/EN/BS 60947-5-1 designation		AC	A600	A600	A600	—
		DC	P600❻	Q600	P600	—
Mechanical life (million)		cycles	10❽	10	10	10

SM1 breaker - contactor connecting kit
See page 1-9.

Maximum assembly combination of add-on blocks
See pages 2-23 and 2-26...27.

Certifications and compliance
Certifications obtained:

Type	UL	cULus	CSA	EAC	CCC
BFX10...	—	●	—	●	●
BFX12...	—	●	—	●	—
G218	𝓤𝓛	—	●	●	—
G418..., G428...	𝓤𝓛	—	●	●	—
G481...	𝓤𝓛	—	●	●	—
G482	𝓤𝓛	—	●	●	—
G484...	𝓤𝓛	—	●	●	—
G485...	𝓤𝓛	—	●	●	—
G486...	𝓤𝓛	—	●	●	—
G487...	𝓤𝓛	—	●	●	—

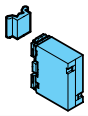
● Certified products.

𝓤𝓛 - UL Recognized for USA only (File E93601) as Auxiliary Devices - Component.
Products having this type of marking are intended for use as components of complete workshop-assembled equipment.
cULus - UL Listed for USA and Canada (cULus - File E93601) as Auxiliary Devices.
CSA - CSA certified for Canada only (File 54332) as Auxiliary Devices for motor controllers.

Add-on auxiliary contacts are compliant with the following standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL 60947-1, UL 60947-5-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-5-1.
The add-on auxiliary contact blocks BFX10... (BFX101111 excluded) and BFX12... comply with annex F of the IEC/EN/BS 60947-4-1 standard “auxiliary contact linked with power contact” also known as mirror contact. They also comply with annex L of the IEC/EN/BS 60947-5-1 standard “mechanically linked contact elements”.
For the BF40...BF150 contactors, compliance with annex L of the IEC/EN/BS 60947-5-1 standard applies only to the versions with electronically controlled AC/DC coil.

BF00A, BF09A...BF150A, BF40E...BF150E

Maximum assembly combination for alternating-current contactors BF00A, BF09A...BF150A.
Maximum assembly combination for alternating/direct-current contactors BF40E...BF150E.

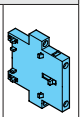
			Front centre mount					Front lateral mount			Side mount	
											
			BFX1002	BFX1004	G485...	G222...❹	BFX5002	BFX5303	G418...	G428...	BFX1202
			BFX1011	BFX1013	G486...	G272...❹	BFX5003 ❶	BFX5403 ❾	G218	G419+ G418...	BFX1211
									G481...		
			BFX1020	BFX1022	G487	BFX641... ❹			G482	G280+ G218	BFX120
				BFX1031						G483+ G481...	BFX5000 ❸❽
				BFX1040						G483+ G482	BFX5001 ❸❽
			n° of blocks 1 type only			n° of blocks	n° of blocks 1 type only		n° of blocks	n° of blocks	n° of blocks
Contactors	Control relay	BF00A	1	1	1	1 ❺	1	—	1 or 2 ❶	1 or 2 ❶	1 ❸
	Three-poles	BF09A...BF25A	1	1	1	1 ❺	1	—	1 or 2 ❶	1 or 2 ❶	1 ❸
		BF26A...BF38A	1	1	1	1 ❺	1	—	1 or 2 ❶	1 or 2 ❶	1 ❸
		BF40A...-BF150A	1	1	1	1 ❺	—	1 ❿	1 or 2 ❶	2	1 ❸
		BF40E...-BF150E	1	1	1	1 ❺	—	1 ❿	1 or 2 ❶	2	1 ❸
	Four-poles	BF09A...BF25A	1	1	1	1 ❺	1	—	1 or 2	1 or 2 ❶	1 ❸
		BF26A...BF38A	1	1	1	1 ❺	1 ❸	—	1 ❶	1 or 2 ❶	1 ❸
		BF40A...-BF150A	1	1	1	1 ❺	—	1 ❿	1 or 2	2	1 ❸
		BF40E...-BF150E	1	1	1	1 ❺	—	1 ❿	1 or 2	2	2

OR + OR OR OR

❶ Cannot be fitted with BFX10... with 4 contacts and G222.
❷ To fit the mechanical interlock, the add-on fourth pole needs to be mounted on the left side of the one of the contactors.
❸ One only side-mount block can be fitted on each contactor whenever the BFX500... interlock is mounted.
❹ One BFX10... or delayed G48... contact block can be mounted on the G222, G272 or BFX641 mechanical latch.
❺ G222 mechanical latch.
❻ G272 mechanical latch for BF40...BF80; BFX641 for BF95...BF150.
❽ For BF40...BF94 code BFX5300 or BFX5301; for BF95...BF150 code BFX5400 or BFX5401.
❾ BFX5303 for BF40...BF94; BFX5403 for BF95...BF150.
❿ BFX5303 cannot be mounted if a contact block BFX10... with 4 contacts (BFX1004, BFX1013, BFX1022, BFX1031, BFX1040) is installed.

BF00D, BF09D...BF38D, BF00L, BF09L...BF38L

Maximum assembly combination for direct-current contactors BF00D, BF09D...BF38D.
Maximum assembly combination for direct-current contactors BF00L, BF09L...BF38L with low consumption.

			Front centre mount											Front lateral mount		Side mount	
																	
			BFX10...			BFX10...				G485...		G222... ❹		1 type only BFX50...			BFX12... ❸
			...02	...11	...20	...04	...13	...22	...31	40	G486.. G487			...02	...03 ❶	...00	...01
			n° of blocks 1 type only									n° of blocks		n° of blocks 1 type only			
Contactors	Control relay	BF00D	1			1		1		1		1		1	1	1	1
		BF00L	1			—		1		—		1		1	1	—	—
	Three-poles	BF09D-BF25D	1			1		1		1		1		1	1	1	1
		BF26D-BF38D	1			1		1		1		1		1	1	1	1
		BF09L-BF25L	1			—		1		—		1		1	1	—	—
		BF26L-BF38L	1			—		1		—		1		1	1	—	—
	Four-poles	BF09D-BF25D	1			1		1		1		1		1	1	1	1
		BF26D-BF38D	—	1		—		—		—		1		1❼	1❼	1	1
		BF09L-BF25L	1			—		1		—		1		1	1	—	—
		BF26L-BF38L	—	1	—	—		—		—		—		1❼	1❼	—	—

OR +

❶ Mounting of BFX5003 interlock is not possible when BFX10... block with 4 contacts and G222 latch are mounted.
❸ One only side-mount block can be fitted on each contactor whenever the BFX500... interlock is mounted.
❹ One BFX10... or delayed G48... contact block can be mounted on the G222 or G272 mechanical latch.
❼ To fit the mechanical interlock, the add-on fourth pole needs to be mounted on the left side of the one of the contactors.
For other assembly combination, consult Technical support (E-mail: service@LovatoElectric.com).

BFX42
BFXD42

BFX5000
BFX5300
BFX5400

BFX5001
BFX5301
BFX5401

BFX5002

BFX5003
BFX5303
BFX5403

11G222...
11G272...
BFX641...

11G454
11G455
BFX642

BFX77...
BFX79...

Order code	Characteristics	Max qty per cont.	Qty	Wt
		n°	n°	[kg]
Fourth pole.				
BFX42	For BF26A, BF32A, BF38A	1	1	0.100
BFXD42	For BF26D, BF32D, BF38D, BF26L, BF32L, BF38L	1	1	0.108
BFX43	For BF40A... BF94A and BF40E...BF94E	1	1	0.150
BFX44	For BF95A...BF150A and BF95E...BF150E	1	1	0.500
Mechanical interlock.				
BFX5000❶	Side mount for BF00, BF09...BF38	1	5	0.039
BFX5001❶	Side mount with 2NC contacts for BF00, BF09...BF38	1	5	0.052
BFX5002	Front mount, low contacts for BF00, BF09...BF38	1	5	0.006
BFX5003	Front mount for BF00, BF09...BF38	1	5	0.023
BFX8910	Spacer for interlocking BF09...BF38 AC/DC with types in DC	1	10	0.017
BFX5300	Side mount for BF40...BF94 A/E	1	5	0.039
BFX5301	Side mount with 2NC contacts for BF40...BF94 A/E	1	5	0.052
BFX5303	Front mount for BF40...BF94 A/E	1	5	0.034
BFX5400	Side mount for BF95...BF150 A/E	1	5	0.039
BFX5401	Side mount with 2NC contacts for BF95...BF150 A/E	1	5	0.052
BFX5403	Front mount for BF95...BF150 A/E	1	5	0.034
Mechanical latch. Screw terminals.				
11G222❷	For BF00, BF09...BF38	1	1	0.070
11G272❷	For BF40...BF94	1	1	0.070
BFX641...❷	For BF95...BF150	1	1	0.070
Manual closing mechanism.				
11G454	For BF00, BF09...BF38	1	1	0.021
11G455	For BF40...BF94	1	1	0.021
BFX642	For BF95...BF150	1	1	0.021
Quick connect surge suppressors for BF00A, BF09A...BF150A contactors.				
BFX77048	≤48VAC/DC (Varistor)		5	0.012
BFX77125	48...125VAC/DC (Varistor)		5	0.012
BFX77240	125...240VAC/DC (Varistor)		5	0.012
BFX79048	≤48VAC (Resistor-Capacitor)		5	0.012
BFX79125	48...125VAC (Resistor-Capacitor)		5	0.012
BFX79240	125...240VAC (Resistor-Capacitor)		5	0.012
BFX79415	240...415VAC (Resistor-Capacitor)		5	0.012

NOTE: All contactors BF series, equipped with DC or AC/DC electronic coil, have built-in surge suppressor filter.

❶ Different sized contactors can be interlocked.
Example: BF09...BF25 with BF26...BF38.

❷ Replace with the digit of the voltage if 50 or 60Hz and with the letter C followed by the digit of the voltage if DC. Standard voltages are:
– AC 50/60Hz 24 (indicate 24) - 48 (indicate 48) - 110...125 (indicate 110) 220...240 (indicate 220) - 380...415V (indicate 380).
– DC 12 (indicate 12) - 24 (indicate 24) - 48 (indicate 48) 110...125 (indicate 110) - 220...240V (indicate 220).

Operational characteristics

Type		BFX42 BFXD42	BFX43	BFX44	BFX5001 BFX5301 BFX5401
IEC conventional free air thermal current Ith	A	56	115	165	10
IEC rated insulation voltage Ui	V	690	1000	1000	690
Minimum switching capacity		5V 10mA			
Terminals: Screw		M4	M6	M8	M3
Width	mm	12.5	9.6	14.5	7
Tightening torque	Nm	2.5...3	4...5	5.5...6.5	0.8...1
	lb.in	21.6...26.4	35.4...44.2	48...57	7...9
Conductor section maximum with 1 or 2 cables flexible w/o lug	mm^2	16	35	70	2,5
flexible c/w lug	mm^2	16	35	70	2,5
AWG	n°	6	2	2/0	14
Terminal protection for IEC/EN/BS 60529		IP20❸	IP20❸	IP20❸	IP20
UL/CSA and IEC/EN/BS 60947-5-1 designation	AC	—	—	—	A60
	DC	—	—	—	Q600
Mechanical life (million)	cycles	20	15	15	10

Type			G222...	G272...	BFX641
Rated control circuit voltage	AC (50/60Hz)	V	24...415	24...415	24...415
	DC	V	12...240	12...240	12...240
Power consumption with control:	AC	VA	40	40	40
	DC	W	70	70	70
Minimum energising:	drop-out	ms	10	10	10
	pick-up	ms	100	200	200
Tightening torque		Nm	0.8...1	0.8...1	0.8...1
		lb.in	7...9	7...9	7...9
Conductor section Maximum with 1 or 2 cables flexible w/o lug		mm^2	4	4	4
flexible c/w lug		mm^2	2.5	2.5	2.5
AWG		n°	14...12	14...12	14...12
Mechanical life (million)		cycles	0.1	0.1	0.01

❸ The condition is front IP20 protection.

Maximum assembly combination of add-on blocks
See pages 2-23, 2-26...27.

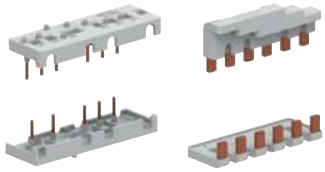
Certifications and compliance
Certifications obtained:

Type	UL	cULus	CSA	EAC
BFX42 - BFXD42 - BFXD43	—	●	—	●
BFX5...	—	●	—	●
BFX77... - BFX79...	—	●	—	●
G222... - G272... - BFX641	𝓤𝓛	—	●	●

● Certified products.

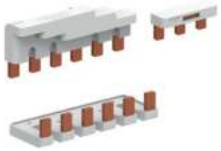
𝓤𝓛 - UL Recognized for USA only (File E93601) as Auxiliary Devices Component.
Products having this type of marking are intended for use as components of complete workshop-assembled equipment.
cULus - UL Listed for USA and Canada (cULus - File E93602) as Magnetic motor controllers.
CSA - CSA certified for Canada only (File 54332) as Auxiliary Devices for motor controllers.

Compliant with standards: IEC/EN/BS 60947-1, UL 60947-1, CSA C22.2 n° 60947-1. IEC/EN/BS 60947-5-1, UL 60947-5-1, CSA C22.2 n° 60947-5-1 for auxiliary contacts IEC/EN/BS 60947-4-1, UL 60947-4-1, CSA C22.2 n° 60947-4-1 for four-poles.


BFX310...
BFX3201

BFX3301
BFX3401

BFX3131
BFX3231


BFX3331
BFX3431

BFX3361
BFX3461

BFX3371
BFX3471

BFX833
BFX834

BFX3393

BFX3392
BFX3492

11BA135
11BA235

11BA435

11G231
11G232

BFX3399

BFX8901

BFX80

BFX8902

Order code	Characteristics	Qty per pkg	Wt
		n°	[kg]
Rigid connecting kits for three-pole reversing contactor assembly.			
BFX3101	For contactors BF09...BF25 side by side with BFX5002 or BFX5003 mechanical interlock	1	0.052
BFX3102	For contactors BF09...BF25 side by side with BFX5000 or BFX5001 mechanical interlock	1	0.054
BFX3201	For contactors BF26...BF38 side by side with BFX50... mechanical interlock	1	0.060
BFX3301	For contactors BF40...BF94 side by side with BFX5303 mechanical interlock	1	0.150
BFX3401	For contactors BF95...BF150 side by side with BFX5403 mechanical interlock	1	0.200
Rigid connecting kits for star-delta starters.			
BFX3131	For contactors BF09...BF25	1	0.058
BFX3231	For contactors BF26...BF38	1	0.064
BFX3232	For contactors BF26...BF38 (L/Δ) BF09...BF25 (Δ)	1	0.064
BFX3332	For contactors BF40...BF94 (L/Δ) BF26...BF38 (Δ)	1	0.200
BFX3331	For contactors BF40...BF94	1	0.220
BFX3432	For contactors BF95...BF150 (L/Δ) BF40...BF94 (Δ)	1	0.250
BFX3431	For contactors BF95...BF150	1	0.270
Rigid connecting kits for changeovers.			
BFX3361	For three-pole contactors BF40...BF94 with BFX5300/BFX5301 mechanical interlock	1	0.150
BFX3461	For three-pole contactors BF95...BF150 with BFX5400/BFX5401 mechanical interlock	1	0.200
BFX3371	For four-pole contactors BF40...BF80 with BFX5300/BFX5301 mechanical interlock	1	0.200
BFX3471	For four-pole contactors BF95...BF150 with BFX5400/BFX5401 mechanical interlock	1	0.300
IP20 protection for power terminals. 2 pieces for each contactor are required.			
BFX833	For three-pole contactors BF40...BF94	10	0.020
BFX834	For three-pole contactors BF95...BF150	10	0.030
Non-insulated paralleling links.			
11BA135	2 poles for contactors BF09...BF25 types	10	0.001
11BA235	2 poles for contactors BF26...BF38 types	10	0.003
BFX3392	2 poles for contactors BF40...BF94 types	4	0.022
BFX3492	2 poles for contactors BF95...BF150 types	4	0.027
BFX3393	3 poles for contactors BF40...BF94 types	4	0.038
11BA435	3 poles for contactors BF95...BF150 types	10	0.030
Insulated paralleling link with terminal.			
BFX3399	3 poles (for contactors BF40...BF94) Conductor section connectable: 25...95mm² (95mm² without lug)	10	0.135
One-pole enlarged terminals.			
11G231	1x6mm² for contactors BF09...BF25 types	12	0.009
11G232	1x16mm² for contactors BF26...BF38 types	12	0.014
Sealing cover.			
BFX80	Sealing cover for contactors BF00 and BF09...BF38	10	0.001
Screw fixing adapters for contactors.			
BFX8901	Universal base to screw fix BF09...BF38 contactors	5	0.016
BFX8902	Screw fixing brackets for BF09...BF38 contactors	10	0.002
Marking element for BF00, BF09...BF150 contactors.			
BFX30	Blank label for writing	50	0.001

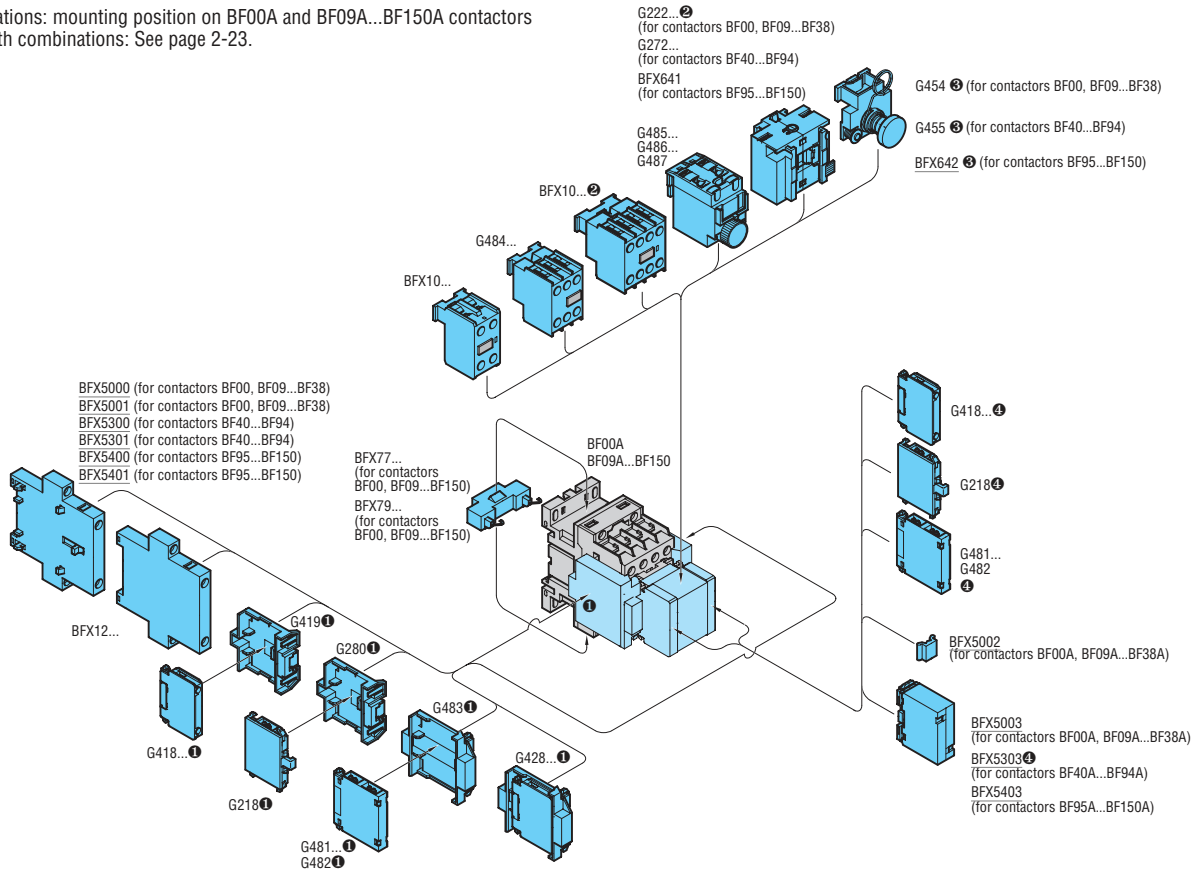
Operational characteristics

Type		BFX3399	11G231	11G232
Tightening torque	Nm	13Nm	1.5-1.8	2.5-3
	lb.in	115	13.2-18	7-9
Tool	Type	Allen key 6	PH1	PH2

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada (cULus - File E93602), for all connecting kits for starters and changeovers BFX3... ; EAC.
Compliant with standards: IEC/EN/BS 60947-1, UL 60947-1, CSA C22.2 n° 60947-1.

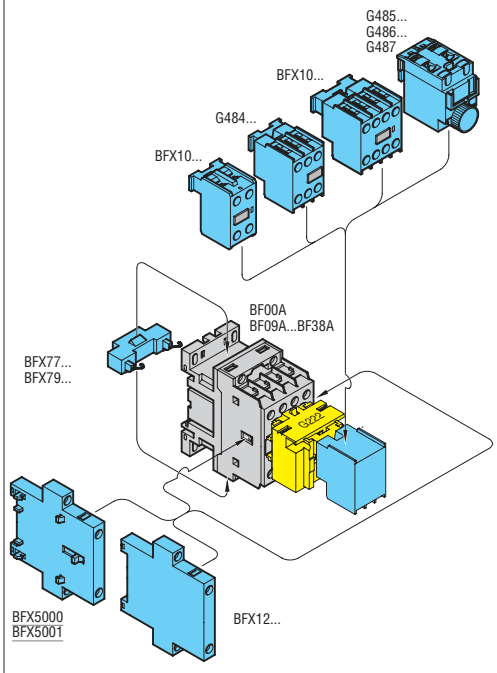
Add-on blocks for AC and AC/DC contactors

Combinations: mounting position on BF00A and BF09A...BF150A contactors
Table with combinations: See page 2-23.

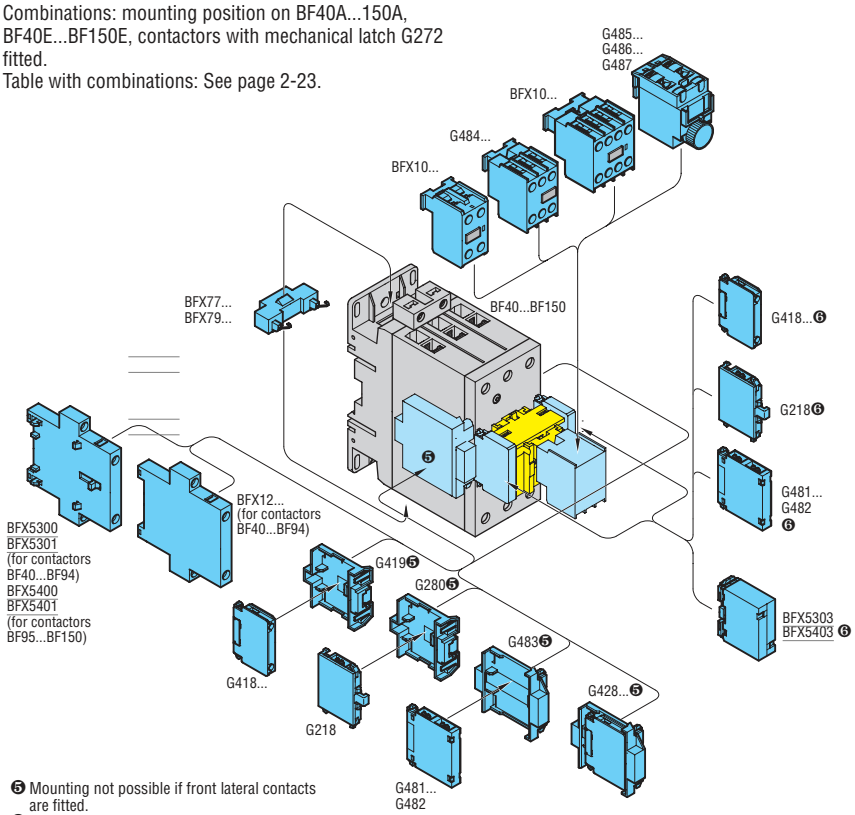


❶ Mounting is not possible if front lateral contacts or mechanical interlock BFX5000 or BFX5001 are mounted. BF00, BF09...38 cannot be fitted with BFX10 with 4 contacts or G222...
❷ Refer to the diagrams below for use of G222..., G272... and BFX641...; see also the table of combinations on page 2-23.
❸ No add-on block can be mounted on front when the manual closing mechanism G454 or G455 is fitted.
❹ This accessory, for contactors BF09...BF94, cannot be mounted if a contact block BFX10... with 4 contacts (BFX1004, BFX1013, BFX1022, BFX1031, BFX1040) is installed.

Combinations: mounting position on BF00A and BF09A-BF38A contactors with mechanical latch G222 fitted.
Table with combinations: See page 2-23.



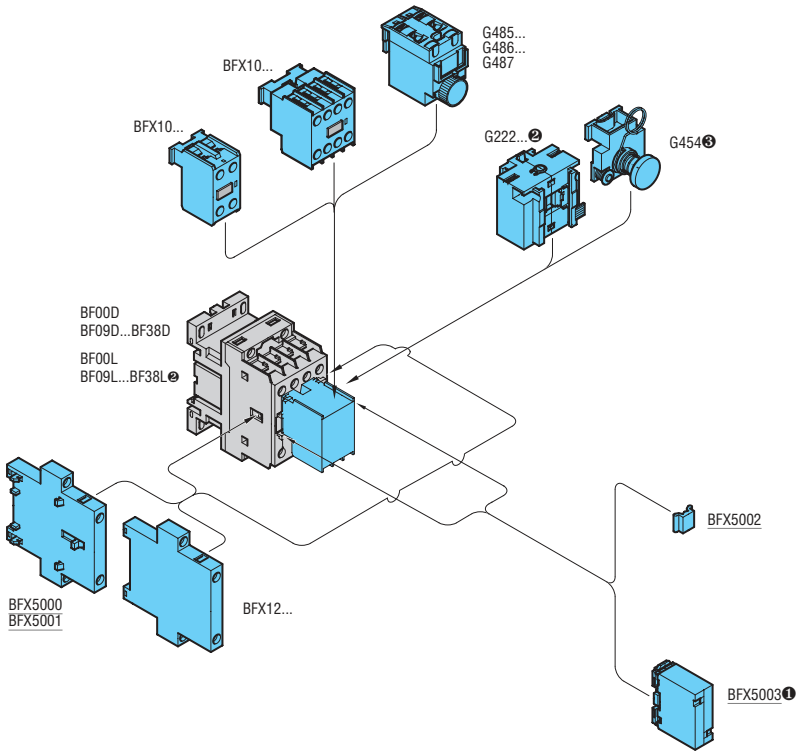
Combinations: mounting position on BF40A...150A, BF40E...BF150E, contactors with mechanical latch G272 fitted.
Table with combinations: See page 2-23.



❺ Mounting not possible if front lateral contacts are fitted.
❻ Mounting only for BF95...BF150.

Add-on blocks for DC and DC low consumption contactors

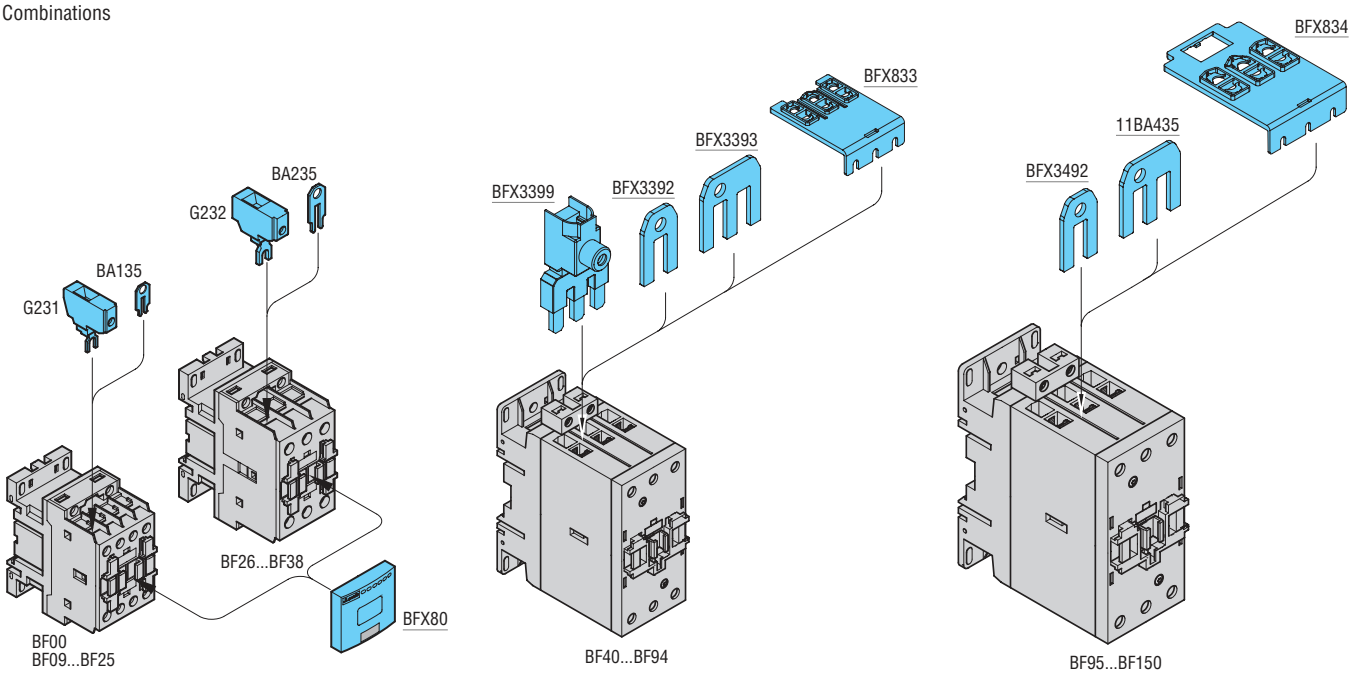
Combinations: mounting position on BF00 and BF09-BF38, D and L versions
Table with combinations: See page 2-23.



❶ Mounting not possible when the G222 mechanical latch is fitted.
❷ The G222 mechanical latch cannot be fitted on BF26L - BF38L four-pole types.
❸ No add-on block can be mounted on front when the G454 manual closing mechanism is fitted.

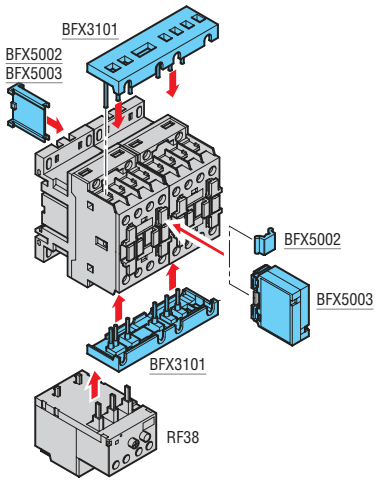
Accessories for AC, DC and DC low consumption contactors

Combinations

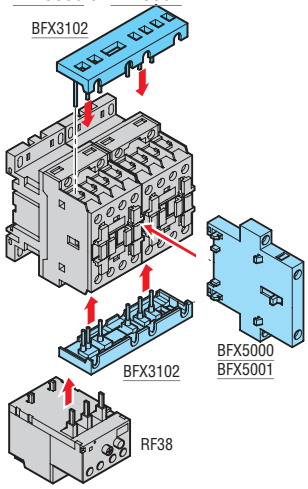


Accessories for AC, DC and DC low consumption contactors

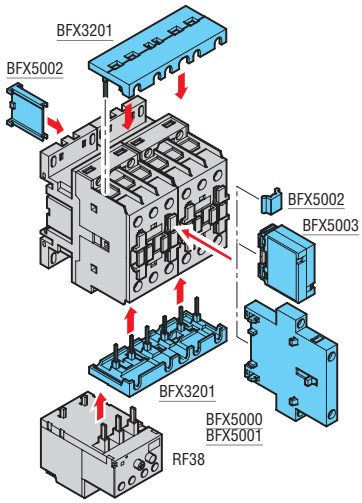
Rigid connecting kits for three-pole reversing contactor assembly. For BF09...BF25



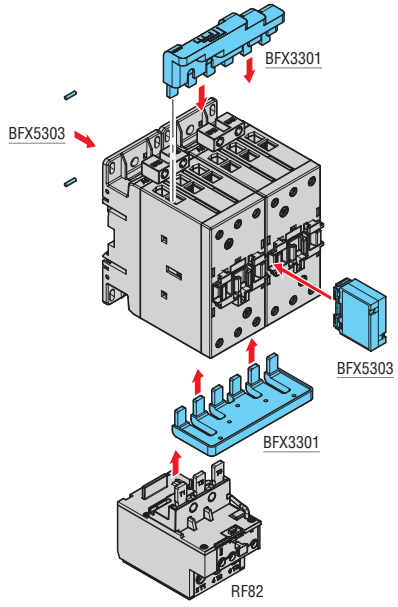
Rigid connecting kits for three-pole reversing contactor assembly. For BF09...BF25 and mechanical interlock BFX5000 or BFX5001



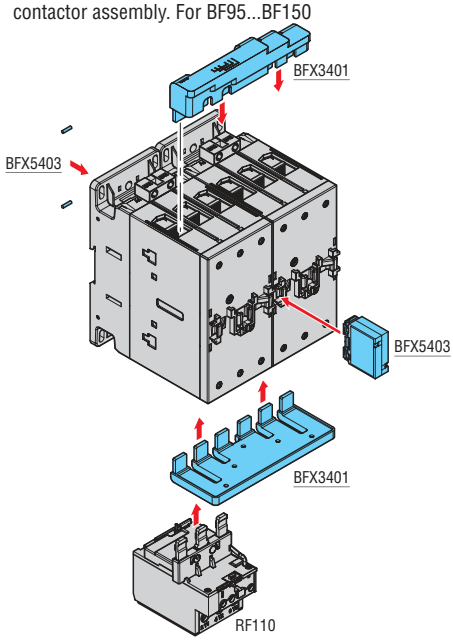
Rigid connecting kits for three-pole reversing contactor assembly. For BF26...BF38



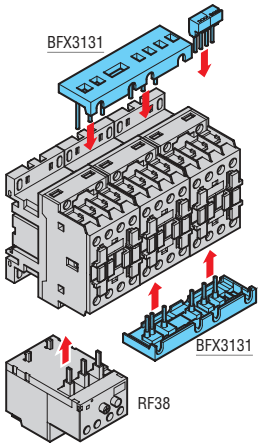
Rigid connecting kits for three-pole reversing contactor assembly. For BF40...BF94



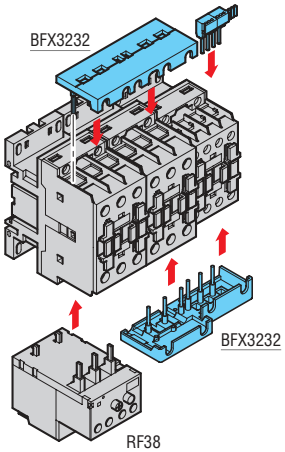
Rigid connecting kits for three-pole reversing contactor assembly. For BF95...BF150



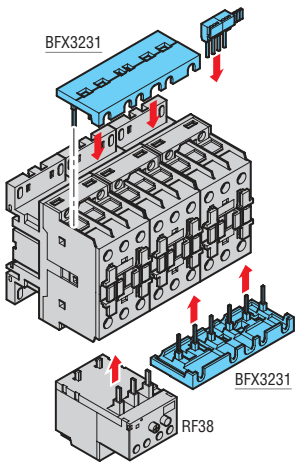
Rigid connecting kits for star-delta starters. For BF09...BF25 contactors



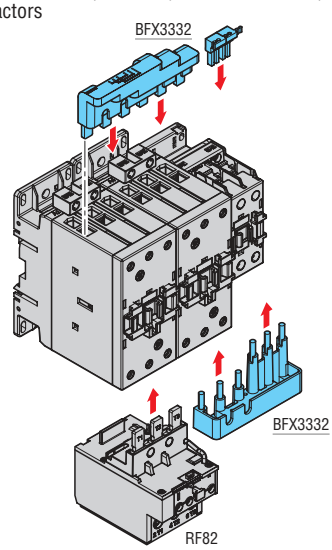
Rigid connecting kits for star-delta starters. For BF26...BF38 (line-delta) and BF09...BF25 (star) contactors



Rigid connecting kits for star-delta starters. For BF26...BF38 contactors

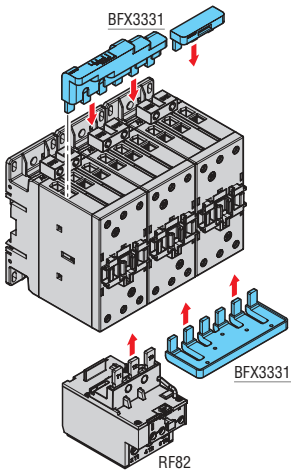


Rigid connecting kits for star-delta starters. For BF40...BF94 (line-delta) and BF26...BF38 (star) contactors

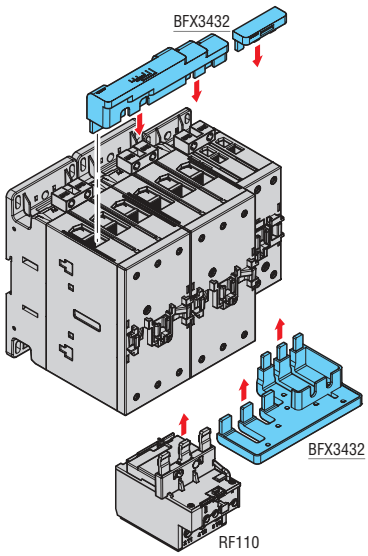


Dimensions
pages 2-48 and 49

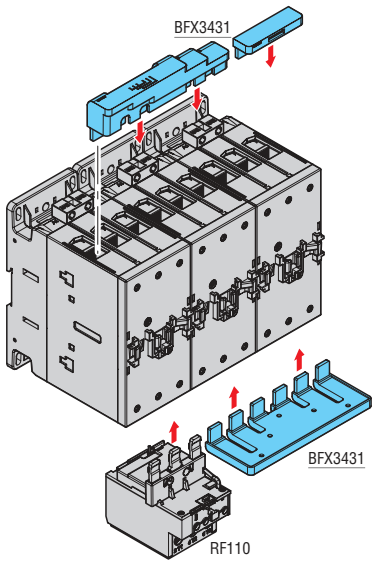
Rigid connecting kits for star-delta starters.
For BF40...BF94 contactors



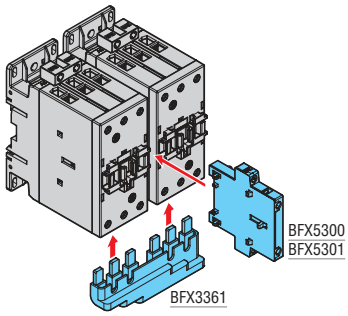
Rigid connecting kits for star-delta starters.
For BF95...BF150 (line-delta) and BF40...BF94 (star) contactors



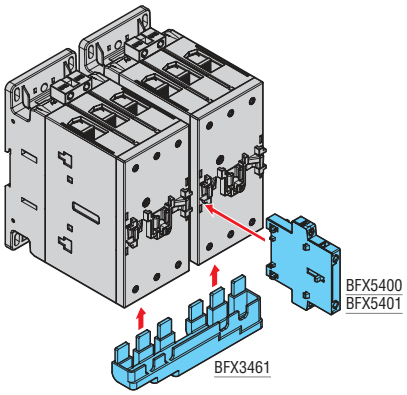
Rigid connecting kits for star-delta starters.
For BF95...BF150 contactors



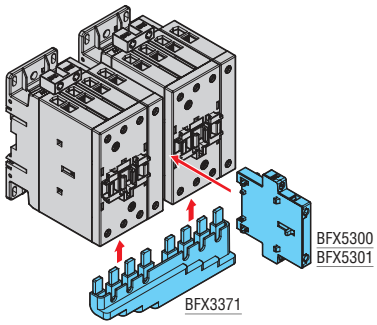
Rigid connecting kits for changeovers. For BF40...
BF94 three-pole contactors



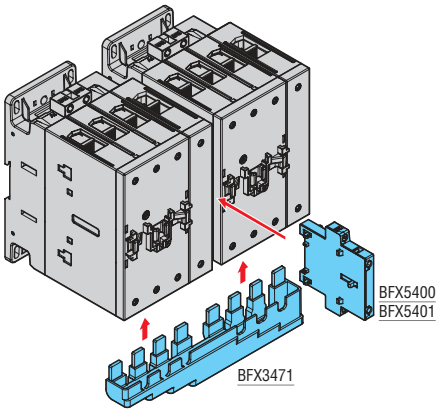
Rigid connecting kits for changeovers.
For BF95...BF150 three-pole contactors



Rigid connecting kits for changeovers.
For BF40...BF94 four-pole contactors



Rigid connecting kits for changeovers.
For BF95...BF150 four-pole contactors



Contactors

Add-on blocks and accessories for contactors BF160...BF400

BFX10C01

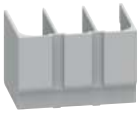
BFX10C10

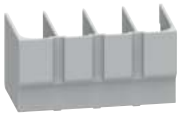
BFX12C...

BFX5500

BFX5503
BFX5504

BFX815
BFX816


BFX835
BFX836


BFX845
BFX846

BFX805
BFX806

GLX500
GLX501

GMX500

GMX501

BFX3583
BFX3683

BFX3584
BFX3684

BFX8508
BFX8608

Order Code	Characteristics	Max qty per cont.	Qty per pkg	Wt
		n°	n°	[kg]
Auxiliary contacts with front-mounting. Screw terminals.				
BFX10C10	1NO	6	10	0.048
BFX10C01	1NC	6	10	0.048
Auxiliary contacts with low side-mounting. Screw terminals.				
BFX12C02	2NC	2	5	0.048
BFX12C11	1NO + 1NC	2	5	0.048
BFX12C20	2NO	2	5	0.048
Mechanical interlock.				
BFX5500	For contactors BF160...BF400. Side by side mounting.	1	1	0.050
new **BFX5503**	For contactors BF160...BF400. One on top of other mounting. Interaxis 305...345mm	1	1	0.150
BFX5504	For contactors BF160...BF400. One on top of other mounting. Interaxis: 345...385mm	1	1	0.200

Order Code	Characteristics	Qty per pkg	Wt
		n°	[kg]
Power terminal protection. One-pole terminal cover.			
new **BFX815** ❶	For BF160...BF230	6	0.026
new **BFX816** ❶	For BF265...BF400	6	0.035
Three-pole terminal cover.			
new **BFX835**	For BF160...BF230	1	0.050
new **BFX836**	For BF265...BF400	1	0.075
Four-pole terminal cover			
new **BFX845**	For BF160T4...BF230T4	1	0.070
new **BFX846**	For BF265T4...BF400T4	1	0.098
Phase barrier.			
new **BFX805** ❸	For BF160...BF230	1	0.021
new **BFX806** ❹	For BF265...BF400	1	0.030
Terminal clamp sets for rigid and flexible cables.			
GLX500	1-piece set. For AWG 6....kcmil 250 wires.	1	0.011
GLX501	3-piece set. For AWG 6....kcmil 250 wires.	1	0.011
GMX500 ❷	6-piece set. For AWG 14...2/0 wires.	1	0.200
GMX501	6-piece set. For AWG 4....kcmil 300 wires.	1	0.200
Connections and captive nut accessory. Terminal enlargement.			
new **BFX3583**	For BF160...BF230 three-pole	1	0.100
new **BFX3683**	For BF265...BF400 three-pole	1	0.140
new **BFX3584**	For BF160...BF230 four-pole	1	0.130
new **BFX3684**	For BF265...BF400 four-pole	1	0.180
Paralleling link.			
new **BFX3592**	Two-pole paralleling for BF160...BF230	1	0.050
new **BFX3692**	Two-pole paralleling for BF265...BF400	1	0.070
new **BFX3593**	Three-pole paralleling for BF160...BF230	1	0.070
new **BFX3693**	Three-pole paralleling for BF265...BF400	1	0.098
Connecting kit for reversing contactor assembly.			
BFX3501	Per BF160...BF230	1	1.000
BFX3601	Per BF265...BF400	1	1.400
Connecting kits for star-delta starter.			
BFX3531	For BF160...BF230	1	1.100
BFX3631	For BF265...BF400	1	1.500
Rigid connecting kit for changeover.			
new **BFX3561**	For BF160...BF230 three-pole	1	0.900
new **BFX3661**	For BF265...BF400 three-pole	1	1.250
new **BFX3571**	For BF160...BF230 four-pole	1	1.200
new **BFX3671**	For BF265...BF400 four-pole	1	1.700
Captive nut.			
new **BFX8508**	For BF160...BF230. 8-piece set	1	0.052
new **BFX8608**	For BF265...BF400. 8-piece set	1	0.073

Operational characteristics for add-on auxiliary contacts

Type			BFX10C10 BFX10C01	BFX12
IEC conventional free air thermal current Ith		A	10	10
IEC rated insulation voltage Ui		V	690	690
Terminals	Screw		M3.5	M3
	Width	mm	7	7
Tightening torque		Nm	0.8...1	0.8...1
		lb.in	7...9	7...9
Conductor section maximum with (1 or 2 cables)	flexible w/o lug	mm²	2.5	2.5
	flexible c/w lug	mm²	2.5	2.5
	AWG	n°	14	14
Terminal protection per IEC/EN/BS 60529			IP20	IP20
IEC/EN/BS 60947-5-1 designation		AC	A600	A600
		DC	Q600	Q600
Mechanical life (million)		cycles	10	10

Certifications and compliance

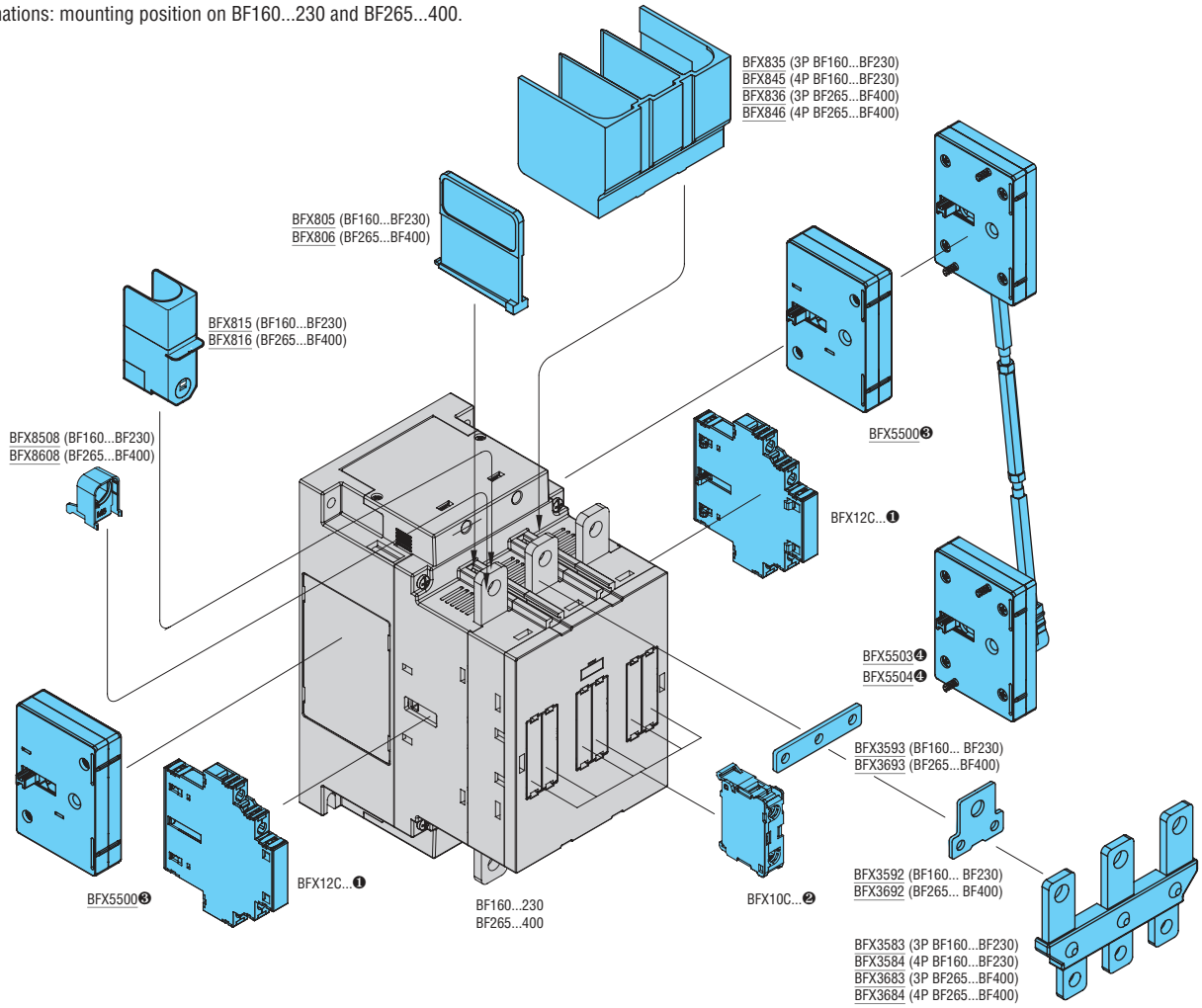
Certifications obtained:

Type	cULus	EAC	CCC
BFX10C...	●	●	●
BFX12C...	●	●	●
BFX3...	●	–	–
BFX5...	●	–	–
BFX8...	●	–	–
GLX50...	●	–	–
GMX50...	●	–	–

Add-on auxiliary contacts are compliant with the following standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL 60947-1, UL 60947-5-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-5-1.
The add-on auxiliary contact blocks BFX10C... and BFX12C... comply with annex F of the IEC/EN/BS 60947-4-1 standard auxiliary contact linked with power contact" also known as mirror contact.
They also comply with Annex L of the IEC/EN/BS 60947-5-1 standard "mechanically linked contact elements".

❶ It is supplied for one terminal only. Example: for three-pole contactor, order 3 pieces for the upper terminals or 6 pieces for all the upper and lower terminals.
❷ For currents higher than 175A, 2 pieces can be mounted for each contactor terminal.
❸ Kit 4 pieces. For three-pole contactor order 1x BFX805; for four pole contactor order 2x BFX805.
❹ Kit 4 pieces. For three-pole contactor order 1x BFX806; for four pole contactor order 2x BFX806.

Combinations: mounting position on BF160...230 and BF265...400.



❶ Max 2 BFX12C... contact blocks per each contactor side.
❷ Max 6 BFX10C... contact blocks for three-pole contactors and 8 contact blocks for four-pole contactors.
❸ The BFX12C... contacts, in the presence of the BFX5500 mechanical interlock, can be mounted only on the opposite side of the contactor from that where the interlock is mounted.
❹ On the side of the contactor where the BFX5503 and BFX5504 vertical mechanical interlocks are mounted, the BFX12C... auxiliary contacts can also be mounted.

Add-on blocks

11G350 - 11G354

11G358

Order code	Characteristics	Max qty per. contactor	Qty per pkg	Wt
		n°	n°	[kg]
Auxiliary contacts. Faston terminals. Side mounting.				
11G350	2NO+1NC or 1NO+2NC reversible	4	1	0.082
11G354	1NO+1NC	4	1	0.078
Adapter.				
11G358❼	For fitting auxiliary contacts BFX10..., with 2 contacts, G484..., G485..., G486... and G487 on contactors B500...B6301000	4	5	0.050
Mechanical interlock.				
11G3551❷	Side by side	1	1	0.026
11G35641❸	One on top of other	1	1	0.140
11G35651❸	One on top of other	1	1	0.146
11G35663❹	One on top of other	1	1	0.150
Mechanical latch.				
11G4955❻	For B500...B630	1	1	0.795

Accessories

11G527 - 11G528 - 11G529
11G530

11G370

11G371

Order code	Characteristics	Qty per pkg	Wt
		n°	[kg]
Power terminal protection.			
11G527	For contactor B500	1	0.238
11G528	For contactor B5004	1	0.265
11G529	For contactor B630	1	0.238
11G530	For contactor B6304	1	0.266
3 pole star connecting bars.			
11BA1846	For contactors B500-B630	1	0.34
2 pole bars for parallel arrangement.			
11BA1845	For contactors B500-B630	1	0.322
Terminal adapter.			
11G370	To transform Faston terminals of auxiliary contacts and coils into screw terminals	10	0.003
11G371	To transform both coil Faston terminals into screw terminals	5	0.022

❶ Not suitable for B6301000-B1250-B1600 ❹.
❷ For use with three-pole B6301000, consult Technical support for information; see contact details on inside front cover.
❸ Allowed distances see page 2-76.
❹ For contactors B1250 and B1600, two G3566 mechanical interlocks are required.
❺ Replace with the digit of the voltages if 50 or 60 Hz or with the letter C followed by voltage if DC. The standard voltages are:
– AC 50/60Hz 48 - 110...125 (indicate 110) - 220...240 (indicate 220) - 380...415 (indicate 380)
– DC 48 - 110...125 (indicate 110) - 220...240 (indicate 220).
❻ It can be mounted only in contactors if predisposed for it. Technical support for information; see contact details on inside front cover.
❼ For use with mechanical interlock see page 2-79.

Operational characteristics of auxiliary contacts

Type			G350-G354
IEC conventional free-air thermal current Ith		A	16
IEC rated insulation voltage Ui		V	690
Terminals	Faston		1-6.35x0.8 2-2.8x0.8
Conductor section maximum (with 1 or 2 cables)	flexible c/w lug	mm²	2.5
	AWG	n°	14
UL/CSA and IEC/EN/BS 60947-5-1 designation		AC	A600
		DC	P600
Mechanical life (million)		cycles	5

Type			G495❼
Rated AC control circuit voltage	AC (50/60Hz)	V	48...480
	DC	V	48...480
Power consumption with control in:	AC	VA	1500
	DC	W	1100
Minimum energising:	drop-out	ms	40
	pick-up	ms	300
Terminals	Faston		1-6.3x0.8
Mechanical life (million)		cycles	0.1

Type		G370-G371
Tightening torque	Nm	1
	lb.in	8.9
Tool	Type	PH2
Conductor section (with 1 or 2 cables)	mm²	4
	AWG	10

Certifications and compliance
Certifications obtained:

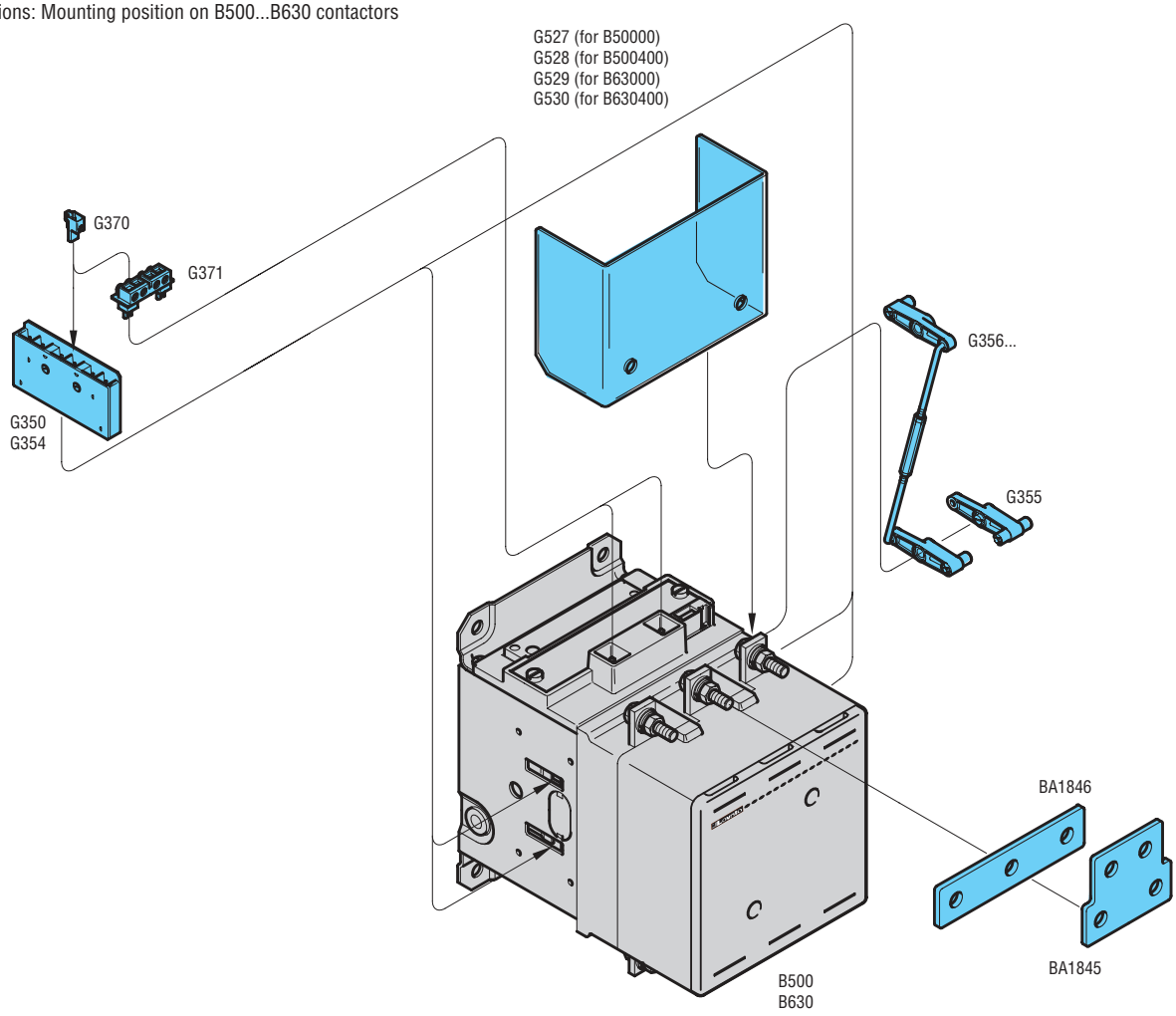
Type	UL	CSA	EAC	CCC
G350	●	●	●	●
G354	●	●	●	—
G355	—	●	●	—
G356 ...	—	●	●	—
G361	—	●	●	—
G362	—	●	●	—
G363	—	●	●	—
G370	—	●	●	—

● Certified products.

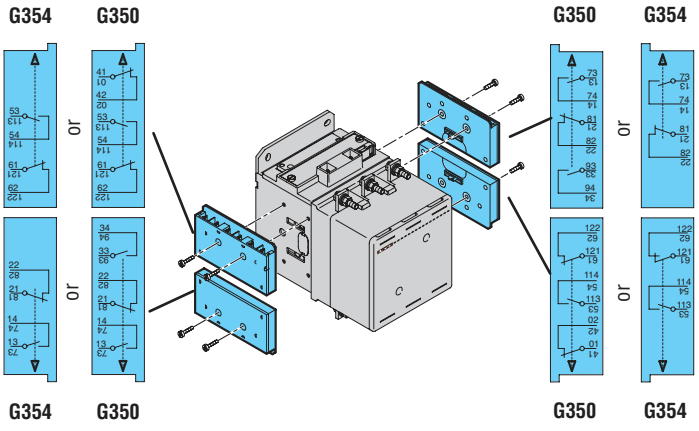
UL - UL Recognized for USA only (File E93601) as Auxiliary Devices - Component.
Products having this type of marking are intended for use as components of complete workshop-assembled equipment.
CSA - CSA certified for Canada only (File 54332) as Auxiliary Devices for motor controllers.

Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, UL 60947-1, UL 60947-4-1, IEC/EN/BS 60947-4-1, UL508, CSA C22.2 n° 14; add-on auxiliary contacts also comply with: IEC/EN/BS 60947-5-1, UL 60947-5-1, CSA C22.2 n° 60947-5-1.
The add-on auxiliary contact blocks 11G350 and 11G354 comply with annex F of the IEC/EN/BS 60947-4-1 standard "auxiliary contact linked with power contact" also known as mirror contact.

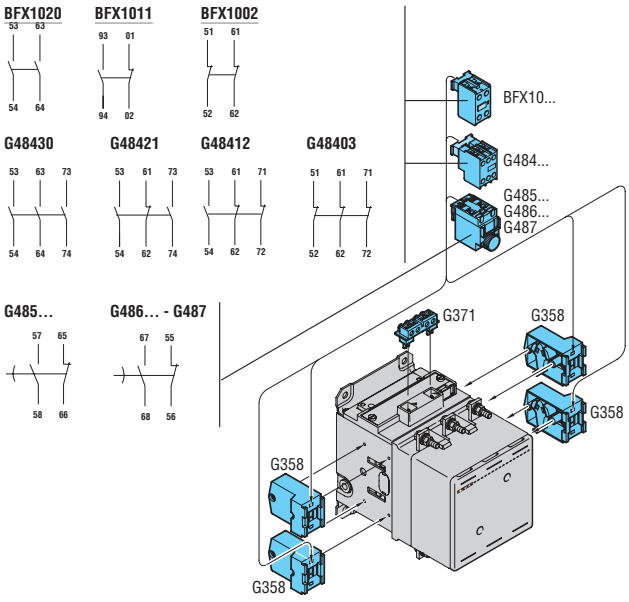
Combinations: Mounting position on B500...B630 contactors



The add-on auxiliary contact blocks G350 and G354 can be applied to contactors B500-B6301000 only up to a maximum of four pieces for each contactor, for a total of 12 contacts.
The contact block G350 provides a 2NO+1NC or 1NO+2NC combination depending on its mounting position; see the drawing below. The G354 block consists of 1NO+1NC.



Contact blocks, BFX10 with 2 contacts, G484, G485, G486 and G487 types, can be mounted using the G358 adapter, refer to page 2-22 for exact types and order codes of the blocks. A maximum of four adapters can be possibly used per contactor and each adapter can hold one BFX10, G484, G485, G486 and G487.



AC coils

BFX91A...

BFX92A...

BFX93A...

BFX94A...

Order code	Rated frequency and voltage		Qty per pkg	Wt
	[Hz]	[V]	n°	[kg]
For contactors BF00A-BF09A-BF12A-BF18A-BF25A.				
BFX91A024❶	50/60	24VAC	1	0.085
BFX91A048❶		48VAC	1	0.085
BFX91A110❶		110VAC	1	0.085
BFX91A230❶		230VAC	1	0.085
BFX91A400❶		400VAC	1	0.085
BFX91A02460❶	60	24VAC	1	0.085
BFX91A04860❶		48VAC	1	0.085
BFX91A12060❶		120VAC	1	0.085
BFX91A22060❶		220VAC	1	0.085
BFX91A23060❶		230VAC	1	0.085
BFX91A46060❶		460VAC	1	0.085
BFX91A57560❶		575VAC	1	0.085
For contactors BF26A-BF32A-BF38A.				
BFX92A024❶	50/60	24VAC	1	0.088
BFX92A048❶		48VAC	1	0.088
BFX92A110❶		110VAC	1	0.088
BFX92A230❶		230VAC	1	0.088
BFX92A400❶		400VAC	1	0.088
BFX92A02460❶	60	24VAC	1	0.088
BFX92A04860❶		48VAC	1	0.088
BFX92A12060❶		120VAC	1	0.088
BFX92A22060❶		220VAC	1	0.088
BFX92A23060❶		230VAC	1	0.088
BFX92A46060❶		460VAC	1	0.088
BFX92A57560❶		575VAC	1	0.088
For contactors BF40A-BF50A-BF65A-BF80A-BF94A-BFD65A-BFD80A.				
BFX93A024❶	50/60	24VAC	1	0.150
BFX93A048❶		48VAC	1	0.150
BFX93A110❶		110VAC	1	0.150
BFX93A230❶		230VAC	1	0.150
BFX93A400❶		400VAC	1	0.150
BFX93A02460❶	60	24VAC	1	0.150
BFX93A04860❶		48VAC	1	0.150
BFX93A12060❶		120VAC	1	0.150
BFX93A22060❶		220VAC	1	0.150
BFX93A23060❶		230VAC	1	0.150
BFX93A46060❶		460VAC	1	0.150
BFX93A57560❶		575VAC	1	0.150
For contactors BF95A-BF115A-BF150A.				
BFX94A024❶	50/60	24VAC	1	0.185
BFX94A048❶		48VAC	1	0.185
BFX94A110❶		110VAC	1	0.185
BFX94A230❶		230VAC	1	0.185
BFX94A400❶		400VAC	1	0.185
BFX94A02460❶	60	24VAC	1	0.185
BFX94A04860❶		48VAC	1	0.185
BFX94A12060❶		120VAC	1	0.185
BFX94A22060❶		220VAC	1	0.185
BFX94A23060❶		230VAC	1	0.185
BFX94A46060❶		460VAC	1	0.185
BFX94A57560❶		575VAC	1	0.185

❶ Four-terminal coil.

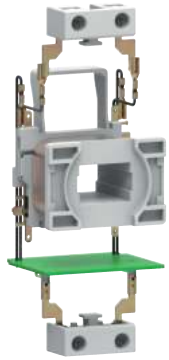
Operational characteristics for BFX91A, BFX92A, BFX93A and BFX94A coils
AC control

Rated voltage at 50/60, 60Hz			V	12...600		
Operating voltage limits						
50/60Hz coil powered at 50Hz	50Hz	pick-up	% Us	80...110		
		drop-out	% Us	20...55		
	60Hz	pick-up	% Us	85...110		
		drop-out	% Us	20...55		
60Hz coil powered at 60Hz		pick-up	% Us	80...110		
		drop-out	% Us	20...55		
Average coil consumption at ≤20°C				BFX91 BFX92	BFX93	BFX94
50/60Hz coil powered at 50Hz	50Hz	in-rush	VA	75	210	300
		holding	VA	9	15	20
	60Hz	in-rush	VA	70	195	275
		holding	VA	6.5	13	17
60Hz coil powered at 60Hz		in-rush	VA	75	210	300
		holding	VA	9	15	20
Dissipation	at 50Hz		W	2.5	5	6.5

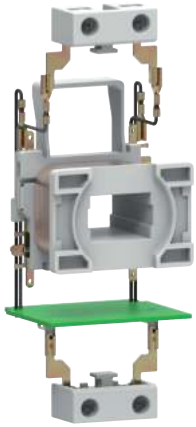
Materials
Class F enamelled copper wire.

Special versions
For coils with non standard voltages, consult Technical support for information; see contact details on inside front cover

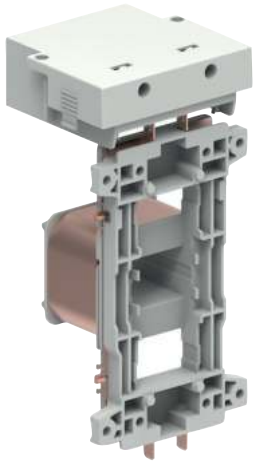
AC/DC and DC coils



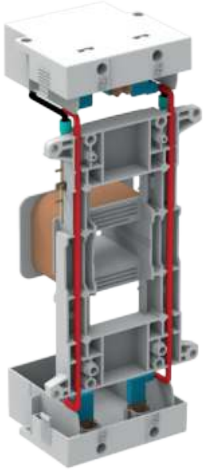
BFX93E...



BFX94E...



BFX95E...



BFX96E...

Order code	Rated	Qty per pkg	Wt
	[V]	n°	[kg]
For contactors BF40E-BF50E-BF65E-BF80E-BF94E-BFD80E❶.			
BFX93E024❷	20...48V AC/DC	1	0.190
BFX93E110❷	60...110V AC/DC	1	0.190
BFX93E230❷	100...250V AC/DC	1	0.190
For contactors BF95E-BF115E-BF150E-BFD150E.			
BFX94E024❷	20...48V AC/DC	1	0.225
BFX94E110❷	60...110V AC/DC	1	0.225
BFX94E230❷	100...250V AC/DC	1	0.225
For contactors BF160E-BF195E-BF230E.			
BFX95E024	24...60VAC / 20...60VDC	1	0.400
BFX95E110	60...130VAC/DC	1	0.400
BFX95E230	100...250VAC/DC	1	0.400
BFX95E400	250...500VAC/DC	1	0.400
For contactors BF265E-BF330E-BF400E.			
BFX96E024	24...60VAC / 20...60VDC	1	0.560
BFX96E110	60...130VAC/DC	1	0.560
BFX96E230	100...250VAC/DC	1	0.560
BFX96E400	250...500VAC/DC	1	0.560

new

NOTE: no coil replacement for contactors BF00 D, BF09D-BF38D, BF00L, BF09L-BF38L is possible.

❶ For BF80T2E... contactors the coil supply voltage must be AC or smoothed DC. For pulsating DC please consult our Technical support.
❷ Four-terminal coil.

Operational characteristics for BFX93E coil
AC/DC control

Rated voltage		V	20...250
Operating voltage limits: 50/60 Hz coil powered at or in DC	pick-up	% Us	80...110❶
	drop-out	% Us	≤70% Us min
Average coil cons. at ≤20°C	in-rush	W	45...75
	holding	W	1.2...2.1

Operational characteristics for BFX94E... coil
AC/DC control

Rated voltage		V	20...250
Operating voltage limits: 50/60 Hz coil powered at or in DC	pick-up	% Us	80...110❶
	drop-out	% Us	≤70% Us min
Average coil cons. at ≤20°C	in-rush	W	65...110
	holding	W	1.8...3

Operational characteristics for BFX95E... coil
AC/DC control

Rated voltage		V	20...250
Operating voltage limits: 50/60 Hz coil powered at or in DC	pick-up	% Us	80...110❶
	drop-out	% Us	≤70% Us min
Average coil cons. at ≤20°C	in-rush	W	160...230
	holding	W	1.5...3

Operational characteristics for BFX96E... coil
AC/DC control

Rated voltage		V	20...250
Operating voltage limits: 50/60 Hz coil powered at or in DC	pick-up	% Us	80...110❶
	drop-out	% Us	≤70% Us min
Average coil cons. at ≤20°C	in-rush	W	160...320
	holding	W	3.5...8

❶ 80% of Us min. and 110% of Us max.

Materials
Class F enamelled copper wire.

Special versions
For coils with non standard voltages, consult Technical support for information; see contact details on inside front cover.

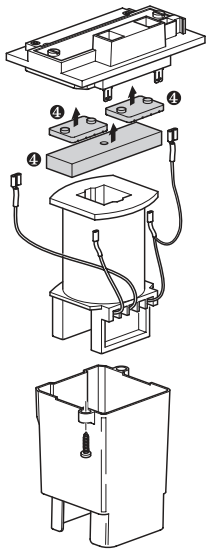
AC/DC coils

Coil

Bridge rectifier

Coil protection

Coil assembly



Order code	Rated voltage AC 50/60Hz and DC	Qty per pkg	Wt
	[V]	n°	[kg]
Coil for B500-B630-B6301000 contactors.			
11BA180048	48VAC/DC	1	3.400
11BA180060	60VAC/DC	1	3.400
11BA1800110	110...125VAC/DC	1	3.400
11BA1800220	220...240VAC/DC	1	3.400
11BA1800380	380...415VAC/DC	1	3.400
11BA1800440	440...480VAC/DC	1	3.400
Coil for B1250-B1600 contactors.			
11BA1800110❶	110...125VAC❶	1	3.400
11BA1800220❶	220...240VAC❶	1	3.400

Order code	For contactor	Qty per pkg	Wt
		n°	[kg]
Bridge rectifier (Faston terminals).			
11BA1799❸	B500-B630-B6301000 B1250-B1600	1	0.520
Coil protection.			
11BA1803	B500-B630-B6301000 B1250-B1600	1	0.164
Coil assembly (Coil, rectifier and coil protection).			
11BA1796❷	B500-B630-B6301000 B1250-B1600	1	4.650

❶ Available for AC supply only.
❷ Add the coil voltage digit. Standard voltages are:
- AC/DC 48 - 60 - 110...125 - 220...240 - 380...415 - 440...480V.

Example: 11BA1671110 (coil assembly powered at 110VAC/DC complete with power supply and coil protection for B500...B1600 contactors).

For B1250 and B1600 only voltages 110...125 and 220...240VAC are available.
❸ For contactors with coil voltage up to 415V. For higher voltages add suffix 440 to the code. E.G.: 11BA1796440.

Operational characteristics

For contactor type			B500 - B630 - B6301000
Supply voltage			AC and DC
Rated control voltage		V	48...480
Operating limits	pick-up	% Us	80...110
	drop-out	% Us	20...60
Consumption	in-rush	VA/W	400
	holding	VA/W	18
Dissipation		W	18

For contactor type			B1250 - B1600
Supply voltage			AC
Rated control voltage		V	110/240
Operating limits	pick-up	% Us	80...110
	drop-out	% Us	20...60
Consumption	in-rush	VA/W	800
	holding	VA/W	45
Dissipation		W	40

Materials
Class F enamelled copper wire.

Coil assembly
Comprises the coil, bridge rectifier, fixed core, coil protection, cross piece and fixing screws.

Special versions
For coils with non standard voltages, consult Technical support for information; see contact details on inside front cover.

Main contacts for BF and B contactors

BFX99095T

Order code	For contactor	Qty per pkg	Wt
		n°	[kg]
Main contacts. 3 or 4 pole set complete with Allen screws and key for contact replacement.			
BFX99026T	BF2600	1	0.038
BFX99026F	BF26T4	1	0.051
BFX99032T	BF3200	1	0.070
BFX99038T	BF3800	1	0.070
BFX99038F	BF38T4	1	0.093
BFX99040T	BF4000	1	0.095
BFX99040F	BF40T4	1	0.127
BFX99050T	BF5000	1	0.095
BFX99050F	BF50T4	1	0.127
BFX99065T	BF6500	1	0.095
BFX99065F	BF65T4	1	0.127
BFX99080T	BF8000	1	0.100
BFX99080F	BF80T4	1	0.130
BFX99094T	BF9400	1	0.100
BFX99095T	BF9500	1	0.210
BFX99095F	BF95T4	1	0.280
BFX99115T	BF11500	1	0.225
BFX99115F	BF115T4	1	0.300
BFX99150T	BF15000	1	0.225
BFX99150F	BF150T4	1	0.300
BFX99160T	BF16000	1	0.350
BFX99160F	BF160T4	1	0.450
BFX99195T	BF19500	1	0.350
BFX99195F	BF195T4	1	0.450
BFX99230T	BF23000	1	0.350
BFX99230F	BF230T4	1	0.450
BFX99265T	BF26500	1	0.490
BFX99265F	BF265T4	1	0.630
BFX99330T	BF33000	1	0.490
BFX99330F	BF330T4	1	0.630
BFX99400T	BF40000	1	0.490
BFX99400F	BF400T4	1	0.630
11G525	B500	1	2.520
11G5254	B5004	1	3.360
11G526	B630	1	2.660
11G5264	B6304	1	3.550
11G537	B6301000	1	2.660
11G5374	B63010004	1	3.550
11G538	B125024	1	5.040
11G5384	B1250424	1	6.720
11G539	B160024	1	5.320
11G5394	B1600424	1	7.100

new

11G525... - 11G526... - 11G537...

Special versions
For non standard spare contact configurations, contact Technical support; see contact details on inside front cover.

NOTE: For B1250 and B1600 contactor spares, consult Technical support for information; see contact details on inside front cover.

Arc chutes for BF and B contactors

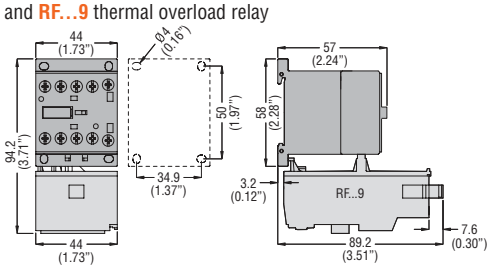
Arc chute 11BA1838

Order code	For contactor	Qty per pkg	Wt
		n°	[kg]
Arc chutes.			
BFX9805T	BF16000-BF19500-BF23000	1	1.000
BFX9805F	BF160T4-BF195T4-BF230T4	1	1.200
BFX9806T	BF26500-BF33000-BF40000	1	1.400
BFX9806F	BF265T4-BF330T4-BF400T4	1	1.680
11BA1838	B500-B630-B6301000	1	1.910
11BA1839	B5004-B6304-B63010004	1	2.490

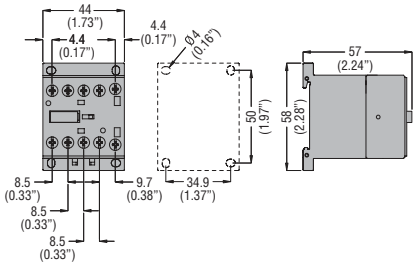
new

BG... MINI-CONTACTORS WITH AC OR DC SUPPLY VOLTAGE

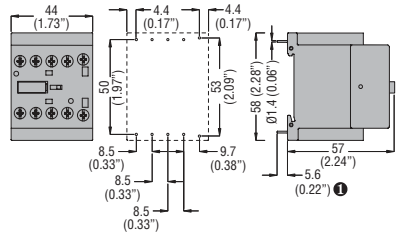
BG... three-poles with screw terminals
and **RF...9** thermal overload relay



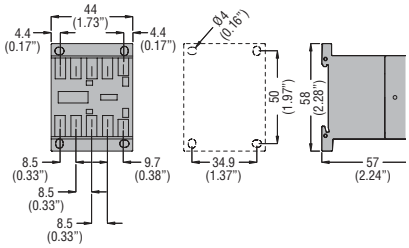
BG...T...
four-poles, with screw terminals



BGP...
with rear PCB solder pins



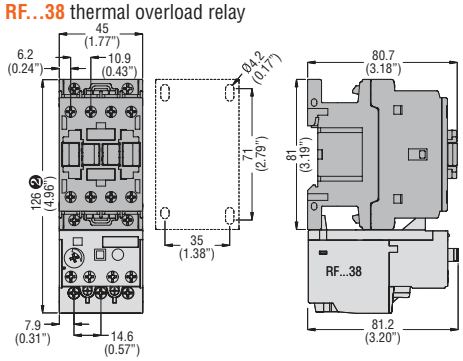
BGF...
with Faston terminals



❶ Recommended PCB drillings 1.7-2mm.

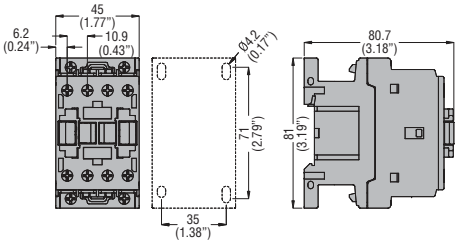
BF... CONTACTORS WITH AC SUPPLY VOLTAGE

BF00A... BF09 A... - BF12A... - BF18A... - BF25A... three-poles with
RF...38 thermal overload relay

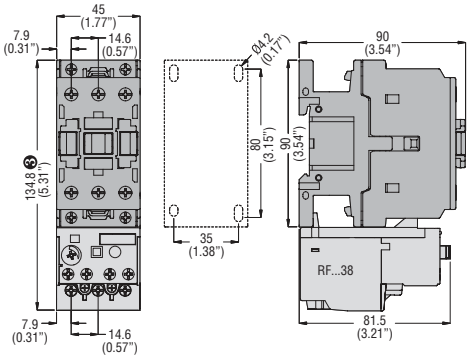


❷ 135mm/5.31" for RFE45

BF09T...A... - BF12T...A... - BF18T...A... four-poles

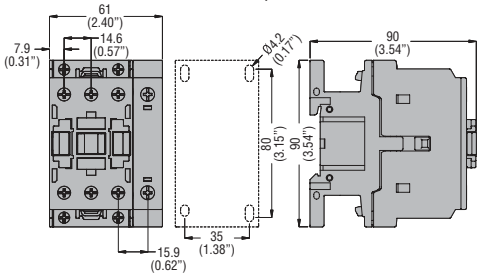


BF2600A... - BF3200A... - BF3800A... three-poles with **RF...38** thermal overload relay

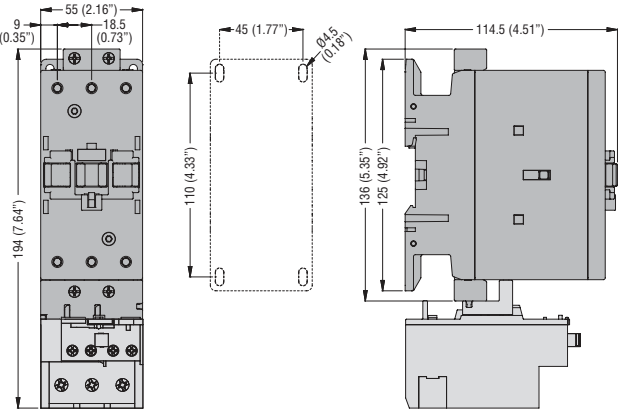


❸ 144mm/5.67" for RFE45

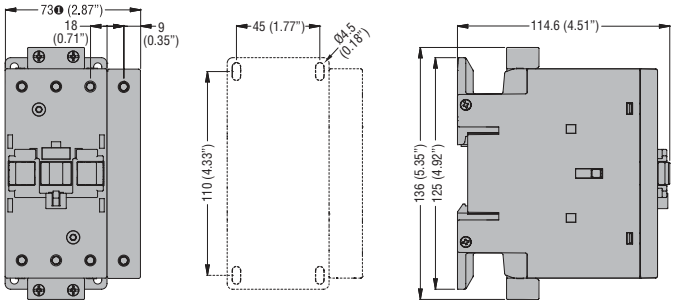
BF26T...A... - BF38T...A... four-poles



BF4000A... - BF5000A... - BF6500A... - BF8000A... - BF9400A...
three-poles with **RF82** thermal overload relay

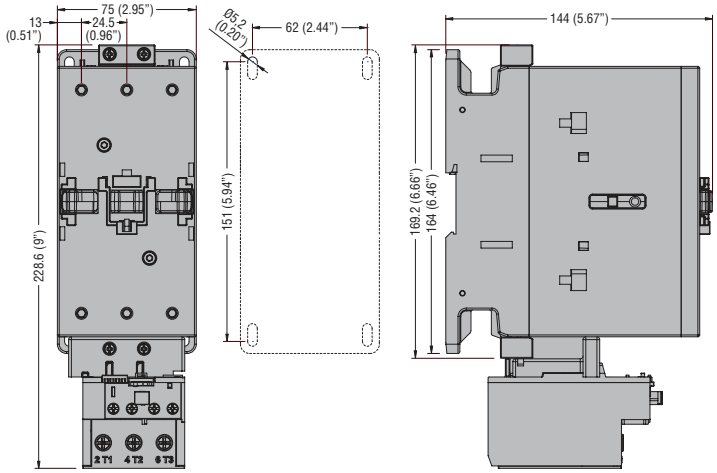


BF40T4...A... - BF50T4...A... - BF65T4...A... -
BF80T4...A... - BFD80T4... - BF80T2A... four-poles

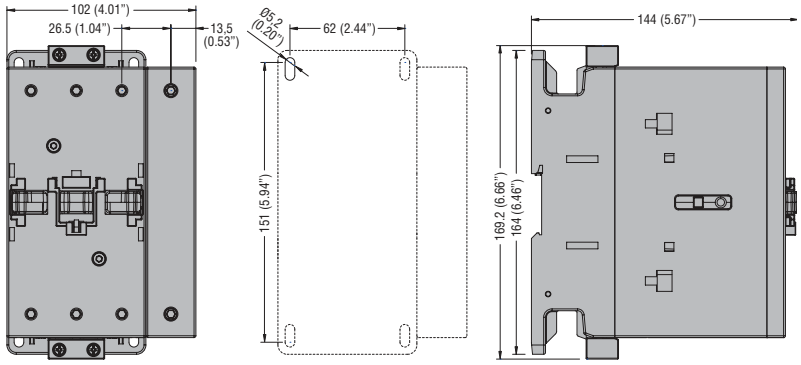


❶ BF80T2 91mm/3.58", BFD6500... - BFD8000... 55mm/2.16"

BF9500A... - BF11500A... - BF15000A... three-poles with **RF110** thermal relay

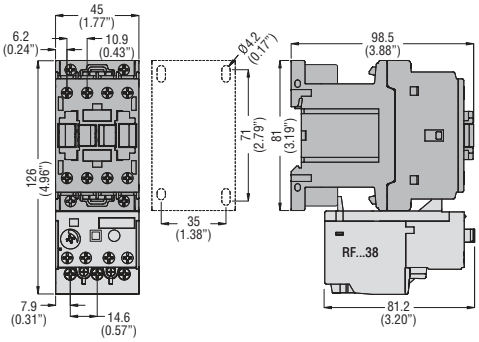


BF95T4A... - BF115T4A... - BF150T4A... four-poles



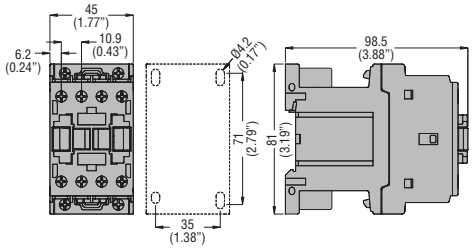
BF...CONTACTORS WITH DC SUPPLY VOLTAGE

BF00...D and **BF00...L - BF09... - BF12... - BF18... - BF25...D** and **L**
three-poles with **RF...38** thermal overload relay

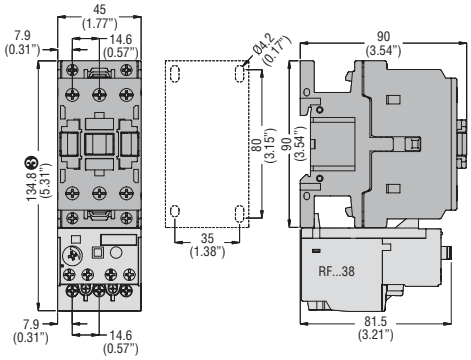


Control relays

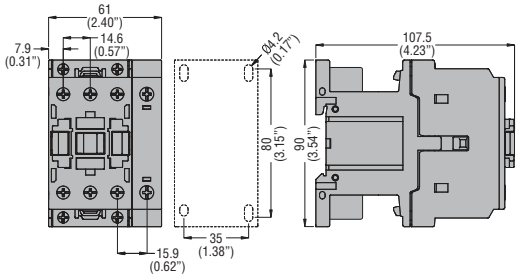
BF00...D and **BF00...L**
BF09T... - BF18T... D and **L** four-poles



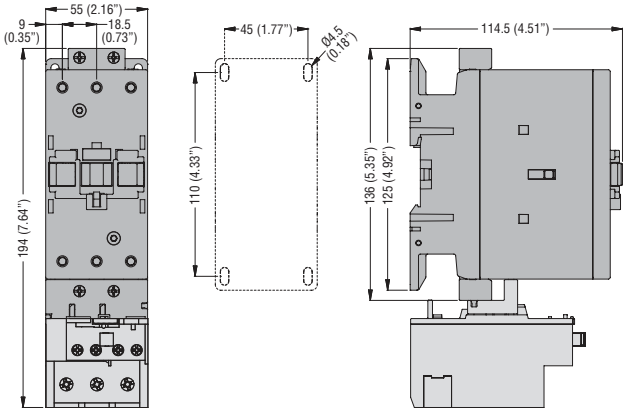
BF26... - BF32... - BF38...D and **L** three-poles with **RF...38** thermal overload relay



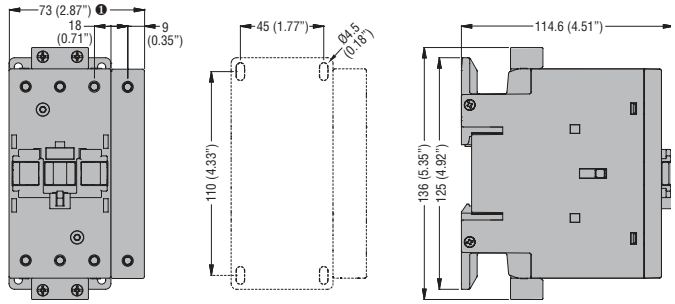
BF26T... - BF38 T...D and **L** four-poles



BF4000E... - BF5000E... - BF6500E... - BF8000E... - BF9400E...
three-poles with **RF82** thermal overload relay

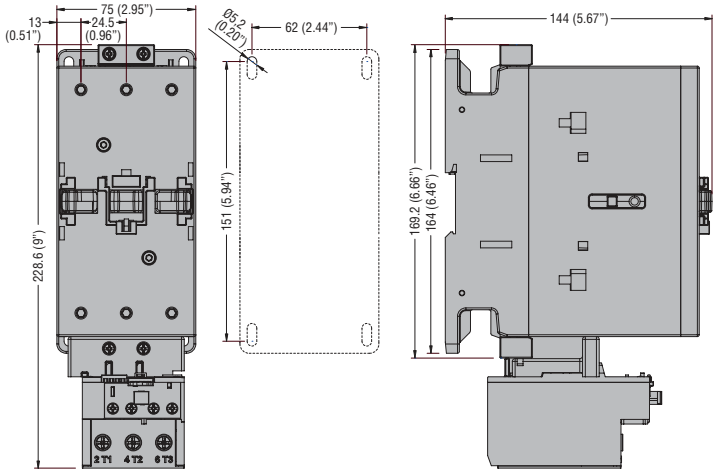


BF65T4E... - BF80T4E... - BF80T2E... four-poles

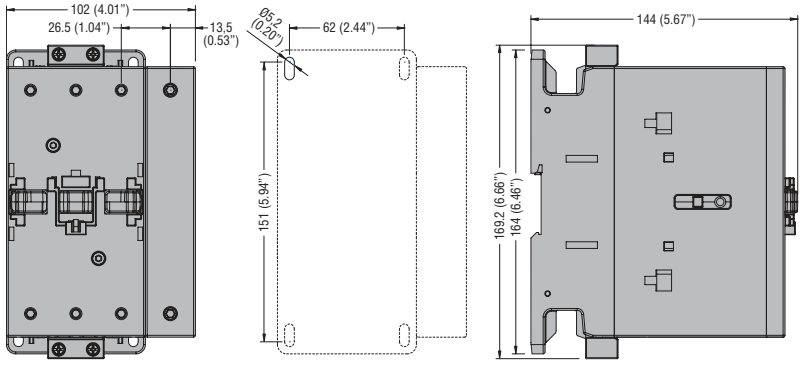


❶ BF80T2 91mm (3.58")

BF9500E... - BF11500E... - BF15000E... three-poles with RF110 thermal relay

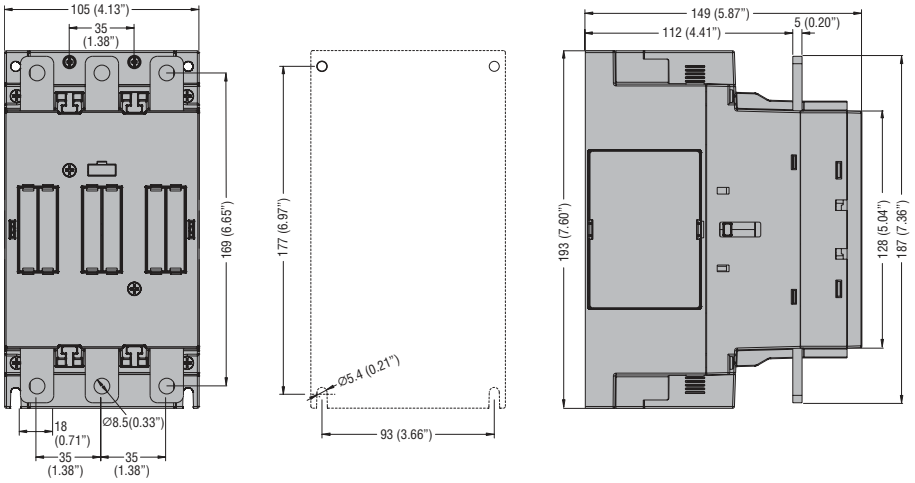


BF95T4E... - BF115T4E... - BF150T4E... - BFD150T4E... four-poles

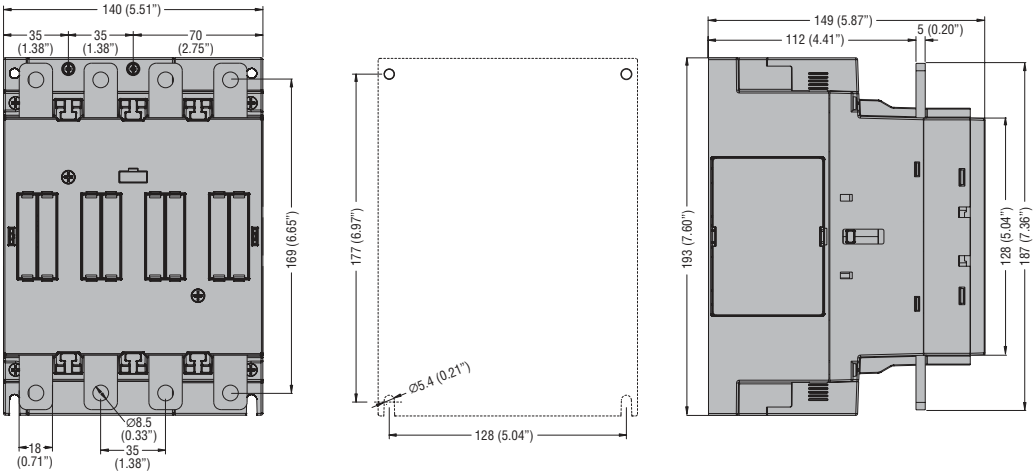


BF...CONTACTORS WITH AC/DC SUPPLY VOLTAGE

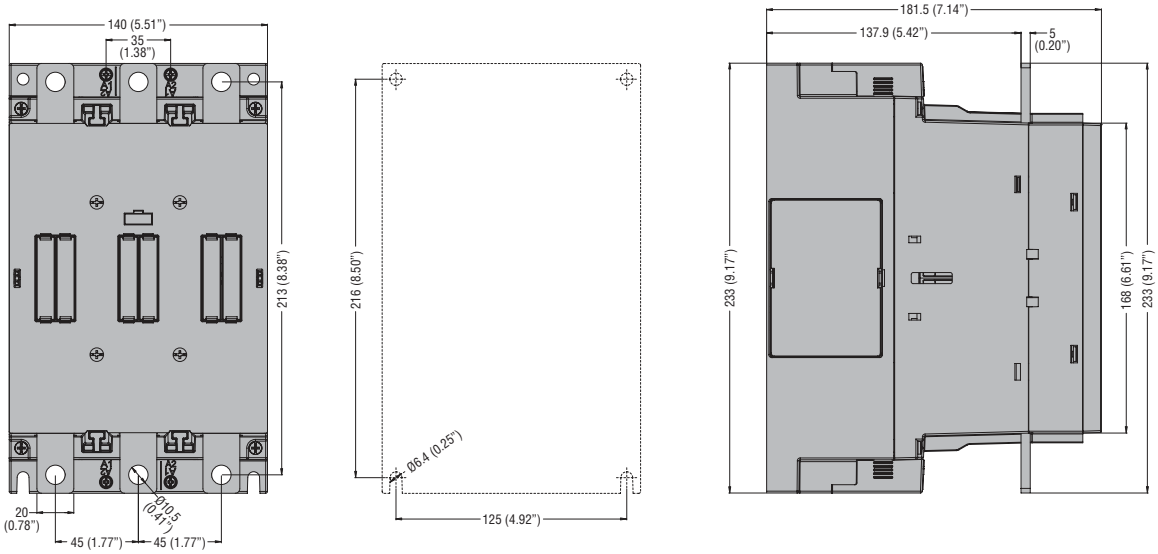
BF16000E... - BF19500E... - BF23000E... three-poles



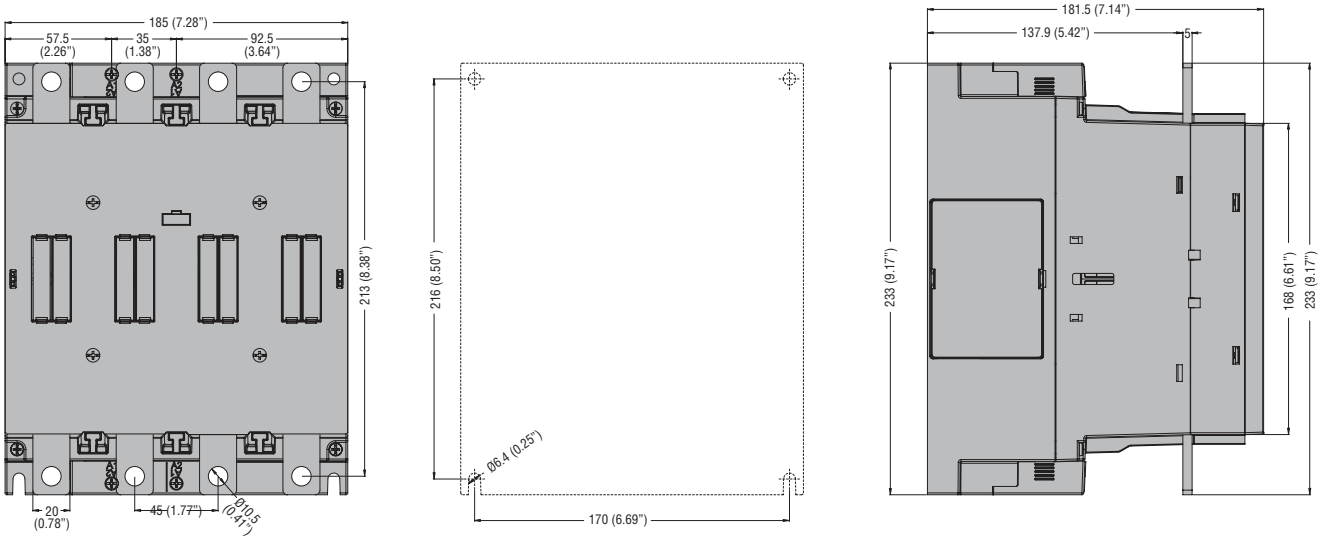
BF160T4E... - BF195T4E... - BF230T4E... four-poles



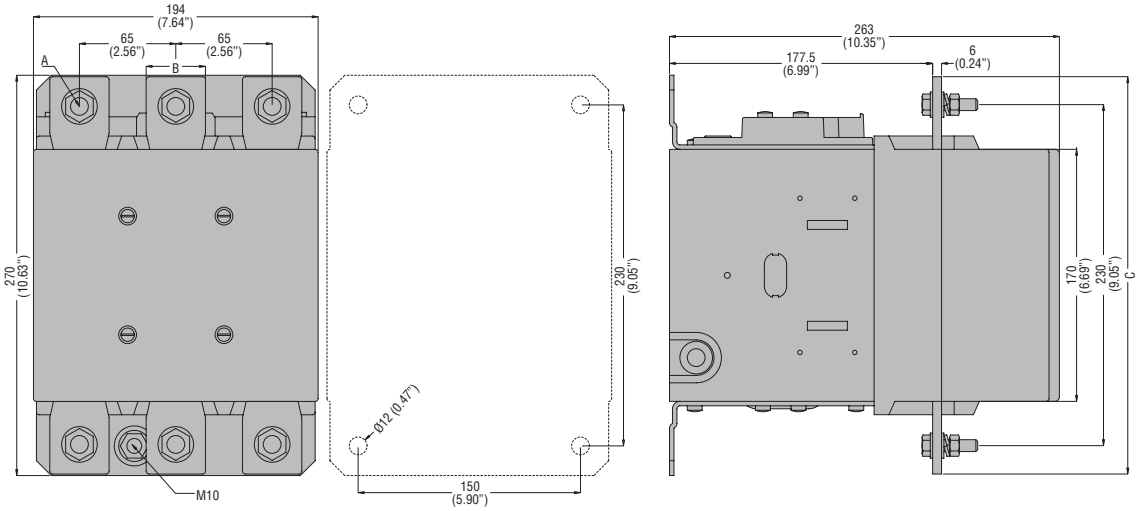
BF265... - BF330... - BF400... three-poles



BF265T4E... - BF330T4E... - BF400T4E... four-poles

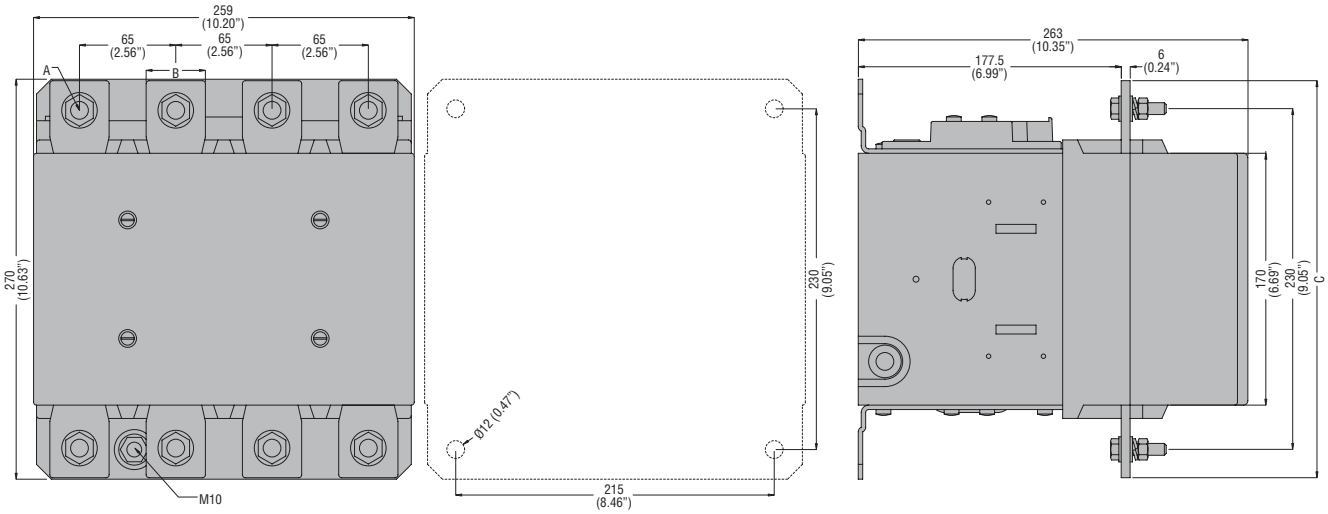


B500... - B630... three-poles



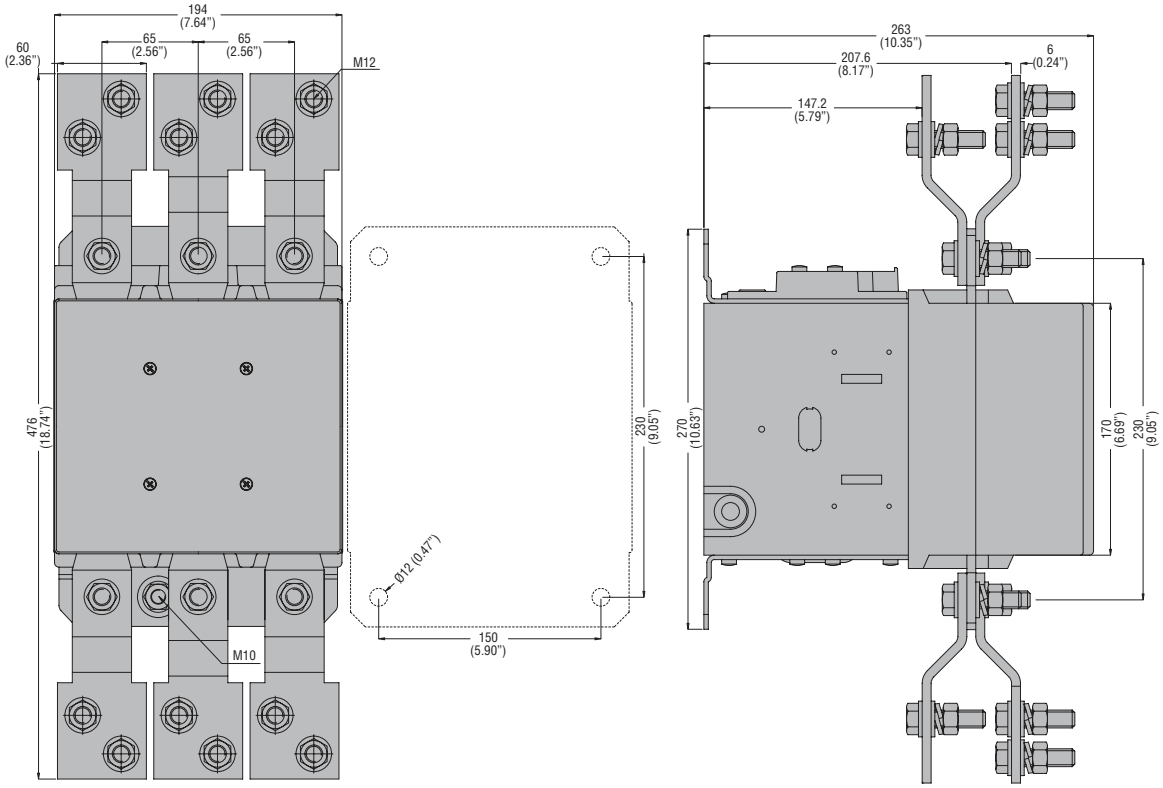
CONTACTOR TYPE	A	B	C
B500	M10	35 (1.38")	265 (10.43")
B630	M12	40 (1.57")	270 (10.63")

B5004... - B6304... four-poles

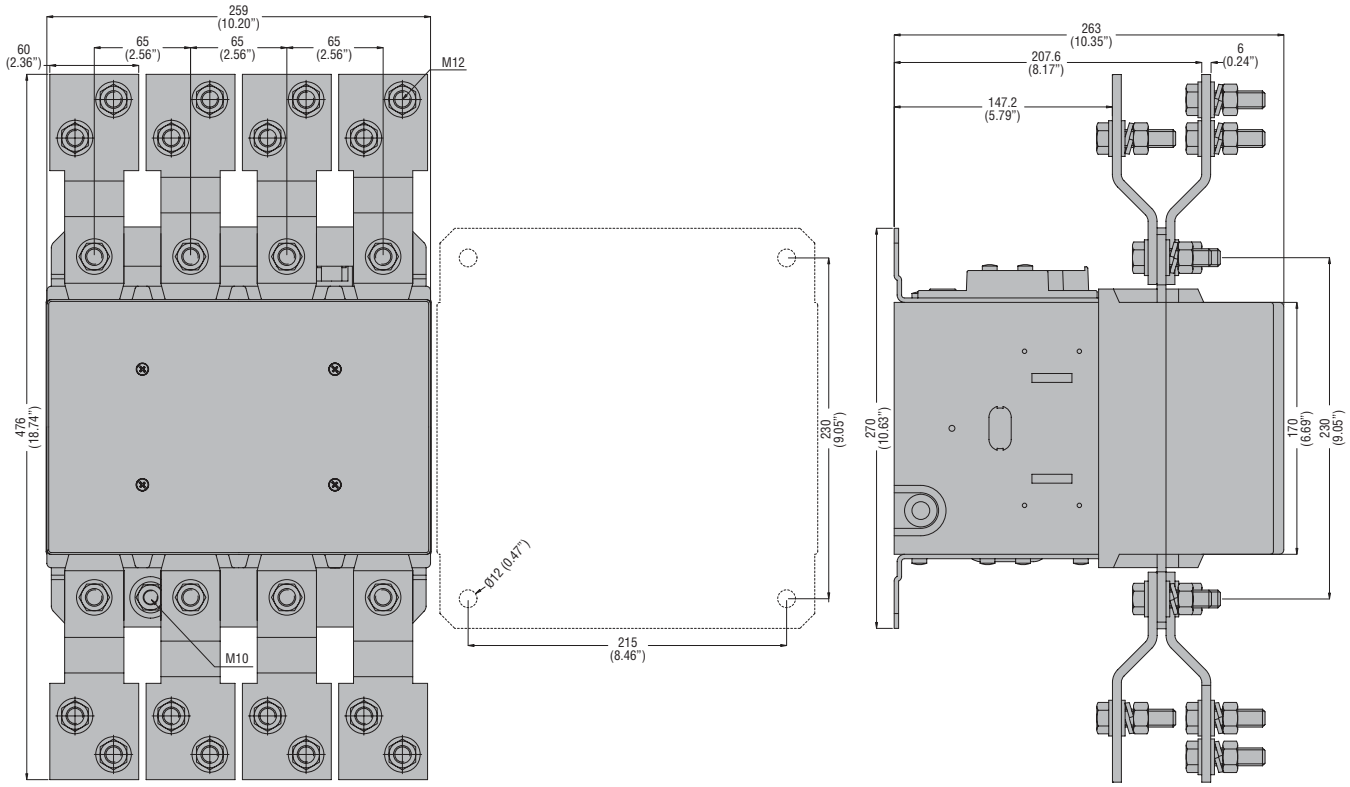


CONTACTOR TYPE	A	B	C
B5004	M10	35 (1.38")	265 (10.43")
B6304	M12	40 (1.57")	270 (10.63")

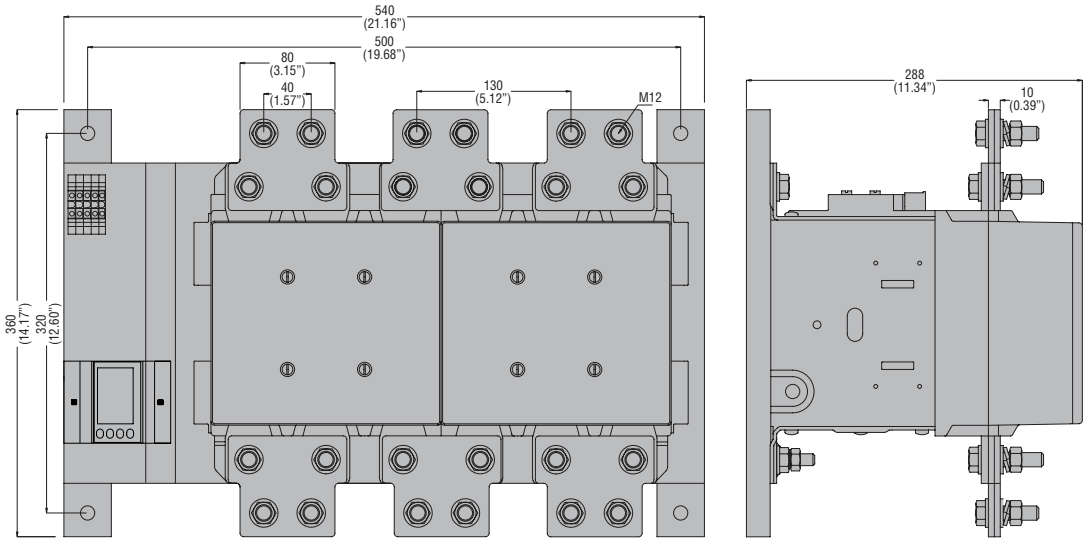
B6301000... three-poles



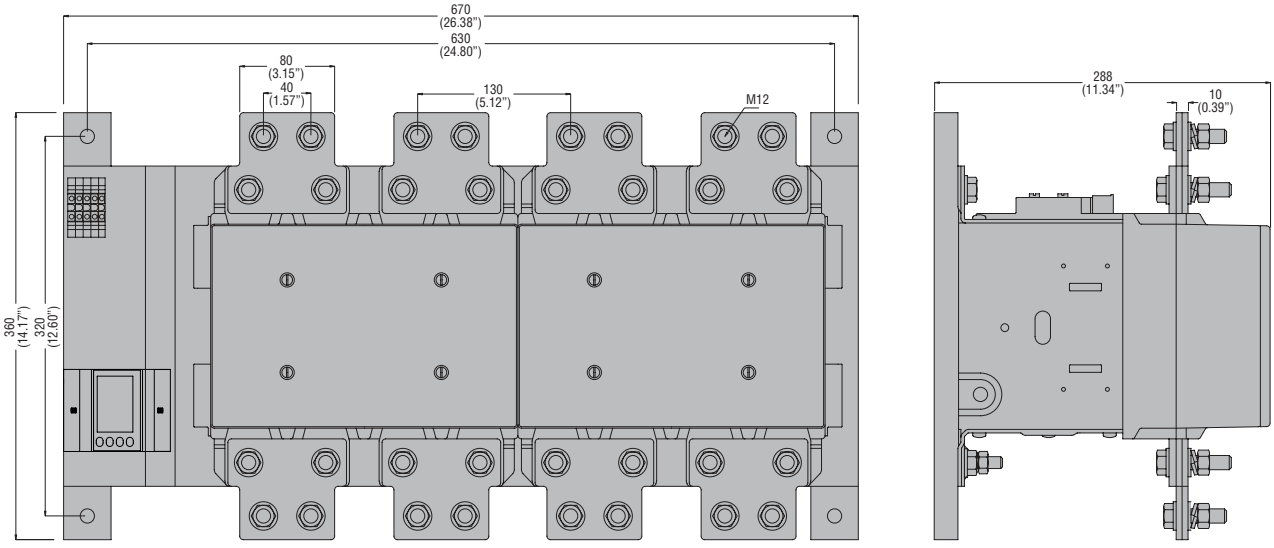
B63010004... four-poles



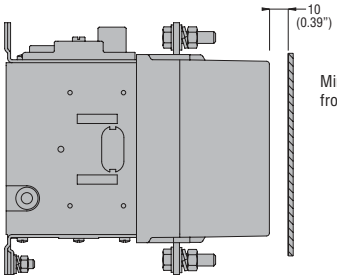
B1250… - B1600… three-poles



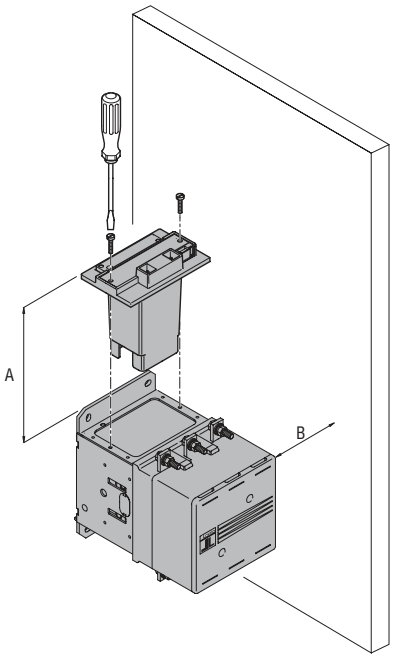
B12504… - B16004… four-poles



B500… - B630… - B6301000… - B1250… - B1600…



Minimum safety distance from metal parts.



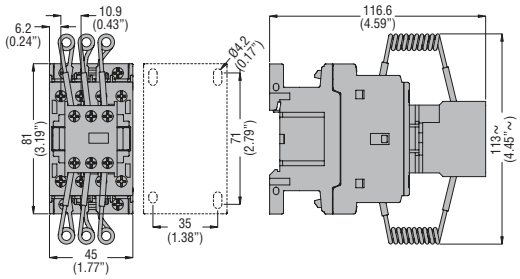
Minimum space needed to replace the coil.

	B500…B6301000
A	170 (6.69")
B	160 (6.30")

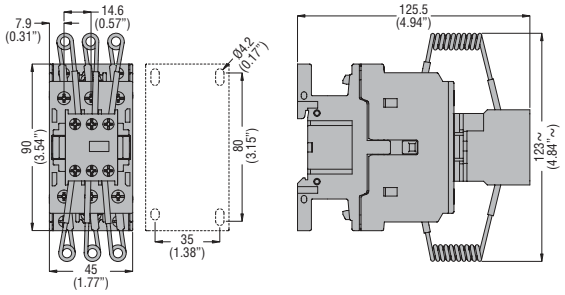
If dimension B is respected, coil replacement is possible without removing power wiring.

CONTACTORS FOR POWER FACTOR CORRECTION

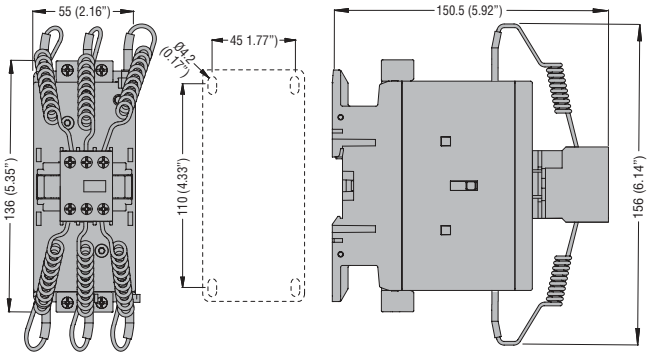
BFK0910A - BFK1210A - BFK1810A



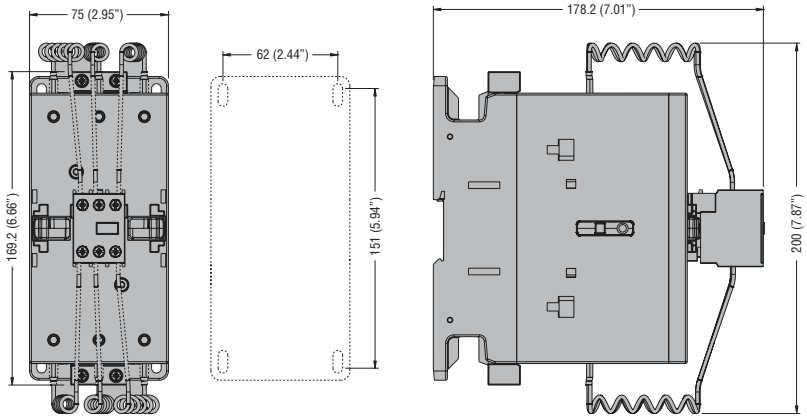
BFK2600A - BFK3200A - BFK3800A



BFK50 - BFK65 - BFK80 - BFK94

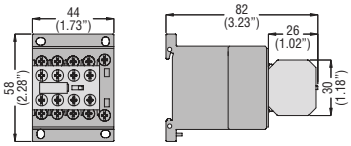


BFK95 - BFK115 - BFK150



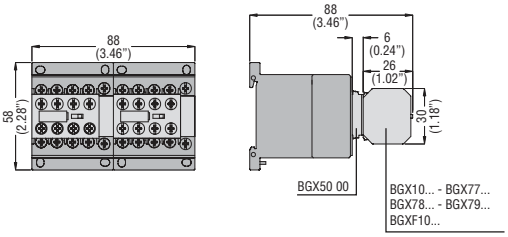
ADD-ON BLOCKS WITH BG MINI-CONTACTORS

BGX10... - BGXF10...
auxiliary contacts ❶

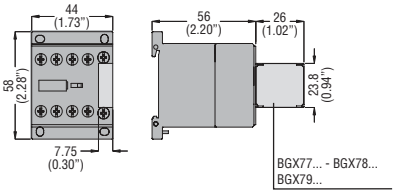


❶ Valid for BGX11... contacts as well when mounted on left-hand contactor of BGT or BGC assembly (p. 4-5).

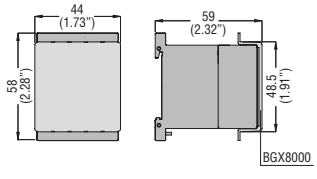
BGX5000 interlock with **BGX10..., BGXF10...** contacts and **BGX77...** or **BGX78...** or **BGX79...** suppressor



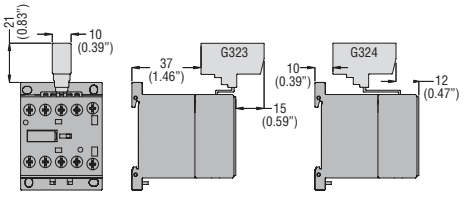
BGX77..., BGX78... or **BGX79...**
suppressor only



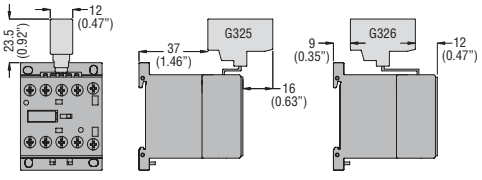
BGX8000 shroud



Paralleling links
G323, G324

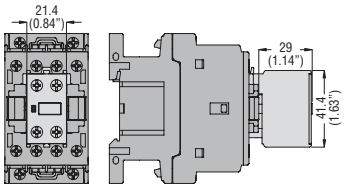


G325, G326

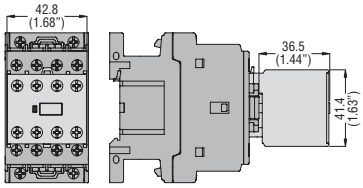


ADD-ON BLOCKS WITH BF CONTACTORS

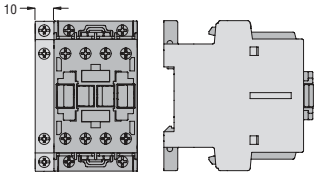
Auxiliary contacts **BFX10...**
w/2 contacts



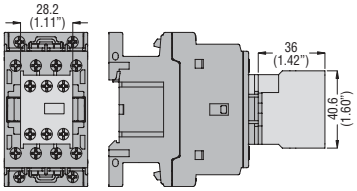
BFX10... w/4 contacts



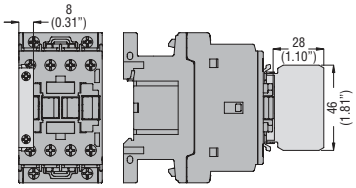
BFX12...



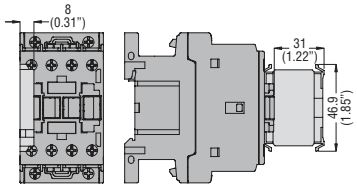
G484...



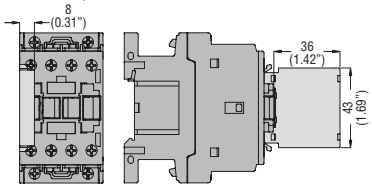
G418...



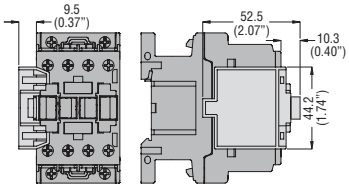
G218



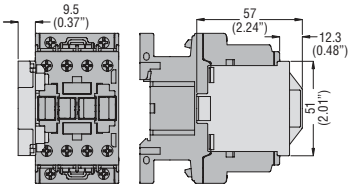
G481..., G482



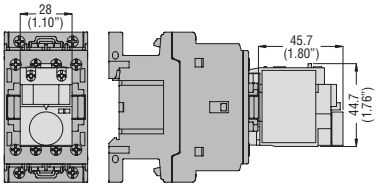
G280 with G218



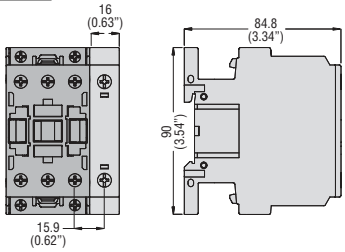
G419, with G418..., **G428..., G483** with G481... or G482



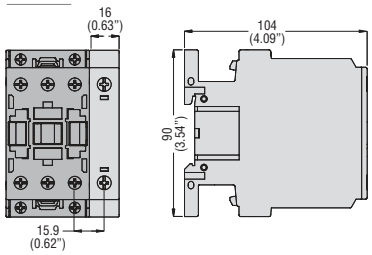
G485..., G486..., G487 delayed contacts



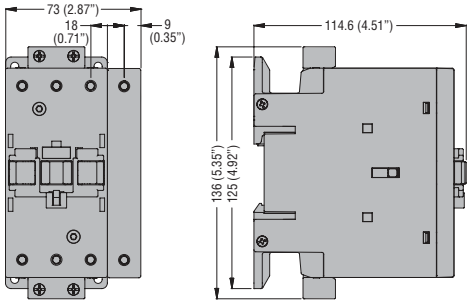
Fourth pole
BFX42



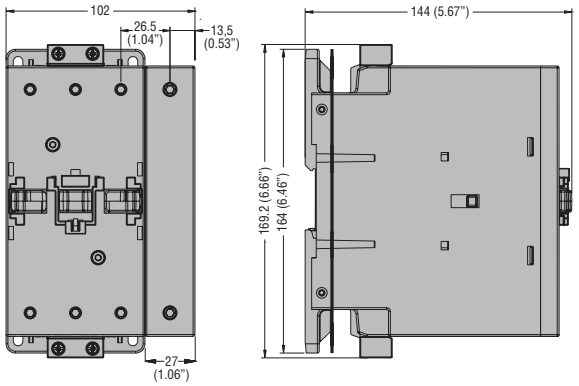
BFXD42



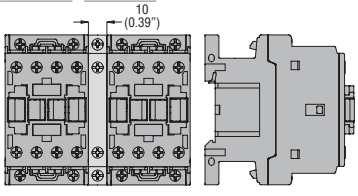
BFX43



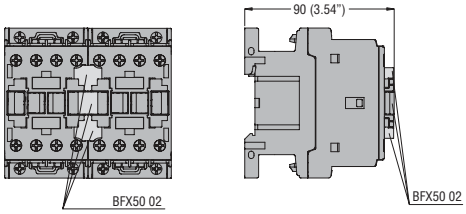
BFX44



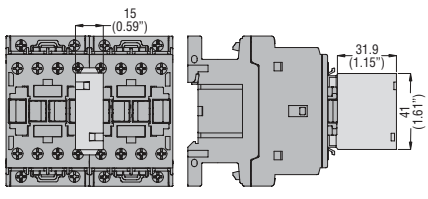
Mechanical interlocks
BFX5000, BFX5001, BFX5300, BFX5301, BFX5400, BFX5401



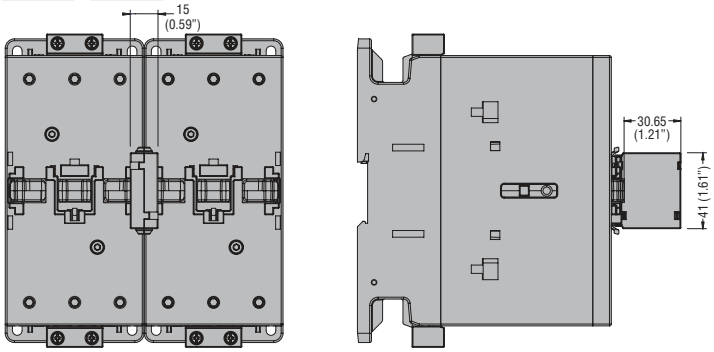
BFX5002



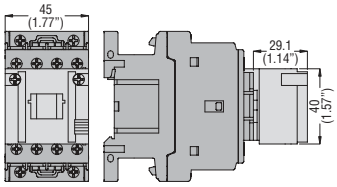
BFX5003, BFX5303, BFX5403



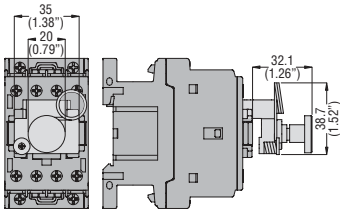
Mechanical interlocks
BFX5303 - BFX5403



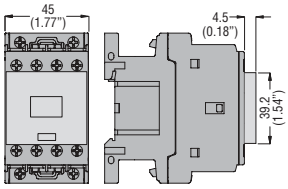
G222, G272, BFX641 mechanical latch



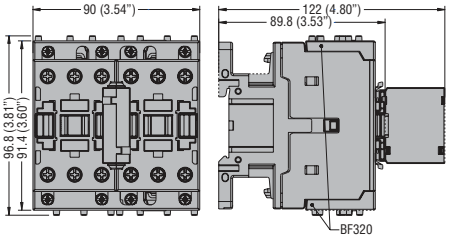
G454, G455, BF642 manual closing



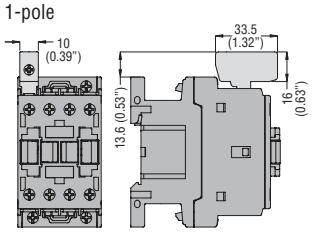
BFX80 sealing cover



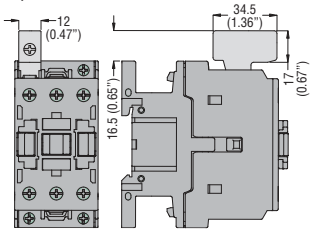
Rigid connecting kit BFX3201
A = 100mm (3.94") with BFX5000 and BFX5001
A = 90mm (3.54") with BFX5002 and BFX5003



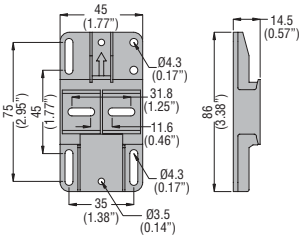
G231 terminal
1-pole



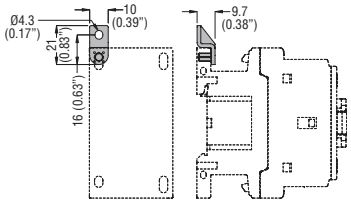
G232 terminal
1-pole



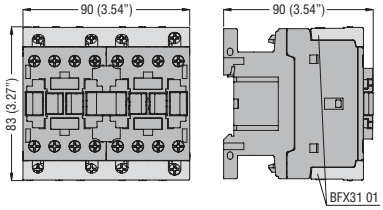
BFX8901 fixing base



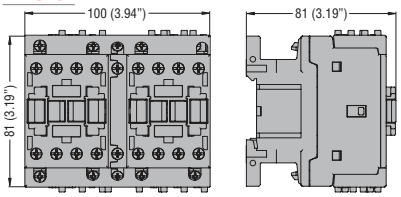
BFX8902 fixing brackets



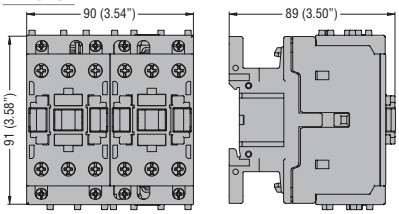
Rigid connecting kit
BFX3101



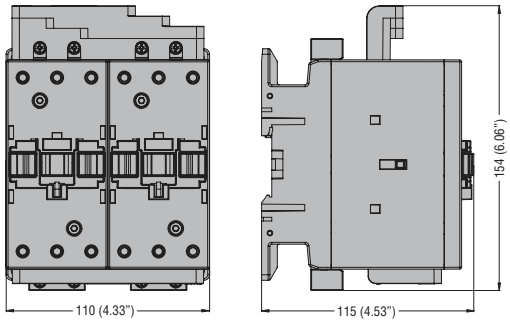
BFX3102



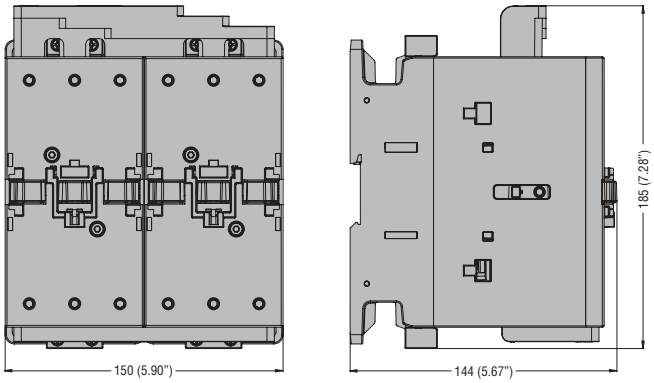
BFX3201



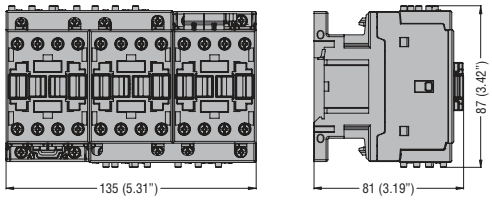
BFX3301



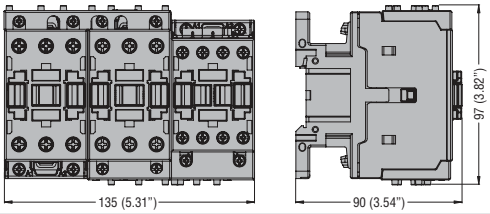
BFX3401



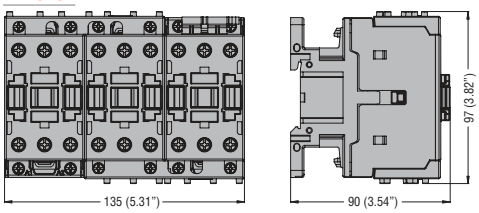
BFX3131



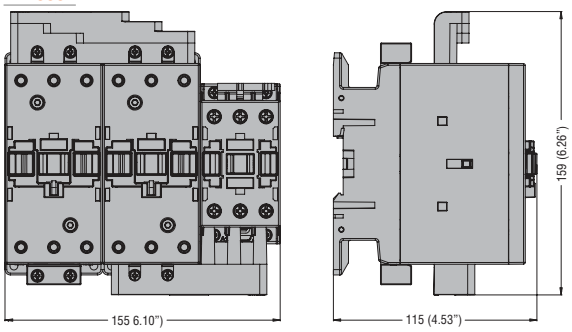
BFX3232



BFX3231



BFX3332



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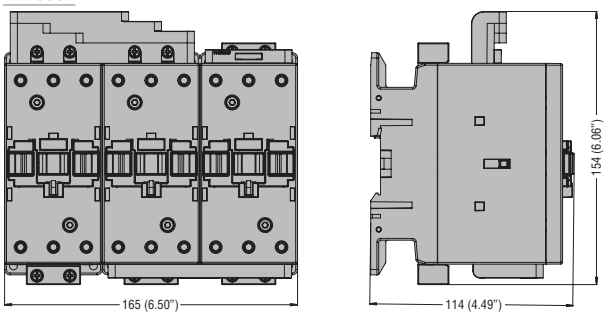

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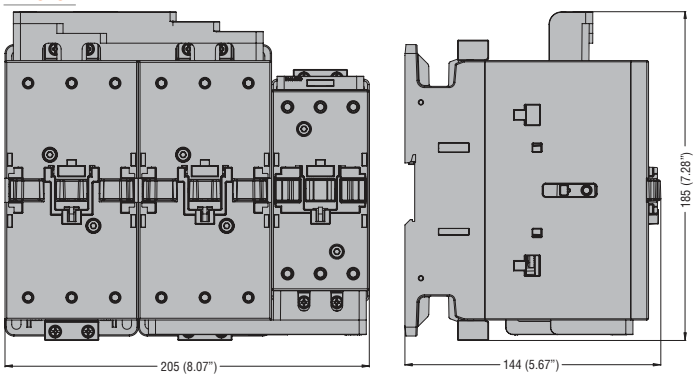

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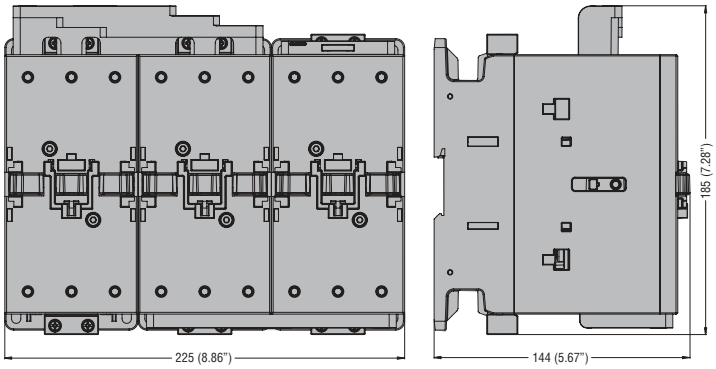
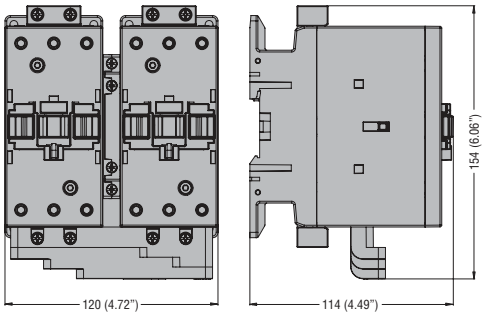
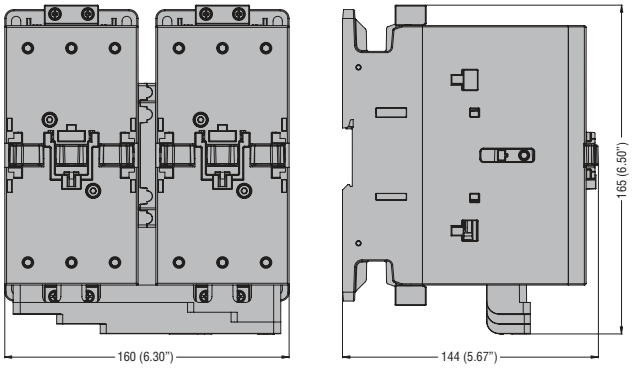


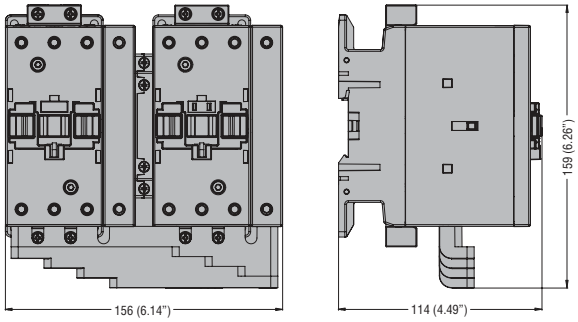
BFX3361



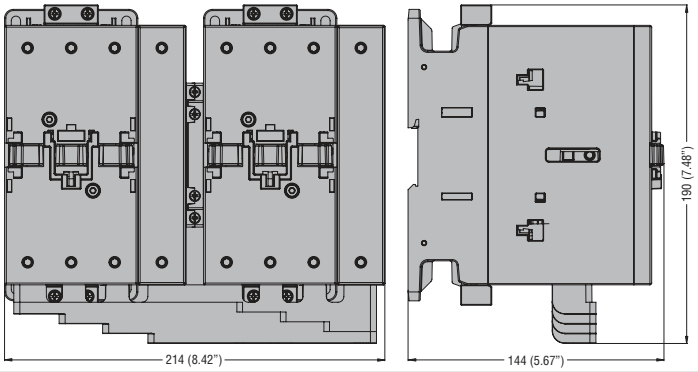
BFX3461



BFX3371

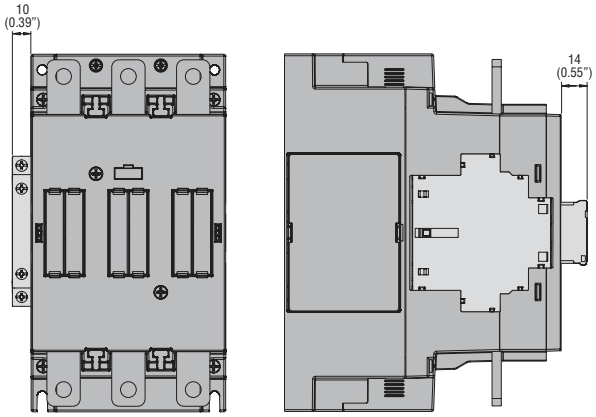


BFX3471

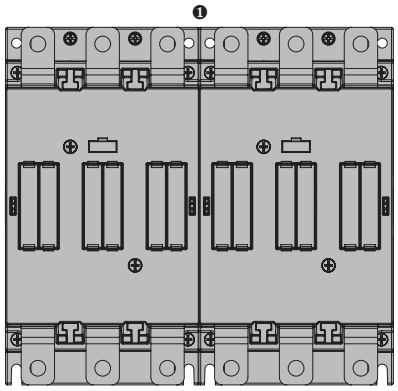


ADD-ON BLOCKS WITH BF160...BF400 CONTACTORS

BFX10C..., BFX12C... auxiliary contacts

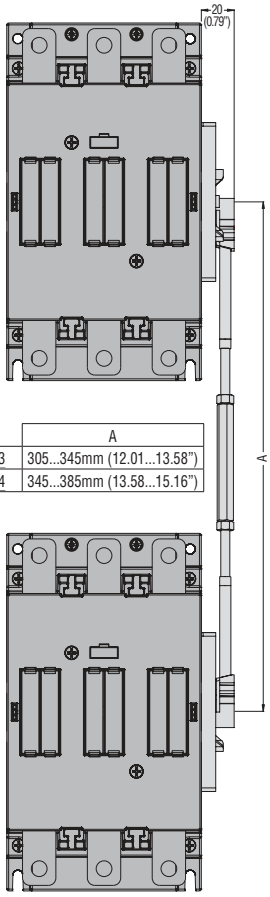


BFX5500 interlock



❶ The BFX5500 interlock is mounted inside the 2 contactors without dimesions increasing.

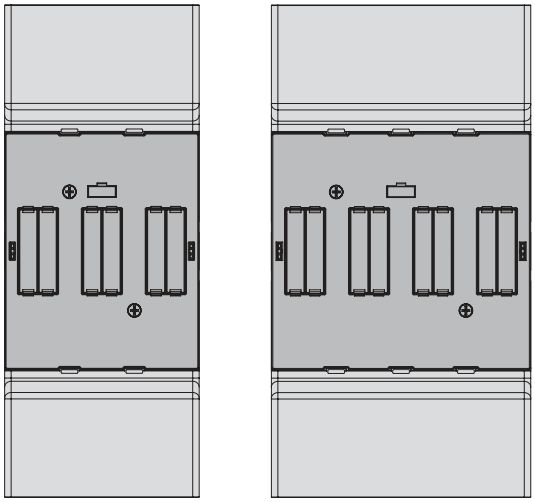
BFX5503, BFX5504 interlocks

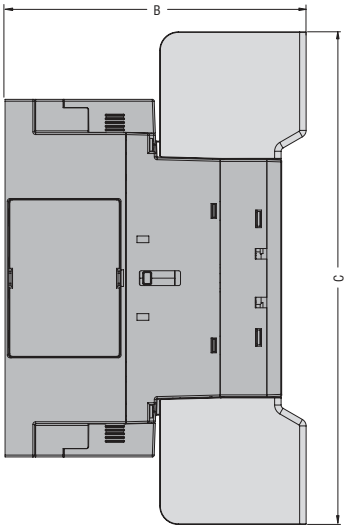


	A
BFX5503	305...345mm (12.01...13.58")
BFX5504	345...385mm (13.58...15.16")

Terminal protection

BFX835 - BFX845 - BFX836 - BFX846

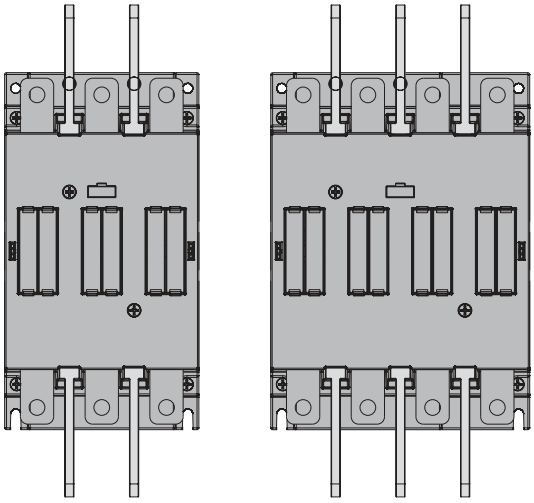


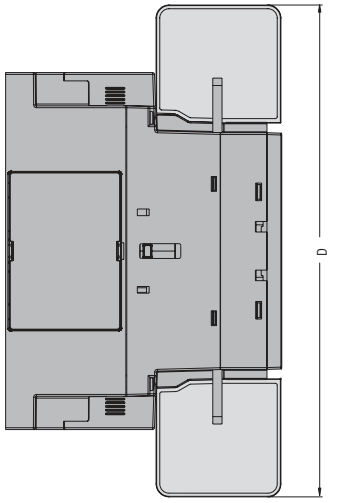


	B	C
BFX835 - BFX845	163 (6.42")	266 (10.47")
BFX836 - BFX846	193 (7.60")	384 (15.23")

Phase barrier

BFX805 - BFX806

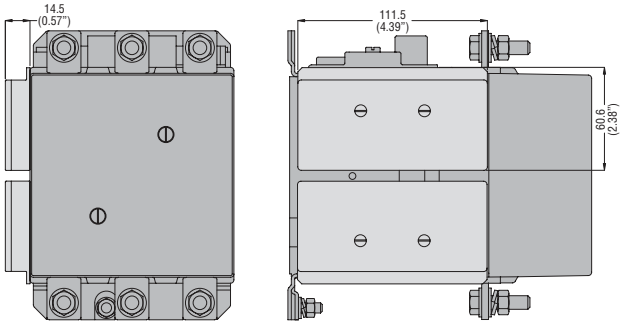




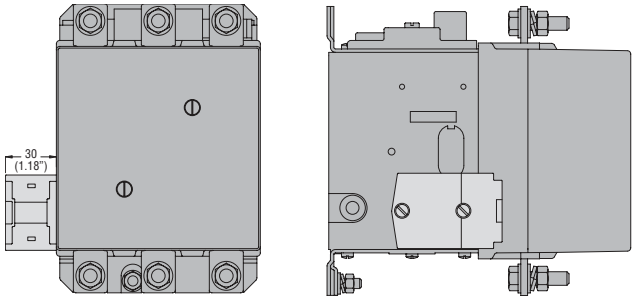
	D
BFX805	266 (10.47")
BFX806	384 (15.23")

ADD-ON BLOCKS WITH B CONTACTORS

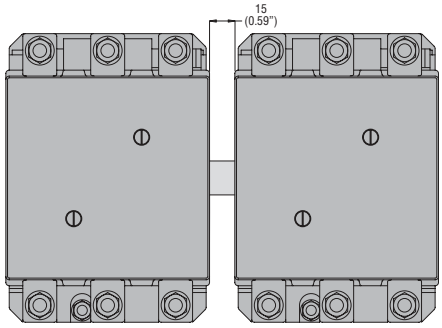
Auxiliary contacts **G350, G354**



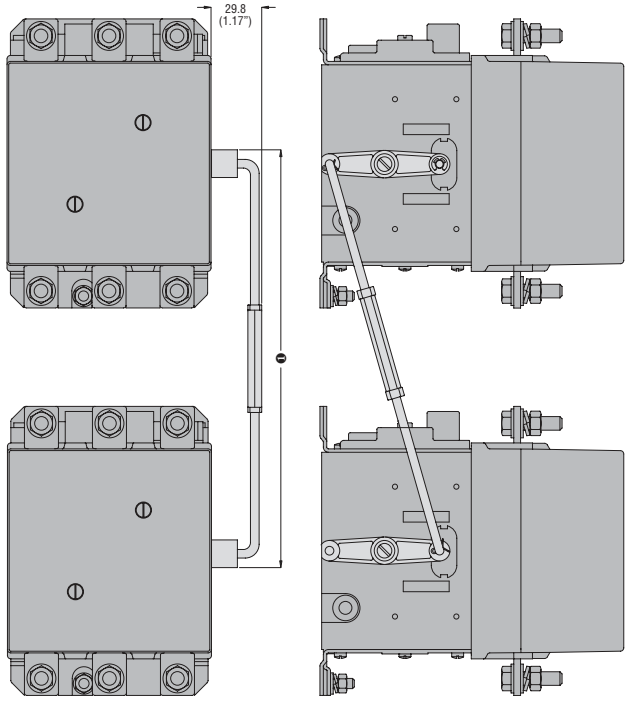
G358 adapter



G355 interlocks



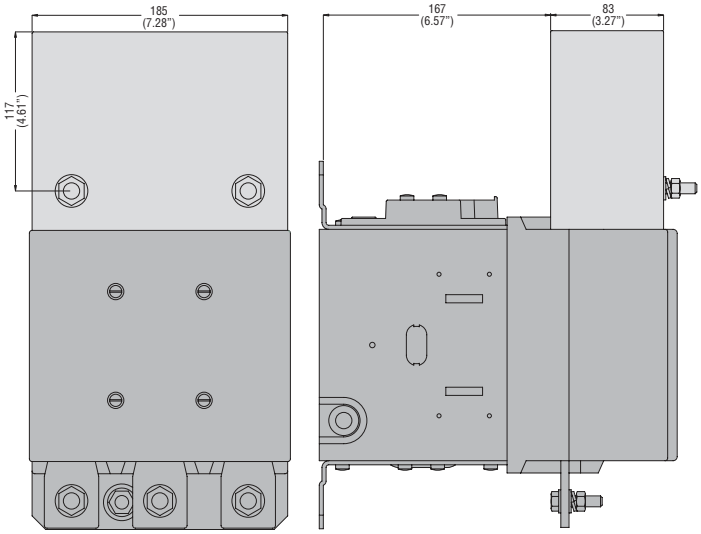
G356…



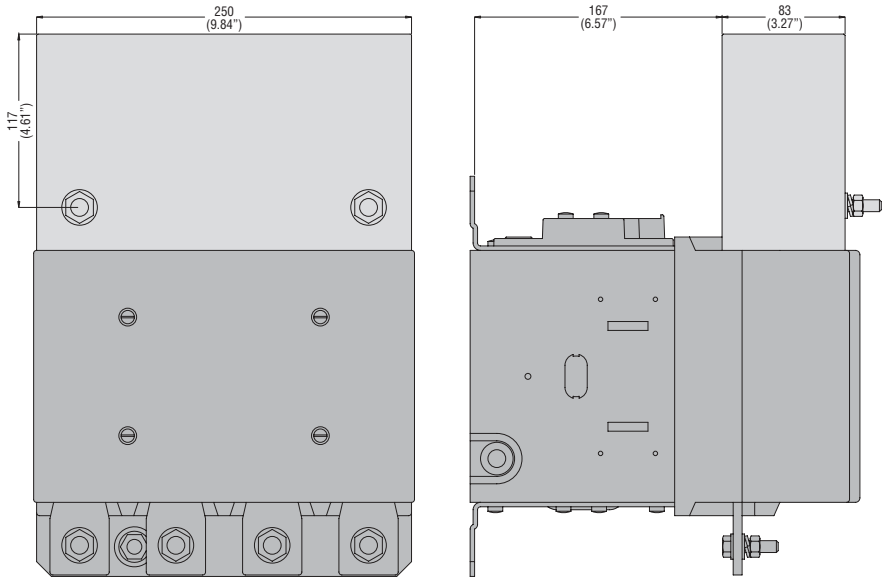
❶ For dimensions, refer to page 2-78.

Terminal protection

G527, G529

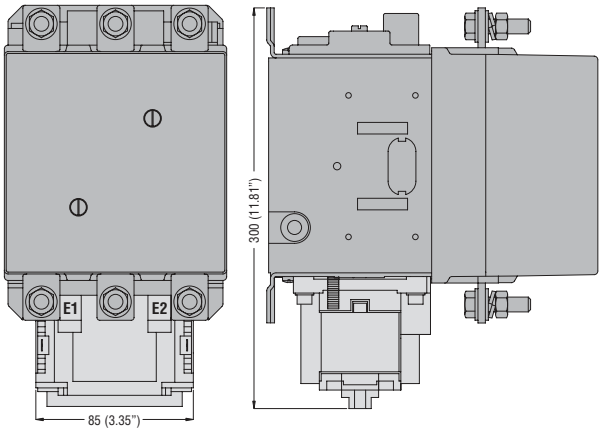


G528, G530

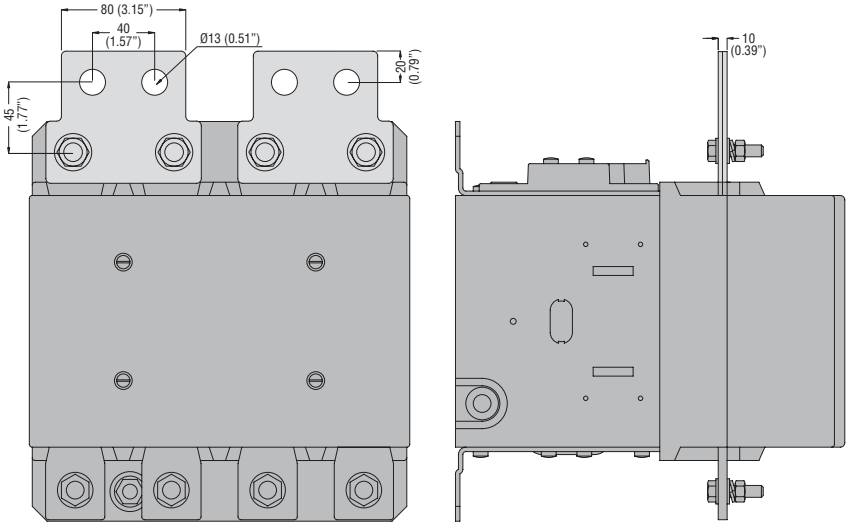


Mechanical latch on B500...B630 contactor

G495



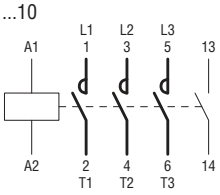
BA1845



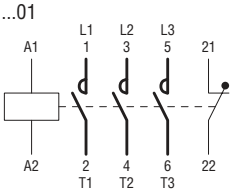
THREE-POLE CONTACTORS IN AC

BG06A - BG09A - BGF09A - BGP09A - BG12A
BF09A - BF12A - BF18A - BF25A

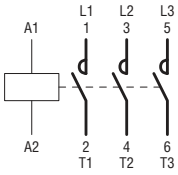
...10



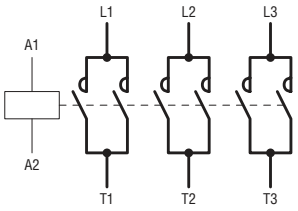
...01



BF26A - BF32A - BF38A
BF40A - BF50A - BF65A - BF80A
BF94A - BF95A - BF115A - BF150A
B500...B630



B125024 - B160024... ❶

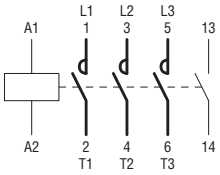


❶ The input electronic circuit of the contactor coil is designed and tested according to IEEEC 62.41 standards and can withstand a 10kV impulse voltage (1.2/50µs) with 50 Joule energy. The use of an auxiliary reduced voltage transformer is recommended for higher values.

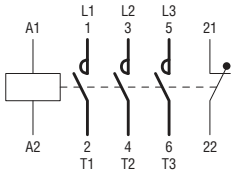
THREE-POLE CONTACTORS IN DC (AC/DC for BF40E...BF400E)

BG06D - BG09D - BGF09D - BGP09D - BG12D
BG06L - BG09L - BGF09L - BGP09L - BG12L

...10

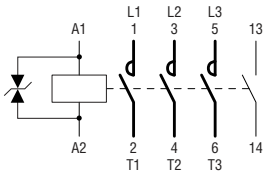


...01

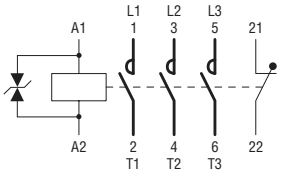


BF09D - BF12D - BF18D - BF25D
BF09L - BF12L - BF18L - BF25L

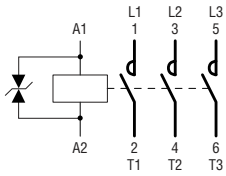
...10



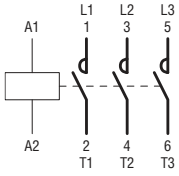
...01



BF26D - BF32D - BF38D
BF26L - BF32L - BF38L

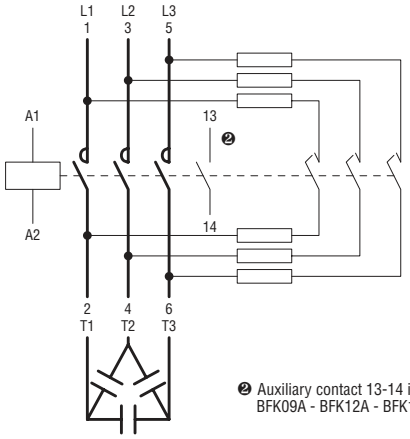


BF40E - BF50E - BF65E - BF80E - BF94E
BF95E - BF115E - BF150E - BF160E - BF195E - BF230E
BF265E - BF330E - BF400E



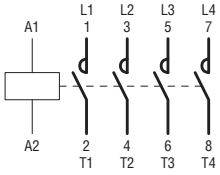
CONTACTORS FOR POWER FACTOR CORRECTION

BFK09A - BFK12A - BFK18A
BFK26A - BFK32A - BFK38A - BFK50A - BFK65A - BFK80A - BFK94A - BFK95A - BFK115A - BFK150A

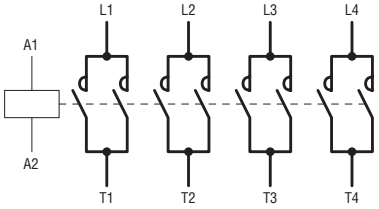


❷ Auxiliary contact 13-14 is found on BFK09A - BFK12A - BFK18A types only.

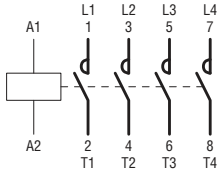
FOUR-POLE CONTACTORS IN AC
BG09T4A - BGF09T4A - BGP09T4A
BF09T4A - BF38T4A
BF50T4A - BF65T4A - BF80T4A
BF95T4A - BF115T4A - BF150T4A
BFD80T4A
B5004...B6304



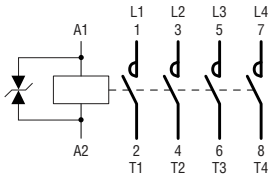
B12504 - B16004



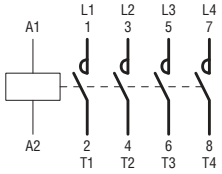
FOUR-POLE CONTACTORS IN DC (AC/DC for BF65T4E...BF400T4E)
BG09T4D - BGF09T4D - BGP09T4D



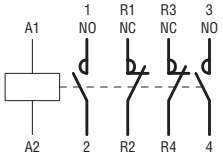
BF09T4D - BF38T4D
BF09T4L - BF38T4L



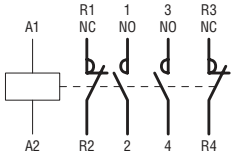
BF65T4E - BF80T4E - BF95T4E - BF150T4E - BFD150T4E
BF160T4E - BF195T4E - BF230T4E



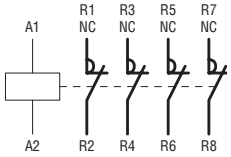
FOUR-POLE CONTACTORS IN AC WITH 2NO AND 2NC POLES
BG09T2A



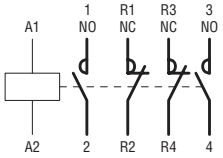
BF09T2A - BF18T2A - BF26T2A - BF38T2A
BF80T2A



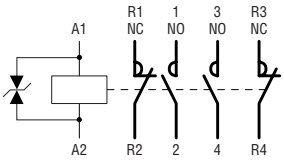
WITH NC FOUR-POLES
BF18T0A - BF26T0A



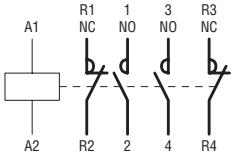
FOUR-POLE CONTACTORS IN DC (AC/DC for BF80T2E) WITH 2NO AND 2NC POLES
BG09T2D



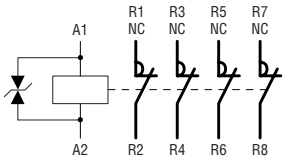
BF18T2D - BF26T2D - BF38T2D
BF18T2L - BF26T2L - BF38T2L



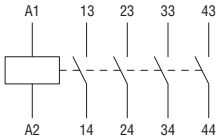
BF80T2E



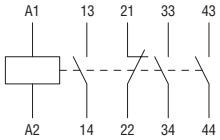
WITH NC FOUR-POLES
BF18T0D - BF26T0D
BF18T0L



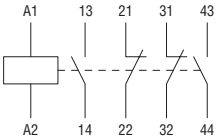
CONTROL RELAY IN AC
BG0040A - BGF0040A
BF0040A



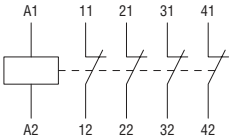
BG0031A - BGF0031A
BF0031A



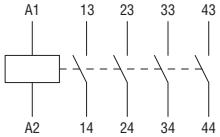
BG0022A - BGF0022A
BF0022A



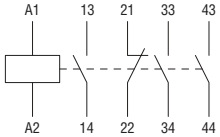
BF0004A



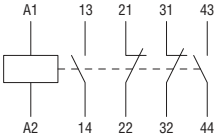
CONTROL RELAY IN DC
BG0040D - BGF0040D
BG0040L - BGF0040L



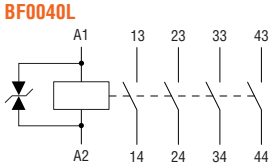
BG0031D - BGF0031D
BG0031L - BGF0031L



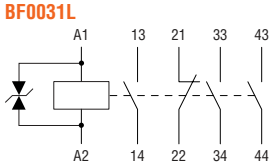
BG0022D - BGF0022D
BG0022L - BGF0022L



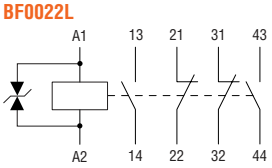
BF0040D
BF0040L



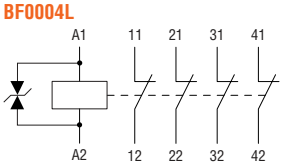
BF0031D
BF0031L



BF0022D
BF0022L



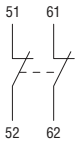
BF0004D
BF0004L



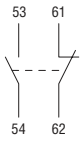
ADD-ON BLOCKS FOR BG MINI-CONTACTORS

Auxiliary contacts

BGX1002 BGXF1002

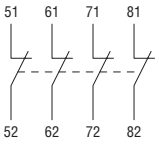


BGX1011 BGXF1011

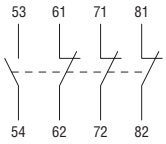


BGX1020 BGXF1020

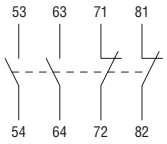
BGX1004 BGXF1004



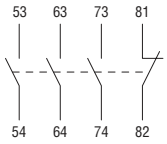
BGX1013 BGXF1013



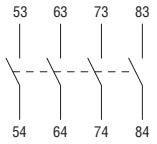
BGX1022 BGXF1022



BGX1031 BGXF1031

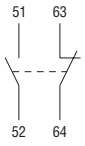


BGX1040 BGXF1040

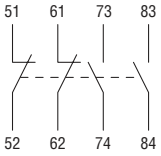


Special auxiliary contacts

BGX1111

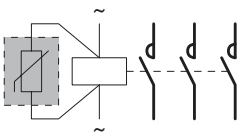


BGX1122

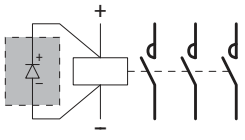


Surge suppressor

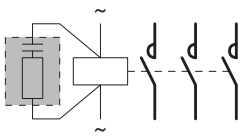
BGX77…



BGX78…

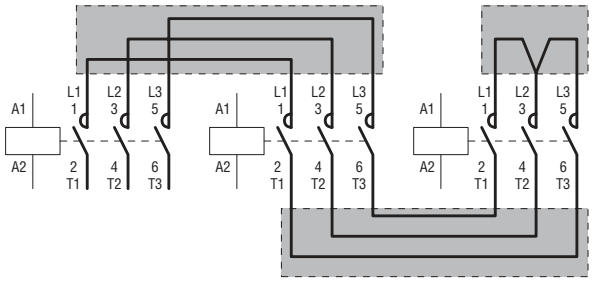


BGX79…

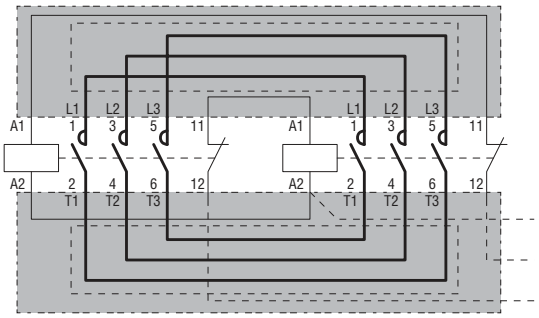


Rigid connections

SMX9021



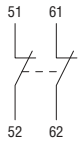
SMX9022



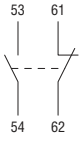
ADD-ON BLOCKS FOR BF CONTACTORS

Auxiliary contacts

BFX1002

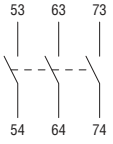


BFX1011

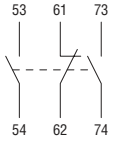


BFX1020

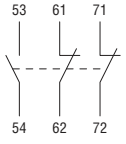
G48430



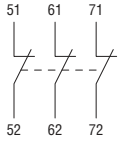
G48421



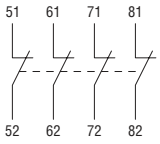
G48412



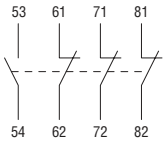
G48403



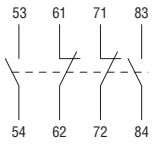
BFX1004



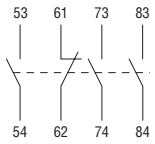
BFX1013



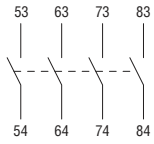
BFX1022



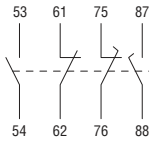
BFX1031



BFX1040

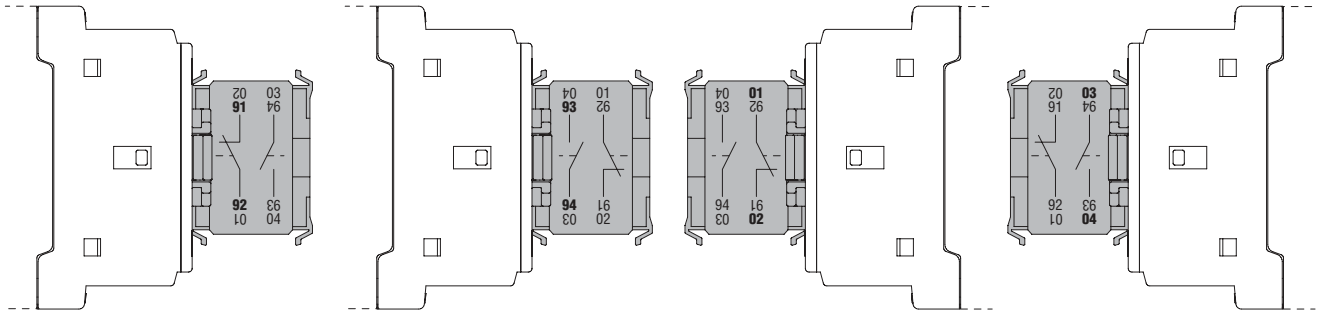


BFX101111



Auxiliary contact

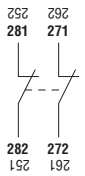
G218



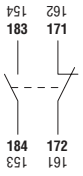
The termination of the G218 auxiliary contact has more than one numbering due to the fact that the block can assume various mounting positions.
See the numbering in boldface for a correct interpretation.

Auxiliary contacts

BFX1202
BFX12C02



BFX1211
BFX12C11



BFX1220
BFX12C20

BFX10C10

BFX10C01

G41810
G42810

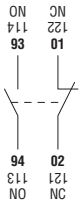
G41810A
G42810A

G41801
G42801

G41801D
G42801D

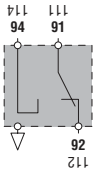
G48120

G48111

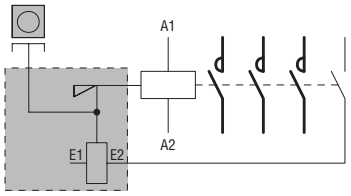


G48102

G482



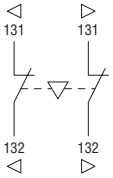
Mechanical latch
G222... - G272... - BFX641...



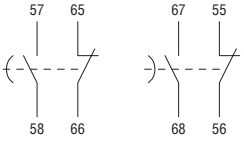
The termination of the BFX12... / G418... / G481... / G482 auxiliary contacts has more than one numbering due to the fact that the block can assume various mounting positions. See the numbering in boldface when the block is mounted on the left side of the contactor.

4th pole
BFX42 - BFX43 - BFX44
BFXD42

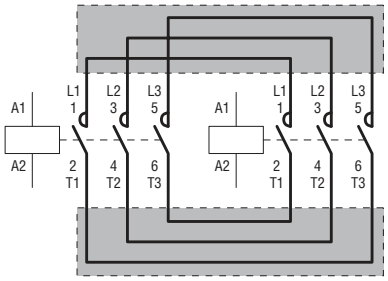
Interlock
BFX5001 - BFX5301
BFX5401



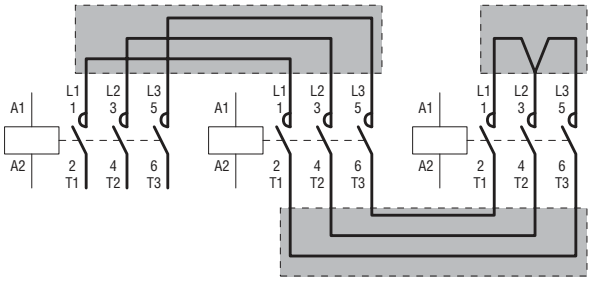
Delayed auxiliary contacts
G485... **G486... - G487**



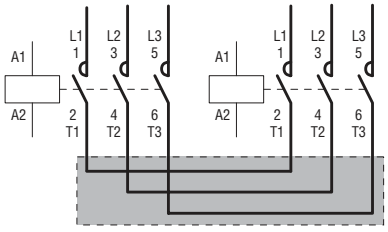
Rigid connecting kits
BFX3101 - BFX3102 - BFX3201
BFX3301 - BFX3401



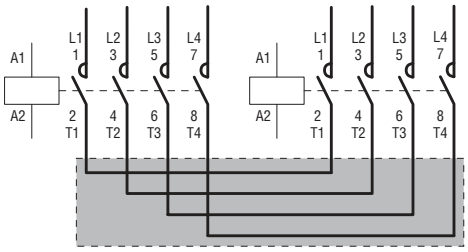
BFX3131 - BFX3231 - BFX3232 - BFX3331 - BFX3332 - BFX3431 - BFX3432



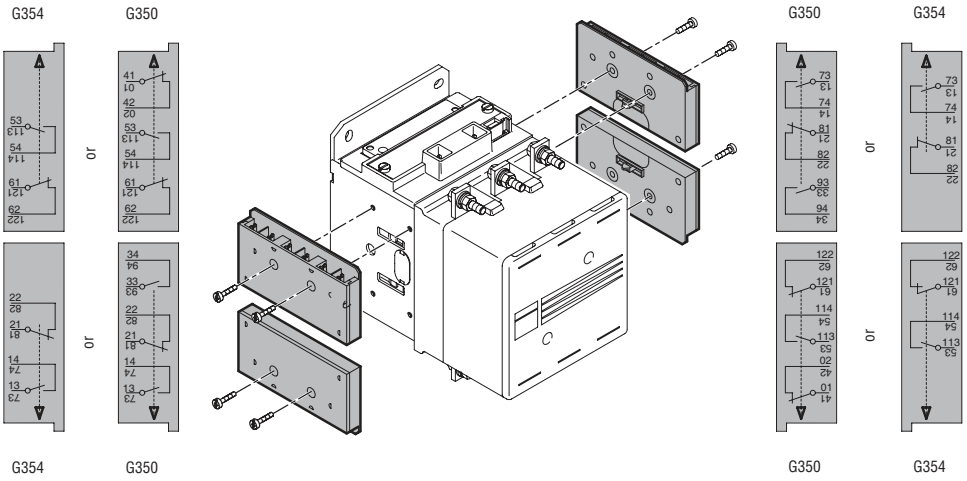
BFX3361 - BFX3461



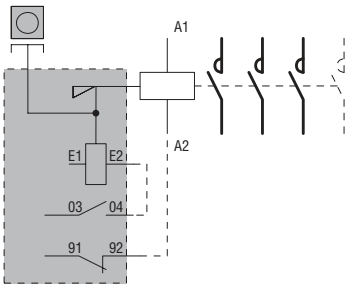
BFX3371 - BFX3471



ADD-ON BLOCKS FOR B CONTACTORS
Auxiliary contacts
G350 - G354



Mechanical latch
G495

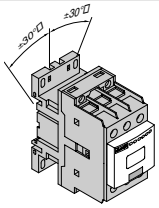


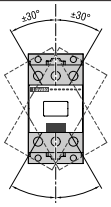
MOUNTING POSITION OF CONTACTORS

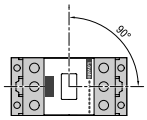
ON VERTICAL PLANE

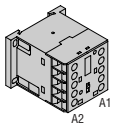
The performances given in this catalogue have been established with contactors mounted on a vertical plane with line terminals facing upwards and load terminals facing downwards.
All contactors can be mounted with a ± 30° inclination to the vertical axis of the contactor without any derating.

For BF series contactors, this inclination can reach ± 90°, that is when the terminals are facing towards left and right.
For BG mini-contactors:
– Position A, with coil terminals A1-A2 facing downwards, is not recommended.
– The position with coil terminals A1-A2 facing upwards is not recommended for mini-contactors with NC contacts.







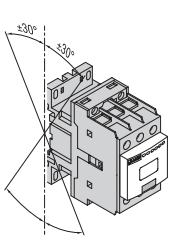


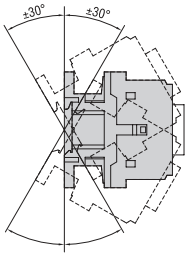
Pos. A

ON VERTICAL PLANE WITH 30° INCLINATION

All contactors can be mounted on a plane which varies in respect to the vertical up to ± 30° angle.
On the average, a 5% increase of the minimum pick-up voltage in -30° position can be noted.

This inclination is greater than the one prescribed by main naval registers.





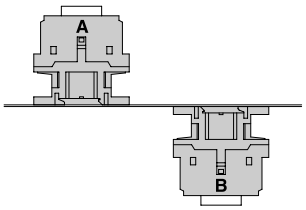
ON HORIZONTAL PLANE (FOR BF SERIES CONTACTORS)

Considerable performance variations can be noted.
It is necessary to check the two possible mounting positions:
– when the contactor is energised, the movable equipment moves upwards
– when the contactor is energised, the movable equipment moves downwards.

In the first case, it is difficult to close the contactor while in the second, to open it.

The variables which could influence the contactor performance, in addition to the two mounting positions, are:
– type of contactor
– type of control
– contact configuration
– number and type of add-on blocks
– permissible tolerance of auxiliary voltage variation
– ambient temperature.

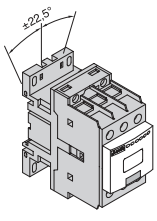
NOTE: Position B is not recommendable.

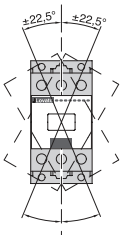


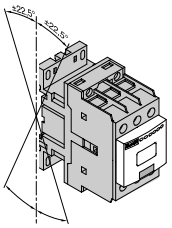
Our Technical support (Tel. 035 4282422; E-mail: service@LovatoElectric.com) can provide further information concerning operational performance of contactors mounted on a horizontal plane.

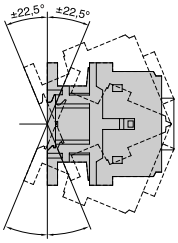
DYNAMIC TYPE TESTS

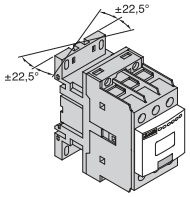
Our contactors have sustained dynamic testing, with contactor mounting position rotated ± 22.5° in respect to the three orthogonal axes.

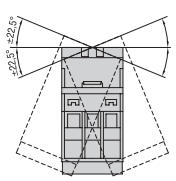












IEC UTILISATION CATEGORY AC-3 / AC-3e
POLE CHARACTERISTICS
Squirrel-cage induction motors; breaking at rated motor current.

MAXIMUM IEC OPERATIONAL POWER at ambient temperature ≤55°C.

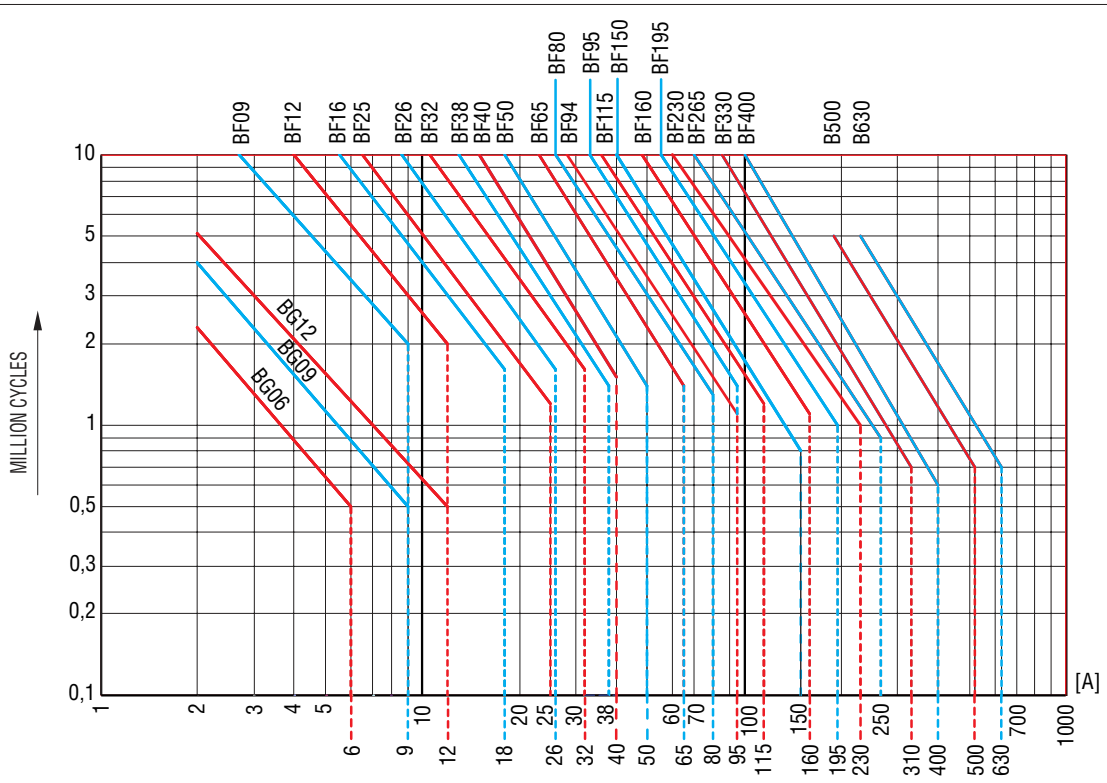
UL/CSA DUTY FOR AC MOTOR SWITCHING

POLE CHARACTERISTICS
Three-phase AC induction motors; breaking at rated motor current.
UL/CSA RATINGS at ambient temperature ≤55°C

Contactor type	IEC operational current (Ue ≤440V) [A]	IEC operational power 220/230V [kW]	380/400V [kW]	415V [kW]	440V [kW]	500V [kW]	660/690V [kW]	1000V [kW]	Maximum horsepower ratings (60Hz) Three phase 200-208V [HP]	240V [HP]	480V [HP]	600V [HP]
BG06	6	1.5	2.2	2.4	2.5	3	3	--	1½	2	3	3
BG09	9	2.2	4.0	4.3	4.5	5	5	--	2	3	5	5
BG12	12	3.2	5.7	6.2	5.5	5	5	--	3	3	7½	10
BF09	9	2.2	4.2	4.5	4.8	5.5	7.5	--	3	3	5	7½
BF12	12	3.2	5.7	6.2	6.2	7.5	10	--	5	5	7½	10
BF18	18	4	7.5	9	9	10	10	--	5	5	10	15
BF25	25	7.0	12.5	13.4	13.4	15	18	--	7½	7½	15	15
BF26	26	7.3	13	14	14	15.6	18.5	--	7½	7½	15	20
BF32	32	8.8	16	17	17	20	22	--	10	10	20	25
BF38	38	11	18.5	18.5	18.5	20	22	--	10	15	30	30
BF40	40	11	18.5	22	22	22	30	22	10	15	30	30
BF50	50	15	22	30	30	30	37	30	15	20	40	40
BF65	65	18.5	30	37	37	37	45	30	20	25	50	60
BF80	80	22	45	45	45	55	55	37	25	30	60	75
BF94	95	30	55	55	55	55	55	37	25	30	60	75
BF95	95	30	55	55	55	75	90	45	30	30	60	75
BF115	115	37	55	55	55	75	110	55	40	40	75	100
BF150	150	45	75	75	75	90	110	55	50	50	100	125
BF160	160	45	75	90	90	110	132	75	50	50	100	125
BF195	195	55	90	110	110	132	160	110	60	75	150	150
BF230	230	55	110	110	132	132	160	132	75	75	150	200
BF265	265	75	132	132	160	160	200	160	75	100	200	250
BF330	320	90	160	160	160	200	250	200	100	125	250	300
BF400	420	110	200	200	200	250	315	220	125	150	350	400
B500	520	156	290	306	328	367	416	312	150 ❶	200 ❶	400 ❶	450 ❶
B630	630	198	335	368	368	368	440	368	200 ❶	250 ❶	500 ❶	500 ❶

❶ No UL/CSA ratings; data given for indication and reference purposes only.

ELECTRICAL IEC LIFE FOR MOTOR CONTROL AC3 ≤440V
Electrical life of contactors



IEC DC UTILISATION CATEGORY
POLE CHARACTERISTICS

MAXIMUM OPERATIONAL CURRENT

IEC Voltage Ue	Contactor Type	IEC Maximum current Ie [A] in categories: DC1 with L/R ≤ 1ms and poles in series 1	2	3	4	DC3 - DC5 with L/R ≤ 15ms and poles in series 1	2	3	4
≤ 24V	**BG06**	9	12	14	–	6	7	9	–
	BG09	12	15	16	16	7	8	10	10
	BG12	12	15	16	–	7	8	10	–
	BF09	15	18	20	20	10	13	15	15
	BF12	17	20	22	20	12	15	18	15
	BF18	17	20	22	22	12	15	18	18
	BF25	20	23	23	–	15	18	22	–
	BF26	25	28	28	28	18	20	25	30
	BF32	30	32	32	–	20	25	30	–
	BF38	35	36	36	36	24	28	32	32
	BF40	40	48	48	–	27	32	40	–
	BF50	45	60	60	60	30	35	50	55
	BF65	50	70	70	70	35	45	55	60
	BF80	70	100	100	100	40	60	80	90
	BF94	77	110	110	115	45	65	86	96
	BF95	140	140	140	140	140	140	140	140
	BF115	160	160	160	160	160	160	160	160
	BF150	165	165	165	165	165	165	165	165
48V	**BG06**	8	11	14	–	5	7	9	–
	BG09	10	14	16	16	6	8	10	10
	BG12	10	14	16	–	6	8	10	–
	BF09	13	18	20	20	9	11	15	15
	BF12	15	20	22	20	11	13	18	15
	BF18	15	20	22	22	11	13	18	18
	BF25	18	23	23	–	13	18	22	–
	BF26	21	28	28	28	15	20	25	30
	BF32	26	32	32	–	17	22	28	–
	BF38	30	34	34	34	20	25	28	28
	BF40	35	48	48	–	23	30	40	–
	BF50	40	60	60	60	25	35	50	55
	BF65	50	70	70	70	25	40	50	60
	BF80	60	100	100	100	30	50	70	90
	BF94	66	110	110	115	33	55	75	95
	BF95	140	140	140	140	44	63	115	110
	BF115	160	160	160	160	50	72	150	120
	BF150	165	165	165	165	60	82	195	130
75V	**BG06**	4	7	8	–	2	4	5	–
	BG09	4	9	10	10	2	5	6	6
	BG12	4	9	10	–	2	5	6	–
	BF09	12	17	20	20	8	10	13	15
	BF12	13	18	20	20	10	12	15	15
	BF18	15	20	20	20	11	13	16	16
	BF25	18	23	23	–	13	16	18	–
	BF26	18	25	25	25	13	18	20	25
	BF32	22	28	32	–	15	20	28	–
	BF38	23	29	33	33	17	22	28	28
	BF40	30	45	48	–	19	27	38	–
	BF50	40	60	60	60	22	30	45	55
	BF65	50	70	70	70	25	40	50	60
	BF80	60	100	100	100	30	50	70	90
	BF94	66	110	110	115	33	55	75	95
	BF95	100	140	155	155	36	60	90	110
	BF115	120	160	160	160	40	65	100	120
	BF150	150	165	165	165	44	70	110	130

POLE CHARACTERISTICS

MAXIMUM OPERATIONAL CURRENT

IEC Voltage Ue	Contactor Type	IEC Maximum current Ie [A] in categories: DC1 with L/R ≤ 1ms and poles in series 1	2	3	4	DC3 - DC5 with L/R ≤ 15ms and poles in series 1	2	3	4
110V	**BG06**	3	6	8	–	1	3	4	–
	BG09	3	8	10	10	1	4	5	5
	BG12	3	8	10	–	1	4	5	–
	BF09	6	12	15	16	2	7	11	12
	BF12	6	13	16	16	2	8	12	16
	BF18	6	13	16	18	2	8	12	13
	BF25	6	16	18	–	2	10	15	–
	BF26	6	22	24	24	2	13	18	20
	BF32	8	25	27	–	2.5	15	20	–
	BF38	8	32	34	34	2.5	18	23	23
	BF40	8	42	44	–	3	22	27	–
	BF50	8	50	55	60	3	25	30	45
	BF65	8	60	60	70	3	30	35	50
	BF80	8	80	85	100	3	40	60	75
	BF94	8	90	93	110	3	43	64	80
	BF95	10	110	120	140	6	55	85	105
	BF115	10	130	140	160	6	65	100	125
	BF150	10	150	160	165	6	80	120	150
220V	**BG06**	–	–	1	–	–	–	0.5	–
	BG09	–	–	2	2	–	–	0.8	0.8
	BG12	–	–	2	–	–	–	0.8	–
	BF09	–	1	10	12	–	2	6	7
	BF12	–	1	11	12	–	2	6	7
	BF18	–	1	11	13	–	2	6	8
	BF25	–	1	12	–	–	2	8	–
	BF26	–	2	20	26	–	3	19	15
	BF32	–	3	23	–	–	3	23	–
	BF38	–	4	30	38	–	3	25	15
	BF40	–	5	56	70	–	5	32	40
	BF50	–	7	75	90	–	5	40	50
	BF65	–	9	90	110	–	5	52	65
	BF80	–	9	95	115	–	5	64	80
	BF94	–	9	95	115	–	5	64	80
	BF95	–	12	125	140	–	7	76	95
	BF115	–	14	145	160	–	7	92	115
	BF150	–	14	150	165	–	7	120	150

IEC DC UTILISATION CATEGORY
POLE CHARACTERISTICS

MAXIMUM OPERATIONAL CURRENT

IEC Voltage Ue	and poles in series	IEC Maximum current Ie [A] in categories: DC1 with L/R ≤ 1ms and poles in series				DC3 - DC5 with L/R ≤ 15ms and poles in series			
	Type	1	2	3	4	1	2	3	4
75V	**BF160**	250	250	250	250	160	160	160	160
	BF195	275	275	275	275	180	180	180	180
	BF230	350	350	350	350	250	250	250	250
	BF265	350	350	350	350	280	280	280	280
	BF330	375	375	375	375	310	310	310	310
	BF400	400	400	400	400	350	350	350	350
	B500	650	650	650	650	550	550	550	550
	B630	800	800	800	800	800	800	800	800
110V	**BF160**	110	150	160	250	80	120	140	140
	BF195	120	170	170	275	90	140	160	160
	BF230	145	270	270	350	135	225	250	250
	BF265	160	300	300	300	150	250	280	280
	BF330	195	350	350	350	170	290	310	310
	BF400	250	400	400	400	200	350	350	350
	B500	320	550	600	600	320	550	550	550
	B630	460	800	800	800	460	800	800	800
220V	**BF160**	--	130	150	250	--	90	120	140
	BF195	--	150	170	275	--	100	140	160
	BF230	--	225	270	350	--	180	225	225
	BF265	--	250	300	300	--	200	250	280
	BF330	--	300	350	350	--	230	290	310
	BF400	--	350	400	400	--	280	350	350
	B500	--	450	600	600	--	450	550	550
	B630	--	700	800	800	--	700	800	800
330V	**BF160**	-	-	130	150	--	--	90	140
	BF195	--	--	150	170	--	--	100	160
	BF230	--	--	225	270	--	--	180	210
	BF265	--	--	250	300	--	--	200	280
	BF330	--	--	300	350	--	--	230	310
	BF400	--	--	350	400	--	--	280	350
	B500	--	--	450	600	--	--	450	550
	B630	--	--	700	750	--	--	650	700
460V	**BF160**	--	--	--	130	--	--	--	90
	BF195	--	--	--	150	--	--	--	100
	BF230	--	--	--	225	--	--	--	180
	BF265	--	--	--	250	--	--	--	200
	BF330	--	--	--	300	--	--	--	230
	BF400	--	--	--	350	--	--	--	280
	B500	--	--	--	450	--	--	--	450
	B630	--	--	--	700	--	--	--	700

IEC UTILISATION CATEGORIES DC1, DC3 AND DC5.
POLE CHARACTERISTICS

CHOICE CRITERIA
The elements to be considered for the contactor choice are:
-- Rated operational current Ie
-- Rated operational voltage Ue
-- Utilisation category and L/R time constant
-- Eventual verification of electrical life.

OPERATING CONDITIONS
Indicated current is valid for:
-- Ambient temperature ≤ 55°C
-- Operating cycles: up to 120 cy/h with 60% on-load factor
up to 250 cy/h with 30% on-load factor.

POLES IN SERIES
It is important to use contactors with the indicated number of poles in series depending on operating voltage.
The poles in series can be connected to one single polarity or divided between the two polarities of the circuit indifferently.
NOTE. For voltages lower than 30V, the diagrams given in figures 3 and 4 are not recommendable since voltage drops can take place. In these cases, it is better to use poles in parallel considering the notes given in the following section.

Examples of poles in series:

1 POLE

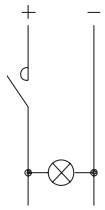


Fig. 1

2 POLES

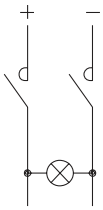


Fig. 2

3 POLES

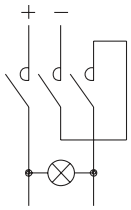


Fig. 3

4 POLES

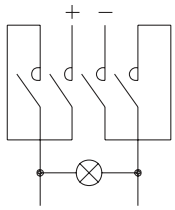


Fig. 4

POLES IN PARALLEL
It is possible to increase the electrical life by placing poles in series when using voltages which require 1 or 2 poles in parallel.
Poles in parallel do not increase the maximum operational current given in the previous pages; that is, if one pole has a maximum operational current in DC5 of 8A, two poles in parallel, it will always be 8A.
With poles in parallel, it is possible to increase the rated contact capacity (Ith) only if the contactor opens and closes in no-load conditions or when used as resistance shunts.
In this case, the contact capacity can be increased.
The value can be obtained by multiplying the rated current of one pole by the K factor given below; e.g.: if one pole carries 10A, three-poles in parallel can carry 10 x 2.2 = 22A.
Therefore, the operating current is the one indicated in the tables, multiplied by the K factor given below which takes into consideration the unequal current division on the various poles.
2 POLES in parallel K = 1.6
3 POLES in parallel K = 2.2
4 POLES in parallel K = 2.8

Examples of poles in parallel:

1 POLE in series and
2 POLES in parallel

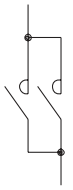


Fig. 5

1 POLE in series and
3 POLES in parallel

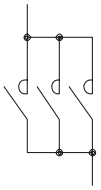


Fig. 6

1 POLE in series and
4 POLES in parallel

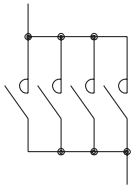


Fig. 7

2 POLE in series and
2 POLES in parallel

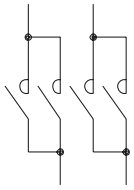


Fig. 8

MAXIMUM OPERATIONAL CURRENT
See tables on pages 2-59 to 2-61.

OTHER CONDITIONS
For different operating conditions or voltage not included among those indicated in the tables, on pages 2-59 to 2-61, consult Technical support (Tel. 035 4282422; E-mail: service@LovatoElectric.com).

IEC SELECTION GUIDE FOR LIGHTING CIRCUIT SWITCHING

GENERAL INFORMATION

The elements which are to be considered for the contactor choice are:
- Type of lamp
- Power factor (cosφ)
- With or without power factor correction
- Value of current when switching on and in running conditions.

Depending on the number and type of lamps, it is also important to bear in mind the main discriminating characteristics given below for the contactor choice:
- Incandescent lamps → contactor making capacity
- Lamps not corrected → rated contactor current in AC1
- Lamps corrected → rated contactor current in AC3

The table below summarises the major characteristics depending on the more commonly used type of lamps:

Type of lamps	Switching on Multiple of In❶	cosφ	Switching off Multiple of In❶	cosφ
Incandescent	15	1	1	1
Mixed light	1.3	1	1	1
Fluorescent	1.15...1.3	0.2	1	0.3...0.5 (not corrected) 1 (corrected)
High-pressure mercury vapour	1.5...1.75	0.2	1	0.45...0.7 (not corrected)
High-pressure sodium vapour	1.3...1.5	0.2	1	0.3...0.5 (not corrected)
Low-pressure sodium vapour	1	0.2...0.5	1	0.2...0.5 (not corrected)
Metal halide	1.7...2.1	0.2	1	0.4...0.5 (not corrected)
LED	20...40 ❺	0.6...0.95	1	0.6...0.95

Lamp features		Lamp power	Rated current	Capacitor capacity	Maximum number [n] of lamps for each contactor pole ❷										
					BG06 BG09 BG12	BF09 BF12 BF18	BF25	BF26 BF32	BF38	BF40 BF50	BF65 BF80 BF94	BF95	BF115 BF150	BF160	BF195 BF230
		[W]	[A]	[µF]											
LED 220...240V 50/60Hz	See note ❻				Each pole can carry 67% of the rated current AC3 ❻										
INCANDESCENT	50/60Hz	60	0.27	-	30	48	92	118	129	203	240	296	370	425	462
220...240V		100	0.45	-	18	28	55	71	77	122	144	177	222	255	277
		200	0.91	-	8	14	27	35	38	60	71	87	109	126	137
		300	1.4	-	5	9	17	22	25	39	46	57	71	82	89
		500	2.3	-	3	5	10	13	15	23	28	34	43	50	54
		1000	4.6	-	1	2	5	6	7	11	14	17	21	25	27
MIXED LIGHT	50/60Hz	100	0.45	-	20	33	57	77	88	122	144	177	244	311	377
220...240V		160	0.72	-	12	20	36	48	55	76	90	111	152	194	236
		250	1.13	-	8	13	23	30	35	48	57	70	97	123	150
		500	2.3	-	4	6	11	15	17	23	28	34	47	60	73
		1000	4.6	-	1	3	5	7	8	11	14	17	23	30	36
ELECTRONIC BALLAST FLUORESCENT	Single mounting	16 / 18	0.1	(6.8) ❸	48	80	160	220	220	400	450	500	750	1050	1200
		32 / 36	0.18	(6.8) ❸	27	44	88	122	122	222	250	277	416	583	666
220...240V 50/60Hz (EVG)		50 / 58	0.27	(10) ❸	17	29	59	82	82	148	166	185	277	388	444
	Dual mounting	2x16 / 18	0.18	(10) ❸	26	44	88	122	122	222	250	277	416	583	666
		2x32 / 36	0.35	(10) ❸	13	22	45	62	62	114	128	142	214	300	342
		2x50 / 58	0.52	(22) ❸	9	15	30	42	42	76	86	96	144	201	230
STANDARD FLUORESCENT	Not corrected	15	0.35	-	25	42	74	100	114	157	185	228	314	400	485
220...240V	Single mounting	20	0.37	-	24	40	70	94	108	148	175	216	297	378	459
		40	0.44	-	20	34	59	79	90	125	147	181	250	318	386
		65	0.7	-	12	21	37	50	57	78	92	114	157	200	242
		115	1.5	-	6	10	17	23	26	36	43	53	73	93	113
		140	1.5	-	6	10	17	23	26	36	43	53	73	93	113
	Corrected	15	0.11	4.5	24	40	62	94	94	200	200	200	533	533	533
	Single mounting	20	0.16	4.5	24	40	62	94	94	200	200	200	533	533	533
		40	0.24	4.5	24	40	62	94	94	200	200	200	458	500	520
		65	0.4	7	15	25	40	50	57	125	128	128	275	300	312
		115	0.7	18	6	10	15	23	23	50	50	50	133	133	133
		140	0.7	18	6	10	15	23	23	50	50	50	133	133	133
	DUO circuit	2 x 20	0.26 ❹	-	54	57	100	153	153	211	250	307	423	538	653
		2 x 40	0.46 ❹	-	19	32	56	86	86	119	141	173	239	304	369
		2 x 65	0.7 ❹	-	12	21	37	57	57	78	92	114	157	200	242
		2 x 115	1.3 ❹	-	6	11	20	30	30	42	50	61	84	107	130
		2 x 140	1.5 ❹	-	6	10	17	26	26	36	43	53	73	93	113

❶ In = Rated lamp current.
❷ For 220/240V circuits, either single-phase (between phase and neutral) or 2-wire (between phase and phase), the maximum number of lamps is as per the table.
For three-phase circuits with neutral 380/415V or 220/240V, the maximum number of lamps controlled by the same contactor is n • 3.
For three-phase 380/415V circuits without neutral, the maximum number of lamps controlled by the same contactor is n • √3.
Electrical life is 100,000 cycles up to 55°C.
❸ Incorporated capacitor.
❹ Total.
❺ With reference to the AC side of the power supplies.
❻ Usually, each light has its own power supply. If a power supply controls several lights, the number of power supplies must be factored into the calculation. The sum of the rated currents of the power supplies connected to each pole of the contact must not exceed 67% of the rated current AC-3 of the contactor indicated on page 2-6.
e.g. BF18 has a rated current AC-3 of 18A; it can control 18x0.67=12.06A per pole at most.

Lamp features		Lamp power [W]	Rated current [A]	Capacitor capacity [µF]	Maximum number [n] of lamps for each contactor pole❶ BG06 BG09 BG12	BF09 BF12 BF18	BF25	BF26 BF32	BF38	BF40 BF50	BF65 BF80 BF94	BF95	BF115 BF150	BF160	BF195 BF230
HIGH-PRESSURE MERCURY VAPOUR 220...240V 50/60Hz	Not corrected	50	0.61	-	10	16	26	36	44	65	73	82	122	172	196
		80	0.8	-	7	12	20	27	33	50	56	62	93	131	150
		125	1.2	-	5	8	13	18	22	33	37	41	62	87	100
		250	2.2	-	3	4	7	10	12	18	20	22	34	47	54
		400	3.4	-	2	3	5	6	7	11	13	14	22	30	35
		700	5.5	-		1	3	4	4	7	8	9	13	19	21
		1000	8	-		1	2	2	3	5	5	6	9	13	15
	Corrected	50	0.29	7	15	25	40	60	60	128	128	128	258	342	342
		80	0.42	8	13	22	35	52	53	95	107	112	178	250	285
		125	0.7	10	8	14	22	31	35	57	64	71	107	150	171
		250	1.3	18	4	7	12	16	19	30	34	38	57	80	92
		400	2.1	25	2	4	7	10	11	19	21	23	35	50	57
		700	3.6	40	-	2	4	6	6	11	12	13	20	29	33
		1000	5.3	60	-	1	3	4	4	7	8	9	14	19	22
380...415V 50/60Hz	Not corrected	2000	8	-		-	1	2	2	3	3	4	5	8	9
	Corrected	2000	5.5	35		-	1	2	2	4	5	5	8	11	13
HIGH-PRESSURE SODIUM VAPOUR 220...240V 50/60Hz	Not corrected	150	1.8	-	3	5	8	12	15	22	25	27	41	58	66
		250	3	-	2	3	5	7	9	13	15	16	25	35	40
		400	4.7	-	1	2	3	4	5	8	9	10	15	22	25
		600	7.1	-	-	1	2	3	3	5	6	6	10	15	16
		1000	10.4	-		-	1	2	2	3	4	4	7	10	11
	Corrected	150	0.83	20	-	9	14	19	21	45	45	45	90	120	120
		250	1.5	36	-	5	7	10	11	25	25	25	50	66	66
		400	2.4	48	-	3	5	6	7	16	18	18	31	43	50
		600	3.5	68	-	2	3	4	4	10	12	12	20	28	34
		1000	6.3	120	-	1	1	2	2	6	7	7	11	16	19
LOW-PRESSURE SODIUM VAPOUR 220...240V 50/60Hz	Not corrected	35	1.5	-	4	6	10	14	18	26	30	33	50	70	80
		55	1.5	-	4	6	10	14	18	26	30	33	50	70	80
		90	2.4	-	3	4	6	9	11	16	18	20	31	43	50
		135	3.1	-	2	3	5	7	8	12	14	16	24	33	38
		150	3.2	-	2	3	5	6	8	12	14	15	23	32	37
		180	3.3	-	2	3	4	6	8	12	13	15	22	31	36
	Corrected	35	0.31	20	-	6	10	14	18	45	45	45	120	120	120
		55	0.42	20	-	6	10	14	18	45	45	45	120	120	120
		90	0.63	30	-	4	6	9	11	30	30	30	80	80	80
		135	0.94	40	-	3	5	7	8	22	22	22	60	60	60
		150	1	40	-	3	5	6	8	22	22	22	60	60	60
		180	1.2	40	-	3	4	6	8	22	22	22	60	60	60
METAL HALIDE 220...240V 50/60Hz	Not corrected	35	0.3	-	-	28	50	66	80	100	150	167	250	330	400
		70	0.5	-	-	16	28	40	50	60	90	100	150	200	240
		150	1	-	-	8	14	20	25	30	45	50	75	100	120
		250	3	-	-	3	5	7	9	13	15	16	25	35	40
		400	3.5	-	-	2	4	6	7	11	12	14	21	30	34
		1000	10	-	-	1	1	2	2	4	4	5	7	10	12
		2000	17	-	-	-	-	1	1	2	2	2	4	6	7
	Corrected	35	0.17	6	-	33	60	65	65	200	240	260	400	420	440
		70	0.28	12	-	20	36	40	40	120	145	155	240	255	265
		150	0.6	20	-	9	17	18	18	56	68	74	112	118	120
		250	1.5	32	-	5	7	8	10	26	28	28	46	50	53
		400	2	35	-	4	5	6	7	20	22	25	35	37	40
		1000	5.8	95	-	1	1	2	2	6	7	8	12	12	13
		2000	11.5	148	-	-	-	1	1	3	3	4	6	6	6
380...415V 50/60Hz	Not corrected	2000	10.3	-	-	-	-	1	1	2	2	3	4	6	7
		3500	18	-	-	-	-	-	-	1	1	1	2	3	4
	Corrected	2000	6.6	60	-	-	1	1	1	3	3	4	6	7	7
		3500	11.6	100	-	-	-	-	-	2	2	2	3	3	4

❶ For 220/240V circuits, either single-phase (between phase and neutral) or 2-wire (between phase and phase), the maximum number of lamps is as per the table.
For three-phase circuits with neutral 380/415V or 220/240V, the maximum number of lamps controlled by the same contactor is n • 3.
For three-phase 380/415V circuits without neutral, the maximum number of lamps controlled by the same contactor is n • $\sqrt{3}$.
Electrical life is 100,000 cycles up to 55°C.

POWER FACTOR CORRECTION CAPACITORS

CHOICE CRITERIA

The contactor during the closing transition is influenced by electrical currents having high frequencies and high amplitudes.The frequencies of these currents range between 1 and 10kHz; the amplitudes must have values lower than the maximum permissible current peak of the contactor to be used.

AMBIENT OPERATING CONDITIONS

Ambient temperature: ≤ 50 °C.
For temperatures higher than 50°C up to 70 °C, stated maximum operational power ratings are to be reduced by a percentage equal to the difference between the ambient temperature and 50°C.
Operating cycle: ≤ 120 cy/h
Electrical life: ≥ 100,000 cycles.

Contactor	IEC rated current ≤400V	Maximum permissible peak current	IEC maximum operational voltage	Fuse	IEC maximum operational power (AC-6b)			
					220V 230V 240V	380V 400V	415V 440V	500V 660/690V
Type	[A]	[A]	[V]	gG [A]	[kvar]	[kvar]	[kvar]	[kvar]
BF09A	12	500	690	16	4.5	7.5	9	10
BF12A	18	550	690	25	7	12.5	12	14
BF18A	23	1000	690	32	9	15	16	18
BF25A	23	1000	690	32	9	15	16	18
BF26A	30	1400	690	40	11	20	22	22
BF32A	36	1700	690	50	14	25	27	30
BF38A	43	1900	690	63	17	30	30	34
BF40A	50	2500	1000	100	20	35	40	45
BF50A	58	2500	1000	80	22	40	41	45
BF65A	65	2500	1000	100	26	45	50	52
BF80A	75	2500	1000	125	30	50	56	60
BF94A	75	2500	1000	125	30	50	56	70
BF95A	90	3000	1000	125	34	60	75	80
BF115A	115	3000	1000	160	45	75	85	135
BF150A	144	3000	1000	160	50	100	115	150
BF160	150	3400	1000	200	57	100	108	130
BF195	170	3600	1000	250	65	112	122	150
BF230	215	4500	1000	315	85	140	150	190
BF265	240	5100	1000	315	91	158	172	210
BF330	265	5900	1000	315	105	184	200	245
BF400	320	7500	1000	400	122	211	230	280
B500	500	9000	1000	630	190	330	360	430
B630	610	11000	1000	800	230	400	432	520

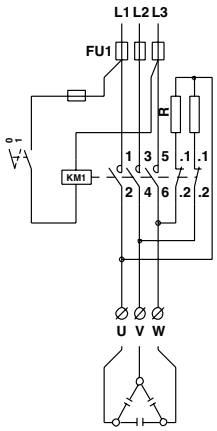
The use of contactors with the above operational powers is allowable only when the peak current, in the installation point of the power factor correction board, is lower than the values stated in the table.
If this condition is not verified, it is necessary to use limiting inductances or specific contactors stated on page 2-18. Consult Technical support (see contact details on inside front cover) to obtain detailed information on the correct use of contactors without limiting inductances.

LIMITING INDUCTANCES

The use of limiting inductances is imperative when the system inductances (line transformer and cables), upstream of the power factor correction panel, are not able to maintain the maximum connecting current within the limit value of the contactor used.

FAST DISCHARGE RESISTANCES OF CAPACITORS

The use of the contactor, according to the wiring diagram given, allows the fast discharge of the capacitors as well as the instantaneous disconnection of the capacitors from the mains when the coil is de-energised.
The resistances, indicated in the following table, guarantee the discharge within a maximum time of 2 seconds.



Capacitor power	Voltage 220...230V		Voltage 380...500V	
[kvar]	[Ω]	[W]	[Ω]	[W]
2.5...5	3900	12	8200	12
10...15	1800	25	4300	25
20...50	1000	50	2200	50

SPECIAL CONTACTORS FOR POWER FACTOR CORRECTION CAPACITORS

GENERAL CHARACTERISTICS

These contactors are equipped with early-make contacts. This special type of contact has the purpose of connecting for a very brief interval, 2-3ms, during the contactor closing, resistors which limit the connecting current of the capacitors. These resistors are then excluded when the closing operation is complete and the current capacity is conveyed to the main contacts. With this type of circuit, it is possible to obtain minor wear of all the components of the system especially fuses and capacitors ensuring a longer life and better reliability.
The contactors are particularly suitable for use in automatic power factor correction panels since there is no need of limiting inductances and a source of heat has been eliminated. In this way, these modular electric switchboards can be more compact.

The BFK version, figure 1, is designed for three-phase switching. The peculiarity of this type is in the contacts, suitable to connect limiting resistors, which close only for the time needed to limit any in-rush current peak and then reopen to avoid eventual flow of residual currents through the resistors.

AMBIENT OPERATING CONDITIONS

Ambient temperature: ≤ 50 °C
For ambient temperature higher than 50°C up to 70°C, maximum operational power ratings, indicated in the table, are to be reduced by a percentage equal to the difference between the ambient temperature and 50°C.
Operating cycles: ≤ 120 cy/h.
Electrical life: ≥ 400,000 cycles.

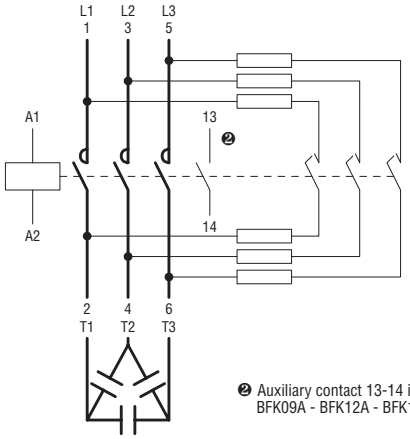


Fig. 1

❷ Auxiliary contact 13-14 is found on BFK09A - BFK12A - BFK18A types only.

Contactor	Built-in auxiliary contacts NO	IEC rated operational current ≤440V	IEC fuse gG	Maximum IEC power at ≤50°C (AC6b) ❶ 220V 230V 240V	380V 400V	415V 440V	500V 690V
Type	n°	[A]	[A]	[kvar]	[kvar]	[kvar]	[kvar]
BFK09A	1	12	16	4.5	7.5	9	10
BFK12A	1	18	25	7	12.5	14	16
BFK18A	1	23	40	9	15	17	20
BFK26A	—	30	40	11	20	22	25
BFK32A	—	36	63	14	25	27.5	30
BFK38A	—	43	63	17	30	33	36
BFK50A	—	58	80	22	40	41	46
BFK65A	—	65	100	26	45	50	56
BFK80A	—	75	125	30	50	56	65
BFK94A❷	—	90	125	34	60	75	80
BFK95A	—	90	125	34	60	75	80
BFK115A	—	115	160	45	75	85	135
BFK150A	—	144	160	50	100	115	150

NOTE: See page 2-18 for order codes.
❶ Consult Technical support (Tel. 035 4282422; E-mail: service@LovatoElectric.com) for the use of contactors to switch within delta connection.
❷ **Note: The maximum thermal current of the BFK94 contactor is 115A.**

CHOICE OF CONTACTORS TYPE BFK ACCORDING TO cULus LISTING

Contactor	Built-in auxiliary contacts NO (SPST)	UL/CSA rated current ≤440V	UL/CSA protection fuse SC/gG	Maximum UL/CSA operational power at voltage: 240V	480V	600V
Type	n°	[A]	[A]	[kvar]	[kvar]	[kvar]
BFK09A	1	12	16	4.5	9	10
BFK12A	1	18	25	7	14	16
BFK18A	1	23	40	9	17	20
BFK26A	—	30	40	11	22	27.5
BFK32A	—	36	63	14	27.5	32
BFK38A	—	43	63	17	33	36
BFK50A	—	58	80	22	41	46
BFK65A	—	70	100	26	50	56
BFK80A	—	75	125	30	60	75
BFK95A	—	100	125	40	80	100
BFK115A	—	115	160	45	90	120
BFK150A	—	121	160	50	100	125

NOTE: See page 2-18 for order codes.

IEC OPERATIONAL CHARACTERISTICS BG00 AND BF00

TYPE			BG00	BF00A	BF00D	BF00L
POLE CONTACT CHARACTERISTICS						
Poles❶		n°	4			
Conventional free air thermal current Ith (≤40°C)		A	10			
Rated insulation voltage Ui		V	690			
Frequency limit		Hz	25...400 ❷			
UL/CSA and IEC/EN/BS 60947-5-1 auxiliary contact designation		AC	A600			
		DC	Q600	P600		
Terminals		A	7.5	8.3		
		B	4	3.5		
		Screw	M3	M3.5		
		Phillips	2	2		
Quick-connect		Faston	1x6.35 - 2x2.8	—		
Tightening torque for contact terminals min-max		Nm	0.8...1	1.5...1.8		
		lb.in	9	13...16		
Tightening torque for coil terminals min-max		Nm	0.8...1			
		lb.in	7...9			
		Phillips	2			
Conductor section connectable with 1 or 2 wires min ... max	AWG stranded	n°	18...12	16...10		
	Flexible w/o lug	mm²	0.75...2.5	1...6		
	Flexible c/w boot-lace ferrule	mm²	2x1.5 o 1x2.5	1...4		
	Flexible c/w spade lug	mm²	2x1.5 o 1x2.5	1...4		
Terminal protection according to IEC/EN/BS 60529			IP20❸			
AMBIENT CONDITIONS						
Operating temperature		°C	-50...+70			
Storage temperature		°C	-60...+80			
Maximum altitude		m	3000			
Operation position	Normal		On vertical plane			
	Allowable		±30°			
Fixing			Screw or on 35mm DIN rail			

❶ The built-in auxiliary contacts are high-conductivity.
❷ Derating for use at 61-400 Hz. Consult Technical support for information (Tel. 035 4282422; E-mail: service@LovatoElectric.com).
❸ IP20 protection warranted by wired equipment; minimum 0.75mm² conductor section for BG00 or 1mm² for BF00.

ELECTRICAL RATINGS BASED ON IEC/EN/BS 60947-5-1 UTILIZATION CATEGORIES AND UL508/CSA C22.2 n°14

IEC/EN/BS designation	IEC/EN/BS utilization category	Conventional enclosed thermal current Ithe	Rated operational current Ie [A] at rated operational voltage Ue										VA rating	
UL designation	—	Thermal continuous test current	Maximum Amperes (AC) 60Hz										Maximum VA	
			120VAC		240VAC		380VAC		480VAC		600VAC			
Alternating current		[A]	Make	Break	Make	Break	Make	Break	Make	Break	Make	Break	Make	Break
A600	AC-15	10	60	6	30	3	19	1.9	15	1.5	12	1.2	7200	720
Direct current			Maximum Amperes (DC) Make or Break										W max	
			125VDC		250VDC		301VDC		400VDC		500VDC	600VDC	300V or less ❺	
P600	DC-13	5	1.1		0.55		0.2		0.31		0.27	0.2	138	138
Q600	DC-13	2.5	0.55		0.27		0.1		0.15		0.13	0.1	69	69

TYPE					BG00	BF00A	BF00D	BF00L
AC CONTROL								
Rated control voltage at 50/60Hz or 60Hz				V	12...575	12...600	—	—
Operating voltage limits								
50/60Hz coil powered at	50Hz	pick-up		% Us	75...115	80...110	—	—
		drop-out		% Us	20...55	20...55	—	—
	60Hz	pick-up		% Us	80...115	80...110	—	—
		drop-out		% Us	20...55	20...55	—	—
60Hz coil powered at		pick-up		% Us	75...115	80...110	—	—
		drop-out		% Us	20...55	20...55	—	—
Average coil consumption at ≤20°C								
50/60Hz coil powered at	50Hz	in-rush		VA	30	75	—	—
		holding		VA	4	9	—	—
	60Hz	in-rush		VA	25	70	—	—
		holding		VA	3	6.5	—	—
60Hz coil powered at		in-rush		VA	30	75	—	—
		holding		VA	4	9	—	—
Dissipation at holding ≤20°C			a 50Hz	W	0.95	2.5	—	—
DC CONTROL								
Rated control voltage				V	6...250	-—	6...415	6...415
Operating voltage limits		pick-up		% Us	75...115	—	70...125	80...110
		drop-out		% Us	10...20	—	10...40	10...40
Average consumption at ≤20°C (in-rush/holding)				W	3.2❶	—	5.4	2.4
OPERATING TIMES								
Average time for Us control in	AC	closing NO		ms	12...21	8...24	—	—
		opening NO		ms	9...18	10...20	—	—
		closing NC		ms	17...26	17...30	—	—
		opening NC		ms	7...17	7...18	—	—
	DC	closing NO		ms	18...25	—	54...66	75...91
		opening NO		ms	2...3	—	14...17	15...19
		closing NC		ms	3...5	—	24...30❷	24...30❸
		opening NC		ms	11...17	—	47...57❷	67...81❸
LIFE								
Mechanical	AC control			cycles	20 million			
	DC control			cycles	20 million			
MAXIMUM OPERATING RATE								
Mechanical operations				cycles/h	3600			

❶ 2.3W for low-consumption BG00...L version.
❷ NC closing time for BF0004D is 23...29ms while NC opening time is 40...49ms.
❸ NC closing time for BF0004L is 25...31ms while NC opening time is 56...68ms.

IEC OPERATIONAL CHARACTERISTICS BG06..., BG09... AND BG12...

TYPE				BG06	BG09	BG12
POLE CHARACTERISTICS						
Power poles			N°	3	3-4	3
Rated insulation voltage Ui			V	690	690 ❶	690
Rated impulse withstand voltage Uimp			kV	6	6	6
Operational frequency			Hz	25...400 ❷	25...400 ❷	25...400 ❷
Operational current	Conventional free air thermal Ith (≤40°C)		A	16	20	20
	AC3 (≤440V ≤55°C)		A	6	9	12
	AC4 (400V) ❸		A	3.3	4.0	4.8
Short-time allowable current (IEC/EN/BS 60947-1)		10s	A	96	96	96
Maximum fuse size coordination Type 2 - 400V - 50kA		gG	A	16	20	20
		aM	A	6	10	16
Making capacity (RMS value)			A	92	92	120
Breaking capacity at voltage		≤ 440V	A	72	72	96
		500V	A	72	72	72
		690V	A	72	72	72
Consumption per pole and resistance (average values)			mΩ	10	10	10
		Ith	W	2.6	4	4
		AC3	W	0.36	0.81	1.44
Terminals			A	7.5	7.5	7.5
			B	4	4	4
			screw	M3	M3	M3
			Phillips	2	2	2
		Quick-connect	Faston	—	1x6.35 - 2x2.8	—
		Solder		—	PIN for PCB❹	—
Tightening torque for pole and coil terminals min-max			Nm	0.8...1	0.8...1	0.8...1
			lb.in	9	9	9
			Phillips	2	2	2
Conductor section connectable with 1 or 2 wires min...max						
	AWG stranded		N°	18...12		
	Flexible w/o lug		mm²	0.75...2.5		
	Flexible c/w boot-lace ferrule		mm²	2x1.5 or 1x2.5		
	Flexible c/w spade lug		mm²	2x1.5 or 1x2.5		
Terminal protection to IEC/EN/BS 60529				IP20❺		
AUXILIARY CONTACT CHARACTERISTICS						
Type of contact			n°	1-NO or NC based on configuration❻		
Thermal current Ith			A	10		
IEC/EN/BS 60947-5-1 designation			AC	A600		
			DC	Q600		
AMBIENT CONDITIONS						
Operating temperature			°C	-50...+70		
Storage temperature			°C	-60...+80		
Maximum altitude			m	3000		
Operating position		Normal		On vertical plane		
		Allowable		± 30°		
Fixing				Screw or on 35mm DIN rail		

❶ Rated voltage Ui for BGP... types is 500V.
❷ Derating for use at 61-400Hz. Consult Technical support for information (Tel. 035 4282422; E-mail: service@LovatoElectric.com).
❸ Current values guarantee an electrical life of about 50,000 cycles.
❹ Dimensions and drilling distances are given on page 2-38.
❺ IP20 protection warranted by wired equipment; minimum 0.75mm² conductor section.
❻ NO or NC auxiliary is highly conductive.
Other characteristics are the same as the mechanical characteristics of the poles.

TYPE				BG06	BG09	BG12
AC CONTROL						
Rated voltage at 50/60Hz, 60Hz			V	12...575		
Operating voltage limits						
50/60Hz coil powered at	50Hz	pick-up	% Us	75...115		
		drop-out	% Us	20...55		
	60Hz	pick-up	% Us	80...115		
		drop-out	% Us	20...55		
60Hz coil powered at 60Hz		pick-up	% Us	75...115		
		drop-out	% Us	20...55		
Average coil consumption at ≤20°C						
50/60Hz coil powered at	50Hz	in-rush	VA	30		
		holding	VA	4		
	60Hz	in-rush	VA	25		
		holding	VA	3		
60Hz coil powered at 60Hz		in-rush	VA	30		
		holding	VA	4		
Dissipation at ≤20°C		at 50Hz	W	0.95		
DC CONTROL						
Rated control voltage			V	6...250		
Operating voltage limits	pick-up		% Us	75...115		
	drop-out		% Us	10...25		
Average consumption at ≤20°C (in rush-holding)			W	3.2	3.2❶	3.2
OPERATING TIMES						
Average time for Us control in	AC	closing NO	ms	12...21	12...21	12...21
		opening NO	ms	9...18	9...18	9...18
		closing NC	ms	17...26	17...26	17...26
		opening NC	ms	7...17	7...17	7...17
	DC	closing NO	ms	18...25	18...25	18...25
		opening NO	ms	2...3	2...3	2...3
		closing NC	ms	3...5	3...5	3...5
		opening NC	ms	11...17	11...17	11...17
LIFE						
Mechanical	AC control		cycles	20 million		
	DC control		cycles	20 million		
Electrical (Ie at 400V AC3)			cycles	500.000		
MAXIMUM OPERATING RATE						
Mechanical operations			cy/h	3600		

❶ 2.3W for low-consumption type BG09...L.

ELECTRICAL RATINGS BASED ON IEC/EN/BS 60947-5-1 UTILIZATION CATEGORIES AND UL508/CSA C22.2 n°14

IEC/EN/BS designation	IEC/EN/BS utilization category	Conventional enclosed thermal current Ithe	Rated operational current Ie [A] at rated operational voltage Ue										VA rating	
UL designation	—	Thermal continuous test current	Maximum Amperes (AC) 60Hz										Maximum VA	
			120VAC		240VAC		380VAC		480VAC		600VAC			
Alternating current		[A]	Make	Break	Make	Break	Make	Break	Make	Break	Make	Break	Make	Break
A600	AC-15	10	60	6	30	3	19	1.9	15	1.5	12	1.2	7200	720
Direct current			Maximum Amperes (DC) Make or Break										W max	
			125VDC		250VDC		301VDC		400VDC		500VDC		300V or less	
Q600	DC-13	2.5	0.55		0.27		0.1		0.15		0.13		69	69

IEC OPERATIONAL CHARACTERISTICS BF09-BF38

TYPE				BF09	BF12	BF18	BF25	BF26	BF32	BF38
POLE CHARACTERISTICS										
Power poles			n°	3-4	3-4	3-4	3	3-4	3	3-4
Rated insulation voltage Ui			V	690						
Rated impulse withstand voltage Uimp			kV	6						
Operational frequency			Hz	25...400❶						
Operational current	Conventional free air thermal Ith (≤40°C)		A	25	28	32	32	45	56	56(60❺)
	AC3 (≤440V ≤55°C)		A	9	12	18	25	26	32	38
	AC4 (400V)❷		A	4.9	7.9	8.5	10	11.5	13.5	15.5
Short-time allowable current for 10s (IEC/EN/BS 60947-1)			A	150	150	200	200	210	320	320
Max fuse size coordination Type 2 - 400V - 50kA		gG	A	25	32	32	50	50	63	63
		aM	A	10	12	20	25	32	32	40
Making capacity (RMS value)			A	90	120	180	250	260	320	380
Breaking capacity at voltage		≤440V	A	72	96	144	200	208	256	304
		500V	A	72	96	120	184	184	240	240
		690V	A	71	94	94	102	168	192	192
Consumption and resistance per pole (average values)			mΩ	2.5	2.5	2.5	2.5	2.0	2.0	2.0
		Ith	W	1.6	2.0	2.6	2.6	4.0	6.0	6.0
		AC3	W	0.2	0.4	0.8	1.6	1.4	2.0	2.9
Terminals			Type	Clamp-screw						
			A	9.5	9.5	9.5	9.5	13	13	13
			B	4.5	4.5	4.5	4.5	5.5	5.5	5.5
			Screw	M3.5	M3.5	M3.5	M3.5	M4	M4	M4
			Phillips	2	2	2	2	2	2	2
Tightening torque for pole terminal min-max			Nm	1.5...1.8	1.5...1.8	1.5...1.8	1.5...1.8	2.5...3	2.5...3	2.5...3
			lb.in	13...16	13...16	13...16	13...16	22...27	22...27	22...27
Tightening torque for coil terminals min-max			Nm	0.8...1	0.8...1	0.8...1	0.8...1	0.8...1	0.8...1	0.8...1
			lb.in	7.1...8.8	7.1...8.8	7.1...8.8	7.1...8.8	7.1...8.8	7.1...8.8	7.1...8.8
			Phillips	2	2	2	2	2	2	2
Conductor section connectable with 1 or 2 wires min...max										
	AWG stranded		n°	16...8	16...8	16...8	16...8	14...6	14...6	14...6
	Flexible w/o lug		mm²	1...6	1...6	1...6	1...6	2.5...16	2.5...16	2.5...16
	Flexible c/w insulated boot-lace ferrule		mm²	1...4	1...4	1...4	1...4	1...10	1...10	1...10
	Flexible c/w insulated spade lug		mm²	1...4	1...4	1...4	1...4	1...10	1...10	1...10
Power terminal protection according to IEC/EN/BS 60529				IP20❸	IP20❸	IP20❸	IP20❸	IP20❹	IP20❹	IP20❹
AUXILIARY CONTACT CHARACTERISTICS										
Type of contact			n°	1-NO or NC based on configuration❻				—		
Thermal current Ith			A	10				—		
IEC/EN/BS 60947-5-1 designation			AC	A600				—		
			DC	P600				—		
AMBIENT CONDITIONS										
Operating temperature			°C	-50...+70						
Storage temperature			°C	-60...+80						
Maximum altitude			m	3000						
Operating position	Normal			On vertical plane						
	Allowable			± 30°						
Fixing				Screw or on 35mm DIN rail						

Products certified by UL / CSA as Elevator Equipment.

Type	Maximum horsepower ratings Single phase		Three phase			
	120V	240V	200-208V	240V	480V	600V
	[HP]	[HP]	[HP]	[HP]	[HP]	[HP]
BF12❼	½	1½	3	3	7½	7½
BF25❼	1½	3	5	7½	15	15
BF38❼	3	5	10	10	20	20
BF65❽	3	10	15	15	40	50
BF95❽	7.5	15	25	30	60	75
BF115❽	–	–	30	40	75	100
BF150❽	–	–	30	40	75	100

❶ Derating for use at 61-400Hz. Consult Technical support for information; see contact details on inside front cover.
❷ Current values guarantee an electrical life of about 200,000 cycles.
❸ IP20 protection warranted by wired equipment; minimum 1mm² conductor section.
❹ IP20 protection on front.
❺ For this other current value, use 16mm² wire with spade cable terminal.
❻ NO or NC auxiliary is highly conductive. Other characteristics are the same as the mechanical characteristics of the poles.
❼ Elevator equipment by CSA (file LR54332-23) 500,000 operations.
❽ Elevator equipment by cULus (file E93602) 500,000 operations.

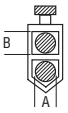
TYPE				BF09	BF12	BF18	BF25	BF26	BF32	BF38
AC CONTROL										
Rated voltage at 50/60Hz, 60Hz			V	12...600						
Operating voltage limits										
50/60Hz coil powered at	50Hz	pick-up	% Us	80...110						
		drop-out	% Us	20...55						
	60Hz	pick-up	% Us	85...110						
		drop-out	% Us	20...55						
60Hz coil powered at 60Hz		pick-up	% Us	80...110						
		drop-out	% Us	20...55						
Average coil consumption at ≤20°C										
50/60Hz coil powered at	50Hz	in-rush	VA	75						
		holding	VA	9						
	60Hz	in-rush	VA	70						
		holding	VA	6.5						
60Hz coil powered at 60Hz		in-rush	VA	75						
		holding	VA	9						
Dissipation at holding ≤20°C	50Hz		W	2.5						
DC CONTROL - normal and low consumption										
Rated control voltage			V	6...415						
Operating limits										
pick-up	three-pole BF...D	from	% Us	70						
		to	% Us	125						
	four-pole BF...D	from	%Us	70				80		
		to	%Us	125				125		
	three and four-pole BF...L	from	% Us	80						
		to	% Us	110						
drop-out	for all versions	from	%Us	10						
		to	%Us	40						
Average coil consumption ≤20°C (in rush-holding)	BF...D		W	5.4						
	BF...L		W	2.4						
OPERATING TIMES										
Average time for Us control in	AC	closing NO	ms	8...24				8...24		
		opening NO	ms	10...20				5...15		
		closing NC	ms	14...28❶				9...20❷		
		opening NC	ms	7...18❶				9...17❷		
	DC BF...D types	closing NO	ms	54...66				53...65		
		opening NO	m	14...17				14...18		
		closing NC	ms	24...30❸				23...28		
		opening NC	ms	47...57❸				46...56		
	DC BF...L types	closing NO	ms	75...91				76...92		
		opening NO	ms	15...19				16...20		
		closing NC	ms	24...30❹				25...31		
		opening NC	ms	67...81❹				63...77		
LIFE										
Mechanical (million)	AC control		cycles	20	20	20	20	20	20	20
	DC control		cycles	20	20	20	20	20	20	20
Electrical (Ie at 400V AC3) (million)			cycles	2.0	2.0	1.6	1.2	1.6	1.6	1.4
MAXIMUM OPERATING RATE										
Mechanical operations			cy/h	3600						

❶ NC closing time for BF...T0A types is 9...25ms while NC opening time is 9...15ms.
❷ NC closing time for BF...T0A types is 11...29ms while NC opening time is 6...14ms.
❸ NC closing time for BF...T0D types is 23...29ms while NC opening time is 40...49ms.
❹ NC closing time for BF...T0L types is 25...31ms while NC opening time is 56...68ms.

ELECTRICAL RATINGS BASED ON IEC/EN/BS 60947-5-1 UTILIZATION CATEGORIES AND UL508/CSA C22.2 n°14

IEC/EN/BS designation	IEC/EN/BS utilization category	Conventional enclosed thermal current Ithe	Rated operational current Ie [A] at rated operational voltage Ue										VA rating	
UL designation	—	Thermal continuous test current	Maximum Amperes (AC) 60Hz										Maximum VA	
			120VAC		240VAC		380VAC		480VAC		600VAC			
Alternating current		[A]	Make	Break	Make	Break	Make	Break	Make	Break	Make	Break	Make	Break
A600	AC-15	10	60	6	30	3	19	1.9	15	1.5	12	1.2	7200	720
Direct current			Maximum Amperes (DC) Make or Break										W max	
			125VDC		250VDC		301VDC		400VDC		500VDC		300V or less	
P600	DC-13	5	1,1		0,55		0,2		0,31		0,27		138	138

IEC OPERATIONAL CHARACTERISTICS BF40...BF150...

TYPE				BF40	BF50	BF65	BF80	BF94	BF95	BF115	BF150
POLE CHARACTERISTICS											
Power poles			N°	3-4	3-4	3-4	3-4	3	3-4	3-4	3-4
Rated insulation voltage Ui			V	1000							
Rated impulse withstand voltage Uimp			kV	8							
Operational frequency			Hz	25 ... 400❶							
Operational current	Conventional free air thermal Ith (≤40°C)		A	70	90	100	115	115	140	160	165
	AC3 (≤440V ≤55°c)		A	40	50	65	80	95	95	115	150
	AC4 (400V)❷		A	24	28	31	38	45	45	54	70
Short-time allowable current for (IEC/EN/BS 60947-1)		10s	A	400	400	640	640	640	760	920	1200
Maximum fuse size coordination Type 2 - 400V - 50kA		gG	A	100	100	125	125	125	160	200	250
		aM	A	50	50	80	80	100	100	125	160
Making capacity (RMS value)			A	400	500	650	800	950	1200	1500	1500
Breaking capacity at voltage		≤440V	A	320	400	520	640	760	1100	1200	1200
		500V	A	265	352	425	625	660	775	850	1025
		690V	A	256	312	376	456	475	745	905	905
Consumption and resistance per pole (average values)			mΩ	0.8	0.8	0.8	0.6	0.6	0.45	0.45	0.45
		Ith	W	3.9	6.5	8.0	7.9	7.9	8.8	11.5	12
		AC3	W	1.3	2.0	3.4	3.8	5.4	4.1	6.0	10.1
Terminals			Type	Double lug clamp terminal 							
			A [mm]	9.5					15		
			B [mm]	11					14.5		
			Screw	M6					M8		
			Metric Allen	4					4		
Tightening torque for power pole terminal min-max			Nm	4...5					6...7		
			lb.in	35.4...44.3					53.1...61.9		
Tightening torque for coil terminals min-max			Nm	0.8...1							
			lb.in	7.1...8.8							
			Phillips	2							
Conductor section connectable with 1 or 2 wires min...max		AWG	N°	14...2					14...2/0		
		Flexible w/o lug	mm^2	1.5...35					1.5...70		
		Flexible c/w lug	mm^2	1.5...35					1.5...70		
Power terminal protection according to IEC/EN/BS 60529				IP20 front							
AMBIENT CONDITIONS											
Operating temperature			°C	-50...+70❸							
Storage temperature			°C	-60...+80❹							
Maximum altitude			m	3000							
Operating position		Normal		On vertical plane							
		Allowable		± 30°							
Fixing				Screw or on 35mm DIN rail					Screw or on 35mm DIN rail❺		

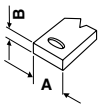
❶ Derating for use at 61-400 Hz. Consult Technical support for information; see contact details on inside front cover.
❷ Current values guarantee an electrical life of about 200,000 cycles.
❸ -40...+70 for BF40...150E.
❹ -50...+80 for BF40...150E.
❺ Din rail height 15mm (TH35-15).

Products certified by UL / CSA as Elevator Equipment.
See table on page 2-72.

TYPE					BF40	BF50	BF65	BF80	BF94	BF95	BF115	BF150
AC CONTROL												
Rated voltage at 50/60Hz, 60Hz				V	12...600 (20...250 electronically controlled AC/DC coil)							
Operating voltage limits												
50/60Hz coil powered at	50Hz	pick-up		% Us	80...110 ❶							
		drop-out		% Us	20...55 (≤70% electronically controlled AC/DC coil)							
	60Hz	pick-up		% Us	85...110 ❶							
		drop-out		% Us	40...55 (≤70% electronically controlled AC/DC coil)							
60Hz coil powered at 60Hz		pick-up		% Us	80...110							
		drop-out		% Us	20...55							
Average coil consumption at ≤20°C												
50/60Hz coil powered at	50Hz	in-rush		VA	210 (35...120 electronically controlled AC/DC coil)					300 (70...175 electronically controlled AC/DC coil)		
		holding		VA	15 (1.5...3.7 electronically controlled AC/DC coil)					20 (1.7...3.5 electronically controlled AC/DC coil)		
	60Hz	in-rush		VA	195 (35...120 electronically controlled AC/DC coil)					275 (70...175 electronically controlled AC/DC coil)		
		holding		VA	13 (1.5...3.7 electronically controlled AC/DC coil)					17 (1.7...3.5 electronically controlled AC/DC coil)		
60Hz coil powered at 60Hz		in-rush		VA	210					300		
		holding		VA	15					20		
Dissipation at ≤20°C			50Hz	W	5 (1...2.5 electronically controlled AC/DC coil)					6.5 (1.5...3 electronically controlled AC/DC coil)		
DC CONTROL												
Rated voltage				V	20...250							
Operating voltage limits		pick-up		% Us	80...110 ❶							
		drop-up		% Us	≤75% Us min							
Average consumption ≤20°C (in rush-holding)				W	23...68 / 1.2...1.9					70...80 / 1.3...1.5		
OPERATING TIMES												
Average time for Us control in	AC	closing NO		ms	12...28 (40...85 electronically controlled AC/DC coil)					16...32 (45...90 electronically controlled AC/DC coil)		
		opening NO		ms	8...22 (20...55 electronically controlled AC/DC coil)					9...24 (24...60 electronically controlled AC/DC coil)		
	DC	closing NO		ms	40...85 (electronically controlled AC/DC coil)					45...90 (electronically controlled AC/DC coil)		
		opening NO		ms	20...55 (electronically controlled AC/DC coil)					24...60 (electronically controlled AC/DC coil)		
LIFE												
Mechanical (million)	AC control			cycles	15	15	15	15	15	15	15	15
	DC control			cycles	15	15	15	15	15	15	15	15
Electrical (Ie at 400V in AC3) (million)				cycles	1.5	1.4	1.4	1.3	1.1	1.4	1.2	0.8
MAXIMUM OPERATING RATE												
Mechanical operations				cy/h	3600 (1500 for BF40...E...BF150...E...)							

❶ For electronically controlled AC/DC coils 80% of Us min. and 110% of Us max; for 20...48V 85% of Us min when powered in AC; 77% of Us min for 100...250V coils.
❷ Electromagnetic compatibility: BF40...94E contactors with electronic coil 20...48VAC/DC are in compliance with IEC/EN/BS 60947-1 and IEC/EN/BS 60947-1 standards for Environment B (domestic). The other devices are in compliance for Environment A (industrial) and can be upgraded to Environment B connecting proper filters; consult Technical support for information - see contact details on inside front cover.

IEC OPERATIONAL CHARACTERISTICS BF160...BF400 and B500...B1600

TYPE				BF160	BF195	BF230	BF265	BF330	BF400	B500	B630	B630 1000	B1250	B1600
POLE CHARACTERISTICS														
Power poles			N°	3-4	3-4	3-4	3-4	3-4	3-4	3-4	3-4	3-4	3-4	3-4
Rated insulation voltage Ui			V	1000										
Rated impulse withstand voltage Uimp			kV	8										
Operational frequency			Hz	25-400❶										
Operational current	Conventional free air thermal Ith (≤40°C)		A	250	275	350	450	500	600	700	800	1000	1250	1600
	AC3 (≤440V ≤55°C)		A	160	195	230	265	330	400	520	630	–	–	–
	AC4 (400V)❷		A	75	95	110	125	160	190	240	260	–	–	–
Short-time allowable current for 10s (IEC/EN/BS 60947-1)			A	1280	1560	1840	2120	2640	3200	4050	5040	5600	6500	8300
Maximum fuse size coordination Type 2 - 400V - 50kA		gG	A	315	400	400	630	630	800	800	1000	1000	1250	1600
		aM	A	250	250	315	400	500	500	500	630	–	–	–
Making capacity (RMS value)			A	1600	1950	2300	2650	3300	4000	5000	6300	6300	6300	6300
Breaking capacity at voltage		≤440V	A	1280	1560	1840	2120	2640	3200	5000	6300	6300	6300	6300
		500V	A	1248	1472	1472	1792	2240	2752	4500	5600	5600	5600	5600
		690V	A	1072	1296	1296	1624	2000	2504	4000	5000	5000	5000	5000
		1000V	A	440	528	624	856	960	1064	2700	3400	3400	3400	3400
Consumption and resistance per pole (average values)			mΩ	0.18	0.18	0.18	0.12	0.12	0.12	0.14	0.14	0.14	0.07	0.07
		Ith	W	11	13	21	24.3	30.0	43.2	68.6	90	140	110	180
		AC3	W	4.5	6.7	9.3	8.4	13	19	35	56	–	–	–
Terminals														
			A mm	18	18	18	20	20	20	35	40	60	80	80
			B mm	5	5	5	5	5	5	6	6	6	10	10
			Screw + hex nut	M8	M8	M8	M10	M10	M10	M10	M12	2xM12	2xM12	2xM12
			Key mm	13	13	13	17	17	17	17	19	19	19	19
	Coil terminals		Type	Screw						Faston 1x6.35 o 2x2.8				
Pole tightening torque			Nm	18	18	18	35	35	35	35	55	55	55	55
			lb.in	159	159	159	310	310	310	310	486	486	486	486
Tightening torque for coil terminals min-max			Nm	0.8...1						0.8...1❸				
			lb.in	7.1...8.8						7.1...8.8❸				
			Phillips	2						2❸				
Maximum conductor section	1 or 2 bars		mm	25x5	25x5	25x5	30x4	30x5	30x5	50x5	60x5	60x5	100x5	100x5
	N° 1 wire with lug		mm²	185			240			--	--	–	–	–
	N° 2 wire with lug		mm²	185			240			240	240	–	–	–
AMBIENT CONDITIONS														
Operating temperature			°C	-40...+70						-50...+70		-20...+60		
Storage temperature			°C	-50...+80						-60...+80		-30...+80		
Maximum altitude			m	3000										
Operating position	Normal			Vertical										
	Allowable			± 30°										
Fixing				Screw										

❶ Derating for use at 61-400 Hz. Consult Technical support for information (Tel. 035 4282422; E-mail: service@LovatoElectric.com).
❷ Current values guarantee an electrical life of about 200,000 cycles.
❸ G371: Adapter to transform coil Faston terminals into screw type.

TYPE			BF160	BF195	BF230	BF265	BF330	BF400	B500	B630	B630 1000	B1250	B1600
AC CONTROL													
Supply voltage			50/60Hz, DC						Either in AC/DC			Only AC	
Rated control voltage		V	20...500						48...480	48...480	48...480	110/240	110/240
Operating voltage limits	pick-up	% Us	80...110❶						80...110	80...110	80...110	80...110	80...110
	drop-out	% Us	≤70% Us min						20...60	20...60	20...60	20...60	20...60
Consumption at ≤20°C	in-rush	VA/W	160...230			160...320			400	400	400	800	800
	holding	VA/W	1.5...3.0			3.5...8.0			18	18	18	45	45
Dissipation at ≤20°C		W	1.5...3.0			3.5...8.0			18	18	18	40	40
OPERATING TIMES													
Making		ms	50...100			80...120	80...120	80...120	110...180	110...180	110...180	120...210	300...450
Breaking		ms	30...75			30...75	30...75	30...75	60...100	60...100	60...110	70...130	70...130
LIFE													
Mechanical (million)	AC/DC	cycles	10	10	10	5	5	5	5	5	5	5	5
Electrical (million) (Ie at 400V in AC3)		cycles	1	1	1	0.9	0.7	0.6	0.7	0.7	–	–	–
MAXIMUM OPERATING RATE													
Mechanical operations		cy/h	1,000						1,200				
PARTICULAR CHARACTERISTICS													
Indicator			For contactor open or closed status										

❶ 80% of Us min and 110% of Us max.

CONTROL CIRCUIT UTILISATION
The input electronic circuit of the contactor coil B500-B1600 is designed and tested according to IEEEC 62.41 and can withstand a 10 kV impulse voltage (1.2/50µs) with 50 Joule energy.
For higher values, the use of an auxiliary step-down voltage transformer is recommended.

CONTACTORS WITH MECHANICAL LATCH
Contactors B500-B630 type, can have mechanical latch included or can be predisposed, to be completed with mechanical latch, see pages 2-6 and 2-8 (3-pole version) or 2-10 and 2-12 (4-pole version).
Technical data of mechanical latch G495 type is stated on page 2-32.

MECHANICAL INTERLOCK BETWEEN CONTACTORS ONE ON TOP OF THE OTHER B500...B1600... (Fig. 1, 2 and 3)
It is G356... type, which is provided in three types to allow different fixing interaxis of contactors.
Contactors of the same size can be interlocked as well as different sizes.

INTERAXIS A [mm] - For contactors with terminal protection (Fig. 1)

KM1	B500-B630
KM2	B500 B630
G3566	470...500

The tables below indicate the interaxis which can be obtained with the various interlock types; with terminal protections (INTERAXIS A) and without terminal protection (INTERAXIS B).

INTERAXIS B [mm] - For contactors without terminal protection (Fig. 2)

KM1	B500-B630
KM2	B500 B630
G3564	345...385
G3565	390...425
G3566	470...500

To interlock two contactors B6301000, use type G3566 only.
To interlock two contactors B1250 or B1600, it is imperative to use two pieces of type G3566 (fig. 3), one fixed on the left side and the other on the right.

Interaxis B is 470-500mm for B6301000, B1250 or B1600.
The B1250 or B1600 cannot be interlocked with the other types of the B series.

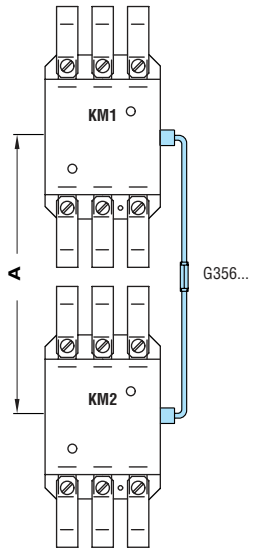


Fig. 1

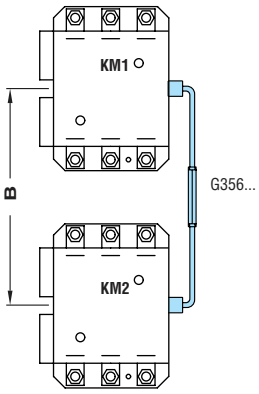


Fig. 2

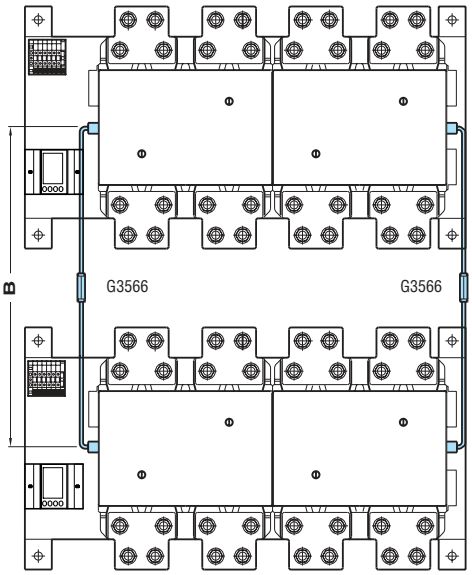
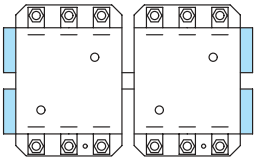


Fig. 3

Horizontal and vertical interlock between contactors B500...B630.
For contactor B6301000 (three-pole), contact our Technical support office.

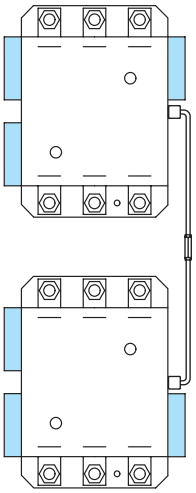
Admissible mounting positions for 11G350 and 11G354 auxiliary contacts on contactors equipped with mechanical interlock:

– horizontal G355



B500-B630

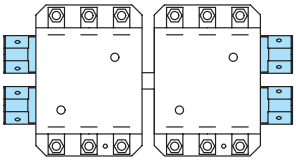
– vertical G356/...



B500-B6301000

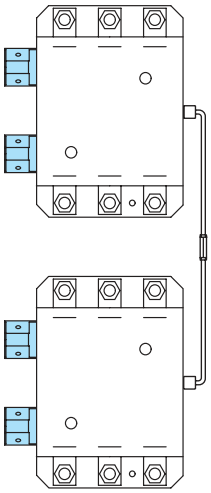
Admissible mounting positions for 11G358 adapter on contactors equipped with mechanical interlock:

– horizontal G355



B500-B630

– vertical G356/...



B500-B6301000

Motor control and protection

Motor protection relays

- Thermal overload relays for currents between 0.09 and 420A
- Electronic thermal overload relays for currents between 0.4 and 45A
- Electronic thermal overload relays with selectable tripping class: 5-10-20-30
- Phase failure sensitive and non phase failure sensitive versions
- Automatic and/or manual resetting
- Independent or direct mounting on contactor
- Thermistor protection relay.

SEC. - PAGE

Thermal overload relays
For BG series mini-contactors ..... 3 - 2
For BF series contactors ..... 3 - 4
For BF and B series contactors ..... 3 - 8
Accessories ..... 3 - 10

Electronic thermal overload relays
For BF series contactors ..... 3 - 11

Electronic relay
Thermistor protection relays ..... 3 - 12

Dimensions ..... 3 - 13
Wiring diagrams ..... 3 - 14
Technical characteristics ..... 3 - 15

	TYPE OF THERMAL OVERLOAD RELAY					ELECTRONIC THERMAL OVERLOAD RELAYS	
Type of contactor	Phase failure / single phase sensitive		Non phase failure / non single phase sensitive		Pages	Phase failure / single phase sensitive Manual/hand or automatic reset	Pages
	Manual/hand reset	Automatic reset	Manual/hand reset	Automatic reset			
BG06...BG12	**RF9**	**RFA9**	**RFN9**	**RFNA9**	3-2 and 3-3	—	—
BF09...BF38	**RF38**		**RFN38**		3-4 and 3-6	RFE45	3-11
BF40...BF94	**RF82**	**RFA82**	**RFN82**	**RFNA82**	3-5 and 3-7	—	—
BF95...BF150❶	**RF110**	**RFA110**	**RFN110**	**RFNA110**	3-5 and 3-7	—	—
BF160...BF230	**RF200**		**RFN200**		3-8 and 3-9	—	—
BF195...BF400	**RF400**		**RFN400**				

❶ For currents higher than 110A use RF200 (independent mounting).

Page 3-2

FOR BG SERIES MINI-CONTACTORS
- Type RF9, phase failure sensitive, manual resetting
- Type RFA9, phase failure sensitive, automatic resetting
- Type RFN9, non phase failure sensitive, manual resetting
- Type RFNA9, non phase failure sensitive,automatic resetting.

Page 3-4

FOR BF SERIES CONTACTORS
- Type RF38, phase failure sensitive, manual or automatic resetting
- Type RFN38, non phase failure sensitive,manual or automatic resetting
- Type RF82 and RF110, phase failure sensitive, manual resetting
- Type RFA82 and RFA110, phase failure sensitive, automatic resetting
- Type RFN82 and RFN110, non phase failure sensitive, manual resetting
- Type RFNA82 and RFNA110, non phase failure sensitive, automatic resetting.

Page 3-8

FOR BF AND B SERIES CONTACTORS
- Type RF200 and RF420, phase failure sensitive, manual or automatic resetting
- Type RFN200 and RFN420, non phase failure sensitive, manual or automatic resetting.

Page 3-11

ELECTRONIC THERMAL OVERLOAD RELAYS FOR BF SERIES CONTACTORS
- Phase failure sensitive, manual or automatic resetting
- Selectable tripping class: 5-10-20-30
- High reliability and accuracy of tripping
- Minimal heat dissipation
- Wide current adjustment range.

Page 3-12

THERMISTOR PROTECTION RELAY
- 24VDC and 24 to 240VAC supply types.

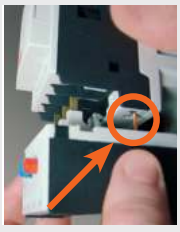
LOVATO Electric motor protection relays are suitable for new motors with high IE3 efficiency values

RF38 features

FRONT PROTECTION COVER OF THERMAL OVERLOAD RELAYS
A sealable protection cover is available. When fitted on to the relay front, it precludes all possible adjuster tampering and involuntary activation of the “Reset” and “Stop” buttons of the thermal overload relay.

CLEAR IDENTIFICATION OF THERMAL OVERLOAD RELAY MANUAL OR AUTOMATIC RESETTING
The RF38 thermal overload relay is supplied configured for manual resetting. Breaking the plate below the “Reset” button allows for the automatic resetting configuration.

FIXING EASE OF THE THERMAL OVERLOAD RELAY
While the thermal overload relay is being linked to the contactor, its auxiliary contact fits on and connects to the coil terminal by rigid terminal.
Complete relay fixing is done in a single operation, with no need of other connections.



SEALABLE RELAY COVER
A handy closing flap feature excludes any tampering of the thermal overload relay adjuster.

Phase failure / single phase sensitive Three poles (three phase)

11RF9...

11RFA9...

Order code	Adjustment range	Protection fuses IEC aM	gG	UL K5	Qty per pkg	Wt
	[A]	[A]	[A]	[A]	n°	[kg]
MANUAL RESETTING. Direct mounting on BG06, BG09, BG12 mini-contactors.						
11RF9015	0.09...0.15	0.25	—	—	1	0.116
11RF9023	0.14...0.23	0.5	—	1	1	0.116
11RF9033	0.2...0.33	0.5	1	1	1	0.116
11RF905	0.3...0.5	1	2	3	1	0.116
11RF9075	0.45...0.75	1	2	3	1	0.116
11RF91	0.6...1	2	4	3	5	0.116
11RF91V5	0.9...1.5	2	4	6	5	0.116
11RF92V3	1.4...2.3	4	6	10	5	0.116
11RF933	2...3.3	4	10	10	5	0.116
11RF95	3...5	6	16	15	5	0.116
11RF975	4.5...7.5	8	20	25	5	0.116
11RF910	6...10	10	32	30	5	0.116
11RF915	9...15	16	40	45	5	0.116
AUTOMATIC RESETTING. Direct mounting on BG06, BG09, BG12 mini-contactors.						
11RFA9015	0.09...0.15	0.25	—	—	1	0.116
11RFA9023	0.14...0.23	0.5	—	1	1	0.116
11RFA9033	0.2...0.33	0.5	1	1	1	0.116
11RFA905	0.3...0.5	1	2	3	1	0.116
11RFA9075	0.45...0.75	1	2	3	1	0.116
11RFA91	0.6...1	2	4	3	1	0.116
11RFA91V5	0.9...1.5	2	4	6	1	0.116
11RFA92V3	1.4...2.3	4	6	10	1	0.116
11RFA933	2...3.3	4	10	10	1	0.116
11RFA95	3...5	6	16	15	1	0.116
11RFA975	4.5...7.5	8	20	25	1	0.116
11RFA910	6...10	10	32	30	1	0.116
11RFA915	9...15	16	40	45	1	0.116

NOTE: two pole (single phase) versions are available on request.
Add the letter "S" in the order code e.g. 11RF9015 is three pole; 11RFS9015 two pole.
The appropriate adjustment range of the overload relay should be selected on the basis of the motor nameplate full-load current when direct, across the line starting is considered.

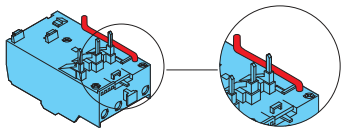
Three-phase IEC motor powers ❶

230V [kW]	400V [kW]	500V [kW]	690V [kW]
❷	❷	❷	0.06
❷	0.06	0.06	0.09
❷	0.09	0.09	0.12
0.06	0.12	0.12	0.18
0.09-0.12	0.18	0.18	0.25-0.37
0.12	0.25	0.25-0.37	0.55
0.18	0.37	0.55	0.75
0.25-0.37	0.55-0.75	0.75	1.1-1.5
0.55	1.1	1.1-1.5	1.5-2.2
0.75	1.5	2.2	3
1.1-1.5	2.2-3	3-4	4-5.5
2.2	4	4-5.5	7.5
3	5.5	7.5	11
❷	❷	❷	0.06
❷	0.06	0.06	0.09
❷	0.09	0.09	0.12
0.06	0.12	0.12	0.18
0.09-0.12	0.18	0.18	0.25-0.37
0.12	0.25	0.25-0.37	0.55
0.18	0.37	0.55	0.75
0.25-0.37	0.55-0.75	0.75	1.1-1.5
0.55	1.1	1.1-1.5	1.5-2.2
0.75	1.5	2.2	3
1.1-1.5	2.2-3	3-4	4-5.5
2.2	4	4-5.5	7.5
3	5.5	7.5	11

❶ The indicated powers apply to 4-pole motors; it is advisable to always check that the nameplate motor current is within the relay adjustment range.
❷ No standard power ratings exist; select relay according to current consumption.

NOTE: to facilitate connection between the auxiliary NC contact of the RF...9 thermal relay and terminal A2 of the contactor, insert the conductor into the appropriate conduit as shown.

RF9...
RFA9...



Certifications and compliance
Certifications obtained:

Type	cULus	CSA	EAC	CCC
RF9... - RFA9...	●	●	●	●

● Certified products.

cULus – UL Listed for USA and Canada (cULus - File E93601) as Auxiliary Devices – Thermal Overload Relays, 600VAC, open type, ambient compensated, 5000 Amps RMS symmetrical short circuit rating; the trip current is 120% FLA.
CSA – CSA certified for Canada only (File 54332) as Auxiliary Devices for use with magnetic contactors.

Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, UL 60947-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

Non phase failure / non single phase sensitive Three poles (three phase)

11RFN9...

11RFNA9...

Order code	Adjustment range	Protection fuses IEC aM	gG	UL K5	Qty per pkg	Wt
	[A]	[A]	[A]	[A]	n°	[kg]
MANUAL RESETTING. Direct mounting on BG06, BG09, BG12 mini-contactors.						
11RFN9015	0.09...0.15	0.25	—	—	1	0.123
11RFN9023	0.14...0.23	0.5	—	1	1	0.123
11RFN9033	0.2...0.33	0.5	1	1	1	0.123
11RFN905	0.3...0.5	1	2	3	1	0.123
11RFN9075	0.45...0.75	1	2	3	1	0.123
11RFN91	0.6...1	2	4	3	1	0.123
11RFN91V5	0.9...1.5	2	4	6	1	0.123
11RFN92V3	1.4...2.3	4	6	10	1	0.123
11RFN933	2...3.3	4	10	10	1	0.123
11RFN95	3...5	6	16	15	1	0.123
11RFN975	4.5...7.5	8	20	25	1	0.123
11RFN910	6...10	10	32	30	1	0.123
11RFN915	9...15	16	40	45	1	0.123
AUTOMATIC RESETTING. Direct mounting on BG06, BG09, BG12 mini-contactors.						
11RFNA9015	0.09...0.15	0.25	—	—	1	0.123
11RFNA9023	0.14...0.23	0.5	—	1	1	0.123
11RFNA9033	0.2...0.33	0.5	1	1	1	0.123
11RFNA905	0.3...0.5	1	2	3	1	0.123
11RFNA9075	0.45...0.75	1	2	3	1	0.123
11RFNA91	0.6...1	2	4	3	1	0.123
11RFNA91V5	0.9...1.5	2	4	6	1	0.123
11RFNA92V3	1.4...2.3	4	6	10	1	0.123
11RFNA933	2...3.3	4	10	10	1	0.123
11RFNA95	3...5	6	16	15	1	0.123
11RFNA975	4.5...7.5	8	20	25	1	0.123
11RFNA910	6...10	10	32	30	1	0.123
11RFNA915	9...15	16	40	45	1	0.123

NOTE: the appropriate adjustment range of the overload relay should be selected on the basis of the motor nameplate full-load current when direct, across the line starting is considered.

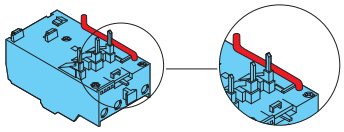
Three-phase IEC motor powers ❶

230V [kW]	400V [kW]	500V [kW]	690V [kW]
❷	❷	❷	0.06
❷	0.06	0.06	0.09
❷	0.09	0.09	0.12
0.06	0.12	0.12	0.18
0.09-0.12	0.18	0.18	0.25-0.37
0.12	0.25	0.25-0.37	0.55
0.18	0.37	0.55	0.75
0.25-0.37	0.55-0.75	0.75	1.1-1.5
0.55	1.1	1.1-1.5	1.5-2.2
0.75	1.5	2.2	3
1.1-1.5	2.2-3	3-4	4-5.5
2.2	4	4-5.5	7.5
3	5.5	7.5	11
❷	❷	❷	0.06
❷	0.06	0.06	0.09
❷	0.09	0.09	0.12
0.06	0.12	0.12	0.18
0.09-0.12	0.18	0.18	0.25-0.37
0.12	0.25	0.25-0.37	0.55
0.18	0.37	0.55	0.75
0.25-0.37	0.55-0.75	0.75	1.1-1.5
0.55	1.1	1.1-1.5	1.5-2.2
0.75	1.5	2.2	3
1.1-1.5	2.2-3	3-4	4-5.5
2.2	4	4-5.5	7.5
3	5.5	7.5	11

❶ The indicated powers apply to 4-pole motors; it is advisable to always check that the nameplate motor current is within the relay adjustment range.
❷ No standard power ratings exist; select relay according to current consumption.

NOTE: to facilitate connection between the auxiliary NC contact of the RFN...9 thermal relay and terminal A2 of the contactor, insert the conductor into the appropriate conduit as shown.

RFN9...
RFNA9...



Certifications and compliance
Certifications obtained:

Type	cULus	CSA	EAC	CCC
RFN9... - RFNA9...	●	●	●	●

● Certified products.

cULus – UL Listed for USA and Canada (cULus - File E93601) as Auxiliary Devices – Thermal Overload Relays, 600VAC, open type, ambient compensated, 5000 Amps RMS symmetrical short circuit rating; the trip current is 120% FLA.
CSA – CSA certified for Canada only (File 54332) as Auxiliary Devices for use with magnetic contactors.

Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, UL 60947-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

Phase failure / single phase sensitive Three poles (three phase)

RF38...

Order code	Adjustment range	Protection fuses IEC aM	gG	UL K5	Qty per pkg	Wt
	[A]	[A]	[A]	[A]	n°	[kg]
MANUAL OR AUTOMATIC RESETTING. Direct mounting on BF09...BF38 contactors. Independent mounting with RFX3804 base.						
RF380016	0.1...0.16	0.25	—	1	1	0.160
RF380025	0.16...0.25	0.5	—	1	1	0.160
RF380040	0.25...0.4	0.5	1	3	1	0.160
RF380063	0.4...0.63	1	2	3	1	0.160
RF380100	0.63...1	2	4	3	5	0.160
RF380160	1...1.6	2	4	6	5	0.160
RF380250	1.6...2.5	4	6	10	5	0.160
RF380400	2.5...4	4	6	15	5	0.160
RF380650	4...6.5	8	16	25	5	0.160
RF381000	6.3...10	10	20	40	5	0.160
RF381400	9...14	16	32	50	5	0.160
RF381800	13...18	25	40	70	5	0.160
RF382300	17...23	25	50	90	5	0.160
RF382500	20...25	32	50	100	5	0.160
RF383200	24...32	40	63	120	1	0.160
RF383800	32...38	40	63	150	1	0.160

NOTE: two pole (single phase) versions are available on request.
Add the letter "S" in the order code e.g. RF381000 is three pole; RFS381000 two pole.
The appropriate adjustment range of the overload relay should be selected on the basis of the motor nameplate full-load current when direct, across the line starting is considered.

Three-phase IEC motor powers ❶

230V [kW]	400V [kW]	500V [kW]	690V [kW]
❷	❷	❷	0.06
❷	0.06	0.06-0.09	0.09-0.12
0.06	0.09	0.12	0.18
0.09	0.12-0.18	0.18	0.25
0.12	0.25	0.25-0.37	0.37-0.55
0.18-0.25	0.37-0.55	0.55-0.75	0.75
0.37	0.75	1.1	1.1-1.5
0.55-0.75	1.1-1.5	1.5-2.2	2.2-3
1.1-1.5	2.2	3	4
1.5-2.2	3-4	4-5.5	5.5-7.5
3	5.5	5.5-7.5	11
4	7.5	11	15
5.5	11	11	18.5
5.5	11	15	22
7.5	15	18.5	30
11	18.5	22	30

❶ The indicated powers apply to 4-pole motors; it is advisable to always check that the nameplate motor current is within the relay adjustment range.
❷ No standard powers ratings exist; select relay according to current consumption.

Certifications and compliance
Certifications obtained:

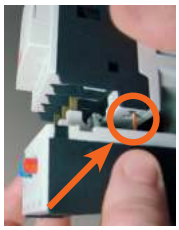
Type	c UL us	CSA	EAC	CCC	Register of shipping LROS
RF38	●	—	●	●	—

● Certified products.

cULus – UL Listed for USA and Canada (cULus - File E93601) as Auxiliary Devices – Thermal Overload Relays, 600VAC, open type, ambient compensated, 5000 Amps RMS symmetrical short circuit rating; the trip current is 120% FLA.
CSA – CSA certified for Canada only (File 54332) as Auxiliary Devices for use with magnetic contactors.

Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, UL 60947-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

FIXING EASE OF THE THERMAL OVERLOAD RELAY
While the thermal overload relay is being linked to the contactor, its auxiliary contact fits on and connects to the coil terminal by rigid terminal. Complete relay fixing is done in a single operation, with no need of other connections.



Phase failure / single phase sensitive Three poles (three phase)

RF82...

RF110...

RFA82...

RFA110...

Order code	Adjustment range	Protection fuses IEC aM	gG	UL K5	Qty per pkg	Wt
	[A]	[A]	[A]	[A]	n°	[kg]
MANUAL RESETTING. Direct mounting on BF40...BF94 contactors. Independent mounting with 11G270 base.						
RF823300	20...33	40	63	110	1	0.365
RF824200	28...42	50	80	150	1	0.365
RF825000	35...50	50	100	175	1	0.365
RF826500	46...65	80	125	200	1	0.365
RF828200	60...82	100	200	250	1	0.365
RF829500	70...95	100	200	250	1	0.365
MANUAL RESETTING. Direct mounting on BF95...BF150 contactors❷. Independent mounting with 11G270 base.						
RF110082	60...82	100	200	250	1	0.365
RF110095	70...95	100	200	350	1	0.365
RF110110	90...110	125	200	350	1	0.365
AUTOMATIC RESETTING. Direct mounting on BF40...BF94 contactors. Independent mounting with 11G270 base.						
RFA823300	20...33	40	63	110	1	0.365
RFA824200	28...42	50	80	150	1	0.365
RFA825000	35...50	50	100	175	1	0.365
RFA826500	46...65	80	125	200	1	0.365
RFA828200	60...82	100	200	250	1	0.365
RFA829500	70...95	100	200	250	1	0.365
AUTOMATIC RESETTING. Direct mounting on BF95...BF150 contactors❷. Independent mounting with 11G270 base.						
RFA110082	60...82	100	200	250	1	0.365
RFA110095	70...95	100	200	350	1	0.365
RFA110110	90...110	125	200	350	1	0.365

NOTE: two pole (single phase) versions are available on request.
Add the letter "S" in the order code e.g. RF828200 is three pole; RFS828200 two pole.
The appropriate adjustment range of the overload relay should be selected on the basis of the motor nameplate full-load current when direct, across the line starting is considered.

❷ For BF150 contactor used at current higher than 110A, use RF200 thermal overload relay (independent mounting).

Three-phase IEC motor powers ❶

230V [kW]	400V [kW]	500V [kW]	690V [kW]
5.5-7.5	11-15	15-18.5	18.5-22
11	15-18.5	18.5-22	30-37
11	22	30	37-45
15-18.5	22-30	37-45	45-55
18.5-22	37-45	45-55	75
22	45	55	75-90
18.5-22	37-45	45-55	75
22	45	55	75-90
30	55	75	90
5.5-7.5	11-15	15-18.5	18.5-22
11	15-18.5	18.5-22	30-37
11	22	30	37-45
15-18.5	22-30	37-45	45-55
18.5-22	37-45	45-55	75
22	45	55	75-90
18.5-22	37-45	45-55	75
22	45	55	75-90
30	55	75	90

❶ The indicated powers apply to 4-pole motors; it is advisable to always check that the nameplate motor current is within the relay adjustment range.

Certifications and compliance

Certifications obtained:

Type	cULus	CSA	EAC
RF82	●	—	●
RFA82	●	—	●
RF110	●	—	—
RFA110	●	—	—

● Certified products.

cULus – UL Listed for USA and Canada (cULus - File E93601) as Auxiliary Devices – Thermal Overload Relays, 600VAC, open type, ambient compensated, 5000 Amps RMS symmetrical short circuit rating up to 82A FLA range and 10000 Amps RMS for 95A and 110A FLA range; the trip current is 120% FLA.
CSA – CSA certified for Canada only (File 54332) as Auxiliary Devices for use with magnetic contactors.

Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, UL 60947-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

FIXING EASE OF THE THERMAL OVERLOAD RELAY

While the thermal overload relay is being linked to the contactor, its auxiliary contact fits on and connects to the coil terminal by rigid terminal. Complete relay fixing is done in a single operation, with no need of other connections (for RF...A... version characteristic not present).

Non phase failure / non single phase sensitive
Three poles (three phase)

RFN38...

Order code	Adjustment range	Protection fuses IEC aM	gG	UL K5	Qty per pkg	Wt
	[A]	[A]	[A]	[A]	n°	[kg]
MANUAL OR AUTOMATIC RESETTING. Direct mounting on BF09...BF38 contactors. Independent mounting with RFX3804 base.						
RFN380016	0.10...0.16	0.25	—	1	1	0.160
RFN380025	0.16...0.25	0.5	—	1	1	0.160
RFN380040	0.25...0.40	0.5	1	3	1	0.160
RFN380063	0.40...0.63	1	2	3	1	0.160
RFN380100	0.63...1	2	4	3	1	0.160
RFN380160	1...1.6	2	4	6	1	0.160
RFN380250	1.6...2.5	4	6	10	1	0.160
RFN380400	2.5...4	4	6	15	1	0.160
RFN380650	4...6.5	8	16	25	1	0.160
RFN381000	6.3...10	10	20	40	1	0.160
RFN381400	9...14	16	32	50	1	0.160
RFN381800	13...18	25	40	70	1	0.160
RFN382300	17...23	25	50	90	1	0.160
RFN382500	20...25	32	50	100	1	0.160
RFN383200	24...32	40	63	125	1	0.160
RFN383800	32...38	40	63	150	1	0.160

NOTE: the appropriate adjustment range of the overload relay should be selected on the basis of the motor nameplate full-load current when direct, across the line starting is considered.

Three-phase IEC motor powers ❶

230V [kW]	400V [kW]	500V [kW]	690V [kW]
❷	❷	❷	0.06
❷	0.06	0.06-0.09	0.09-0.12
0.06	0.09	0.12	0.18
0.09	0.12-0.18	0.18	0.25
0.12	0.25	0.25-0.37	0.37-0.55
0.18-0,.25	0.37-0.55	0.55-0.75	0.75
0.37	0.75	1.1	1.1-1.5
0.55-0.75	1.1-1.5	1.5-2.2	2.2-3
1.1-1.5	2.2	3	4
1.5-2.2	3-4	4-5.5	5.5-7.5
3	5.5	5.5-7.5	11
4	7.5	11	15
5.5	11	11	18.5
5.5	11	15	22
7.5	15	18.5	30
11	18.5	22	30

❶ The indicated powers apply to 4-pole motors; it is advisable to always check that the nameplate motor current is within the relay adjustment range.
❷ No standard power ratings exist; select relay according to current consumption.

Certifications and compliance
Certifications obtained:

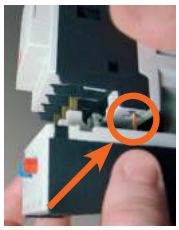
Type	cULus	CSA	EAC	CCC
RFN38	●	—	●	●

● Certified products.

cULus – UL Listed for USA and Canada (cULus - File E93601) as Auxiliary Devices – Thermal Overload Relays, 600VAC, open type, ambient compensated, 5000 Amps RMS symmetrical short circuit rating; the trip current is 120% FLA.
CSA – CSA certified for Canada only (File 54332) as Auxiliary Devices for use with magnetic contactors.

Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, UL 60947-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

FIXING EASE OF THE THERMAL OVERLOAD RELAY
While the thermal overload relay is being linked to the contactor, its auxiliary contact fits on and connects to the coil terminal by rigid terminal. Complete relay fixing is done in a single operation, with no need of other connections.



Non phase failure / non single phase sensitive Three poles (three phase)

RFN82...

RFN110...

RFNA82...

RFNA110...

Order code	Adjustment range	Protection fuses IEC aM	gG	UL K5	Qty per pkg	Wt
	[A]	[A]	[A]	[A]	n°	[kg]
MANUAL RESETTING. Direct mounting on BF40...BF94 contactors. Independent mounting with 11G270 base.						
RFN824200	28...42	50	80	150	1	0.365
RFN825000	35...50	50	100	175	1	0.365
RFN826500	46...65	80	125	200	1	0.365
RFN828200	60...82	100	200	250	1	0.365
RFN829500	70...95	100	200	250	1	0.365
MANUAL RESETTING. Direct mounting on BF95...BF150 contactors❷. Independent mounting with 11G270 base.						
RFN110082	60...82	100	200	250	1	0.365
RFN110095	70...95	100	200	350	1	0.365
RFN110110	90...110	125	200	350	1	0.365
AUTOMATIC RESETTING. Direct mounting on BF40...BF94 contactors. Independent mounting with 11G270 base.						
RFNA824200	28...42	50	80	150	1	0.365
RFNA825000	35...50	50	100	175	1	0.365
RFNA826500	46...65	80	125	200	1	0.365
RFNA828200	60...82	100	200	250	1	0.365
RFNA829500	70...95	100	200	250	1	0.365
AUTOMATIC RESETTING. Direct mounting on BF95...BF150 contactors❷. Independent mounting with 11G270 base.						
RFNA110082	60...82	100	200	250	1	0.365
RFNA110095	70...95	100	200	350	1	0.365
RFNA110110	90...110	125	200	350	1	0.365

NOTE: the appropriate adjustment range of the overload relay should be selected on the basis of the motor nameplate full-load current when direct, across the line starting is considered.

❷ For BF150 contactor used at current higher than 110A, use RFN200 thermal overload relay (independent mounting).

Three-phase IEC motor powers ❶

230V [kW]	400V [kW]	500V [kW]	690V [kW]
11	15-18.5	18.5-22	30-37
11	22	30	37-45
15-18.5	22-30	37-45	45-55
18.5-22	37-45	45-55	75
22	45	55	75-90
18.5-22	37-45	45-55	75
22	45	55	75-90
30	55	75	90
11	15-18.5	18.5-22	30-37
11	22	30	37-45
15-18.5	22-30	37-45	45-55
18.5-22	37-45	45-55	75
22	45	55	75-90
18.5-22	37-45	45-55	75
22	45	55	75-90
30	55	75	90

❶ The indicated powers apply to 4-pole motors; it is advisable to always check that the nameplate motor current is within the relay adjustment range.

Certifications and compliance

Certifications obtained:

Type	cULus	CSA	EAC
RFN82	●	—	●
RFNA82	●	—	●
RFN110	●	—	—
RFNA110	●	—	—

● Certified products.

cULus – UL Listed for USA and Canada (cULus - File E93601) as Auxiliary Devices – Thermal Overload Relays, 600VAC, open type, ambient compensated, 5000 Amps RMS symmetrical short circuit rating up to 82A FLA range and 10000 Amps RMS for 95A and 110A FLA range; the trip current is 120% FLA.
CSA – CSA certified for Canada only (File 54332) as Auxiliary Devices for use with magnetic contactors.

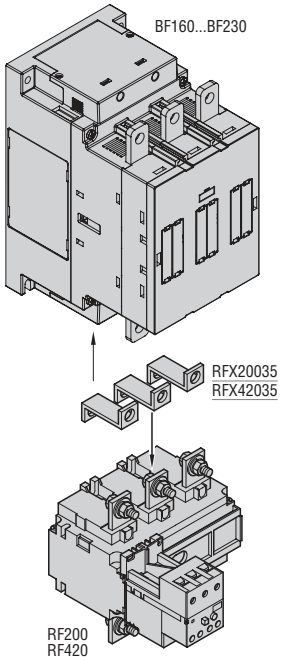
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, UL 60947-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

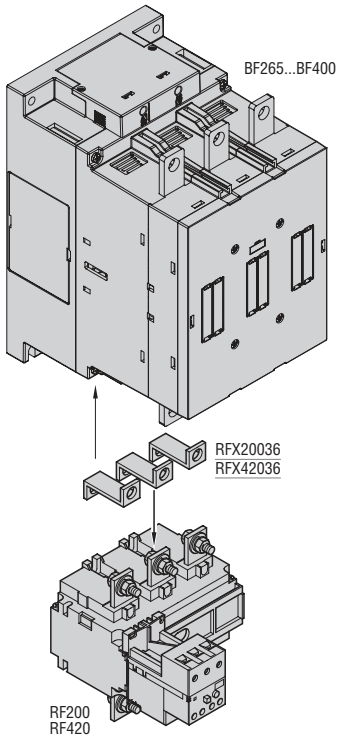
FIXING EASE OF THE THERMAL OVERLOAD RELAY

While the thermal overload relay is being linked to the contactor, its auxiliary contact fits on and connects to the coil terminal by rigid terminal. Complete relay fixing is done in a single operation, with no need of other connections (for RF...A... version characteristic not present).

Phase failure / single phase sensitive Three poles (three phase)

RF200... - RF420...





Order code	Adjustment range	Protection fuses IEC aM	gG	UL K5	Qty per pkg	Wt
	[A]	[A]	[A]	[A]	n°	[kg]
MANUAL OR AUTOMATIC RESETTING. Independent screw fixing or direct mounting on contactors: BF160-BF195-BF230 using RFX20035 links. BF265-BF330-BF400 using RFX20036 links.						
RF200100	60...100	100	160	500	1	2.150
RF200125	75...125	125	200	500	1	2.150
RF200150	90...150	160	250	500	1	2.150
RF200200	120...200	200	315	500	1	2.150
Independent screw fixing or direct mounting on contactors: BF160-BF195-BF230 using RFX42035 links. BF265-BF330-BF400 using RFX42036 links.						
RF420250	150...250	250	400	800	1	2.460
RF420300	180...300	315	500	800	1	2.460
RF420420	250...420	500	630	800	1	2.460

NOTE: the appropriate adjustment range of the overload relay should be selected on the basis of the motor nameplate full-load current when direct, across the line starting is considered.

RELAYS FOR B500 AND B630 CONTACTORS

MANUAL OR AUTOMATIC RESETTING.
Consult Technical support for the relative order codes and detailed information; see contact details on inside front cover.

Three-phase IEC motor powers ❶

230V [kW]	400V [kW]	500V [kW]	690V [kW]
18.5-25	33-51	45-63	59-92
22-37	40-63	55-80	75-110
25-45	51-80	63-100	92-140
37-59	75-100	92-140	129-184
45-75	92-132	110-162	140-220
55-92	100-162	129-198	180-280
75-110	129-198	180-280	250-368

NOTE: for 1000V powers, consult Technical support for information;see contact details on inside front cover.

❶ The indicated powers apply to 4-pole motors; it is advisable to always check that the nameplate motor current is within the relay adjustment .

Certifications and compliance
Certifications obtained:

Type	c U L us	E A C
RF200	●	●
RF420	●	●

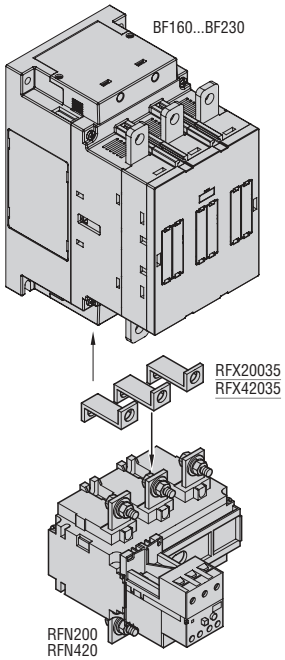
● Certified products.

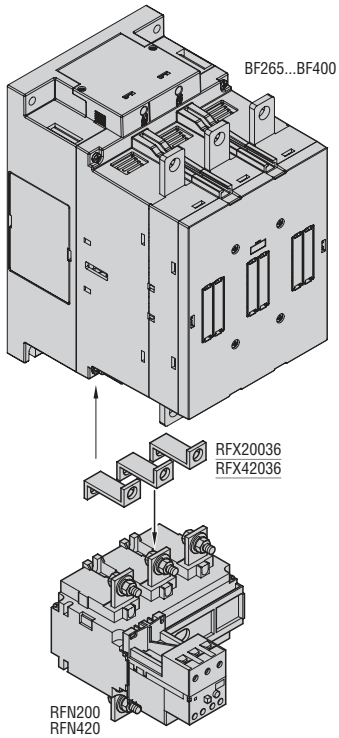
cULus – UL Listed for USA and Canada (cULus - File E93601) as Auxiliary Devices – Thermal Overload Relays, 600VAC, open type, ambient compensated, 5000 Amps RMS symmetrical short circuit rating up to 150A FLA range, 10000 Amps RMS for 200A up to 300A FLA range and 18000 Amps for the 420A; the trip current is 120% FLA.

Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, UL 60947-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

Non phase failure / non single phase sensitive Three poles (three phase)

RFN200... - RFN420...





Order code	Adjustment range	Protection fuses IEC aM	gG	UL K5	Qty per pkg	Wt
	[A]	[A]	[A]	[A]	n°	[kg]
MANUAL OR AUTOMATIC RESETTING. Independent screw fixing or direct mounting on contactors: BF160-BF195-BF230 using RFX20035 links. BF265-BF330-BF400 using RFX20036 links.						
RFN200100	60...100	100	160	500	1	2.150
RFN200125	75...125	125	200	500	1	2.150
RFN200150	90...150	160	250	500	1	2.150
RFN200200	120...200	200	315	500	1	2.150
Independent screw fixing or direct mounting on contactors: BF160-BF195-BF230 using RFX42035 links. BF265-BF330-BF400 using RFX42036 links.						
RFN420250	150...250	250	400	800	1	2.460
RFN420300	180...300	315	500	800	1	2.460
RFN420420	250...420	500	630	800	1	2.460

NOTE: the appropriate adjustment range of the overload relay should be selected on the basis of the motor nameplate full-load current when direct, across the line starting is considered.

RELAYS FOR B500 AND B630 CONTACTORS.

MANUAL OR AUTOMATIC RESETTING.
Consult Technical support for the relative order codes and detailed information; see contact details on inside front cover.

Three-phase IEC motor powers ❶

230V [kW]	400V [kW]	500V [kW]	690V [kW]
18.5-25	33-51	45-63	59-92
22-37	40-63	55-80	75-110
25-45	51-80	63-100	92-140
37-59	75-100	92-140	129-184
45-75	92-132	110-162	140-220
55-92	100-162	129-198	180-280
75-110	129-198	180-280	250-368

NOTE: for 1000V powers, consult Technical support for information;see contact details on inside front cover.

❶ The indicated powers apply to 4-pole motors; it is advisable to always check that the nameplate motor current is within the relay adjustment range.

Certifications and compliance

Certifications obtained:

Type	c U L u s	E A C
RFN200	●	●
RFN420	●	●

● Certified products.

cULus – UL Listed for USA and Canada (cULus - File E93601) as Auxiliary Devices – Thermal Overload Relays, 600VAC, open type, ambient compensated, 5000 Amps RMS symmetrical short circuit rating up to 150A FLA range, 10000 Amps RMS for 200A up to 300A FLA range and 18000 Amps for the 420A; the trip current is 120% FLA.

Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, UL 60947-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

RFX20035

RFX3802

RFX3803

11G363

RFX3804

11G228

Order code	For relay		Qty per pkg	Wt
			n°	[kg]
Set of links for direct contactor mounting.				
RFX20035	RF...200 on contactor	BF160-BF195-BF230	1	0.250
RFX20036		BF265-BF330-BF400	1	0.360
RFX42035	RF...420 on contactor	BF160-BF195-BF230	1	0.313
RFX42036		BF265-BF330-BF400	1	0.500
Protection cover for thermal overload relay-contactor assembly.				
RFX3802	RF38 on contactor BF09-BF12-BF18-BF25		10	0.014
RFX3803	RF38 on contactor BF26-BF32-BF38		10	0.014
Protection shrouds for power terminals.				
BFX815❶	RF...200		6	0.026
BFX816❶	RF...420		6	0.046
Independent mounting. Screw fixing or 35mm DIN rail (IEC/EN/BS 60715) mounting.				
RFX3804	RF...38 and RFE45		5	0.082
11G270	RF...82 - RF...110		10	0.148
Electrical reset.				
11G228❷	RF...9 - RF...82 - RF...110		5	0.072
Sealing device.				
RFX3801	RF...38 - RF...200 - RF...420		10	0.002
11G233	RF...9 - RF...82 - RF...110		1	0.006

❶ Code for a single terminal.
To protect all thermal overload relay terminals order 6 pcs.
N.B. The terminals equipped with the links for direct contactor mounting RFX200... and RFX420... don't accept the protection.
❷ Replace with voltage digit. Standard voltages are:
– AC 50/60Hz 24V / 48V / 110-125V / 220-240V / 380-415V.

Operational characteristics
ELECTRICAL RESET 11G228

Control circuit voltage AC (50/60Hz)	V	12...550
Power consumption in AC	VA	300
Minimum reset time	ms	20
Terminals	Faston	6.3x0.8

NOTE: coils can remain supplied for a maximum interval of 500ms; 3 consecutive operations are allowed, followed by a 5 minute interval. Reset only if at least 1min has passed from overload tripping.It is recommended to use the wiring diagram on page 3-14.

INDEPENDENT MOUNTING
– Conductor cross section with one cable:
  • 6...10mm² / AWG 8 for RFX3804
  • 35mm² / AWG 2 for 11G270
– Tightening torque:
  • 2...2.5Nm / 18...22lb.in for RFX3804
  • 3.9Nm / 34lb.in for 11G270.

Certifications and compliance
Certifications obtained:

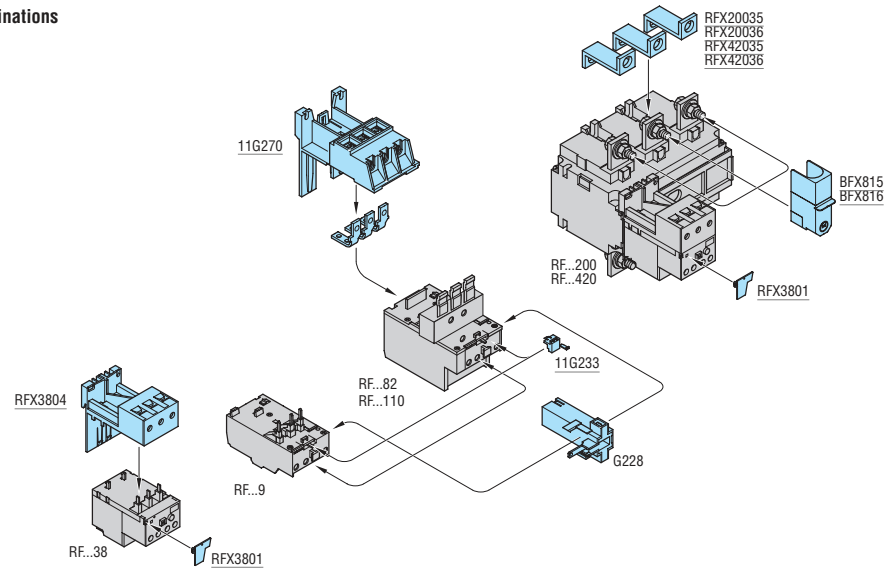
Type	c UL us	CSA	EAC
G361-G363 G373-G376-RFX20035-RFX42035	—	●	●
11G270	●	—	●
RFX3804	●	—	●

● Certified products.

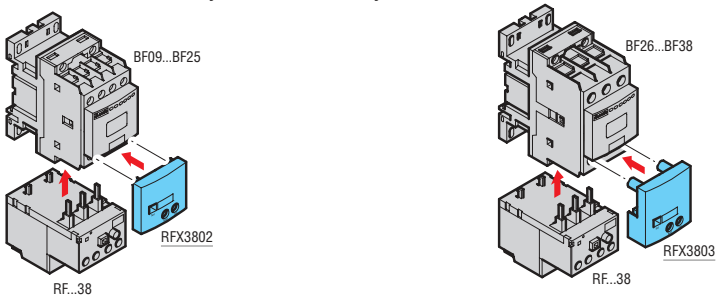
cULus – UL Listed for USA and Canada (cULus - File E93601) as Auxiliary Devices for thermal overload relays.
CSA – CSA certified for Canada only (File 54332) as Kits for industrial control equipment.

Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, UL 60947-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

Combinations



Protection cover for thermal overload relay-contactor assembly



Phase failure / single phase sensitive Three poles (three phase)

RFE45...

Order code	Adjustment range	Protection fuses IEC aM	gG	Qty per pkg	Wt
	[A]	[A]	[A]	n°	[kg]
MANUAL OR AUTOMATIC RESETTING. Direct mounting on BF09...BF38 contactors. Independent mounting with RFX3804.					
RFE450200	0.4...2	4	6	1	0.195
RFE450800	1.6...8	10	20	1	0.195
RFE453200	6.4...32	40	63	1	0.195
RFE454500	9...45	50	63	1	0.195

Three-phase IEC motor powers ❶

230V [kW]	400V [kW]	500V [kW]	690V [kW]
0.09...0.37	0.12...0.75	0.18...0.75	0.25...1.1
0.37...0.55	0.75...3	1.1...4	1.1...5.5
1.5...7.5	3...15	6.8...28	5.5...30
3...11	4...22	5.5...30	7.5...45

❶ The indicated powers apply to 4-pole motors; it is advisable to always check that the nameplate motor current is within the relay adjustment range.

General characteristics
The RFE... electronic thermal overload relays for BF series contactors are characterized by a wide current adjustment range and high reliability and accuracy of tripping. They are self powered by the main circuit current and therefore do not require separate auxiliary supply voltage. RFE electronic thermal overload relays are suitable for all types of motor starting thanks to the possibility to select several tripping classes. A single front push button is used to select the reset function, manual or automatic, and to activate or deactivate the STOP function.

Operational characteristics
- IEC power circuit rated insulation voltage Ui: 690V
- IEC auxiliary circuit rated insulation voltage Ui: 690V
- rated impulse withstand voltage: 8kV
- rated frequency: 50/60Hz
- maximum rated current: 45A
- heat dissipation per phase: <1W
- selectable tripping classes: 5-10-20-30
- phase failure sensitive
- mounting position: Any
- sealable current adjuster and dip switches for tripping class selection
- degree of protection: IP20 on front.

Certifications and compliance
Certifications obtained: cULus.
Compliant with standards: IEC/EN/BS 60947-1; IEC/EN/BS 60947-4-1, UL 60947-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

Thermistor protection relays

31DRPT...

Order code	Rated auxiliary supply voltage	Qty per pkg	Wt.
	[V]	n°	[kg]
DC supply (version for 35mm DIN rail IEC/EN/BS 60715).			
31DRPTC24	24VDC❶	1	0.269
AC supply (version for 35mm DIN rail IEC/EN/BS 60715).			
31DRPT24	24VAC	1	0.269
31DRPT110	110VAC	1	0.269
31DRPT220	220...240VAC	1	0.269
Accessories.			
Order code	Description	Qty per pkg	Wt
		n°	[kg]
31CE106	Adapter for screw fixing of DRPT relay on mounting plate.	10	0.008

❶ Galvanic isolation between supply and measuring circuits does not exist.

General characteristics
The DRPT is a thermal protection relay for motors equipped with thermistor PTC sensors immersed in the winding heads. The maximum number of thermistors to be used is limited by the resistance of all the sensors connected in series; total ohmic value is not to exceed 1.5kΩ at 25°C.
The DRPT type has fail-safe operation: the protective feature trips even in the case the PTC circuit is disconnected or there is a lack of voltage.
Resetting is manual or automatic.

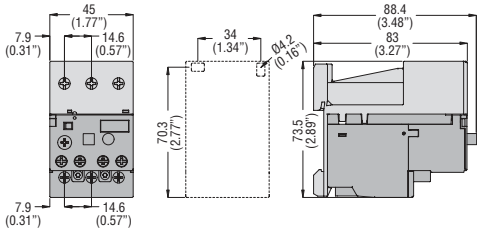
Operational characteristics
– Supply circuit:
  • Rated frequency: 50-60Hz for AC types only
  • Operational limits: 0.85...1.1 Us
  • Maximum dissipation: 2.5W
  • Connection: Permanent
– Measuring circuit:
  • Type of connectable PTC sensor: According to DIN 44081
  • Total PTC resistance at 25°C: ≤1.5kΩ
  • Tripping resistance: 2.7...3.1kΩ
  • Resetting resistance: 1.5...1.8kΩ
  • Voltage at PTC terminals: ≤ 2.5VDC
– Remote resetting:
  • Control: NC contact opening
  • Contact voltage: 5VDC
  • Current consumption: About 1mA
– Relay output:
  • Arrangement: 1 relay with 2 changeover contacts
  • Rated operational voltage Ue: 250VAC
  • Conventional free air thermal current Ith: 5A
  • Designation to IEC/EN/BS 60947-5-1: B300
  • Mechanical life: $50x10^6$ cycles
  • Electrical life (with rated load): $2x10^5$ cycles
– Indications:
  • Green LED indicator for power ON
  • Red LED indicator for relay state TRIP
– Connections:
  • Conductor section $2x1.5mm^2$ with ferrule (max)
  • Tightening torque: 0.8-1.2Nm
– Ambient conditions:
  • Operating temperature: -10...+60°C
  • Storage temperature: -30...+80°C
– Housing:
  • Snap on 35mm DIN rail (IEC/EN/BS 60715)
  • For screw fixing, use CE106 adapter
  • Degree of protection
    – IP40 housing
    – IP20 terminals.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60255-5.

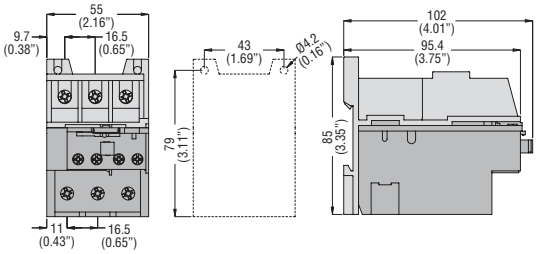
THERMAL OVERLOAD RELAYS DIMENSIONS WITH CONTACTORS SEE ON CHAPTER 2

ACCESSORIES FOR THERMAL OVERLOAD RELAYS

RFX3804 base c/w RF...38 thermal relay

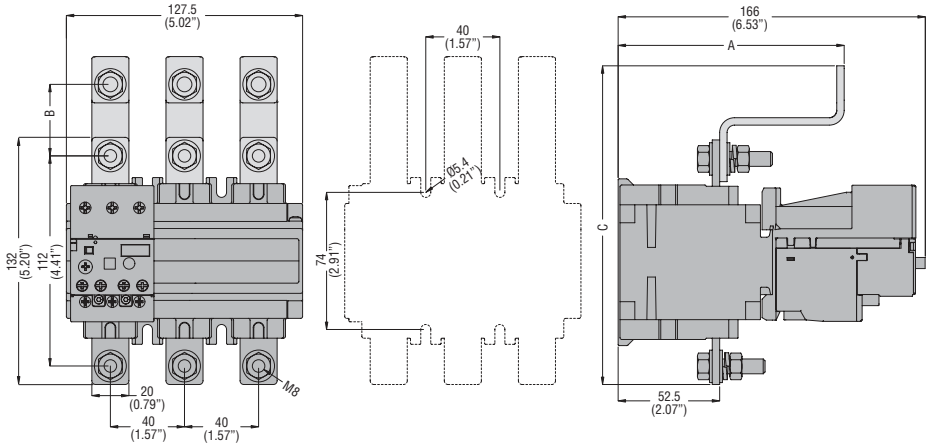


11G270 base c/w RF...82 and RF...110 thermal relay



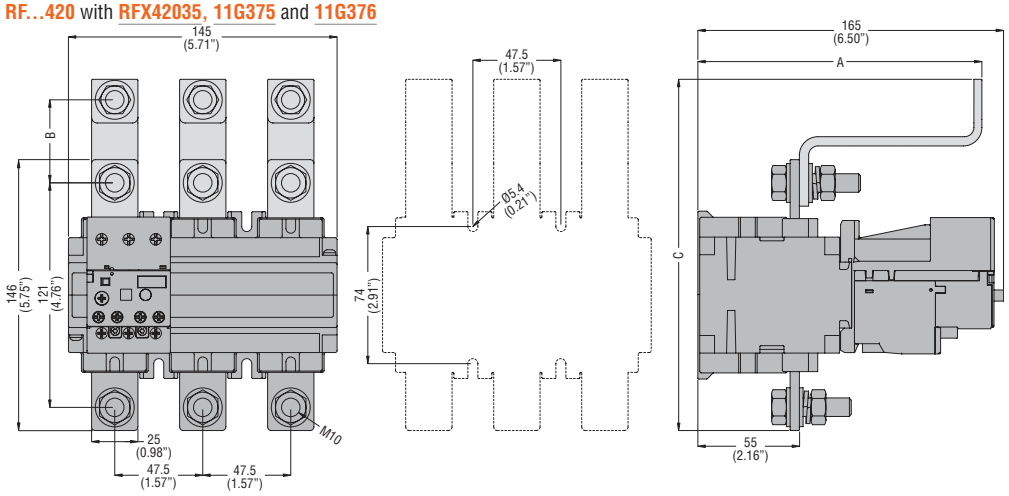
THERMAL RELAYS WITH LINKS

RF...200 with **RFX20035**, **11G372** and **11G373**



	A	B	C
RFX20035	120 (4.72")	40 (1.57")	174.5 (6.87")
RFX20036	146 (5.75")	45 (1.77")	179.5 (7.07")

RF...420 with **RFX42035**, **11G375** and **11G376**

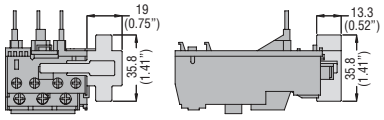


	A	B	C
RFX42035	122.5 (4.82")	45 (1.77")	191 (7.52")
RFX42036	148 (5.83")	45 (1.77")	191 (7.52")

ADD-ON BLOCKS FOR THERMAL OVERLOAD RELAYS

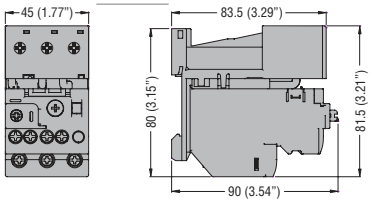
RF...9, RF...82 and RF...110

11G228... reset



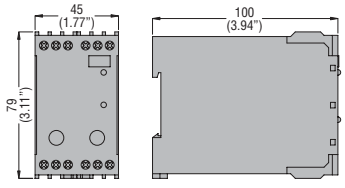
ELECTRONIC THERMAL OVERLOAD RELAYS

RFE45 with RFX3804

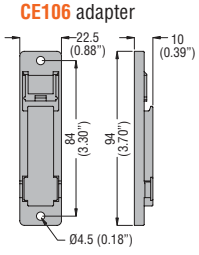


THERMISTOR PROTECTION RELAYS

DRPT

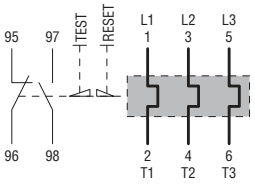


CE106 adapter

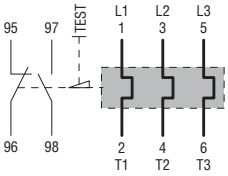


THERMAL OVERLOAD RELAYS FOR BG MINI-CONTACTORS

RF9 - RFN9

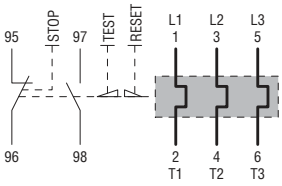


RFA9 - RFNA9

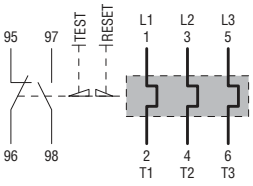


THERMAL OVERLOAD RELAYS FOR BF CONTACTORS

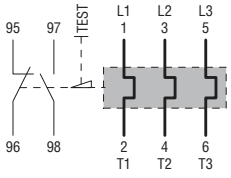
RF38 - RFN38



RF82 - RFN82 - RF110 - RFN110

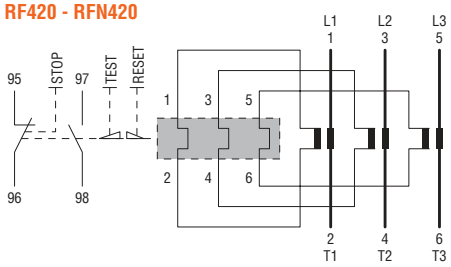


RFA82 - RFNA82 - RFA110 - RFNA110



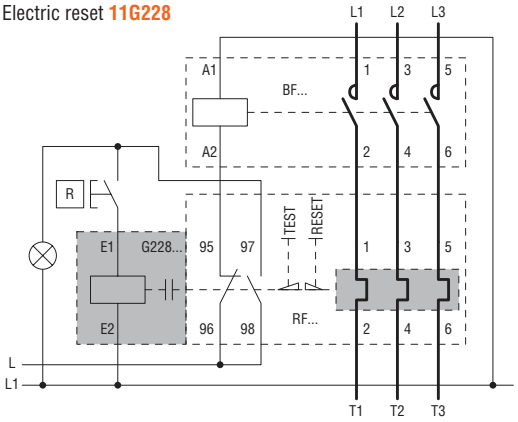
THERMAL OVERLOAD RELAYS FOR B CONTACTORS

RF200 - RFN200
RF420 - RFN420



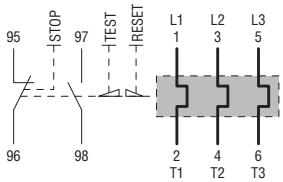
ADD-ON BLOCKS FOR THERMAL OVERLOAD RELAYS RF9 - RF82 - RF110

Electric reset **11G228**



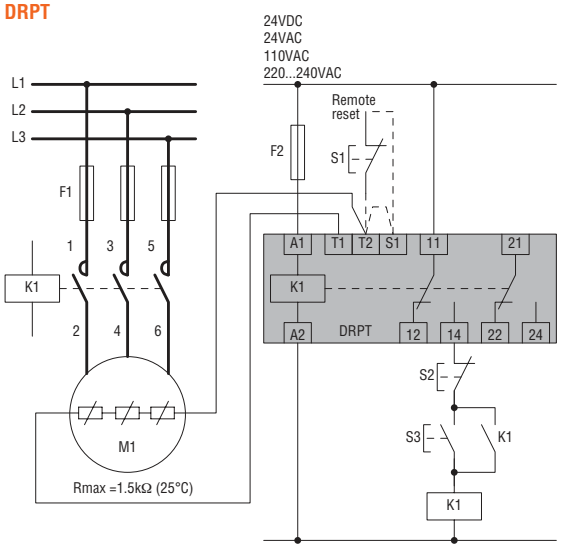
ELECTRONIC THERMAL OVERLOAD RELAYS

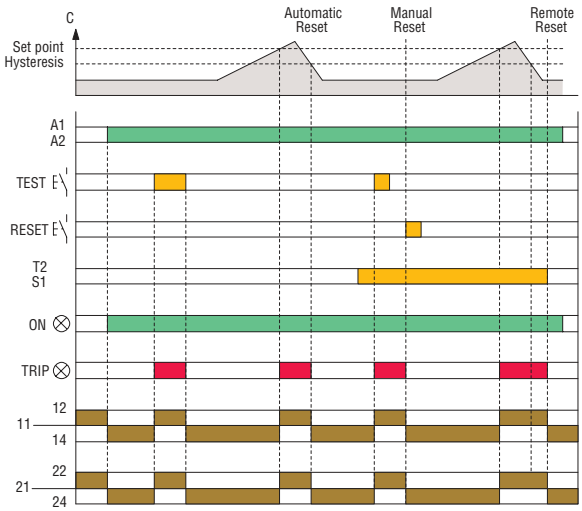
RFE45



THERMISTOR PROTECTION RELAYS

DRPT





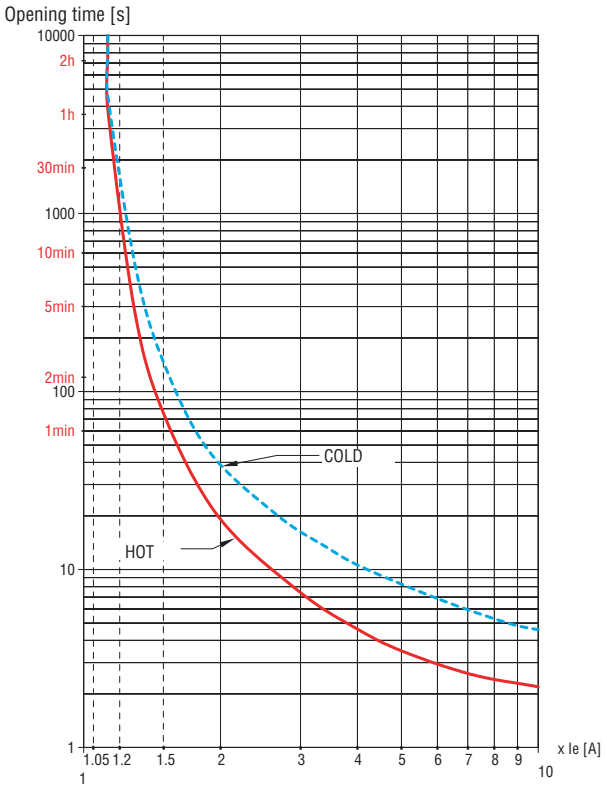
Phase failure/single phase sensitive manual reset Phase failure sensitive automatic reset Non phase failure/non single phase sensitive manual reset Non phase failure/non single phase sensitive automatic reset			**RF9 RFA9 RFN9 RFNA9**	**RF38❶ RFN38❶**	**RF82-RF110 RFA82-RFA110 RFN82-RFN110 RFNA82-RFNA110**		**RFE45**	**RF200❶ RFN200❶**	**RF420❶ RFN420❶**
POWER CIRCUIT CHARACTERISTICS									
IEC rated insulation voltage Ui		V	690	690	690		690	1000	1000
IEC rated impulse withstand voltage Uimp		kV	8 ❻	6	8 ❻		6	6	6
Frequency limit		Hz	0...400	0...400	0...400		50...60	50...60	50...60
Operational range	from	A	0.09	0.1	20	60	0.4	60	150
	to	A	15	38	95	110	45	200	420 ❷
Tripping class			10A				5-10-20-30	10A	
Particular characteristics			Test button - Trip indicator						
Connection			Direct				With current transformers ❸		
Terminals	Type		Screw and washer		Yoke clamp		Screw and washer	Screw and flat washer	
	Screw		M4	M4	M5		M4	M8	M10
	Terminal width	mm	9.8	12.6	9		12	20	25
	Phillips	n°	2	2	2		2	13mm❹	18mm❹
Tightening torque for power terminals		Nm	2.3	2...2.5	3.9		3.1	18	35
		lb.in	20	14...18	34		28	159	310
Maximum conductor section connectable									
	AWG	N°	10	8	2		6	--	--
	Flexible w/o lug	mm²	6	10	35		16	--	--
	Flexible c/w lug	mm²	10	6	--		10	150	2 x 150
	Bar	mm	--	--	--		--	25 x 3	30 x 5
Dissipation per phase		W	0.7...2.4	0.7...2.4	2.0...4.2		<1	0.7...2.4	0.7...2.4
AUXILIARY CIRCUIT CHARACTERISTICS									
Available contacts	NO	N°	1						
	NC	N°	1						
IEC rated insulation voltage		V	690						
IEC conventional free air thermal current Ith		A	10				5	10	
Terminals with screw and washer	Screw		M3.5						
	Terminal width	mm	8				7	8	
	Phillips	n°	1	2	1		2	2	2
Maximum conductor section connectable									
	Flexible w/o lug	mm²	2.5						
	Flexible c/w lug	mm²	2.5						
Tightening torque for auxiliary terminals		Nm	1	0.8...1	1		0.8	0.8...1	0.8...1
		lb.in	8.8	9...13	8.8		9	9...13	9...13
UL/CSA and IEC/EN/BS 60947-5-1 designation			B600-P600 ❺	B600-R300	B600-P600 ❺		B600-R300	B600-R300	B600-R300
AMBIENT CONDITIONS									
Operating temperature		°C	-20...+55	-25...+60	-20...+55		-25...+70	-25...+60	-25...+60
Storage temperature		°C	-55...+70	-50...+70	-55...+70		-55...+80	-50...+70	-50...+70
Compensation temperature		°C	-15...+55	-20...+60	-15...+55		-25...+70	-20...+60	-20...+60
Maximum altitude		m	3000						
Operation position	Normal		On vertical plane						
	Allowable		±30°						
Mounting			On contactor or separately						

❶ With manual and automatic resetting.
❷ For currents higher than 420A, consult Technical support for information; see contact details on inside front cover.
❸ Standard supplied.
❹ Metric wrench/spanner.
❺ C600-R300 for automatic reset type.
❻ 6kV for auxiliary terminals.

TRIP CHARACTERISTIC FOR RF THERMAL OVERLOAD RELAYS (AVERAGE TIME)

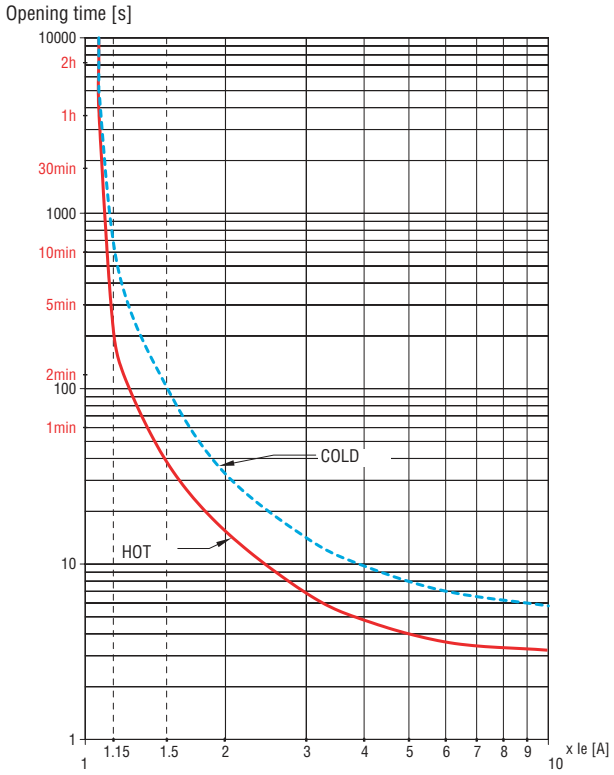
Three-phase balanced operation

RF9 RF38 RF82 RF110
RFA9 RFN38 RFA82 RFA110
RFN9 RFN82 RFN110
RFNA9 RFNA82 RFNA110

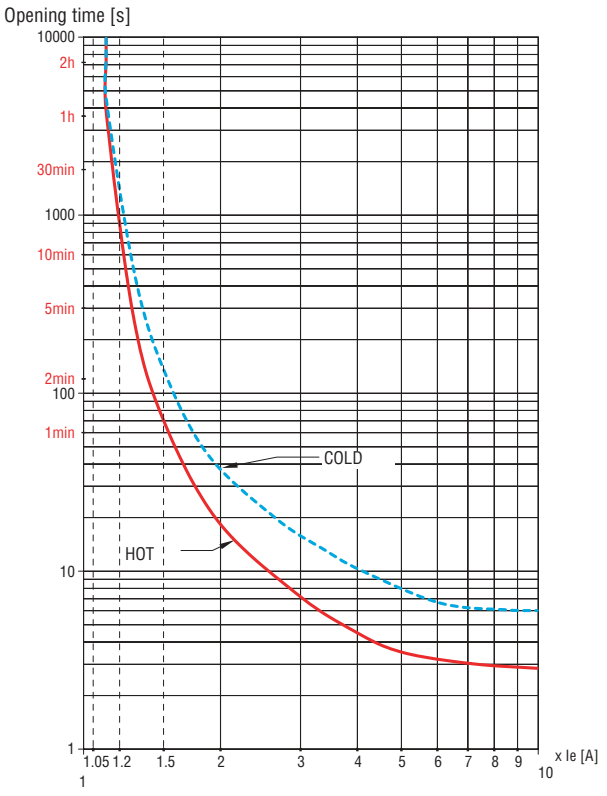


Two-phase operation (phase failure/single phase)

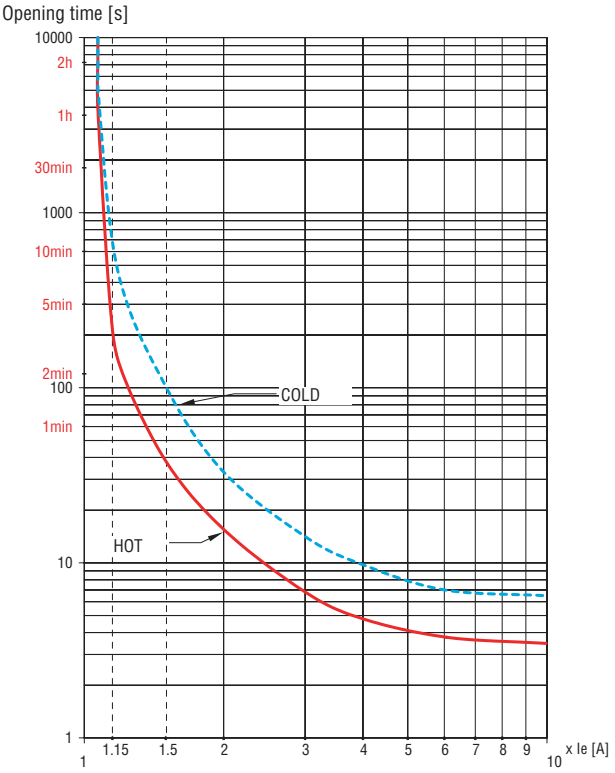
RF9 RF38 RF82 RFA110
RFA9 RFA82 RFNA110



RF200 RF420
RFN200 RFN420



RF200 RF420

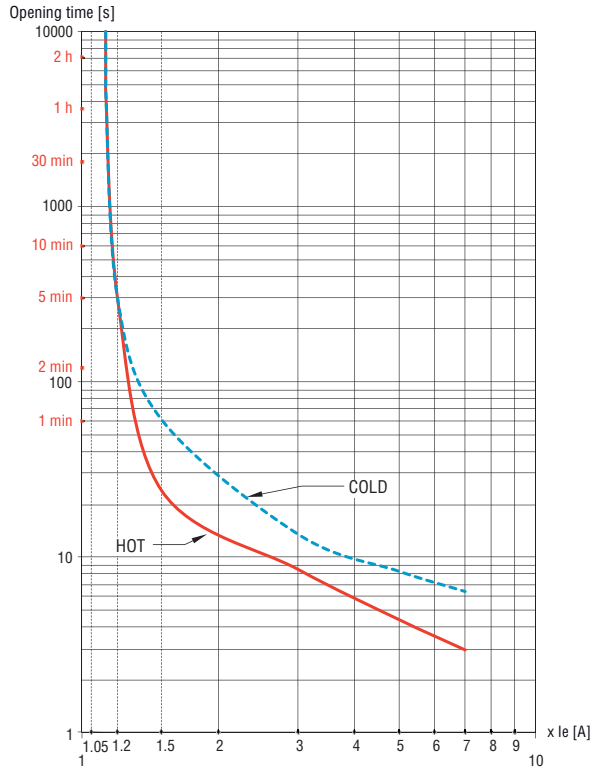


Tripping times can have a ±20% deviation with respect to the average tripping curve values above.

TRIP CHARACTERISTIC FOR RFE ELECTRONIC THERMAL OVERLOAD RELAYS

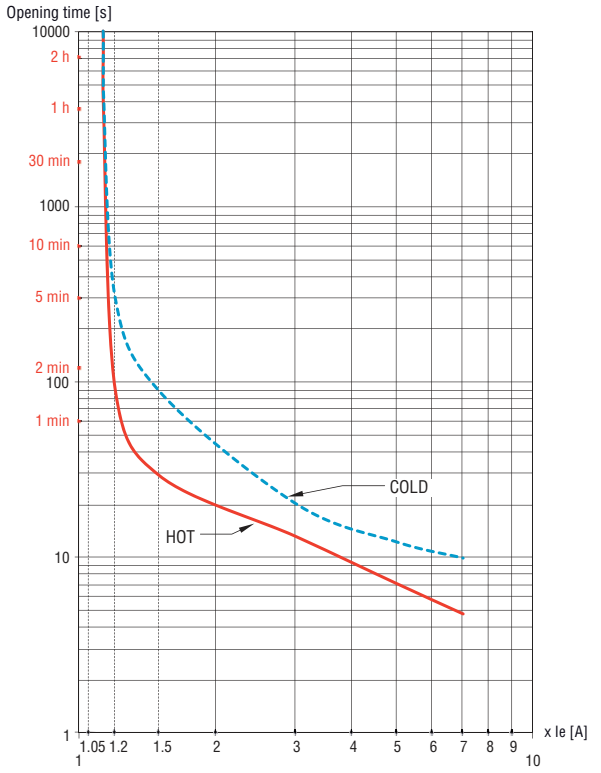
Three-phase balanced operation; class 5

RFE45



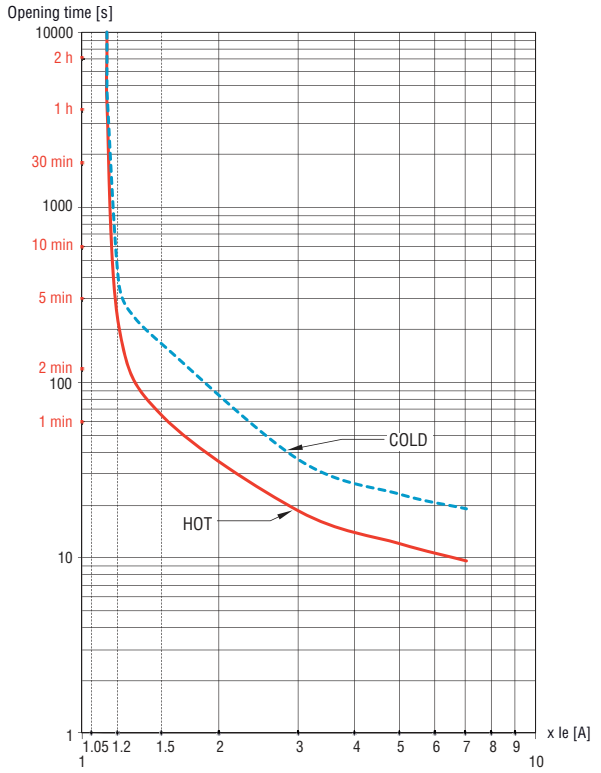
Three-phase balanced operation; class 10

RFE45



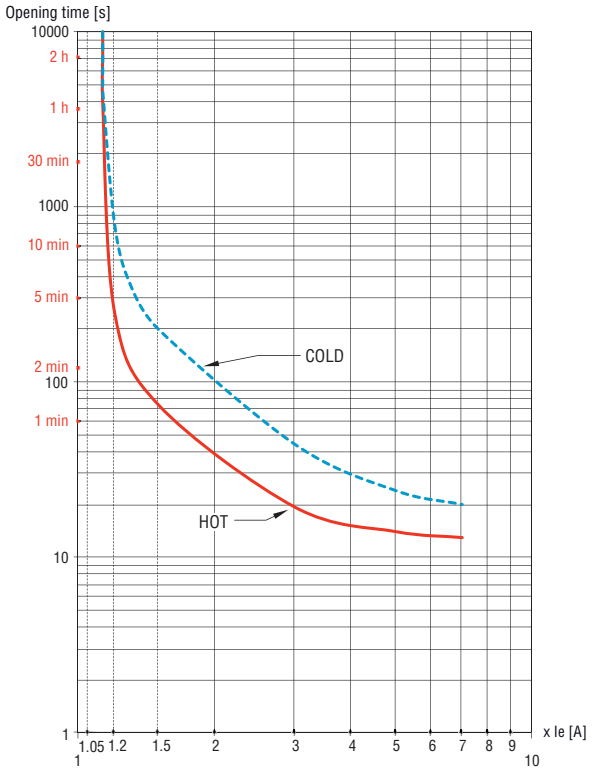
Three-phase balanced operation; class 20

RFE45



Three-phase balanced operation; class 30

RFE45



Note: with phase asymmetry >40% tripping in 3s max.

Electronic and electromechanical starters

- Electronic motor starters in compact enclosure 22.5mm width
- Direct-on-line and reversing starter versions with integrated motor thermal protection
- Versions with or without STO (Safe Torque Off) emergency stop
- Direct-on-line starters in non-metallic enclosure complete with or without thermal relay
- Versions with START/STOP or RESET pushbuttons
- Non-metallic enclosures for customer-assembled starters
- Reversing and changeover contactor assemblies
- Star-delta starters, open frame and in non-metallic enclosure versions.

	SEC. - PAGE
Electronic motor starters	**4 - 2**
Direct-on-line starters - Full voltage across the line - Non reversing	
Enclosed with thermal relay	4 - 3
Enclosed without thermal relay	4 - 4
Enclosed with motor protection circuit breaker	4 - 5
Ratings for USA and CANADA	4 - 26
Reversing contactor assemblies 3 poles	**4 - 6**
Changeover contactor assemblies 4 poles	**4 - 6**
Star-delta starters	
Open frame	4 - 7
Enclosed	4 - 8
Non-metallic enclosure for starters	4 - 8
Empty non-metallic enclosures	
Enclosures	4 - 9
Accessories and spare parts	4 - 9
Combinations	4 - 11
Dimensions	**4 - 17**
Wiring diagrams	**4 - 22**

Page 4-2

ELECTRONIC MOTOR STARTERS

- For the command of motors up to 2.4A or 7A (500V/AC53a)
- Direct-on-line or reversing starters
- Integrated motor thermal protection
- Versions with or without STO (Safe Torque Off) emergency stop
- Compact enclosure 22.5mm width
- 35mm DIN rail mounting.

Page 4-3

DIRECT-ON-LINE STARTERS

- Motor ratings up to 80A 440V in IEC AC3 duty
- Motor rating up to 52A 600V per UL/CSA (see page 4-26)
- Versions with Start-Stop/Reset buttons or Reset button
- Versions with and without thermal relay
- Versions with motor protection circuit breaker.

Page 4-6

REVERSING CONTACTOR ASSEMBLIES 3 POLES

- For three-phase motor control 9...25A 440V / 4...12.5kW 400V, in IEC AC3 duty and up to 15HP 600V per UL/CSA
- Versions with built-in or external mechanical interlock
- Complete with rigid connections
- PCB version 9A 440V / 4kW 400V in IEC AC3 duty; 5HP 300V per UL/CSA.

Page 4-6

CHANGEOVER CONTACTOR ASSEMBLIES 4 POLES

- From 20A to 165A loads at ≤40°C in IEC AC1 duty
- For 20A general use per UL/CSA
- With built-in mechanical interlock.

Page 4-7

STAR-DELTA STARTERS OPEN FRAME

- Suitable for three-phase motor control, 16A...225A 440V / 7.5kW...132kW 400V ratings in IEC AC3 duty.

Page 4-8

STAR-DELTA STARTERS IN NON-METALLIC ENCLOSURE

- Suitable for three-phase motor control, 16...60A 440V / 7.5kW...30kW 400V ratings in IEC AC3 duty.

Page 4-9

EMPTY NON-METALLIC ENCLOSURES

- Versions without pushbuttons, with Reset button only or Start-Stop/Reset buttons
- For starters, with pushbuttons and metal plate
- Suitable to contain BG mini-contactor or BF09A to BF80 contactors, up to 110A 440V rating in IEC AC3 duty; up to 52A at 600V for UL/CSA.

Lovato electric

Electronic motor starters

ME070RD024

ME070RSD024

new

Order code	Rated current Ie AC-53a	Rated power (400VAC)	Adjustment range	Qty per pkg	Wt
	[A]	[kW]	[A]	n°	[kg]
Direct-on-line starters with integrated motor thermal protection, operational voltage Ue ≤500VAC, auxiliary and control supply voltage 24VDC.					
ME024FD024	2.4	0.75	0.18-2.4	1	0.300
ME070FD024	7.0	3	1.50-7.0	1	0.300
Reversing starters with integrated motor thermal protection, operational voltage Ue ≤500VAC, auxiliary and control supply voltage 24VDC.					
ME024RD024	2.4	0.75	0.18-2.4	1	0.300
ME070RD024	7.0	3	1.50-7.0	1	0.300
Direct-on-line starters with integrated motor thermal protection and STO (Safe Torque Off) emergency stop, operational voltage Ue ≤500VAC, auxiliary and control supply voltage 24VDC.					
ME024FSD024	2.4	0.75	0.18-2.4	1	0.300
ME070FSD024	7.0	3	1.50-7.0	1	0.300
Reversing starters with integrated motor thermal protection and STO (Safe Torque Off) emergency stop, operational voltage Ue ≤500VAC, auxiliary and control supply voltage 24VDC.					
ME024RSD024	2.4	0.75	0.18-2.4	1	0.300
ME070RSD024	7.0	3	1.50-7.0	1	0.300

General characteristics

The ME... series of electronic motor starters is achieved in enclosure of just 22.5mm width, ideal solution for applications that require a very high number of starts and space saving inside the cabinet. They are made with hybrid technology, that combines the advantages of extremely long working life of a wear-free semiconductor device and the robustness of a mechanical relay. The range is composed of direct-on-line and reversing starters for motors up to 2.4 or 7A, for systems with rated voltage up to 500VAC. All the types integrate the electronic motor thermal protection and the versions with built-in STO (Safe Torque Off) are provided with emergency stop function. The multiple functions are integrated in one single device of extremely compact dimensions, with the possibility to install side-by-side, making the ME range of electronic starters the best solution for the applications that combine the requirements of space saving, reduction of the installation and wiring time with a high number of operations and a long electrical durability. Typical applications can include conveyors, packaging machines, automatic doors, escalators, sorting equipment, access control systems, augers, hoppers, machine tools and many others.

FUNCTIONALITIES
- Direct-on-line and reversing starters
- Rated motor current 2.4 or 7A
- Control three-phase asynchronous motors up to 500VAC
- Possibility to command also single-phase motors with poles connected in series (only forward running)
- Potentiometer for the adjustment of the rated motor current Ie
- Integrated electronic motor thermal protection with tripping class 10A
- Versions with STO (Safe Torque Off) emergency stop with Safety Integrity Level SIL3 (IEC/EN 61508) and Performance Level “PL e” (ISO 13489).

COMMANDS AND SIGNALLING
- 4 digital inputs:
  - 1 digital input for motor starting in forward direction
  - 1 digital input for motor starting in reversing direction (ME...R... only)
  - 1 digital input for reset mode selection of motor thermal protection alarm (automatic or manual)
  - 1 digital input for manual alarm reset
- 1 button on the front for manual alarm reset
- 3 integrated digital outputs:
  - 1 relay output with changeover contact for alarm signaling
  - 2 PNP digital outputs for motor running direction signaling
- 4 status LEDs on front for diagnostics:
  - POWER = presence of auxiliary supply
  - ALARM = alarm active
  - FORWARD = motor forward running
  - REVERSE = motor reverse running.

PROTECTIONS
- Motor thermal protection, against overload
- Protection against phase loss
- Protection against phase imbalance (current asymmetry) or load loss

Operational characteristics
- Rated thermal voltage Ue 40...500VAC
- Rated frequency 50/60Hz
- Auxiliary and control supply voltage 24VDC ±20%
- Rated operational current Ie AC-53a 2.4A or 7A
- Electrical life: 50 milion cycles
- Mechanical life: 15 milion cycles
- Output rarings:
  - relay output with changeover contact: 3A 230V AC15, 2A 24V DC13
  - PNP digital outputs: 24VDC 40mA max
- Operating temperature: -25...+70°C (see the derating curve on the technical manual)
- Storage temperature: -25...+80°C
- Relative humidity: 20...90% non-condensing
- 35mm DIN rail mounting (IEC/EN/BS 60715)
- Protection degree: IP20.

Certifications and compliance

Certifications: cULus.
Compliant with standards: IEC/EN/BS 609474-2, UL 60947-4-2, CSA C22.2 n° 60947-4-2. On the versions type ME...S..., the STO function is certified Safety Integrity Level 3 according to IEC/EN/BS 61508 and Performance Level PL e according to ISO 13849.

Enclosed with thermal overload relay

M0P...12

M0R...12

M1P...12

M1R...12

M2P...12

M2R...12

M25P03812

M25R03812

M3P...12

M3R...12

Order code	Relay adj range	IEC technical characteristics (≤440V) Ie	kW	Qty per pkg	Wt
	[A]	[A]	[kW]	n°	[kg]
Starters with Start and Stop/Reset pushbuttons ❷.					
M0P00912❶1	0.6-1	1	0.18-0.25	1	0.760
M0P00912❶1V5	0.9-1.5	1.5	0.37	1	0.760
M0P00912❶2V3	1.4-2.3	2.3	0.55-0.75	1	0.760
M0P00912❶33	2-3.3	3.3	1.1	1	0.760
M0P00912❶5	3-5	5	1.5-2.2	1	0.760
M0P00912❶75	4.5-7.5	7.5	2.2-3	1	0.760
M0P00912❶10	6-10	10	3-4	1	0.760
M0P01212❶15	9-15	12	5.5	1	0.760
M1P00912❶A4	0.63-1	1	0.25	1	1.040
M1P00912❶A5	1-1.6	1.6	0.37-0.55	1	1.040
M1P00912❶A6	1.6-2.5	2.5	0.75	1	1.040
M1P00912❶A7	2.5-4	4	1.1-1.5	1	1.040
M1P00912❶A8	4-6.5	6.5	2.2-3	1	1.040
M1P00912❶A9	6.3-10	10	3-4	1	1.040
M1P00912❶B0	9-14	13	5.5	1	1.040
M1P01812❶B1	13-18	18	7.5	1	1.040
M2P02512❶B2	17-23	23	11	1	1.220
M2P02512❶B3	20-25	25	11	1	1.220
M2P03212❶B4	24-32	32	15	1	1.300
M25P03812❶B5	32-38	38	18.5	1	2.880
M3P05012❶B6	35-50	50	18.5-22	1	3.760
M3P06512❶B7	46-65	65	30	1	3.760
M3P08012❶B8	60-82	80	37-45	1	3.760
Starters with Reset pushbuttons ❷.					
M0R00912❶1	0.6-1	1	0.18-0.25	1	0.720
M0R00912❶1V5	0.9-1.5	1.5	0.37	1	0.720
M0R00912❶2V3	1.4-2.3	2.3	0.55-0.75	1	0.720
M0R00912❶33	2-3.3	3.3	1.1	1	0.720
M0R00912❶5	3-5	5	1.5-2.2	1	0.720
M0R00912❶75	4.5-7.5	7.5	2.2-3	1	0.720
M0R00912❶10	6-10	10	3-4	1	0.720
M0R01212❶15	9-15	12	5.5	1	0.720
M1R00912❶A4	0.63-1	1	0.25	1	0.995
M1R00912❶A5	1-1.6	1.6	0.37-0.55	1	0.995
M1R00912❶A6	1.6-2.5	2.5	0.75	1	0.995
M1R00912❶A7	2.5-4	4	1.1-1.5	1	0.995
M1R00912❶A8	4-6.5	6.5	2.2-3	1	0.995
M1R00912❶A9	6.3-10	10	3-4	1	0.995
M1R00912❶B0	9-14	13	5.5	1	0.995
M1R01812❶B1	13-18	18	7.5	1	0.995
M2R02512❶B2	17-23	23	11	1	1.165
M2R02512❶B3	20-25	25	11	1	1.165
M2R03212❶B4	24-32	32	15	1	1.260
M25R03812❶B5	32-38	38	18.5	1	2.600
M3R05012❶B6	35-50	50	18.5-22	1	3.410
M3R06512❶B7	46-65	65	30	1	3.410
M3R08012❶B8	60-82	80	37-45	1	3.410

❶ Complete order code with coil voltage digit (if 50/60Hz) or with voltage digit followed by 60 (if 60Hz).
Standard voltages are as follows:
– AC 50/60Hz 024 / 048 / 110 / 230 / 400V
– AC 60Hz 024 60 / 048 60 / 120 60 / 220 60 / 230 60 / 460 60 / 575 60 (V).
Example: M0R009120241 for direct-on-line starter in M0 type enclosure with Reset button, 9A/AC3 contactor with 24VAC 50/60Hz coil and 0.6-1A thermal overload relay.
M0P00912024601 for direct-on-line starter in M0 type enclosure with Start and Stop/Reset buttons , 9A /AC3 contactor with 24VAC 60Hz coil and 0.6-1A thermal overload relay.

❷ Protection fuses are to be mounted externally by the user.

Components

Starter enclosure	Contactor	Thermal relay	Auxiliary contact block
M0PA	BG0910A	RF91	—
M0PA	BG0910A	RF91V5	—
M0PA	BG0910A	RF92V3	—
M0PA	BG0910A	RF933	—
M0PA	BG0910A	RF95	—
M0PA	BG0910A	RF975	—
M0PA	BG0910A	RF910	—
M0PA	BG1210A	RF915	—
M1PA	BF0910A	RF380100	—
M1PA	BF0910A	RF380160	—
M1PA	BF0910A	RF380250	—
M1PA	BF0910A	RF380400	—
M1PA	BF0910A	RF380650	—
M1PA	BF0910A	RF381000	—
M1PA	BF0910A	RF381400	—
M1PA	BF1810A	RF381800	—
M2PA	BF2510A	RF382300	—
M2PA	BF2510A	RF382500	—
M2PA	BF3200A	RF383200	G41810
M25PA	BF3800A	RF383800	G41810
M3PA	BF5000A	RF825000	G41810
M3PA	BF6500A	RF826500	G41810
M3PA	BF8000A	RF828200	G41810
M0RA	BG0910A	RF91	—
M0RA	BG0910A	RF91V5	—
M0RA	BG0910A	RF92V3	—
M0RA	BG0910A	RF933	—
M0RA	BG0910A	RF95	—
M0RA	BG0910A	RF975	—
M0RA	BG0910A	RF910	—
M0RA	BG1210A	RF915	—
M1RA	BF0910A	RF380100	—
M1RA	BF0910A	RF380160	—
M1RA	BF0910A	RF380250	—
M1RA	BF0910A	RF380400	—
M1RA	BF0910A	RF380650	—
M1RA	BF0910A	RF381000	—
M1RA	BF0910A	RF381400	—
M1RA	BF1810A	RF381800	—
M2RA	BF2510A	RF382300	—
M2RA	BF2510A	RF382500	—
M2RA	BF3200A	RF383200	G41810
M25RA	BF3800A	RF383800	G41810
M3RA	BF5000A	RF825000	G41810
M3RA	BF6500A	RF826500	G41810
M3RA	BF8000A	RF828200	G41810

Operational characteristics
Refer to page 4-4 for details.

Certifications and compliance
Refer to page 4-4 for details.

Special M3... versions
Refer to page 4-4 for details.

UL/CSA HP ratings
See page 4-26.

Enclosed without thermal overload relay

M0P...10

M0R...10

M1P...10

M1R...10

M2P...10

M2R...10

M25P03810

M25R03810

M3P...10

M3R...10

Order code	Maximum operating current (≤440V)	Qty per pkg	Wt
	[A]	n°	[kg]
Starters with Start and Stop/Reset pushbuttons ❷.			
M0P00910❶	10	1	0.667
M0P01210❶	12	1	0.667
M1P00910❶	13	1	0.910
M1P01810❶	18	1	0.910
M2P02510❶	25	1	1.060
M2P03210❶	32	1	1.162
M25P03810❶	38	1	2.360
M3P05010❶	50	1	3.110
M3P06510❶	65	1	3.110
M3P08010❶	80	1	3.110
Starters with Reset pushbutton ❷.			
M0R00910❶	10	1	0.627
M0R01210❶	12	1	0.627
M1R00910❶	13	1	0.867
M1R01810❶	18	1	0.867
M2R02510❶	25	1	1.020
M2R03210❶	32	1	1.110
M25R03810❶	38	1	2.320
M3R05010❶	50	1	3.070
M3R06510❶	65	1	3.070
M3R08010❶	80	1	3.070

❶ Complete order code with coil voltage digit if 50/60Hz or with voltage digit followed by 60 if 60Hz.
Standard voltages are as follows:
– AC 50/60Hz 024 / 048 / 110 / 230 / 400V
– AC 60Hz 024 60 / 048 60 / 120 60 / 220 60 / 230 60 / 460 60 / 575 60 (V).
Example: M0R00910024 for direct-on-line starter in M0 type enclosure with Reset button, 9A /AC3 contactor with 24VAC 50/60Hz coil.
M0P0091002460 for direct-on-line starter in M0 type enclosure with Start and Stop/Reset buttons , 9A /AC3 contactor with 24VAC 60Hz coil.
❷ Protection fuses are to be mounted externally by the user.

Components

Starter enclosure standard supplied	Contactor standard supplied	Thermal relay to purchase separately	Auxiliary contact standard supplied
M0PA	BG0910A	RF9❸	—
M0PA	BG1210A	RF9❸	—
M1PA	BF0910A	RF38❹	—
M1PA	BF1810A	RF38❹	—
M2PA	BF2510A	RF38❹	—
M2PA	BF3200A	RF38❹	G41810
M25PA	BF3800A	RF38❹	G41810
M3PA	BF5000A	RF82❺	G41810
M3PA	BF6500A	RF82❺	G41810
M3PA	BF8000A	RF82❺	G41810
M0RA	BG0910A	RF9❸	—
M0RA	BG1210A	RF9❸	—
M1RA	BF0910A	RF38❹	—
M1RA	BF1810A	RF38❹	—
M2RA	BF2510A	RF38❹	—
M2RA	BF3200A	RF38❹	G41810
M25RA	BF3800A	RF38❹	G41810
M3RA	BF5000A	RF82❺	G41810
M3RA	BF6500A	RF82❺	G41810
M3RA	BF8000A	RF82❺	G41810

❸ For thermal overload relay selection, refer to pages 3-2 or 3-3.
❹ For thermal overload relay selection, refer to pages 3-4 or 3-6
❺ For thermal overload relay selection, refer to pages 3-5 or 3-7.

General characteristics
The M0..., M1..., M2..., M25... and M3...UL enclosures are made of UV protected polycarbonate. They are ideal to assemble starters for stand alone motors; robust and easily customizable adding pushbuttons, selector switches, pilot lights, modular time relays, modular level controls, etc.
M3 enclosures are made in ABS plastic material: a version in polycarbonate is available by adding the UL suffix at the end of the code.

Operational characteristics
– Cable entry:
  • M0/M1... - 2 knockouts PG13.5/M20 on enclosure top and bottom
  • M2... - 2 knockouts PG13.5/M20 or PG16/M25 on enclosure top and bottom
  • M25... - 2 knockouts PG16/M25-PG29/M32 on enclosure top and bottom
  • M3... - Smooth surfaces; can be drilled by customer
– Ambient conditions:
  • Operating temperature: -25...+60°C
  • Storage temperature: -40...+70°C
– Degree of protection: IEC IP65 for all; Type 4/4X industrial control environment for M1/M2/M25... and M3... UL versions.

Special M3... versions
In addition to standard-indicated versions, cULus certified starters are available up to 52A motor control or 65A general use rating max.
Add suffix **UL** to the order code, e.g. M3P05010024**UL**.

UL/CSA HP ratings
See page 4-26.

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada cULus - File E93602) and CSA certified for Canada and USA (cCSAus - File 94157) as Magnetic Motor Controllers, enclosed type, for all M0-M1-M2-M25P/R... starters and M3P/R50-65...UL types as indicated in "Special M3" above; EAC for all.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, UL 60947-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

Electronic and electromechanical starters

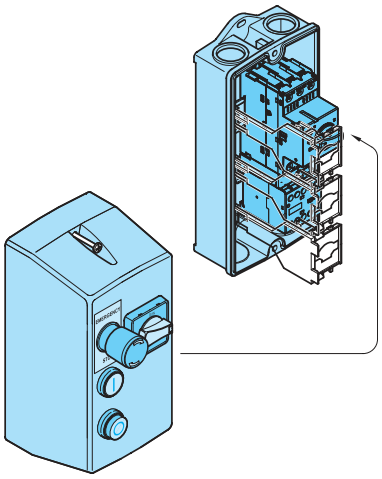
Direct-on-line starters - Full voltage across the line.
Non reversing three phase

Enclosed with motor protection circuit breaker

M2P00911....

Order code	Thermal trip adjustment range	IEC technical characteristics (≤440V) Ie	kW	Qty per pkg	Wt
	[A]	[A]	[kW]	n°	[kg]
M2P00911❶A4	0.63-1	1	0.25	1	1.450
M2P00911❶A5	1-1.6	1.6	0.37-0.55	1	1.450
M2P00911❶A6	1.6-2.5	2.5	0.75	1	1.515
M2P00911❶A7	2.5-4	4	1.1-1.5	1	1.515
M2P00911❶A8	4-6.5	6.5	2.2-3	1	1.515
M2P00911❶A9	6.3-10	10	3-5	1	1.515
M2P00911❶B0	9-14	13	5.5	1	1.515

❶ Complete order code with coil voltage digit (if 50/60Hz) or with voltage digit followed by 60 (if 60Hz).
Standard voltages are as follows:
– AC 50/60Hz 024 / 048 / 110 / 230 / 400V
– AC 60Hz 024 60 / 048 60 / 120 60 / 220 60 / 230 60 / 460 60 / 575 60 (V).
Example: M2P00911400A8 for direct-on-line starter in M2 type with reset and reset/emergency button, 9A/AC3 contactor with 400VAC 50/60Hz coil and motor protection circuit breaker 4...6.5A.



General characteristics
M2P00911... is ideal for starting applications on small machines. It is robust and fully functional for machine control: start, stop, emergency stop, overload protection, short circuit protection and disconnection (isolation function), padlockable in OFF position.

General characteristics
The M2P00911... starters are composed of an IP65 plastic enclosure where the following devices are mounted:
– a motor protection circuit breaker type SM1R... with the short circuit and overload protection function
– a contactor with start / stop function of the motor
– 2 push-buttons for the start and stop
– a mushroom push-button for the emergency stop
– a padlockable rotary actuator, that operates the circuit breaker, for the isolation, with door coupling function.

These starters are easily and quickly installed. They are especially suitable to operate the motor of smaller machines where there is no electrical panel.
Inside the enclosure, other components can be added like timers, level relays, protection relays, etc.

Operational characteristics
– M2... - 2 knockouts PG13.5/M20 or PG16/M25 on enclosure top and bottom
– Ambient conditions:
  • Operating temperature: -25...+60°C
  • Storage temperature: -40...+70°C
– Degree of protection: IEC IP65.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1.

Reversing contactor assemblies 3 poles

11BGR...

BFA...

11BGT...

11BGTP...

Order code	IEC Ie (AC3) ≤440V ≤55°C	Max. IEC power AC3 400V at ≤55°C	Built-in auxiliary contacts		Qty per pkg	Wt
	[A]	[kW]	NO	NC	n°	[kg]
AC COIL. Terminals: clamp screw. External interlock with power and auxiliary wiring.						
11BGR0901A❶	9	4	0	1❸	1	0.394
11BGR1201A❶	12	5.7	0	1❸	1	0.394
BFA00942❶	9	4.2	0	1❸	1	0.760
BFA01242❶	12	5.7	0	1❸	1	0.760
BFA01842❶	18	7.5	0	1❸	1	0.760
BFA02542❶	25	12.5	0	1❸	1	0.760
Built-in interlock with power wiring only.						
11BGT0910A❶	9	4	1❸	0	1	0.380
11BGT1210A❶	12	5.7	1❸	0	1	0.380
Rear terminals: PCB solder pins. Built-in interlock only.						
11BGTP0901A❶	9	4❹	0	1❸	1	0.400
DC COIL. Terminals: clamp screw. External interlock with power and auxiliary wiring.						
11BGR0901D❷	9	4	0	1❸	1	0.460
11BGR1201D❷	12	5.7	0	1❸	1	0.460
Built-in interlock with power wiring only.						
11BGT0910D❷	9	4	1❸	0	1	0.445
11BGT1210D❷	12	5.7	1❸	0	1	0.44
Rear terminals: PCB solder pins. Built-in interlock only.						
11BGTP0901D❷	9	4❹	0	1❸	1	0.460

Changeover contactor assemblies 4 poles

11BGC09 ...

BFC150T4A230

Order code	IEC Operating current (AC1) ≤40°C	≤55°C	≤60°C	UL/CSA General Use	Qty per pkg	Wt
	[A]	[A]	[A]	[A]	n°	[kg]
AC COIL. Terminals: clamp screw. Built-in interlock only.						
11BGC09T4A❶	20	18	15	20	1	0.365
AC COIL 230V 50/60HZ. Terminals: screw. Side mount mechanical interlock with 2NC contacts.						
BFC18T4A230	32	26	23	20	1	0.786
BFC38T4A230	56	45	40	20	1	1.068
BFC80T4A230	115	95	80	20	1	2.532
BFC95T4A230	140	115	100	20	1	4.892
BFC150T4A230	165	135	118	20	1	4.892
DC COIL. Terminals: clamp screw. Built-in interlock only.						
11BGC09T4D❷	20	18	15	20	1	0.450

❶ Complete order code with coil voltage digit or with voltage digit followed by 60 if 60Hz. Standard voltages are as follows:
– AC 50/60Hz 024 / 048 / 110 / 230 / 400V
– AC 60Hz 024 60 / 048 60 / 120 60 / 220 60 / 230 60 / 460 60 / 575 60 (V).
Example: 11BGR0901A024 for reversing contactor assembly with 2 mini-contactors BG09 having 1 NC auxiliary contact each and 24VAC 50/60Hz coil.
11BGR0901A02460 for reversing contactor assembly with 2 mini-contactors BG09 having 1 NC auxiliary contact each and 24VAC 60Hz coil.

❷ Complete order code with coil voltage digit.
Standard voltages are:
– DC 012 / 024 / 048 / 060 / 110 / 125 / 220V.
Example: 11BGC09T4D012 is a changeover contactor assembly with 2 mini-contactors BG09 having 4 main poles each and 12VDC coil.

❸ One auxiliary contact for each contactor.

❹ Maximum voltage is limited at 300V for UL. For certified type up to 600V, consult Technical support; see contact details inside front cover.

General characteristics

REVERSING CONTACTOR ASSEMBLIES
Supplied complete, ready for quick mounting.
The various versions are composed as follows:
BGR... Screw termination, external mechanical interlock BGX5000, power and auxiliary wiring.
BGT... Screw termination, built-in mechanical interlock and power wiring only.
BGTP... Rear PCB solder pin termination, built-in mechanical interlock only.
No thermal overload relay can be directly mounted to BG... reversing contactor assemblies.
BFA... Screw termination, external mechanical interlock BFX5002 and power wiring.
The motor protection circuit breakers SM1... can be directly mounted to BGR... and BFA... reversing contactor assemblies by means the rigid connections SM1X3...; for selection, refer to page 1-9.
The thermal overload relay RF38... can be directly mounted to BFA... reversing contactor assemblies; for selection, refer to section 3.

CHANGEOVER CONTACTOR ASSEMBLIES 4 POLES
Supplied complete, ready for quick mounting as follows: 11BGC... with built-in mechanical interlock, BFC... with side mounting mechanical interlock including NC contacts for electrical interlock. The changeover contactor assemblies are made with four-pole contactors.
No power or auxiliary wiring included.

Operational characteristics

Type	Maximum IEC operational power at ≤55°C (AC3) 230V	400V	415V	440V	500V	690V
	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]
BGR09	2.2	4	4.3	4.5	5	5
BGT09	2.2	4	4.3	4.5	5	5
BGTP09❹	2.2	4	4.3	4.5	5	–
BGR12	3.2	5.7	6.2	5.5	5	5
BGT12	3.2	5.7	6.2	5.5	5	5
BFA009	2.2	4.2	4.5	4.8	5.5	7.2
BFA012	3.2	5.7	6.2	6.2	7.5	10
BFA018	4	7.5	9	9	10	10
BFA025	7	12.5	13.4	13.4	15	11
	at ≤40°C (AC1)					
BGC09T4	8	14	14	15	16	22

	Maximum UL/CSA horsepower rating Single phase 120V	240V	Three phase 208V	240V	480V	600V
	[HP]	[HP]	[HP]	[HP]	[HP]	[HP]
BGR09	½	1½	2	3	5	5
BGT09	½	1½	2	3	5	5
BGTP09	½	1½	2	3	5❹	-❹
BGR12	½	1½	3	3	7½	10
BGT12	½	1½	3	3	7½	10
BFA009	¾	2	3	3	5	7½
BFA012	1	2	5	5	7½	10
BFA018	1	3	5	5	10	15
BFA025	2	3	7½	7½	15	15

NOTE: BGR09, BGT09, BGR12, BGT12... types are UL Listed for USA and Canada as "Magnetic Motor Controller – Reversing Contactors". All these are rated 20A general purpose use and suitable for use on a circuit capable of delivering more than 5kA symmetrical amps at 600V max when protected by fuses class K5 rated no more than 30A.
BGTP09 type is UL Recognized for USA and Canada as "Magnetic Motor Controller – Component – reversing contactors". Max HP rating up to 300VAC only; rated 20A general purpose use.
BGC... types are UL Listed for USA and Canada as "Magnetic Motor Controller – Changeover contactor".
No coil change or replacement is possible for any BG... types.

Add-on blocks

Refer to section 2, page 2-20 and page 2-22. Special add-on auxiliary contacts 11BGX1111 or 11BGX1112 must be used on the left-side contactor of the BGT reversing assemblies. For the right-side contactor, normal 11BGX10... types of auxiliary contacts can be used instead. Refer to page 2-20 for details.

Certifications and compliance

Certifications obtained: UL Listed for USA and Canada (File E93602) for BGR09, BGT09, BGR12, BGT12, BFA... and BGC... (see NOTE above), EAC.
UL Recognized, for USA and Canada (cULus - File E93602 Component), for BGTP09; products having this type of marking are intended for use as components of complete workshop-assembled equipment.
Compliant with standards UL 60947-1, UL 60947-4-1, IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

Open frame

BFA009...BFA025

Order code	Three-phase motor control. Max IEC operating current (≤440V)	Thermal overload relay	Qty per pkg	Wt
	[A]		n°	[kg]
Complete star-delta starters, open frame, for starting time up to 12s and a maximum of 30 operations/hour.				
BFA00970❶❷	16	No	1	1.700
BFA01270❶❷	22	No	1	1.700
BFA01870❶❷	28	No	1	1.700
BFA02570❶❷	35	No	1	1.800
BFA02670❶❷	43	No	1	1.800
BFA03270❶❷	50	No	1	1.900
BFA03870❶❷	60	No	1	1.900
BFA05070❶❷	85	No	1	5.200
BFA06570❶❷	110	No	1	5.200
BFA08070❶❷❹	140	No	1	6.265
BFA09570❶❷	160	No	1	6.900
BFA11570❶❷❺	195	No	1	7.500
BFA15070❶❷❺	225	No	1	7.500

Thermal relay adjustment range
Choose the thermal relay adjustment range considering a value equal to 58% of rated motor current (Ie).
Example: Ie=100A; 58% Ie=58A.
The suitable relay range is 46-65A.
During the setup, the relay is to be regulated at 58A.

Operational characteristics
IEC standard motor powers

230V	400V	440V	500V
[kW]	[kW]	[kW]	[kW]
4	7.5	7.5	7.5
5.5	11	11	11
7.5	15	11	11
11	18.5	18.5	22
11	22	22	25
15	25	25	25
15	30	30	30
25	45	45	59
30	55	55	75
45	75	75	90
45	90	90	110
55	110	110	132
75	132	132	160

❶ Complete order code with the coil voltage digit or the coil voltage digit followed by 60 if 60Hz. Standard voltage are as follows:
– AC 50/60Hz 024 / 048 / 110 / 230 / 400V
– AC 60Hz 024 60 / 048 60 / 120 60 / 220 60 / 230 60 (V).
Example: BFA00970024 for BFA009 star-delta starter with 24VAC 50/60Hz power supply.
BFA0097002460 for BFA009 star-delta starter with 24VAC 60Hz power supply.
❷ The thermal overload relay is not included and must be purchased separately.
Refer to the example given under Thermal relay adjustment range, for a correct choice and then to page 3-4 for the order code.
❸ TMST with auxiliary supply 24...240VAC.
TMSTA440 with auxiliary supply 380...440VAC.
❹ For motors with rated current >115A connect the line side with 50mm² wires crimped with pin terminals or with 2x25mm² wires connected in parallel.
❺ For motors with rated current >175A connect the line side with insulated flexible copper bars or with 2x35mm² wires in parallel.

NOTE: for higher powers and voltages, or suitable for heavy-duty starting (centrifugal fans, mills, crushers) that is with starting time exceeding 12s, consult Technical support; see contact details inside front cover.

Components

Starter	Contactors			Thermal overload relay	Time relay	Auxiliary contacts fitted on contactor:			Rigid connections
	Line	Delta	Star			Line	Delta	Star	
BFA00970	BF0910A	BF0901A	BF0910A	❷ RF38	TMST❸	BFX1020	—	BFX1011	BFX3131
BFA01270	BF1210A	BF1201A	BF0910A	❷ RF38	TMST❸	BFX1020	—	BFX1011	BFX3131
BFA01870	BF1810A	BF1801A	BF1210A	❷ RF38	TMST❸	BFX1020	—	BFX1011	BFX3131
BFA02570	BF2510A	BF2501A	BF1810A	❷ RF38	TMST❸	BFX1020	—	BFX1011	BFX3131
BFA02670	BF2600A	BF2600A	BF1810A	❷ RF38	TMST❸	BFX1020	BFX1011	BFX1011	BFX3232
BFA03270	BF3200A	BF3200A	BF2510A	❷ RF38	TMST❸	BFX1020	BFX1011	BFX1011	BFX3232
BFA03870	BF3800A	BF3800A	BF2510A	❷ RF38	TMST❸	BFX1020	BFX1011	BFX1011	BFX3232
BFA05070	BF5000A	BF5000A	BF3200A	❷ RF82	TMST❸	BFX1020	BFX1011	BFX1011	BFX3332
BFA06570	BF6500A	BF6500A	BF3200A	❷ RF82	TMST❸	BFX1020	BFX1011	BFX1011	BFX3332
BFA08070	BF8000A	BF8000A	BF5000A	❷ RF82	TMST❸	BFX1020	BFX1011	BFX1011	BFX3331
BFA09570	BF9500A	BF9500A	BF6500A	❷ RF110	TMST❸	BFX1020	BFX1011	BFX1011	BFX3432
BFA11570	BF11500A	BF11500A	BF8000A	❷ RF200	TMST❸	BFX1020	BFX1011	BFX1011	BFX3432
BFA15070	BF15000A	BF15000A	BF8000A	❷ RF200	TMST❸	BFX1020	BFX1011	BFX1011	BFX3432

Certifications and compliance
Certifications obtained: EAC.
Compliant with stardards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1.

Enclosed starters

M3P...70... - M3PA70

M3P...73...

Order	Three-phase motor control. Max IEC operating current (≤440V)	Qty per pkg	Wt
	[A]	n°	[kg]
Star-delta starters in enclosure with Start and Stop/Reset buttons. Starting time up to 12s and a maximum of 30 operations/hour.			
M3P00970❶❷	16	1	3.540
M3P01270❶❷	22	1	3.540
M3P01870❶❷	28	1	3.540
M3P02570❶❷	35	1	3.650
M3P02670❶❷	43	1	3.650
M3P03270❶❷	50	1	3.800
M3P03870❶❷	60	1	3.800
With switch disconnector, rotary door coupling handle GAX61 and Start and Stop/Reset buttons.			
M3P00973❶❷	16	1	3.700
M3P01273❶❷	22	1	3.700
M3P01873❶❷	28	1	3.700
M3P02573❶❷	35	1	3.800
M3P02673❶❷	43	1	3.800
M3P03273❶❷	50	1	4.300
M3P03873❶❷	60	1	4.300
Enclosure for star-delta starter, complete with Start and Stop/Reset buttons, metal plate fixed with piece of 35mm DIN (IEC/EN 60715) rail.			
M3PA70❸	—	1	2.240

❶ Complete order code with the coil voltage digit or the coil voltage digit followed by 60 if 60Hz. Standard voltage are as follows:
– AC 50/60Hz 024 / 048 / 110 / 230 / 400V
– AC 60Hz 024 60 / 048 60 / 120 60 / 220 60 / 230 60 (V).
Example: M3P00970024 for M3P009 star-delta starter with 24VAC 50/60Hz power supply.
M3P0097002460 for M3P009 star-delta starter with 24VAC 60Hz power supply.

❷ The thermal overload relay is not included and must be purchased separately.
Choose the thermal relay adjustment range considering a value equal to 58% of rated motor current (Ie).
Example: Ie=10A; 58% Ie = 5.8A. The suitable relay range is 4-6.5A, set at 5.8A, so the order code to select is RF380650).
Refer to page 3-4 for the order codes available.

❸ Suitable for BFA...70 starters.

❹ TMST with auxiliary supply 24...240VAC; TMSTA440 with auxiliary supply 380...400VAC.

NOTE: for higher powers and voltage ratings or suitable for heavy-duty starting (centrifugal fans, mills, crushers) that is with starting time exceeding 12s, consult Technical support; see contact details inside front cover.

Operational characteristics
IEC standard motor powers

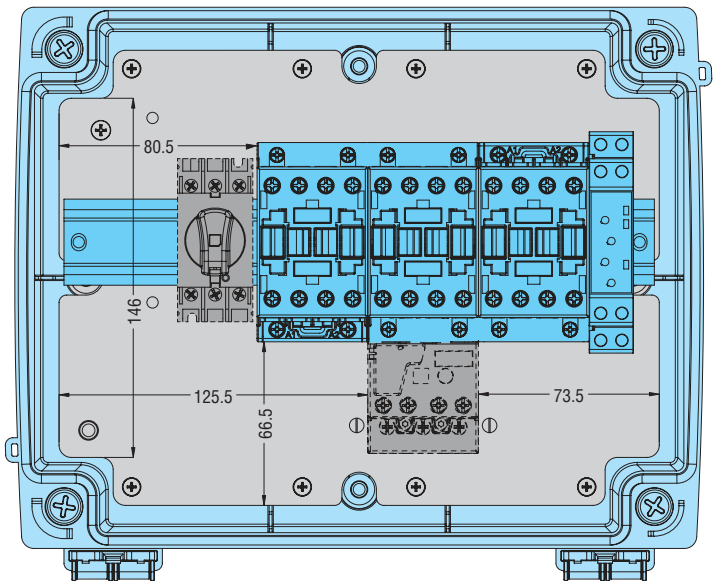
230V [kW]	400V [kW]	440V [kW]	500V [kW]
4	7.5	7.5	7.5
5.5	11	11	11
7.5	15	11	11
11	18.5	18.5	22
11	22	22	25
15	25	25	25
15	30	30	30

– Enclosure is made in ABS plastic material
– Cable entry: smooth surface; can be drilled by customer
– Ambient conditions:
  • Operating temperature: -25...+60°C
  • Storage temperature: -40...+70°C
– Degree of protection: IEC IP65 for M3P...; UL Type 1, 12, 4/4X for M3...UL versions.

Special M3... versions
In addition to standard-indicated versions, cULus certified starters are available up to 52A motor control rating max. This is also valid for the enclosure with general use rating of 65A.
Add suffix **UL** to the order code, e.g. M3PA70**UL**.

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (File E93602), as Magnetic Motor Controllers - Enclosed (starters) and - Enclosures for M3...PUL types.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, UL 60947-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

Maximum available space inside M3P...70/73 with star-delta starters BFA...70...



Components

Type	Enclosure	Contactors			T/o relay ❷	Time relay	Auxiliary contacts fitted on contactor:			Rigid connections	Switch disconnector ❺	Handle ❺	Shaft ❺
		Line	Delta	Star			Line	Delta	Star				
M3P00970/73	M3PA70	BF0910A	BF0901A	BF0910A	RF38	TMST❹	BFX1020	—	BFX1011	BFX3131	GA016A	GAX61	GAX7150
M3P01270/73	M3PA70	BF1210A	BF1201A	BF0910A	RF38	TMST❹	BFX1020	—	BFX1011	BFX3131	GA025A	GAX61	GAX7150
M3P01870/73	M3PA70	BF1810A	BF1801A	BF1210A	RF38	TMST❹	BFX1020	—	BFX1011	BFX3131	GA032A	GAX61	GAX7150
M3P02570/73	M3PA70	BF2510A	BF2501A	BF1810A	RF38	TMST❹	BFX1020	—	BFX1011	BFX3131	GA040A	GAX61	GAX7150
M3P02670/73	M3PA70	BF2600A	BF2600A	BF1810A	RF38	TMST❹	BFX1020	BFX1011	BFX1011	BFX3232	GA063SA	GAX61	GAX7150
M3P03270/73	M3PA70	BF3200A	BF3200A	BF2510A	RF38	TMST❹	BFX1020	BFX1011	BFX1011	BFX3232	GA063SA	GAX61	GAX7150
M3P03870/73	M3PA70	BF3800A	BF3800A	BF2510A	RF38	TMST❹	BFX1020	BFX1011	BFX1011	BFX3232	GA063SA	GAX61	GAX7150

❺ For M3P...73 types

Empty enclosures

M...PA

M...RA

M...N

M2P00911

Order code	Contactor type ❶	Thermal relay ❷	Degree of protect.	Qty per pkg	Wt
				n°	[kg]
Enclosures with Start-Stop/Reset pushbuttons.					
M0PA	BG06, BG09, BG12	RF9	IP65	1	0.490
M1PA	BF09A, BF12A, BF18A	RF38	IP65	1	0.545
M2PA	BF09A, BF12A, BF18A, BF25A, BF26A, BF32A	RF38	IP65	1	0.715
M25PA❸	BF26A, BF32A, BF38A	RF38	IP65	1	0.990
M3PA❹	BF40A, BF50A, BF65A, BF80A, BF94A	RF82	IP65	1	1.900
Enclosures with Reset pushbutton.					
M0RA	BG06, BG09, BG12	RF9	IP65	1	0.445
M1RA	BF09A, BF12A, BF18A	RF38	IP65	1	0.500
M2RA	BF09A, BF12A, BF18A, BF25A, BF26A, BF32A	RF38	IP65	1	0.670
M25RA❸	BF26A, BF32A, BF38A	RF38	IP65	1	0.970
M3RA❹	BF40A, BF50A, BF65A, BF80A, BF94A	RF82	IP65	1	1.850
Enclosures without external pushbuttons.					
M0N	BG06, BG09, BG12	RFA9	IP65	1	0.405
M1N	BF09A, BF12A, BF18A	RF38	IP65	1	0.460
M2N	BF09A, BF12A, BF18A, BF25A, BF26A, BF32A	RF38	IP65	1	0.640
M24N❸❺	BG06...BG12, BF09A...BF25A	❷	IP65	1	0.625
M25N❸	BF09A, BF12A, BF18A, BF26A, BF32A, BF38A	RF38	IP65	1	0.940
M3N	BF40A, BF50A, BF65A, BF80A, BF94A	RF82	IP65	1	1.800
Enclosures with Start, Stop, Emergency stop pushbuttons and handle to operate motor protection circuit breaker.					
M2P00911	BG06, BG09, BG12	SM1R ❻	IP65	1	0.950

new

Accessories and spare parts

MX20P
MX21P

Order code	Description	Qty per pkg	Wt
		n°	[kg]
LPXA130	Threaded plug for unused holes, grey RAL7035	10	0.007
MX10P	Stop/Reset button extension rod for M0 enclosure	5	0.010
MX11P	Stop/Reset button extension rod for M1 enclosure	5	0.010
MX12P	Stop/Reset button extension rod for M2, M25 enclosures	5	0.010
MX21P	Mounting base for LPXC... contact on M0 enclosure	5	0.014
MX21P	Mounting base for LPXC... contact on M1, M2, M25 enclosures	5	0.014
MX30	Metal mounting plate for M3N	1	0.500
MX31	Metal mounting plate for M24N and M25 enclosures	1	0.400
MX02	Earth / Neutral terminal for M0, M1, M2	1	0.035

❶ To be purchased separately; refer to page 2-6 for contactor choice.
❷ To be purchased separately.
Refer to pages 3-2 to 3-9 for thermal overload relay choice.
For use of the overload relay in the M24N, consult Technical support; see contact details on inside front cover.
❸ MX31 metal mounting plate included.
❹ MX30 metal mounting plate included.
❺ To install eventual pushbuttons, selectors and/or other control accessories, use the PLatinum series and mount the relay contact elements on the cover using the LPXAU120 mounting adapter. See section 8.
❻ SM1R motor protection circuit breaker gives the following functions: overload protection, short circuit protection and disconnection.

General characteristics
The M0..., M1..., M2..., M25... and M3...UL enclosures are made in UV protected polycarbonate.
M3 enclosure is made in ABS plastic material.

Operational characteristics

Enclosure type	Maximum operating current (≤440V) [A]
M0...	12
M1...	18
M2...	32
M2P00911	13
M24N	38
M25...	38
M3...	80

General characteristics
Enclosures are supplied with the following accessories:

Accessory		Type of enclosure							
Description	Type	M0PA	M1PA	M2PA	M25PA	M0RA	M1RA	M2RA	M25RA
Contact holder	MX20P	1							
	MX21P		1	1	1				
Buttons: - Stop/Reset - Start	LPCB1176					1	1	1	1
	LPCB2104	1	1	1	1				
	LPCB1113	1	1	1	1				
Contact for Start button	LPXC10	1	1	1	1				
Stop/Reset button extension	MX10P	1				1			
	MX11P		1				1		
	MX12P			1	1			1	1
Unused hole threaded plug	LPXA130					1	1	1	1

– M2P00911 enclosure: Start, Stop, Emergency stop pushbuttons with contacts. Handle to operate motor protection circuit breaker
– M3PA enclosure: n° 2 Start and Stop/Reset pushbuttons and n° 1 MX30 mounting plate
– M3RA enclosure: n° 1 Reset pushbutton and n° 1 MX30 mounting plate
– M3N enclosure: supplied without accessories to be purchased separately including MX30 mounting plate.

Enclosures can house the following devices:
M0 = BG... with/without RF9
M1 = BF09A-BF12A-BF18A with/without RF38
M2 = BF25A-BF26A-BF32A, assemblies BFA...42 with/without RF38
M2P00911 = SM1R... with BG...
M24N = BG..., BF09A...BF25A, assemblies BGR/BGT/BGC and BFA...42 without overload
M25 = BF26...BF38A, assemblies BGR/BGT/BGC and BFA...42 with/without overload
M3 = BF40...BF94 and all assemblies with/without overload.

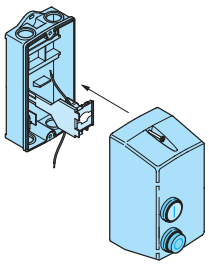
Operational characteristics:
– Cable entry:
  • M0/M1//M2... - 2 knockouts PG13.5/M20 on enclosure top and bottom
  • M24N/M25... - 2 knockouts PG16/M25-PG29/M32 on enclosure top and bottom
  • M3... - Smooth surfaces; can be drilled by customer
– Ambient conditions:
  • Operating/storage temperature: -25...+60°C/-40...+70°C
– Degree of protection: IEC IP65 for all; UL Type 1, 12, 4/4X for M0/M1/M2/M24N/M25... types and M3...UL versions.

Special M3... versions
In addition to standard-indicated versions, cULus certified starters and enclosures are available up to 52A - motor control and 65A general use rating max (MX30 plate, earth/ground and neutral terminal plates are always included in this case). Add suffix **UL** to the order code of enclosures e.g. M3N**UL**.

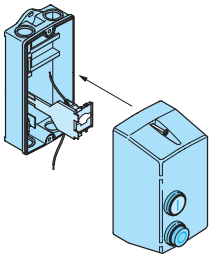
Certifications and compliance
Certifications obtained: EAC for all; for M3NUL type, UL Listed for USA and Canada (cULus – File E300050) as Industrial control panels; for M0/M1/M2PA/RA/N and other M3...UL types, UL Listed for USA and Canada (cULus – File E93602) under magnetic motor controllers as Polymeric enclosures - and CSA certified for Canada and USA (cCSAus – File 94157) as Non-metallic enclosures. Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, UL 60947-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

M...PA EMPTY ENCLOSURES

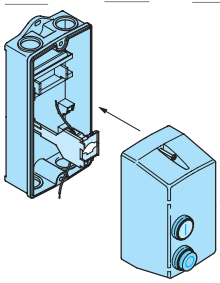
M0PA



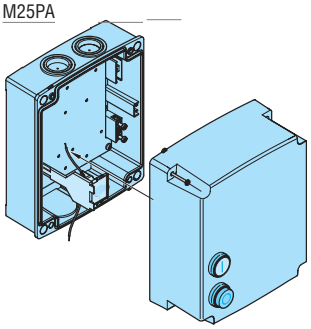
M1PA



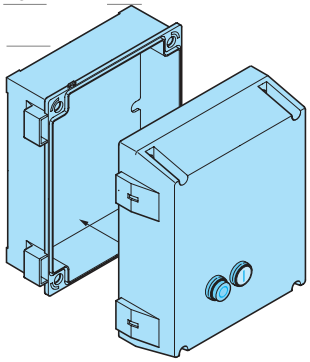
M2PA



M25PA

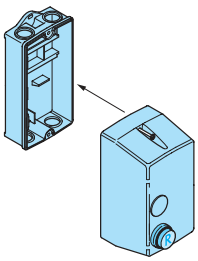


M3PA

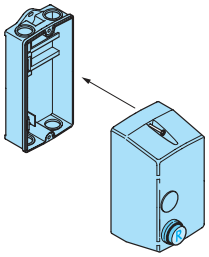


M...RA EMPTY ENCLOSURES

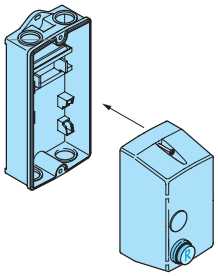
M0RA



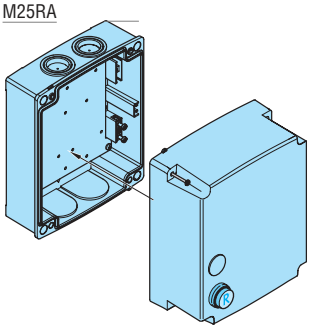
M1RA



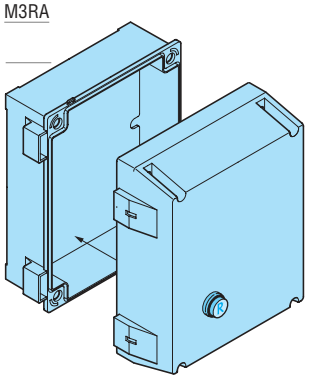
M2RA



M25RA

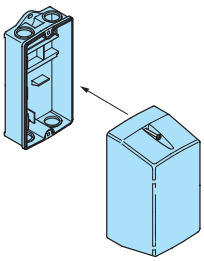


M3RA

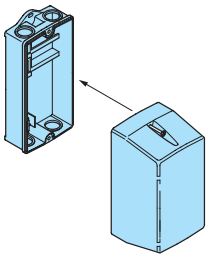


M...N EMPTY ENCLOSURES

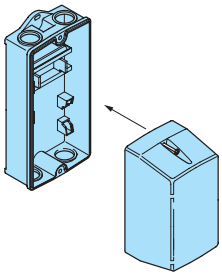
M0N



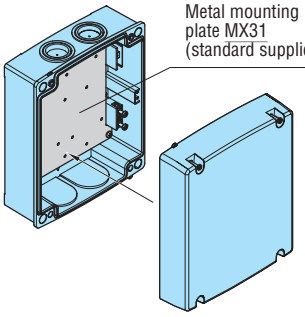
M1N



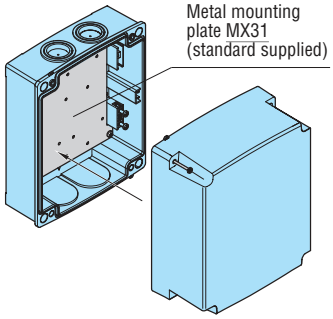
M2N



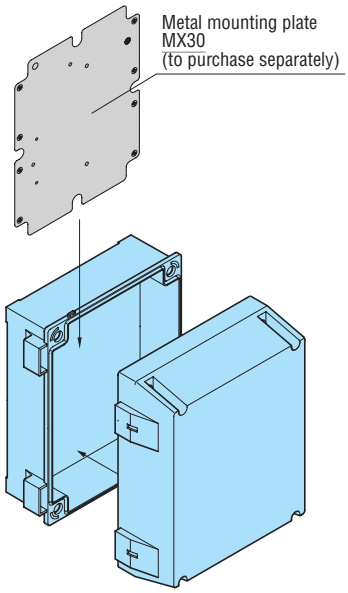
M24N



M25N

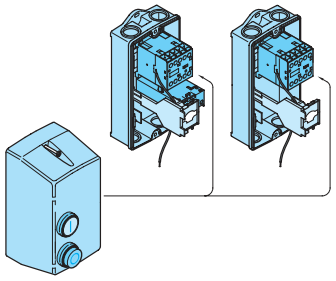


M3N

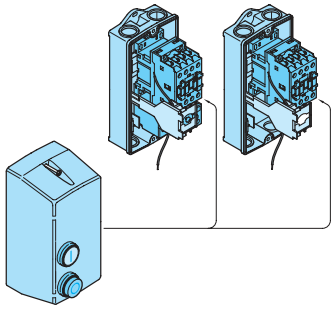


M...P... STARTERS, ENCLOSED

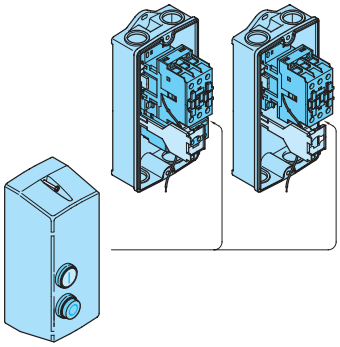
M0P00912... M0P01212... M0P00910... M0P01210...



M1P00912... M1P01812... M1P00910... M1P01810...

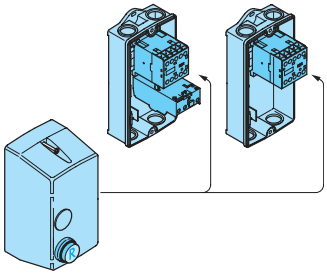


M2P02512... M2P03212... M2P02510... M2P03210...

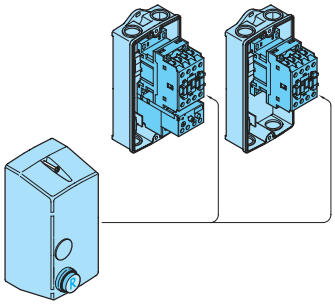


M...R... STARTERS, ENCLOSED

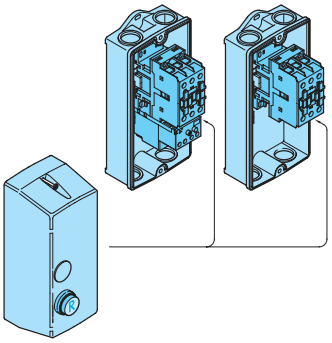
M0R00912... M0R01212... M0R00910... M0R01210...



M1R00912... M1R01812... M1R00910... M1R01810...

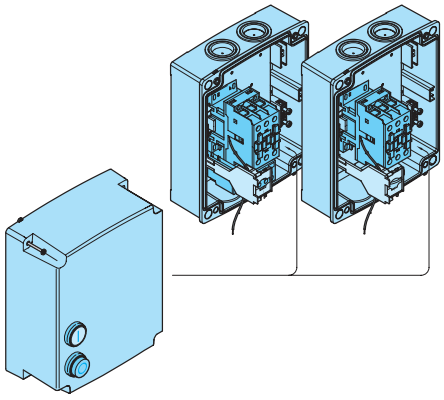


M2R02512... M2R03212... M2R02510... M2R03210...

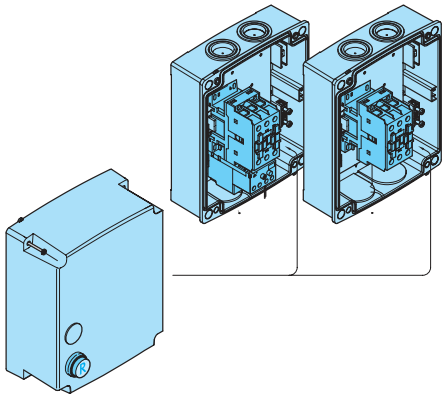


M25... STARTERS, ENCLOSED

M25P03812... M25P03810...

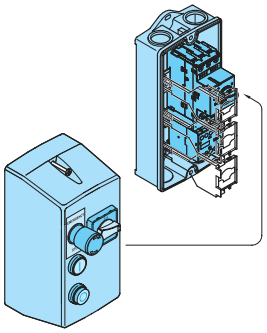


M25R03812... M25R03810...



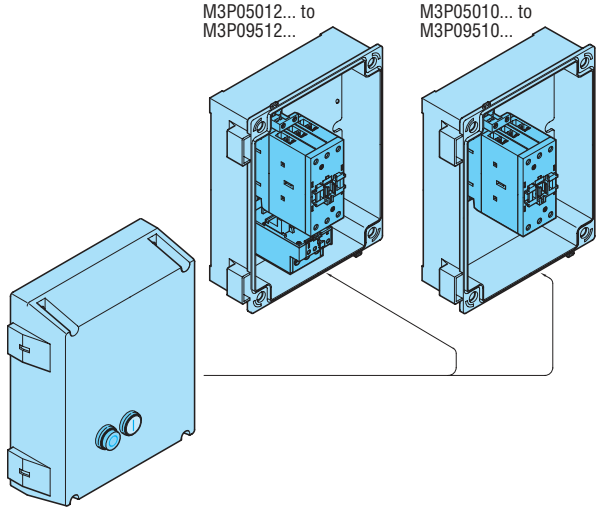
M2... STARTERS, ENCLOSED

M2P00911

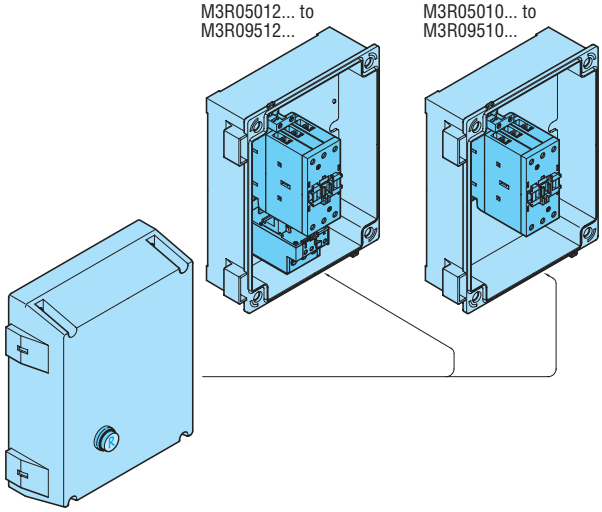


M3... STARTERS, ENCLOSED

M3P05012... to M3P09512... M3P05010... to M3P09510...



M3R05012... to M3R09512... M3R05010... to M3R09510...



Maximum combinations for M0... and M1... starters in enclosure

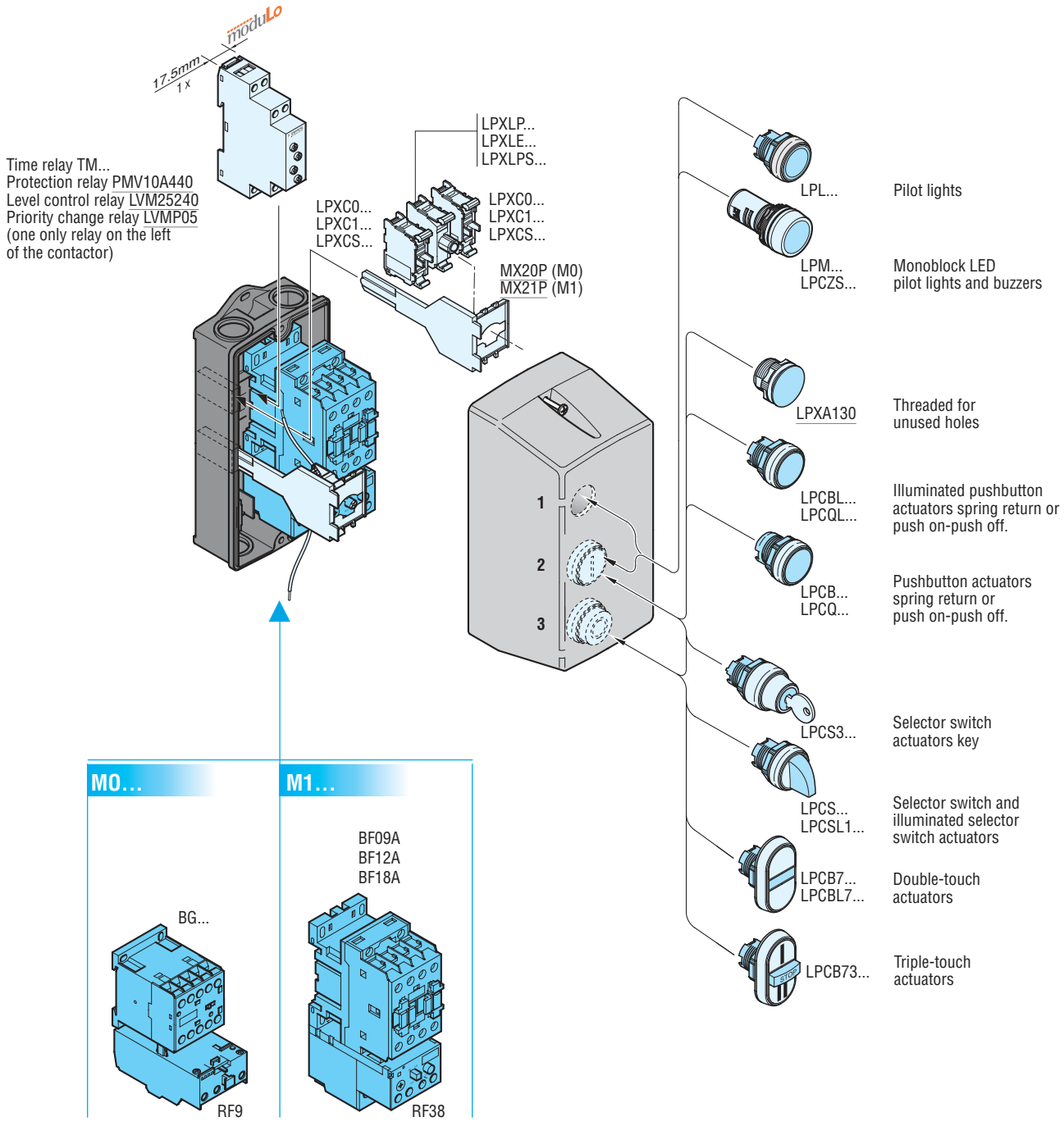
For the fitting of add-on blocks and electronic relays in the starters, consult our Technical support; see contact details on inside front cover.

The enclosure cover can be equipped with various types of actuators and pilot lights, per following details:

1) Upper position 1
   The cover must be drilled in this position, with a 22.5mm hole, by the user and LPL..., LPM... and LPCZS... pilot light can be fitted.
   To fit the LPL... pilot light head, the mounting base, type MX20P for M0 enclosure or type MX21P for M1 enclosure, must also be purchased. The LED element is snapped onto this mounting base.
   No adapter or base is needed for LPL..., LPM... and LPCZS...

2) Middle position 2
   Based on the enclosure type, in this position, the user finds either the Start button or threaded plug.
   Various PLatinum (plastic series) actuators can be fitted in this position, such as flush or extended buttons, selectors or pilot lights, as illustrated below.
   To fit the actuators, the mounting base, type MX20 for M0 enclosure, or type MX21P for M1 enclosure, must also be purchased. The contact or LED elements are snapped onto this mounting base.
   No adapter or base is needed for LPL..., LPM... and LPCZS...

3) Lower position 3
   The STOP/RESET button is mounted in this position, except for the enclosure without buttons.
   This button activates the thermal overload relay via a mechanical actuator.
   In eventual applications without thermal overload relay, this button can be removed and the hole closed up by the threaded plug LPXA130.



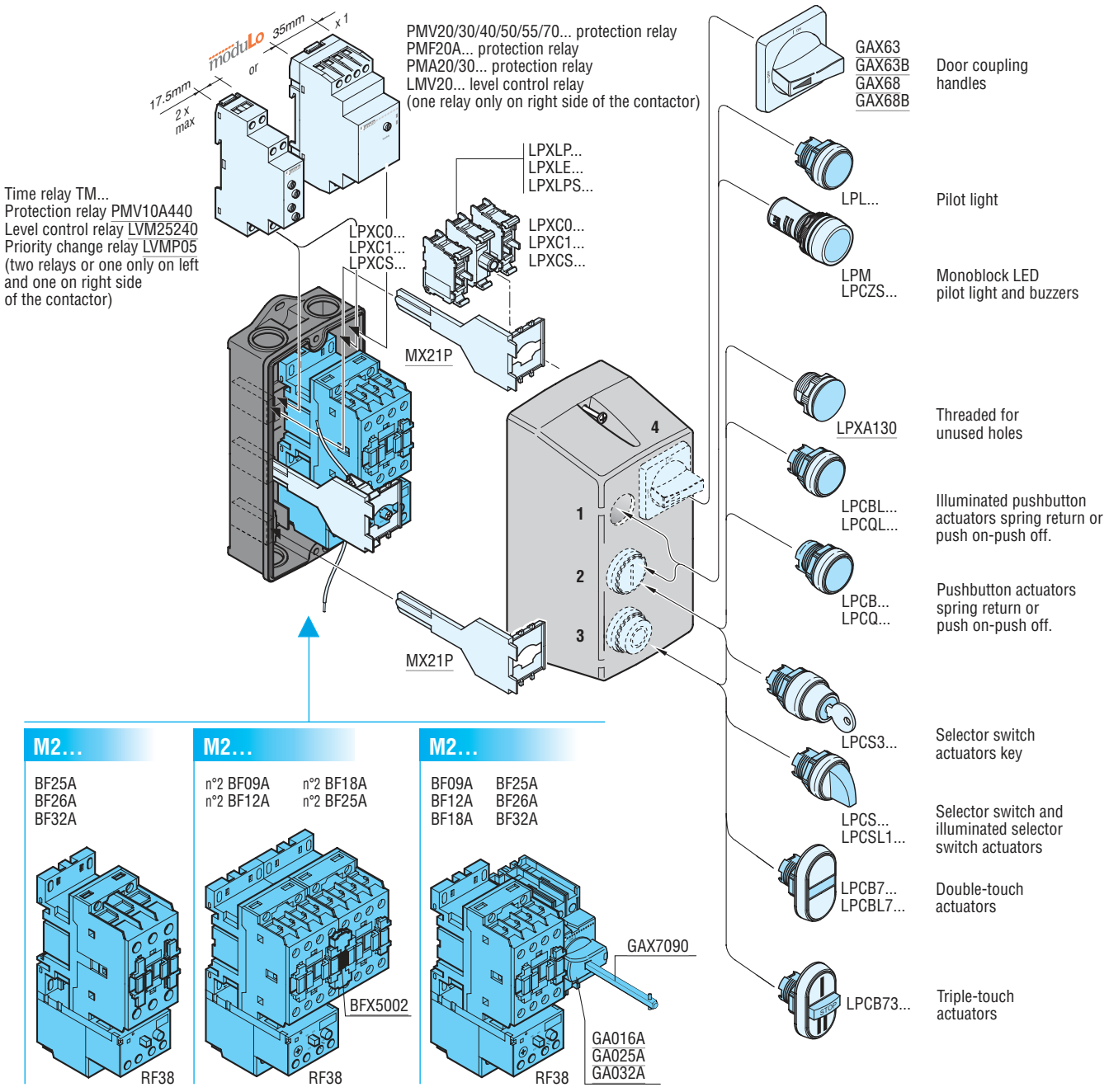
Maximum combinations for M2… starters in enclosure
For the fitting of add-on blocks and electronic relays in the starters, consult our Technical support; see contact details on inside front cover.
The enclosure covers can be equipped with various types of actuators and pilot lights, per following details:

1) Upper position 1
The cover must be drilled in this position with a 22.5mm hole by the user; LPL..., LPM... or LPCZS... pilot light can be fitted.
To fit the LPL... pilot light, the mounting base type MX21P must also be purchased. The LED element is snapped onto this mounting base.
No adapter or base is needed for LPL..., LPM... and LPCZS...

2) Middle position 2
Based on the enclosure type, in this position, the user finds either the Start button or threaded plug.
Various PLatinum (plastic series) actuators can be fitted in this position, such as flush or extended buttons, selectors or pilot lights, as illustrated in the side figure.
To fit the actuators, the mounting base type MX 21P must also be purchased.
The contact or LED elements are snapped onto this mounting base.
No adapter or base is needed for LPL..., LPM... and LPCZS...

3) Lower position 3
The STOP/RESET button is mounted in this position, except for the enclosure without buttons.
This button activates the thermal overload relay via a mechanical actuator. In eventual applications without thermal overload relay, this button can be removed and the hole closed up by the threaded plug LPXA130.
Various PLatinum (plastic series) actuators can be fitted in this position, such as flush or extended buttons, selectors or pilot lights, as illustrated in the drawing below. To fit the actuators, the mounting base type MX21P must also be purchased. The contact or LED elements are snapped onto this mounting base.
No adapter or base is needed for LPL..., LPM... and LPCZS...

4) Upper position 4
The cover must be drilled in this position with a 22.5mm hole by the user whenever an external handle is needed for a switch disconnector fitted in the enclosure.



Maximum combinations for starters in M24N enclosure

In addition to a direct-on-line, full voltage across the line, starter or reversing contactor assembly, various other electromechanical devices can be fitted. The cover of the M24N enclosure can be used across the entire surface to mount pushbuttons, measuring instruments, switch disconnectors GA016A...GA040A and GA063SA type. No contact blocks or other additional accessories can be mounted on the contactor face of AC BF series; they can only be fitted on the contactor side since the cover is shallow.

Eventually pushbuttons, selector switches and/or other control accessories of the (plastic series) can be used and contact or LED elements can be mounted directly inside on the cover with the LPXAU120 mounting adapter; refer to section 8.

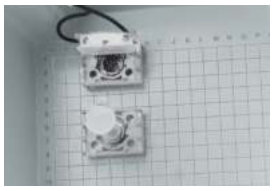
MX31 internal metal mounting plate is standard-supplied.

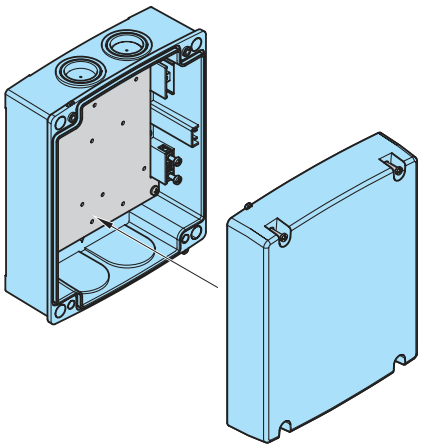
The wall fixing holes and the cover closing captive **screws** are positioned **outwards** with respect to the sealing gasket. This guarantees the protection degree of the enclosure against infiltrations liquid (IEC IPX5 / UL Type 4X).

The base has **ribbing** which facilitates the fixing of DIN rails, metal mounting plates and electronic printed boards.

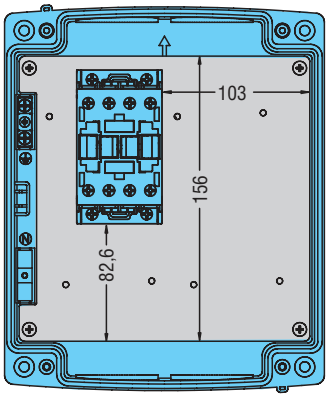
Grid references, marked by letters and numbers, are engraved on the interior surface of the cover. This grid allows to quickly identify the exact drilling points where pushbuttons, handles or pilot lights will be mounted.

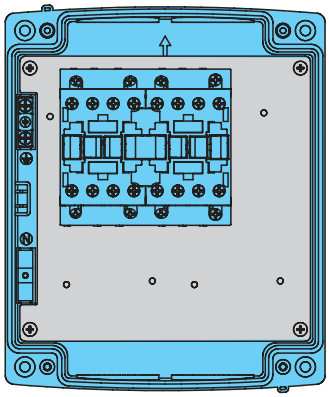
A **safety sealing** system keeps the cover and base together to avoid inopportune opening and tampering.

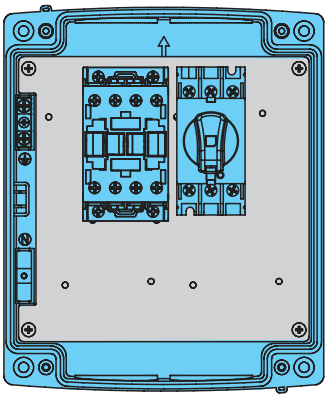




Available space for fitting other electrical or electronic devices

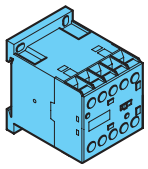






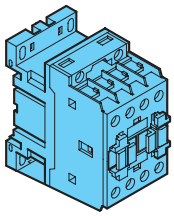
M24N

BG06
BG09
BG12
without overload



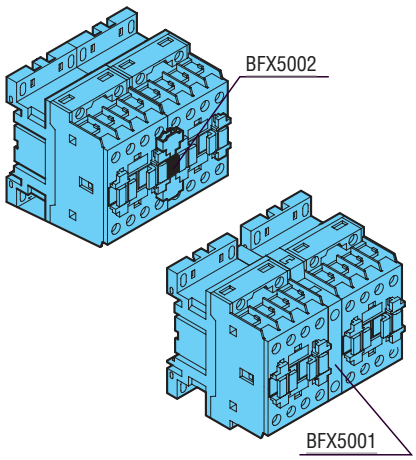
M24N

BF09A...BF25A
without overload



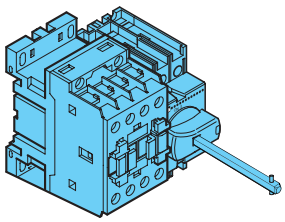
M24N

BGR... - BGT... - BGC... without overload
n° 2 BF09A n° 2 BF12A
n° 2 BF18A n° 2 BF25A
All without overload
BFA...42 without overload



M24N

BF09A BF12A
BF18A BF25A
with GA016A...GA040A and GA063SA



Maximum combinations for starters in M25… enclosure

In addition to a direct-on-line, full voltage across the line, starter or reversing contactor assembly, various other electromechanical devices can be fitted. The cover of the M25 enclosure can be used across the entire surface to mount pushbuttons, measuring instruments, switch disconnectors GA016A...GA040A and GA063SA type. Possible contact blocks or other additional accessories can be mounted on the contactor face of AC or DC BF series or on the contactor side since the cover is deep. Eventually pushbuttons, selector switches and/or other control accessories of the (plastic series) can be used and contact or LED elements can be mounted directly inside on the cover with the LPXAU120 mounting adapter; refer to section 8.

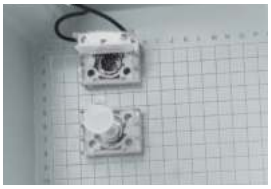
MX31 internal metal mounting plate is standard-supplied.

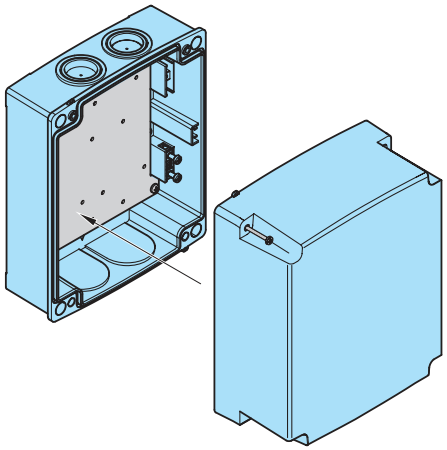
The wall fixing holes and the cover closing captive **screws** are positioned **outwards** with respect to the sealing gasket. This guarantees the protection degree of the enclosure against liquid infiltrations (IEC IPX5 / UL Type 4X).

The base has **ribbing** which facilitates the fixing of DIN rails, metal mounting plates and electronic printed boards.

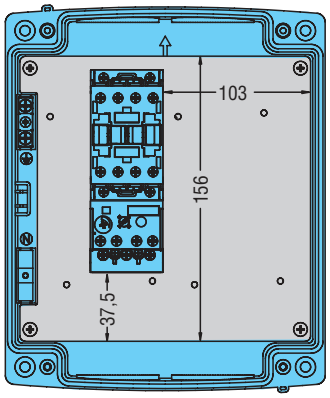
Grid references, marked by letters and numbers, are engraved on the interior surface of the cover. This grid allows to quickly identify the exact drilling points where pushbuttons, handles or pilot lights will be mounted.

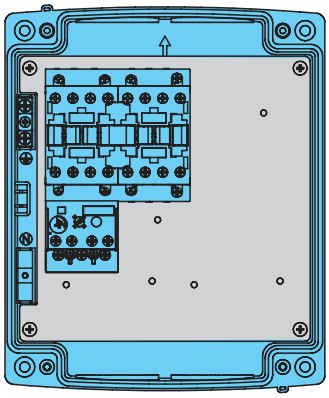
A **safety sealing** system keeps the cover and base together to avoid inopportune opening and tampering.

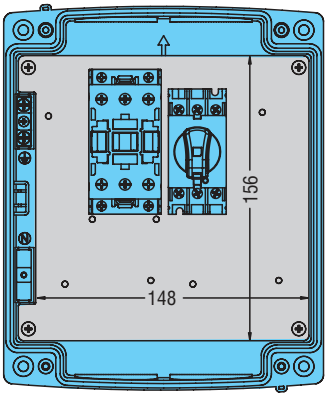




Available space for fitting other electrical or electronic devices

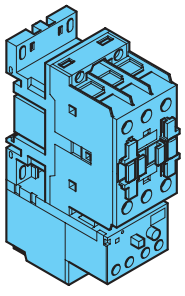






M25…038…

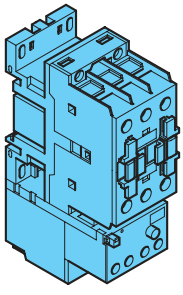
BF38
with or without overload



RF38...

M25…

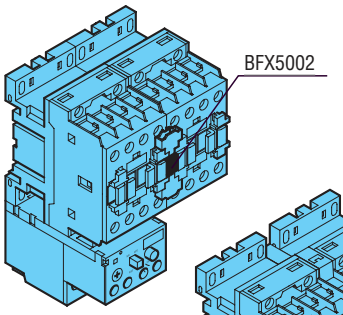
BF26 - BF32
with or without overload



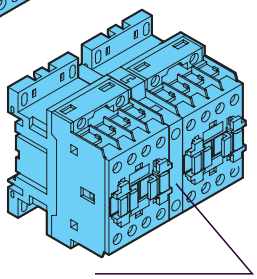
RF38...

M25…

BGR... - BGT... - BGC with or without overload RF9
n° 2 BF26 - n° 2 BF32 - n° 2 BF38 with or without overload RF38
BFA...42 with or without overload RF38



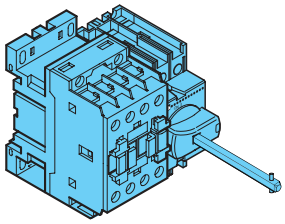
RF38...



BF09A...BF38A with BFX5001

M25…

BF09 BF12 BF18
BF26 BF32 BF38
with GA016A...GA040A and GA063SA



Maximum combinations for starters in M3… enclosure
In addition to a direct-on-line, full voltage across the line, starter or reversing contactor assembly, star-delta starters can be installed as illustrated at the lower right as well as various other electromechanical devices. The cover of the M3 enclosure can be used across the entire surface to mount pushbuttons, measuring instruments or switch disconnectors GA016A...GA125A, etc.
MX30 internal metal mounting plate is standard supplied with M3P… and M3R… types; not included with the M3N, it can be purchased separately.

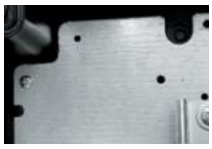
With the specifically designed **hinges**, the cover remains attached to the base, fully open, while the wiring work is being carried out.
By applying **slight pressure** on the hinges, the cover can be released from the base.

The cover closing captive **screws** and the wall fixing holes are positioned **outwards** with respect to the sealing gasket. This guarantees the protection degree of the enclosure against liquids infiltrations (IEC IPX5 / UL Type 4X).

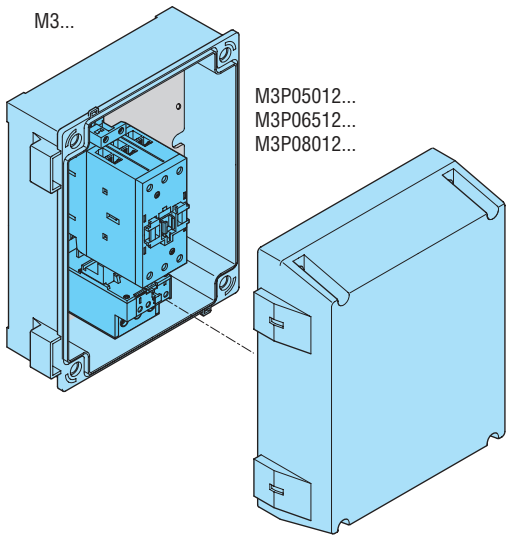
A **safety sealing** system keeps the cover and base together to avoid inopportune opening and tampering.

Grid references, marked by letters and numbers, are engraved on the interior surface of the cover. This grid allows to quickly identify the exact drilling points where pushbuttons, handle or pilot lights will be mounted.

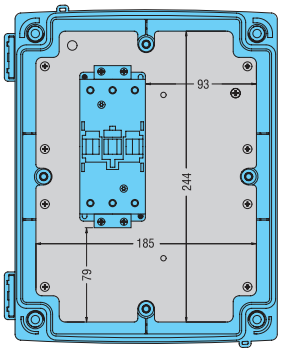
A properly predrilled metal mounting plate (MX30 standard supplied except for M3N) permits to quickly and precisely fix equipment in place.



The base has **ribbing** which facilitates the fixing of DIN rails, metal mounting plates and electronic printed boards.

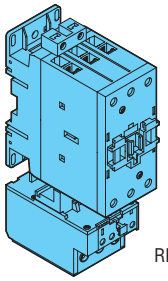


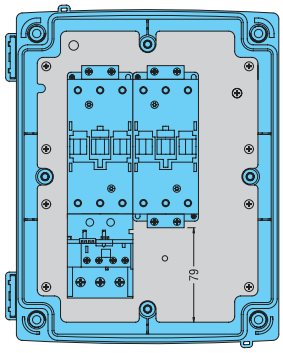
Available space for fitting other electrical or electronic devices



M3…

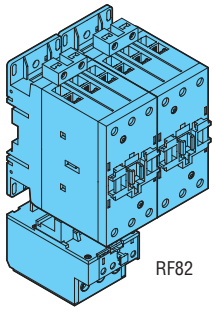
n° 1 BF40 n° 1 BF80
n° 1 BF50 n° 1 BF94
n° 1 BF65

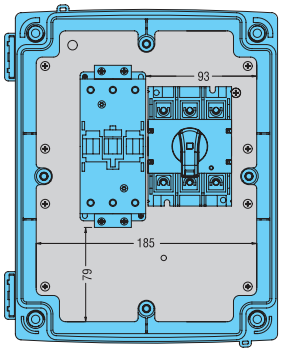




M3…

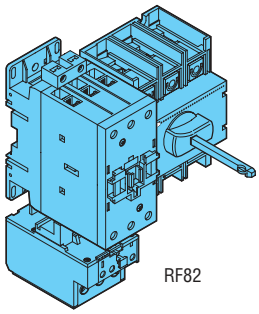
n° 2 BF40 n° 2 BF65 n° 2 BF94
n° 2 BF50 n° 2 BF80

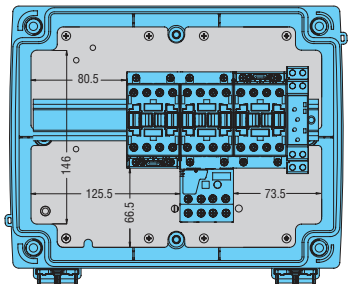




M3…

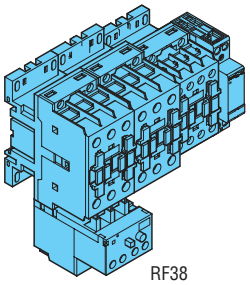
n° 1 BF40 n° 1 BF65 n° 1 BF94 + n° 1 GA...
n° 1 BF50 n° 1 BF80





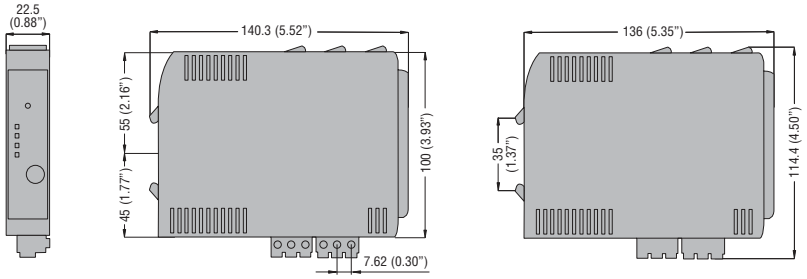
M3P…70

Star-delta configuration with RF38 relay, TM ST time relays and contactors:
BF09A BF12A BF18A
BF25A BF26A BF38A



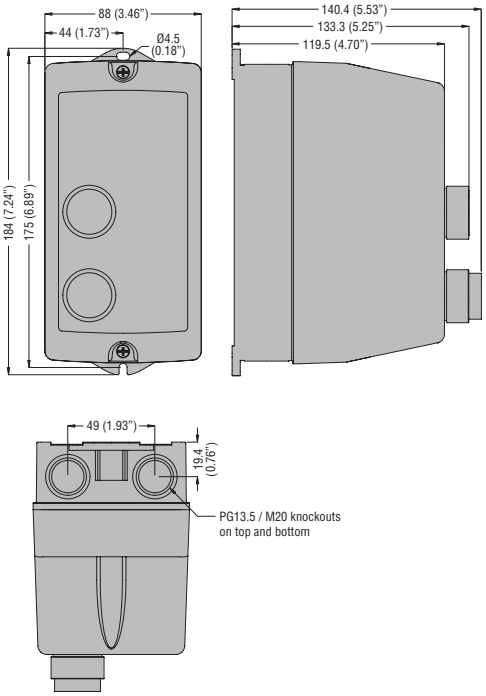
ELECTRONIC MOTOR STARTERS

ME...

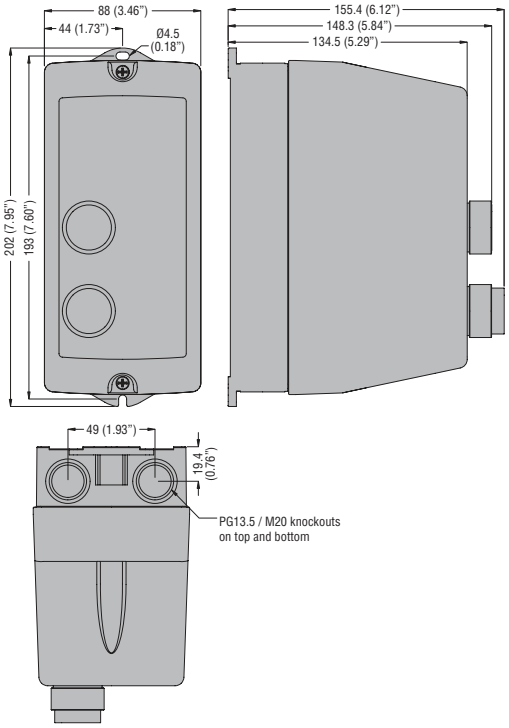


DIRECT-ON-LINE STARTERS - EMPTY ENCLOSURES

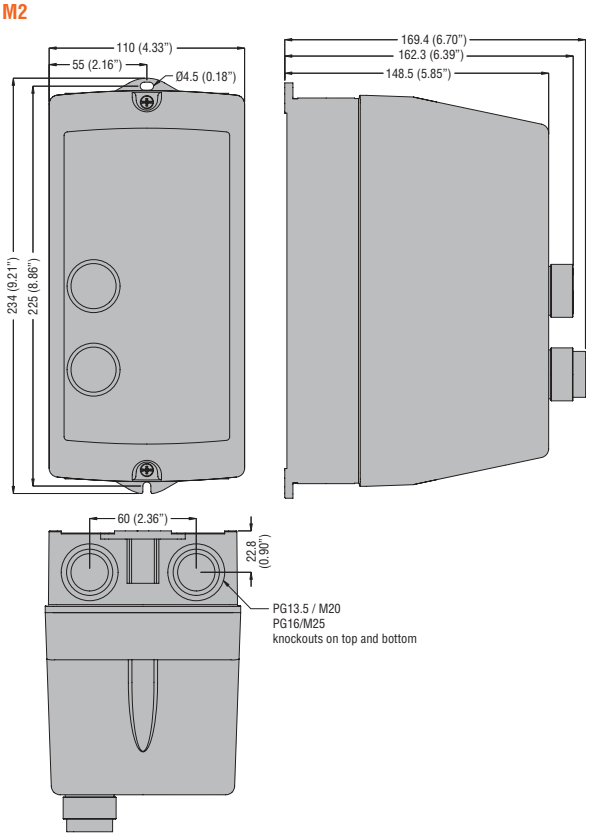
M0

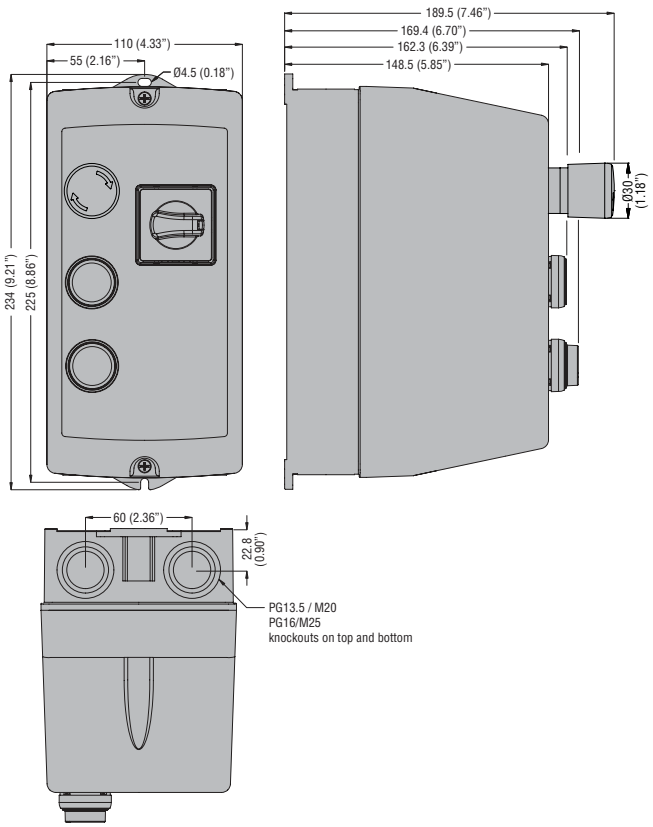


M1



M2

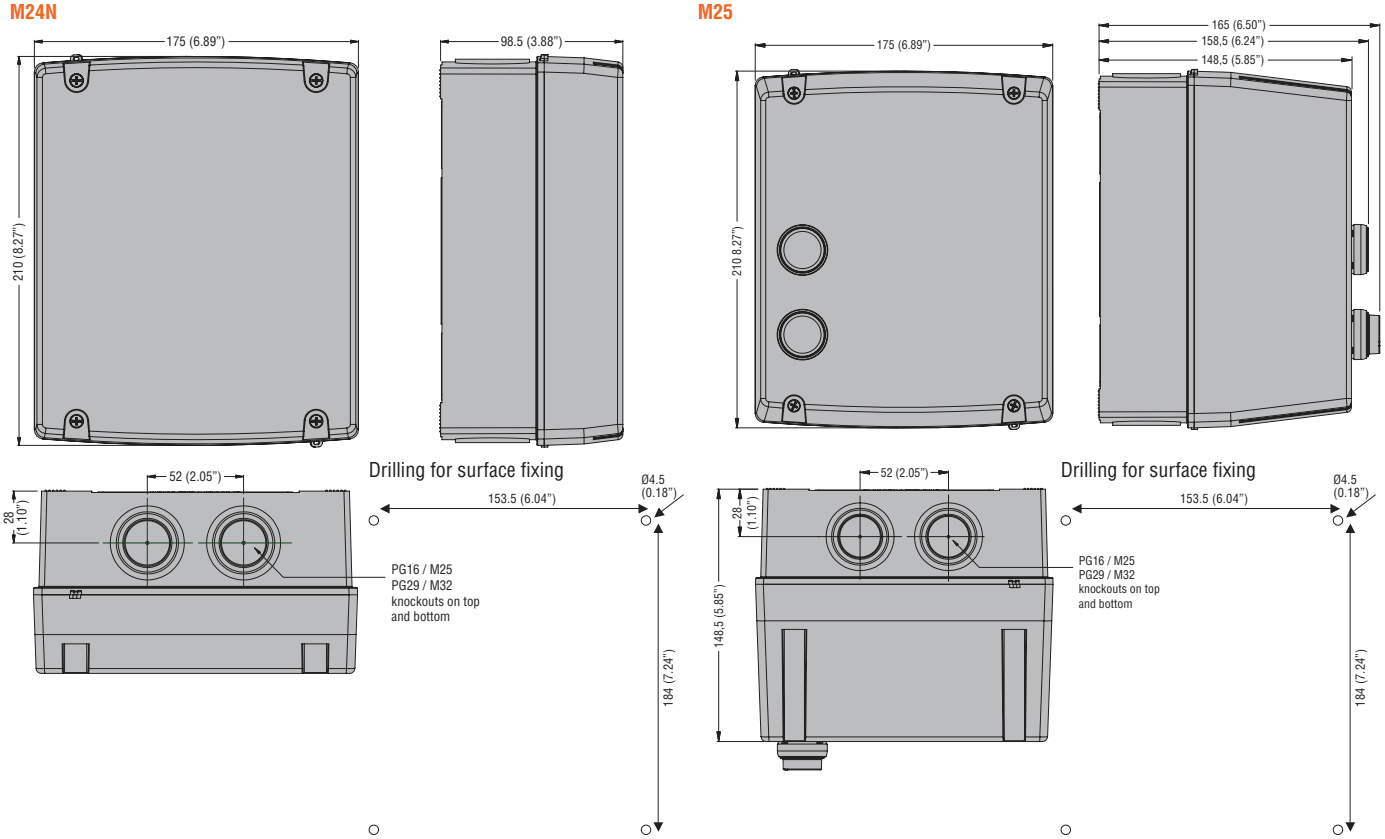




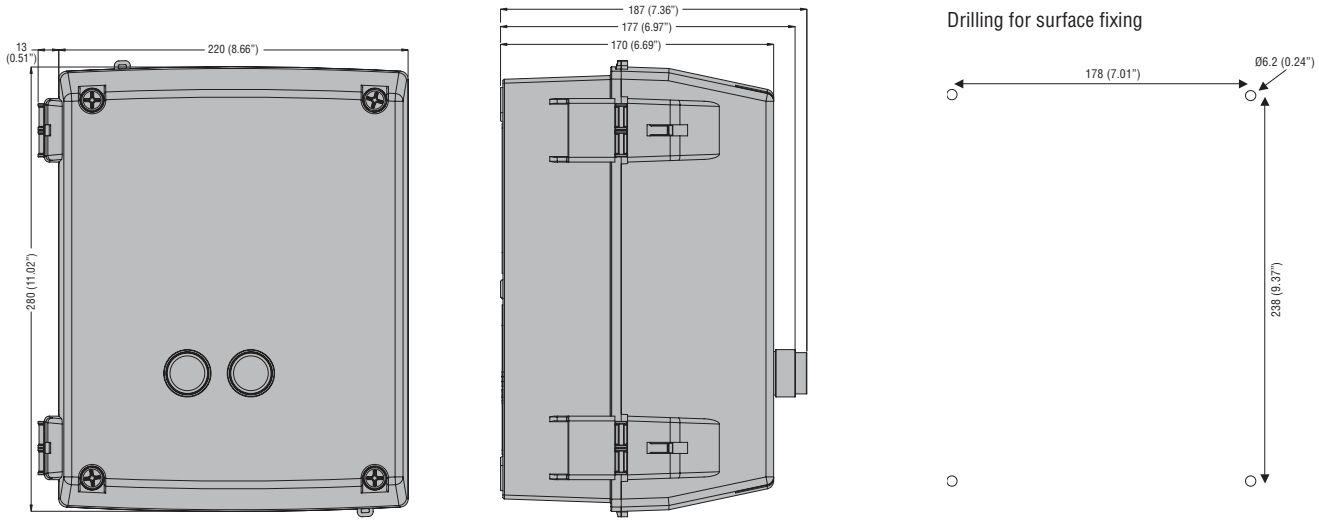
M24N

175 (6.89")
98.5 (3.88")
210 (8.27")
52 (2.05")
28 (1.10")
PG16 / M25
PG29 / M32
knockouts on top
and bottom
Drilling for surface fixing
153.5 (6.04")
Ø4.5 (0.18")
184 (7.24")

M25

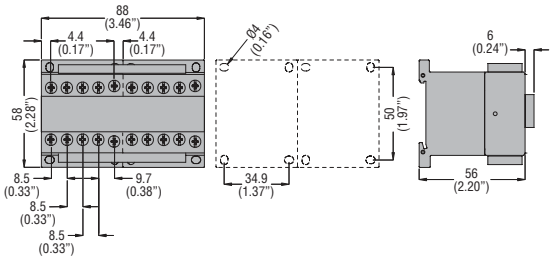

175 (6.89")
165 (6.50")
158,5 (6.24")
148,5 (5.85")
210 8.27")
52 (2.05")
28 (1.10")
148.5 (5.85")
PG16 / M25
PG29 / M32
knockouts on top
and bottom
Drilling for surface fixing
153.5 (6.04")
Ø4.5 (0.18")
184 (7.24")

M3

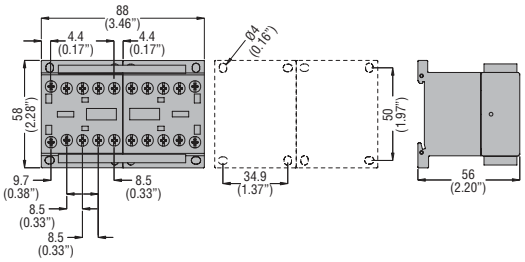

13 (0.51")
220 (8.66")
280 (11.02")
187 (7.36")
177 (6.97")
170 (6.69")
Drilling for surface fixing
178 (7.01")
Ø6.2 (0.24")
238 (9.37")

REVERSING CONTACTOR 3 POLES ASSEMBLIES

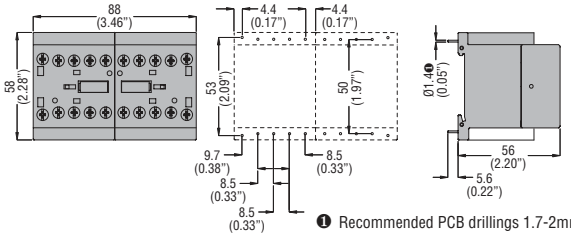
BGR...



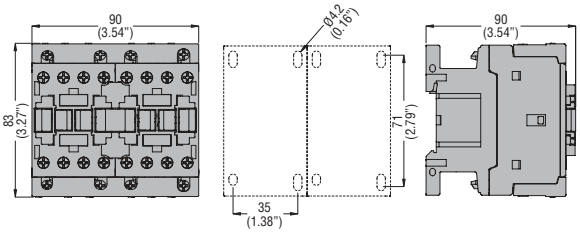
BGT...



BGTP...



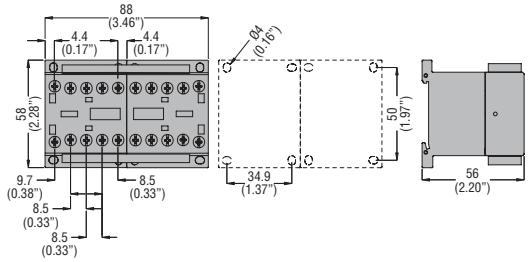
BFA...42



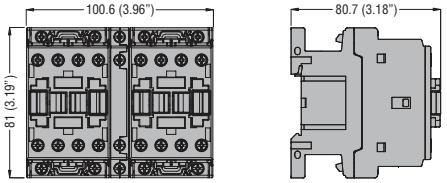
❶ Recommended PCB drillings 1.7-2mm (0.07-0.08").

CHANGEOVER CONTACTOR 4 POLES ASSEMBLIES

BGC09T4...



BFC18T4A230



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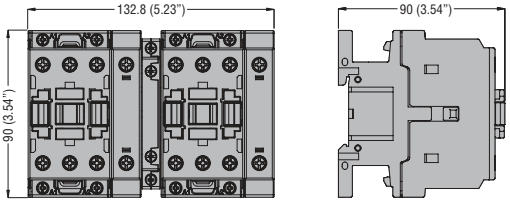

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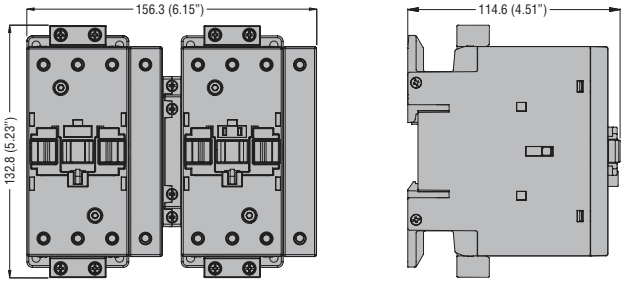
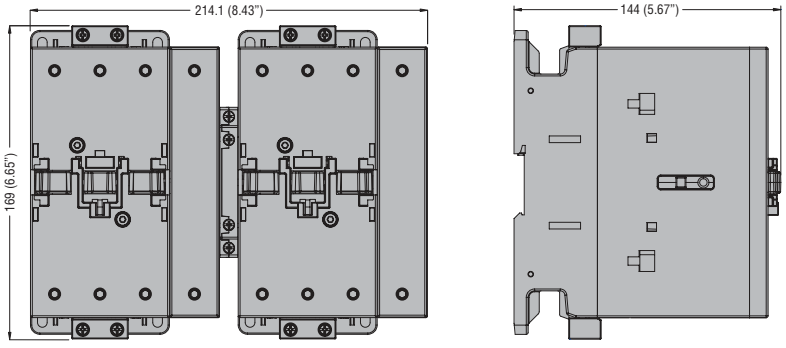
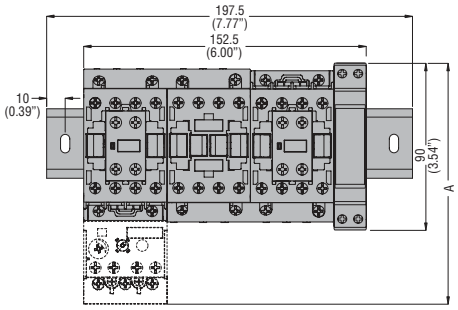


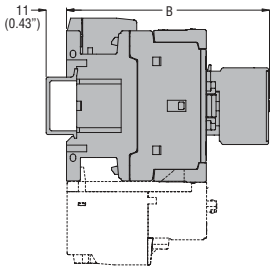
BFC95T4A230 - BFC150T4A230



STAR-DELTA STARTERS OPEN FRAME

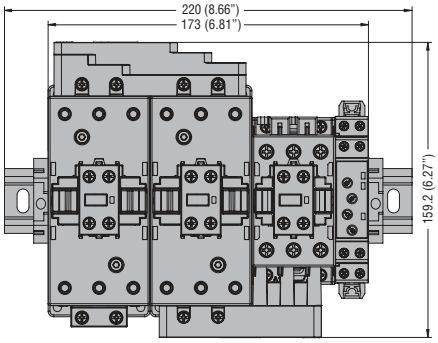
BFA00970...BFA03870

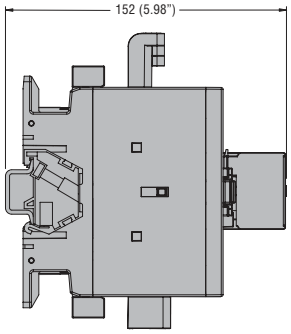




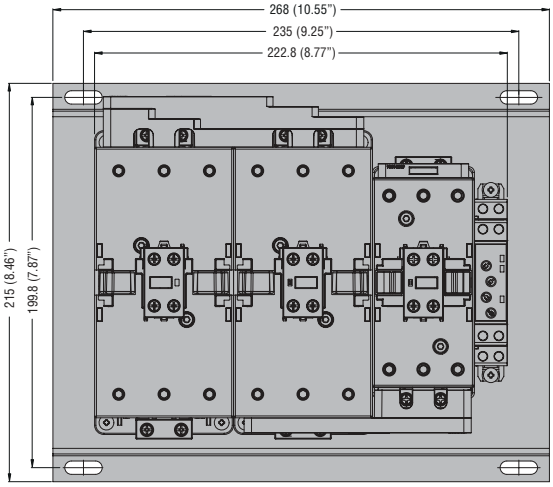
STARTER TYPE	A	B
BFA00970	130.5 (5.14")	109.5 (4.31")
BFA01270	130.5 (5.14")	109.5 (4.31")
BFA01870	130.5 (5.14")	109.5 (4.31")
BFA02570	130.5 (5.14")	109.5 (4.31")
BFA02670	135 (5.14")	119 (4.68")
BFA03270	135 (5.14")	119 (4.68")
BFA03870	135 (5.14")	119 (4.68")

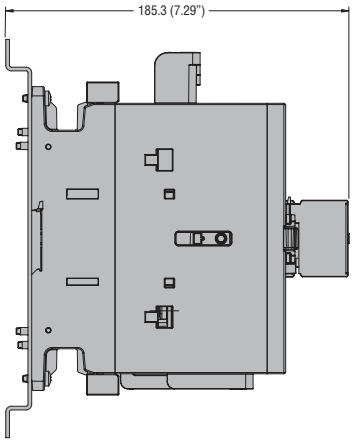
BFA05070...BFA08070





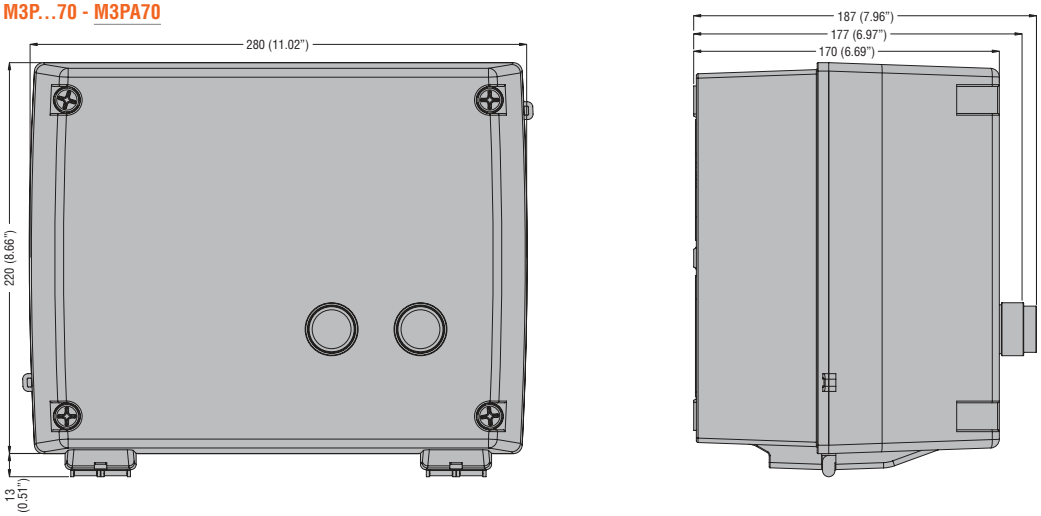
BFA09570...BFA15070



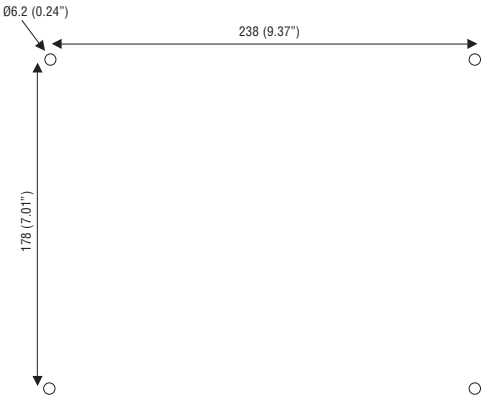


STAR-DELTA STARTERS IN ENCLOSURE - EMPTY ENCLOSURE FOR STAR-DELTA STARTERS

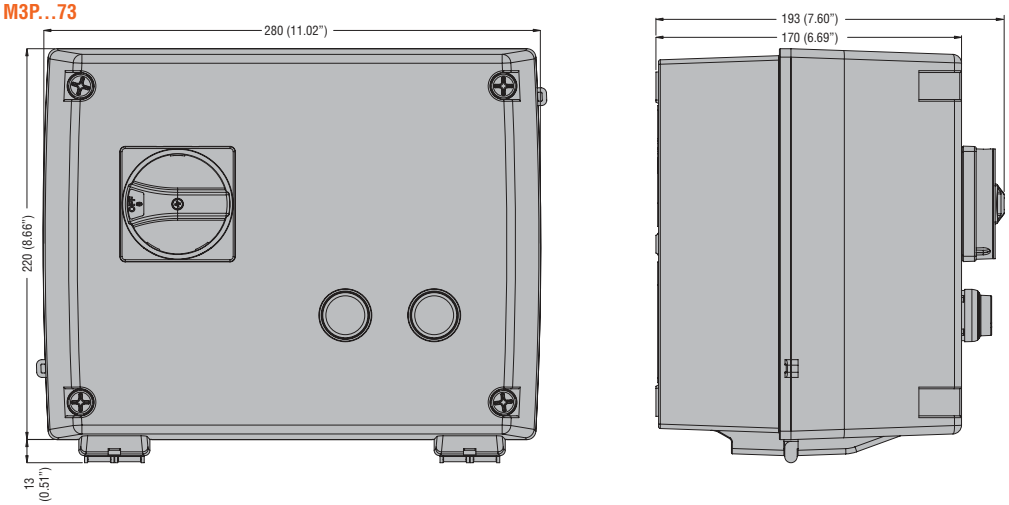
M3P...70 - M3PA70



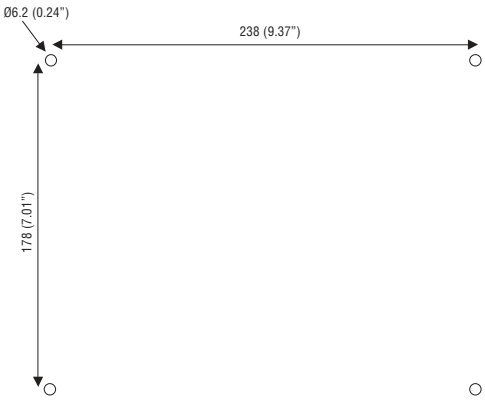
Drilling for surface fixing



M3P...73



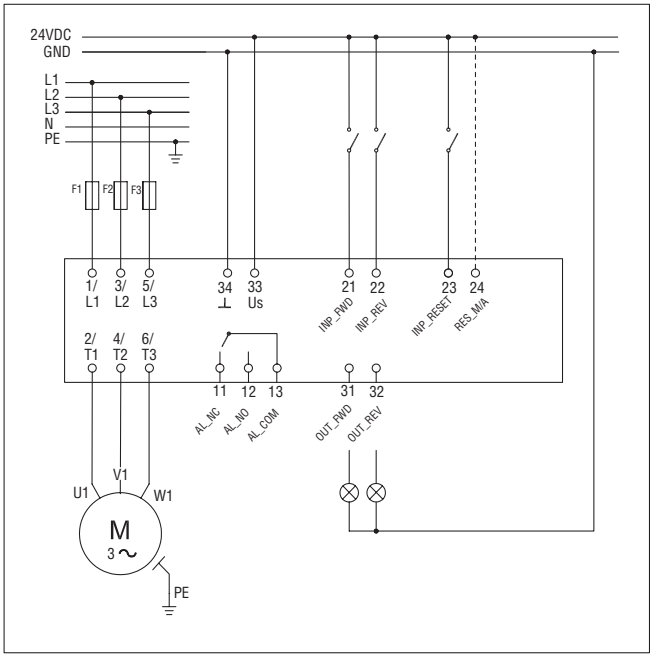
Drilling for surface fixing



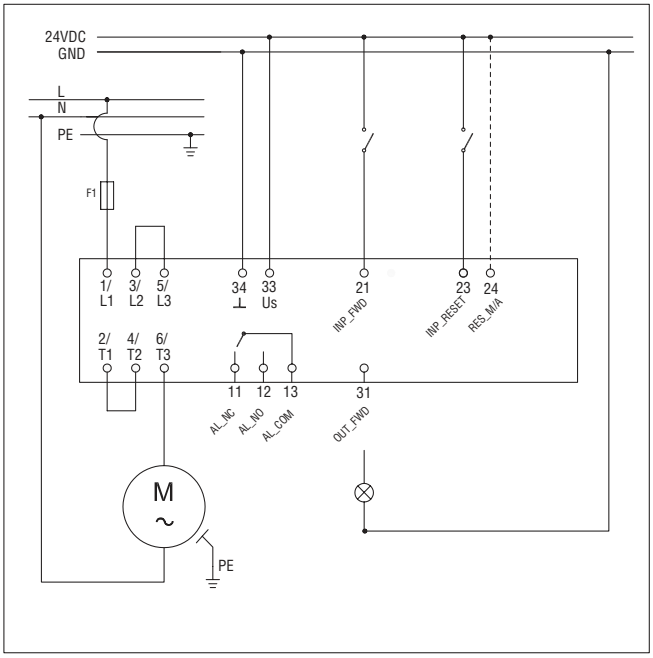
ELECTRONIC MOTOR STARTERS

ME...

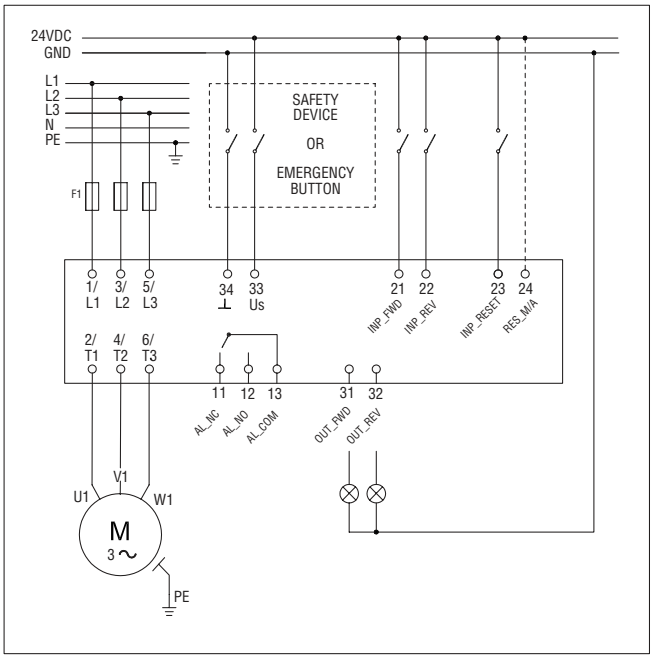
Wiring diagram for three-phase motors



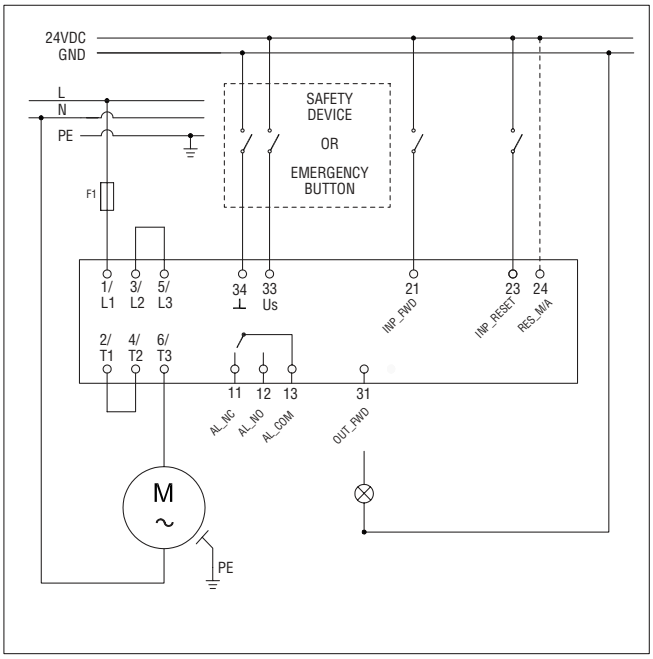
Wiring diagram for single-phase motors



Wiring diagram for three-phase motors for safety applications



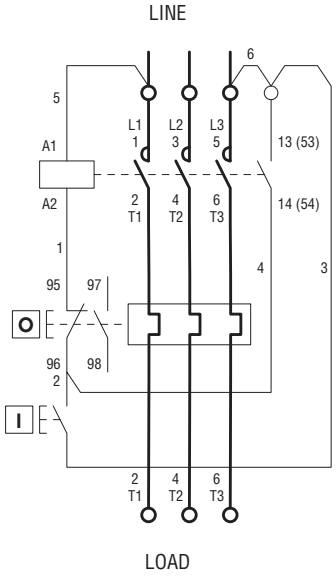
Wiring diagram for single-phase motors for safety applications



DIRECT-ON-LINE STARTERS IN ENCLOSURE

M...P

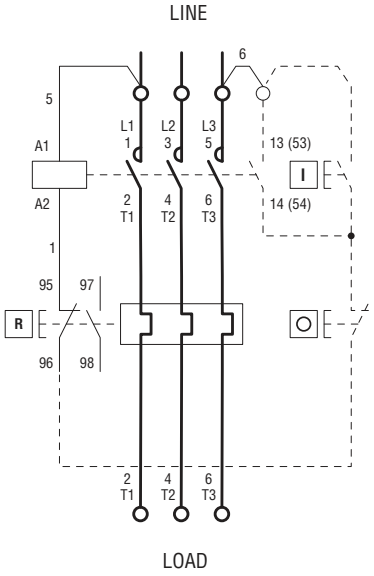
Diagram 1 - Incorporated button control for 3-phase motors



I = Start; O = Stop/Reset

M...R

Diagram 2 - External button control for 3-phase motors



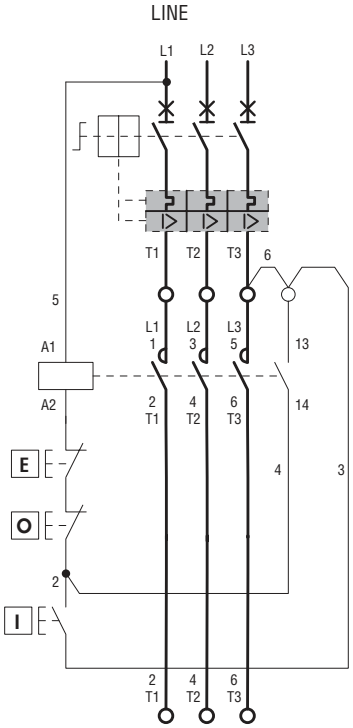
R = Reset; I = Start; O = Stop

DIAGRAM 2
Connect the eventual two-wire control (e.g. automatism) between terminal 3 of the contactor and terminal 96 of the thermal overload relay.

IMPORTANT
- Remove jumpers 5 and 6 and connect the auxiliary line to terminals A1 and 3 for a control circuit with a voltage value different than the supply.
- Remove jumper 5 and connect the neutral to terminal A1 for a control circuit between phase and neutral.
- SINGLE-PHASE SUPPLY
  The main circuit must be configured according to Diagram 4 in the case of a single-phase line or motor.
- FUSES
  A set of three fuses must be connected upstream of the starter in the event no appropriate protection is included in the system.

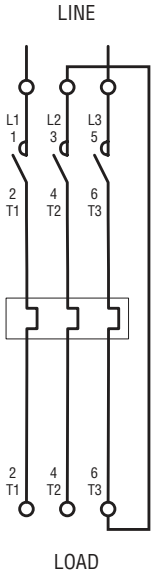
M2P00911...

Diagram 3 - Incorporated button control and rotary actuator for 3-phase motors



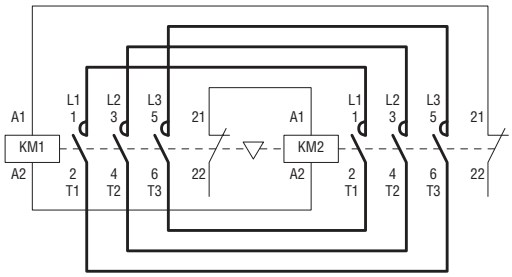
I = Start; O = Stop; E = Emergency Stop

Diagram 4 - Power connection for 1-phase motors

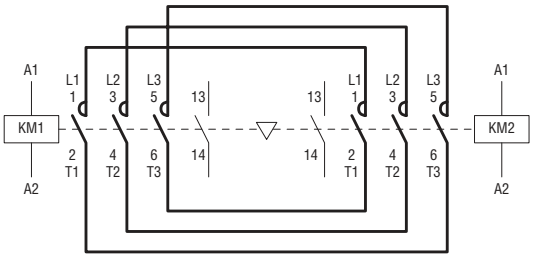


REVERSING CONTACTOR ASSEMBLY

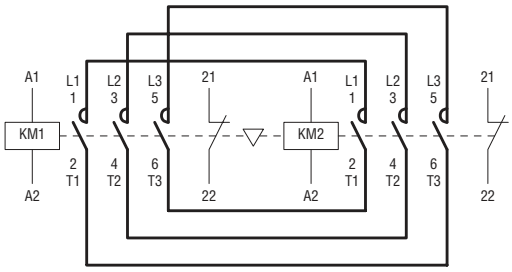
BGR...



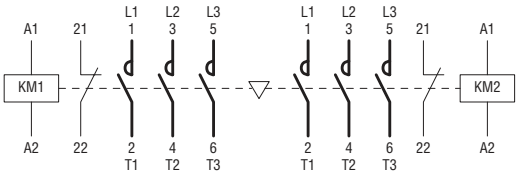
BGT...



BFA...42

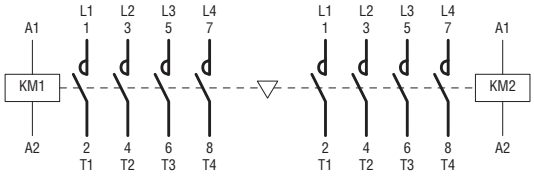


BGTP09...

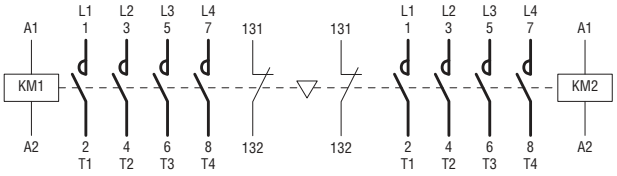


CHANGEOVER CONTACTOR ASSEMBLY

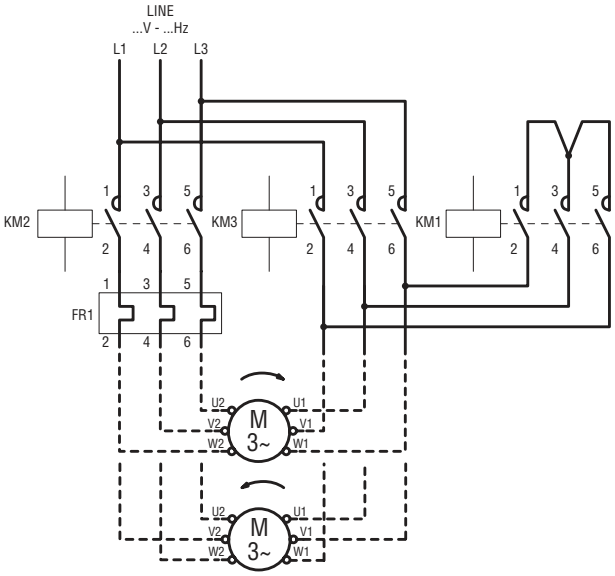
BGC09...



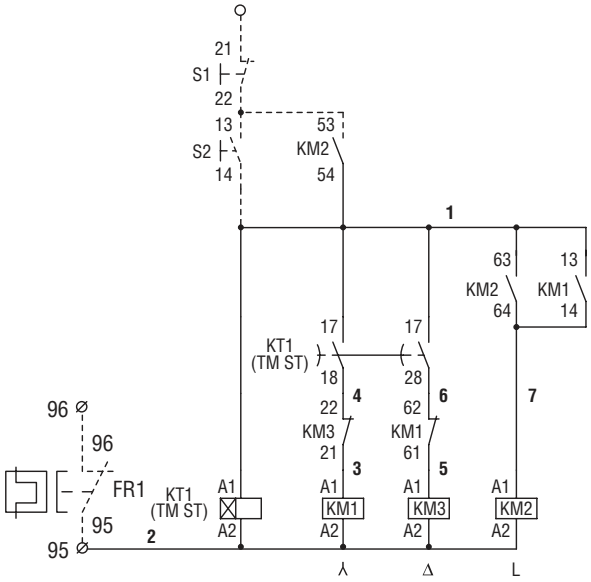
BFC...



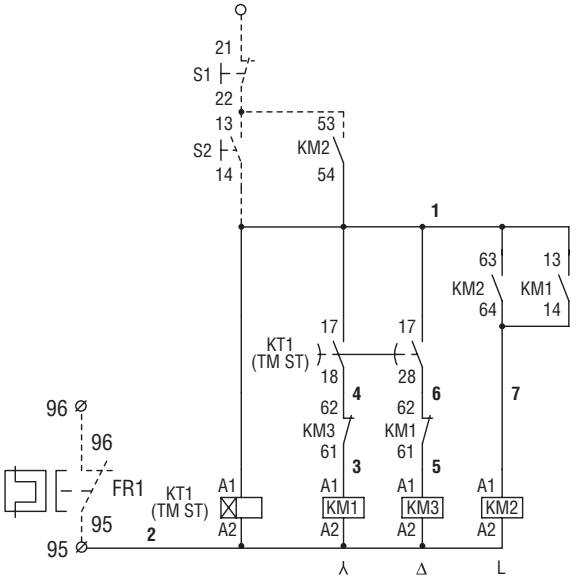
STAR-DELTA STARTERS, OPEN FRAME
BFA009…03870 - M3P009…03870



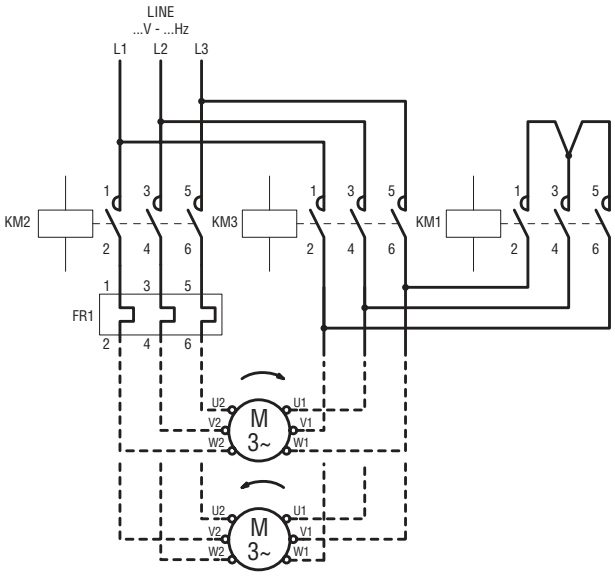
BFA00970… BFA02570
M3P00970…M3P02570

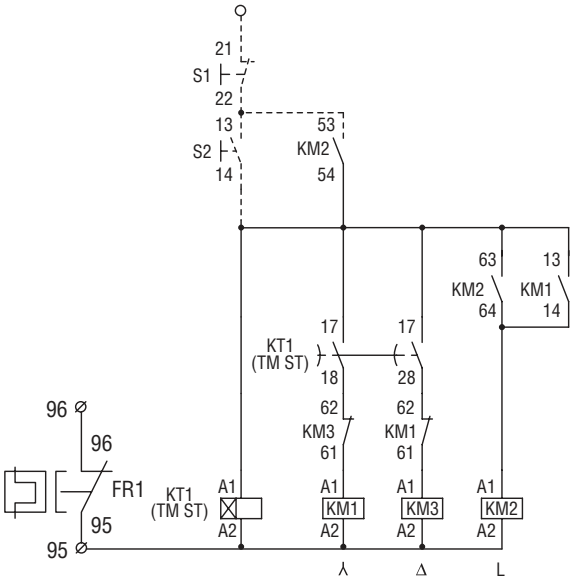


BFA2670…BFA03870
M3P02670…M3P03870



BFA050…BFA150





RATINGS FOR USA AND CANADA.

Order code for magnetic motor starters in non-metallic enclosure with 2 push buttons	T/O RELAY ADJ RANGE	MAX UL/CSA HP RATINGS INDICATED ON STARTER (based on t/o relay adj range)					
		Single phase		Three phase			
	[A]	120V	240V	200V	240V	480V	600V
M0P009❶❷1	0.6 - 1	-	-	-	-	½	½
M0P009❶❷1V5	0.9 - 1.5	-	-	-	-	¾	¾
M0P009❶❷2V3	1.4 - 2.3	-	-	-	½	1	1
M0P009❶❷33	2 - 3.3	-	¼	¾	1½	1½	2
M0P009❶❷5	3 - 5	-	½	1	1	3	3
M0P009❶❷75	4.5 - 7.5	-	¾	1½	2	5	5
M0P009❶❷10	6 - 10	½	1½	2	3	5	5
M0P012❶❷15	9 - 15	½	1½	3	3	7½	10
M1P009❶❷A4	0.63 - 1	-	-	-	-	-	½
M1P009❶❷A5	1 - 1.6	-	-	-	-	½	¾
M1P009❶❷A6	1.6 - 2.5	-	-	½	½	1	1½
M1P009❶❷A7	2.5 - 4	-	-	¾	¾	2	3
M1P009❶❷A8	4 - 6.5	¼	½	1	1½	3	5
M1P009❶❷A9	6.3 - 10	½	1½	2	3	5	7½
M1P009❶❷B0	9 - 14	¾	2	3	3	5	7½
M1P012❶❷B0	9 - 14	1	2	5	5	7½	10
M1P018❶❷B1	13 - 18	1	3	5	5	10	15
M2P025❶❷B2	17 - 23	1½	3	5	7½	15	15
M2P025❶❷B3	20 - 25	2	3	7½	7½	15	15
M2P026❶❷B2	17 - 23	1½	3	5	7½	15	20
M2P026❶❷B3	20 - 25	2	5	7½	7½	15	20
M2P026❶❷B4	24 - 32	2	5	7½	7½	15	20
M2P032❶❷B4	24 - 32	3	7½	10	10	20	25
M25P038❶❷B5	32 - 38	3	7½	10	15	30	30
M3P050❶❷B6UL	35 - 50	5	10	15	20	40	40
M3P065❶❷B7UL❸	46 - 65	-	-	20	25	50	60
M3P080❶❷B8❹	60 - 82	-	-	25❹	30❹	60❹	75❹

NOTE: the HP / FLA values vary from one motor to another; if possible, always verify the HP and FLA (or rated current) on the motor nameplate.
Enclosure UL Type 1, 12, 4 and 4X industrial control environment for M1, M2, M25 and M3...UL versions; designation of control units can be:
N – without push buttons
R – with reset button only
P – per table, with start-stop push buttons.
Consult Technical support for any other combination required (e.g. with other type of contactors, contactor assemblies or definite-purpose version, different overload version or range, additional pilot lights, extra electrical or electronic elements); see contact details on inside front cover. Refer to ❶ below for specified standard configurations.

❶ Complete the order code by indicating:
– 10 if required without thermal overload relay
– 12 if required with three-phase overload relay
– 17 if required with disconnect switch for M2 and M3 types.

❷ Complete order code with coil voltage digit (if 50/60Hz) or with voltage digit followed by 60 (if 60Hz).
Standard voltages are as follows:
-- AC 50/60Hz 024 / 048 / 110 / 230 / 400V
-- AC 60Hz 024 60 / 048 60 / 120 60 / 220 60 / 230 60 / 460 60 / 575 60 (V).

❸ Maximum UL ratings is 52A for motor control and 65A for general use.

❹ No CSA or UL certification. Indicated values correspond to UL/CSA magnetic contactor ratings and for indication and reference purposes only.

Certifications obtained:
– CSA certified for Canada and USA (cCSAus - File 94157) as Magnetic Motor Controllers at max 600VAC, max 15HP per single phase, max 60HP three phase, max 125A with general purpose enclosure.
– UL Listed for USA and Canada (cULus - File E93602) as Magnetic Motor Controllers – Enclosed.

Electronic and electromechanical starters

Typical full-load current values of single and three phase electric motors

THREE-PHASE POWER RATINGS		Rated motor current								
		200V	230V	**220-240V**	**380-415V**	400V	**440-480V**	500V	**550-600V**	690V
[HP]	[kW]	**[A]**	[A]	**[A]**	**[A]**	[A]	**[A]**	[A]	**[A]**	[A]
-	0.37	-	1.9	-	-	1.1	-	0.88	-	0.64
1/2	-	**2.5**	-	**2.2**	**1.3**	-	**1.1**	-	**0.9**	-
-	0.55	-	2.6	-	-	1.5	-	1.2	-	0.87
3/4	-	**3.7**	-	**3.2**	**1.8**	-	**1.6**	-	**1.3**	-
1	-	**4.8**	-	**4.2**	**2.3**	-	**2.1**	2	**1.7**	-
-	0.75	-	3.3	-	-	1.9	-	1.5	-	1.1
-	1.1	-	4.7	-	-	2.7	-	2.2	-	1.6
1-1/2	-	**6.9**	-	**6**	**3.3**	-	**3**	-	**2.4**	-
2	-	**7.8**	-	**6.8**	**4.3**	-	**3.4**	-	**2.7**	-
-	1.5	-	6.3	-	-	3.6	-	2.9	-	2.1
-	2.2	-	5.5	-	-	4.9	-	3.9	-	2.8
3	-	-	11.3	-	-	6.5	-	5.2	-	3.8
-	4	-	15	-	-	8.5	-	6.8	-	4.9
5	-	**17.5**	-	**15.2**	**9.7**	-	**7.6**	-	**6.1**	-
-	5.5	-	20	-	-	11.5	-	9.2	-	6.7
7-1/2	-	**25.3**	-	**22**	**14**	-	**11**	-	**9**	-
10	-	**32.2**	-	**28**	**18**	-	**14**	-	**11**	-
-	7.5	-	27	-	-	15.5	-	12.4	-	8.9
-	11	-	38	-	-	22	-	17.6	-	12.8
15	-	**48**	-	**42**	**27**	-	**21**	-	**17**	-
20	-	**62.1**	-	**54**	**34**	-	**27**	-	**22**	-
-	15	-	51	-	-	29	-	23	-	17
-	18.5	-	61	-	-	35	-	28	-	21
25	-	**78.2**	-	**68**	**44**	-	**34**	-	**27**	-
-	22	-	72	-	-	41	-	33	-	24
30	-	**92**	-	**80**	**51**	-	**40**	-	**32**	-
40	-	**120**	-	**104**	**66**	-	**52**	-	**41**	-
-	30	-	96	-	-	55	-	44	-	32
-	37	-	115	-	-	66	-	53	-	39
50	-	**150**	-	**130**	**83**	-	**65**	-	**52**	-
60	-	**177**	-	**154**	**103**	-	**77**	-	**62**	-
-	45	-	140	-	-	80	-	64	-	47
-	55	-	169	-	-	97	-	78	-	57
75	-	**221**	-	**192**	**128**	-	**96**	-	**77**	-
100	-	**285**	-	**248**	**165**	-	**124**	-	**99**	-
-	75	-	230	-	-	132	-	106	-	77
-	90	-	278	-	-	160	-	128	-	93
125	-	**359**	-	**312**	**208**	-	**156**	-	**125**	-
-	110	-	340	-	-	195	-	156	-	113
150	-	**414**	-	**360**	**240**	-	**180**	-	**144**	-
-	132	-	400	-	-	230	-	184	-	134
200	-	**552**	-	**480**	**320**	-	**240**	-	**192**	-
-	160	-	487	-	-	280	-	224	-	162
250	-	-	-	**604**	**403**	-	**302**	-	**242**	-
-	200	-	609	-	-	350	-	280	-	203
300	-	-	-	**722**	**482**	-	**361**	-	**289**	-
-	250	-	748	-	-	430	-	344	-	250
350	-	-	-	**828**	**560**	-	**414**	-	**336**	-
400	-	-	-	**954**	**636**	-	**477**	-	**382**	-
-	315	-	940	-	-	540	-	432	-	313
450	-	-	-	**1030**	-	-	**515**	-	**412**	-
-	355	-	1061	-	-	610	-	488	-	354
500	-	-	-	**1180**	**786**	-	**590**	-	**472**	-

THREE-PHASE POWER RATINGS	Rated motor current	
[HP]	**[A] a 120V**	**[A] a 240V**
1/10	3	1.5
1/8	3.8	1.9
1/6	4.4	2.2
1/4	5.8	2.9
1/3	7.2	3.6
1/2	9.8	4.9
3/4	12.8	6.9
1	16	8
1-1/2	20	10
2	24	12
3	34	17
5	56	28
7-1/2	80	40
10	100	50
15	135	68

The information in the chart has been obtained from the IEC/EN/BS 60947-4-1 standards. The kW ratings are preferred rated values according to IEC 60072-1 (primary series) at 50/60Hz while Horsepower and corresponding current values are according to UL 508 Industrial Control Standard at 60Hz.

The full load current values listed are for motors running at standard speeds with normal torque characteristics. Motors which are non-standard, such as low speed, high torque or other special applications may have higher full load currents.

Caution: for accurate and reliable motor protection, motor nameplate current should be used to obtain actual motor full load amps for all motors. The information given is for indication and reference purposes only.

Soft starters

- Sizes from 6 to 640A
- For standard and severe duty
- Versions with 2 or 3 phase control
- Versions with advanced functions for the control of the motor
- Startup with torque control, voltage ramp with current limit
- Protection functions for the motor and the soft starter
- Digital control and adjustment
- NFC connectivity for a simple, fast and intuitive programming with smartphone and App
- Versions with optional communication port for control and supervision

Soft starters — SEC. - PAGE

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Pag. 5-6

ADXN...

- Two phase control
- For standard duty
- IEC rated soft starter current Ie 6...45A
- IEC rated motor power 2.2...22kW (400VAC)
- Rated operational voltage 208...600VAC
- Version with auxiliary supply voltage 24VAC/DC or 100...240VAC
- Built-in bypass relay
- Starting with voltage ramp
- Basic version with parameter setting with potentiometers on front
- Version with NFC connectivity for the programming with smartphone and App
- Advanced version with potentiometers and NFC connectivity, optical port, integrated motor thermal protection and optional RS485 module, Modbus-RTU protocol
- Integrated protections for the motor and soft starter
- LEDs for status signaling and diagnostics
- Compact housing, 45mm width
- Screw fixing or 35mm DIN rail mounting
- cULus certification.

Pag. 5-10

51ADX...

- Three phase control
- For severe duty
- IEC rated soft starter current Ie 17...640A
- IEC rated motor power 7.5...355kW (400VAC)
- Rated operational voltage 208...500VAC (51ADX...B), 208...415VAC (51ADX...)
- Auxiliary supply voltage 208...240VAC
- Built-in bypass contactor up to 245A. Predisposed for external bypass contactor for the upper sizes
- Starting with voltage ramp or torque control
- Maximum starting current limitation
- Backlit LCD icon display
- LEDs for status signaling and diagnostics
- Built-in RS232 port for remote control from PC, Modbus-RTU and property ASCII protocols
- Built-in RS485 port for the connection of the optional remote keypad.

Pag. 5-8

ADXL...

- Two phase control
- For standard and severe duty
- IEC rated soft starter current Ie 18....320A
- IEC rated motor power 7.5...160kW (400VAC)
- Rated operational voltage 208...600VAC
- Auxiliary supply voltage 100...240VAC
- Built-in bypass relay
- Starting with voltage ramp or torque control
- Maximum starting current limitation
- Integrated protections for the motor and soft starter
- Backlit LCD icon display
- LEDs for status signaling and diagnostics
- Optical port for programming, data download and diagnostics from PC
- NFC connectivity for the programming with smartphone and App
- Optional RS485 communication card, Modbus-RTU protocol
- cULus certification.

Pag. 5-10

ADXT...

- Three phase control
- For standard and severe duty
- IEC rated soft starter current Ie 34...554A
- IEC rated motor power 18.5...315kW (400VAC)
- Rated operational voltage 380...690VAC
- Versions with auxiliary supply voltage 110...120VAC and 220...240VAC, or version 24VAC/DC
- Built-in bypass contactor
- In-line or inside delta connection
- Starting with constant current, current ramp, voltage ramp or adaptive control
- Maximum starting current limitation
- Integrated protections for the motor and soft starter
- Backlit LCD graphic display
- LEDs for status signaling and diagnostics
- Optional RS485 (Modbus-RTU protocol) or Ethernet (Modbus-TCP protocol) communication cards
- cULus certification.

Guide for selecting

	ADXN	ADXL	ADXT	51ADX
Number of controlled phases	2	2	3	3
Built-in bypass	●	●	●	● (up to 245A)
Built-in display and keypad	—	●	●	●
Languages	—	6	8	4
View measurements	—	●	●	●
Torque control	—	●	●	●
Adjustable current limit	● (ADXNP)	●	●	●
Dynamic braking	—	—	●	●
Kick start function	—	●	●	●
Electronic motor thermal protection	● (ADXNP)	●	●	●
Motor protection thermistor input	—	●	●	●
Inside delta connection	—	—	●	—
Protection against phase loss	●	●	●	●
Protection against phase inversion	●	●	●	●
Protection against locked rotor	● (ADXNP)	●	●	●
Protection against thyristor overtemperature	●	●	●	●
Protection against low load	● (ADXNP)	●	●	●
Programmable alarm functions	● (ADXNF, ADXNP)	●	●	●
Digital inputs	● (start)	●	●	●
Analog input	—	—	—	●
Digital outputs	●	●	●	●
Analog output	—	—	●	●
Communication port	○ (ADXNP, RS485)	○ (RS485)	○ (RS485, Ethernet)	● (RS232)
Optical port for programming	● (ADXNP)	●	—	—
USB port for programming	—	—	●	—
Event log	—	●	●	●
Motor hour counter	—	●	●	●
Motor startup counter	—	●	●	●
Clock calendar	—	—	●	●
Remote external keypad	○ (ADXNP)	○	○	○
cULus certification	●	●	●	—

● Standard
○ With optional module or card
— Not available

Lovato electric

ADXN SERIES: SIMPLE, COMPACT AND FUNCTIONAL

The soft starters ADXN series are the ideal solution for those who need a **simple, compact and fast to configure** product for the gradual control of the starting and stopping of the motors.
Their **versatility** makes them suitable for several applications such as the control of pumps, fans, conveyor belts, compressors and they are available with **rated currents from 6 to 45A**.

VERSIONS

The soft starters ADXN series are available in three versions.

Basic version (ADXNB)

Ideal solution for those who need a soft starter with basic functions and extremely simple to configure, with only the need to control the gradual starting and the stopping of the motor. The configuration requires the settings of only 3 parameters (starting voltage, acceleration ramp and deceleration ramp) adjusted with 3 **potentiometers** present on the front of the soft starter.

NFC version (ADXNF)

Version provided with **NFC** (Near Field Communication) connectivity for the programming via smartphone and LOVATO NFC App. The default settings make it ready to use for the control of scroll compressors, typically used in conditioning systems, refrigerators and heating pumps without need for any programming. Thanks to the NFC antenna integrated on the front, it is however, possible to modify the parameters of the soft starter via smartphone for the control of loads different from compressors, like pumps, fans, conveyors, etc, solution which makes ADXNF extremely flexible for any kind of application.
The setting of parameters in digital format guarantees accuracy and repeatability, with possibility to set the programming on the smartphone to be immediately transferred to other ADXNF devices. It is also possible to configure a password for the locking of the settings to protect the soft starter against tampering of the parameters by unauthorized personnel.

Advanced version (ADXNP)

Version which provides the **electronic thermal protection** of the motor, obtained thanks to the presence of integrated current transformers, which allow the protection of the motor against overload and the management of starting ramps with current limiting, which are automatically adapted to follow the load variations. The soft starter ADXNP can also be equipped with an **optional RS485 communication module (CX04)** in order to be integrated in a remote control and supervision system. It is provided with both **potentiometers** on front for the setting of the basic parameters (starting voltage, acceleration ramp and deceleration ramp) and **NFC connectivity** for the programming of the advanced parameters through the LOVATO NFC App, such as the rated motor current, the tripping thermal class, protection thresholds, password, communication parameters, the function of the relay outputs and alarm properties. The **frontal optical port** allows the programming, data download and diagnostics from PC and App with the optional USB (CX01) and Wi-Fi (CX02) devices.

COMPACT DIMENSIONS

The soft starters ADXN series are characterized by two phase control and are realized in an extremely compact enclosure **only 45mm wide** for the entire range up to 45A (divided in 2 mechanical sizes that differ in height and depth).

SIMPLICITY

They are extremely **simple and quick to configure**. The control of the motor requires only the setting of **few and intuitive parameters**, such as the ramp times and the starting voltage, which can be configured according to the version with potentiometers on front or via smartphone with NFC connectivity and LOVATO NFC App, available for free for iOS and Android smart devices.

WIDE OPERATIONAL VOLTAGE RANGE

They are characterized by a wide rated line voltage range, which extends **from 208 to 600VAC**; this makes them suitable for every market, every market, including North America, without needs to manage different codes according to the supply voltage available in the system.

AUXILIARY POWER SUPPLY

All the three versions of ADXN are available with 2 auxiliary supply voltages: **24VAC/DC**, typical voltage available in the automation control panels, or **100-240VAC**, typical voltage available for example in the panels for pumps control.

INTEGRATED PROTECTION FUNCTIONS

They integrate several functions for the protection of the motor and the soft starter, such as:
- soft starter thermal protection made by a built-in temperature probe
- controls on the line voltage: voltage and frequency out of limits, phase loss, wrong phase sequence
- electronic thermal protection of the motor (ADXNP version only).

The protection thresholds and tripping delays are configurable on the versions provided with NFC connectivity (ADXNF and ADXNP) and can be individually enabled or disabled.

NFC CONNECTIVITY

The ADXNF and ADXNP versions are provided with NFC connectivity integrated on the front, which allows the modification of the parameters in a **fast, simple and intuitive** way directly from the **smartphone** with **LOVATO NFC App.**

The programming can be saved on the smartphone to be copied to other soft starters of the same model series extremely quickly, even with the device powered off, a solution ideal for those who make programming in series. It is also possible to set a password to protect the parameters against tampering by unauthorized personnel.

The LOVATO NFC App is available for **Android and iOS** smart devices and it is freely downloadable from Google Play Store and App Store.

ELECTRONIC MOTOR THERMAL PROTECTION (ADXNP version only)

The advanced version ADXNP integrates current transformers for the measure of the current flowing in the motor phases, allowing the soft starter to thermally protect the motor commanding it to stop when the current exceeds the rated value for an extended time, without the need to install an external thermal overload relay, resulting in cost, space, wiring and installation time savings. The thermal protection is electronic type and it is possible to set a double protection class: one for the starting and one for the running, and choice between class 10, 15, 20 and 25 according to the duty level of the application.

OPTICAL PORT FOR COMMUNICATION (ADXNP version only)

The advanced version ADXNP is provided with optical port on front for the connection of the optional USB (CX01) or Wi-Fi (CX02) devices, by which the soft starter can be connected to a PC with software Xpress, smartphone and tablet with LOVATO Sam1 App programming and diagnostic in simple and safe way, by operating directly from the front of the soft starter without the need to disconnect the electrical power supply.

RS485 COMMUNICATION PORT (ADXNP version only)

CX04

The advanced version ADXNP can be equipped with the optional RS485 Modbus-RTU communication module CX04. This enables the integration in a supervision and monitoring system or to communicate with a Modbus master like a PLC, an HMI or the remote display unit EXCRDU2, display unit EXCRDU2, through which it is possible to control and monitor up to 32 starters connected in RS485. The module is supplied 24VAC/DC and it connects in simple and fast way to the optical port of the soft starter with screw fixing. Compatible with Synergy supervision and energy management software.

EXCRDU2

BUILT-IN BYPASS

All the versions integrate a **bypass** relay which automatically deactivates the thyristors circuit once the acceleration ramp is completed and the motor reaches its rated speed, reducing the heat and the power dissipation, which consequently results in **energy saving**. The presence of the bypass also increases the reliability of the soft starter, by protecting the internal thyristors against unpredictable phenomena on the network during the motor running, such as short circuits, overcurrents or overvoltages.

2 RELAY OUTPUTS INTEGRATED

The soft starters ADXN have 2 built-in relay outputs with NO contact for signaling functions or for the command of external devices. The function of the outputs is fixed on the basic version ADXNB, while it is programmable on the versions ADXNF and ADXNP and choice between line contactor control, TOR (Top Of Ramp), alarm and maximum torque.

PASSWORD FOR THE PROTECTION OF THE SETTINGS

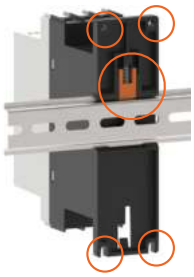
The access to the parameters of the soft starters ADXNF and ADXNP can be locked with a password configurable with the LOVATO NFC App to protect the settings against tampering by unauthorized personnel.

FRONTAL LEDS

All the three versions have 3 LEDs on the front for the signalling of the presence of auxiliary power supply, run status and alarm. In case of active alarm the alarm LED is flashing and the type of alarm in progress can be identified by the number of flashes.

MOUNTING

The soft starters ADXN can be fixed with screws on the rear panel or on 35mm DIN rail (IEC/EN/BS 60715). For the screw fixing there are 4 holes on the base of the soft starter, while for the DIN rail fixing there is a rubber pad insert which prevents the soft starter from sliding on the DIN rail.



FAN

It is possible to install on the soft starter ADXN up to 30A an optional fan **40x40mm** (already built-in on the sizes 38A and 45A) to improve the heating dissipation performances and increase the number of starts per hour. The fan is supplied directly by the soft starter through a pre-wired cable which is completely hidden inside the soft starter enclosure. The presence of the fan doesn't affect the dimensions of the soft starter ensuring the maintenance of compact dimensions.

RIGID CONNCECTION FOR THE DIRECT MOUNTING TO A MOTOR PROTECTION CIRCUIT BREAKER (MPCB)

The rigid connection SM1X3150R allows the direct mounting of the ADXN to a motor protection circuit breaker type SM1R (rotary knob type) up to size 38A, creating a compact starter and reducing installation time. SM1X3150R includes an accessory for the support of the weight of the soft starter when hooked to the MPCB, to be fixed with screws to the panel and compatibile with both high and low DIN rail.

ADXL SERIES: SIMPLE, EFFICIENT AND SAFE MOTOR CONTROL

SIMPLE
The ADXL soft starter series is equipped with a backlit LCD display with icons and NFC connectivity, for a simple configuration via smartphones and tablets. They are ideal for "plug and play" applications, thanks to the installation AUTO SET wizard, and for high-performance applications, with control and protection during the motor startup and operation.

EFFICIENCY
The two phase control during the start and stop of the motor allows a reduction of the power consumption and the heat dissipation. Once the starting ramp is completed, the soft starter closes the internal bypass contacts and reduces the energy consumption.

SAFETY
ADXL integrated functions allow to protect the motor and the soft starter; it's capable of monitoring the motor thermal status, to manage the thermal protection, and its internal temperature, in order to protect the thyristors from overtemperature. Furthermore, a motor overtemperature protection can be enabled through an external PTC temperature sensor.

AUTO SET
Upon startup, the soft starter launches a user wizard to simplify the setup. The user can set the device through 4 simple parameters:
- **language:** it is possible to choose the text view by selecting the preferred language, at choice between: English, Italian, French, Spanish, Portuguese, German;
- **rated motor current:** the motor nominal current can be set between 50% and 100% of the rated soft starter current;
- **application type:** it includes predefined setups for the most common applications: centrifugal pump, fire fighting pump, conveyor belt, fan, mixer and general purpose. By selecting one type, the soft starter automatically updates the parameter programming to adapt to the requested application.
- **soft starter duty level:** the same application, based on the load connected to the motor, can be more or less heavy-duty. ADXL is capable of automatically adapting to standard or heavy-duty startups by adjusting the maximum starting current limit based on the user selection.

Expert users can customize the settings through the complete parameter menu.

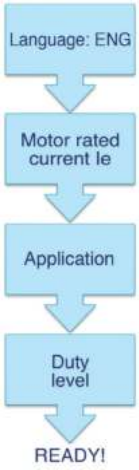
EASY SETUP
The ADXL series soft starters are equipped with NFC connectivity to simplify the parameter setting procedure. Using a compatible smartphone or tablet, the user, can download, save and edit the parameters using the LOVATO NFC App even with the soft starter powered off. On the front it has a built-in optical port compatible with the CX01 device, to connect the ADXL via USB to a PC with Xpress software, and the CX02 device, for Wi-Fi connection to a PC with Xpress software or to smartphone and tablet with LOVATO Sam1 App.

LOVATO NFC App and LOVATO Sam1 App freely downloadable from Google Play Store and App Store.

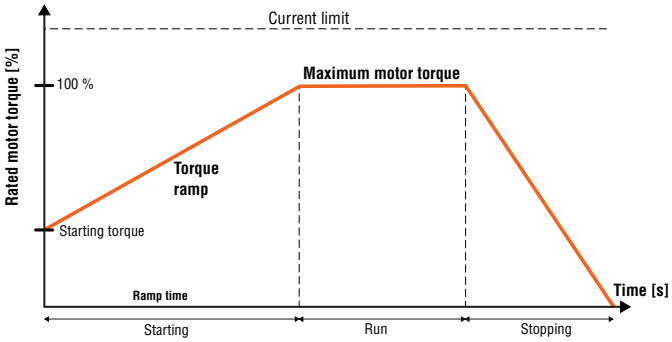
ANDROID APP ON Google play

Available on the App Store

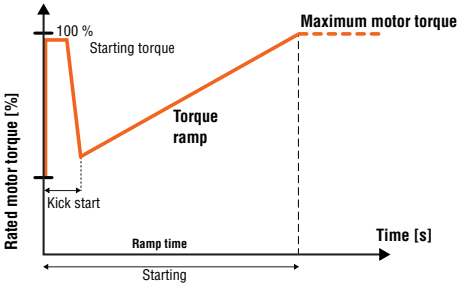
ADXL: from start-up to operation in 4 steps



TORQUE CONTROL
The torque control function allows to perform gradual accelerations and decelerations of the motor, with significant reduction of mechanical faults and wear of the transmission devices.



KICK START
This function allows to start the motor when the initial torque is not sufficient to overcome friction forces typical of high inertia loads, by providing a high torque during the very first moments of the startup.



EMERGENCY START
In situations where the motor operation is absolutely prioritized over the possibility of motor or soft starter failure, it is possible to program a digital input to inhibit the activation of all protections and alarms that prevent the motor start-up.

FIRE FIGHTING PUMP PRESET SETUP
In the AUTO SET wizard it is possible to select the fire fighting pump application. This setting is optimized to start fire fighting pumps overriding all alarms and protections. In this situation, the main priority is the pump start-up, without considering the possible consequences for the pump starter and motor.

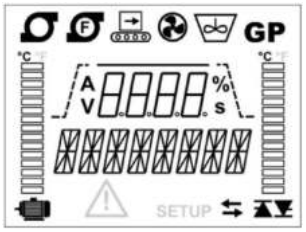
INPUTS, OUTPUTS, LIMITS AND REMOTE VARIABLES
The input and output functions are preset with the most common settings; however, the user can easily edit the preset configuration to adapt the soft starter to the application needs. All inputs and outputs can be edited. There are three types of programmable internal variables:
– limit thresholds
– remote variables
– user alarms.

MAINTENANCE COUNTERS
ADXLs have two maintenance counters dedicated for the counting of the number of motor starts and the motor working hours, on which it is possible to set a threshold, that when exceeded, an alarm is triggered.

COOLING FAN
It is possible to equip the ADXL soft starters from 18 to 115A with an optional fan (built-in as standard for the higher sizes) to improve the heating dissipation performance and increase the number of permissible starts per hour. The fan is supplied directly by the soft starter that controls its activation and it monitors its status, by signaling anomalies with dedicated alarms.

DIN RAIL MOUNTING
For sizes from 18 to 115A, the EXP8003 accessory is available to mount the soft starter on a 35mm DIN rail.

USER INTERFACE
A backlit icon display shows the data to the user in a clear and immediate way.
- Alarm texts available in 6 languages (ENG-ITA-FR-ES-POR-DE)
- 6 icons indicate the default setup in use: centrifugal pump, fire fighting pump, conveyor belt, fan, mixer and general purpose
- Two graphic bars show the motor and thyristors thermal status
- An alphanumeric display shows texts and measures
- A status bar shows the soft starter status: start, bypass, run, stop.



PASSWORD
Access to the soft starter parameters can be protected by user customizable passwords. There are two access levels, user and advanced.
Furthermore, it's possible to block the serial communication using the remote control password.

RS485 COMMUNICATION AND REMOTE DISPLAY UNIT
ADXL soft starters are equipped with a slot for the optional RS485 card with Modbus-RTU protocol EXC1042. RS485 communication can be used to connect the soft starter to a supervision software (e.g. Synergy) or for the connection to the EXCRDU2 remote display unit, for the monitoring of the measures, the command of motor start and stop, and the setup from the panel door.

EXC1042

EXCRDU2

MONITORING AND REMOTE CONTROL
Through the optional EXC1042 communication card and compatibility with the supervision and energy management software Synergy, setup and remote control software Xpress, it's possible to constantly monitor all the measures available on the soft starter, the soft starter status, see live trends and edit the parameters.

ADXT SERIES: HIGH PERFORMANCE, GREAT FUNCTIONALITIES

ADXT is the ideal soft starter for applications that require high performance, great reliability and robustness. Provided with advanced features and integrated protections, it provides an accurate control of the motor starting and stopping and allows to reduce the energy consumption for constant speed applications.

THREE PHASE CONTROL

The three phase control allows the soft starter to provide a higher torque in the very first instants of the starting ramp compared to a soft starter with two controlled phases at the same current. This characteristic makes it particularly suitable for the control of heavy-duty applications, characterized by high inertia, such as crushers, fans, vertical or inclined conveyors, screw compressors, centrifuges, propellers, mills, band or circular saws, shredders.

WIDE OPERATING VOLTAGE RANGE UP TO 690VAC

ADXT can be installed in systems with rated voltage from 380 to 690VAC, a selling point that makes it extremely versatile for every market, including North America.
Two versions are available, which differ in the auxiliary supply voltage: version with supply 110...120VAC and 220...240VAC and version with supply 24VAC/DC.

INTEGRATED BYPASS

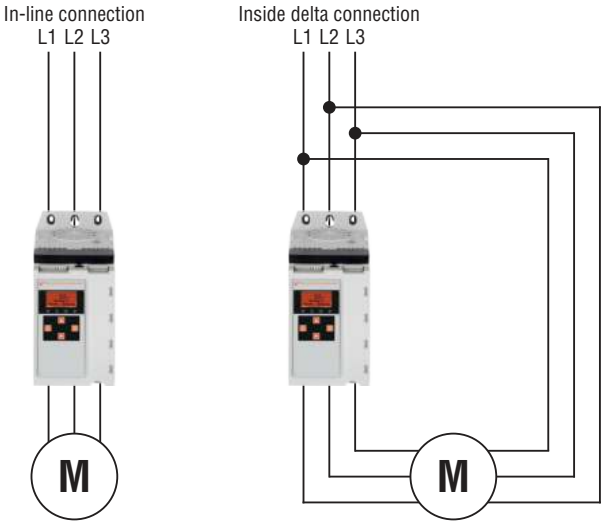
The entire range integrates the bypass contactor, that disables the thyristors once the motor starting is completed, reducing the energy consumption, the heating generated and the power dissipation.

MULTI-LANGUAGE GRAPHICAL DISPLAY

The backlit LCD graphic display provides a clear and complete visualization of the status of the soft starter and electrical measurements, with extended texts, feedback messages, and a real-time performance graph. It supports 8 languages (English, Italian, French, Spanish, Portuguese, German, Chinese, Russian), and allows the customization of the display screens with the desired parameters.

IN-LINE OR INSIDE DELTA CONNECTION

The ADXT soft starters can be installed either with the traditional in-line connection or with the inside delta connection (six-wire connection), with thyristors connected in series to each motor winding, a configuration common in the United States and many other countries. In this configuration, which requires special six-wire motors, the soft starter is only crossed by the phase current, significantly lower than the line current. This allows the use of a smaller starter, resulting in cost savings, and simplifies the replacement of star-delta starters since the existing wiring is retained.



QUICK SETUP AND SIMULATION

A quick setup menu is available for the fast configuration of the soft starter, which guides the user during the configuration by suggesting typical settings for the most common applications. Additionally, with the simulation mode, it's possible to simulate the start-up, operation, and shutdown of the motor to verify the correct functioning of the soft starter and the associated equipment.

STANDARD OR HEAVY DUTY SERVICE

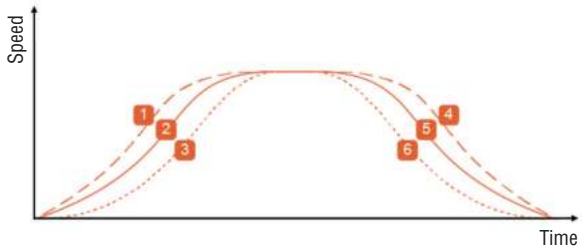
They are suitable for controlling both standard loads, with typical starting currents between 3 and 4 times the rated current of the motor, and heavy loads with higher starting currents such as 5 times the rated current. Depending on the starting current and the ramp-up time, the soft starter is capable of providing a more or less high continuous output current. The tables present in the catalog offer a guide for the proper selection of the code according to the duty level of the load.

INTEGRATED PROTECTIONS

Several integrated functions are available for the protection of the motor, system, and the soft starter, including: motor thermal protection against overload, overcurrent, phase loss, incorrect phase sequence, load too low (protection against dry running), overvoltage, undervoltage, excessive starting time, current asymmetry, overtemperature, motor protection with thermistor, and many others.

MOTOR CONTROL MODES

The ADXT soft starters integrate several modes for controlling the motor start and stop, making them extremely versatile for any type of application: starting with constant current, current ramp, voltage ramp, adaptive control, kick start, starting with current limitation, pump cleaning cycles, controlled or coasting stop, DC injection braking, gradual braking with braking contactor control, contactor control for reverse direction, jog function, and scheduled starts.



❶ Early acceleration
❷ Constant acceleration
❸ Late acceleration
❹ Late deceleration
❺ Constant deceleration
❻ Early deceleration

POWER THROUGH AND EMERGENCY MODE

Two functions are available for the starting of the motor in emergency situations:

- The function PowerThrough, if enabled, allows the soft starter to control the motor even if one of the three thyristors is damaged, allowing the motor to start with control over two phases, minimizing machine downtime.
- The emergency mode function, controlled via a digital input, instead allows the soft starter to keep the motor running, ignoring any fault or alarm condition, prioritizing motor control in case of emergency.

USB PORT AND OPTIONAL COMMUNICATION CARDS

On the top of the soft starter, there is a USB port for the connection of a USB pen drive through which it is possible to:

- upload the parameter configuration file
- download the event log
- modify the languages
- update the soft starter firmware.

The configuration of the exportable files via USB is done with a PC with the software ADXTSW, downloadable from the website www.LovatoElectric.com. If it is necessary to integrate the soft starter into a control and supervision network, two optional communication cards are also available with an RS485 (Modbus-RTU protocol) or Ethernet (Modbus-TCP protocol) port.

SCHEDULED START

It is possible to configure the soft starter to automatically start or stop the motor at a specific time of day or on certain days of the week based on the integrated clock calendar.

cULus CERTIFICATION

The ADXT soft starters are cULus certified, an essential requirement for sales in the US and Canadian markets.

Basic version ADXNB... type

ADXNB...

Order code	IEC rated starter current Ie	Rated motor power ≤40°C 400V	400-480V	550-600V	Qty per pkg	Wt
	[A]	[kW]	[HP]	[HP]	n°	[kg]
Parameters setting with potentiometers. Built-in bypass relay and 2 relay outputs. Rated operational voltage 208...600VAC Auxiliary supply voltage 100...240VAC.						
ADXNB006	6	2.2	3	5	1	0.540
ADXNB012	12	5.5	7.5	10	1	0.540
ADXNB018	18	7.5	10	15	1	0.540
ADXNB025	25	11	15	20	1	0.720
ADXNB030	30	15	20	25	1	0.720
ADXNB038	38	18.5	25	30	1	0.750
ADXNB045	45	22	30	40	1	0.750
Auxiliary supply voltage 24VAC/DC.						
ADXNB00624	6	2.2	3	5	1	0.540
ADXNB01224	12	5.5	7.5	10	1	0.540
ADXNB01824	18	7.5	10	15	1	0.540
ADXNB02524	25	11	15	20	1	0.720
ADXNB03024	30	15	20	25	1	0.720
ADXNB03824	38	18.5	25	30	1	0.750
ADXNB04524	45	22	30	40	1	0.750

NFC version ADXNF... type

NFC

ADXNF...

Order code	IEC rated starter current Ie	Rated motor power ≤40°C 400V	400-480V	550-600V	Qty per pkg	Wt
	[A]	[kW]	[HP]	[HP]	n°	[kg]
NFC connectivity for parameters setting with smartphone and App. Built-in bypass relay and 2 relay outputs. Rated operational voltage 208…600VAC Auxiliary supply voltage 100...240VAC.						
ADXNF006	6	2.2	3	5	1	0.540
ADXNF012	12	5.5	7.5	10	1	0.540
ADXNF018	18	7.5	10	15	1	0.540
ADXNF025	25	11	15	20	1	0.730
ADXNF030	30	15	20	25	1	0.730
ADXNF038	38	18.5	25	30	1	0.760
ADXNF045	45	22	30	40	1	0.760
Auxiliary supply voltage 24VAC/DC.						
ADXNF00624	6	2.2	3	5	1	0.540
ADXNF01224	12	5.5	7.5	10	1	0.540
ADXNF01824	18	7.5	10	15	1	0.540
ADXNF02524	25	11	15	20	1	0.730
ADXNF03024	30	15	20	25	1	0.730
ADXNF03824	38	18.5	25	30	1	0.760
ADXNF04524	45	22	30	40	1	0.760

General characteristics
ADXN... is a soft starter with two phase control for the gradual control of the start and stop of asynchronous motors. Its main strengths are the simplicity of configuration, thanks to a short set of parameters which allows the programming simple and fast, and the compactness, thanks to the enclosure only 45mm wide which makes it suitable for the installation in panels with limited spaces.
It can be used for several applications such as the control of pumps, fans, compressors, conveyor belts and mixers.
It is available with rated current from 6 to 45A, suitable for the installation in systems with rated line voltage from 208 to 600VAC 50/60Hz.
The series consists of 3 versions which differs in the type of programming mode (settings with potentiometers on front or via smartphone with NFC connectivity and App) and integrated functions.
Every version is available in double variant with auxiliary supply voltage 24VAC/DC or 100...240VAC to suit every need based on the voltage present in the plant.

BASIC VERSION ADXNB
The soft starter ADXNB is the ideal solution for those who need a soft starter with basic functions and extremely simple to configure. The configuration requires the settings of only 3 parameters adjusted with potentiometers present on the front of the soft starter.
The general characteristics are the following:
– Built-in bypass relay
– Programming with potentiometers on front: starting voltage, acceleration ramp and deceleration ramp
– Voltage ramp startup
– Free wheel or controlled stop
– Integrated overtemperature protection
– 2 built-in relay outputs with normally open contact, with function line contactor control and TOR (Top Of Ramp)
– Suitable for the control of pumps, fans, blowers, conveyor belts, compressors and general purpose applications.

NFC VERSION ADXNF
The soft starter ADXNF is a version provided with NFC connectivity for the programming via smartphone and LOVATO NFC App. The default settings make it ready to use for the control of scroll compressors, typically used in air conditioning systems, refrigerators and heating pumps but the parameters can be modified via smartphone and LOVATO NFC App for the control of every kind of application, like pumps, fans, conveyor belts, etc.
It is also possible to configure a password for the locking of the settings.
The general characteristics are the following:
– Built-in bypass relay
– Programming with smartphone with NFC connectivity and LOVATO NFC App, available for Android and iOS smart devices, freely downloadable from Google Play Store and App Store.
– Default settings with pre-configured parameters for the control of scroll compressors
– Voltage ramp startup
– Free wheel or controlled stop
– Integrated overtemperature protection
– 2 built-in relay outputs with normally open contact with programmable function line contactor control, TOR (Top Of Ramp) and alarm
– Suitable for the control of scroll compressors (air conditioning systems, refrigerators and heating pumps), pumps, fans, blowers, conveyor belts, compressors and general purpose applications with parameters settings via NFC connectivity and LOVATO NFC App.

Operational characteristics ADXN...
See page 5-9.

Certifications and compliance
See page 5-9.

Advanced version ADXNP... type

ADXNP...

Order code	IEC rated starter current Ie	Rated motor power ≤40°C 400V	400-480V	550-600V	Qty per pkg	Wt
	[A]	[kW]	[HP]	[HP]	n°	[kg]
Setting of basic parameters with potentiometers and advanced parameters with NFC connectivity and App. Integrated motor electronic thermal protection. Built-in bypass relay and 2 relay outputs. Built-in optical port on front. Optional RS485 Modbus-RTU module. Rated operational voltage 208...600VAC Auxiliary supply voltage 100...240VAC.						
ADXNP006	6	2.2	3	5	1	0.560
ADXNP012	12	5.5	7.5	10	1	0.560
ADXNP018	18	7.5	10	15	1	0.560
ADXNP025	25	11	15	20	1	0.750
ADXNP030	30	15	20	25	1	0.750
ADXNP038	38	18.5	25	30	1	0.780
ADXNP045	45	22	30	40	1	0.780
Auxiliary supply voltage 24VAC/DC.						
ADXNP00624	6	2.2	3	5	1	0.560
ADXNP01224	12	5.5	7.5	10	1	0.560
ADXNP01824	18	7.5	10	15	1	0.560
ADXNP02524	25	11	15	20	1	0.750
ADXNP03024	30	15	20	25	1	0.750
ADXNP03824	38	18.5	25	30	1	0.780
ADXNP04524	45	22	30	40	1	0.780

Accessories for ADXN...

SM1X3150R

EXP8007

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Accessories for soft starters ADXN... type			
SM1X3150R	Rigid connection for soft starters type ADXN from 6 to 38 A for the direct mounting to a motor protection circuit breaker type SM1R❶	1	0.053
EXP8007	Fan for soft starters type ADXN from 6 to 30 A for the increasing of number of operations per hour (ADXN size 38 and 45A already have a built-in fan as standard)	1	0.044

❶ For details about motor protection circuit breakers type SM1R refer to the chapter 1.

Communication devices and remote display unit for ADXNP... type

CX01

CX02

CX04

EXCRDU2

new

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Communication devices			
CX01	USB connection device PC ↔ ADXNP with optical connector for programming, data download, diagnostics and firmware update	1	0.090
CX02	Wi-Fi connection device PC/smartphone ↔ ADXNP for data download, programming and diagnostics	1	0.090
CX04	RS485 communication module for ADXNP, Modbus-RTU protocol. Auxiliary supply voltage 24VAC/DC.	1	0.046
Remote display unit			
EXCRDU2	Remote display unit, widescreen colour LCD graphic display, built-in RS485 port, for the monitoring and control of max 32 starters, IP65, 3m cable included	1	0.420

ADVANCED VERSION ADXNP
The soft starter ADXNP provides the motor electronic current thermal protection, obtained thanks to the presence of integrated current transformers, which allow the motor protection against overload and the management of starting ramps with current limiting, which are automatically adapted to follow the load variations. It is provided with both potentiometers on front for the setting of the basic parameters and NFC connectivity and optical port for the programming of the advanced parameters through the LOVATO NFC App.
ADXNP can also be equipped with an optional RS485 communication module in order to be integrated in a supervision network.
The general characteristics are the following:
- Built-in bypass relay
- Integrated electronic thermal protection of the motor, with double class configurable (starting and running)
- Programming of basic parameters with potentiometers on front (which can be disabled via NFC if preferable): starting voltage, acceleration ramp and deceleration ramp
- Programming of advanced parameters (rated motor current, starting current limit, tripping thermal class, protection thresholds, communication parameters, password, relay outputs function and alarm properties) with smartphone with NFC connectivity and LOVATO NFC App, available for Android and iOS smart devices, freely downloadable from Google Play Store and App Store
- Voltage ramp startup with current limiting
- Free wheel or controlled stop
- Integrated overtemperature protection
- 2 built-in relay outputs with normally open contact with programmable function line contactor control, TOR (Top Of Ramp), alarm and maximum torque
- Optical port on front for the connection of USB (CX01) or Wi-Fi (CX02) optional devices for programming, data download and diagnostics from PC with Sam1 software or smart devices with LOVATO Xpress App, freely downloadable from Google Play Store and App Store
- Optional RS485 module (CX04), Modbus-RTU protocol
- Suitable for the control of pumps, fans, blowers, conveyor belts, compressors mixers and general purpose applications.

Operational characteristics ADXN...
- Two phase control
- Rated operational voltage: 208...600VAC ±10%
- Rated frequency: 50/60Hz ±5%
- Auxiliary supply voltage: 24VAC/DC (ADXN...24), 100...240VAC (ADXN...) -15%/+10%
- IEC rated soft starter current Ie: 6...45A
- Rated motor power: 2.2...22kW (400VAC) and 5...40HP (600VAC)
- 3 LEDs: presence of auxiliary power supply, ramp in progress / TOR, alarm
- 1 digital input for start command
- 2 relay outputs with normally open contact, programmable on ADXNF and ADXNP, fixed function on ADXNB
- Operating temperature: -20...+60°C (above 40°C with derating of the soft starter current by 1%/°C)
- Storage temperature: -30...+80°C
- Screw fixing or 35mm DIN rail mounting (IEC/EN/BS 60715)
- Protection degree: IP20.

Software Synergy, Xpress, Sam1 and App NFC
See the chapter 36.

Certifications and compliance for soft starters ADXN...
Certifications: cULus, EAC, RCM (pending).
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-2, UL 60947-4-2, CSA C22.2 n° 60947-4-2.

Certifications and compliance for accessories
Certifications: cULus (EXP8007 and CX04), cETLus (only for EXCRDU2), EAC (excluded EXCRDU2).
Compliant with standards: CX01: IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3; CX02: IEC/EN/BS 60950-1, EN 62311, EN301 489-1 V2.2.0, EN 301 489-17 V3.2.0, EN300 328 V2.1.1. SM1X3150R: IEC/EN/BS 60947-1; CX04: IEC/EN/BS 61010-1, UL 61010-1, CSA C22.2 n° 61010-1; EXCRDU2: IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 61000-6-2, IEC61000-6-4.

ADXL... series

ADXL0018600...ADXL0060600

ADXL0135600...ADXL0162600

Order code	IEC rated starter current Ie	Rated motor power ≤40°C IEC (400V)		Qty per pkg	Wt
	[A]	[kW]	[HP]	n°	[kg]
For standard and heavy-duty applications. Built-in bypass relay. Rated operational voltage 208...600VAC. Auxiliary supply voltage 100...240VAC.					
ADXL0018600	18	7.5	10	1	2.100
ADXL0030600	30	15	15	1	2.100
ADXL0045600	45	22	25	1	2.100
ADXL0060600	60	30	30	1	2.100
ADXL0075600	75	37	40	1	2.900
ADXL0085600	85	45	50	1	2.900
ADXL0115600	115	55	60	1	2.900
ADXL0135600	135	75	75	1	7.800
ADXL0162600	162	90	75	1	7.800
ADXL0195600	195	110	100	1	13.900
ADXL0250600	250	132	150	1	13.900
ADXL0320600	320	160	200	1	13.900

IEC power ratings ≤40°C (50Hz)

Order code	Rated starter current Ie	Rated motor power ❶		
		230V	400V	500V
	[A]	[kW]	[kW]	[kW]
ADXL0018600	18	4	7.5	11
ADXL0030600	30	7.5	15	18.5
ADXL0045600	45	11	22	30
ADXL0060600	60	15	30	37
ADXL0075600	75	22	37	45
ADXL0085600	85	22	45	55
ADXL0115600	115	37	55	75
ADXL0135600	135	37	75	90
ADXL0162600	162	45	90	110
ADXL0195600	195	55	110	132
ADXL0250600	250	75	132	160
ADXL0320600	320	90	160	200

UL power ratings ≤40°C (60Hz)

Order code	Rated starter current FLA	Rated motor power ❷				
		208V	220-240V	380-415V	440-480V	550-600V
	[A]	[HP]	[HP]	[HP]	[HP]	[HP]
ADXL0018600	18	5	5	10	10	15
ADXL0030600	28	10	10	15	20	25
ADXL0045600	44	10	15	25	30	40
ADXL0060600	60	20	20	30	40	50
ADXL0075600	75	25	25	40	50	60
ADXL0085600	83	25	30	50	60	75
ADXL0115600	114	40	40	60	75	100
ADXL0135600❸	130	40	50	75	100	125
ADXL0162600❸	156	50	60	75	125	150
ADXL0195600❸	192	60	75	100	150	200
ADXL0250600❸	248	75	100	150	200	250
ADXL0320600❸	320	100	125	200	250	300

❶ Preferred rated values according to IEC/EN/BS 60072-1.
❷ Horsepower and current values according to UL508 (60Hz).
❸ Terminal lug kits and shrouds are required for UL. See page 5-11.

General characteristics

The ADXL soft starter with two phase control and built-in bypass relay allows the control of the start and stop of three-phase asynchronous motors. ADXL is equipped with a backlit display with icons and NFC connectivity, for a simple, intuitive and fast configuration, with smartphones and tablets.
ADXL is ideal for simple "plug and play" applications, thanks to the installation wizard, and for high-performance applications, with control and protection during the motor start-up and operation.
The ADXL includes protection features for the soft starter and motor, and it's possible to enable specific alarms to signal maintenance needs, such as the number of startups performed or the operation hours of the motor.

It has the following main features:
- Two phase control
- Backlit LCD icon display
- Texts available in 6 languages (ENG-ITA-FR-ES-POR-DE)
- Built-in bypass relay
- Voltage or torque ramp startup
- Torque control
- Kick start
- Starting with current limitation
- Free wheel or controlled stop
- 3 programmable digital inputs, one of which configurable as digital or PTC input
- 3 programmable relay outputs: 1 with changeover contact, 2 with NO contact
- 3 indicator LEDs: presence of power supply, ramp in progress/TOR, alarm
- 4 configurable sets of motor parameters
- Optical port for programming, data download and diagnostics with the software Xpress and LOVATO Sam1 App, freely downloadable from Google Play Store and App Store
- NFC connectivity for parameter settings with LOVATO NFC App, freely downloadable from Google Play Store and App Store
- Optional RS485 communication card, Modbus-RTU protocol
- Supervision and energy management software Synergy
- Measures visible on display: max current, phase currents, torque, voltage, active power, power factor, motor thermal status, heatsink temperature, energy, motor hour counter, number of starts counter
- Protections:
  - motor: motor thermal protection with double class (starting and running), protection with PTC probe, locked rotor, current asymmetry, starting too long, low torque, motor not connected
  - auxiliary supply: voltage too low or micro-interruption
  - power line: lack of voltage, phase loss, wrong phase sequence, voltage or frequency out of limits
  - soft starter: overtemperature, overcurrent, thyristor failure, bypass relay failure, temperature sensor failure, fan failure
- Events log.

Operational characteristics
- Rated operational voltage: 208...600VAC ±10%
- Rated frequency: 50/60Hz ±5%
- Auxiliary supply voltage: 100...240VAC
- IEC rated soft starter current Ie from 18 to 320A
- Rated motor current selectable from the 50% to the 100% of rated soft starter current Ie
- Rated motor power 7.5...160kW (400VAC) and 15...300HP (600VAC)
- Operating temperature: -20...+60°C (above 40°C with derating of the soft starter current by 0.5%/°C)
- Storage temperature: -30...+80°C
- Number of starts per hour: see page 5-23.
- Screw fixing or 35mm DIN rail mounting for ADXL0018600...ADXL0115600 with optional accessory EXP8003
- Protection degree: IP00

Certifications and compliance

Certifications obtained: cULus, EAC, RCM.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-2, UL508, CSA C22.2 n°14.

Accessories for ADXL...

CX01

CX02

EXCRDU2

EXC1042

EXCGLB...

EXCCON02

EXCM4G01

EXP8003

EXP8004

EXA01

EXA02

EXA03

EXA04

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Communication devices			
CX01	USB connection device PC ↔ ADXL with optical connector for programming, data download, diagnostics and firmware update	1	0.090
CX02	Wi-Fi connection device PC/smartphone ↔ ADXL for data download,programming, diagnostics and cloning	1	0.090
EXC1042	RS485 communication card, Modbus-RTU protocol	1	0.020
Remote display unit			
EXCRDU2	Remote display unit, widescreen colour LCD graphic display, built-in RS485 port, for the monitoring and control of max 32 starters, IP65, 3m cable included	1	0.420
Gateway and converters			
EXCGLB01	Gateway data logger, 1 RS485 port, 1 Ethernet port, Wi-Fi connection	1	0.190
EXCGLB02	Gateway data logger, 1 RS485 port, 1 Ethernet port, LTE connection, GNSS (GPS)	1	0.190
EXCGLB03	Gateway data logger, 1 RS485 port, 2 Ethernet ports, 4G (LTE) connection	1	0.190
EXCM4G01	4G Gateway with RS485 and Ethernet port, Modbus-RTU/TCP protocol	1	0.300
EXCCON02	RS485/Ethernet converter, 9...48VDC, with Modbus-RTU/TCP protocol conversion functionality	1	0.400
Accessories.			
EXP8003	35mm DIN rail mounting accessory for ADXL0018600... ADXL0115600	1	0.200
EXP8004	Fan for ADXL0018600... ADXL0115600 (codes ADXL0075600...ADXL0115600 max of two EXP8004 fans)	1	0.040
EXA01	Kit of 3 UL terminal lugs for ADXL0135600, ADXL0162600, and ADXL0195600	1	0.141
EXA02	Kit of 3 terminals protection covers for ADXL0135600, ADXL0162600 and ADXL0195600	1	0.125
EXA03	Kit of 3 UL terminal lugs for ADXL0250600 and ADXL0320600	1	0.314
EXA04	Kit of 3 terminals protection covers for ADXL0250600 and ADXL0320600	1	0.154

General characteristics
Communication devices to connect LOVATO Electric products to:
– PC
– Smartphones
– Tablets.

CX01
This USB/optical device, complete with cable, allows the frontal connection of products compatible with PC with Xpress software without the need to remove the power supply from the electric panel.

CX02
Via Wi-Fi connection, compatible LOVATO Electric products can be viewed on PCs, smartphones and tablets with no need for cabling. Compatible with Xpress software and LOVATO Sam1 App.

For dimensions, wiring diagrams and technical characteristics, consult the manuals available on the website www.LovatoElectric.com

EXCRDU2
With the EXCRDU2 remote display unit it is possible to command and monitor up to 32 starters via RS485 communication, at choice between soft starters ADXL... or ADXNP... series and variable speed drives VLB... series.
– Auxiliary power supply: 100...240VAC 50/60Hz, 110...250VDC
– Widescreen colour LCD graphic display 118x96mm
– Isolated RS485 communication port, Modbus-RTU protocol
– Configurable communication parameters
– Integrated optical port for firmware update
– Flush mount, standard 92x92mm cut-out
– Compatible with soft starters ADXL... series equipped with RS485 communication card, code EXC1042
– RS485 cable included, 3m length
– IEC degree of protection: IP65 frontal with gasket (provided as standard), IP20 housing and terminals.

EXGLB..., EXCCON02, EXCM4G01
For details please see section 34.

Certifications and compliance
Certifications obtained: cULus for EXA..., EXP8003 and EXP8004, cETLus for EXCRDU2, EAC (except EXA... and EXCRDU2).
Compliant with standard:
CX01: IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3;
CX02: IEC/EN/BS 60950-1, EN 62311, EN 301 489-1 V2.2.0, EN 301 489-17 V3.2.0, EN 300 328 V2.1.1.
EXC1042: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-2;
EXCRDU2: IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 61000-6-2, IEC61000-6-4.

ADXT... series
In-line connection

ADXT...

Order code	IEC rated soft starter current Ie in-line connection Starting current (starting time)					Qty per pkg	Wt
	3*Ie (10s)	3.5*Ie (15s)	4*Ie (10s)	4*Ie (20s)	5*Ie (5s)		
	[A]	[A]	[A]	[A]	[A]	n°	[kg]
For standard and heavy-duty applications. Built-in bypass contactor. Rated operational voltage 380...690VAC. Auxiliary supply voltage 110...120VAC and 220...240VAC.							
ADXT0034	42	34	34	27	31	1	4.800
ADXT0060	64	62	60	50	53	1	4.900
ADXT0084	105	86	84	68	76	1	5.500
ADXT0104	115	107	104	86	95	1	5.500
ADXT0126	135	129	126	103	115	1	5.500
ADXT0139	184	143	139	115	127	1	12.700
ADXT0165	200	170	165	138	150	1	12.700
ADXT0187	229	194	187	157	170	1	12.700
ADXT0230	250	244	230	200	202	1	12.700
ADXT0311	397	322	311	262	288	1	15.500
ADXT0410	410	410	410	379	400	1	15.500
ADXT0506	550	526	506	427	462	1	19.000
ADXT0554	580	578	554	469	507	1	19.000
Auxiliary supply voltage 24VAC/DC.							
ADXT003424	42	34	34	27	31	1	4.800
ADXT006024	64	62	60	50	53	1	4.900
ADXT010424	115	107	104	86	95	1	5.500
ADXT013924	184	143	139	115	127	1	12.700
ADXT023024	250	244	230	200	202	1	12.700

Inside-delta connection

ADXT...

Order code	IEC rated soft starter current Ie inside-delta connection Starting current (starting time)					Qty per pkg	Wt
	3*Ie (10s)	3,5*Ie (15s)	4*Ie (10s)	4*Ie (20s)	5*Ie (5s)		
	[A]	[A]	[A]	[A]	[A]	n°	[kg]
For standard and heavy-duty applications. Built-in bypass contactor. Rated operational voltage 380...690VAC. Auxiliary supply voltage 110...120VAC and 220...240VAC.							
ADXT0034	63	51	51	41	47	1	4.800
ADXT0060	96	93	90	75	80	1	4.900
ADXT0084	158	129	126	102	114	1	5.500
ADXT0104	173	161	156	129	143	1	5.500
ADXT0126	203	194	189	155	173	1	5.500
ADXT0139	276	215	209	173	191	1	12.700
ADXT0165	300	255	248	207	225	1	12.700
ADXT0187	344	291	281	236	255	1	12.700
ADXT0230	375	366	345	300	303	1	12.700
ADXT0311	596	484	466	393	433	1	15.500
ADXT0410	615	615	615	568	600	1	15.500
ADXT0506	825	789	758	640	694	1	19.000
ADXT0554	870	868	832	704	760	1	19.000
Auxiliary supply voltage 24VAC/DC.							
ADXT003424	63	51	51	41	47	1	4.800
ADXT006024	96	93	90	75	80	1	4.900
ADXT010424	173	161	156	129	143	1	5.500
ADXT013924	276	215	209	173	191	1	12.700
ADXT023024	375	366	345	300	303	1	12.700

General characteristics

ADXT... is a soft starter with three phase control for the progressive starting and stopping of three phase asynchronous motors. It is mainly used for the control of heavy loads, thanks to the high torque available during the starting phase, which allows overcoming the inertia of applications such as crushers, fans, vertical or inclined conveyors, screw compressors, centrifuges, propellers, mills, band or circular saws, shredders, and many others. The entire range integrates a bypass contactor, which allows a reduction of the power consumption and heat dissipation once the motor is started. Programming can be done either through the integrated keyboard with display or from a PC and USB pen drive and it offers advanced features and integrated protections for the motor control.

The main features are the following:
- Three phase control
- Backlit LCD graphic display
- Texts available in 8 languages (English, Italian, French, Spanish, Portuguese, German, Chinese, Russian)
- Built-in bypass contactor
- Several motor control modes available: constant current, current ramp, voltage ramp, adaptive control (starting with acceleration profile that adapts automatically based on information from previous starts)
- Kick start
- Starting with current limitation
- Free wheel or controlled stop
- DC current braking
- Soft brake with braking contactor for loads with high inertia or variable loads requiring maximum possible braking torque
- Pump clean cycles, to temporarily start the motor forwards and backwards via a dedicated input, to remove any debris present in the impeller before starting
- Control of reversing contactor to operate the motor in reverse direction
- Jog operation, with the run of the motor at reduced speed, to allow alignment of the load or to assist servicing
- Possibility to install the soft starter with the in-line connection or inside delta connection (6-wires wiring)
- Timed starting and stopping management based on the clock calendar
- PowerThrough function for motor starting even with damaged soft starter on one phase, with control on two phases
- Emergency mode for the running of the motor ignoring alarm conditions
- 4 digital inputs: 1 for start/stop, 1 for reset, and 2 programmable
- 1 thermistor input
- 3 relay outputs: 1 programmable with changeover contact, 2 with NO contact (1 for line contactor control and 1 programmable)
- 1 programmable analog output, type 0/4…20mA
- 4 indicator LEDs: soft starter ready, ramp in progress/TOR, alarm, control with remote keypad
- 2 configurable sets of motor parameters
- Integrated USB port for parameter transfer and event log export to csv file on USB pen drive
- Optional RS485 communication card, Modbus-RTU protocol
- Optional Ethernet communication card, Modbus-TCP protocol
- Measures visible on display: current, motor voltage, phase voltage, mains frequency, motor power factor, motor power, motor temperature %, operating hours, number of starts, analog output value, heatsink temperature, SCR temperature, soft starter thermal capacity, information about the last start
- User-configurable display screens
- Real-time performance trend on display
- Protections:
  - motor: thermal protection, overtemperature, overcurrent, locked rotor, current asymmetry, starting too long, current too low, power too high or too low, motor not connected
  - auxiliary supply: voltage too low
  - power line: lack of voltage, phase loss, wrong phase sequence, voltage or frequency out of limits
  - soft starter: overtemperature, overcurrent, thyristors failure, bypass overload
- Events log
- Calendar clock.

ADXT... series

Rated power
In-line connection

Order code	Rated soft starter current Ie (starting 4*Ie 10s)	Rated motor power IEC ≤40°C (50Hz)			Rated motor power UL ≤40°C (60Hz)		
		400V	500V	690V	380-415V	440-480V	550-600V
	[A]	[kW]	[kW]	[kW]	[HP]	[HP]	[HP]
Auxiliary supply voltage 110...120VAC and 220...240VAC.							
ADXT0034	34	18.5	22	30	20	25	30
ADXT0060	60	30	37	55	30	40	50
ADXT0084	84	45	55	75	50	60	75
ADXT0104	104	55	75	90	60	75	100
ADXT0126	126	55	90	110	75	100	125
ADXT0139	139	75	90	132	75	100	125
ADXT0165	165	90	110	160	100	125	150
ADXT0187	187	90	132	185	100	150	200
ADXT0230	230	132	160	200	125	150	200
ADXT0311	311	160	220	315	150	250	300
ADXT0410	410	220	280	400	250	300	400
ADXT0506	506	280	355	500	300	400	500
ADXT0554	554	315	400	560	300	450	500
Auxiliary supply voltage 24VAC/DC.							
ADXT003424	34	18.5	22	30	20	25	30
ADXT006024	60	30	37	55	30	40	50
ADXT010424	104	55	75	90	60	75	100
ADXT013924	139	75	90	132	75	100	125
ADXT023024	230	132	160	200	125	150	200

Rated power
Inside delta connection

Order code	Rated soft starter current Ie (starting 4*Ie 10s)	Rated motor power IEC ≤40°C (50Hz)			Rated motor power UL ≤40°C (60Hz)		
		400V	500V	690V	380-415V	440-480V	550-600V
	[A]	[kW]	[kW]	[kW]	[HP]	[HP]	[HP]
Auxiliary supply voltage 110...120VAC and 220...240VAC.							
ADXT0034	51	22	30	45	30	30	40
ADXT0060	90	45	55	75	50	60	75
ADXT0084	126	55	75	110	60	100	125
ADXT0104	156	75	110	132	75	125	150
ADXT0126	189	90	132	160	100	150	150
ADXT0139	209	110	132	200	125	150	200
ADXT0165	248	132	160	200	150	200	250
ADXT0187	281	160	200	250	150	200	250
ADXT0230	345	160	250	315	200	250	350
ADXT0311	466	250	315	400	250	350	450
ADXT0410	615	355	400	630	350	500	600
ADXT0506	758	400	500	710	400	600	700
ADXT0554	832	450	600	800	500	600	700
Auxiliary supply voltage 24VAC/DC.							
ADXT003424	51	22	30	45	30	30	40
ADXT006024	90	45	55	75	50	60	75
ADXT010424	156	75	110	132	75	125	150
ADXT013924	209	110	132	200	125	150	200
ADXT023024	345	160	250	315	200	250	350

Operational characteristics
- Rated operational voltage: 380...690VAC ±10%
- Rated frequency: 50/60Hz ±5%
- Auxiliary supply voltage:
  - ADXT...: 110...120VAC and 220...240VAC -15%/+10%
  - ADXT...24: 24VAC/DC ±20%
- IEC rated soft starter current Ie from 34 to 554A
- Possibility to increase the rated current for light loads (see the selection table at page 5-12)
- Rated motor power 18.5...315kW (400VAC), 20...300HP (400VAC)
- Operating temperature: -10...+60°C (above 40°C with derating of the soft starter current, see the technical manual, available on the website www.LovatoElectric.com)
- Storage temperature: -25...+60°C
- Number of starts per hour: see the technical manual, available on the website www.LovatoElectric.com
- Screw fixing
- Protection degree: IP20 up to ADXT0126, IP00 for higher sizes (IP20 with fingerguards type ADXTFG)

Certifications and compliance
Certifications (pending): cULus, RCM.
Compliant with standards: IEC/EN/BS 60947-4-2, UL 60947-4-2, CSA C22.2 n°60947-4-2.

Accessories for ADXT...

ADXTRTU

ADXTTCP

ADXTC01KIT

ADXTFG

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Communication cards.			
ADXTRTU	RS485 communication card, Modbus-RTU protocol❶	1	0.330
ADXTTCP	Ethernet communication card, Modbus-TCP protocol ❶	1	0.330
Accessories.			
ADXTC01KIT	Remote keypad kit composed by IP65 type 12 remote keypad ADXTC01, connection card to ADXT... and connection cable 3m length	1	0.560
ADXTFG	IP20 fingerguards kit for ADXT0139...ADXT0554	6	0.850

❶ The communication cards integrate the port for the connection of the optional ADXTC01 remote keypad.

General characteristics

COMMUNICATION CARDS

The ADXTRTU and ADXTTCP cards equip the ADXT soft starter with a communication port type RS485 (Modbus-RTU) or Ethernet (Modbus-TCP) for interfacing with a control and monitoring system. The cards integrate also the DB9 connector for the connection of the optional remote keypad type ADXTC01.

REMOTE KEYPAD KIT

The ADXTC01 remote keypad allows the control and monitoring of the ADXT soft starter from the panel door. With the keypad, it is possible to control the motor's start and stop operations and set the parameters. The kit includes the remote keypad, a card for the connection of the keypad to the soft starter (not necessary if ADXT is already equipped with a communication card type ADXTRTU or ADXTTCP), DB9 connection cable, IP65 gasket, and fixing screws.

FINGERGUARDS KIT

They are installed on the power terminals of the ADXT0139...ADXT0554 soft starters to prevent accidental contact with live terminals. The kit includes 6 terminal covers with respective mounting brackets and cable ties, offering IP20 protection when used with cables of diameter equal to or greater than 22mm.

Certifications and compliance

Certifications (pending): cULus for ADXTC01KIT.
Compliant with standards: ADXTC01KIT: IEC/EN/BS 60947-4-2, IEC/EN/BS 60529, UL60947-4-2, CSA C22.2 n° 60947-4-2.
ADXTRTU and ADXTTCP: IEC/EN/BS 60947-4-2.

51ADX... series

51ADX0017B...51ADX0045B

51ADX0060B...51ADX0085B

51ADX0110B...51ADX0125B

Order code	IEC rated starter current Ie	IEC rated motor power ≤40°C 400V	380-415V	Qty per pkg	Wt
	[A]	[kW]	[HP]	n°	[kg]
For severe duty. Built-in bypass contactor. Rated operational voltage 208...500VAC. Auxiliary supply voltage 208...240VAC.					
51ADX0017B	17	7.5	7.5	1	8.970
51ADX0030B	30	15	15	1	9.240
51ADX0045B	45	22	25	1	9.240
51ADX0060B	60	30	30	1	14.200
51ADX0075B	75	37	40	1	14.400
51ADX0085B	85	45	50	1	14.400
51ADX0110B	110	55	60	1	17.700
51ADX0125B	125	55	60	1	17.700
51ADX0142B	142	75	75	1	28.000
51ADX0190B	190	90	100	1	37.300
51ADX0245B	245	132	150	1	39.300
For severe duty. Predisposed for external bypass contactor. Rated operational voltage 208...415VAC. Auxiliary supply voltage 208...240VAC.					
51ADX0310	310	160	150	1	48.900
51ADX0365	365	200	200	1	49.300
51ADX0470	470	250	250	1	95.000
51ADX0568	568	315	350	1	95.000
51ADX0640	640	355	400	1	106.000

General characteristics
The 51ADX... is a soft starter with three phase control for the progressive starting and stopping of three phase asynchronous motors. Its high robustness and the considerable torque available during the startup make it the ideal solution for controlling heavy loads with high inertia, such as fans, cutting machines, turbines, crushers, mixers, band saws, mills, crushers, etc.... Startup can be performed using a voltage ramp with torque control and limitation of the maximum starting current. The internal bypass contactor (built-in only on versions 51ADX...B) allows for a drastic reduction in heat dissipation once the ramp is completed, reducing the need for oversized electrical panels or ventilation systems.

The main features are the following:
- Three phase control
- Backlit LCD display 2 rows x 16 characters
- Texts available in 4 languages (English, Italian, French, Spanish)
- Built-in bypass contactor up to size 245A (51ADX...B), predisposed for external bypass contactor for the higher sizes
- Starting with voltage ramp with torque control, starting with current limiting, torque boost
- Free wheel or controlled stop, dynamic breaking
- In emergency conditions: starting without protection, direct-on-line starting using integrated bypass contactor
- 3 digital inputs: start and stop/reset + 1 programmable digital/analog
- 4 relay outputs: 1 with changeover contact for alarm signaling, 3 programmable with NO contact
- 1 programmable analog output, type 0/4…20mA
- 3 indicator LEDs: presence of power supply, ramp in progress/TOR, alarm
- 2 configurable sets of motor parameters
- Built-in RS232 port with Modbus-RTU protocol for setup and control from PC with 51ADXSW software, freely downloadable from the website www.LovatoElectric.com. The connection between 51ADX and PC can be made through 51C2 serial cable, RS232/RS485 converter or GSM modem
- Built-in RS485 port for the connection to the 51ADXTAST remote keypad through 51C8 cable (included with the remote keypad, 3m length) for setup, measures monitoring and parameter transfer
- Measures visible on display: phase voltage, phase currents, active and apparent power, power factor, energy
- Protections:
  - motor: motor thermal protection with double class (starting and running) or by PTC sensor, locked rotor, current asymmetry, minimum torque and starting time too long
  - auxiliary supply: voltage too low
  - power line: lack of voltage, phase loss, wrong phase sequence, voltage or frequency out of limits
  - soft starter: overtemperature, overcurrent, thyristors failure, bypass failure
- Events log
- Calendar clock with backup battery.

Operational characteristics
- Rated operational voltage:
  - 208...500VAC ±10% (51ADX...B)
  - 208...415VAC ±10% (51ADX...)
- Rated frequency: 50/60Hz ±5%
- Auxiliary supply voltage: 208...240VAC ±10%
- IEC rated soft starter current Ie:
  - 17A...245A (51ADX...B)
  - 310A...640A (51ADX...)
- Overload current:
  - 105% Ie for 51ADX...B
  - 115% Ie for 51ADX...
- Operating temperature: -10...+55°C (above 45°C with derating of the soft starter current by 1.5%/°C)
- Storage temperature: -30...+70°C
- Number of starts per hour: see the technical manual available on the website www.LovatoElectric.com
- Screw fixing
- Protection degree: IP20 for 51ADX0017B…51ADX0125B, IP00 for higher sizes.

Certifications and compliance
Certifications: EAC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-2.

Accessories for 51ADX...

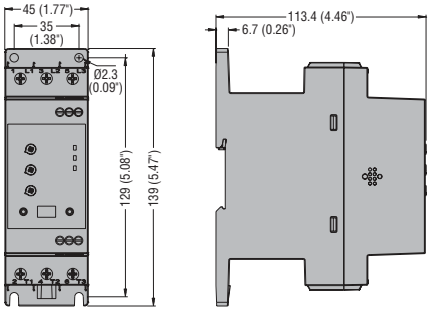
51ADXTAST

51C4

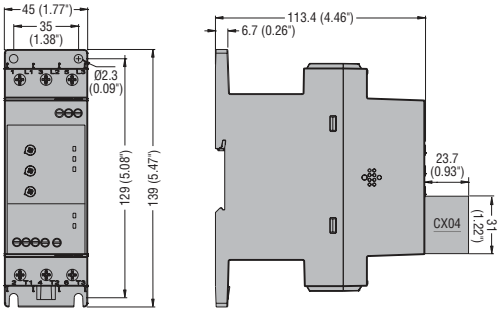
Order code	Description	Qty per pkg	Wt
		n°	[kg]
51ADXTAST	Remote keypad 96x96mm, IP41 2x16 characters backlit LCD, 208...240VAC supply, provided with 51C8 cable, 3m/10ft length	1	0.350
31PA96X96	IP54 protective cover for remote keypad 51ADXTAST	1	0.076
51C2	PC (RS232) ↔ 51ADX connecting cable, 1.8m/6ft length	1	0.062
51C4	PC (RS232) ↔ RS232/ RS485 converter drive connecting cable, 1.8m/6ft length	1	0.147
51C6	51ADX ↔ RS232/RS485 converter drive connecting cable, 1.8m/6ft length	1	0.102
51C8	51ADX ↔ 51ADXTAST remote keypad connecting cable, 3m/10ft length	1	0.080

SOFT STARTER

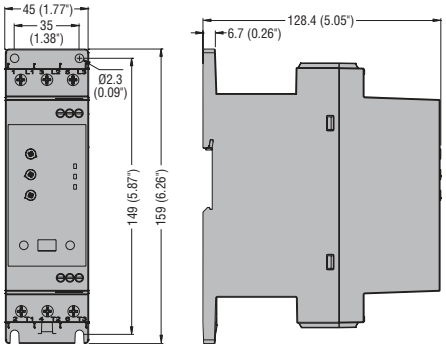
ADXN...006... - ADXN...018...



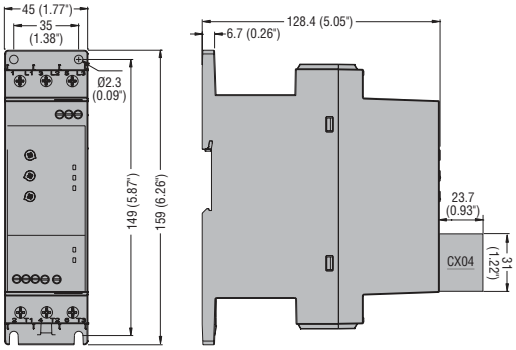
ADXNP006... - ADXNP018... with CX04 RS485 communication module.



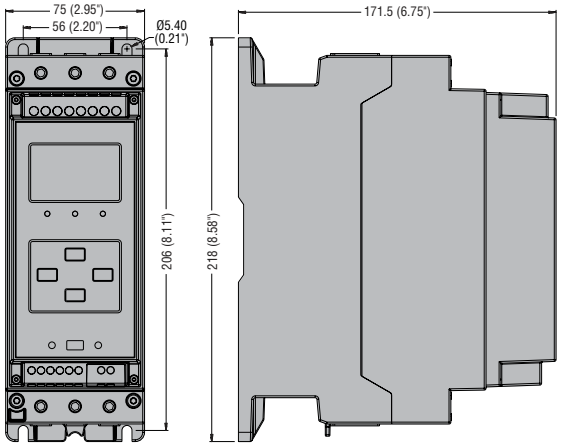
ADXN...025... - ADXN...045...



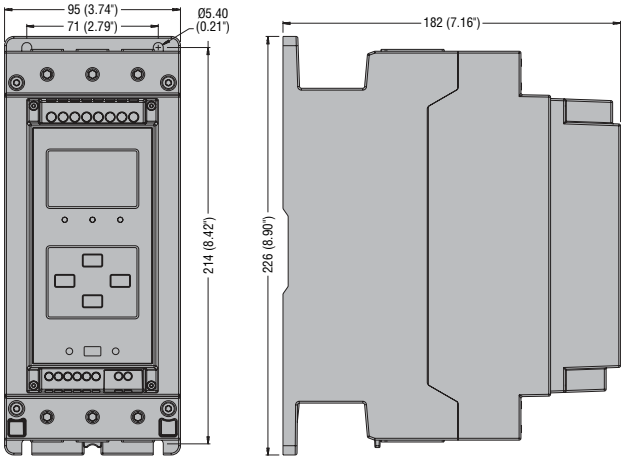
ADXNP025... - ADXNP045... with CX04 RS485 communication module.



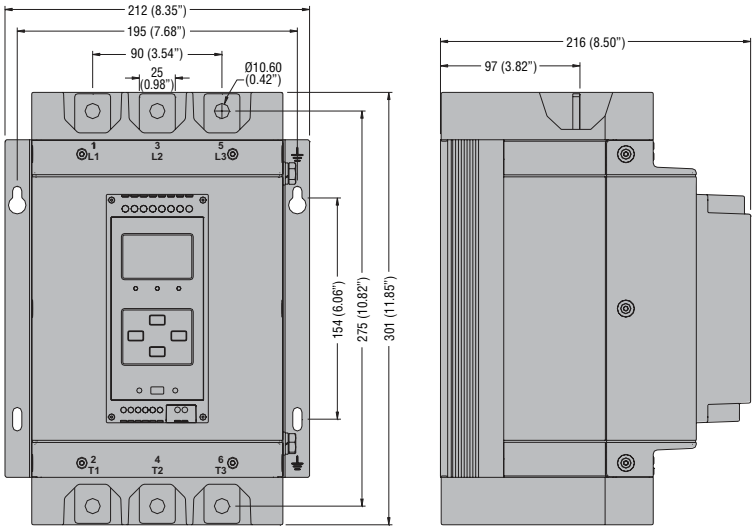
ADXL0018600...ADXL0060600



ADXL0075600...ADXL0115600

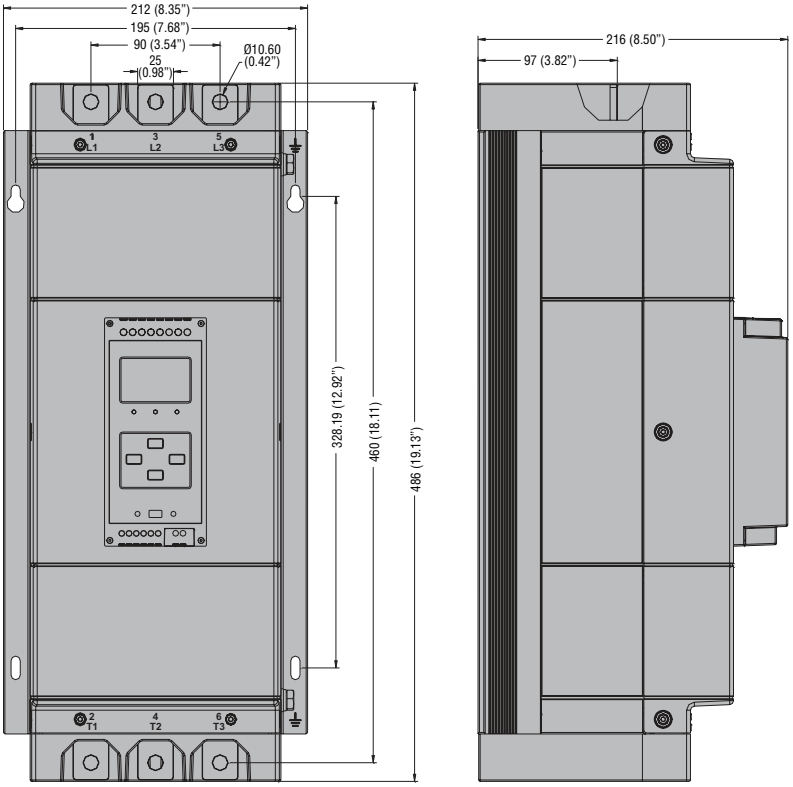


ADXL0135600 - ADXL0162600



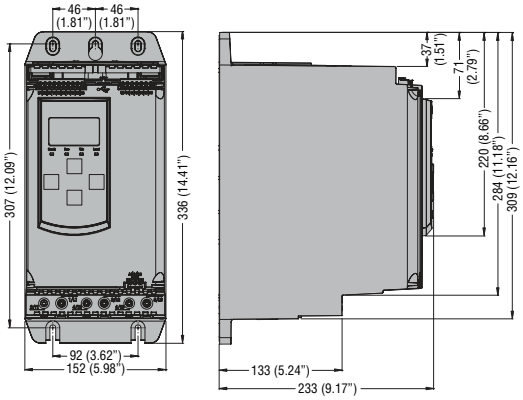
For the dimensions of ADXL0135600 and ADXL0162600 complete with UL terminal lugs and protection covers (type EXA...) refer to the technical manual of the ADXL soft starters, available on the website www.LovatoElectric.com.

ADXL0195600...ADXL0320600

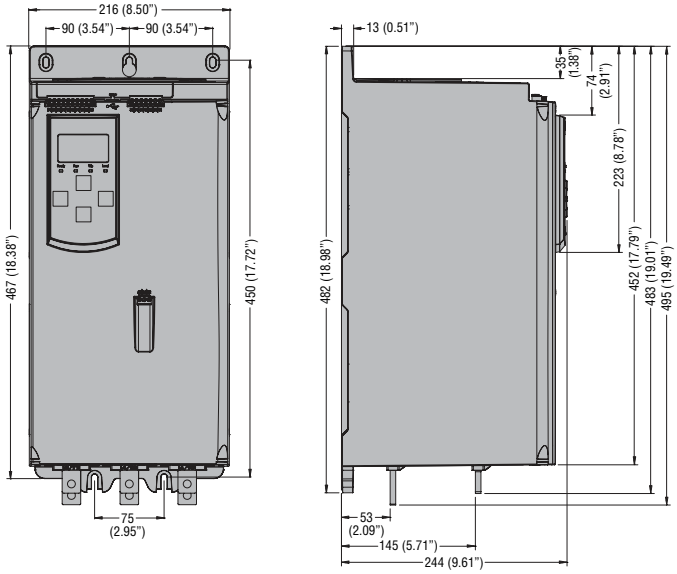


For the dimensions of ADXL0195600, ADXL0250600 and ADXL0320600 complete with UL terminal lugs and protection covers (type EXA...) refer to the technical manual of the ADXL soft starters, available on the website www.LovatoElectric.com.

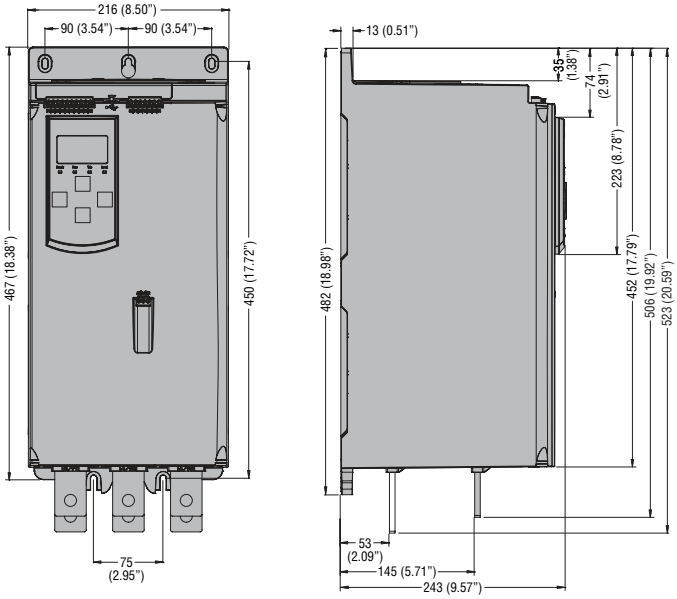
ADXT0034...ADXT0126



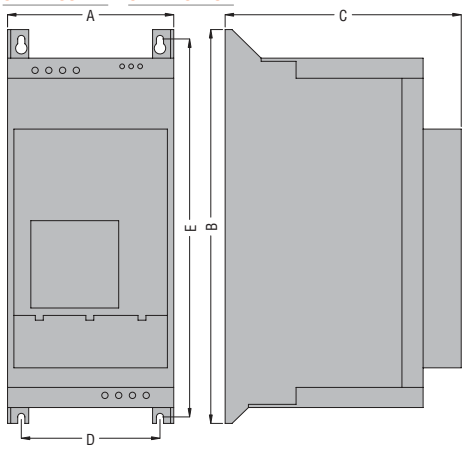
ADXT0139...ADXT0230



ADXT0311...ADXT0554

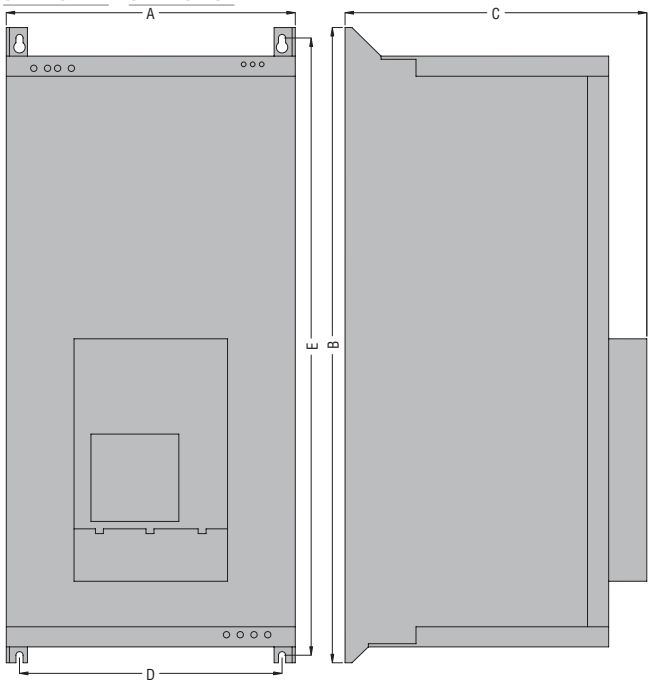


51ADX0017B...51ADX0125B



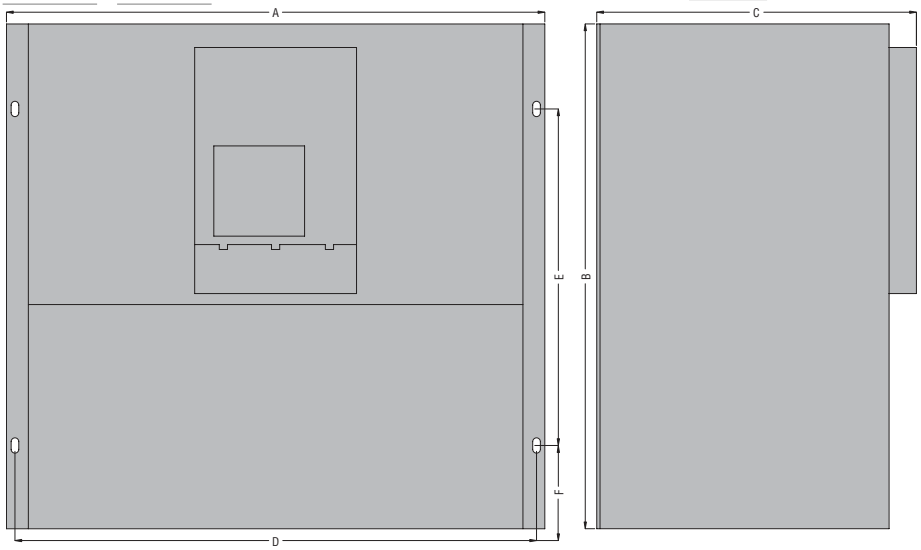
TYPE	A	B	C	D	E
51ADX0017B	157 (6.18")	372 (14.64")	223 (8.78")	131 (5.16")	357 (14.05")
51ADX0030B	157 (6.18")	372 (14.64")	223 (8.78")	131 (5.16")	357 (14.05")
51ADX0045B	157 (6.18")	372 (14.64")	223 (8.78")	131 (5.16")	357 (14.05")
51ADX0060B	157 (6.18")	534 (21.02")	250 (9.84")	132 (5.20")	517 (20.35")
51ADX0075B	157 (6.18")	534 (21.02")	250 (9.84")	132 (5.20")	517 (20.35")
51ADX0085B	157 (6.18")	534 (21.02")	250 (9.84")	132 (5.20")	517 (20.35")
51ADX0110B	157 (6.18")	584 (22.99")	250 (9.84")	132 (5.20")	567 (22.32")
51ADX0125B	157 (6.18")	584 (22.99")	250 (9.84")	132 (5.20")	567 (22.32")

51ADX0142B...51ADX0245B



TYPE	A	B	C	D	E
51ADX0142B	273 (10.75")	600 (23.62")	285 (11.22")	230 (9.05")	560 (25.20")
51ADX0190B	273 (10.75")	680 (26.77")	310 (12.20")	230 (9.05")	640 (25.20")
51ADX0245B	273 (10.75")	680 (26.77")	310 (12.20")	230 (9.05")	640 (25.20")

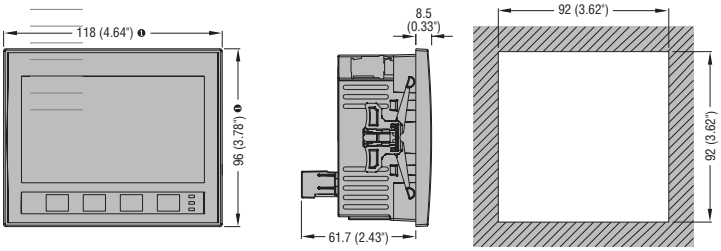
51ADX0310...51ADX0640



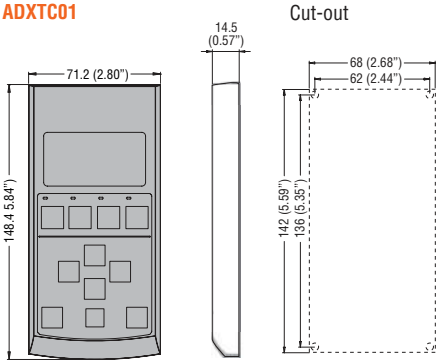
TYPE	A	B	C	D	E	F
51ADX0310	640 (25.20")	600 (23.62")	380 (14.96")	620 (24.41")	400 (15.75")	100 (3.94")
51ADX0365	640 (25.20")	600 (23.62")	380 (14.96")	620 (24.41")	400 (15.75")	100 (3.94")
51ADX0470	790 (31.10")	650 (25.59")	430 (16.93")	770 (30.31")	450 (17.72")	100 (3.94")
51ADX0568	790 (31.10")	650 (25.59")	430 (16.93")	770 (30.31")	450 (17.72")	100 (3.94")
51ADX0640	790 (31.10")	650 (25.59")	430 (16.93")	770 (30.31")	450 (17.72")	100 (3.94")

REMOTE KEYPADS

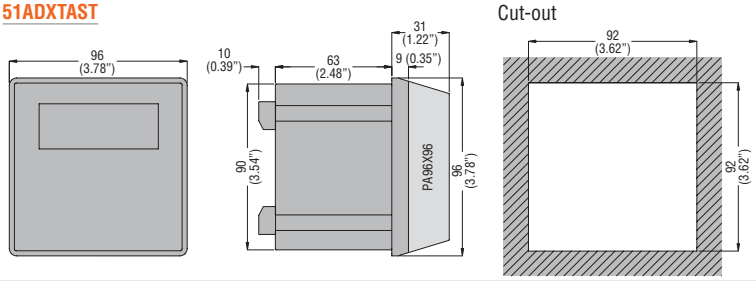
EXCRDU2



ADXTC01



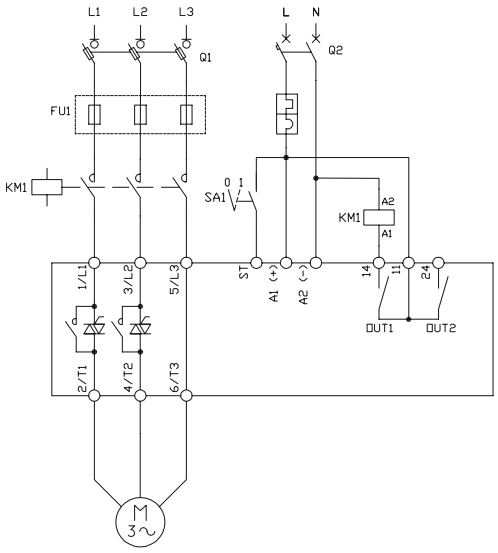
51ADXTAST



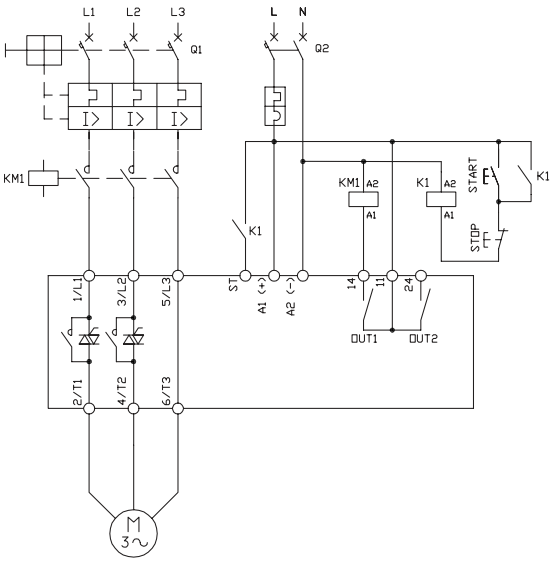
❶ Dimensions with gasket: 122x100mm.

ADXN...

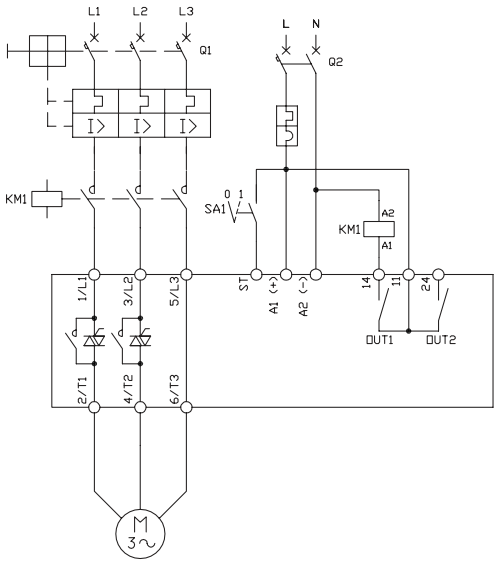
Switch disconnector + fuses + contactor, control by switch (type 0-1)



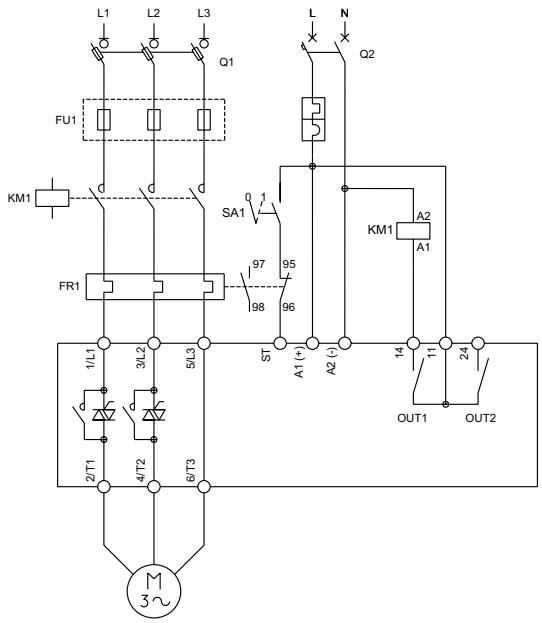
MPCB + contactor, control by pushbuttons



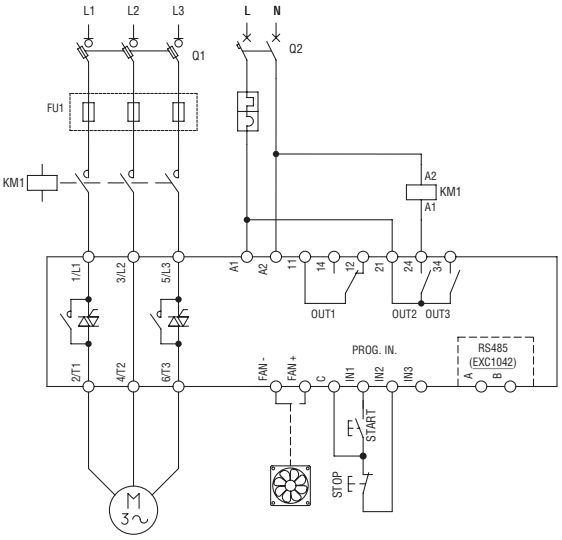
MPCB + contactor, control by switch (type 0-1)



Switch disconnector + fuses + contactor + thermal overload relay, control by switch (type 0-1)

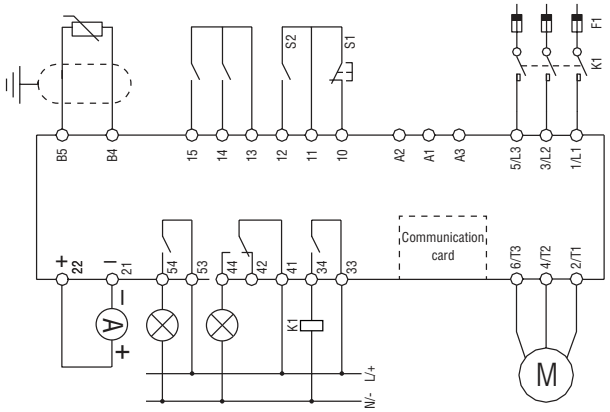


ADXL...

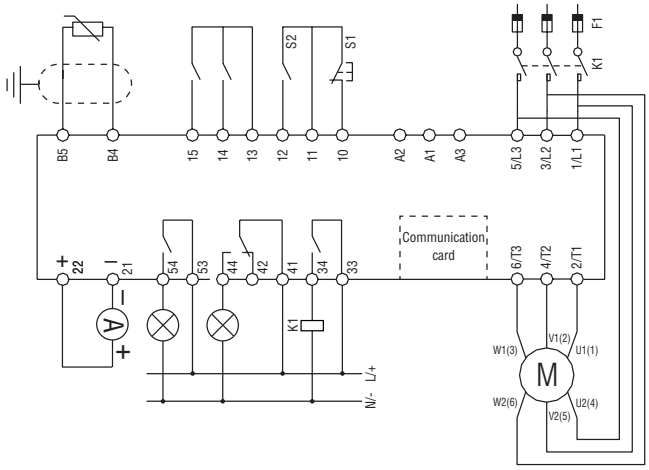


ADXT...

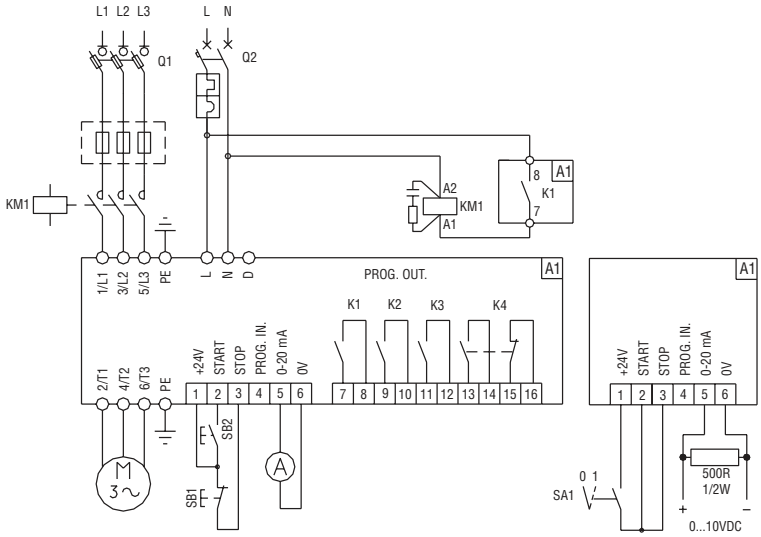
In-line connection



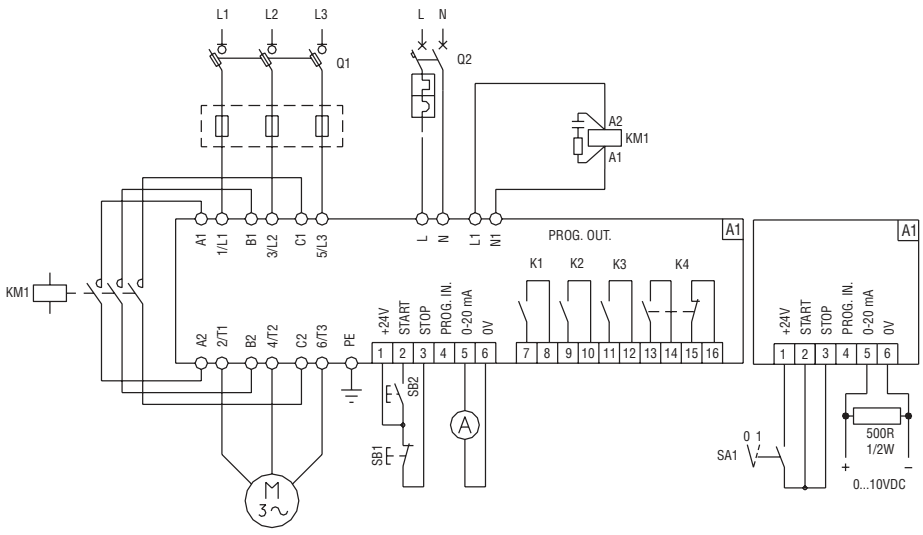
Inside delta connection



51ADX...B



51ADX...



TYPE (with 2 controlled phases)		ADXNB...	ADXNF...	ADXNP...
Motor	Type	Asynchronous three phase		
	Power	1.1...11kW (230VAC), 2.2...22kW (400VAC), 3...30kW (500VAC) 1.5...15HP (220-240VAC), 3...30HP (440-480VAC), 5...40HP (550-600VAC)		
	Rated current	6...45A		
Supply voltage	Line voltage	208...600VAC ±10%		
	Auxiliary supply voltage	100...240VAC for ADXN..., 24VAC/DC for ADXN...24 -15%/+10%		
	Frequency	50 or 60Hz ±5%		
Bypass relay		Integrated		
Cooling system	Natural	ADXN...006... - ADXN...030...		
	Forced	ADXN...038... - ADXN...045..., optional for ADXN...006... - ADXN...030...		
Number of starts per hour		See page 5-23		
PROTECTIONS				
Line voltage		Lack of line voltage, phase loss, voltage out of limits, frequency out of limits, wrong phase sequence		
Motor		–	–	Electronic current thermal protection (overload), locked rotor, current asymmetry, load too low, starting too long
Soft starter		Overtemperature	Overtemperature	Overcurrent and overtemperature
START AND STOP SETTINGS				
Starting		Voltage ramp	Voltage ramp	Voltage ramp with current limit
Stop		Voltage ramp or free-wheel stop		
Braking		–		
PROGRAMMING INTERFACES				
Potentiometers		Settings: starting voltage, acceleration ramp time, deceleration ramp time	–	Settings: starting voltage, acceleration ramp time, deceleration ramp time. Note. The potentiometers can be disabled via NFC.
NFC connectivity		–	Settings: starting voltage, acceleration ramp time, deceleration ramp time, protection thresholds, password, relay outputs function and alarm properties	Settings: rated motor current, starting current limit, thermal protection class, protection thresholds, communication parameters, password, relay outputs function and alarm properties
Optical port		–	–	Connection with USB device CX01 for the connection to a PC with Xpress software. Connection to Wi-Fi device CX02 for the connection to a PC with Xpress software or Android and iOS smartphone and tablet with LOVATO SAM1 App. Connection of the RS485 communication module CX04, Modbus-RTU protocol.
LEDs		3: POWER (presence of auxiliary power supply), RUN (ramp in progress/Top Of Ramp), ALARM (alarm, with identification of the type of active alarm with number of flashes of the LED)		
DIGITAL INPUT ST (start)				
Input type		Volt-free contact		
Input function		Motor start		
RELAY OUTPUTS				
Number of outputs		2		
Outputs arrangement		2 NO contacts with the same common, 5A 250VAC AC1 – 5A 30VDC		
Outputs function		Line contactor, TOR (Top Of Ramp)	Programmable: Line contactor, TOR (Top Of Ramp), alarm	Programmable: Line contactor, TOR (Top Of Ramp), alarm, max torque
COMMUNICATION INTERFACES				
RS485 port		–	–	Optional, with communication module CX04 (RS485, Modbus-RTU protocol)
AMBIENT CONDITIONS				
Operating temperature		-20...+60°C (above 40°C with derating of the starter current by 1%/°C)		
Storage temperature		-30...+80°C		
Relative humidity		<80%		
Maximum altitude		1000m without derating (above 1000m with derating of starter current ❶)		
Pollution degree		2		
Overvoltage category		III		
Operating position		Vertical		
HOUSING				
Mounting		Screw fixing or mounting on 35mm DIN rail (IEC/EN/BS 60715)		
IEC degree of protection		IP20		

❶ Consult the ADXN technical manual, available on the website www.LovatoElectric.com.

TYPE (with 2 controlled phases)		**ADXL...600**
Motor	Type	Asynchronous three phase
	Power	7.5...160kW (400VAC) 15...300HP (550...600VAC)
	Rated current	18...320A (the motor current can be set between the 50% and 100% of the rated soft starter current Ie)
Supply voltage	Line voltage	208...600VAC ±10%
	Auxiliary supply voltage	100...240VAC ±10%
	Frequency	50 or 60Hz ±5%
Bypass relay		Integrated
Cooling system	Natural	ADXL0018600...ADXL0115600
	Forced	ADXL0135600...ADXL0320600 Optional for ADXL0018600...ADXL0115600
Number of starts per hour		See table at page 5-23
PROTECTIONS		
Auxiliary supply		Voltage too low
Line voltage		Lack of line voltage, phase loss, voltage out of limits, frequency out of limits, wrong phase sequence
Motor		Overload at starting (trip class 2, 10A, 10, 15, 20, 25, 30, 35 and 40), overload during running (trip class 2, 10A, 10, 15, 20, 25 and 30), locked rotor, current asymmetry, minimum torque and starting too long
Soft starter		Overcurrent and overtemperature
START AND STOP SETTINGS		
Starting		Torque ramp with current limit, voltage ramp with current limit
Stop		Torque ramp, voltage ramp or free-wheel stop
Braking		—
DISPLAY AND PROGRAMMING		
		Using the built-in keyboard and display, PC with CX01 and CX02 with software Xpress, smartphone or tablet with LOVATO NFC App or LOVATO SAM1 App with CX02 and remote display unit EXCRDU2 with EXC1042
Display		Backlit icon LCD display
Measure view		Maximum current, L1 current, L2 current, L3 current, torque, line voltage, power factor, motor thermal status, soft starter temperature, active power, active energy, motor hour counter, startup counter
Other views		Operational status, events, alarms, measures
LEDs		3: POWER (presence of auxiliary supply voltage), RUN (ramp in progress/bypass), ALARM (alarm)
DIGITAL INPUTS		
Number of inputs		3
Input type		2 programmable digital inputs with volt-free contact, 1 programmable input configurable as digital input with volt-free contact or PTC input
Inputs function		OFF, motor start, motor stop, free-wheel stop, motor preheating, local control, alarm inhibition, thermal status reset, keyboard lock, motor selection, user alarm, command, alarm reset
RELAY OUTPUTS		
Number of outputs		3
Outputs arrangement		- 2 NO programmable: 3A 250VAC AC1 - 3A 30VDC - 1 changeover programmable: NO contact 5A 250VAC AC1 - 5A 30VDC; NC contact 3A 250VAC AC1 - 3A 30VDC
Outputs function		OFF, line contactor, run (ramp completed), global alarm, limits, remote variable, alarm
COMMUNICATION INTERFACES		
		NFC, front optical port, optional RS485 (EXC1042)
VARIOUS FUNCTIONS		
Calendar clock		—
Event memory		60 events
Operational data memory		Energy meter, startup counter, motor hour meter and maintenance hour counter
AMBIENT CONDITIONS		
Operating temperature		-20...+60°C (above 40°C with derating of starter current by 0.5%/°C)
Storage temperature		-30°...+80°C
Maximum altitude		1000m without derating (above 1000m with derating of starter current of 0.5%/100mt)
Pollution degree		2
Operating position		Vertical
HOUSING		
Mounting		Screw-mount on panel or 35mm DIN rail (IEC/EN/BS 60715) with EXP8003 accessory for ADXL0018600...ADXL0115600
IEC degree of protection		IP00

NUMBER OF STARTS PER HOUR ADXN... SERIES
The following data are based on an ambient temperature of 40°C, starting current of 4*In and ramp time 6 seconds. In=Rated motor current.

	NUMBER OF STARTS PER HOUR WITHOUT FAN																			
In	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
3A	ADXN006																			
6A	ADXN006												ADXN012							
9A	ADXN012								ADXN018											
12A	ADXN012 - ADXN018																			
18A	ADXN018		ADXN025		ADXN030															
25A	ADXN025		ADXN030																	
30A	ADXN030																			
38A																				
45A																				

ADXN038… and ADXN045… have built-in fan

	NUMBER OF STARTS PER HOUR WITH FAN																			
In	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
3A	ADXN006																			
6A	ADXN006																		ADXN012	
9A	ADXN012																		ADXN018	
12A	ADXN012														ADXN018				ADXN025	
18A	ADXN018												ADXN025			ADXN030				
25A	ADXN025														ADXN030					
30A	ADXN030												ADXN038		ADXN045					
38A	ADXN038								ADXN045											
45A	ADXN045																			

NUMBER OF STARTS PER HOUR ADXL... SERIES
The following data are based on an ambient temperature of 40°C, starting current of 4*In and ramp time 6 seconds. In=Rated motor current.

	NUMBER OF STARTS PER HOUR WITHOUT FAN																			
In	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
16A	ADXL0018600										ADXL0030600									
30A	ADXL0030600								ADXL0045600				ADXL0060600							
37A	ADXL045600							ADXL0060600			ADXL0075600									
45A	ADXL0045600					ADXL0060600		ADXL0075600				ADXL0085600								
60A	ADXL0060600			ADXL0075600			ADXL0085600	ADXL0115600												
66A	ADXL0075600					ADXL0085600	ADXL0115600													
75A	ADXL0075600			ADXL0085600	ADXL0115600															
85A	ADXL0085600			ADXL0115600																
97A	ADXL0115600																			
115A	ADXL0115600																			
135A																				
162A																				
195A																				
250A																				
320A																				

ADXL0135600...ADXL0320600 have two integrated fans as standard

	NUMBER OF STARTS PER HOUR WITH FAN																			
In	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
16A	ADXL0018600														ADXL0030600					
30A	ADXL0030600												ADXL0045600				ADXL0060600			
37A	ADXL0045600													ADXL0060600					ADXL0075600	
45A	ADXL0045600												ADXL0060600				ADXL0075600		ADXL0085600	
60A	ADXL0060600									ADXL0075600					ADXL0085600			ADXL0115600		
66A	ADXL0075600													ADXL0085600			ADXL0115600			
75A	ADXL0075600												ADXL0085600			ADXL0115600		ADXL0135600		
85A	ADXL0085600											ADXL0115600				ADXL0135600			ADXL0162600	
97A	ADXL0115600										ADXL0135600			ADXL0162600				ADXL0195600		
115A	ADXL0115600								ADXL01355600					ADXL0162600			ADX0 ADXL0195600			
135A	ADXL0135600										ADXL0162600					ADXL0195600			ADXL0250600	
162A	ADXL0162600								ADXL0195600				ADXL0250600				ADXL0320600			
195A	ADXL0195600										ADXL0250600				ADXL0320600					
250A	ADXL0250600						ADXL0320600													
320A	ADXL0320600																			

TYPE (with 3 controlled phases)		**ADXT...**
Motor	Type	Asynchronous three phase
	Power at 400VAC	18.5...315kW (400VAC), 20...300HP (400VAC)
	Rated current	See the selection tables at page 5-12 and 5-13
Supply voltage	Line voltage	380...690VAC ±10%
	Auxiliary supply voltage	ADXT...: 110...120VAC and 220...240VAC -15%/+10%, ADXT...24: 24VAC/DC ±20%
	Frequency	50 or 60Hz ±5%
Bypass contactor		Integrated
Cooling system		Forced
PROTECTIONS		
Auxiliary supply		Voltage too low
Line voltage		Lack of line voltage, phase loss, voltage out of limits, frequency out of limits and wrong phase sequence
Motor		Thermal protection, overtemperature, overcurrent, locked rotor, current asymmetry, starting too long, current too low, power too low or too high, motor not connected
Soft starter		Overcurrent and overtemperature
START AND STOP SETTINGS		
Starting		Constant current, current ramp, voltage ramp, adaptive control
Stop		Voltage ramp, adaptive control or free-wheel stop
Braking		DC braking, soft brake with braking contactor
DISPLAY AND PROGRAMMING		
		Using the built-in keypad and display, PC with software ADXTSW and USB pen drive
Display		Backlit LCD graphic display
Measure view		Current, motor voltage, phase voltage, network frequency, motor power factor, motor power, motor temperature %, motor hour counter, number of starts, analog output value, heatsink temperature, SCR temperature, soft starter thermal capacity
Other views		Status, events, alarms, performance trend
LED		4: READY (soft starter ready), RUN (ramp in progress/TOR), ALARM (alarm), REMOTE (control via optional remote keypad)
DIGITAL AND ANALOG INPUTS		
Number of inputs		5
Inputs type		4 digital inputs with volt-free contact (2 for start/stop and reset, 2 programmable), 1 input for motor thermistor
Inputs function		Input trip, zero speed sensor, motor set select, emergency mode, reverse direction, jog forward, jog reverse, pump clean
RELAY OUTPUTS		
Number of outputs		3
Output arrangement		2 NO (1 for line contactor + 1 programmable) + 1 C/O (programmable): 10A 250VAC AC1, 5A 250VAC AC15
Outputs function		Off, ready, line contactor, run (TOR), warning, alarm, low current, high current, motor overtemperature, soft brake relay, reversing contactor, failsafe alarm
ANALOG OUTPUT		
Type		0...20mA or 4...20mA
Associated measure		Current %, motor temperature %, motor power factor, motor power %, heatsink temperature
COMMUNICATION INTERFACES		
RS485		Optional, with ADXTRTU card, Modbus-RTU protocol
Ethernet		Optional, with ADXTTCP card, Modbus-TCP protocol
USB		Integrated, for loading configuration files, download parameters and event logs
VARIOUS FUNCTIONS		
Calendar clock		Calendar clock with backup battery
Event memory		384 events with date and time
Operational data memory		Startup counter, motor operating hours counter, number of thermal status reset counter
AMBIENT CONDITIONS		
Operating temperature		-10...+60°C (above 40°C with derating of the soft starter current ❶)
Storage temperature		-25...+60°C
Maximum altitude		1000m without derating (higher up with derating of the soft starter current ❶)
Pollution degree		3
Operating position		Vertical
HOUSING		
Mounting		Screw-mount on panel
IEC degree of protection		IP20 for ADXT0034...ADXT0126, IP00 for higher sizes (IP20 with optional ADXTFG fingerguards)

❶ Consult the ADXT technical manual, available on the website www.LovatoElectric.com.

TYPE (with 3 controlled phases)		51ADX...B	51ADX...
Motor	Type	Asynchronous three phase	
	Rated power (at 400VAC)	7.5...132kW	160...355kW
	Rated current	17...245A	310...640A
Supply voltage	Line voltage	208...500VAC ±10%	208...415VAC ±10%
	Auxiliary supply voltage	208...240VAC ±10%	
	Frequency	50 or 60Hz ±5%	
Bypass contactor		Integrated	Predisposed for external bypass contactor
Cooling system	Natural	51ADX0017B...51ADX0045B	—
	Forced	51ADX0060B...51ADX0245B	All types
PROTECTIONS			
Auxiliary supply		Voltage too low	
Line voltage		Lack of line voltage, phase loss, voltage out of limits, frequency out of limits and wrong phase sequence	
Motor		Overload at starting (trip class 2, 10A, 10, 15, 20, 25, 30, 35, and 40), overload during running (trip class 2, 10A, 10, 15, 20, 25 and 30), locked rotor, current asymmetry, minimum torque and maximum starting time	
Soft starter		Overcurrent and overtemperature	
START AND STOP SETTINGS			
Starting		Torque ramp with maximum current control	
Stop		Torque ramp, voltage ramp or free-wheel stop	
Braking		DC braking, soft brake with braking contactor	
DISPLAY AND PROGRAMMING			
		Integrated keypad on front, remote keypad 51ADXTAST or PC with software 51ADXSW	
Display		Backlit LCD 2x16 characters	
Measure view		Voltage, current, torque, active power, apparent power, power factor, thermal status of motor and starter, energy	
Other views		Operating status, events, alarms, event log, data	
LEDs		"POWER", "RUN" and "FAULT"	
DIGITAL AND ANALOG INPUTS			
Number of inputs		3 (2 digital + 1 digital/analog)	
Input type		Volt-free contact	
Inputs with fixed functions		2 inputs for starting and stopping/reset	
Multifunction input PROG.IN configured as digital input		Free-wheel stop, external alarm, motor preheat, local control, alarm inhibition, thermal protection, manual reset, cascade starting and keypad lock	
Multifunction input PROG.IN configured as analog input		Motor protection via PTC probe, acceleration and/or deceleration ramp via analog input, analog input thresholds for motor starting and stopping, analog input thresholds for programmable relay enable and disable, PT100 input thresholds for motor starting and stopping and PT100 input thresholds for programmable relay enable and disable	
RELAY OUTPUTS			
Number of outputs		4	
Output arrangement		1NO+1NC (global alarm) and 3 NO programmable: 5A 250VAC AC1	
Outputs function		Motor running, motor started, braking, current threshold triggering, maintenance schedule, cascaded startup, PROG-IN thresholds, alarm	
ANALOG OUTPUT			
Type		0...20mA, 4...20mA or 0...10V (with external 500Ω resistor)	
Associated measure		Current, torque, motor thermal status, power factor and active power	
COMMUNICATION INTERFACES			
RS232		Setup and remote control with software 51ADXSW	
RS485		Dedicated only for the connection of 51ADXTAST optional remote keypad	
VARIOUS FUNCTIONS			
Calendar clock		Calendar clock with backup battery	
Event memory		20 events with date and time	
Operational data memory		Energy meter, startup counter, motor hour meter and maintenance hour counter	
AMBIENT CONDITIONS			
Operating temperature		-10...+55°C (above 45°C with derating of the starter current of 1.5%/°C)	
Storage temperature		-30°...+70°C	
Pollution degree		3	
Maximum altitude		1000m without derating (above 1000m with derating of the starter current of 0.5%/100mt)	
Operating position		Vertical	
HOUSING			
Mounting		Screw-mount on panel	
IEC degree of protection		IP20 for 51ADX0017B...51ADX0125B. IP00 for higher sizes	

Variable speed drives

- Versions with single-phase input up to 2.2kW / 3HP and three-phase input up to 110kW / 150HP
- Special function for pump and fan control using PID algorithm
- EMC suppressor integrated in all versions
- Selectable motor control modes: V/f, vector control, energy saving
- Selectable digital and analog input and output functions
- Integrated functions for motor protection
- STO (Safe Torque Off) module.

SEC. - PAGE

Variable speed drives
VT1 series (single-phase ultra-compact with RS485) ..... 6 - 3
VLA1 series (single-phase) ..... 6 - 4
VLB1 series (single-phase advanced type) ..... 6 - 5
VLB3 series (three-phase advanced type) ..... 6 - 6
VLG3 series (three-phase) ..... 6 - 8

Accessories
Three-phase chokes ..... 6 - 9
Braking resistors ..... 6 - 9
Other accessories ..... 6 - 9

Dimensions ..... 6 - 10

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VT1… SERIES

- Single-phase 200...240VAC supply
- Three-phase motor power 0.2...2.2kW / 0.25...3HP, ratings at 240VAC
- Built-in EMC suppressor cat. C2 (IEC/EN/BS 61800-3)
- Built-in RS485 port, Modbus-RTU and BACnet protocol
- Ultra-compact.

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VLB3… SERIES

- Three-phase 400...480VAC supply
- Three-phase motor power 0.4...110kW / 0.5...150HP for heavy load, up to 132kW / 175HP for standard load, ratings at 400VAC
- Built-in EMC suppressor cat. C1 (up to 2.2kW) and C2 (IEC/EN/BS 61800-3)
- Modular structure
- Built-in braking chopper
- Optional communication protocols: Modbus-RTU, Modbus-TCP, CANopen, ProfiBUS, ProfiNET, Ethercat and IO-Link
- Optional STO (Safe Torque Off) module
- Optional USB and Wi-Fi modules for programming with software
- “Book style” housing.

Page 6-4

VLA1… SERIES

- Single-phase 200...240VAC supply
- Three-phase motor power 0.25...2.2kW / 0.33...3HP, ratings at 240VAC
- Built-in EMC suppressor cat. C2 (IEC/EN/BS 61800-3)
- Optional USB module for parameter programming with software
- “Book style” housing.

Page 6-8

VLG3… SERIES

- Three-phase 380...480VAC supply
- Three-phase motor power 0.4...22kW / 0.5...30HP for heavy load, 0.75...30kW / 1...40HP for standard load, ratings at 400VAC
- Built-in EMC suppressor cat. C3 (IEC/EN/BS 61800-3)
- Built-in braking chopper
- Built-in RS485 port, Modbus-RTU protocol
- Optional Ethernet communication module, Modbus-TCP protocol.

Page 6-5

VLB1… SERIES

- Single-phase 200...240VAC supply
- Three-phase motor power 0.4...2.2kW / 0.5...3HP, ratings at 240VAC
- Built-in EMC suppressor cat. C1 and C2 (IEC/EN/BS 61800-3)
- Modular structure
- Built-in braking chopper
- Optional communication protocols: Modbus-RTU, Modbus-TCP, CANopen, ProfiBUS, ProfiNET, Ethercat and IO-Link
- Optional STO (Safe Torque Off) module
- Optional USB and Wi-Fi modules for programming with software
- “Book style” housing.

Description		VT1 single-phase ultra-compact with RS485	VLA1 single-phase	VLB1 single-phase advanced	VLB3 three-phase advanced	VLG3 three-phase
Three-phase motor power (kW)	heavy load❶	0.2...2.2kW (240V)	0.25...2.2kW (240V)	0.4...2.2kW (240V)	0.4...110kW (400V)	0.4...22kW (400V)
	standard load❷	—	—	—	5.5...132kW (400V)	0.75...30kW (400V)
Motor control modes						
	V/f linear	●	●	●	●	●
	V/f quadratic (for pumps and fans)	●	●	●	●	●
	Sensorless vector control	●	●	●	●	●
	Servo control with encoder feedback	—	—	●	●	—
	Energy saving mode (ECO)	—	—	●	●	—
	V/f closed loop with encoder feedback	●	—	●	●	●
	Multipoint V/f curve	—	—	●	●	—
	Torque setpoint	—	●	●	●	—
	Sensorless control for synchronous motors	—	—	●	● (up to 22kW)	—
Maximum output frequency		599Hz	599Hz	599Hz	599Hz	400Hz
Current overload		150% for 60s	150% for 60s	150% for 60s	Heavy load: 150% for 60s standard load: 120% for 60s	Heavy load: 150% fpr 60s standard load: 120% for 60s
Communication port		RS485 (Modbus-RTU and BACnet protocols	—	Optional, a choice between: Modbus-RTU, Modbus-TCP, ProfiBUS, ProfiNET, Ethercat, IO-Link or without communication	RS485 (Modbus-RTU) on complete drives, other optional available protocols: Modbus-TCP, ProfiBUS, ProfiNET, Ethercat, IO-Link or without communication	RS485 (Modbus-RTU), optional module with Modbus-TCP protocol
Digital inputs		5	5	5	5	5
Digital outputs		1	2	2	2	2
Analog inputs		2	2	2	2	2
Analog outputs		1	1	1	1	1
Sequencer (frequency/time cycles)		●	●	●	●	—
Onboard potentiometer		●	—	—	—	●
PID control with sleep and wake-up thresholds		●	●	●	●	●
Jog		●	●	●	●	●
3-wire motor control		●	●	●	●	●
DC braking		●	●	●	●	●
Braking with resistor		—	—	●	●	●
Preset frequencies		●	●	●	●	●
Multi-pump PID control		●	●	●	●	—
Flying restart		—	●	●	●	●
Motor PTC thermistor input		●	—	●	●	●
Fire mode		—	—	—	—	●
STO (Safe Torque Off) module		—	—	Optional	Optional	—

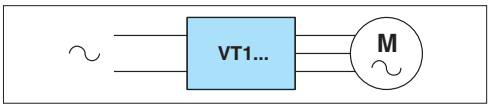
❶ Current overload 150% for 60s.

❷ Higher operational current, reduced current overload 120% for 60s.

VT1 series (single-phase ultra-compact with RS485)

VT1...

Order code	Output current Ie	3-phase motor power at 240V		Qty per pkg	Weight
	[A]	[kW]	[HP]	n°	[kg]
Single-phase supply 200...240VAC 50/60Hz. Three-phase motor output 240VAC max. Built-in RS485 communication port. Built-in EMC suppressor.					
VT102A240	1.8	0.2	0.25	1	1.0
VT104A240	2.6	0.4	0.5	1	1.0
VT107A240	4.3	0.75	1	1	1.0
VT115A240	7.5	1.5	2	1	2.0
VT122A240	10.5	2.2	3	1	2.0



Accessories for VT1

VT1XC01

VT1XC02

Order code	Description	Qty per pkg	Weight
		n°	[kg]
VT1XC01	Cable RS485/USB for the connection VT1-PC ❶, 1.8m length	1	0.080
VT1XC02	Remote keypad (Ethernet connection cable ❷ not included), IP20	1	0.122

❶ Software for programming and monitoring VT1XSW freely downloadable from the website www.LovatoElectric.com, download section.
❷ Use a standard Ethernet cable (CAT.5 or higher) max. 5m length.

General characteristics
VT1 is an ultra-compact variable speed drive with single phase input and built-in RS485 communication port. Simple and versatile, it can be used in several applications such as control of pumps and fans, conditioning systems, packaging machines, conveyor belts, control of automatic doors, etc.
The extremely compact dimensions make it suitable for the installation in panels or machinery with limited space.
The integrated RS485 communication port allows the remote control and monitoring of the drive from a supervision system or a controller such as a PLC or HMI. It supports the communication protocols Modbus-RTU, Modbus-ASCII and BACnet.
VT1 is extremely simple to install and configure from the frontal keypad with 7 segment LED display. Alternatively, it is possible to program the parameters from a PC with software VT1XSW and dedicated USB connection cable VT1XC01.
The different integrated motor control modes, like the linear or quadratic V/f control, multipoint curve and sensorless vector control, make it perfectly suitable for several types of loads and applications.

SPEED REFERENCE SIGNALS
- Front jog dial control (potentiometer)
- External potentiometer 1...10kΩ
- Voltage or current analog signals
- 8 preset speeds via digital inputs
- Optional remote keypad
- RS485 serial signals.

PROGRAMMABLE INPUTS AND OUTPUTS
- 5 digital inputs
- 1 voltage analog input 0...10VDC
- 1 current analog input 0/4...20mA
- 1 relay output with NO contact
- 1 voltage analog output 0...10VDC.

PROTECTIONS
- Motor and drive overload
- Overvoltage and undervoltage
- Phase loss
- Overtemperature
- Overspeed.

FUNCTIONS
- Speed control
- V/f linear or quadratic curves
- V/f customizable multipoint curve
- Sensorless (open loop) vector control
- Preset speeds
- DC braking and DC injection at start
- PID control with sleep and wake up thresholds
- Sequencer (programmable frequency/time cycles)
- Multi-pump PID for the control of up to 4 VT1... drives in master-slave configuration
- Software for programming and monitoring VT1XSW, freely downloadable from the website www.LovatoElectric.com.

Operational characteristics
- Input voltage: 200...240VAC single-phase
- Output voltage: 0...240VAC three-phase
- Mains frequency: 50/60Hz
- Output frequency: 0...599Hz
- Current overload: 150% for 60s
- Operating temperature:
  - -10...+40°C (50°C with derating of 40% of the output current) for sizes 0.2...0.75kW
  - -10...+50°C for sizes 1.5 and 2.2kW
- Maximum altitude: 1000m, (3000m with derating)
- Relative humidity <95% (with no condensing)
- Built-in EMC suppressor, cat. C2 (EN/BS 61800-3)
- IEC degree of protection: IP20.

Certifications and compliance
Certifications:
- VT1...A240: cULus, EAC, RCM
- VT1XC...: EAC.

Compliant with standards: EN/BS 61800-5-1, UL 508C, CSA C22.2 No. 274.

VLA1 series (single-phase)

VLA1...

Order code	Output current Ie	3-phase motor power at 240VAC		Qty per pkg	Weight
	[A]	[kW]	[HP]	n°	[kg]
Single phase supply 200...240VAC 50/60Hz. Three-phase motor output 240VAC max. Built-in EMC suppressor.					
VLA102A240	1.7	0.25	0.33	1	0.750
VLA104A240	2.4	0.4	0.5	1	0.750
VLA107A240	4.2	0.75	1	1	0.950
VLA115A240	7	1.5	2	1	1.350
VLA122A240	9.6	2.2	3	1	1.350

Accessories for VLA1

VLAXC01

VLAXC02

VLAXP01

Order code	Description	Qty per pkg	Weight
		n°	[kg]
VLAXC01	Display and keypad	1	0.050
VLAXC02	USB communication module❶	1	0.050
VLAXP01	Door-mount installation kit for the keypad VLAXC01. IP65, Type 4X. Connecting cable included, 3m long	1	0.340

❶ Software for programming and monitoring VLBXSW freely downloadable from the website www.LovatoElectric.com

IE2 COMPLIANT

The drive efficiency is 25% higher than the reference value for the IE1 class.

General characteristics

VLA1 is an ultra-compact drive (book style housing) with high performance. It integrates different motor control modes, like V/f linear and quadratic and sensorless vector control. VLA1... is extremely versatile and can be used in several applications such as conveyor belts, machine tools, control of automatic doors, packaging machines and in particular to manage pumps and fans thanks to specific integrated functions like the PID control and flying restart. Simple to install and configure.
The user interface, which comprises of a built-in keypad and display, allows to access the setting parameters easily, thanks to the use of extended texts describing the functions and codes. Using the optional USB communication module, the programming, monitoring and diagnostics can be performed using a PC with software VLBXSW, freely downloadable from the website www.LovatoElectric.com.

SPEED REFERENCE SIGNALS
- External potentiometer 1...10kΩ
- Voltage or current analog signals
- Buttons on front keypad
- Door-mount installation kit
- 15 preset speeds via digital inputs
- Motor potentiometer.

PROGRAMMABLE INPUTS AND OUTPUTS
- 5 digital inputs
- 1 digital output
- 1 changeover relay output
- 2 analog inputs: 1 configurable as voltage input 0/2...10VDC, 0...5VDC or current input 0/4...20mA, 1 voltage input 0/2...10VDC, 0...5VDC
- 1 analog output configurable as voltage output 0/2...10VDC, 0...5VDC or current output 0/4...20mA.

PROTECTIONS
- Overcurrent
- Output short circuit and earth/ground leakage
- Overvoltage and undervoltage
- Phase loss
- Motor heat overload (I^2t)
- Overspeed
- Speed reverse.

FUNCTIONS
- Speed or torque control
- V/f linear or quadratic curves
- Sensorless vector control
- Flying restart
- DC braking and DC injection at start
- Preset speeds
- PID control with sleep and wake up thresholds
- Multi-pump PID control (1 main pump frequency regulated + 2 auxiliary pumps activated in on-off mode in case of necessity)
- Sequencer (programmable frequency/time cycles)
- Different parameter configurations
- Programming and monitoring software VLBXSW, freely downloadable from the website www.LovatoElectric.com.

Operational characteristics
- Input voltage: 200...240VAC single-phase
- Output voltage: 0...240VAC three-phase
- Mains frequency: 50/60Hz
- Output frequency: 0...599Hz
- Current overload: 150% for 60s; 200% for 3s
- Operating temperature: -10...+45°C (up to 55°C with derating)
- Maximum altitude: 1000m (4000m with derating)
- Relative humidity: 5...95% (with no condensing)
- Side-by-side installation
- Built-in EMC suppressor, cat. C2 (EN/BS 61800-3)
- IE2 efficiency level (EN/BS 50598-2)
- IEC degree of protection: IP20.

Certifications and compliance

Certifications: cULus, EAC, RCM (excluded VLAXP01).
Compliant with standards: EN/BS 61800-5-1, UL 61800-5-1, CSA C22.2 No. 274.

VLB1 series (single-phase advanced)

VLB1…A240XX

new

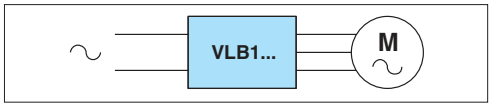
Order code	Output current Ie	3-phase motor power at 240VAC		Qty per pkg	Weight
	[A]	[kW]	[HP]	n°	[kg]
POWER UNITS❶. Single phase supply 200...240VAC (50/60Hz). Three-phase motor output max 240VAC. Built-in EMC suppressor.					
VLB104A240XX	2.4	0.4	0.5	1	0.850
VLB107A240XX	4.2	0.75	1	1	1.050
VLB115A240XX	7	1.5	2	1	1.400
VLB122A240XX	9.6	2.2	3	1	1.400

LOGIC UNITS
See page 6-7

CONTROL UNITS
See page 6-7

ACCESSORIES
See page 6-7

❶ To be completed with logic unit VLBXL.. and control unit VLBXC...
See page 6-7.



IE2 COMPLIANT

The drive efficiency is 25% higher than the reference value for the IE1 class.

Modularity of the VLB1… variable speed drive
Every VLB1... variable speed drive must be composed of:
– a power unit type VLB1...A240XX, to be chosen according to the motor size
– a logic unit type VLBXL..., to be chosen according to the desired communication protocol
– a control unit type VLBXC..., at choice between keypad with display, USB module and Wi-Fi module
– any optional accessories.

POWER UNIT | LOGIC UNIT | CONTROL UNIT

VLB1…A240XX
available sizes:
0.4...2.2kW

+

VLBXL…

+

VLBXC01
Keypad and display

or

VLBXC02
USB module

or

VLBXC03
Wi-Fi module

General characteristics
VLB1 is a variable speed drive with single phase input 200...240VAC and advanced functionalities. The "book" shape and the modular structure, composed by power unit, logic unit and control unit, allows to create a compact drive with the desired features to meet the requirements of any facility. Available in sizes from 0.4 to 2.2kW, it is suitable for the command of pumps, fans, conveyor belts, compressors, packaging machines, elevators, automatic doors and many other applications. The optional keypad VLBXC01 allows for simple and intuitive programming, alternatively to the optional USB and Wi-Fi modules for configuration from a PC with VLBXSW software.
It integrates the EMC suppressor and it supports a logic unit type VLBXL..., that completes the drive with the I/Os and a communication port, with a choice of Modbus-RTU, Modbus-TCP, CANopen, ProfiBUS, ProfiNET, Ethercat, IO-Link or version without communication.
VLB1... offers advanced features, the same of the three-phase series VLB3..., with which it also shares the optional accessories, including the STO (Safe Torque Off) safety module and the fieldbus, realizing a single-phase drive with high performance.

SPEED REFERENCE SIGNALS
– External potentiometer 1...10kΩ
– Voltage or current analog signals
– Buttons on front keypad
– Remote control panel
– 15 preset speeds via digital inputs
– Motor potentiometer
– Setting via communication protocol.

PROGRAMMABLE INPUTS AND OUTPUTS
– 5 digital inputs
– 1 digital output, 1 changeover relay output
– 2 analog inputs configurable as voltage inputs (0/2...10VDC, -10...+10VDC, 0...5VDC) or current inputs 0/4...20mA
– 1 analog output configurable as voltage output 0...10VDC or current output 0/4...20mA.

PROTECTIONS
– Overcurrent
– Output short circuit and earth/ground leakage
– Overvoltage and undervoltage
– Phase loss
– Motor heat overload (I^2t)
– Motor PTC heat protection
– Drive, motor and braking resistor overload
– Overspeed and speed reverse.

FUNCTIONS
– Speed or torque control
– V/f linear or quadratic curves
– Open or closed loop vector control
– Energy-saving ECO control
– S-shape curves
– Flying restart
– DC braking and DC injection at start
– PID control with sleep and wake up thresholds
– Multi-pump PID control (1 main pump frequency regulated + 2 auxiliary pumps activated in on-off mode in case of necessity)
– Sequencer (programmable frequency/time cycles)
– Suitable for AC three-phase asynchronous or synchronous motors
– Different parameter configurations
– Safe Torque Off (STO) function with optional module
– Programming and monitoring software VLBXSW, freely downloadable from the website www.LovatoElectric.com.

Operational characteristics
– Input voltage: 200...240VAC single-phase
– Output voltage: 0...240VAC three-phase
– Mains frequency: 50/60Hz
– Output frequency: 0...599Hz
– Current overload: 150% for 60s; 200% for 3s
– Operating temperature: -10...+45°C (up to 60°C with derating)
– Maximum altitude: 1000m (4000m with derating)
– Relative humidity: 5...95% (with no condensing)
– Side-by-side installation
– Built-in EMC suppressor, cat. C1 and C2 (EN/BS 61800-3)
– IE2 efficiency level (EN/BS 50598-2)
– IEC degree of protection: IP20.

Certifications and compliance
Certifications obtained: cULus, RCM.
Compliant with standards: EN/BS 61800-5-1, UL 61800- 5-1, CSA C22.2 n° 274.

VLB3 series (three-phase advanced)

VLB3...A480

VLB3...A480XX

Order code	Output current Ie❸	3-phase motor power at 400VAC with heavy load❹		Qty per pkg.	Weight
	[A]	[kW]	[HP]	n°	[kg]
COMPLETE DRIVES❶ Three-phase supply 400...480VAC 50/60Hz. Three-phase motor output max 480VAC. Built-in EMC suppressor.					
VLB30004A480	1.3	0.4	0.5	1	1.000
VLB30007A480	2.4	0.75	1	1	1.200
VLB30015A480	3.9	1.5	2	1	1.550
VLB30022A480	5.6	2.2	3	1	1.550
VLB30040A480	9.5	4	5	1	1.550
VLB30055A480	13	5.5	7.5	1	2.500
VLB30075A480	16.5	7.5	10	1	3.950
VLB30110A480	23.5	11	15	1	3.950
VLB30150A480	32	15	20	1	10.650
VLB30185A480	40	18.5	25	1	10.650
VLB30220A480	47	22	30	1	10.650
VLB30300A480	61	30	40	1	10.650
POWER UNITS❷ Three-phase supply 400...480VAC 50/60Hz. Three-phase motor output max 480VAC. Built-in EMC suppressor.					
VLB30004A480XX	1.3	0.4	0.5	1	0.850
VLB30007A480XX	2.4	0.75	1	1	1.050
VLB30015A480XX	3.9	1.5	2	1	1.400
VLB30022A480XX	5.6	2.2	3	1	1.400
VLB30040A480XX	9.5	4	5	1	1.400
VLB30055A480XX	13	5.5	7.5	1	2.350
VLB30075A480XX	16.5	7.5	10	1	3.750
VLB30110A480XX	23.5	11	15	1	3.750
VLB30150A480XX	32	15	20	1	10.350
VLB30185A480XX	40	18.5	25	1	10.350
VLB30220A480XX	47	22	30	1	10.350
VLB30300A480XX	61	30	40	1	10.350
VLB30370A480XX	76	37	50	1	17.250
VLB30450A480XX	89	45	60	1	17.250
VLB30550A480XX	110	55	75	1	24.050
VLB30750A480XX	150	75	100	1	24.050
VLB30900A480XX	180	90	120	1	35.650
VLB31100A480XX	212	110	150	1	35.650
LOGIC UNITS See page 6-7					
CONTROL UNITS See page 6-7					
ACCESSORIES See page 6-7					

Operational characteristics for standard load❺
(available only for variable speed drives from 4kW upwards)

Order code		Ie❸	3-phase motor power at 400VAC with standard load	
Complete drives❶	Power units❷	[A]	[kW]	[HP]
VLB30040A480	**VLB30040A480XX**	11.9	5.5	7.5
VLB30055A480	**VLB30055A480XX**	15.6	7.5	10
VLB30075A480	**VLB30075A480XX**	23	11	15
VLB30110A480	**VLB30110A480XX**	28.2	15	20
VLB30150A480	**VLB30150A480XX**	38.4	18.5	25
VLB30185A480	**VLB30185A480XX**	48	22	30
VLB30220A480	**VLB30220A480XX**	56.4	30	40
VLB30300A480	**VLB30300A480XX**	73.2	37	50
–	**VLB30370A480XX**	91.2	45	60
–	**VLB30450A480XX**	107	55	75
–	**VLB30550A480XX**	132	75	100
–	**VLB30750A480XX**	180	90	120
–	**VLB30900A480XX**	216	110	150
–	**VLB31100A480XX**	254	132	175

IE2 COMPLIANT

The drive efficiency is 25% higher than the reference value for the IE1 class.

❶ Complete drive: power unit + logic unit with Modbus-RTU + control unit with keypad and display
❷ To be completed with logic unit VLBXL.. and control unit VLBXC... See page 6-7
❸ Operation up to 45°C without power derating
❹ Heavy load: 150% overload for 60s
❺ Standard load: 120% overload for 60s

General characteristics
VLB3 is a variable speed drive with compact dimensions and three-phase supply 400...480VAC. Its versatility and the numerous integrated functions make it suitable for the control of applications like pumps, fans, compressors, textile machines, conveyor belts, packaging machines, elevators. The modular structure, composed of power unit, logic unit and control unit, makes it extremely flexible to satisfy any plant requirement. Moreover, the compact "book" shape housing allows the side-by-side installation without the need of space for side ventilation. The user interface, consisting of a keypad with display, allows for quick and intuitive parameter configuration. Alternatively, it can be programmed from a PC with software VLBXSW via connection with optional USB or Wi-Fi modules. The integrated EMC suppressor and the RS485 communication port with Modbus-RTU (integrated on complete drives type VLB3... A480) complete the hardware equipment. Alternatively, several optional logic units with the most common fieldbuses are available, as well as a wide range of accessories for expanding functionalities, including the Safe Torque Off (STO) module for safety purposes.

SPEED REFERENCE SIGNALS
- External potentiometer: 1...10kΩ
- Voltage or current analog signals
- Buttons on front keypad
- Remote control panel
- 15 preset speeds via digital inputs
- Motor potentiometer
- Setting via communication protocol.

PROGRAMMABLE INPUTS AND OUTPUTS
- 5 digital inputs
- 1 digital output, 1 changeover relay output
- 2 analog inputs configurable as voltage inputs (0/2...10VDC, -10...+10VDC, 0...5VDC) or current inputs 0/4...20mA
- 1 analog output configurable as voltage output 0/2...10VDC, 0...5VDC or current output 0/4...20mA.

PROTECTIONS
- Overcurrent
- Output short circuit and earth/ground leakage
- Overvoltage and undervoltage
- Phase loss
- Motor heat overload (I^2t)
- Motor PTC heat protection
- Drive, motor and braking resistor overload
- Overspeed and speed reverse.

FUNCTIONS
- Speed or torque control
- V/f linear or quadratic curves
- Open or closed loop vector control
- Energy-saving ECO control
- S-shape curves
- Flying restart
- Direct access to DC bus
- DC braking and DC injection at start
- PID control with sleep and wake up thresholds
- Multi-pump PID control (1 main pump frequency regulated + 2 auxiliary pumps activated in on-off mode in case of necessity)
- Sequencer (programmable frequency/time cycles)
- Suitable for AC three-phase asynchronous or synchronous motors (up to 22kW)
- Different parameter configurations
- Safe Torque Off (STO) function with optional module
- Programming and monitoring software VLBXSW freely, downloadable from the website www.LovatoElectric.com.

Operational characteristics
- Input voltage: 400...480VAC three-phase
- Output voltage: 0...480VAC three-phase
- Mains frequency: 50/60Hz
- Output frequency: 0...599Hz
- Current overload: 150% for 60s (heavy load), 120% for 60s (standard load)
- Operating temperature: -10...+45°C (up to 60°C with derating)
- Maximum altitude: 1000m (4000m with derating)
- Relative humidity: 5...95% (with no condensing)
- Side-by-side installation
- Built-in EMC suppressor cat. C1 (up to 2.2kW) and C2 (EN/BS 61800-3)
- IE2 efficiency level (EN/BS 50598-2)
- IEC degree of protection: IP20.

Certifications and compliance
Certifications obtained: cULus, EAC, RCM.
Compliant with standards: EN/BS 61800-5-1, UL 61800-5-1, CSA C22.2 No. 274.

Logic units for VLB1 and VLB3

VLBXL...

Order code	Description	Qty per pkg.	Weight
		n°	[kg]
VLBXL01	Logic unit with CANopen	1	0.209
VLBXL02	Logic unit with ProfiBUS	1	0.209
VLBXL03	Logic unit with ProfiNET	1	0.209
VLBXL04	Logic unit with Ethercat	1	0.209
VLBXL06	Logic unit with Modbus-RTU (RS485)	1	0.209
VLBXL07	Logic unit without communication port	1	0.209
VLBXL08	Logic unit with Modbus-TCP (Ethernet)	1	0.209
VLBXL09	Logic unit with IO-Link	1	0.209

new

Control units for VLB1 and VLB3

VLBXC00

VLBXC01

VLBXC02

VLBXC03

Order code	Description	Qty per pkg.	Weight
		n°	[kg]
VLBXC00	Blanking cover	4	0.128
VLBXC01	Keypad and display	1	0.095
VLBXC02	USB communication module	1	0.095
VLBXC03	Wi-Fi communication module	1	0.095

Accessories for VLB1 and VLB3

VLBXSM

EXCRDU2

VLBXP01

Order code	Description	Qty per pkg.	Weight
		n°	[kg]
VLBXSM	STO (Safe Torque Off) module	1	0.080
VLBXP01	Door-mount installation kit for the keypad VLBXC01, IP65, Type 4X, connecting cable included 3m long	1	0.340
EXCRDU2	Remote display unit, widescreen colour LCD graphic display, built-in RS485 port, for the monitoring and control of max 32 starters, IP65, 3m cable included	1	0.420

new

Modularity of the VLB... series variable speed drives
Every VLB... variable speed drive must be composed of:
- a power unit, to be chosen according to the type of supply voltage (single-phase or three-phase) and the motor size
- a logic unit, to be chosen according to the desired communication protocol
- a control unit, at choice between keypad with display, USB module and Wi-Fi module
- any optional accessories.

POWER UNIT

VLB1...A240XX
(single-phase 200...240VAC)
VLB3...A480XX
(three-phase 400...480VAC)

+

LOGIC UNIT

VLBXL...

+

CONTROL UNIT

Keypad and display
VLBXC01

or

USB module
VLBXC02

or

Wi-Fi module
VLBXC03

General characteristics
LOGIC UNITS VLBXL...
The variable speed drives VLB... series must be equipped with a logic unit type VLBXL..., which integrates the terminal blocks with I/Os, the program memory and a communication port. Several models are available, which differ in the type of filedbus integrated. The complete drives type VLB3...A480 come standard with the Modbus-RTU logic unit, which can be replaced with any of the other logic units if needed.

CONTROL UNITS VLBXC...
The variable speed drives VLB... series can be programmed with the control unit VLBXC01 (keypad and display) or alternatively from a PC with the software VLBXSW (freely downloadable from the website www.LovatoElectric.com) by using the communication modules type VLBXC02 (USB) and VLBXC03 (Wi-Fi).

SAFE TORQUE OFF (STO) MODULE VLBXSM
The VLBXSM module allows to increase and optimize the safety functions of the drive providing two inputs dedicated to the function Safe Torque Off (STO) with safety class SIL 3 (IEC/EN 62061 and IEC/EN 61508) and Performance Level e (ISO 13849-1).

DOOR-MOUNT INSTALLATION KIT VLBXP01
With the kit VLBXP01 it is possible to mount on the panel door the keypad and display type VLBXC01 (provided as standard on the complete drives VLB3...A480 or purchased as an optional accessory for the power units VLB...XX)
The kit has an IP65 and Type 4X degree of protection and it is provided with an Ethernet connection cable 3 meters long.

REMOTE DISPLAY UNIT EXCRDU2
The EXCRDU2 remote display allows to command and monitor up to 32 starters via RS485 communication, at choice between variable speed drives VLB... series or soft starters ADXL... or ADXNP... series. EXCRDU2 allows to command the motor start and stop, reverse the sense of rotation, adjust the motor frequency and monitor the status and the main measures of the starters connected with graphical pages on the display.
- Auxiliary power supply: 100...240VAC 50/60Hz, 110...250VDC
- Widescreen colour LCD graphic display 118x96mm
- Isolated RS485 communication port, Modbus-RTU protocol
- Configurable communication parameters
- Integrated optical port for firmware update
- Flush mount, standard 92x92mm cut-out
- Compatible with VLB... variables speed drives equipped with RS485 logic unit type VLBXL06 (already integrated as standard on the complete drives type VLB3...A480)
- RS485 cable included, 3m length
- IEC degree of protection: IP65 frontal with gasket (provided as standard), IP20 housing and terminals.

Certifications and compliance
Certifications obtained:
- VLBXC..., VLBXSM and VLBXP01: cULus, EAC, RCM
- VLBXL...: cULus, EAC (excluded VLBXL07, VLBXL08, VLBXL09), RCM
- EXCRDU2: cETLus.

Compliant with standard:
- VLBXC..., VLBXL..., VLBXP01and VLBXSM: EN/BS 61800-5-1, UL61800-5-1, CSA C22.2 n°274
- EXCRDU2: IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 61000-6-2, IEC61000-6-4.

Dimensions
page 6-15

VLG3 series (three-phase)

VLG3...

new

Order code	Output current Ie	3-phase motor power at 400VAC with heavy load❶		Qty per pkg.	Weight
	[A]	[kW]	[HP]	n°	[kg]
Three-phase supply 380…480VAC 50/60Hz. Three-phase motor output max 480VAC Built-in RS485 communication port. Built-in EMC suppressor.					
VLG30004A480	1.3	0.4	0.5	1	1.040
VLG30007A480	2.5	0.75	1	1	1.080
VLG30015A480	4	1.5	2	1	1.440
VLG30022A480	5.5	2.2	3	1	1.460
VLG30040A480	9	4	5	1	1.980
VLG30055A480	12	5.5	7.5	1	3.240
VLG30075A480	16	7.5	10	1	3.280
VLG30110A480	24	11	15	1	5.040
VLG30150A480	31	15	20	1	5.060
VLG30185A480	39	18.5	25	1	7.960
VLG30220A480	45	22	30	1	7.980

Operational characteristics for standard load❷

Order code	Ie	3-phase motor power at 400VAC with standard load	
	[A]	[kW]	[HP]
VLG30004A480	2	0.75	1
VLG30007A480	3.1	1.5	2
VLG30015A480	5.1	2.2	3
VLG30022A480	6.9	4	5
VLG30040A480	10	5.5	7.5
VLG30055A480	16	7.5	10
VLG30075A480	23	11	15
VLG30110A480	31	15	20
VLG30150A480	38	18.5	25
VLG30185A480	45	22	30
VLG30220A480	61	30	40

Accessories for VLG3

VLGXC01

new

VLGXC02

VLGXL01

Order code	Description	Qty per pkg.	Weight
		n°	[kg]
VLGXC01	Cable converter RS485/USB for the connection VLG3-PC❸, 1.8m length	1	0.058
VLGXC02	Remote keypad, IP20. Connection cable included, 3m length	1	0.229
VLGXL01	Ethernet communication module, Modbus-TCP protocol	1	0.210

❶ Heavy load: 150% overload for 60s.
❷ Standard load: 120% overload for 60s.
❸ Programming and monitoring software VLGXSW freely downloadable from the website www.LovatoElectric.com.

General characteristics
VLG3 is a simple and versatile three-phase general purpose variable speed drive. It finds use in numerous industrial sectors for controlling applications such as conveyor belts, textile machines, escalators, lifts, pumps, fans, compressors, washing machines, mixers.The range consists of sizes from 0.4 to 22 kW and it integrates as standard the EMC suppressor and the braking chopper. The compact enclosure allows side-by-side installation, with the possibility of mounting on DIN rail or screw. On the front of the drive, there is a keypad with a 7-segment LED display for the configuration, a potentiometer for frequency adjustment, and an RJ45 connector for connecting peripheral devices such as the optional remote keypad and the PC connection cable for programming via VLGXSW software (downloadable from the website www.LovatoElectric). The built-in RS485 serial port with Modbus-RTU completes the hardware equipment for the interfacing with a supervision and control network or the communication with a master like PLC or HMI. It is also possible to add on to the drive an Ethernet communication port via the optional module installed on the front.

SPEED REFERENCE SIGNALS
- Front jog dial control (potentiometer)
- External potentiometer 1...5kΩ
- Voltage or current analog signals
- Buttons on front keyboard
- Remote control panel
- 8 preset speeds via digital inputs
- Motor potentiometer
- Setting via communication protocol.

PROGRAMMABLE INPUTS AND OUTPUTS
- 5 digital inputs
- 2 relay outputs: 1 with changeover contact and 1 with NO contact
- 2 analog inputs: 1 voltage input (type 0...10VDC or -10...+10VDC) and 1 current input 0/4...20mA
- 1 analog output 0...10VDC.

PROTECTIONS
- Overcurrent
- Output short circuit and earth/ground leakage
- Overvoltage and undervoltage
- Phase loss
- Motor heat overload (I2t)
- Drive and motor overtemperature
- Speed reverse.

FUNCTIONS
- Speed control
- V/f linear or quadratic curves
- Open or closed loop vector control
- S-shape curves
- Flying restart
- DC braking and DC injection at start
- PID control with sleep and wake up thresholds
- Torque boost
- Fire mode
- Programming and monitoring software VLGXSW, freely downloadable from the website www.LovatoElectric.com.

Operational characteristics
- Input voltage: 380...480VAC three-phase
- Output voltage: 0...480VAC three-phase
- Mains frequency: 50/60Hz
- Output frequency: 0...400Hz
- Current overload: 150% for 60s (heavy load), 120% for 60s (standard load)
- Operating temperature: -10...+40°C (up to 50°C with derating)
- Maximum altitude: 1000m (4000m with derating)
- Relative humidity: ≤95% (with no condensing)
- Side-by-side installation
- Built-in EMC suppressor, cat. C3 (EN/BS 61800-3)
- IEC degree of protection: IP20.

Certifications and compliance
Certifications: cULus (excluded accessories).
Compliant with standards: EN/BS 61800-5-1, EN/BS 61800-3, UL 61800-5-1, CSA C22.2 No 274.

Three-phase mains chokes

VLBXL...

Order code	Ie	Induc-tance	Drive power	Qty per pkg.	Wt
	[A]	[mH]	[kW]	n°	[kg]
Three phase mains chokes for VLB3... variable speed drives.					
VLBXL590	50	0.59	22...30	1	8.350
VLBXL370	80	0.37	37	1	12.500
VLBXL330	90	0.33	45	1	16.000
VLBXL300	100	0.30	55	1	19.000
VLBXL190	160	0.19	75	1	26.000
VLBXL140	200	0.14	90...110	1	32.000

General characteristics
VLBXL... three-phase mains chokes are applied to the input of VLB3... drives from 22kW to 110kW to reduce the harmonic content upstream, with consequent reduction of the input current absorbed by the drives.
For the correct choice, select the inductance with current rating equal to or greater than the rated current of the drive they will be used with.

Operational characteristics
- Current: 50...200A.
- Operating temperature: -10...+40°C (up to 55°C with derating)

Compliance
Compliant with standards: IEC/EN/BS 61558-1.

Three-phase motor chokes

VLXM...

Order code	Ie	Induc-tance	Drive power	Qty per pkg.	Wt
	[A]	[mH]	[kW]	n°	[kg]
Three phase motor chokes for VLA1... - VT1... - VLB1... - VLB3... - VLG3... variable speed drives.					
VLXM012	12.5	1	0.2...4	1	3.000
VLXM025	25	0.6	5.5...11	1	6.000
VLXM050	50	0.2	15...22	1	8.000
VLXM100	100	0.15	30...45	1	16.000
VLXM150	150	0.08	55...75	1	18.000
VLXM300	300	0.04	90...110	1	29.000

General characteristics
Three phase motor chokes VLXM... can be installed to the drive output, to reduce the voltage peaks generated by the drive towards the motor, or when several parallel motors are simultaneously controlled by the drives.
For the correct choice, select the inductance with Ie current rating equal to or greater than the rated current of the drive they will be used with.

Operational characteristics
- Rated mains voltage: 400VAC
- Operating range: 170...530VAC
- Rated frequency: 50/60Hz
- Winding material: Aluminium
- Rated current Ie: 12.5...300A type code according
- Rated power: 150...3390VA type code according
- Saturation current: 1.5*Ie
- THD: about 40%
- Ambient temperature max: 40°C
- Maximum altitude: 1000m
- Insulation class: F
- Working class: F
- Test voltage: 3kV/1 sec
- Protection degree: IP00.

Compliance
Compliant with standards: IEC/EN/BS 61558.

Braking resistors

VLBXR...

Order code	Output	Resistance	Qty per pkg.	Wt
	[W]	[Ω]	n°	[kg]
Resistors for VLB1... - VLB3... - VLG3... variable speed drives❶.				
VLBXR390	100	390	1	0.260
VLBXR180	200	180	1	0.630
VLBXR047	200	47	1	0.500
VLBXR027	200	27	1	0.500
VLBXR018	800	18	1	4.200
VLBXR015	800	15	1	4.200
VLBXR007	1900	7.5	1	9.500

❶ For the correct selection of the resistor see the installation manual of the variable speed drives, available on the website www.LovatoElectric.com.

General characteristics
Braking resistors can be connected to VLB1... - VLB3... - VLG3... drives in order to absorb the power generated during the motor stop phase.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60204-1, IEC/EN/BS 60664-1.

Other accessories

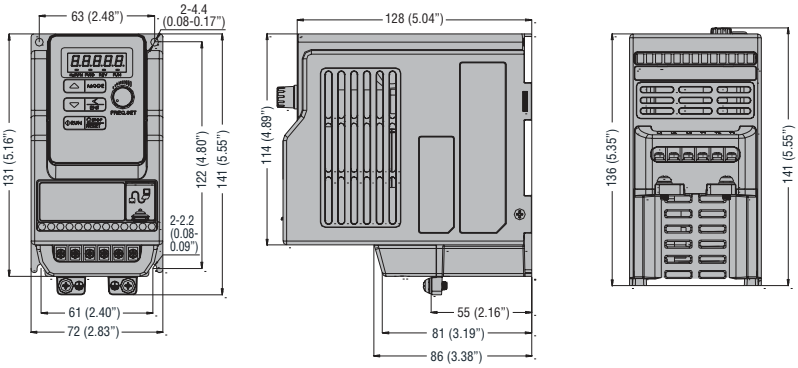
LPCPA001

Order code	Description	Qty per pkg.	Wt
		n°	[kg]
Potentiometer.			
LPCPA001	1kΩ potentiometer 1 turn, complete with operating knob IP66, IP67 and IP69K on front❷	10	0.040

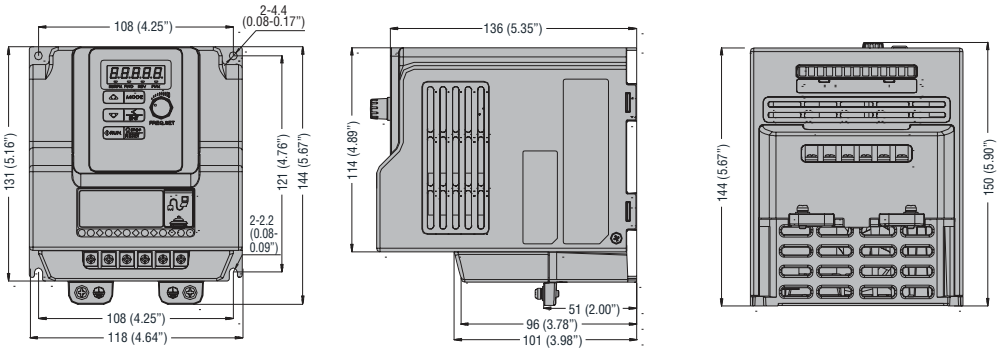
❷ For more information consult page 8-35.

SINGLE-PHASE ULTRA-COMPACT VARIABLE SPEED DRIVES WITH RS485 VT1 SERIES

VT102A240 - VT104A240 - VT107A240

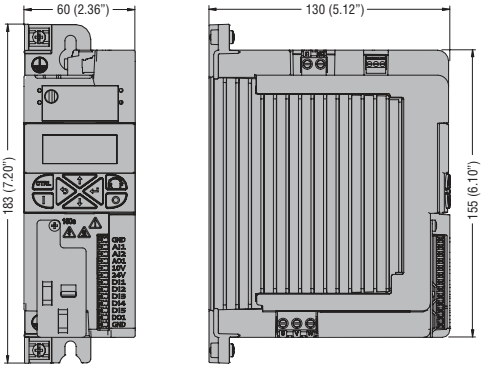


VT115A240 - VT122A240

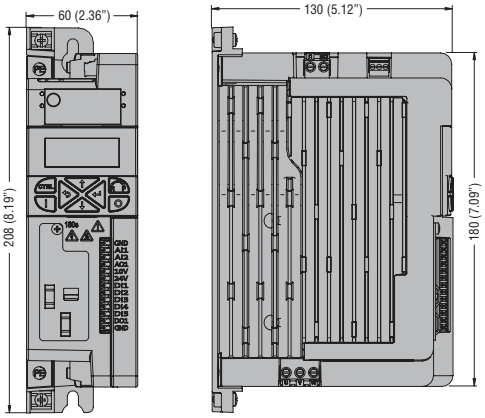


SINGLE-PHASE VARIABLE SPEED DRIVES VLA1 SERIES

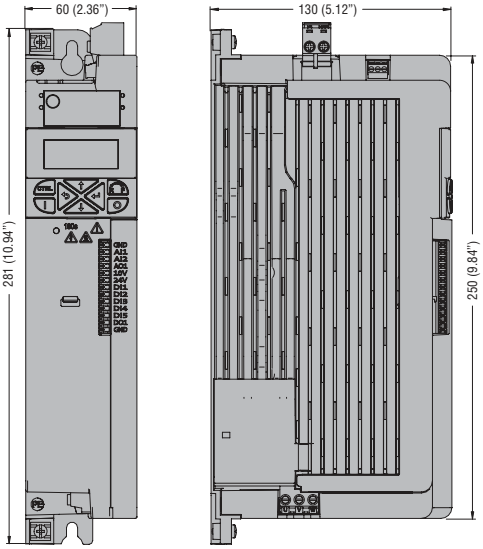
VLA102A240 - VLA104A240



VLA107A240

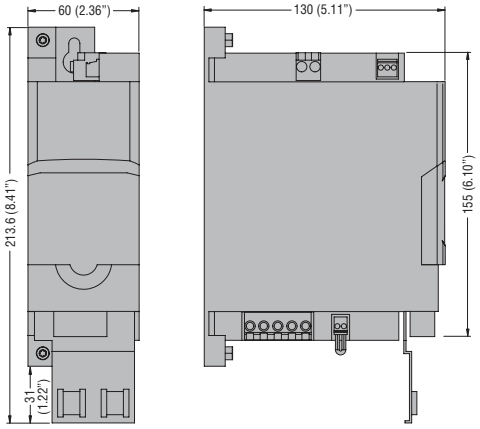


VLA115A240 - VLA122A240

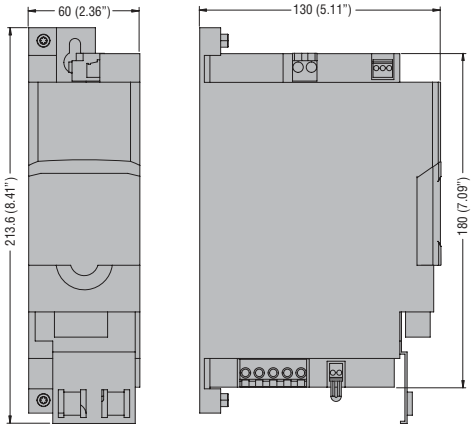


SINGLE-PHASE ADVANCED VARIABLE SPEED DRIVES VLB1 SERIES❶

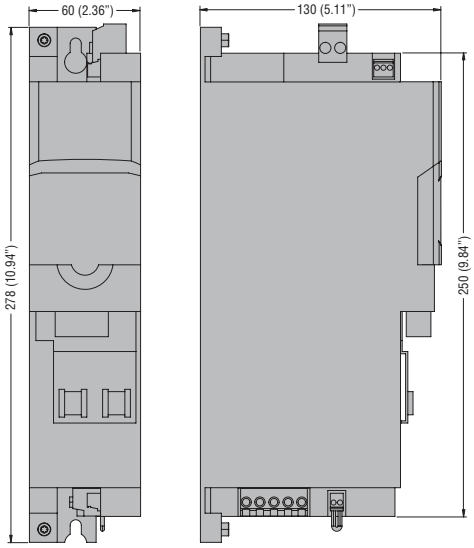
VLB104A240



VLB107A240



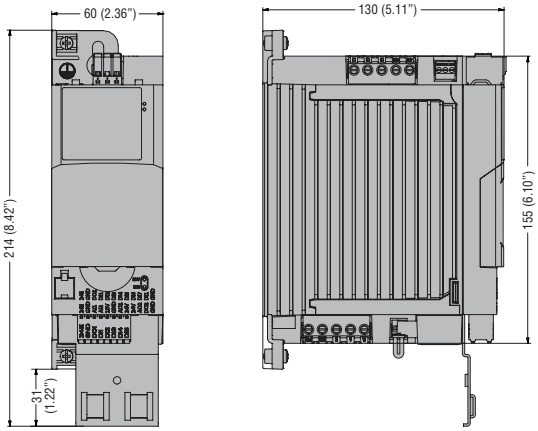
VLB115A240 - VLB122A240



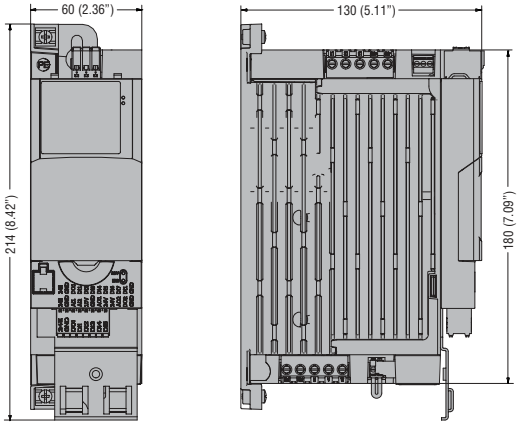
❶ The dimensions refer to complete drives, composed of power unit type VLB1...A240XX, logic unit type VLBXL... and control unit type VLBXC...

THREE-PHASE ADVANCED VARIABLE SPEED DRIVES VLB3 SERIES❶

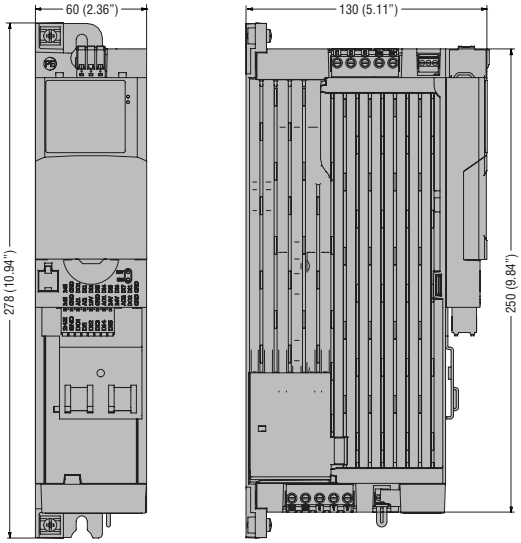
VLB30004A480



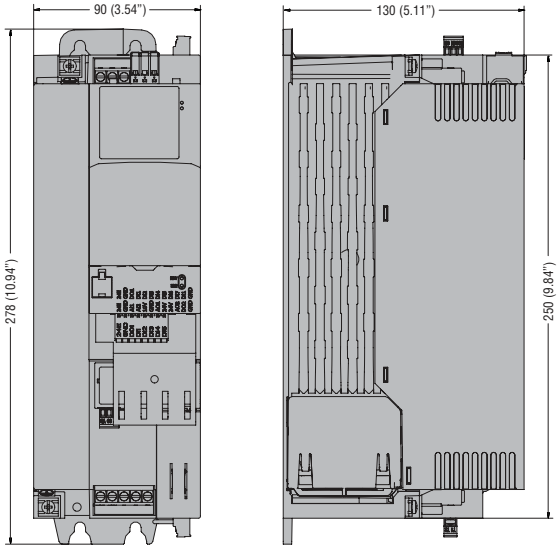
VLB30007A480



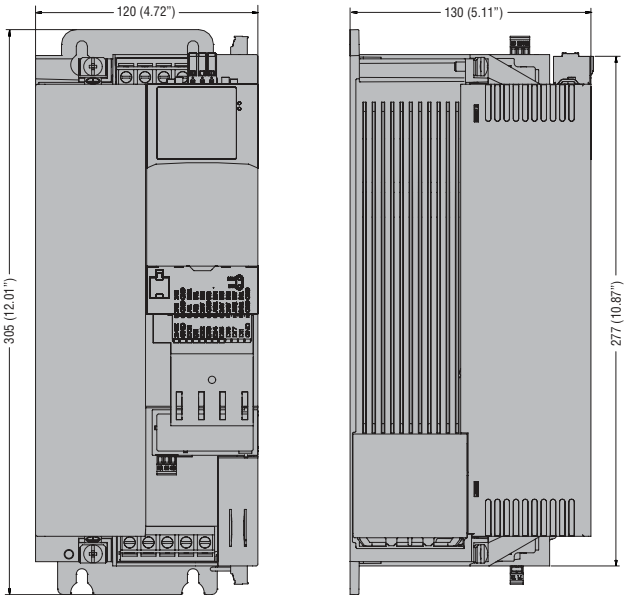
VLB30015A480 - VLB30022A480 - VLB30040A480



VLB30055A480

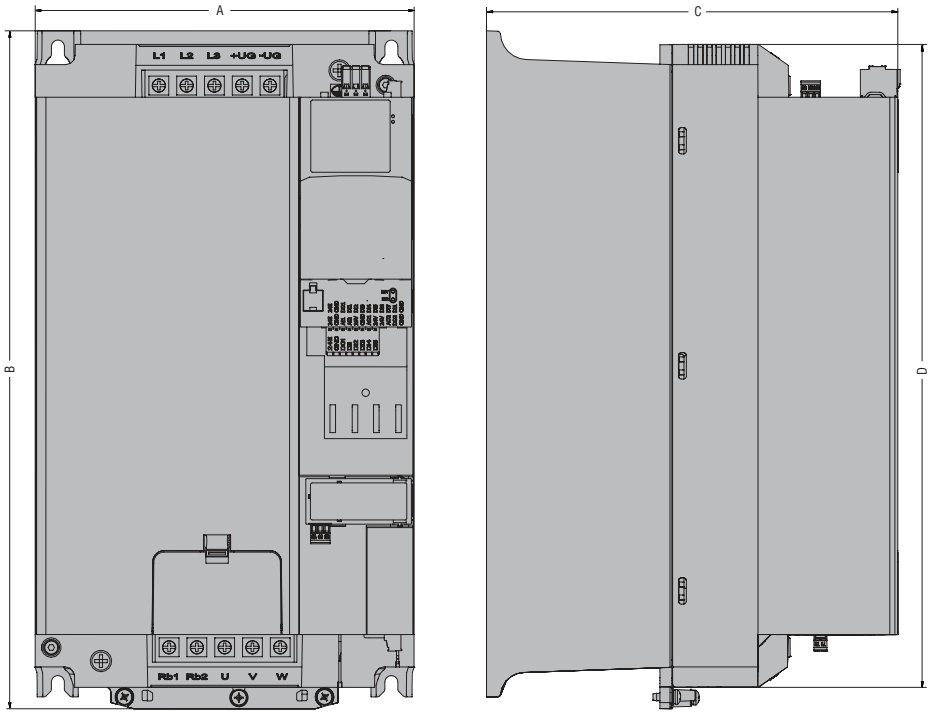


VLB30075A480 - VLB30110A480



❶ The dimensions refer to complete drives, composed of power unit type VLB3...A480XX, logic unit type VLBXL... and control unit type VLBXC...

VLB30150A480...VLB31100A480

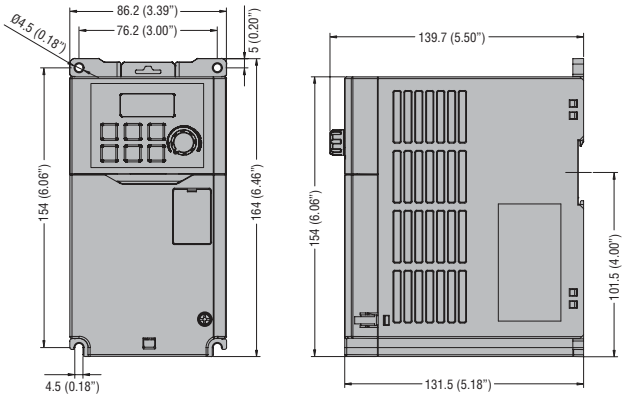


TYPE	A	B	C	D
VLB30150A480❶	180 (7.09")	384 (15.12")	165 (6.50")	342 (13.46")
VLB30185A480❶	180 (7.09")	384 (15.12")	165 (6.50")	342 (13.46")
VLB30220A480❶	180 (7.09")	384 (15.12")	165 (6.50")	342 (13.46")
VLB30300A480❶	180 (7.09")	384 (15.12")	165 (6.50")	342 (13.46")
VLB30370A480	250 (9.84")	520 (20.47")	230 (9.05")	450 (17.72")
VLB30450A480	250 (9.84")	520 (20.47")	230 (9.05")	450 (17.72")
VLB30550A480	250 (9.84")	623 (24.53")	265 (10.43")	536 (21.10")
VLB30750A480	250 (9.84")	623 (24.53")	265 (10.43")	536 (21.10")
VLB30900A480	258 (10.16")	775 (30.51")	304 (11.97")	685 (26.97")
VLB31100A480	258 (10.16")	775 (30.51")	304 (11.97")	685 (26.97")

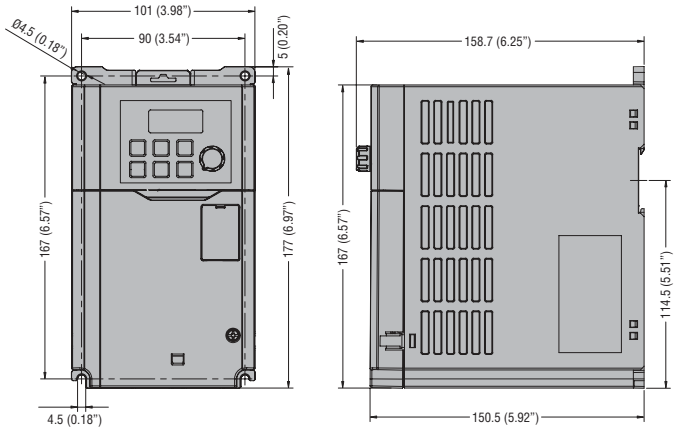
❶ Dimensions valid for variable speed drives with batch number starting with letter E or higher.

THREE-PHASE VARIABLE SPEED DRIVES VLG3 SERIES

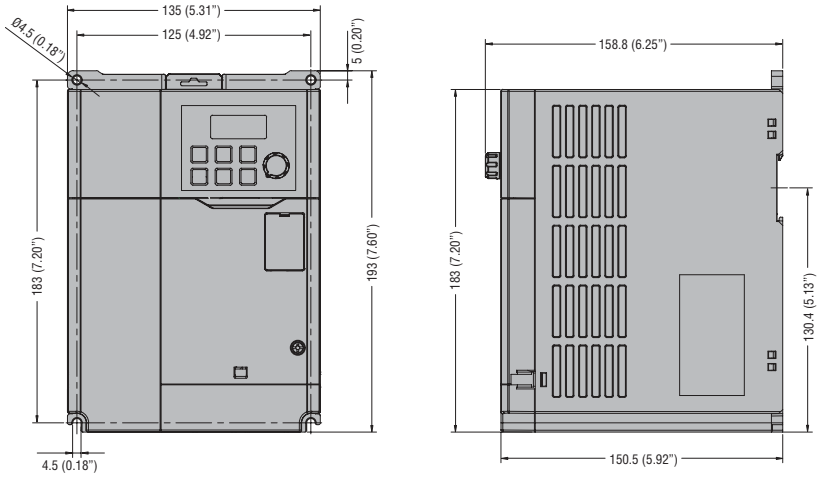
VLG30004A480 - VLG30007A480



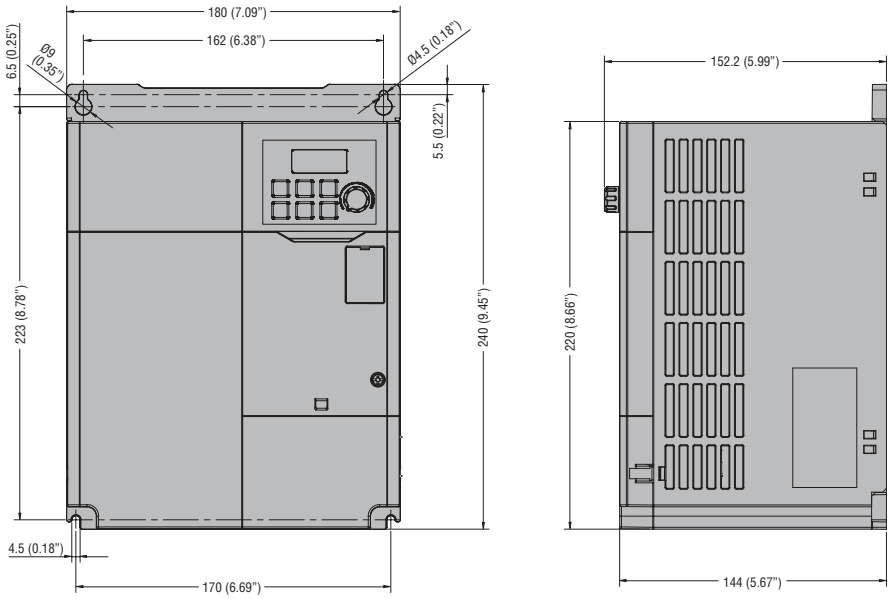
VLG30015A480 - VLG30022A480



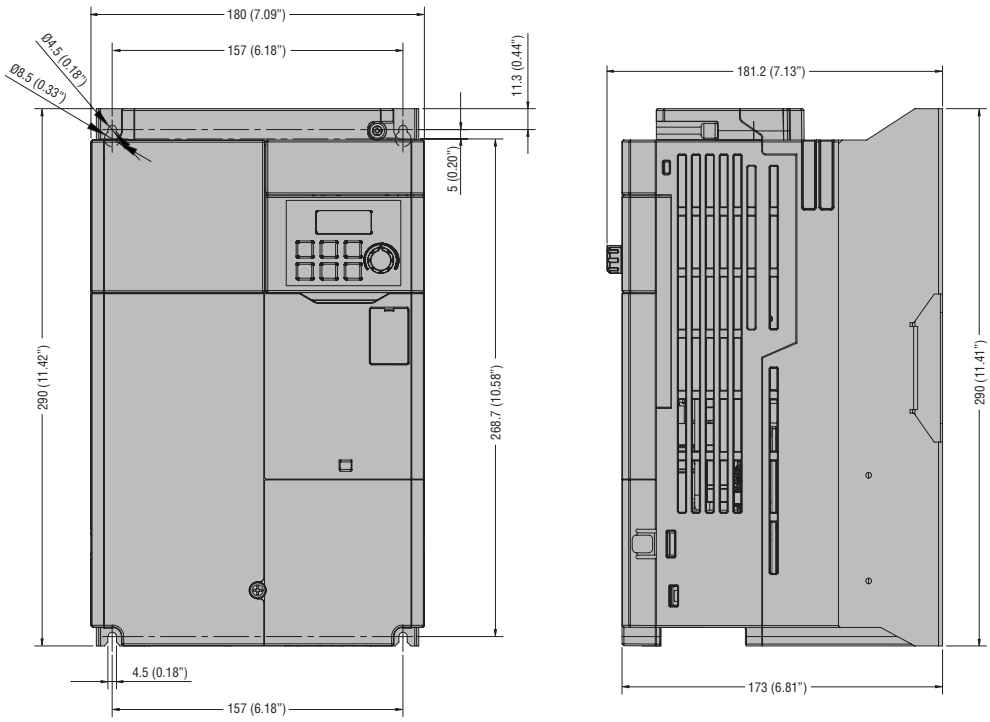
VLG30040A480



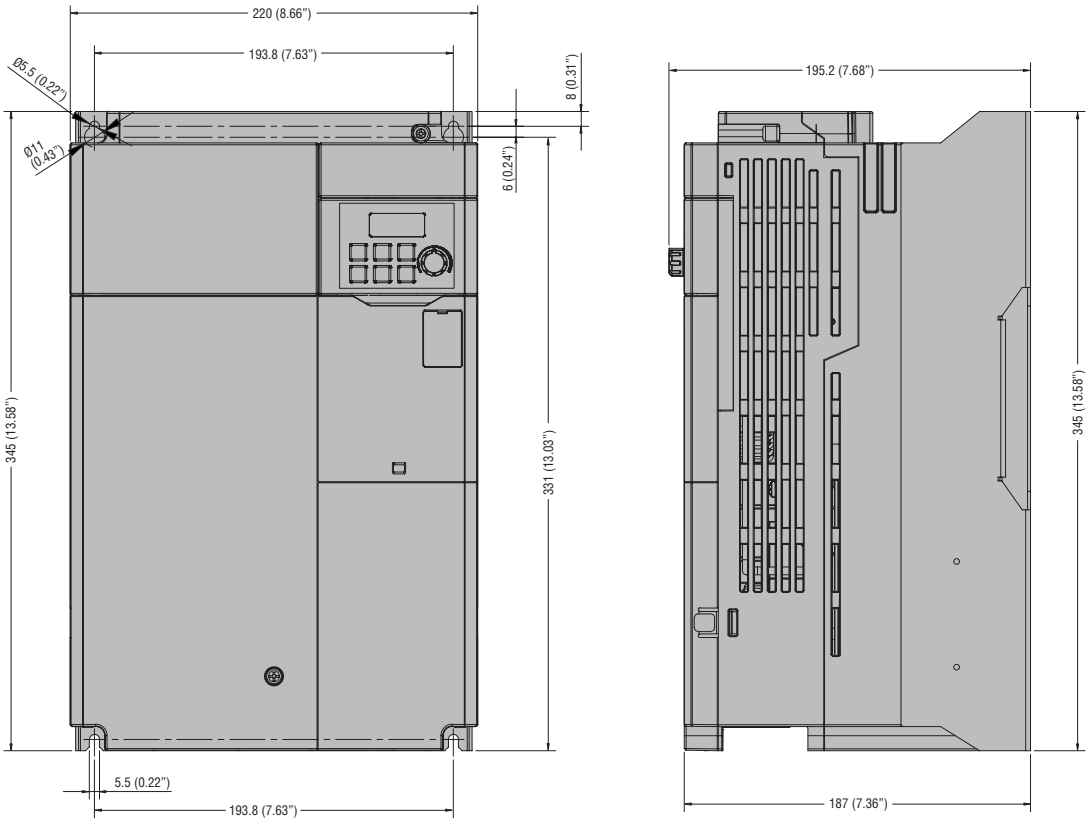
VLG30055A480 - VLG30075A480



VLG30110A480 - VLG30150A480

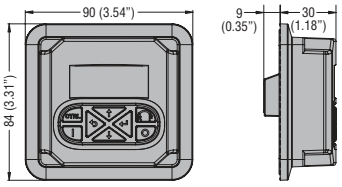


VLG30185A480 - VLG30220A480

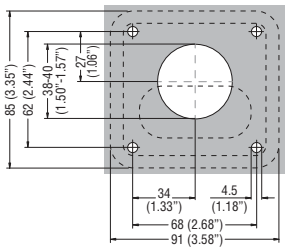


Remote keypads

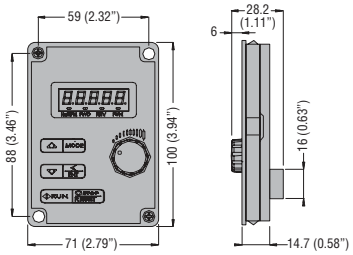
VLAXP01 - VLBXP01



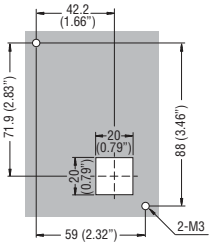
Cut-out



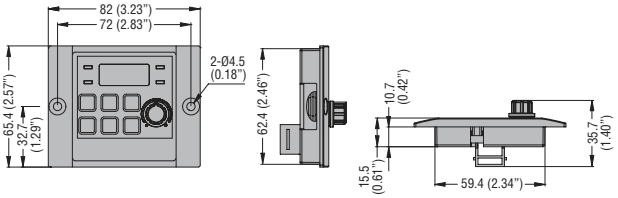
VT1XC02



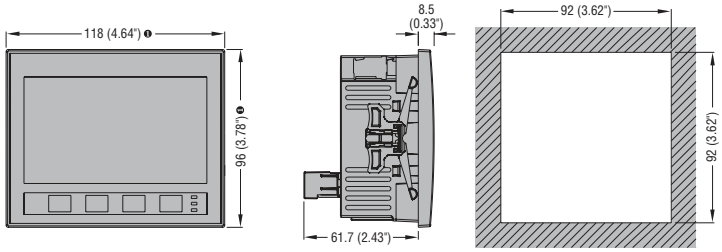
Cut-out



VLGXC02



EXCRDU2



Cut-out

❶ Dimensions with gasket: 122x100mm/4.80x3.94".

Note. For the dimensions of the mains chokes, motor chokes and braking resistor, see the website www.LovatoElectric.com.

Solid state relays

- Long electrical and mechanical life
- High switching frequency
- Silent operation
- No electric arc
- In compliance with EN60335 standard.

	Sec. - Page
Solid state relays	
Miniature, single-phase	7 - 2
Hockey puck, single-phase	7 - 2
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MINIATURE, SINGLE-PHASE
- Operating current up to 25A
- Operating voltage up to 280VAC
- Faston terminals
- Zero crossing switching
- cURus and VDE certified
- IP00 protection
- Screw fixing.

Page 7-2

HOCKEY PUCK, SINGLE-PHASE
- Operating current up to 130A
- Operating voltage up to 600VAC
- Screw terminals
- Zero crossing switching
- cURus, CSA and VDE certified
- IP20 protection
- Status indicator LED.

Page 7-2

HOCKEY PUCK, TWO-PHASE
- Operating current up to 50A
- Operating voltage up to 600VAC
- Screw terminals
- Zero crossing switching
- cURus, CSA and VDE certified
- IP20 protection
- Status indicator LED.

Page 7-3

COMPLETE WITH HEATSINK, SINGLE-PHASE
- Ready to use
- Operating current up to 60A
- Operating voltage up to 600VAC
- Zero crossing switching
- cULus certified
- IP20 protection
- Status indicator LED
- Screw or on 35mm DIN rail.

Page 7-3

COMPLETE WITH HEATSINK, 3-PHASE, (2 CONTROLLED)
- Ready to use
- Operating current up to 60A
- Operating voltage up to 600VAC
- Zero crossing switching
- cULus certified
- IP20 protection
- Status indicator LED
- 35mm DIN rail.

Page 7-3

COMPLETE WITH HEATSINK, 3-PHASE (3 CONTROLLED)
- Ready to use
- Operating current up to 48A
- Operating voltage up to 600VAC
- Zero crossing switching
- cULus certified
- IP20 protection
- Status indicator LED
- Screw or on 35mm DIN rail.

Miniature and hockey puck, single-phase

HS1A2NN025D024

new

HS1B...

Order code	Load operating voltage	Ie AC-51 at ≤40°C ❶	Control voltage	Type of load	Qty per pkg
	[VAC]	[A]	[V]		n°
Miniature, Faston terminals. Faston: load 6.3x0.8mm - control 4.8x0.8mm.					
HS1A2NN025D024	12...280	25	4...30VDC	Resistive	4
Hockey puck, screw terminals.					
HS1B2NT025D024	12...280	25	3...32VDC	Resistive	1
HS1B2NT025E230	12...280	25	18...280VAC/DC		1
HS1B5NV040D024	24...510	40	3.5...32VDC	Resistive or inductive	1
HS1B5NV040E230	24...510	40	20...265VAC/DC		1
HS1B6NT040D024	24...600	40	3.5...32VDC	Resistive	1
HS1B6NT040E230	24...600	40	18...280VAC/DC		1
HS1B6NN050D024	24...600	50	3.5...32VDC		1
HS1B5NV060D024	24...510	60	3.5...32VDC	Resistive or inductive	1
HS1B5NV060E230	24...510	60	20...265VAC/DC		1
HS1B6NT060D024	24...600	60	3.5...32VDC	Resistive	1
HS1B6NT060E230	24...600	60	18...280VAC/DC		1
HS1B6NT090D024	24...600	90	3.5...32VDC		1
HS1B6NT090E230	24...600	90	18...280VAC/DC		1
HS1B5NV130D024	24...510	130	3.5...32VDC	Resistive or inductive	1
HS1B5NV130E230	24...510	130	20...265VAC/DC		1

Hockey puck, two-phase

new

HS2B...

Order code	Load operating voltage	Ie AC-51 at ≤40°C ❶	Control voltage	Type of load	Qty per pkg
	[VAC]	[A]	[V]		no.
Hockey puck, Faston terminals.					
HS2B2NN025D024	12...280	25	3...32VDC	Resistive	1
Hockey puck, screw terminals.					
HS2B6NN050D024	24...600	50 ❷	10...30VDC	Resistive	1
HS2B6NN051D024	24...600	50 ❸	10...30VDC		1

❶ Ratings valid with correct heatsink.
❷ I^2t 2800A2s.
❸ I^2t 7200A2s.

General characteristics
Solid state relays (SSRs) can offer significant advantages in electrical control. SSRs have no moving parts, resulting in a very high electrical life and silent operation. SSRs also have fast switching speed and can sustain a very high switching frequency. SSRs are also resistant to vibration and shocks. Furthermore, they do not generate electric arc during the operation. Their primary use is for controlling resistive loads, such as heating elements, but can also operate small motors and other types of inductive loads. The HS... series can control loads up to 130A. Overall, SSRs offer a solid, efficient and durable solution for precise and reliable electrical control.

Operational characteristics
- Control current:
  - HS1A...: <29mA
  - HS1B...: <13mA
  - HS2B...: <24mA
- Switching mode: zero crossing
- Output protection: varistor, TVS or none (V or T or N as 7th digit in the code)
- Status indicator: LED on front (except HS1A...).

Certifications and compliance
Certifications obtained: see table below.
Compliant with standards: IEC/EN/BS 60947-4-3, IEC/EN/BS 60947-4-2, IEC/EN/BS 62314, IEC/EN/BS 6335-1.

	cURus	CSA	VDE
HS1A2NN025D024	●	—	●
HS1B2NT025D024	●	●	●
HS1B2NT025E230	●	—	●
HS1B5NV040D024	●	●	●
HS1B5NV040E230	●	●	●
HS1B6NT040D024	●	●	●
HS1B6NT040E230	●	—	●
HS1B6NN050D024	●	●	●
HS1B5NV060D024	●	●	●
HS1B5NV060E230	●	●	●
HS1B6NT060D024	●	●	●
HS1B6NT060E230	●	—	●
HS1B6NT090D024	●	●	●
HS1B6NT090E230	●	—	●
HS1B5NV130D024	●	●	●
HS1B5NV130E230	●	●	●
HS2B2NN025D024	●	●	●
HS2B6NN050D024	●	●	●
HS2B6NN051D024	●	●	●

Complete with heatsink, single-phase

HS1C...

new

Order code	Load operating voltage	Ie AC-51 at ≤40°C	Control voltage	Type of load	Qty per pkg
	[VAC]	[A]	[V]		n°
Complete with heatsink, ready to use, screw terminals.					
HS1C2HV020D024	12...275	20	3...32VDC	Resistive or inductive	1
HS1C6HV020D024	48...600	20	4...32VDC		1
HS1C6HV020A230	48...600	20	90...280VAC		1
HS1C2HV025D024	12...275	25	3...32VDC		1
HS1C6HV025D024	48...600	25	4...32VDC		1
HS1C6HV025A230	48...600	25	90...280VAC		1
HS1C2HV030D024	12...275	30	3...32VDC		1
HS1C6HV030D024	48...600	30	4...32VDC		1
HS1C6HV030A230	48...600	30	90...280VAC		1
HS1C6HV040D024	48...600	40	4...32VDC		1
HS1C6HV040A230	48...600	40	90...280VAC		1
HS1C6HV060D024	48...600	60	4...32VDC		1
HS1C6HV060A230	48...600	60	90...280VAC		1

Complete with heatsink, three-phase (2 controlled)

HS2...

new

Order code	Load operating voltage	Ie AC-51 at ≤40°C	Control voltage	Type of load	Qty per pkg
	[VAC]	[A]	[V]		n°
Complete with heatsink, ready to use, screw terminals.					
HS2C6HV015D024	48...600	15	4...32VDC	Resistive or inductive	1
HS2C6HV015A230	48...600	15	90...280VAC		1
HS2C6HV030D024	48...600	30	4...32VDC		1
HS2C6HV030A230	48...600	30	90...280VAC		1
HS2C6HV060D024	48...600	60	4...32VDC		1
HS2C6HV060A230	48...600	60	90...280VAC		1

Complete with heatsink, three-phase (3 controlled)

HS3C...

HS3D...

new

Order code	Load operating voltage	Ie AC-51 at ≤40°C	Control voltage	Type of load	Qty per pkg
	[VAC]	[A]	[V]		n°
Complete with heatsink, ready to use, screw terminals.					
HS3C6HV020D024	48...600	20	4...32VDC	Resistive or inductive	1
HS3C6HV020A230	48...600	20	90...280VAC		1
HS3C6HV025D024	48...600	25	4...32VDC		1
HS3C6HV025A230	48...600	25	90...280VAC		1
HS3C6HV040D024	48...600	40	4...32VDC		1
HS3C6HV040A230	48...600	40	90...280VAC		1
Complete with heatsink, ready to use, screw terminals, high I^2t.					
HS3D5HV024E230	24...520	24	24...255VACDC	Resistive or inductive	4
HS3D5HV048E230	24...520	48	24...255VACDC		1

General characteristics
Solid state relays (SSRs) can offer significant advantages in electrical control. SSRs have no moving parts, resulting in a very high electrical life and silent operation. SSRs also have fast switching speed and can sustain a very high switching frequency. SSRs are also resistant to vibration and shocks. Furthermore, they do not generate electric arc during the operation. Their primary use is for controlling resistive loads, such as heating elements, but can also operate small motors and other types of inductive loads. HS1...H... series can control loads up to 60A. Overall, SSRs offer a solid, efficient, and durable solution for precise and reliable.
HS1... versions have heatsink factory mounted.
They are ready to use and fast mounting on DIN rail.

Operational characteristics
- Control current:
  - HS1...D...: <12mA
  - HS1...A...: <22mA
  - HS2...D...: <21mA
  - HS2...A...: <50mA
  - HS3...D...: <27mA
  - HS3...A...: <50mA
- Input-output insulation: 5kV
- Switching mode: zero crossing
- Output protection: varistor
- Status indicator: LED on front.

Certifications and compliance
Certifications obtained: cULus.
Compliant with standards: IEC/EN/BS 62314; IEC/EN/BS 61000-6-2; IEC/EN/BS 61000-6-3.

Accessories

HSBXH1

new

HSBXP...

HSBX80

HSCXM...

Order code	Characteristics	Qty per pkg	Wt
		n°	[kg]
Heatsinks for HS1B... and HS2B... solid state relays.			
HSBXH1	Heatsink 2.2K/W for one HS1B... or HS2B... solid state relay	12	0.290
HSBXH2	Heatsink 1.2K/W for one or two HS1B... or HS2B... solid state relay	2	0.600
HSBXH3	Heatsink 0.9K/W for one or two HS1B... or HS2B... solid state relay	1	1.400
HSBXH4D024	Heatsink 0.3K/W for one HS1B... or HS2B... solid state relay; complete with fan 24VDC	1	1.720
HSBXH5A230	Heatsink 0.3K/W for one or two HS1B... or HS2B... solid state relay; complete with fan 230VAC	1	1.720
Thermal pads for HS1B... and HS2B... solid state relays.			
HSBXP0050	Adhesive thermal pad – 50 pcs	1	0.050
HSBXP0100	Adhesive thermal pad – 100 pcs	1	0.100
HSBXP1000	Adhesive thermal pad – 1000 pcs	1	1.200
Fixing element for HS1B... solid state relays.			
HSBX80	DIN rail adapter. 6K/W dissipation	1	0.080
Current monitoring modules for HS1C... solid state relays.			
HSCXM1	Load current monitoring. Supply 24VDC	1	0.090
HSCXM2	Load current monitoring with Modbus-RTU over RS485 comunication. Supply 24VDC	1	0.090
HSCXM3	Temperature controller and load current monitoring with Modbus-RTU over RS485 comunication. Supply 24VDC	1	0.090

General characteristics

HEATSINKS FOR HS1B... AND HS2B... SOLID STATE RELAYS

The heatsinks HSBXH1, HSBXH2 and HSBXH3 can be fixed by screw or on DIN rail.

HSBXH4D024 and HSBXH5A230 are for mounting on DIN rail only.

All the heatsinks contains the screws to fix the solid state relay.

THERMAL PADS FOR HS1B... AND HS2B... SOLID STATE RELAYS

The thermal pad mounting on the solid state relays is recommended to ensure effective heat dissipation, to prevent overheating and to enhance the overall reliability and performance.

CURRENT MONITORING MODULES FOR HS1C... SOLID STATE RELAYS

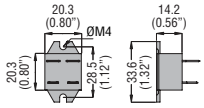
The accessory snaps onto the front of the HS1C... solid state relay.

The current monitor modules have a button to set the rated current of the load. In case the current is +10% or -10% of the set threshold, an alarm will be generated. This alarm, for the version with comunication, will be also trasmitted via Modbus.

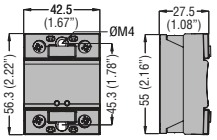
Three LED on the front indicate the working status.

Current measuring range: 2A...40A.

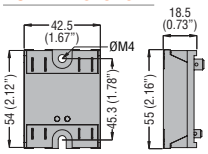
HS1A2NN025D024



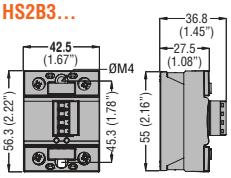
HS1B...



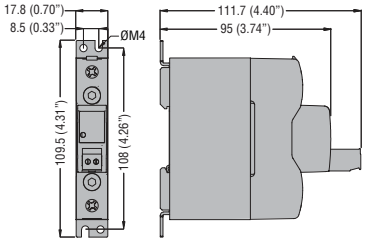
HS2B2NN025D024



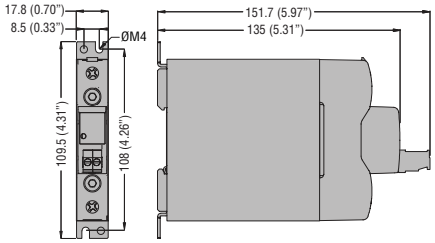
HS2B3...



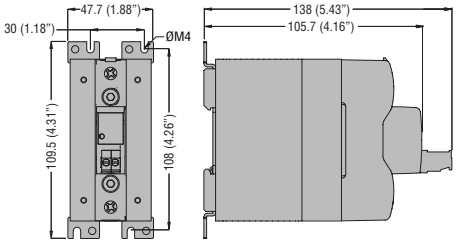
HS1C...020... - HS1C...025...



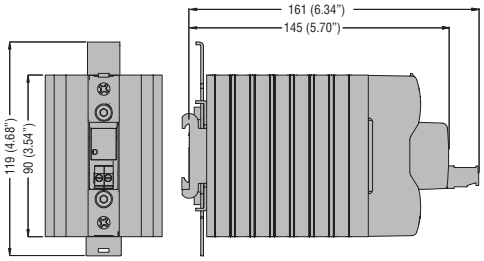
HS1C...030...



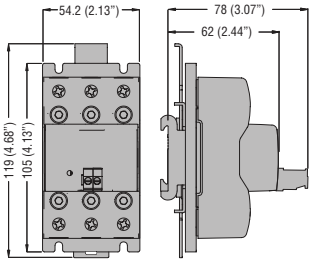
HS1C...040...



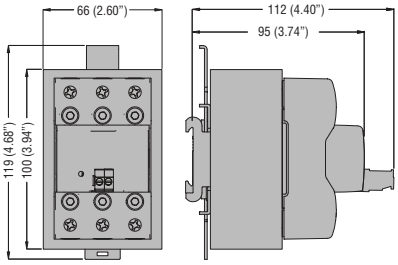
HS1C...060...



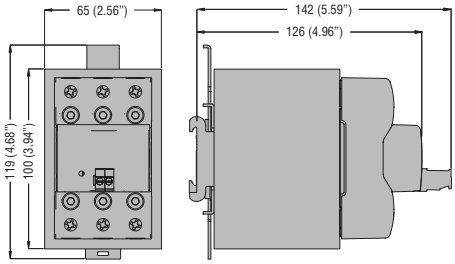
HS2C...015...



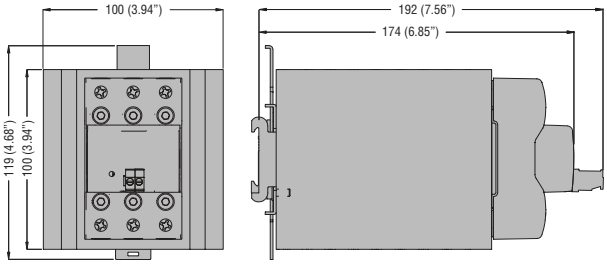
HS2C...030... - HS3C...020...



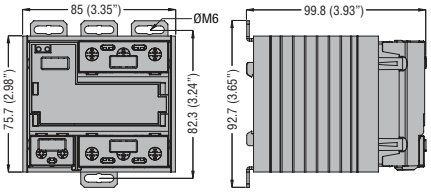
HS3C...025...



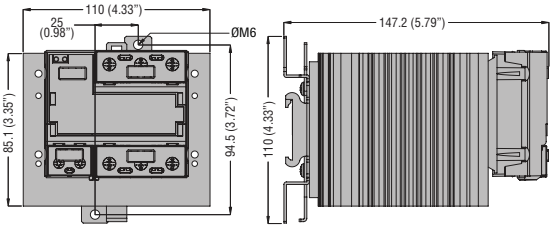
HS2C...060... - HS3C...040...



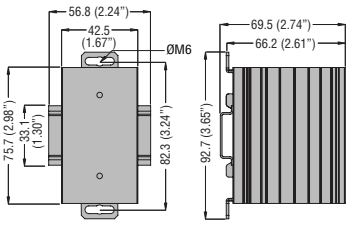
HS3D...024



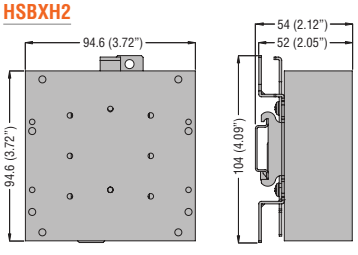
HS3D...048



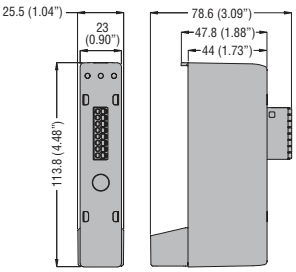
HSBXH1



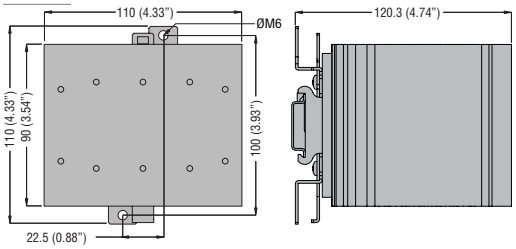
HSBXH2



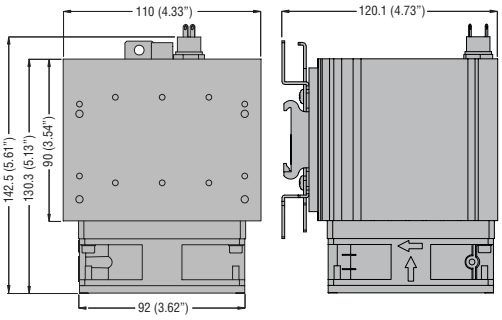
HSCXM...



HSBXH3



HSBXH4



TYPE		HS1A2NN 025D024	HS1B2NT 025D024	HS1B2NT 025E230	HS1B5NV 040D024	HS1B5NV 040E230	HS1B6NT 040D024	HS1B6NT 040E230	HS1B6NN 050D024	HS1B5NV 060D024
MODEL		Single-phase								
INPUT CHARACTERISTICS										
Control voltage		4...30VDC	3...32VDC	18...280VAC/DC	3.5...32VDC	20...265VAC/DC	3.5...32VDC	18...280VAC/DC	3.5...32VDC	3.5...32VDC
Operating voltage limits pick-up	V	4	3	18	3.5	95	3.5	18	3.5	3.5
drop-out	V	1	1	8	2	5	2	8	2	2
Input current at min...max voltage	mA	3...29	10...13	4.5...6	10...13	5...10	10...13	4.5...6	10...13	10...13
OPERATING TIMES										
switching -on		Half cycle max								
switching -off		Half cycle max								
OUTPUT CHARACTERISTICS										
Switching mode		Zero crossing switching								
Rated operating voltage	VAC	12...280	12...280	12...280	24...510	24...510	24...600	24...600	24...600	24...510
Blocking voltage	V	600	600	600	1200	1200	1200	1200	1200	1200
Operational frequency (min...max)	Hz	45...65								
Rated operating current AC-51 (resistive load) at 40°C ❸	A	25	25	25	40	40	40	40	50	60
Rated operating current AC-51 (resistive load) at 55°C ❸	A	22	20	20	35	35	35	35	42	52
Heatsink for use at 40°C and 55°C at rated current AC-51	K/W	≤1.2	≤2.2	≤2.2	≤0.9	≤0.9	≤0.9	≤0.9	≤0.9	≤0.55
Rated operating current AC-53 (motor load) at 40°C	A	7	–	–	7	7	–	–	–	12
Min. operational current	A	0.005	0.05							
Input - Output isolation	V	4000	4000							
Input - Output to metal base	V	2500	4000							
Output protection type		–	TVS		VDR		TVS		–	VDR
I^2t	A^2s	340	600		1250				1680	2800
TERMINAL CHARACTERISTICS										
Control terminals	Type	Faston 4.8x0.8	Screw M4							
Tool	Type	–	PZ 2							
Tightening torque	Nm	–	1.2...2							
	lb.in	–	10.6...17.7							
Conductor section connectable (control terminals) with 1 or 2 wires min...max AWG stranded	n°	16...14 (Faston lug)	18...14							
Flexible w/o lug	mm^2	–	0.75...2.5							
Flexible c/w insulated spade lug	mm^2	0.75...6 (Faston lug)	0.75...2.5							
Load terminals	Type	Faston 6.3x0.8	Screw M5							
Tool	Type	–	PZ 2							
Tightening torque Load terminals (min...max)	Nm	–	2...3							
	lb.in	–	20.4							
Conductor section connectable (load terminals) with 1 or 2 wires min...max AWG stranded	n°	16...10 (Faston lug)	16...10	16...10❷						
Flexible w/o lug	mm^2	–	1.5...6							
Flexible c/w insulated lug	mm^2	0.75...6 (Faston lug)	1.5...6	1.5...6❶						
AMBIENT CONDITIONS										
Operating temperature	°C	-40...+90								-55...+90
Storage temperature	°C	-40...+100								-55...+125
Operating position allowable		Any								
Fixing		Screw								

❶ Wires up to 50mm^2 can be connected with specific spade lugs or ring lugs. Lug width max 12.6mm.
❷ Wires up to AWG0 can be connected with specific spade lugs or ring lugs. Lug width max 12.6mm.
❸ Ratings valid with proper heatsink.
❹ 110A max with 0.3K/W heatsink.

	HS1B5NV 060E230	HS1B6NT 060D024	HS1B6NT 060E230	HS1B6NT 090D024	HS1B6NT 090E230	HS1B5NV 130D024	HS1B5NV 130E230	HS2B2NN 025D024	HS2B6NN 050D024	HS2B6NN 051D024
	Single-phase							Two-phase		
	20...265VAC/DC	3.5...32VDC	18...280VAC/DC	3.5...32VDC	18...280VAC/DC	3.5...32VDC	20...265VAC/DC	3...32VDC	10...30VDC	10...30VDC
	20VAC-18VDC	3.5	18	3.5	18	3.5	20VAC-18VDC	3	10	10
	5	2	8	2	8	2	5	2	2	2
	5...10	10...13	4.5...6	10...13	4.5...6	10...13	5...10	10...13	6...24	6...24
	Half cycle max									
	Half cycle max									
	Zero crossing switching									
	24...510	24...600	24...600	24...600	24...600	24...510	24...510	12...280	24...600	24...600
	1200	1200	1200	1200	1200	1200	1200	600	1200	1200
	45...65									
	60	60	60	90	90	130	130	25	50	50
	52	52	52	80	80	105	105	21	37	50
	≤0.55	≤0.55	≤0.55	≤0.3	≤0.3	≤0.3	≤0.3	≤0.3	≤0.3❹	≤0.3❹
	12	–	–	–	–	32	32	–	–	–
	0.05									
	4000									
	4000							2500	4000	
	VDR	TVS				VDR		–	–	–
	2800		7200			22000		340	2800	7200
	Screw M4							Faston 4.8x0.8	Screw	
	PZ 2							–	Blade 3.5mm	
	1.2...2							–	0.5Nm	
	10.6...17.7							–	4.5	
	18...14							16...14 (Faston lug)	28...12	
	0.75...2.5							–	0.75...2.5	
	0.75...2.5							0.75...6 (Faston lug)	0.75...2.5	
	Screw M5							Faston 6.3x0.8	Screw M5	
	PZ 2							–	PZ 2	
	2...3							–	2...3	
	20.4							–	20.4	
	16...10❷							16...10 (Faston lug)	16...10❷	
	1.5...6							–	1.5...6	
	1.5...6❶							0.75...6 (Faston lug)	1.5...6❶	
	-55...+90							-40...+90	-55...+90	
	-55...+125							-40...+100	-55...+125	
	Any									
	Screw									

TYPE		HS1C2HV 020D024	HS1C6HV 020D024	HS1C6HV 020A230	HS1C2HV 025D024	HS1C6HV 025D024	HS1C6HV 025A230	HS1C2HV 030D024	HS1C6HV 030D024	HS1C6HV 030A230	HS1C6HV 040D024	HS1C6HV 040A230
MODEL		Single-phase										
INPUT CHARACTERISTICS												
Control Voltage		3-32VDC	4-32VDC	90-280VAC	3-32VDC	4-32VDC	90-280VAC	3-32VDC	4-32VDC	90-280VAC	4-32VDC	90-280VAC
Operating voltage limits pick-up	V	3	4	45	3	4	45	3	4	45	4	45
Operating voltage limits drop-out	V	2	2	20	2	2	20	2	2	20	2	20
Input current at min...max voltage	mA	4...12	8...12	5...22	4...12	8...12	5...22	4...12	8...12	5...22	8...12	5...22
OPERATING TIMES												
switching -on		Half cycle max										
switching -off		Half cycle max										
OUTPUT CHARACTERISTICS												
Switching mode		Zero crossing switching										
Rated operating voltage	VAC	12...275VAC	48...600VAC		12...275VAC	48...600VAC		12...275VAC	48...600VAC			
Blocking Voltage	V	600	1200		600	1200		600	1200			
Operational frequency (min...max)	Hz	45...65										
AC-51 rated operating current (resistive load) at 40°C	A	20			25			30			40	
AC-51 rated operating current (resistive load) at 55°C	A	17			22			25			32	
AC-53 rated operating current (motor load) at 40°C	A	–										
Min. operational current	A	0.165										
Input - Output isolation	V	5000										
Input - Output to metal base	V	5000										
Output protection type		VDR										
I^2t	A^2s	792			1350							
TERMINAL CHARACTERISTICS												
Control terminals	Type	Screw										
Tool	Type	Blade screwdriver 3.5mm										
Tightening torque	Nm	0.5Nm										
	lb.in	4.5										
Conductor section connectable (control terminals) min...max AWG stranded	n°	28...12										
Flexible w/o lug	mm^2	0.75...2.5										
Flexible c/w insulated spade lug	mm^2	0.75...2.5										
Load terminals	Type	Screw										
Tool	Type	PH2										
Tightening torque Load terminals (Min...Max)	Nm	1.5										
	lb.in	13.3										
Conductor section connectable (load terminals) with 1 or 2 wires min...max AWG stranded	n°	18...10										
Flexible w/o lug	mm^2	1...6										
Flexible c/w insulated lug	mm^2	1...16										
AMBIENT CONDITIONS												
Operating temperature	°C	-40...+80°C										
Storage temperature	°C	-40...+130°C										
Operating position allowable		On vertical plane										
Fixing		Screw or on 35mm DIN rail										

❶ Wires up to 50mm^2 can be connected with specific spade lugs or ring lugs. Lug width max 12.6mm.
❷ Wires up to AWG0 can be connected with specific spade lugs or ring lugs. Lug width max 12.6mm.

	HS1C6HV 060D024	HS1C6HV 060A230	HS2C6HV 015D024	HS2C6HV 015A230	HS2C6HV 030D024	HS2C6HV 030A230	HS2C6HV 060D024	HS2C6HV 060A230	HS3C6HV 020D024	HS3C6HV 020A230	HS3C6HV 025D024	HS3C6HV 025A230	HS3C6HV 040D024	HS3C6HV 040A230	HS3D5HV 024E230	HS3D5HV 048E230
	Single-phase		Three-phase (2 controlled)						Three-phase (3 controlled)							
	4-32VDC	90-280VAC	4-32VDC	90-280VAC	4-32VDC	90-280VAC	4-32VDC	90-280VAC	4-32VDC	90-280VAC	4-32VDC	90-280VAC	4-32VDC	90-280VAC	24...255 VAC/DC	24...255 VAC/DC
	4	45	4	90	4	90	4	90	4	90	4	90	4	90	24	24
	2	20	2	20	2	20	2	20	2	20	2	20	2	20	2	2
	8...12	5...22	13...21	23...50	13...21	23...50	13...21	23...50	17...27	23...50	17...27	23...50	17...27	23...50	4.5...6	4.5...6
	Half cycle max															
	Half cycle max															
	Zero crossing switching															
	48...600VAC														24...520VAC	
	1200														1600	
	45...65															
	60	60	15 (UL 12)	15 (UL 12)	30	30	60 (UL 50)	60 (UL 50)	20	20	25	25	40	40	24	48
	40	40	12 (UL 10)	12 (UL 10)	25	25	48 (UL 40)	48 (UL 40)	17	17	20	20	32	32	18	38
	–	–	7	7	13.5	13.5	15	15	12.5	12.5	13.5	13.5	15	15	12	32
	0.165	0.165	0.16	0.16	0.16	0.16	0.16	0.16	–	–	–	–	–	–	0.05	
	5000														4000	
	5000														4000	
	VDR														VDR	
	1350		1404												2800	22000
	Screw														Screw M4	
	Blade screwdriver 3.5mm														PZ 2	
	0.5Nm														1.2...2	
	4.5														10.6...17.7	
	28...12														18...14	
	0.75...2.5														0.75...2.5	
	0.75...2.5														0.75...2.5	
	Screw														Screw M5	
	PH2														PZ 2	
	1.5														2...3	
	13.3														20.4	
	18...10														6...10❷	
	1...6														1.5...6	
	1...16														1.5...6❶	
	-40...+80°C														-40...+90	
	-40...+130°C														-40...+125	
	On vertical plane														Any	
	Screw or on 35mm DIN rail														Screw	

Pushbuttons and selector switches

- Different types of actuators: metal, flat metal and chrome finished plastic
- Availability of actuators in kits
- Simple and snap on installation
- Highly conductive contacts
- Robust for severe ambient conditions
- Contact operation: double breaking action, direct opening operation and self cleaning
- Plastic and metal enclosures.

	Series Sec.	LPS Page	LPF Page	LPC Page
PLatinum series				
Pushbutton actuators, spring return and push-push	8	6	16	24
Mechanical reset button, spring return	8	7	–	25
Pushbutton actuators with symbol, spring return	8	7	17	25
Mushroom-head pushbutton actuators	8	8	–	26
Double and triple-touch button actuators, spring return	8	9	–	27
Selector switch actuators lever	8	10	18	28
Selector switch actuator key	8	11	18	29
Selector switch actuator knobs	8	11	19	29
Illuminated pushbutton actuators, spring return and push-push	8	12	20	30
Illuminated mushroom-head pushbutton actuators	8	13	–	31
Double-touch button actuators, spring return with indicator	8	13	–	32
Illuminated selector actuators	8	14	21	33
Pilot light heads	8	14	22	34
USB and RJ45 communication interfaces	8	–	23	36
Joysticks	8	15	–	–
Monoblock LED pilot lights, steady light	8	–	–	34
Monoblock potentiometers	8	–	–	35
Monoblock buzzers	8	–	–	36

Pushbutton actuators, spring return with symbol	8 - 37
Mounting adapters	8 - 38
Contact elements	8 - 39
LED and test elements	8 - 42
Accessories, spare parts and labels	8 - 46
Plastic control stations	8 - 54
Control stations for 40mm profile rails	**8- 61**
Palm switches	**8- 62**
Metal control stations and enclosures	**8- 63**
Dimensions	**8- 64**
Wiring diagrams	**8- 73**

BUTTON ACTUATORS
- Spring return flush, extended and shrouded
- Push-push flush and extended
- Mushroom-head
- Mechanical reset
- Illuminated.

DOUBLE AND TRIPLE-TOUCH ACTUATORS
- Double-touch with or without indicator
- Triple-touch.

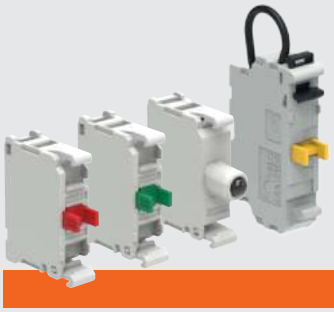
SELECTOR SWITCHES
- Short lever
- Long lever
- Key
- Knob
- Illuminated.

PILOT LIGHTS Ø22mm
- Monoblock LED.

MONOBLOCK BUZZERS Ø22mm
- Continuous or pulse tone.

COMMUNICATION INTERFACES
- USB.
- RJ45.

POTENTIOMETERS Ø22mm
- Potentiometer included in the product with graduated scale
- Potentiometer drives with:
  – graduated scale
  – variable index.



ADD-ON ELEMENTS, ACCESSORIES AND SPARE PARTS
- Mounting adapters
- Contact elements
- Lamp holders
- LED integrated elements
- Labels, label holders, protections, etc.

JOYSTICKS Ø22mm
- 2 directions
- 4 directions
- 2 directions with mechanical interlock
- 4 directions with mechanical interlock
- Complete with contact elements.

PLASTIC CONTROL STATIONS
- 1 to 6 holes option without actuators
- Complete versions from 1 to 3 actuators in various combinations
- Control stations for 40mm profile rails
- Palm switches.

METAL CONTROL STATIONS
- Without actuators (from 1 to 16 holes)
- Version without holes.

Lovato electric

A COMPLETE SERIES AT YOUR FINGERTIPS!

PLatinum

- **HIGH DEGREE OF PROTECTION IP66, IP67 and IP69K**
  The actuators have been tested to guarantee a degree of protection per IEC/EN IP66, IP67, IP69K and per UL Type 4X, appropriate for use even in extreme ambient conditions.
- **ELEGANT STYLE AND ERGONOMIC DESIGN**
  All the series elements have an ergonomic design and, at the same time, particular care has been given to the finest detail aesthetics.
- **LONG ACTUATOR MECHANICAL LIFE**
  High performance characteristics assure 5,000,000 cycle mechanical life for spring return actuators, 1,000,000 for double and triple touch units and 300,000 for emergency-stop types.
- **MATERIALS RESISTANT TO OILS, SOLVENTS AND HYDROCARBONS**
- **CUSTOMIZATION**
  To facilitate warehouse management, it is possible to purchase spring return or push-push button actuators without caps or lenses and at the same time caps and lenses as spare parts.
  This allows for custom buttons to be completed from stock.

- **HIGH STANDARDIZATION**
  Contact elements, LED light elements and a wide range of accessories are common to all types of the series.
- **USAGE AT EXTREME TEMPERATURE CONDITIONS**
  Operation temperature range between -25° and +70°C.
- **CERTIFICATIONS: cULus, EAC, RINA and CCC.**

Ø30MM FLAT METAL LPF

- ACTUATORS MADE OF ALUMINIUM AND ZINC ALLOY
- ACTUATOR PROFILE OF ONLY 4mm
- HIGH STRENGTH
- ERGONOMIC AND FUNCTIONAL
- SCREW PANEL FIXING
- TYPES
  - spring return and push-push button actuators
  - lever, key and knob selectors
  - illuminated spring return and push-push button actuators
  - illuminated lever selectors
  - USB and RJ45 communication interfaces.

Ø22MM METAL LPS

- ACTUATORS MADE OF ALUMINIUM AND ZINC ALLOY
- HIGH STRENGTH AND IMPACT RESISTANCE
- SCREW PANEL FIXING
- TYPES
  - spring return and push-push button actuators
  - spring return mechanical reset button actuators
  - mushroom head push button actuators
  - spring return double and triple-touch button actuators
  - lever, key and knob selector switch actuators
  - illuminated spring return, push-push and mushroom-head actuators
  - spring return double-touch button actuators with indicator
  - illuminated lever selectors
  - joysticks.
- AVAILABILITY OF ACTUATORS IN KITS

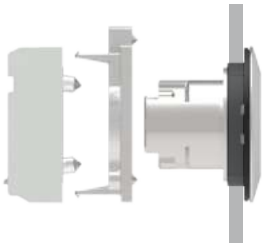
Ø22MM CHROMED PLASTIC LPC

- ACTUATORS MADE OF POLYAMIDE WITH EXTERNAL CHROME RING
- SNAP-ON FAST INSTALLATION OF THE MOUNTING BASE AND CONTACT ELEMENTS
- PANEL FIXING BY THREADED RING
- TYPES
  - spring return and push-push button actuators
  - spring return mechanical reset button actuators
  - mushroom head push button actuators
  - spring return double and triple-touch button actuators
  - lever, key and knob selector switch actuators
  - illuminated spring return, push-push and mushroom-head actuators
  - spring return double-touch button actuators with indicator
  - illuminated lever selectors
  - monoblock LED pilot lights
  - monoblock potentiometers and buzzers
  - USB and RJ45 communication interfaces.
- AVAILABILITY OF ACTUATORS IN KITS

QUICK AND EASY ACTUATOR INSTALLATION

Ø30mm FLAT METAL

- The actuator **fits** into the Ø30mm panel hole with an adapter that retains it securely by two screws.

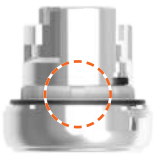


- The actuator has a **seal** with **rubber grommets** which ensure stable fitting.

Ø22mm METAL

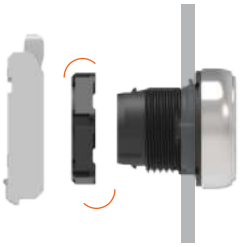
- The actuator **fits** into the Ø22mm panel hole with an adapter that retains it securely by two screws.

- The actuator has a **seal** with **rubber grommets** to ensure stable fitting.

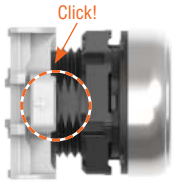


Ø22mm CHROMED PLASTIC

- The actuator mounts to the Ø22mm panel hole with a **threaded ring**.
  The mounting base snaps onto the back of the actuator itself.



- The actuator has a **seal** with **rubber grommets** to ensure stable fitting.
- The anti-rotation lug on the actuator collapses into the seal to enable installation even to round holes without an anti-rotation notch.
- The mounting plate and actuators have **clearly visible reference marks** to facilitate snapping the actuators onto the base.

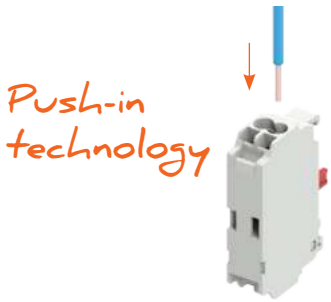


CONTACT ELEMENTS

- Common to all **PL**atinum series actuators.
- Miniaturised size
- Availability of double contacts
- High electric conductivity - 5V 1mA
- Up to 9 contact elements can be installed
- Versions with screw, spring-clamp (push-in), Faston and base mount contact blocks for use with LPZP control stations
- Contact operation: double breaking action, direct (positive) action operation and wiping effect
- Electrical contact and LED elements are **snapped onto** the mounting adapter
- **The activation of the middle contact is standard supplied** on all non-illuminated spring return and push-push button or selector switch actuators.

CONTACT AND LED ELEMENTS WITH SPRING-CLAMP (PUSH-IN) TECHNOLOGY

PUSH-IN technology reduces the time required to connect stiff cables and cables with crimped terminals. The wire simply inserts into the clamp for a secure, sealed connection - no screwdriver needed!The clamping force is long-lasting and unaffected by vibration and impact.

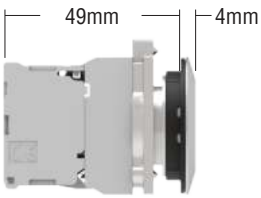


HIGH-LUMINOSITY LED ELEMENTS

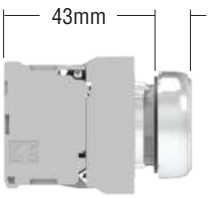
- Miniaturised size
- Long electrical life: 100,000h
- Versions with screw, spring-clamp (push-in) and for bottom of LPZP control stations
- Overvoltage protection
- Withstand vibrations
- Protection against stray currents in wiring
- Flickering phenomenon reduction
- Steady and flashing light versions
- Supply voltages: 12...30VAC/DC, 85...140VAC, 185...265VAC
- Test elements installed alongside and connected with the relative LED element allow checking if all LED elements of the installation are working properly.

LOW PROFILE ACTUATORS AND COMPACT FOOTPRINT

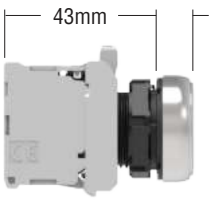
- The actuator's external collar has a low profile and reduced front depth.
- The total depth from the panel surface to the first contact element is just 43mm for the Ø22mm metal/plastic type, and 49mm for the Ø30mm flush-mounting metal type.



Ø30mm flat metal



Ø22mm metal



Ø22mm chromed plastic

DOUBLE AND TRIPLE-TOUCH ACTUATORS

- IEC **IP66, IP67, IP69K** and **UL Type 4X** degree of protection
- Double-touch button actuators, with 2 flush or 1 flush and 1 extended buttons
- Triple-touch button actuators with 2 flush and middle extended butons
- Versions with or without indicator.

MECHANICAL RESET BUTTONS

- Rod adjustment directly on acutator front (1...4mm/0.04...0.16")

- Up to 6 contact elements can be mounted.

EMERGENCY STOP ACTUATORS

- Actuator structure suitable to warrant direct opening operation with mechanical latching for emergency stopping per **ISO 13850** and **IEC/EN/BS 60947-5-5**
- There is a green line around the actuator body to spot when the emergency stop is at rest or activated
- Use of **Ronis key**
- Various accessories available (e.g. yellow E-stop disks, padlockable protection, rubber actuator boots, label holders and labels)
- Auto-monitor contact elements are available with functions to:
  - constantly control the correct installation (mounting adapter and NC contact with the actuator) and proper operation of the NC contact
  - open the circuit in the case of malfunctions (e.g. the contact detaches from the mounting adapter due to strong vibrations or shock).

SELECTOR SWITCH ACTUATORS

- Lever design assures excellent grip
- Option to differentiate the actuation of the central contact

- **High visibility** on front or side and actuator inscription shows exact switch position

- Use of **Ronis key**

- **Activation of the middle contacts is standard supplied** on 2 and 3 position selector switches.

PILOT LIGHTS

- Protection rating IP66, IP67, IP69K and UL Type 4X for LED monoblock pilot lights and pilot light heads
- Long life and low consumption
- Supply voltages:
  - 110...120VAC, 230VAC, 380...415VAC
  - 110...125VDC, 220VDC
  - 12VAC/DC, 24VAC/DC, 48VAC/DC.

MONOBLOCK POTENTIOMETERS

- Potentiometer included in the product
- Protection rating IP66, IP67 and IP69K and UL Type 4X
- Resistance values from 1 to 500kΩ.

ADAPTER FOR Ø30MM HOLES

- Allows installation of Ø22mm actuators in Ø30mm holes
- Two versions; one for buttons and selector switches and one for emergency buttons.

MONOBLOCK BUZZERS

- Continuous or pulse-tone monoblock buzzers in a single product
- IP40 version (90dB/10cm) and IP66, IP67, IP69K and UL Type 4X, version (80dB/10cm) available.

COMMUNICATION INTERFACES

- Protection rating IP65, UL Type 4X
- USB and RJ45 for Ethernet types with data transmission in both directions
- USB type 3.0 (backward compatible with USB 2.0)
- Versions complete with cable.

JOYSTICKS

- Complete with contact elements
- **2 and 4 directions** available versions with or without mechanical interlock.

ACCESSORIES

- DIN rail adapter
- Label holders and labels
- Rubber actuator hoods
- Padlockable protection
- Protective covers.

PLASTIC CONTROL STATIONS

- Protection rating IP66, IP67, IP69K and Type 4X per UL
- 1 to 6 hole empty versions
- Complete 1 to 3 actuator versions in a variety of combinations
- Quick installation and easy cabling of the contacts and LED elements with mounting to the bottom (snap mounting to the base)
- Option to also install screw-in and spring-mounting LED elements together with the actuator inside the cover panel.

MOUNTING THE CONTACTS TO THE BOTTOM OF THE CONTROL STATION

- The use of contact and LED lamp holder elements that snap mount to the bottom of the control station makes for easier cabling.

YELLOW CONTROL STATION WITH ACTUATOR SHROUD

- Protective cover integrated into the button panel cover
- Protection rating IP66, IP67, IP69K and UL Type 4X
- 4 knockout holes for cable wiring
- Kit of 4 caps to protect the screws.

METAL CONTROL STATIONS

- Protection rating IP66, IP67 and UL Type 4X
- From 1 to 16 holes version
- 1 hole version with actuator protection
- Version without holes.

Pushbutton actuators, spring return

LPSB10...

LPSB20...

LPSB30...

Order code	Actuator colour	Qty per pkg	Wt
		n°	[kg]
Flush (without mounting adapter). Spring return.			
LPSB102	Black	5	0.031
LPSB103	Green	5	0.031
LPSB104	Red	5	0.031
LPSB105	Yellow	5	0.031
LPSB106	Blue	5	0.031
LPSB108	White	5	0.031
Extended (without mounting adapter). Spring return.			
LPSB202	Black	5	0.033
LPSB203	Green	5	0.033
LPSB204	Red	5	0.033
LPSB205	Yellow	1	0.033
LPSB206	Blue	1	0.033
LPSB208	White	1	0.033
Shrouded (without mounting adapter). Spring return.			
LPSB302	Black	5	0.033
LPSB303	Green	5	0.033
LPSB304	Red	5	0.033
LPSB305	Yellow	1	0.033
LPSB306	Blue	1	0.033
LPSB308	White	1	0.033

Pushbutton actuators, spring return in kit

new

Order code	Actuator colour	Contacts config.	Qty per pkg	Wt
			n°	[kg]
Flush. Spring return.				
LPSB102K10	Black	1NO	1	0.059
LPSB103K10	Green	1NO	1	0.059
LPSB104K01	Red	1NC	1	0.059
LPSB105K10	Yellow	1NO	1	0.059
LPSB106K10	Blue	1NO	1	0.059
LPSB108K10	White	1NO	1	0.059

Push-push button actuators

LPSQ10...

LPSQ20...

Order code	Actuator colour	Qty per pkg	Wt
		n°	[kg]
Flush (without mounting adapter). Push on-push off.			
LPSQ102❶	Black	5	0.031
LPSQ103❶	Green	5	0.031
LPSQ104❶	Red	5	0.031
LPSQ105❶	Yellow	1	0.031
LPSQ106❶	Blue	1	0.031
LPSQ108❶	White	1	0.031
Extended (without mounting adapter). Push on-push off.			
LPSQ202❶	Black	5	0.033
LPSQ203❶	Green	5	0.033
LPSQ204❶	Red	5	0.033
LPSQ205❶	Yellow	1	0.033
LPSQ206❶	Blue	1	0.033
LPSQ208❶	White	1	0.033

❶ **Use contact elements LPXC10A (EM) and LPXC01 (NC) only.**
Contact elements LPXC10 (NO) and LPXC01D (LB) or double contacts cannot be fitted on these actuators.

Operational characteristics
- Any mounting position allowed
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K.

Materials
An aluminium and zinc alloy (zama) is used for the metal part whereas plastic parts are made of polyamide.

Mechanical endurance
Operating force: <0.5kg/1.1lb (actuator).
Mechanical life:
- Spring return actuators: 5,000,000 cycles
- Push-push actuators: 500,000 cycles.

Mounting adapter
See page 8-38.
Type: LPXAU120M.
The adapter is fixed to the mounting surface by means of incorporated screws (Tmax = 0.7Nm/6.1lb.in).
Actuators latch onto the mounting adapter by simple rotation.

Contact elements for spring return button actuators
See page 8-38 to 8-40.

Type	Terminals

Front-mount types snap onto LPXAU120M mounting adapter (to purchase separately).
Up to:
- 9 single contacts, 3 left, 3 middle and 3 right;
- 6 double contacts, 2 left, 2 middle and 2 right.

The LPXAU120M mounting adapter can also be fitted internally to the cover of the LPZ... control station with up to 3 elements per actuator.

1NO	LPXC10	Screw
	LPXCF10	Faston
	LPXCS10	Spring clamp
1EM	LPXC10A	Screw
1NC	LPXC01	Screw
	LPXCF01	Faston
	LPXCS01	Spring clamp
1LB	LPXC01D	Screw
1NO+1NC	LPXC11	Screw
2NO	LPXC20	Screw
2NC	LPXC02	Screw

Base mount types snap into LPZP... control station base.
See example on page 8-41.

Up to 3 contacts can be fitted per control station.

1NO	LPXCB10	Screw
1NC	LPXCB01	Screw

Contact elements for push-push button actuators
See page 8-39.
Type: LPXC10A (1EM)
LPXC01 (1NC)
Contacts snap onto the mounting adapter which can also be used with LPZ... control stations.
Up to 6 contacts can be fitted: 2 each on the left, middle or right; up to 3 elements can be fitted to the adapter when used with the LPZ... control station.

All these actuators are standard supplied with action plug for middle contacts.

Certifications and compliance
Certifications: cULus, EAC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

Mechanical reset buttons, complete unit, spring return

LPSR1196

Order code	Actuator colour	Qty per pkg	Wt
		n°	[kg]
Flush (5.2mm/0.2" stroke). Adjustable length 0-150mm/5.9". Complete with shaft (without mounting adapter). Spring return.			
LPSR1002	Black	5	0.044
LPSR1003	Green	5	0.044
LPSR1004	Red	5	0.044
LPSR1006	Blue	5	0.044
LPSR1196❶	Blue (RESET)	5	0.044
Extended (5.2mm/0.2" stroke). Adjustable length 0-150mm/5.9". Complete with shaft (without mounting adapter). Spring return.			
LPSR2004	Red	1	0.046

❶ With "RESET" caption on actuator.
E.g. Not suitable for LPZ... control stations.

Pushbutton actuators, spring return, with symbol

LPSB11...

LPSB21...

Order code	Symbol	Actuator colour	Qty per pkg	Wt
			n°	[kg]
Flush (without mounting adapter). Spring return.				
LPSB1102	O	Black	5	0.031
LPSB1104		Red	5	0.031
LPSB1113	I	Green	5	0.031
LPSB1118		White	5	0.031
LPSB1123	II	Green	1	0.031
LPSB1128		White	1	0.031
LPSB1132	STOP	Black	1	0.031
LPSB1134		Red	5	0.031
LPSB1142	← ❶	Black	5	0.031
LPSB1148		White	5	0.031
LPSB1152	↑ ❷	Black	5	0.031
LPSB1158		White	5	0.031
LPSB1163	START	Green	5	0.031
LPSB1168		White	1	0.031
LPSB1176	R	Blue	1	0.031
LPSB1178		White	1	0.031
LPSB1196	RESET	Blue	5	0.031
LPSB1502	◄┤►	Black	5	0.031
LPSB1512	►┤◄	Black	5	0.031
Extended (without mounting adapter). Spring return.				
LPSB2102	O	Black	5	0.033
LPSB2104		Red	5	0.033
LPSB2132	STOP	Black	1	0.033
LPSB2134		Red	5	0.033

❶ Arrow symbol can be used to indicate right or left.
❷ Arrow symbol can be used to indicate up or down.

Pushbutton actuators, spring return, with special symbols

LPSB...

Order code ❹❺	Symbol	Actuator colour	Qty per pkg	Wt
			n°	[kg]
Spring return (without mounting adapter).				
LPSB❶❷18❸	ϟ❻	❸	50	0.033
LPSB❶❷34❸	MAN	❸	50	0.033
LPSB❶❷35❸	AUTO	❸	50	0.033
LPSB❶❷22❸	↗	❸	50	0.033
LPSB❶❷23❸	□◺	❸	50	0.033

Note: for other symbols see page 8-37.
❶ Add letter "L" if illuminated type is required.
❷ For the type of actuator, add: 1 for flush or 2 for extended.
❸ Add the actuator colour: 2 black only for non-illuminated type; 3 green, 4 red, 5 yellow, 6 blue, 8 white or 7 transparent for illuminated version.
❹ Products available on specific request for a minimum multiple quantity of 50 pieces per type.
❺ Consult Technical support for assistance; see contact details or inside front cover.
❻ Symbol indicating dangerous voltage (IEC 60417 5036-a).
Examples of complete order codes:
LPSB2258 – extended non-illuminated white pushbutton with + symbol;
LPSBL1685 – flush illuminated yellow pushbutton actuator with ⚠ symbol.

Operational characteristics
– Any mounting position allowed
– Ambient conditions:
  • Operating temperature: -25...+70°C
  • Storage temperature: -40...+85°C
– Degree of protection:
  • Per IEC/EN: IP66, IP67 and IP69K
  • Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K.

Materials
An aluminium and zinc alloy (zama) is used for the metal part whereas plastic parts are made of polyamide.

Mechanical endurance
Operating force: <0.5kg/1.1lb (actuator).
Mechanical life: 5,000,000 cycles.

Mounting adapter
See page 8-38.
Type: LPXAU120M.
The adapter is fixed to the mounting surface by means of incorporated screws (Tmax = 0.7Nm/6.1lb.in).
Actuators latch onto the mounting adapter by simple rotation.

Contact elements for LPSR... mechanical reset buttons
See page 8-38 to 8-40.

Type		Terminals
Front-mount types snap onto LPXAU120M mounting adapter (to purchase separately). Up to: - 6 single contacts, 3 left and 3 right; - 4 double contacts, 2 left and 2 right.		
1NO	LPXC10	Screw
	LPXCF10	Faston
	LPXCS10	Spring clamp
1EM	LPXC10A	Screw
1NC	LPXC01	Screw
	LPXCF01	Faston
	LPXCS01	Spring clamp
1LB	LPXC01D	Screw
1NO+1NC	LPXC11	Screw
2NO	LPXC20	Screw
2NC	LPXC02	Screw

Contact elements for spring return button actuators
See page 8-38 to 8-40.
Front-mount types snap onto LPXAU120M mounting adapter (to purchase separately).
Up to:
- 9 single contacts, 3 left, 3 middle and 3 right;
- 6 double contacts, 2 left, 2 middle and 2 right.
The LPXAU120M mounting adapter can also be fitted internally to the cover of the LPZ... control station with up to 3 elements per actuator.

Base mount types snap into LPZP... control station base.
See example on page 8-41.
Up to 3 elements can be fitted to the adapter when used with the LPZ... control station.

All LPSB actuators are standard supplied with action plug for middle contacts.

Certifications and compliance
Certifications: cULus, EAC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

Mushroom head pushbutton actuators

LPSB614...

LPSB616...

LPSB6744

LPSB6634

LPSB6644

LPSB6844

Order code	Actuator colour	Qty per pkg	Wt
		n°	[kg]
SPRING RETURN. Ø40mm/1.57" (without mounting adapter).			
LPSB6142	Black	5	0.038
LPSB6143	Green	5	0.038
LPSB6144	Red	5	0.038
LPSB6145	Yellow	5	0.038
LPSB6146	Blue	5	0.038
Ø60mm/2.36" (without mounting adapter).			
LPSB6162	Black	5	0.044
LPSB6163	Green	1	0.044
LPSB6164	Red	5	0.044
LPSB6165	Yellow	1	0.044
LPSB6166	Blue	1	0.044
LATCH, PULL TO RELEASE. Ø40mm/1.57" (without mounting adapter). For normal stopping.			
LPSB6742	Black	5	0.102
For emergency stopping, ISO 13850 compliant.			
LPSB6744	Red	5	0.102
LATCH, TURN TO RELEASE. Ø30mm/1.18" (without mounting adapter). For emergency stopping, ISO 13850 compliant.			
LPSB6634	Red	5	0.048
Ø40mm/1.57" (without mounting adapter). For normal stopping.			
LPSB6642	Black	5	0.051
Ø40mm/1.57" (without mounting adapter). For emergency stopping, ISO 13850 compliant.			
LPSB6644	Red	5	0.084
LATCH, TURN KEY TO RELEASE. Ø40mm/1.57" (without mounting adapter). Key code n° 455. For normal stopping.			
LPSB6842	Black	5	0.088
LPSB6842R❶	Black	1	0.088
For emergency stopping, ISO 13850 compliant.			
LPSB6844	Red	5	0.088
LPSB6844R❶	Red	1	0.088

❶ Versions with different key codes.
Complete with the numeric code of the key.
The following versions are available: 421E, 520E, 3433E, 621E, 622E.
Example of complete code: LPSB6844R421E.

Mushroom head pushbutton actuators in kit

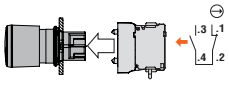
new

Order code	Actuator colour	Contacts config.	Qty per pkg	Wt
			n°	[kg]
LATCH, PULL TO RELEASE. Ø40mm. For emergency stopping, ISO 13850 compliant.				
LPSB6744K01	Red	1NC	1	0.131
LATCH, TURN TO RELEASE. Ø40mm. For emergency stopping, ISO 13850 compliant.				
LPSB6644K01	Red	1NC	1	0.113

Normal operation of auto-monitor contact mounted on surface or on cover of control stations

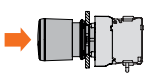
In case of detachment of only the contact element and/or of the mounting adapter with contact element

With contact type LPXC01M (1NC)

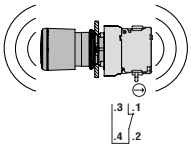


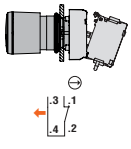
Contact .3-.4 closes when the LPXAU120M mounting adapter and LPXC01M contact are fitted correctly on the mushroom-head latch actuator.
Contact .1-.2 in series does not change state.

If the contact LPXC01M detaches from the actuator due to **strong vibrations or shock,** the equipment can be restored to operating state only when proper mounting of the contact with the actuator is re-established resulting in **contact .3-.4 closing.**



When the button is **fully pressed, contact .1-.2 opens** and remains in this state until the button is released.
Contact .3-.4 in series does not change state.





Operational characteristics
- Any mounting position allowed
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K.

Materials
An aluminium and zinc alloy (zama) is used for the metal part whereas plastic parts are made of polyamide.

Mechanical endurance
Operating force: <0.5kg/1.1lb (actuator).
Mechanical life:
- Spring return actuators: 5,000,000 cycles
- Push-push actuators: 500,000 cycles.

Mounting adapter
See page 8-38.
Type: LPXAU120M.
The adapter is fixed to the mounting surface by means of incorporated screws (Tmax = 0.7Nm/6.1lb.in).
Actuators latch onto the mounting adapter by simple rotation.

Contact elements
See page 8-38 to 8-41.

Type		Terminals

Front-mount types snap onto LPXAU120M mounting adapter (to purchase separately).
For SPRING RETURN types, up to:
- 9 single contacts, 3 left, 3 middle and 3 right;
- 6 double contacts, 2 left, 2 middle and 2 right.
For LATCH types, up to:
- 4 single contacts or 2 double contacts.
The LPXAU120M mounting adapter can also be fitted internally to the cover of the LPZ... control station with up to 3 elements per actuator.

1NO	LPXC10	Screw
	LPXCF10	Faston
	LPXCS10	Spring clamp
1EM	LPXC10A	Screw
1NC	LPXC01	Screw
	LPXCF01	Faston
	LPXCS01	Spring clamp
1LB	LPXC01D	Screw
1NO+1NC	LPXC11	Screw
2NO	LPXC20	Screw
2NC	LPXC02	Screw

Base mount types snap into LPZP... control station base.
See example on page 8-41.
Up to 3 elements can be fitted to the adapter when used with the LPZ... control station.

1NO	LPXCB10	Screw
1NC	LPXCB01	Screw

AUTO-MONITOR CONTACT with MUSHROOM-HEAD LATCH types only: 2 elements max of this type can be mounted.
In addition, another type of contact can be mounted.
The LPXAU120M mounting adapter can also be fitted internally to the cover of the LPZ... control station with up to 2 elements per actuator. No LED element can be installed.

Auto-monitor 1NC	LPXC01M	Screw
1NO	LPXC10	Screw (2 stacked on the right)
	LPXCF10	Faston (2 stacked on the right)
	LPXCS10	Spring clamp (2 stacked on the right)
1NC	LPXC01	Screw (2 stacked on the right)
	LPXCF01	Faston (2 stacked on the right)
	LPXCS01	Spring clamp (2 stacked on the right)

All these actuators are standard-supplied with action plug for middle contacts.

Certifications and compliance
Certifications: cULus, EAC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

Double-touch actuators, spring return

LPSB71...

LPSB72...

Order code	Actuator colour	Symbols	Qty per pkg	Wt
			n°	[kg]
Two flush pushbuttons (without mounting adapter). Both spring return.				
LPSB7112	Black/Red	—	5	0.035
LPSB7113	Green/Red	—	5	0.035
LPSB7114	White/Black	—	5	0.035
LPSB7122	Black/Red	I-O	5	0.035
LPSB7123	Green/Red	I-O	5	0.035
LPSB7124	White/Black	I-O	5	0.035
LPSB7133	Green/Red	Start/Stop	5	0.035
LPSB7191	Black/Black	↑ ↓	5	0.035
One extended and one flush pushbuttons (without mounting adapter). Both spring return.				
LPSB7212	Black/Red	—	1	0.035
LPSB7213	Green/Red	—	5	0.035
LPSB7214	White/Black	—	1	0.035
LPSB7222	Black/Red	I-O	5	0.035
LPSB7223	Green/Red	I-O	5	0.035
LPSB7224	White/Black	I-O	1	0.035
LPSB7233	Green/Red	Start/Stop	5	0.035

Triple-touch actuators, spring return

LPSB73...

Order code	Symbols	Qty per pkg	Wt
		n°	[kg]
One middle extended buttons (without mounting adapter). Spring return.			
LPSB7345		5	0.035
LPSB7355		5	0.035
LPSB7365		5	0.035
LPSB7375		5	0.035

Operational characteristics
- Any mounting position allowed
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K.

Materials
An aluminium and zinc alloy (zama) is used for the metal part whereas plastic parts are made of polyamide.

Mechanical endurance
Operating force: <0.5kg/1.1lb (actuator).
Mechanical life: 1,000,000 cycles.

Mounting adapter
See page 8-38.
Type: LPXAU120M.
The adapter is fixed to the mounting surface by means of incorporated screws (Tmax = 0.7Nm/6.1lb.in).
Actuators latch onto the mounting adapter by simple rotation.

Contact elements
See page 8-38 to 8-40.

Type	Terminals

Front-mount types snap onto LPXAU120M mounting adapter (to purchase separately).
Up to:
- 9 single contacts, 3 left, 3 middle and 3 right;
- 6 double contacts, 2 left, 2 middle and 2 right.

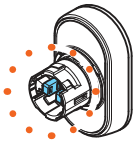
The LPXAU120M mounting adapter can also be fitted internally to the cover of the LPZ... control station with up to 3 elements for double-touch and 3 elements for triple-touch actuators.

1NO	LPXC10	Screw
	LPXCF10	Faston
	LPXCS10	Spring clamp
1EM	LPXC10A	Screw
1NC	LPXC01	Screw
	LPXCF01	Faston
	LPXCS01	Spring clamp
1LB	LPXC01D	Screw
1NO+1NC	LPXC11	Screw
2NO	LPXC20	Screw
2NC	LPXC02	Screw

Base mount types snap into LPZP... control station base.
See example on page 8-41.
For DOUBLE-TOUCH actuators, 2 contacts need to be fitted, one on the left and one on the right.
For TRIPLE-TOUCH actuators, 3 contacts need to be fitted: one each on the left, middle and right.

1NO	LPXCB10	Screw
1NC	LPXCB01	Screw

All these actuators are standard-supplied with action plug for middle contacts.



The middle contact activation, with respect to the right and left side contact, can be changed by the user, if required, by removing one mechanism pin.

Certifications and compliance
Certifications: cULus, EAC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

Selector switch actuators lever

LPSS1...

Order code	Type of positions	Qty per pkg	Wt
		n°	[kg]
2 positions (without mounting adapter).			
LPSS120		5	0.042
LPSS121		5	0.042
3 positions (without mounting adapter).			
LPSS130		5	0.042
LPSS131		5	0.042
LPSS132		5	0.042
LPSS133		5	0.042

Selector switch actuators lever in kit

new

Order code	Type of position	Contacts config.	Qty per pkg	Wt
			n°	[kg]
2 positions.				
LPSS120K10		1NO	1	0.071
3 positions.				
LPSS130K20		1NO+1NO	1	0.081
LPSS131K20		1NO+1NO	1	0.081

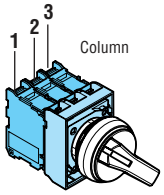
Selector switch actuators long lever

LPSS2...

Order code	Type of positions	Qty per pkg	Wt
		n°	[kg]
2 positions (without mounting adapter).			
LPSS220		5	0.045
LPSS221		5	0.045
3 positions (without mounting adapter).			
LPSS230		5	0.045
LPSS231		5	0.045
LPSS232		5	0.045
LPSS233		5	0.045

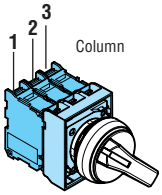
Contact activation

2-position



	Contacts 1	2	3
A	—	—	—
B	●	●	●

3-position



	Contacts 1	2	3
A	●	●	—
B	—	—	—
C	—	●	●

Operational characteristics
- Any mounting position allowed
- Standard key types supplied with Ronis key code n° 455
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K.

Materials
An aluminium and zinc alloy (zama) is used for the metal part whereas plastic parts are made of polyamide.

Mechanical endurance
Mechanical life: 1,000,000 cycles.

Mounting adapter
See page 8-38.
Type: LPXAU120M.
The adapter is fixed to the mounting surface by means of incorporated screws (Tmax = 0.7Nm/6.1lb.in).
Actuators latch onto the mounting adapter by simple rotation.

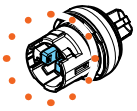
Contact elements
See page 8-38 to 8-40.

Type	Terminals	
Front-mount types snap onto LPXAU120M mounting adapter (to purchase separately). Up to: - 6 single contacts, 2 left, 2 middle and 2 right or 3 left and 3 right; - 3 double contacts, 1 left, 1 middle and 1 right. The LPXAU120M mounting adapter can also be fitted internally to the cover of the LPZ... control station with up to 3 elements per actuator.		
1NO	LPXC10	Screw
	LPXCF10	Faston
	LPXCS10	Spring clamp
1EM	LPXC10A	Screw
1NC	LPXC01	Screw
	LPXCF01	Faston
	LPXCS01	Spring clamp
1LB	LPXC01D	Screw
1NO+1NC	LPXC11	Screw
2NO	LPXC20	Screw
2NC	LPXC02	Screw

Base mount types snap into LPZP... control station base.
See example on page 8-41.
Up to 3 elements can be fitted to the adapter when used with the LPZ... control station.

1NO	LPXCB10	Screw
1NC	LPXCB01	Screw

All these actuators are standard-supplied with action plug for middle contacts.



The middle contact activation, with respect to the right and left side contact, can be changed by the user, if required, by removing one mechanism pin.

Type of position
Maintained position.
Spring return position.

Rotation angles
2 positions

3 positions

Certifications and compliance
Certifications: cULus, EAC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

Selector switch actuators key (Ronis)

LPSS3...

Order code	Type of positions	Qty per pkg	Wt
		n°	[kg]
2 positions (without mounting adapter).			
LPSS320		5	0.065
LPSS320R❶		1	0.065
LPSS321		5	0.065
LPSS321R❶		1	0.065
LPSS340		5	0.065
LPSS340R❶		1	0.065
3 positions (without mounting adapter).			
LPSS330		5	0.065
LPSS330R❶		1	0.065
LPSS331		5	0.065
LPSS331R❶		1	0.065
LPSS332❷		5	0.065
LPSS332R❶❷		1	0.065
LPSS333❷		5	0.065
LPSS333R❶❷		1	0.065
LPSS350		5	0.065
LPSS350R❶		1	0.065
LPSS360		5	0.065
LPSS360R❶		1	0.065
LPSS370❷		5	0.065
LPSS370R❶❷		1	0.065
LPSS380❷		5	0.065
LPSS380R❶❷		1	0.065
LPSS390❷		5	0.065
LPSS390R❶❷		1	0.065

❶ Versions with different key codes.
Complete with the numeric code of the key.
The following versions are available: 421E, 520E, 3433E, 621E, 622E.
Example of complete code: LPCS320R421E.
❷ Available only on specific request.

Selector switch actuators key (Ronis) in kit

new

Order code	Type of positions	Contacts config.	Qty per pkg	Wt
			n°	[kg]
2 positions.				
LPSS320K10		1NO	1	0.094

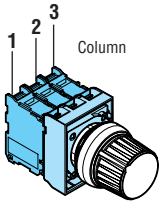
Selector switch actuators knob

LPSS4...

Order code	Type of positions	Qty per pkg	Wt
		n°	[kg]
2 positions (without mounting adapter).			
LPSS420		5	0.042
LPSS421		5	0.042
3 positions (without mounting adapter).			
LPSS430		5	0.042
LPSS431		5	0.042
LPSS432		5	0.042
LPSS433		5	0.042

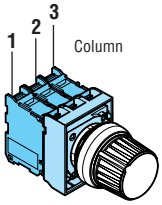
Contact activation

2-position



	Contacts 1	2	3
A	—	—	—
B	●	●	●

3-position



	Contacts 1	2	3
A	●	●	—
B	—	—	—
C	—	●	●

Operational characteristics
- Any mounting position allowed
- Standard key types with numeric code n° 455
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K.

Materials
An aluminium and zinc alloy (zama) is used for the metal part whereas plastic parts are made of polyamide.

Mechanical endurance
Mechanical life: 1,000,000 cycles.

Mounting adapter
See page 8-38.
Type: LPXAU120M.
The adapter is fixed to the mounting surface by means of incorporated screws (Tmax = 0.7Nm/6.1lb.in).
Actuators latch onto the mounting adapter by simple rotation.

Contact elements
See page 8-38 to 8-40.

Type	Terminals

Front-mount types snap onto LPXAU120M mounting adapter (to purchase separately).
Up to:
- 6 single contacts, 2 left, 2 middle and 2 right or 3 left and 3 right;
- 3 double contacts, 1 left, 1 middle and 1 right.

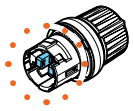
The LPXAU120M mounting adapter can also be fitted internally to the cover of the LPZ... control station with up to 3 elements per actuator.

1NO	LPXC10	Screw
	LPXCF10	Faston
	LPXCS10	Spring clamp
1EM	LPXC10A	Screw
1NC	LPXC01	Screw
	LPXCF01	Faston
	LPXCS01	Spring clamp
1LB	LPXC01D	Screw
1NO+1NC	LPXC11	Screw
2NO	LPXC20	Screw
2NC	LPXC02	Screw

Base mount types snap into LPZP... control station base.
See example on page 8-41.
Up to 3 elements can be fitted to the adapter when used with the LPZ... control station.

1NO	LPXCB10	Screw
1NC	LPXCB01	Screw

All these actuators are standard-supplied with action plug for middle contacts.



The middle contact activation, with respect to the right and left side contact, can be changed by the user, if required, by removing one mechanism pin.

Type of position
- Maintained position.
- Spring return position.
- • Key extraction position.

Rotation angles
2 positions

3 positions

Certifications and compliance
Certifications: cULus, EAC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

Illuminated button actuators, spring return

LPSBL10...

LPSBL20...

Order code	Actuator colour	Qty per pkg	Wt
		n°	[kg]
Flush (without mounting adapter). Spring return.			
LPSBL103	Green	5	0.030
LPSBL104	Red	5	0.030
LPSBL105	Yellow	5	0.030
LPSBL106	Blue	5	0.030
LPSBL107	Transparent	5	0.030
Extended (without mounting adapter). Spring return.			
LPSBL203	Green	5	0.032
LPSBL204	Red	5	0.032
LPSBL205	Yellow	5	0.032
LPSBL206	Blue	5	0.032
LPSBL207	Transparent	5	0.032

Illuminated button actuators, spring return in kit

new

Order code	Actuator colour	Contacts config.	Qty per pkg	Wt
			n°	[kg]
Flush. Spring return. LED element included: 12...30VAC/DC.				
LPSBL103K11PB3	Green	1NO+1NC	1	0.080
LPSBL104K11PB4	Red	1NO+1NC	1	0.080
LPSBL105K11PB5	Yellow	1NO+1NC	1	0.080
LPSBL106K11PB6	Blue	1NO+1NC	1	0.080
LPSBL107K11PB8	Trasparent	1NO+1NC	1	0.080
Flush. Spring return. LED element included: 185...265VAC.				
LPSBL103K11PM3	Green	1NO+1NC	1	0.080
LPSBL104K11PM4	Red	1NO+1NC	1	0.080
LPSBL105K11PM5	Yellow	1NO+1NC	1	0.080
LPSBL106K11PM6	Blue	1NO+1NC	1	0.080
LPSBL107K11PM8	Trasparent	1NO+1NC	1	0.080

Illuminated push-push button actuators

LPSQL10...

LPSQL20...

Order code	Actuator colour	Qty per pkg	Wt
		n°	[kg]
Flush (without mounting adapter). Push on-push off.			
LPSQL103❶	Green	5	0.030
LPSQL104❶	Red	5	0.030
LPSQL105❶	Yellow	5	0.030
LPSQL106❶	Blue	5	0.030
LPSQL107❶	Transparent	5	0.030
Extended (without mounting adapter). Push on-push off.			
LPSQL203❶	Green	5	0.032
LPSQL204❶	Red	5	0.032
LPSQL205❶	Yellow	5	0.032
LPSQL206❶	Blue	5	0.032
LPSQL207❶	Transparent	5	0.032

❶ **Use contact elements LPXC10A (EM) and LPXC01 (NC) only.** Contact elements LPXC10 (NO) and LPXC01D (LB) or double contacts cannot be fitted on these actuators.

Operational characteristics
- Any mounting position allowed
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K.

Materials
An aluminium and zinc alloy (zama) is used for the metal part whereas plastic parts are made of polyamide.

Mechanical endurance
Operating force: <0.5kg/1.1lb (actuator).
Mechanical life:
- Spring return actusators: 5,000,000 cycles
- Push-push actuators: 500,000 cycles.

Mounting adapter
See page 8-38.
Type: LPXAU120M.
The adapter is fixed to the mounting surface by means of incorporated screws (Tmax = 0.7Nm/6.1lb.in).
Actuators latch onto the mounting adapter by simple rotation.

Contact elements for illuminated spring return actuators
See page 8-39 to 8-40.

Type		Terminals

Front-mount types snap onto LPXAU120M mounting adapter (to purchase separately).
Up to:
- 6 single contacts, 3 left and 3 right;
- 4 double contacts, 2 left and 2 right.

The LPXAU120M mounting adapter can also be fitted internally to the cover of the LPZ... control station with up to 2 elements per actuator in addition to the LED element in the middle position.

1NO	LPXC10	Screw
	LPXCF10	Faston
	LPXCS10	Spring clamp
1EM	LPXC10A	Screw
1NC	LPXC01	Screw
	LPXCF01	Faston
	LPXCS01	Spring clamp
1LB	LPXC01D	Screw
1NO+1NC	LPXC11	Screw
2NO	LPXC20	Screw
2NC	LPXC02	Screw

Base mount types snap into LPZP... control station base.
See example on page 8-41.
Up to 2 elements per actuator can also be fitted internally to the cover of the LPZ... control station in addition to the LED element in the middle position.

1NO	LPXCB10	Screw
1NC	LPXCB01	Screw

Contact elements for illuminated push-push button actuators
See page 8-39.
Type: LPXC10A (1EM)
LPXC01 (1NC)
Contacts snap onto the adapter also internally on the cover surface of LPZ... control stations.
Up to 4 contacts can be fitted: 2 each on the left and right, one behind the other; up to 2 elements per control station actuator in addition to the LED element in the middle position.

LED light elements
See pages 8-43 and 44.

Certifications and compliance
Certifications: cULus, EAC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

Illuminated mushroom head button actuators

LPSBL614...

LPSBL664...

Order code	Actuator colour	Qty per pkg	Wt
		n°	[kg]
SPRING RETURN. Ø40mm/1.57" (without mounting adapter).			
LPSBL6143	Green	5	0.040
LPSBL6144	Red	5	0.040
LPSBL6145	Yellow	5	0.040
LPSBL6146	Blue	5	0.040
LPSBL6148	White	1	0.040
LATCH, TURN TO RELEASE. Ø40mm/1.57" (without mounting adapter). For normal stopping.			
LPSBL6643	Green	1	0.045
LPSBL6645	Yellow	1	0.045
LPSBL6646	Blue	1	0.045
For emergency stopping, ISO 13850 compliant.			
LPSBL6644	Red	5	0.045

Double-touch actuators, spring return, white indicator

LPSBL71...

LPSBL72...

Order code	Actuator colour	Symbol	Qty per pkg	Wt
			n°	[kg]
Two flush pushbuttons (without mounting adapter). Both spring return.				
LPSBL7112	Black/Red	—	5	0.035
LPSBL7113	Green/Red	—	5	0.035
LPSBL7114	White/Black	—	1	0.035
LPSBL7122	Black/Red	I-O	5	0.035
LPSBL7123	Green/Red	I-O	5	0.035
LPSBL7124	White/Black	I-O	5	0.035
LPSBL7133	Green/Red	Start/Stop	5	0.035
LPSBL7191	Black/Black	↑ ↓	5	0.035
One extended and one flush pushbuttons (without mounting adapter). Both spring return.				
LPSBL7212	Black/Red	—	1	0.035
LPSBL7213	Green/Red	—	5	0.035
LPSBL7214	White/Black	—	1	0.035
LPSBL7222	Black/Red	I-O	1	0.035
LPSBL7223	Green/Red	I-O	5	0.035
LPSBL7224	White/Black	I-O	5	0.035
LPSBL7233	Green/Red	Start/Stop	5	0.035

Operational characteristics
- Any mounting position allowed
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K.

Materials
An aluminium and zinc alloy (zama) is used for the metal part whereas plastic parts are made of polyamide.

Mechanical endurance
Operating force: <0.5kg/1.1lb (actuator).
Mechanical life:
- Spring return mushroom-head actuators: 5,000,000 cycles
- Latch mushroom-head actuators: 300,000 cycles
- Double-touch: 1,000,000 cycles.

Mounting adapter
See page 8-38.
Type: LPXAU120M.
The adapter is fixed to the mounting surface by means of incorporated screws (Tmax = 0.7Nm/6.1lb.in).
Actuators latch onto the mounting adapter by simple rotation.

Contact elements
See page 8-38 to 41.

Type		Terminals

Front-mount types snap onto LPXAU120M mounting adapter (to purchase separately).
For LPSBL61... types up to:
- 6 single contacts, 3 left and 3 right;
- 4 double contacts, 2 left and 2 right.

For LPSBL66... types up to:
- 4 single contacts, 2 left and 2 right;
- 2 double contacts, 1 left and 1 right.

For DOUBLE-TOUCH types, up to:
- 6 single contacts, 3 left and 3 right;
- 4 double contacts, 2 left and 2 right.

The LPXAU120M mounting adapter can also be fitted internally to the cover of the LPZ... control station with up to 2 elements per actuator in addition to the LED element in the middle position.

1NO	LPXC10	Screw
	LPXCF10	Faston
	LPXCS10	Spring clamp
1EM	LPXC10A	Screw
1NC	LPXC01	Screw
	LPXCF01	Faston
	LPXCS01	Spring clamp
1LB	LPXC01D	Screw
1NO+1NC	LPXC11	Screw
2NO	LPXC20	Screw
2NC	LPXC02	Screw
Auto-monitor 1NC	LPXC01M Only for LPSBL66... type	Screw

Base mount types snap into LPZP... control station base.
See example on page 8-41.
Up to 2 elements per actuator can also be fitted internally to the cover of the LPZ... control station in addition to the LED element in the middle position.

1NO	LPXCB10	Screw
1NC	LPXCB01	Screw

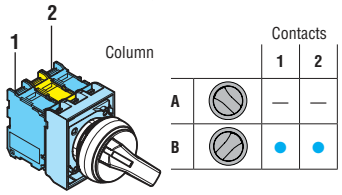
LED light elements
See pages 8-43 and 44.

Certifications and compliance
Certifications: cULus, EAC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

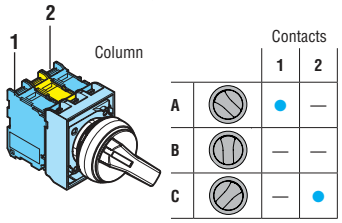
Illuminated selector switch actuators

LPSSL1...

Contact activation of 2-position selector switch



Contact activation of 3-position selector switch



Order code	Actuator colour	Type of positions	Qty per pkg	Wt
			n°	[kg]
2 positions (without mounting adapter).				
LPSSL1203	Green		5	0.030
LPSSL1204	Red		5	0.030
LPSSL1205	Yellow		5	0.030
LPSSL1206	Blue		5	0.030
LPSSL1208	White		5	0.030
LPSSL1213	Green		5	0.030
LPSSL1214	Red		1	0.030
LPSSL1215	Yellow		1	0.030
LPSSL1216	Blue		1	0.030
LPSSL1218	White		5	0.030
3 positions (without mounting adapter).				
LPSSL1303	Green		5	0.030
LPSSL1304	Red		5	0.030
LPSSL1305	Yellow		5	0.030
LPSSL1306	Blue		5	0.030
LPSSL1308	White		5	0.030
LPSSL1313	Green		5	0.030
LPSSL1314	Red		1	0.030
LPSSL1315	Yellow		1	0.030
LPSSL1316	Blue		1	0.030
LPSSL1318	White		5	0.030
LPSSL1323	Green		5	0.030
LPSSL1324	Red		1	0.030
LPSSL1325	Yellow		1	0.030
LPSSL1326	Blue		1	0.030
LPSSL1328	White		5	0.030
LPSSL1333	Green		5	0.030
LPSSL1334	Red		1	0.030
LPSSL1335	Yellow		1	0.030
LPSSL1336	Blue		1	0.030
LPSSL1338	White		5	0.030

Illuminated selector switch actuators in kit

new

Order code	Actuator colour	Type of position	Contacts config.	Qty per pkg
				n°
2 positions. LED element included: 12...30VAC/DC.				
LPSSL120K11PB3	Green		1NO+1NC	1
LPSSL120K11PB4	Red		1NO+1NC	1
LPSSL120K11PB5	Yellow		1NO+1NC	1
2 positions. LED element included: 185...265VAC.				
LPSSL120K11PM3	Green		1NO+1NC	1
LPSSL120K11PM4	Red		1NO+1NC	1
LPSSL120K11PM5	Yellow		1NO+1NC	1
3 positions. LED element included: 12...30VAC/DC.				
LPSSL130K11PB3	Green		1NO+1NC	1
3 positions. LED element included: 185...265VAC.				
LPSSL130K11PM3	Green		1NO+1NC	1

Pilot light heads

LPSL...

Order code	Head colour	Qty per pkg	Wt
		n°	[kg]
Without mounting adapter.			
LPSL3	Green	5	0.029
LPSL4	Red	5	0.029
LPSL5	Yellow	5	0.029
LPSL6	Blue	5	0.029
LPSL7	Transparent	5	0.029
LPSL1187	Transparent ϟ❶	5	0.029

❶ With symbol indicating dangerous voltage (IEC/EN 60417 5036-a).

Operational characteristics
- Any mounting position allowed
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K.

Materials
An aluminium and zinc alloy (zama) is used for the metal part whereas plastic parts are made of polyamide.

Mechanical endurance
Operating force: <0.5kg/1.1lb (actuator).
Mechanical life:
- Selector switches: 1,000,000 cycles.

Mounting adapter
See page 8-38.
Type: LPXAU120M.
The adapter is fixed to the mounting surface by means of incorporated screws (Tmax = 0.7Nm/6.1lb.in).
Actuators latch onto the mounting adapter by simple rotation.

Contact elements
See page 8-38 to 8-40.

Type	Terminals

Front-mount types snap onto LPXAU120M mounting adapter (to purchase separately).
For SELECTOR SWITCHES, up to:
- 4 single contacts, 2 left and 2 right;
- 2 double contacts, 1 left and 1 right.

The LPXAU120M mounting adapter can also be fitted internally to the cover of the LPZ... control station with up to 2 elements per actuator in addition to the LED element in the middle position.

1NO	LPXC10	Screw
	LPXCF10	Faston
	LPXCS10	Spring clamp
1EM	LPXC10A	Screw
1NC	LPXC01	Screw
	LPXCF01	Faston
	LPXCS01	Spring clamp
1LB	LPXC01D	Screw
1NO+1NC	LPXC11	Screw
2NO	LPXC20	Screw
2NC	LPXC02	Screw

Base mount types snap into LPZP... control station base.
See example on page 8-41.
Up to 2 elements per actuator can also be fitted internally to the cover of the LPZ... control station in addition to the LED element in the middle position.

1NO	LPXCB10	Screw
1NC	LPXCB01	Screw

Selector switch type of positions
Maintained position.
Spring return position.

Selector switch rotation angles
2 positions

3 positions

LED light elements
See pages 8-43 and 44.

Certifications and compliance
Certifications: cULus, EAC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

Joysticks

LPSJ4...
(without mechanical interlock)

LPSJ2...
(with mechanical interlock)

Order code	Type of positions	N° auxiliary elements	Qty per pkg	Wt
		NO	n°	[kg]
Without mechanical interlock. Complete with auxiliary contact. Label holder excluded.				
LPSJ200		2	1	0.082
LPSJ201		2	1	0.082
LPSJ400		4	1	0.104
LPSJ401		4	1	0.104
With mechanical interlock. Complete with auxiliary contact. Label holder excluded.				
LPSJ210		2	1	0.082
LPSJ211		2	1	0.082
LPSJ410		4	1	0.104
LPSJ411		4	1	0.104

Accessories

LPXAU101

Order code	Description	Qty per pkg	Wt
		n°	[kg]
LPXAU101	2-4 directional holder for adhesive legends ❶	1	0.004

❶ See page 8-50 for the complete list of available labels.

Operational characteristics
- Any mounting position allowed
- LPSJ2... types can be used with LPZ... control stations
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K
  - IP20 for contact elements.

Materials
An aluminium and zinc alloy (zama) is used for the metal parts whereas plastic parts are made of polyamide and polycarbonate.
The sealing boot is made of NBR rubber.

Mechanical endurance
Mechanical life: 1,000,000 cycles.

General characteristics of contact elements
Wiping action and dual scraping-oscillating effect.
IEC rated insulation voltage: 690V
IEC rated thermal current Ith: 10A
Conductivity: 5V 1mA
UL/CSA and IEC/EN/BS 60947-5-1 designation: A600 Q600.

IEC/EN operational characteristics in AC15 category:

[V]	12	24	48	120	240	400	480	500	600
[A]	6	6	6	6	6	3	1.5	1.4	1.2

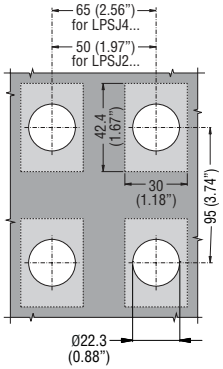
IEC/EN operational characteristics in DC13 category:

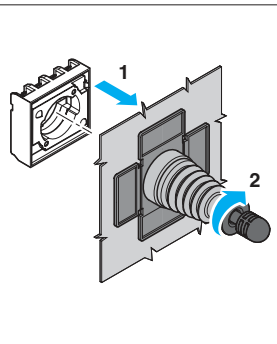
[V]	12	24	48	125	250	440	500	600
[A]	3	3	1.5	0.55	0.27	0.15	0.13	0.1

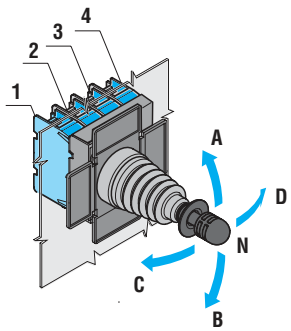
Short circuit protection fuse, max calibre: 10A gG/SC.
Contact resistance: ≤20mΩ.
Terminals: clamp screw with washer.

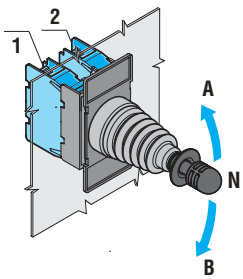
Mounting adapter and contact elements
The joystick is standard supplied with the mounting adapter and contact elements.
The adapter is fixed to the mounting surface by means of incorporated screws (Tmax = 0.7Nm/6.1lb.in).
The joystick latches onto the mounting adapter by simple rotation.
Contact elements snap onto the mounting adapter.
2 LPXC10 contacts are mounted on joystick LPSJ2... type and 4 LPXC10 contacts on LPSJ4... type.
The mounting adapter and contact elements of LPSJ2... types can be internally mounted on LPZ... control stations covers.

Certifications and compliance
Certifications: cULus, EAC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.









Joystick positions and contact activation

2 instable — 2 stable
4 instable — 4 stable

LPXC10		A	B	C	D	N
	1	●				
	2		●			
	3				●	
	4			●		

LPXC10		A	B	N
	1	●		
	2		●	

Pushbutton actuators, spring return

LPFB10...

LPFB20...

Order code	Actuator colour	Qty per pkg	Wt
		n°	[kg]
Flush (without mounting adapter). Spring return.			
LPFB102	Black	5	0.060
LPFB103	Green	5	0.060
LPFB104	Red	5	0.060
LPFB105	Yellow	5	0.060
LPFB106	Blue	5	0.060
LPFB108	White	5	0.060
Extended (without mounting adapter). Spring return.			
LPFB202	Black	5	0.062
LPFB203	Green	5	0.062
LPFB204	Red	5	0.062
LPFB205	Yellow	1	0.062
LPFB206	Blue	1	0.062
LPFB208	White	1	0.062

Push-push button actuators

LPFQ10...

LPFQ20...

Order code	Actuator colour	Qty per pkg	Wt
		n°	[kg]
Flush (without mounting adapter). Push on-push off.			
LPFQ102❶	Black	5	0.060
LPFQ103❶	Green	5	0.060
LPFQ104❶	Red	5	0.060
LPFQ105❶	Yellow	1	0.060
LPFQ106❶	Blue	1	0.060
LPFQ108❶	White	1	0.060
Extended (without mounting adapter). Push on-push off.			
LPFQ202❶	Black	5	0.062
LPFQ203❶	Green	5	0.062
LPFQ204❶	Red	5	0.062
LPFQ205❶	Yellow	1	0.062
LPFQ206❶	Blue	1	0.062
LPFQ208❶	White	1	0.062

❶ **Use contact elements LPXC10A (EM) and LPXC01 (NC) only.**
Contact elements LPXC10 (NO) and LPXC01D (LB) or double contacts cannot be fitted on these actuators.

Operational characteristics
- Any mounting position allowed
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K.

Materials
An aluminium and zinc alloy (zama) is used for the metal part whereas plastic parts are made of polyamide.

Mechanical endurance
Operating force: <0.5kg/1.1lb (actuator).
Mechanical life:
- Spring return actuators: 5,000,000 cycles
- Push-push actuators: 500,000 cycles.

Mounting adapter
See page 8-38.
Type: LPXAU120M.
The actuators fit into a Ø30mm/Ø1.18" hole. The fixing of the base to the mounting surface is made using the adapter supplied with the actuator and the screws incorporated in the base (Tmax = 0.7Nm/6.1lb.in).

Contact elements for spring return button actuators
See page 8-38 to 8-40.

Type		Terminals
Front-mount types snap onto LPXAU120M mounting adapter (to purchase separately). Up to: - 9 single contacts, 3 left, 3 middle and 3 right; - 6 double contacts, 2 left, 2 middle and 2 right.		
1NO	LPXC10	Screw
	LPXCF10	Faston
	LPXCS10	Spring clamp
1EM	LPXC10A	Screw
1NC	LPXC01	Screw
	LPXCF01	Faston
	LPXCS01	Spring clamp
1LB	LPXC01D	Screw
1NO+1NC	LPXC11	Screw
2NO	LPXC20	Screw
2NC	LPXC02	Screw

Contact elements for push-push button actuators
See page 8-39.
Type: LPXC10A (1EM)
LPXC01 (1NC)
Up to 6 contacts can be fitted: 2 each on the left, middle and right, one behind the other.

All actuators are standard supplied with action plug for middle contacts.

Certifications and compliance
Certifications: cULus, EAC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

Pushbutton actuators, spring return, with symbol

LPFB11...

LPFB21...

Order code	Symbol	Actuator colour	Qty per pkg	Wt
			n°	[kg]
Flush (without mounting adapter). Spring return.				
LPFB1102	O	Black	5	0.060
LPFB1104		Red	5	0.060
LPFB1113	I	Green	5	0.060
LPFB1118		White	5	0.060
LPFB1123	II	Green	1	0.060
LPFB1128		White	1	0.060
LPFB1132	STOP	Black	1	0.060
LPFB1134		Red	5	0.060
LPFB1142	← ❶	Black	5	0.060
LPFB1148		White	5	0.060
LPFB1152	↑ ❷	Black	5	0.060
LPFB1158		White	5	0.060
LPFB1163	START	Green	5	0.060
LPFB1168		White	1	0.060
LPFB1176	R	Blue	1	0.060
LPFB1178		White	1	0.060
LPFB1196	RESET	Blue	5	0.060
LPFB1502	◄┤►	Black	5	0.060
LPFB1512	►┤◄	Black	5	0.060
Extended (without mounting adapter). Spring return.				
LPFB2102	O	Black	5	0.062
LPFB2104		Red	5	0.062
LPFB2132	STOP	Black	1	0.062
LPFB2134		Red	5	0.062

❶ Arrow symbol can be used to indicate right or left.
❷ Arrow symbol can be used to indicate up or down.

Pushbutton actuators, spring return, with special symbols

LPFB...

Order code ❹❺	Symbol	Actuator colour	Qty per pkg	Wt
			n°	[kg]
Spring return (without mounting adapter).				
LPFB❶❷18❸	ϟ ❻	❸	50	0.062
LPFB❶❷34❸	MAN	❸	50	0.062
LPFB❶❷35❸	AUTO	❸	50	0.062
LPFB❶❷22❸	↗	❸	50	0.062
LPFB❶❷23❸	⊏◁	❸	50	0.062

Note: for other symbols see page 8-37.
❶ Add letter "L" if illuminated type is required.
❷ For the type of actuator, add: 1 for flush or 2 for extended.
❸ Add the actuator colour: 2 black only for non-illuminated type; 3 green, 4 red, 5 yellow, 6 blue, 8 white or 7 transparent for illuminated version.
❹ Products available on specific request for a minimum multiple quantity of 50 pieces per type.
❺ Consult Technical support for assistance; see contact details or inside front cover.
❻ Symbol indicating dangerous voltage (IEC 60417 5036-a).
Examples of complete order codes:
LPFB2258 – extended non-illuminated white pushbutton with + symbol
LPFBL1685 – flush illuminated yellow pushbutton actuator with ⚠ symbol.

Operational characteristics
– Any mounting position allowed
– Ambient conditions:
  • Operating temperature: -25...+70°C
  • Storage temperature: -40...+85°C
– Degree of protection:
  • Per IEC/EN: IP66, IP67 and IP69K
  • Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K.

Materials
An aluminium and zinc alloy (zama) is used for the metal part whereas plastic parts are made of polyamide.

Mechanical endurance
Operating force: <0.5kg/1.1lb (actuator).
Mechanical life: 5,000,000 cycles.

Mounting adapter
See page 8-38.
Type: LPXAU120M.
The actuators fit into a Ø30mm/Ø1.18" hole. The fixing of the base to the mounting surface is made using the adapter supplied with the actuator and the screws incorporated in the base (Tmax = 0.7Nm/6.1lb.in).

Contact elements for spring return button actuators
See page 8-38 to 8-40.

Type		Terminals
Front-mount types snap onto LPXAU120M mounting adapter (to purchase separately). Up to: - 9 single contacts, 3 left, 3 middle and 3 right; - 6 double contacts, 2 left, 2 middle and 2 right.		
1NO	LPXC10	Screw
	LPXCF10	Faston
	LPXCS10	Spring clamp
1EM	LPXC10A	Screw
1NC	LPXC01	Screw
	LPXCF01	Faston
	LPXCS01	Spring clamp
1LB	LPXC01D	Screw
1NO+1NC	LPXC11	Screw
2NO	LPXC20	Screw
2NC	LPXC02	Screw

All LPFB... actuators are standard supplied with action plug for middle contacts.

Certifications and compliance
Certifications: cULus, EAC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

Selector switch actuators lever

LPFS1...

Order code	Type of positions	Qty per pkg	Wt
		n°	[kg]
2 positions (without mounting adapter).			
LPFS120		5	0.062
LPFS121		5	0.062
3 positions (without mounting adapter).			
LPFS130		5	0.062
LPFS131		5	0.062
LPFS132		5	0.062
LPFS133		5	0.062

Selector switch actuators long lever

LPFS2...

Order code	Type of positions	Qty per pkg	Wt
		n°	[kg]
2 positions (without mounting adapter).			
LPFS220		5	0.065
LPFS221		5	0.065
3 positions (without mounting adapter).			
LPFS230		5	0.065
LPFS231		5	0.065
LPFS232		5	0.065
LPFS233		5	0.065

Selector switch actuators key (Ronis)

LPFS3...

Order code	Type of positions	Qty per pkg	Wt
		n°	[kg]
2 positions (without mounting adapter).			
LPFS320		5	0.095
LPFS320R❶		1	0.095
LPFS321		5	0.095
LPFS321R❶		1	0.095
LPFS340		5	0.095
LPFS340R❶		1	0.095
3 positions (without mounting adapter).			
LPFS330		5	0.095
LPFS330R❶		1	0.095
LPFS331		5	0.095
LPFS331R❶		1	0.095
LPFS332❷		5	0.095
LPFS332R❶❷		1	0.095
LPFS333❷		5	0.095
LPFS333R❶❷		1	0.095
LPFS350		5	0.095
LPFS350R❶		1	0.095
LPFS360		5	0.095
LPFS360R❶		1	0.095
LPFS370❷		5	0.095
LPFS370R❶❷		1	0.095
LPFS380❷		5	0.095
LPFS380R❶❷		1	0.095
LPFS390❷		5	0.095
LPFS390R❶❷		1	0.095

❶ Versions with different key codes.
Complete with the numeric code of the key.
The following versions are available: 421E, 520E, 3433E, 621E, 622E.
Example of complete code: LPCS320R421E.
❷ Available only on specific request.

Operational characteristics
- Any mounting position allowed
- Standard key types supplied with Ronis key code n° 455
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K.

Materials
An aluminium and zinc alloy (zama) is used for the metal part whereas plastic parts are made of polyamide.

Mechanical endurance
Mechanical life: 1,000,000 cycles.

Mounting adapter
See page 8-38.
Type: LPXAU120M.
The actuators fit into a Ø30mm/Ø1.18" hole. The fixing of the base to the mounting surface is made using the adapter supplied with the actuator and the screws incorporated in the base (Tmax = 0.7Nm/6.1lb.in).

Contact elements
See page 8-38 to 8-40.

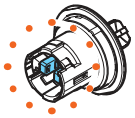
Type	Terminals

Front-mount types snap onto LPXAU120M mounting adapter (to purchase separately).
Up to:
- 6 single contacts, 2 left, 2 middle and 2 right or 3 left and 3 right;
- 3 double contacts, 1 left, 1 middle and 1 right.

The LPXAU120M mounting adapter can also be fitted internally to the cover of the LPZ... control station with up to 3 elements per actuator.

1NO	LPXC10	Screw
	LPXCF10	Faston
	LPXCS10	Spring clamp
1EM	LPXC10A	Screw
1NC	LPXC01	Screw
	LPXCF01	Faston
	LPXCS01	Spring clamp
1LB	LPXC01D	Screw
1NO+1NC	LPXC11	Screw
2NO	LPXC20	Screw
2NC	LPXC02	Screw

Activation of the middle contacts is coupled to the side contacts; the relative mechanism pins are standard supplied.



The middle contact activation, with respect to the right and left side contact, can be changed by the user, if required, by removing one mechanism pin.

Type of position
- Maintained position.
- Spring return position.
- • Key extraction position.

Rotation angles
2 positions

3 positions

Certifications and compliance
Certifications: cULus, EAC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

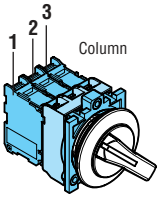
Selector switch actuators knob

LPFS4...

Order code	Type of positions	Qty per pkg	Wt
		n°	[kg]
2 positions (without mounting adapter).			
LPFS420		5	0.072
LPFS421		5	0.072
3 positions (without mounting adapter).			
LPFS430		5	0.072
LPFS431		5	0.072
LPFS432		5	0.072
LPFS433		5	0.072

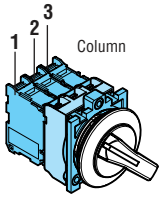
Contact activation

2-position



	Contacts 1	2	3
A	—	—	—
B	●	●	●

3-position



	Contacts 1	2	3
A	●	●	—
B	—	—	—
C	—	●	●

Operational characteristics
- Any mounting position allowed
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K.

Materials
An aluminium and zinc alloy (zama) is used for the metal part whereas plastic parts are made of polyamide.

Mechanical endurance
Mechanical life: 1,000,000 cycles.

Mounting adapter
See page 8-38.
Type: LPXAU120M.
The actuators fit into a Ø30mm/Ø1.18" hole. The fixing of the base to the mounting surface is made using the adapter supplied with the actuator and the screws incorporated in the base (Tmax = 0.7Nm/6.1lb.in).

Contact elements
See page 8-38 to 8-40.

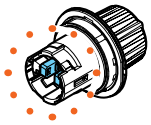
Type	Terminals

Front-mount types snap onto LPXAU120M mounting adapter (to purchase separately).
Up to:
- 6 single contacts, 2 left, 2 middle and 2 right or 3 left and 3 right;
- 3 double contacts, 1 left, 1 middle and 1 right.

The LPXAU120M mounting adapter can also be fitted internally to the cover of the LPZ... control station with up to 3 elements per actuator.

1NO	LPXC10	Screw
	LPXCF10	Faston
	LPXCS10	Spring clamp
1EM	LPXC10A	Screw
1NC	LPXC01	Screw
	LPXCF01	Faston
	LPXCS01	Spring clamp
1LB	LPXC01D	Screw
1NO+1NC	LPXC11	Screw
2NO	LPXC20	Screw
2NC	LPXC02	Screw

Activation of the middle contacts is coupled to the side contacts; the relative mechanism pins are standard supplied.



The middle contact activation, with respect to the right and left side contact, can be changed by the user, if required, by removing one mechanism pin.

Type of position
Maintained position.
Spring return position.

Rotation angles
2 positions

3 positions

Certifications and compliance
Certifications: cULus, EAC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

Illuminated button actuators, spring return

LPFBL10...

LPFBL20...

Order code	Actuator colour	Qty per pkg	Wt
		n°	[kg]
Flush (without mounting adapter). Spring return.			
LPFBL103	Green	5	0.070
LPFBL104	Red	5	0.070
LPFBL105	Yellow	5	0.070
LPFBL106	Blue	5	0.070
LPFBL107	Transparent	5	0.070
Extended (without mounting adapter). Spring return.			
LPFBL203	Green	5	0.072
LPFBL204	Red	5	0.072
LPFBL205	Yellow	5	0.072
LPFBL206	Blue	5	0.072
LPFBL207	Transparent	5	0.072

Illuminated push-push button actuators

LPFQL10...

LPFQL20...

Order code	Actuator colour	Qty per pkg	Wt
		n°	[kg]
Flush (without mounting adapter). Push on-push off.			
LPFQL103❶	Green	5	0.070
LPFQL104❶	Red	5	0.070
LPFQL105❶	Yellow	5	0.070
LPFQL106❶	Blue	5	0.070
LPFQL107❶	Transparent	5	0.070
Extended (without mounting adapter). Push on-push off.			
LPFQL203❶	Green	5	0.072
LPFQL204❶	Red	5	0.072
LPFQL205❶	Yellow	5	0.072
LPFQL206❶	Blue	5	0.072
LPFQL207❶	Transparent	5	0.072

❶ **Use contact elements LPXC10A (EM) and LPXC01 (NC) only.** Contact elements LPXC10 (NO) and LPXC01D (LB) or double contacts cannot be fitted on these actuators.

Operational characteristics
- Any mounting position allowed
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K.

Materials
An aluminium and zinc alloy (zama) is used for the metal part whereas plastic parts are made of polyamide.

Mechanical endurance
Operating force: <0.5kg/1.1lb (actuator).
Mechanical life:
- Spring return actuators: 5,000,000 cycles
- Push-push actuators: 500,000 cycles.

Mounting adapter
See page 8-38.
Type: LPXAU120M.
The actuators fit into a Ø30mm/Ø1.18" hole. The fixing of the base to the mounting surface is made using the adapter supplied with the actuator and the screws incorporated in the base (Tmax = 0.7Nm/6.1lb.in).

Contact elements for illuminated spring return actuators
See page 8-38 to 8-40.

Type		Terminals
Front-mount types snap onto LPXAU120M mounting adapter (to purchase separately). Up to: - 6 single contacts, 3 left and 3 right; - 4 double contacts, 2 left and 2 right.		
1NO	LPXC10	Screw
	LPXCF10	Faston
	LPXCS10	Spring clamp
1EM	LPXC10A	Screw
1NC	LPXC01	Screw
	LPXCF01	Faston
	LPXCS01	Spring clamp
1LB	LPXC01D	Screw
1NO+1NC	LPXC11	Screw
2NO	LPXC20	Screw
2NC	LPXC02	Screw

Contact elements for illuminated push-push button actuators
See page 8-39.
Type: LPXC10A (1EM)
LPXC01 (1NC)
Up to 4 contacts can be fitted: 2 each on the left and right, one behind the other.

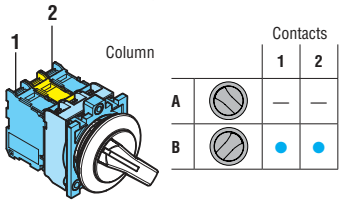
LED light elements
See pages 8-43 and 44.

Certifications and compliance
Certifications: cULus, EAC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, I EC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

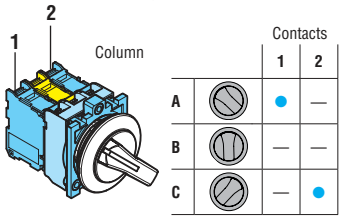
Illuminated selector switch actuators

LPFSL1...

Contact activation of 2-position selector switch



Contact activation of 3-position selector switch



Order code	Actuator colour	Type of positions	Qty per pkg	Wt
			n°	[kg]
2 positions (without mounting adapter).				
LPFSL1203	Green		5	0.060
LPFSL1204	Red		5	0.060
LPFSL1205	Yellow		5	0.060
LPFSL1206	Blue		5	0.060
LPFSL1208	White		5	0.060
LPFSL1213	Green		5	0.060
LPFSL1214	Red		1	0.060
LPFSL1215	Yellow		1	0.060
LPFSL1216	Blue		1	0.060
LPFSL1218	White		5	0.060
3 positions (without mounting adapter).				
LPFSL1303	Green		5	0.060
LPFSL1304	Red		5	0.060
LPFSL1305	Yellow		5	0.060
LPFSL1306	Blue		5	0.060
LPFSL1308	White		5	0.060
LPFSL1313	Green		5	0.060
LPFSL1314	Red		1	0.060
LPFSL1315	Yellow		1	0.060
LPFSL1316	Blue		1	0.060
LPFSL1318	White		5	0.060
LPFSL1323	Green		5	0.060
LPFSL1324	Red		1	0.060
LPFSL1325	Yellow		1	0.060
LPFSL1326	Blue		1	0.060
LPFSL1328	White		5	0.060
LPFSL1333	Green		5	0.060
LPFSL1334	Red		1	0.060
LPFSL1335	Yellow		1	0.060
LPFSL1336	Blue		1	0.060
LPFSL1338	White		5	0.060

Operational characteristics
- Any mounting position allowed
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K.

Materials
An aluminium and zinc alloy (zama) is used for the metal part whereas plastic parts are made of polyamide.

Mechanical endurance
Operating force: <0.5kg/1.1lb (actuator).
Mechanical life:
- Selector switches: 1,000,000 cycles.

Mounting adapter
See page 8-38.
Type: LPXAU120M.
The actuators fit into a Ø30mm/Ø1.18" hole. The fixing of the base to the mounting surface is made using the adapter supplied with the actuator and the screws incorporated in the base (Tmax = 0.7Nm/6.1lb.in).

Contact elements
See page 8-38 to 8-40.

Type	Terminals

Front-mount types snap onto LPXAU120M mounting adapter (to purchase separately).
Up to:
- 4 single contacts, 2 left and 2 right;
- 2 double contacts, 1 left and 1 right.

1NO	LPXC10	Screw
	LPXCF10	Faston
	LPXCS10	Spring clamp
1EM	LPXC10A	Screw
1NC	LPXC01	Screw
	LPXCF01	Faston
	LPXCS01	Spring clamp
1LB	LPXC01D	Screw
1NO+1NC	LPXC11	Screw
2NO	LPXC20	Screw
2NC	LPXC02	Screw

Selector switch type of positions
Maintained position.
Spring return position.

Selector switch rotation angles
2 positions

3 positions

LED light elements
See pages 8-43 and 44.

Certifications and compliance
Certifications: cULus, EAC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

Pilot light heads

LPFL...

Order code	Head colour	Qty per pkg	Wt
		n°	[kg]
Without mounting adapter.			
LPFL3	Green	5	0.054
LPFL4	Red	5	0.054
LPFL5	Yellow	5	0.054
LPFL6	Blue	5	0.054
LPFL7	Transparent	5	0.054
LPFL1187	Transparent ϟ ❶	5	0.054

❶ With symbol indicating dangerous voltage (IEC/EN/BS 60417 5036-a).

Operational characteristics
- Any mounting position allowed
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K.

Materials
An aluminium and zinc alloy (zama) is used for the metal part whereas plastic parts are made of polyamide.

Mounting adapter
See page 8-38.
Type: LPXAU120M.
The actuators fit into a Ø30mm/Ø1.18" hole. The fixing of the base to the mounting surface is made using the adapter supplied with the actuator and the screws incorporated in the base (Tmax = 0.7Nm/6.1lb.in).

LED light elements
See pages 8-43 and 44.

Certifications and compliance
Certifications: cULus, EAC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

USB and RJ45 communication interfaces

LPFD01

LPFD01L...

LPFD06

Order code	Description	Qty per pkg	Wt
		n°	[kg]
LPFD01	USB interface, A/A female type connection	1	0.053
LPFD01L050	USB interface, A/A female connection with 0.5m long cable	1	0.095
LPFD01L100	USB interface, A/A female connection with 1m long cable	1	0.115
LPFD03	USB interface, A/B female type connection	1	0.053
LPFD05	USB interface, B/A female type connection	1	0.053
LPFD06	RJ45 interface, Ethernet connection type	1	0.061
LPFD06L100	RJ45 interface, Ethernet connection with 1m long cable	1	0.125

General characteristics
USB and RJ45 communication interface connectors are used in industrial environments, which in recent years have seen an increase in the number of connections between machines, production lines, equipment and measuring instruments. These interfaces provide the transmission of data in both directions between the various devices.

Operational characteristics
- Rated insulation voltage for LPFD01, LPFD03, LPFD05: 5VAC/DC
- Rated insulation voltage for LPFD06: 50VAC/DC
- Installed through a Ø30mm/Ø1.18" drilling with a threaded fixing ring (Tmax = 0.8Nm/7lb.in)
- Transmission characteristics for LPFD01, LPFD03, LPFD05: 5Gbps (625MB/sec)
- Transmission characteristics for LPFD06: Cat.6
- Rated current for LPFD01, LPFD03, LPFD05: 1.5A
- Rated current for LPFD06: 0.6A
- Insulation resistance: ≥100MOhm
- Contact resistance for LPFD01, LPFD03, LPFD05: ≤30mOhm
- Contact resistance for LPFD06: ≤40mOhm
- USB connector class: 3.0 (backward compatible with USB class 2.0)
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP65 on front (with cap mounted)
  - Per IEC/EN: IP20 at rear
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K on front (with cap mounted).

Materials
An aluminium and zinc alloy (zama) is used for the metal part whereas plastic parts are made of polyamide.

Certifications and compliance
Certifications: cULus, EAC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

Pushbutton actuators, spring return

LPCB10...

LPCB20...

LPCB30...

Order code	Actuator colour	Qty per pkg	Wt
		n°	[kg]
Flush (without mounting adapter). Spring return.			
LPCB102	Black	10	0.025
LPCB103	Green	10	0.025
LPCB104	Red	10	0.025
LPCB105	Yellow	10	0.025
LPCB106	Blue	10	0.025
LPCB108	White	10	0.025
Extended (without mounting adapter). Spring return.			
LPCB202	Black	10	0.027
LPCB203	Green	10	0.027
LPCB204	Red	10	0.027
LPCB205	Yellow	1	0.027
LPCB206	Blue	1	0.027
LPCB208	White	1	0.027
Shrouded (without mounting adapter). Spring return.			
LPCB302	Black	10	0.027
LPCB303	Green	10	0.027
LPCB304	Red	10	0.027
LPCB305	Yellow	1	0.027
LPCB306	Blue	1	0.027
LPCB308	White	1	0.027

Pushbutton actuators, spring return in kit

new

Order code	Actuator colour	Contacts config.	Qty per pkg	Wt
			n°	[kg]
Flush. Spring return.				
LPCB102K10	Black	1NO	1	0.042
LPCB103K10	Green	1NO	1	0.042
LPCB104K01	Red	1NC	1	0.042
LPCB105K10	Yellow	1NO	1	0.042
LPCB106K10	Blue	1NO	1	0.042
LPCB108K10	White	1NO	1	0.042

Push-push button actuators

LPCQ10...

LPCQ20...

Order code	Actuator colour	Qty per pkg	Wt
		n°	[kg]
Flush (without mounting adapter). Push on-push off.			
LPCQ102❶	Black	10	0.025
LPCQ103❶	Green	10	0.025
LPCQ104❶	Red	10	0.025
LPCQ105❶	Yellow	1	0.025
LPCQ106❶	Blue	1	0.025
LPCQ108❶	White	1	0.025
Extended (without mounting adapter). Push on-push off.			
LPCQ202❶	Black	10	0.027
LPCQ203❶	Green	10	0.027
LPCQ204❶	Red	10	0.027
LPCQ205❶	Yellow	1	0.027
LPCQ206❶	Blue	1	0.027
LPCQ208❶	White	1	0.027

❶ **Use contact elements LPXC10A (EM) and LPXC01 (NC) only.**
Contact elements LPXC10 (NO) and LPXC01D (LB) or double contacts cannot be fitted on these actuators.

Operational characteristics
- Any mounting position allowed
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K.

Materials
Polyamide.

Mechanical endurance
Operating force: <0.5kg/1.1lb (actuator).
Mechanical life:
- Spring return actuators: 5,000,000 cycles
- Push-push actuators: 500,000 cycles.

Mounting adapter
See page 8-38.
Type: LPXAU120.
Actuators are installed through a Ø22mm/Ø0.87" drilling with a threaded fixing ring (Tmax = 2.3Nm/20.3lb.in) also on the cover of LPZ... control stations.
The mounting adapter directly snaps onto the actuator.

Contact elements for spring return button actuators
See page 8-38 to 8-40.

Type		Terminals
Front-mount types snap onto LPXAU120 mounting adapter (to purchase separately). Up to: - 9 single contacts, 3 left, 3 middle and 3 right; - 6 double contacts, 2 left, 2 middle and 2 right. The LPXAU120 mounting adapter can also be fitted internally to the cover of the LPZ... control station with up to 3 elements per actuator.		
1NO	LPXC10	Screw
	LPXCF10	Faston
	LPXCS10	Spring clamp
1EM	LPXC10A	Screw
1NC	LPXC01	Screw
	LPXCF01	Faston
	LPXCS01	Spring clamp
1LB	LPXC01D	Screw
1NO+1NC	LPXC11	Screw
2NO	LPXC20	Screw
2NC	LPXC02	Screw
Base mount types snap into LPZP... control station base. See example on page 8-41. Up to 3 contacts can be fitted per LPZ... control station actuator.		
1NO	LPXCB10	Screw
1NC	LPXCB01	Screw

Contact elements for push-push button actuators
See page 8-39.
Type: LPXC10A (1EM)
LPXC01 (1NC)
Contacts snap onto the adapter also internally on the cover surface of LPZ... control stations.
Up to 6 contacts can be fitted: 2 each on the left, middle and right, one behind of the other; up to 3 elements per control station actuator.

All these actuators are standard supplied with action plug for middle contacts.

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada, (cULus - File E93601), as Auxiliary Devices; EAC, CCC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

Mechanical rest buttons, complete unit, spring return

LPCR1196

Order code	Actuator colour	Qty per pkg	Wt
		n°	[kg]
Flush (5.2mm/0.2" stroke). Adjustable length 0-150mm/5.9". Complete with shaft (without mounting adapter). Spring return.			
LPCR1002	Black	10	0.038
LPCR1003	Green	10	0.038
LPCR1004	Red	10	0.038
LPCR1006	Blue	10	0.038
LPCR1196❶	Blue (RESET)	10	0.038
Extended (5.2mm/0.2" stroke). Adjustable length 0-150mm/5.9". Complete with shaft (without mounting adapter). Spring return.			
LPCR2004	Red	1	0.040

❶ With "RESET" caption on actuator.
E.g. Not suitable for LPZ... control stations.

Pushbutton actuators, spring return, with symbol

LPCB11...

LPCB21...

Order code	Symbol	Actuator colour	Qty per pkg	Wt
			n°	[kg]
Flush (without mounting adapter). Spring return.				
LPCB1102	O	Black	10	0.025
LPCB1104		Red	10	0.025
LPCB1113	I	Green	10	0.025
LPCB1118		White	10	0.025
LPCB1123	II	Green	1	0.025
LPCB1128		White	1	0.025
LPCB1132	STOP	Black	1	0.025
LPCB1134		Red	10	0.025
LPCB1142	←❶	Black	10	0.025
LPCB1148		White	10	0.025
LPCB1152	↑❷	Black	10	0.025
LPCB1158		White	10	0.025
LPCB1163	START	Green	10	0.025
LPCB1168		White	1	0.025
LPCB1176	R	Blue	1	0.025
LPCB1178		White	1	0.025
LPCB1196	RESET	Blue	10	0.025
LPCB1502	◄|►	Black	10	0.025
LPCB1512	►|◄	Black	10	0.025
Extended (without mounting adapter). Spring return.				
LPCB2102	O	Black	10	0.027
LPCB2104		Red	10	0.027
LPCB2132	STOP	Black	1	0.027
LPCB2134		Red	10	0.027

❶ Arrow symbol can be used to indicate right or left.
❷ Arrow symbol can be used to indicate up or down.

Pushbutton actuators, spring return, with special symbols

LPCB...

Order code ❹❺	Symbol	Actuator colour	Qty per pkg	Wt
			n°	[kg]
Spring return (without mounting adapter).				
LPCB❶❷183	ϟ❻	❸	50	0.027
LPCB❶❷343	MAN	❸	50	0.027
LPCB❶❷353	AUTO	❸	50	0.027
LPCB❶❷223	↗	❸	50	0.027
LPCB❶❷233	□◺	❸	50	0.027

Note: for other symbols see page 8-37.
❶ Add letter "L" if illuminated type is required.
❷ For the type of actuator, add: 1 for flush or 2 for extended.
❸ Add the actuator colour: 2 black only for non-illuminated type; 3 green, 4 red, 5 yellow, 6 blue, 8 white or 7 transparent for illuminated version.
❹ Products available on specific request for a minimum multiple quantity of 50 pieces per type.
❺ Consult Technical support for assistance; see contact details or inside front cover.
❻ Symbol indicating dangerous voltage (IEC 60417 5036-a).
Examples of complete order codes:
LPCB2258 – extended non-illuminated white pushbutton with + symbol
LPCBL1685 – flush illuminated yellow pushbutton actuator with ⚠ symbol.

Operational characteristics
- Any mounting position allowed
- Fine rod adjustment (1-4mm/0.04-0.16") on front with screwdriver by removing actuator cap for mechanical reset buttons
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K.

Materials
Polyamide.

Mechanical endurance
Operating force: <0.5kg/1.1lb (actuator).
Mechanical life: 5,000,000 cycles.

Mounting adapter
See page 8-38.
Type: LPXAU120.
Actuators are installed through a Ø22mm/Ø0.87" drilling with a threaded fixing ring (Tmax = 2.3Nm/20.3lb.in) also on the cover of LPZ... control stations.
The mounting adapter directly snaps onto the actuator.

Contact elements for mechanical reset buttons
See page 8-38 to 8-40.

Type		Terminals
Front mount types snap onto LPXAU120 mounting adapter (to purchase separately), if any contacts are needed. Up to: - 6 single contacts, 3 left and 3 right; - 4 double contacts, 2 left and 2 right.		
1NO	LPXC10	Screw
	LPXCF10	Faston
	LPXCS10	Spring clamp
1EM	LPXC10A	Screw
1NC	LPXC01	Screw
	LPXCF01	Faston
	LPXCS01	Spring clamp
1LB	LPXC01D	Screw
1NO+1NC	LPXC11	Screw
2NO	LPXC20	Screw
2NC	LPXC02	Screw

Contact elements for spring return button actuators
See page 8-38 to 8-40.

Front-mount types snap onto LPXAU120 mounting adapter (to purchase separately).
Up to:
- 9 single contacts, 3 left, 3 middle and 3 right;
- 6 double contacts, 2 left, 2 middle and 2 right.
The LPXAU120 mounting adapter can also be fitted internally to the cover of the LPZ... control station with up to 3 elements per actuator.
See example on page 8-41.
Up to 3 contacts can be fitted per LPZ... control station actuator.

The LPCB... actuators are standard supplied with action plug for middle contacts.

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada, (cULus - File E93601), as Auxiliary Devices; EAC, CCC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

Mushroom head pushbutton actuators

LPCB614...

LPCB674...

LPCB6344

LPCB6634

LPCB6644

LPCB684...

Order code	Actuator colour	Qty per pkg	Wt
		n°	[kg]
SPRING RETURN. Ø40mm/1.57" (without mounting adapter).			
LPCB6142	Black	10	0.033
LPCB6143	Green	10	0.033
LPCB6144	Red	10	0.033
LPCB6145	Yellow	10	0.033
LPCB6146	Blue	10	0.033
Ø60mm/2.36" (without mounting adapter).			
LPCB6162	Black	10	0.038
LPCB6163	Green	1	0.038
LPCB6164	Red	10	0.038
LPCB6165	Yellow	1	0.038
LPCB6166	Blue	1	0.038
LATCH, PULL TO RELEASE. Ø40mm/1.57" (without mounting adapter). For normal stopping.			
LPCB6742	Black	10	0.097
For emergency stopping, ISO 13850 compliant.			
LPCB6744	Red	10	0.097
LATCH, TURN TO RELEASE. Ø40mm/1.57" (without mounting adapter). For normal stopping.			
LPCB6342	Black	10	0.046
LPCB6344	Red	10	0.046
Ø30mm/1.18" (without mounting adapter). For emergency stopping, ISO 13850 compliant.			
LPCB6634	Red	10	0.079
Ø40mm/1.57" (without mounting adapter). For emergency stopping, ISO 13850 compliant.			
LPCB6644	Red	10	0.079
LATCH, TURN KEY TO RELEASE. Ø40mm/1.57" (without mounting adapter). Key code n° 455. For normal stopping.			
LPCB6842	Black	10	0.083
LPCB6842R❶	Black	1	0.083
For emergency stopping, ISO 13850 compliant.			
LPCB6844	Red	10	0.083
LPCB6844R❶	Red	1	0.083

❶ Versions with different key codes.
Complete with the numeric code of the key.
The following versions are available: 421E, 520E, 3433E, 621E, 622E.
Example of complete code: LPCB6844R421E.

Mushroom head pushbutton actuators in kit

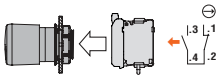
new

Order code	Actuator colour	Contacts config.	Qty per pkg	Wt
			n°	[kg]
LATCH, PULL TO RELEASE. Ø40mm/1.57". For emergency stopping, ISO 13850 compliant.				
LPCB6744K01	Red	1NC	1	0.056
LATCH, TURN TO RELEASE. Ø40mm/1.57". For normal stopping.				
LPCB6344K01	Red	1NC	1	0.062
Ø40mm/1.57". For emergency stopping, ISO 13850 compliant.				
LPCB6644K01	Red	1NC	1	0.099

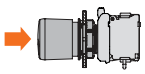
Normal operation of auto-monitor contact mounted on surface or on cover of control stations

In case of detachment of only the contact element and/or of the mounting adapter with contact element

With contact type LPXC01M (1NC)

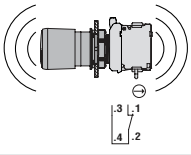


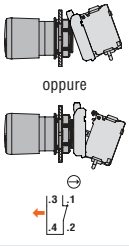
Contact .3-.4 closes when the LPXAU120 mounting adapter and LPXC01M contact are fitted correctly on the mushroom-head latch actuator.
Contact .1-.2 in series does not change state.



When the button is **fully pressed, contact .1-.2 opens** and remains in this state until the button is released.
Contact .3-.4 in series does not change state.

If the contact LPXC01M detaches from the actuator due to **strong vibrations or shock,** the equipment can be restored to operating state only when proper mounting of the contact with the actuator is re-established resulting in **contact .3-.4 closing.**





oppure

Operational characteristics
- Any mounting position allowed
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K.

Materials
Polyamide.

Mechanical endurance
Operating force: <0.5kg1.1lb (actuator).
Mechanical life:
- Spring return mushroom-head actuators: 5,000,000 cycles
- Latch mushroom-head actuators: 300,000 cycles.

Mounting adapter
See page 8-38.
Type: LPXAU120.
Actuators are installed through a Ø22mm/Ø0.87" drilling with a threaded fixing ring (Tmax = 2.3Nm/20.3lb.in) also on the cover of LPZ... control stations.
The mounting adapter directly snaps onto the actuator.

Contact elements
See page 8-38 to 8-40.

Type	Terminals	
Front-mount types snap onto LPXAU120 mounting adapter (to purchase separately). For SPRING RETURN types, up to: - 9 single contacts, 3 left, 3 middle and 3 right; - 6 double contacts, 2 left, 2 middle and 2 right. For LATCH types, up to: - 4 single contacts or 2 double contacts. The LPXAU120 mounting adapter can also be fitted internally to the cover of the LPZ... control station with up to 3 elements per actuator.		
1NO	LPXC10	Screw
	LPXCF10	Faston
	LPXCS10	Spring clamp
1EM	LPXC10A	Screw
1NC	LPXC01	Screw
	LPXCF01	Faston
	LPXCS01	Spring clamp
1LB	LPXC01D	Screw
1NO+1NC	LPXC11	Screw
2NO	LPXC20	Screw
2NC	LPXC02	Screw
Base mount types snap into LPZP... control station base. See example on page 8-41. Up to 3 contacts can be fitted per LPZ... control station actuator.		
1NO	LPXCB10	Screw
1NC	LPXCB01	Screw
AUTO-MONITOR CONTACT with MUSHROOM-HEAD LATCH types only: 2 elements max of this type can be mounted. In addition, another type of contact can be mounted. The LPXAU120M mounting adapter can also be fitted internally to the cover of the LPZ... control station with up to 2 elements per actuator. No LED element can be installed.		
Auto-monitor 1NC	LPXC01M	Screw
1NO	LPXC10	Screw (2 stacked on the right)
	LPXCF10	Faston (2 stacked on the right)
	LPXCS10	Spring clamp (2 stacked on the right)
1NC	LPXC01	Screw (2 stacked on the right)
	LPXCF01	Faston (2 stacked on the right)
	LPXCS01	Spring clamp (2 stacked on the right)

All these actuators are standard-supplied with action plug for middle contacts.

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada, (cULus - File E93601), as Auxiliary Devices; EAC, CCC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

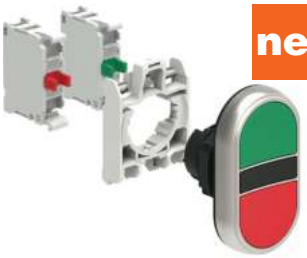
Double-touch actuators, spring return

LPCB71...

LPCB72...

Order code	Actuator colour	Symbols	Qty per pkg	Wt
			n°	[kg]
Two flush pushbuttons (without mounting adapter). Both spring return.				
LPCB7112	Black/Red	—	5	0.030
LPCB7113	Green/Red	—	5	0.030
LPCB7114	White/Black	—	5	0.030
LPCB7122	Black/Red	I-O	5	0.030
LPCB7123	Green/Red	I-O	5	0.030
LPCB7124	White/Black	I-O	5	0.030
LPCB7133	Green/Red	Start/Stop	5	0.030
LPCB7191	Black/Black	↑ ↓	5	0.030
One extended and one flush pushbuttons (without mounting adapter). Both spring return.				
LPCB7212	Black/Red	—	1	0.030
LPCB7213	Green/Red	—	5	0.030
LPCB7214	White/Black	—	1	0.030
LPCB7222	Black/Red	I-O	5	0.030
LPCB7223	Green/Red	I-O	5	0.030
LPCB7224	White/Black	I-O	1	0.030
LPCB7233	Green/Red	Start/Stop	5	0.030

Double-touch actuators, spring return in kit



new

Order code	Actuator colour	Symbols	Contacts config.	Qty per pkg
				n°
Two flush pushbuttons. Both spring return.				
LPCB7113K11	Green/Red	—	1NO+1NC	1
LPCB7191K20	Black/Black	↑ ↓	2NO	1

Triple-touch actuators, spring return

LPCB73...

Order code	Symbols	Qty per pkg	Wt
		n°	[kg]
One middle extended buttons (without mounting adapter). Spring return.			
LPCB7345	STOP	5	0.030
LPCB7355	STOP	5	0.030
LPCB7365	STOP	5	0.030
LPCB7375	STOP	5	0.030

Triple-touch actuators, spring return in kit

new

Order code	Symbols	Contacts config.	Qty per pkg	Wt
			n°	[kg]
One middle extended buttons. Spring return.				
LPCB7355K21	STOP	1NO+1NC+ 1NO	1	0.058

Operational characteristics
- Any mounting position allowed
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K.

Materials
Polyamide.

Mechanical endurance
Operating force: <0.5kg/1.1lb (actuator).
Mechanical life: 1,000,000 cycles.

Mounting adapter
See page 8-38.
Type: LPXAU120.
Actuators are installed through a Ø22mm/Ø0.87" drilling with a threaded fixing ring (Tmax = 2.3Nm/20.3lb.in) also on the cover of LPZ... control stations.
The mounting adapter directly snaps onto the actuator.

Contact elements
See page 8-38 to 8-40.

Type		Terminals
Front-mount types snap onto LPXAU120 mounting adapter (to purchase separately). For DOUBLE-TOUCH actuators, up to: - 6 single contacts, 3 left and 3 right; - 4 double contacts, 2 left and 2 right. For TRIPLE-TOUCH actuators, up to: - 9 single contacts, 3 left, 3 middle and 3 right; - 6 double contacts, 2 left, 2 middle and 2 right. The LPXAU120 mounting adapter can also be fitted internally to the cover of the LPZ... control station with up to 2 elements for double-touch and 3 elements for triple-touch actuators.		
1NO	LPXC10	Screw
	LPXCF10	Faston
	LPXCS10	Spring clamp
1EM	LPXC10A	Screw
1NC	LPXC01	Screw
	LPXCF01	Faston
	LPXCS01	Spring clamp
1LB	LPXC01D	Screw
1NO+1NC	LPXC11	Screw
2NO	LPXC20	Screw
2NC	LPXC02	Screw

Base mount types snap into LPZP... control station base.
See example on page 8-41.
For DOUBLE-TOUCH actuators, 2 contacts need to be fitted, one on the left and one on the right.
For TRIPLE-TOUCH actuators, 3 contacts need to be fitted: one each on the left, middle and right.

1NO	LPXCB10	Screw
1NC	LPXCB01	Screw

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada, (cULus - File E93601), as Auxiliary Devices; EAC, CCC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

Selector switch actuators lever

LPCS1...

Order code	Type of positions	Qty per pkg	Wt
		n°	[kg]
2 positions (without mounting adapter).			
LPCS120		10	0.037
LPCS121		10	0.037
3 positions (without mounting adapter).			
LPCS130		10	0.037
LPCS131		10	0.037
LPCS132		10	0.037
LPCS133		10	0.037

Selector switch actuators lever in kit

new

Order code	Type of positions	Contacts config.	Qty per pkg	Wt
			n°	[kg]
2 positions.				
LPCS120K10		1NO	1	0.050
3 positions.				
LPCS130K20		1NO+1NO	1	0.058
LPCS131K20		1NO+1NO	1	0.058

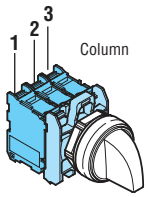
Selector switch actuators long lever

LPCS2...

Order code	Type of positions	Qty per pkg	Wt
		n°	[kg]
2 positions (without mounting adapter).			
LPCS220		10	0.040
LPCS221		10	0.040
3 positions (without mounting adapter).			
LPCS230		10	0.040
LPCS231		10	0.040
LPCS232		10	0.040
LPCS233		10	0.040

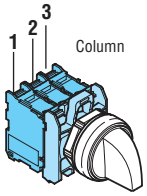
Contact activation

2-positions



	Contacts 1	2	3
A	—	—	—
B	●	●	●

3-positions



	Contacts 1	2	3
A	●	●	—
B	—	—	—
C	—	●	●

Operational characteristics
- Any mounting position allowed
- Standard key types supplied with Ronis key code n° 455
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K.

Materials
Polyamide.

Mechanical endurance
Mechanical life: 1,000,000 cycles.

Mounting adapter
See page 8-38.
Type: LPXAU120.
Actuators are installed through a Ø22mm/Ø0.87" drilling with a threaded fixing ring (Tmax = 2.3Nm/20.3lb.in) also on the cover of LPZ... control stations.
The mounting adapter directly snaps onto the actuator.

Contact elements
See page 8-38 to 8-40.

Type	Terminals

Front-mount types snap onto LPXAU120 mounting adapter (to purchase separately).
Up to:
- 6 single contacts, 2 left, 2 middle and 2 right or 3 left and 3 right;
- 3 double contacts, 1 left, 1 middle and 1 right.

The LPXAU120 mounting adapter can also be fitted internally to the cover of the LPZ... control station with up to 3 elements per actuator.

1NO	LPXC10	Screw
	LPXCF10	Faston
	LPXCS10	Spring clamp
1EM	LPXC10A	Screw
1NC	LPXC01	Screw
	LPXCF01	Faston
	LPXCS01	Spring clamp
1LB	LPXC01D	Screw
1NO+1NC	LPXC11	Screw
2NO	LPXC20	Screw
2NC	LPXC02	Screw

Base mount types snap into LPZP... control station base.
See example on page 8-41.
Up to 3 contacts can be fitted per LPZ... control station actuator.

1NO	LPXCB10	Screw
1NC	LPXCB01	Screw

Activation of the middle contacts is coupled to the side contacts; the relative mechanism pins are standard supplied.

The middle contact activation, with respect to the right and left side contact, can be changed by the user, if required, by removing one or both mechanism pins.

Type of position
Maintained position.
Spring return position.

Rotation angles
2 positions

3 positions

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada, (cULus - File E93601), as Auxiliary Devices; EAC, CCC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

Selector switch actuators key (Ronis)

LPCS3...

Order code	Type of positions	Qty per pkg	Wt
		n°	[kg]
2 positions (without mounting adapter).			
LPCS320		10	0.060
LPCS320R❶		1	0.060
LPCS321		10	0.060
LPCS321R❶		1	0.060
LPCS340		10	0.060
LPCS340R❶		1	0.060
3 positions (without mounting adapter).			
LPCS330		10	0.060
LPCS330R❶		1	0.060
LPCS331		10	0.060
LPCS331R❶		1	0.060
LPCS332❷		10	0.060
LPCS332R❶❷		1	0.060
LPCS333❷		10	0.060
LPCS333R❶❷		1	0.060
LPCS350		10	0.060
LPCS350R❶		1	0.060
LPCS360		10	0.060
LPCS360R❶		1	0.060
LPCS370❷		10	0.060
LPCS370R❶❷		1	0.060
LPCS380❷		10	0.060
LPCS380R❶❷		1	0.060
LPCS390❷		10	0.060
LPCS390R❶❷		1	0.060

❶ Versions with different key codes.
Complete with the numeric code of the key.
The following versions are available: 421E, 520E, 3433E, 621E, 622E.
Example of complete code: LPC S320 R421E.

❷ Available only on specific request.

Selector switch actuators key (Ronis) in kit

new

Order code	Type of positions	Contacts config.	Qty per pkg	Wt
			n°	[kg]
2 positions.				
LPCS320K10		1NO	1	0.080

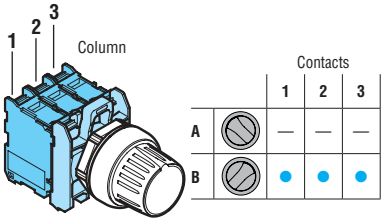
Selector switch actuators knob

LPCS4...

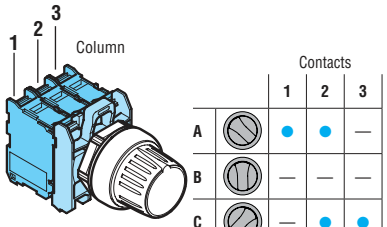
Order code	Type of positions	Qty per pkg	Wt
		n°	[kg]
2 positions (without mounting adapter).			
LPCS420		10	0.037
LPCS421		10	0.037
3 positions (without mounting adapter).			
LPCS430		10	0.037
LPCS431		10	0.037
LPCS432		10	0.037
LPCS433		10	0.037

Contact activation

2-positions



3-positions



Operational characteristics
- Any mounting position allowed
- Standard key types with numeric code n° 455
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K.

Materials
Polyamide.

Mechanical endurance
Mechanical life: 1,000,000 cycles.

Mounting adapter
See page 8-38.
Type: LPXAU120.
Actuators are installed through a Ø22mm/Ø0.87" drilling with a threaded fixing ring (Tmax = 2.3Nm/20.3lb.in) also on the cover of LPZ... control stations.
The mounting adapter directly snaps onto the actuator.

Contact elements
See page 8-38 to 8-40.

Type	Terminals

Front-mount types snap onto LPXAU120 mounting adapter (to purchase separately).
Up to:
- 6 single contacts, 2 left, 2 middle and 2 right or 3 left and 3 right;
- 3 double contacts, 1 left, 1 middle and 1 right.

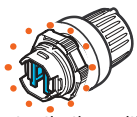
The LPXAU120 mounting adapter can also be fitted internally to the cover of the LPZ... control station with up to 3 elements per actuator.

1NO	LPXC10	Screw
	LPXCF10	Faston
	LPXCS10	Spring clamp
1EM	LPXC10A	Screw
1NC	LPXC01	Screw
	LPXCF01	Faston
	LPXCS01	Spring clamp
1LB	LPXC01D	Screw
1NO+1NC	LPXC11	Screw
2NO	LPXC20	Screw
2NC	LPXC02	Screw

Base mount types snap into LPZP... control station base.
See example on page 8-41.
Up to 3 contacts can be fitted per LPZ... control station actuator.

1NO	LPXCB10	Screw
1NC	LPXCB01	Screw

Activation of the middle contacts is coupled to the side contacts; the relative mechanism pins are standard supplied.



The middle contact activation, with respect to the right and left side contact, can be changed by the user, if required, by removing one or both mechanism pins.

Type of position
- Maintained position.
- Spring return position.
- • Key extraction position.

Rotation angles
2 positions

3 positions

Certifications and compliance
Certifications: UL Listed for USA and Canada, (cULus - File E93601), as Auxiliary Devices; EAC, CCC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

Illuminated button actuators, spring return

LPCBL10...

LPCBL20...

Order code	Actuator colour	Qty per pkg	Wt
		n°	[kg]
Flush (without mounting adapter). Spring return.			
LPCBL103	Green	10	0.025
LPCBL104	Red	10	0.025
LPCBL105	Yellow	10	0.025
LPCBL106	Blue	10	0.025
LPCBL107	Transparent	10	0.025
Extended (without mounting adapter). Spring return.			
LPCBL203	Green	10	0.027
LPCBL204	Red	10	0.027
LPCBL205	Yellow	10	0.027
LPCBL206	Blue	10	0.027
LPCBL207	Transparent	10	0.027

Illuminated button actuators, spring return in kit

new

Order code	Actuator colour	Contacts config.	Qty per pkg	Wt
			n°	[kg]
Flush. Spring return. LED element included: 12...30VAC/DC.				
LPCBL103K11PB3	Green	1NO+1NC	1	0.049
LPCBL104K11PB4	Red	1NO+1NC	1	0.049
LPCBL105K11PB5	Yellow	1NO+1NC	1	0.049
LPCBL106K11PB6	Blue	1NO+1NC	1	0.049
LPCBL107K11PB8	Transparent	1NO+1NC	1	0.049
Flush. Spring return. LED element included: 185...265VAC.				
LPCBL103K11PM3	Green	1NO+1NC	1	0.049
LPCBL104K11PM4	Red	1NO+1NC	1	0.049
LPCBL105K11PM5	Yellow	1NO+1NC	1	0.049
LPCBL106K11PM6	Blue	1NO+1NC	1	0.049
LPCBL107K11PM8	Transparent	1NO+1NC	1	0.049

Illuminated push-push button actuators

LPCQL10...

LPCQL20...

Order code	Actuator colour	Qty per pkg	Wt
		n°	[kg]
Flush (without mounting adapter). Push on-push off.			
LPCQL103❶	Green	10	0.025
LPCQL104❶	Red	10	0.025
LPCQL105❶	Yellow	10	0.025
LPCQL106❶	Blue	10	0.025
LPCQL107❶	Transparent	10	0.025
Extended (without mounting adapter). Push on-push off.			
LPCQL203❶	Green	10	0.027
LPCQL204❶	Red	10	0.027
LPCQL205❶	Yellow	10	0.027
LPCQL206❶	Blue	10	0.027
LPCQL207❶	Transparent	10	0.027

❶ **Use contact elements LPXC10A (EM) and LPXC01 (NC) only.**
Contact elements LPXC10 (NO) and LPXC01D (LB) or double contacts cannot be fitted on these actuators.

Operational characteristics
- Any mounting position allowed
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K.

Materials
Polyamide.

Mechanical endurance
Operating force: <0.5kg/1.1lb (actuator).
Mechanical life:
- Spring return actuators: 5,000,000 cycles
- Push-push actuators: 500,000 cycles.

Mounting adapter
See page 8-38.
Type: LPXAU120.
Actuators are installed through a Ø22mm/Ø0.87" drilling with a threaded fixing ring (Tmax = 2.3Nm/20.3lb.in) also on the cover of LPZ... control stations.
The mounting adapter directly snaps onto the actuator.

Contact elements for illuminated spring return actuators
See page 8-38 to 8-40.

Type		Terminals
Front-mount types snap onto LPXAU120 mounting adapter (to purchase separately). Up to: - 6 single contacts, 3 left and 3 right; - 4 double contacts, 2 left and 2 right. The LPXAU120 mounting adapter can also be fitted internally to the cover of the LPZ... control station with up to 2 elements per actuator in addition to the LED element in the middle position.		
1NO	LPXC10	Screw
	LPXCF10	Faston
	LPXCS10	Spring clamp
1EM	LPXC10A	Screw
1NC	LPXC01	Screw
	LPXCF01	Faston
	LPXCS01	Spring clamp
1LB	LPXC01D	Screw
1NO+1NC	LPXC11	Screw
2NO	LPXC20	Screw
2NC	LPXC02	Screw
Base mount types snap into LPZP... control station base. See example on page 8-41. Up to 2 contacts can be fitted per LPZ... control station actuator in addition to the LED element in the middle position.		
1NO	LPXCB10	Screw
1NC	LPXCB01	Screw

Contact elements for illuminated push-push button actuators
See page 8-39.
Type: LPXC10A (1EM)
LPXC01 (1NC)
Contacts snap onto mounting adapter and also internally on the cover surface of LPZ... control stations.
Up to 4 contacts can be fitted: 2 each on the left and right, one behind the other; up to 2 elements per control station actuator in addition to the LED element in the middle position.

LED light elements
See pages 8-43 and 44.

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada, (cULus - File E93601), as Auxiliary Devices; EAC, CCC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

Illuminated mushroom head button actuators

LPCBL614...

LPCBL664...

Order code	Actuator colour	Qty per pkg	Wt
		n°	[kg]
SPRING RETURN. Ø40mm/1.6" (without mounting adapter).			
LPCBL6143	Green	10	0.035
LPCBL6144	Red	10	0.035
LPCBL6145	Yellow	10	0.035
LPCBL6146	Blue	10	0.035
LPCBL6148	White	1	0.035
LATCH, TURN TO RELEASE. Ø40mm/1.6" (without mounting adapter). For normal stopping.			
LPCBL6643	Green	1	0.040
LPCBL6645	Yellow	1	0.040
LPCBL6646	Blue	1	0.040
For emergency stopping, ISO 13850 compliant.			
LPCBL6644	Red	10	0.040

Operational characteristics
- Any mounting position allowed
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K.

Materials
Polyamide.

Mechanical endurance
Operating force: <0.5kg/1.1lb (actuator).
Mechanical life:
- Spring return mushroom-head actuators: 5,000,000 cycles
- Latch mushroom-head actuators: 300,000 cycles.

Mounting adapter
See page 8-38.
Type: LPXAU120.
Actuators are installed through a Ø22mm/Ø0.87" drilling with a threaded fixing ring (Tmax = 2.3Nm/20.3lb.in) also on the cover of LPZ... control stations.
The mounting adapter directly snaps onto the actuator.

Contact elements
See page 8-38 to 8-41.

Type		Terminals
Front-mount types snap onto LPXAU120 mounting adapter (to purchase separately). For LPSBL61... types up to: - 6 single contacts, 3 left and 3 right; - 4 double contacts, 2 left and 2 right. For LPSBL66... types up to: - 4 single contacts, 2 left and 2 right; - 2 double contacts, 1 left and 1 right. The LPXAU120 mounting adapter can also be fitted internally to the cover of the LPZ... control station with up to 2 elements per actuator in addition to the LED element in the middle position.		
1NO	LPXC10	Screw
	LPXCF10	Faston
	LPXCS10	Spring clamp
1EM	LPXC10A	Screw
1NC	LPXC01	Screw
	LPXCF01	Faston
	LPXCS01	Spring clamp
1LB	LPXC01D	Screw
1NO+1NC	LPXC11	Screw
2NO	LPXC20	Screw
2NC	LPXC02	Screw
Auto-monitor 1NC	LPXC01M Only for LPCBL66... types	Screw
Base mount types snap into LPZP... control station base. See example on page 8-41. Up to 2 contacts can be fitted per LPZ... control station actuator in addition to the LED element in the middle position.		
1NO	LPXCB10	Screw
1NC	LPXCB01	Screw

LED light elements
See pages 8-43 and 44.

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada, (cULus - File E93601), as Auxiliary Devices; EAC, CCC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

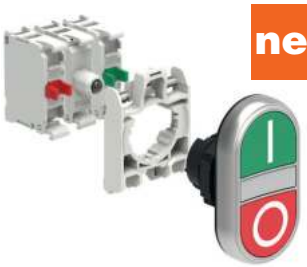
Double-touch actuators, spring return, white indicator

LPCBL71...

LPCBL72...

Order code	Actuator colour	Symbol	Qty per pkg	Wt
			n°	[kg]
Two flush pushbuttons (without mounting adapter). Both spring return.				
LPCBL7112	Black/Red	—	5	0.030
LPCBL7113	Green/Red	—	5	0.030
LPCBL7114	White/Black	—	1	0.030
LPCBL7122	Black/Red	I-O	5	0.030
LPCBL7123	Green/Red	I-O	5	0.030
LPCBL7124	White/Black	I-O	5	0.030
LPCBL7133	Green/Red	Start/Stop	5	0.030
LPCBL7191	Black/Black	↑ ↓	5	0.030
One extended and one flush pushbuttons (without mounting adapter). Both spring return.				
LPCBL7212	Black/Red	—	1	0.030
LPCBL7213	Green/Red	—	5	0.030
LPCBL7214	White/Black	—	1	0.030
LPCBL7222	Black/Red	I-O	1	0.030
LPCBL7223	Green/Red	I-O	5	0.030
LPCBL7224	White/Black	I-O	5	0.030
LPCBL7233	Green/Red	Start/Stop	5	0.030

Double-touch actuators, spring return, white indicator in kit



new

Order code	Actuator colour	Symbol	Contacts config.	Qty per pkg
				n°
Two flush pushbuttons. Both spring return. LED element included: 12...30VAC/DC.				
LPCBL7123K11PB	Green/ Red	I-O	1NO+1NC	1
LPCBL7124K11PB	White/ Black	I-O	1NO+1NC	1
Two flush pushbuttons. Both spring return. LED element included: 185...265VAC.				
LPCBL7123K11PM	Green/ Red	I-O	1NO+1NC	1
LPCBL7124K11PM	White/ Black	I-O	1NO+1NC	1
One extended and one flush pushbuttons. Both spring return. LED element included: 12...30VAC/DC.				
LPCBL7223K11PB	Green/ Red	I-O	1NO+1NC	1
LPCBL7224K11PB	White/ Black	I-O	1NO+1NC	1
One extended and one flush pushbuttons. Both spring return. LED element included: 185...265VAC.				
LPCBL7223K11PM	Green/ Red	I-O	1NO+1NC	1
LPCBL7224K11PM	White/ Black	I-O	1NO+1NC	1

Operational characteristics
- Any mounting position allowed
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K.

Materials
Polyamide.

Mechanical endurance
Operating force: <0.5kg/1.1lb (actuator).
Mechanical life:
- Double-touch: 1,000,000 cycles.

Mounting adapter
See page 8-38.
Type: LPXAU120.
Actuators are installed through a Ø22mm/Ø0.87" drilling with a threaded fixing ring (Tmax = 2.3Nm/20.3lb.in) also on the cover of LPZ... control stations.
The mounting adapter directly snaps onto the actuator.

Contact elements
See page 8-38 to 8-40.

Type		Terminals
Front-mount types snap onto LPXAU120 mounting adapter (to purchase separately). Up to: - 6 single contacts, 3 left and 3 right; - 4 double contacts, 2 left and 2 right. The LPXAU120 mounting adapter can also be fitted internally to the cover of the LPZ... control station with up to 2 elements per actuator in addition to the LED element in the middle position.		
1NO	LPXC10	Screw
	LPXCF10	Faston
	LPXCS10	Spring clamp
1EM	LPXC10A	Screw
1NC	LPXC01	Screw
	LPXCF01	Faston
	LPXCS01	Spring clamp
1LB	LPXC01D	Screw
1NO+1NC	LPXC11	Screw
2NO	LPXC20	Screw
2NC	LPXC02	Screw
Base-mount types snap into LPZP... control station base. See example on page 8-41. Up to 2 contacts can be fitted per LPZ... control station actuator in addition to the LED element in the middle position.		
1NO	LPXCB10	Screw
1NC	LPXCB01	Screw

LED light elements
See pages 8-43 and 44.

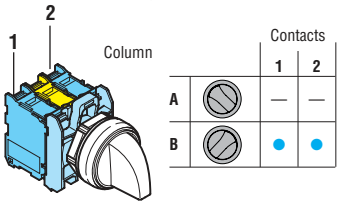
Certifications and compliance
Certifications obtained: UL Listed for USA and Canada, (cULus - File E93601), as Auxiliary Devices; EAC, CCC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

Illuminated selector switch actuators

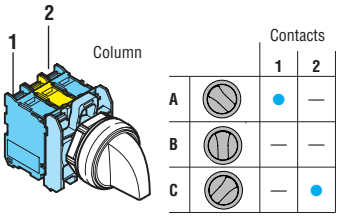
LPCSL1...

Order code	Actuator colour	Type of positions	Qty per pkg	Wt
			n°	[kg]
2 positions (without mounting adapter).				
LPCSL1203	Green		10	0.025
LPCSL1204	Red		10	0.025
LPCSL1205	Yellow		10	0.025
LPCSL1206	Blue		10	0.025
LPCSL1208	White		10	0.025
LPCSL1213	Green		10	0.025
LPCSL1214	Red		1	0.025
LPCSL1215	Yellow		1	0.025
LPCSL1216	Blue		1	0.025
LPCSL1218	White		10	0.025
3 positions (without mounting adapter).				
LPCSL1303	Green		10	0.025
LPCSL1304	Red		10	0.025
LPCSL1305	Yellow		10	0.025
LPCSL1306	Blue		10	0.025
LPCSL1308	White		10	0.025
LPCSL1313	Green		10	0.025
LPCSL1314	Red		1	0.025
LPCSL1315	Yellow		1	0.025
LPCSL1316	Blue		1	0.025
LPCSL1318	White		10	0.025
LPCSL1323	Green		10	0.025
LPCSL1324	Red		1	0.025
LPCSL1325	Yellow		1	0.025
LPCSL1326	Blue		1	0.025
LPCSL1328	White		10	0.025
LPCSL1333	Green		10	0.025
LPCSL1334	Red		1	0.025
LPCSL1335	Yellow		1	0.025
LPCSL1336	Blue		1	0.025
LPCSL1338	White		10	0.025

Contact activation of 2-position selector switch



Contact activation of 3-position selector switch



Illuminated selector switch actuators in kit

new

Order code	Actuator colour	Type of positions	Contacts config.	Qty per pkg
				n°
2 positions. LED element included: 12...30VAC/DC.				
LPCSL120K11PB3	Green		1NO+1NC	1
LPCSL120K11PB4	Red		1NO+1NC	1
LPCSL120K11PB5	Yellow		1NO+1NC	1
2 positions. LED element included: 185...265VAC.				
LPCSL120K11PM3	Green		1NO+1NC	1
LPCSL120K11PM4	Red		1NO+1NC	1
LPCSL120K11PM5	Yellow		1NO+1NC	1
3 positions. LED element included: 12...30VAC/DC.				
LPCSL130K11PB3	Green		1NO+1NC	1
LPCSL130K11PB4	Red		1NO+1NC	1
LPCSL130K11PB5	Yellow		1NO+1NC	1
LPCSL131K11PB4	Red		1NO+1NC	1
LPCSL131K11PB5	Yellow		1NO+1NC	1
3 positions. LED element included: 185...265VAC.				
LPCSL130K11PM3	Green		1NO+1NC	1

Operational characteristics
- Any mounting position allowed
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K.

Materials
Polyamide.

Mechanical endurance
Operating force: <0.5kg/1.1lb (actuator).
Mechanical life:
- Selector switches: 1,000,000 cycles.

Mounting adapter
See page 8-38.
Type: LPXAU120.
Actuators are installed through a Ø22mm/Ø0.87" drilling with a threaded fixing ring (Tmax = 2.3Nm/20.3lb.in) also on the cover of LPZ... control stations.
The mounting adapter directly snaps onto the actuator.

Contact elements
See page 8-38 to 8-40.

Type	Terminals

Front-mount types snap onto LPXAU120 mounting adapter (to purchase separately).
Up to:
- 4 single contacts, 2 left and 2 right;
- 2 double contacts, 1 left and 1 right.

The LPXAU120 mounting adapter can also be fitted internally to the cover of the LPZ... control station with up to 2 elements per actuator in addition to the LED element in the middle position.

1NO	LPXC10	Screw
	LPXCF10	Faston
	LPXCS10	Spring clamp
1EM	LPXC10A	Screw
1NC	LPXC01	Screw
	LPXCF01	Faston
	LPXCS01	Spring clamp
1LB	LPXC01D	Screw
1NO+1NC	LPXC11	Screw
2NO	LPXC20	Screw
2NC	LPXC02	Screw

Base-mount types snap into LPZP... control station base.
See example on page 8-41.
Up to 2 contacts can be fitted per LPZ... control station actuator in addition to the LED element in the middle position.

1NO	LPXCB10	Screw
1NC	LPXCB01	Screw

Selector switch type of positions
- Maintained position.
- Spring return position

Selector switch rotation angles
2 positions: 90°
3 positions: 45° 45°

LED light elements
See pages 8-43 and 44.

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada, (cULus - File E93601), as Auxiliary Devices; EAC, CCC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

Pilot light heads

LPL...

Order code	Head colour	Qty per pkg	Wt
		n°	[kg]
Without mounting adapter.			
LPL3	Green	10	0.024
LPL4	Red	10	0.024
LPL5	Yellow	10	0.024
LPL6	Blue	10	0.024
LPL7	Transparent	10	0.024
LPL1187	Transparent ϟ ❶	10	0.024

❶ With symbol indicating dangerous voltage (IEC/EN/BS 60417 5036-a).

Operational characteristics
- Any mounting position allowed
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K.

Materials
Polyamide.

Mounting adapter
See page 8-38. Type: LPXAU120.
Pilot light heads are installed through a Ø22mm/Ø0.87" drilling with a threaded fixing ring (Tmax = 2.3Nm/20.3lb.in) also on the cover of LPZ... control stations, with LED element in central position. The mounting adapter directly snaps onto the actuator.

LED light elements
See pages 8-43 and 44.

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada, (cULus - File E93601), as Auxiliary Devices; EAC, CCC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

LED integrated monoblock pilot lights steady light

LPM...

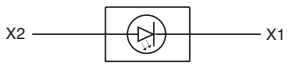
Order code	Rated auxiliary supply voltage	LED colour	Qty per pkg	Wt
			n°	[kg]
LPMLA1	12VAC/DC	Orange	10	0.021
LPMLA3		Green	10	0.021
LPMLA4		Red	10	0.021
LPMLA5		Yellow	10	0.021
LPMLA6		Blue	10	0.021
LPMLA7		Transparent	10	0.021
LPMLB1	24VAC/DC	Orange	10	0.021
LPMLB3		Green	10	0.021
LPMLB4		Red	10	0.021
LPMLB5		Yellow	10	0.021
LPMLB6		Blue	10	0.021
LPMLB7		Transparent	10	0.021
LPMLD1	48VAC/DC	Orange	10	0.021
LPMLD3		Green	10	0.021
LPMLD4		Red	10	0.021
LPMLD5		Yellow	10	0.021
LPMLD6		Blue	10	0.021
LPMLD7		Transparent	10	0.021
LPMLE1	110...120VAC	Orange	10	0.024
LPMLE3		Green	10	0.024
LPMLE4		Red	10	0.024
LPMLE5		Yellow	10	0.024
LPMLE6		Blue	10	0.024
LPMLE7		Transparent	10	0.024
LPMLM1	230VAC	Orange	10	0.024
LPMLM3		Green	10	0.024
LPMLM4		Red	10	0.024
LPMLM5		Yellow	10	0.024
LPMLM6		Blue	10	0.024
LPMLM7		Transparent	10	0.024
LPMLP1	380...415VAC	Orange	10	0.024
LPMLP3		Green	10	0.024
LPMLP4		Red	10	0.024
LPMLP5		Yellow	10	0.024
LPMLP6		Blue	10	0.024
LPMLP7		Transparent	10	0.024
LPMLF1	110...125VDC	Orange	10	0.024
LPMLF3		Green	10	0.024
LPMLF4		Red	10	0.024
LPMLF5		Yellow	10	0.024
LPMLF6		Blue	10	0.024
LPMLF7		Transparent	10	0.024
LPMLN1	220VDC	Orange	10	0.024
LPMLN3		Green	10	0.024
LPMLN4		Red	10	0.024
LPMLN5		Yellow	10	0.024
LPMLN6		Blue	10	0.024
LPMLN7		Transparent	10	0.024

Operational characteristics
- Rated frequency: 50-60Hz
- Auxiliary supply voltage:
  - 110...125VDC, 220VDC (-15%...+10% Ue)
  - 12VAC/DC, 24VAC/DC, 48VAC/DC (-15%...+10% Ue)
  - 110...120VAC, 230VAC, 380...415VAC (-15%...+10% Ue)
- Consumption: ≤20mA
- Installed through a Ø22mm/Ø0.87" drilling with a threaded fixing ring (Tmax = 2.3Nm/20.3lb.in) also on cover of LPZ... control stations
- Electrical life: >30,000 hours
- Screw terminals
- Side cable entry
- Maximum tightening torque: 0.8Nm/7lb.in
- Ambient conditions:
  - Operating temperature: -25...+70°C
- Degree of protection:
  - per IEC/EN: IP66, IP67 and IP69K on front; IP20 at rear
  - per UL: Type 1, 2, 3R, 4, 4X, 12, 12K on front.

Materials
Polyamide.

Maximum conductor cross section
1 or 21.5mm² or AWG16 cables.

Wiring diagram



Certifications and compliance
Certifications: cULus, EAC, CCC (only for LPMLD..., LPMLE... and LPMLM...).
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

Monoblock potentiometers

LPCPA...

Order code	Resistance value	Qty per pkg	Wt
		n°	[kg]
LPCPA001	1kΩ	1	0.040
LPCPA002	2.5kΩ	1	0.040
LPCPA005	5kΩ	1	0.040
LPCPA010	10kΩ	1	0.040
LPCPA050	50kΩ	1	0.040
LPCPA100	100kΩ	1	0.040
LPCPA500	500kΩ	1	0.040

General characteristics
Monoblock potentiometers are typically used for regulating the parameters of many devices (e.g. the speed of the electric motors through static converters).
The monoblock body design permits direct use of the potentiometer by panel fitting with fixing ring and subsequent tightening of cables into the built-in terminal block.
The potentiometer is made with Cermet technology, which ensures stable, constant resistance values over time.
The, UL-certified, range is made for resistance values from 1 to 500kΩ. All potentiometers are IP66, IP67, IP69K and UL Type 4X, which means that they can be used in demanding ambient conditions.

Operational characteristics
- Rated insulation voltage Ui: 250VAC
- Impulse withstand voltage Uimp: 4kV
- Potentiometer included in the product
- Monoblock body with 1-turn graduated scale
- Any fitting position permitted
- Installed through a Ø22mm/Ø0.87" drilling with a threaded fixing ring (Tmax = 2.3Nm/20.3lb.in) also on the cover of LPZ... control stations
- Resistive material: cermet
- Operation: linear
- Resistance tolerance: ±10%
- Max. power: 0.5W (70°C)
- Mechanical travel: 290°
- Side cable entry
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K on front
  - Per IEC/EN: IP20 at rear
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K on front.

Materials
Polyamide.

Mechanical endurance
Mechanical life: 25,000 operations.

Maximum conductor cross section
Screw terminal connections with three separate connections:
- Min. cable 0.5mm² / AWG24
- Max. cable 2.5mm² / AWG14
- Maximum tightening torque: 0.5Nm/4.4lb.in
- Flat-head screwdriver: 0.6x3.5mm/0.02x0.14".

Certifications and compliance
Certifications: cULus, EAC, CCC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

Potentiometer drives

LPXP100

LPXP110

new

Order code	Characteristics	Qty per pkg	Wt
		n°	[kg]
Complete with mounting adapter.			
LPXP100❶	With graduated scale	1	0.070
LPXP110❶	With variable index	1	0.070

❶ Potentiometer not included.

Operational characteristics
- Suitable for potentiometers with 6 and 6.3mm/0.24-0.25" diameter shaft and minimum 40mm/1.6" shaft length
- Ambient conditions:
  - Operating temperature: -25...+60°C
  - Storage temperature: -40...+70°C
- Any mounting position allowed
- Degree of protection: IP65 (warranted by potentiometers with a cylindrical shaft).

Materials
An aluminium and zinc alloy (zama) is used for the metal part whereas plastic parts are made of polyamide and polycarbonate.

Mechanical endurance
Mechanical life: 300,000 cycles.

Mounting adapter
Standard supply with actuator.
The adapter is fixed to the mounting surface by means of incorporated screws (Tmax = 0.8Nm/0.59lbft).
Actuators will latch onto the mounting adapter with a simple twist; not suitable for LPZ control stations.

Compliance
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1.

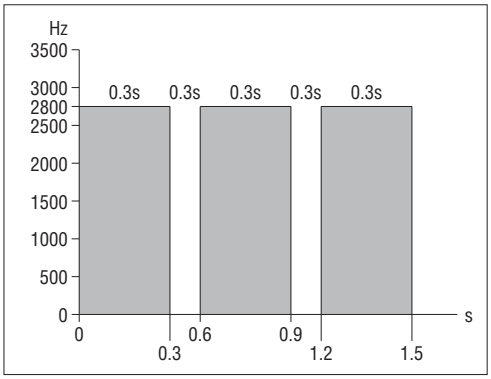
Monoblock buzzers

LPCZS...

LPCZS...IP

Order code	Voltage	Sound intensity at 2800Hz	Qty per pkg	Wt
	[V]	[dB/10cm]	n°	[kg]
Continuous or pulse tone, IP40 version.				
LPCZSA	9...15VAC/DC	90	1	0.020
LPCZSB	18...30VAC/DC	90	1	0.020
LPCZSE	85...140VAC/DC	90	1	0.020
LPCZSM	185...265VAC/DC	90	1	0.020
Continuous or pulse tone, IP66, IP67, IP69K and UL Type 4X version.				
LPCZSAIP	9...15VAC/DC	80	1	0.020
LPCZSBIP	18...30VAC/DC	80	1	0.020
LPCZSEIP	85...140VAC/DC	80	1	0.020
LPCZSMIP	185...265VAC/DC	80	1	0.020

Pulse-tone sound graph



General characteristics
Monoblock buzzers are used as sound indicators in automation systems and on-board machinery in the production processes. Long life, low consumption values, compact size and the use of materials, in accordance with the North American market, are the main features of this product.

Operational characteristics
- Rated frequency: 50...60Hz
- Auxiliary supply voltage: 9...15VAC/DC, 18...30VAC/DC, 85...140VAC/DC, 185...265VAC/DC
- Maximum consumption: 20mA-0.30W (type 9..15VAC/DC), 15mA-0.40W (type 18..30VAC/DC), 5.5mA-0.80W (type 85..140VAC/DC), 3.5mA-0.95W (type 185...265VAC/DC)
- Minimum activation voltage: >4V (type 9...15VAC/DC), >8V (type 18..30VAC/DC), >15V (type 85..140VAC/DC), >25V (type 185..265VAC/DC)
- Impulse withstand voltage Uimp: 4kV
- Installed through a Ø22mm/Ø0.87" drilling with a threaded fixing ring (Tmax = 2.3Nm/20.3lb.in) also on the cover of LPZ... control stations
- Service life: 30,000 hours (permanently powered)
- Side cable entry
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection (type LPCZS...):
  - Per IEC/EN: IP40 on front and IP20 at rear
- Degree of protection (type LPCZS...IP):
  - Per IEC/EN: IP66, IP67, IP69K on front and IP20 at rear
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K on front.

Materials
Polyamide.

Maximum conductor cross section
Screw terminal connections with three separate connections:
- Min. cable 0.5mm² / AWG24
- Max. cable 2.5mm² / AWG14
- Maximum tightening torque: 0.5Nm/4.4lb.in
- Flat-head screwdriver: 0.6x3.5mm/0.02x0.14".

Certifications and compliance
Certifications: cULus, EAC, CCC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

USB and RJ45 communication interfaces

LPCD01

LPCD05

LPCD01L...

Order code	Description	Qty per pkg	Wt
		n°	[kg]
LPCD01	USB interface, A/A female type connection	1	0.018
LPCD01L050	USB interface, A/A female connection with 0.5m long cable	1	0.050
LPCD01L100	USB interface, A/A female connection with 1m long cable	1	0.080
LPCD03	USB interface, A/B female type connection	1	0.018
LPCD05	USB interface, B/A female type connection	1	0.018
LPCD06	RJ45 interface, Ethernet connection type	1	0.026
LPCD06L100	RJ45 interface, Ethernet connection with 1m long cable	1	0.090

General characteristics
USB and RJ45 communication interface connectors are used in industrial environments, which in recent years have seen an increase in the number of connections between machines, production lines, equipment and measuring instruments. These interfaces provide the transmission of data in both directions between the various devices.

Operational characteristics
- Rated insulation voltage for LPCD01, LPCD03, LPCD05: 5VAC/DC
- Rated insulation voltage for LPCD06: 24VAC
- Installed through a Ø22mm/Ø0.87" drilling with a threaded fixing ring (Tmax = 2.3Nm/20.3lb.in) also on the cover of LPZ... control stations
- Transmission characteristics for LPCD01, LPCD03, LPCD05: 5Gbps (625MB/sec)
- Transmission characteristics for LPCD06: Cat.5E
- Rated current for LPCD01, LPCD03, LPCD05: 1.8A
- Rated current for LPCD06: 1.5A
- Insulation resistance: ≥100MOhm
- Contact resistance for LPCD01, LPCD03, LPCD05: ≤30mOhm
- Contact resistance for LPCD06: ≤40mOhm
- USB connector class: 3.0 (backward compatible with USB class 2.0)
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP65 on front (with cap mounted)
  - Per IEC/EN: IP20 at rear
  - Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K on front (with cap mounted).

Materials
Polyamide.

Certifications and compliance
Certifications: cULus, EAC, CCC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

Pushbutton actuators, spring return, with special symbols

LPSB1253

LPFB1253

LPCB1253

Order code ❺❻	Symbol	Actuator colour	Qty per pkg	Wt
			n°	[kg]
Spring return (without mounting adapter).				
LP❶B❷❸25❹	+	❹	50	0.027
LP❶B❷❸26❹	–	❹	50	0.027
LP❶B❷❸27❹		❹	50	0.027
LP❶B❷❸28❹		❹	50	0.027
LP❶B❷❸29❹		❹	50	0.027
LP❶B❷❸30❹	ALTO	❹	50	0.027
LP❶B❷❸31❹	BASSO	❹	50	0.027
LP❶B❷❸32❹	SX	❹	50	0.027
LP❶B❷❸33❹	DX	❹	50	0.027
LP❶B❷❸34❹	MAN	❹	50	0.027
LP❶B❷❸35❹	AUTO	❹	50	0.027
LP❶B❷❸38❹	TRIP	❹	50	0.027
LP❶B❷❸39❹	TEST	❹	50	0.027
LP❶B❷❸40❹		❹	50	0.027
LP❶B❷❸41❹		❹	50	0.027
LP❶B❷❸42❹		❹	50	0.027
LP❶B❷❸43❹		❹	50	0.027
LP❶B❷❸44❹		❹	50	0.027
LP❶B❷❸45❹		❹	50	0.027
LP❶B❷❸46❹		❹	50	0.027
LP❶B❷❸47❹		❹	50	0.027
LP❶B❷❸48❹		❹	50	0.027
LP❶B❷❸49❹		❹	50	0.027
LP❶B❷❸52❹		❹	50	0.027
LP❶B❷❸53❹		❹	50	0.027
LP❶B❷❸54❹		❹	50	0.027
LP❶B❷❸55❹		❹	50	0.027
LP❶B❷❸56❹	START STOP	❹	50	0.027
LP❶B❷❸57❹	III	❹	50	0.027
LP❶B❷❸58❹	IV	❹	50	0.027
LP❶B❷❸59❹		❹	50	0.027
LP❶B❷❸60❹		❹	50	0.027
LP❶B❷❸61❹		❹	50	0.027
LP❶B❷❸62❹		❹	50	0.027
LP❶B❷❸63❹		❹	50	0.027
LP❶B❷❸64❹		❹	50	0.027
LP❶B❷❸65❹		❹	50	0.027
LP❶B❷❸66❹		❹	50	0.027
LP❶B❷❸67❹		❹	50	0.027
LP❶B❷❸68❹		❹	50	0.027
LP❶B❷❸69❹		❹	50	0.027

❶ Add letter "S" if Ø22mm metal type is required; "F" if Ø30mm flat metal type is required; "C" if Ø22mm chromed plastic type is required.
❷ Add letter "L" if illuminated type is required.
❸ or the type of actuator, add: 1 for flush or 2 for extended.
❹ Add the actuator colour: 2 black only for non-illuminated type; 3 green, 4 red, 5 yellow, 6 blue, 8 white or 7 transparent for illuminated version.
❺ Products available on specific request for a minimum multiple quantity of 50 pieces per type.
❻ Consult Technical support for assistance; see contact details or inside front cover.

Examples of complete order codes:
LPSB2258 – Ø22mm metal white extended pushbutton with + symbol;
LPFBL1685 – Ø30mm illuminated flat metal yellow flush pushbutton with ⚠ symbol;
LPCB1344 – Ø22mm chromed plastic green flush pushbutton with "AUTO" symbol.

Operational characteristics
– Any mounting position allowed
– Ambient conditions:
  • Operating temperature: -25...+70°C
  • Storage temperature: -40...+85°C
– Degree of protection:
  • Per IEC/EN: IP66, IP67 and IP69K
  • Per UL: Type 1, 2, 3R, 4, 4X, 12, 12K.

Materials
Polyamide.

Mechanical endurance
Operating force: <0.5kg/1.1lb (actuator).
Mechanical life: 5,000,000 cycles.

Mounting adapter
See page 8-38.
Type: LPXAU120...

Contact elements
See page 8-38 to 8-40.

Type		Terminals

The mounting adapter directly snaps onto the actuator (to purchase separately).
Up to:
- 9 single contacts, 3 left, 3 middle and 3 right;
- 6 double contacts, 2 left, 2 middle and 2 right.
The LPXAU120... mounting adapter can also be fitted internally to the cover of the LPZ... control station with up to 3 elements per actuator.

1NO	LPXC10	Screw
	LPXCF10	Faston
	LPXCS10	Spring clamp
1EM	LPXC10A	Screw
1NC	LPXC01	Screw
	LPXCF01	Faston
	LPXCS01	Spring clamp
1LB	LPXC01D	Screw
1NO+1NC	LPXC11	Screw
2NO	LPXC20	Screw
2NC	LPXC02	Screw

Base mount types snap into LPZP... control station base.
See example on page 8-41.
Up to 3 elements can be fitted to the adapter when used with the LPZ... control station.

1NO	LPXCB10	Screw
1NC	LPXCB01	Screw

All these actuators are standard-supplied with action plug for middle contacts.

Certifications and compliance
Certifications obtained: cULus, EAC, CCC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

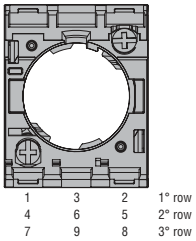
Mounting adapters

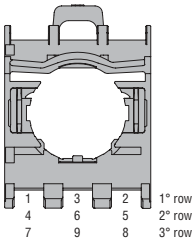
LPXAU120M

LPXAU120

Order code	Description	Qty per pkg	Wt
		n°	[kg
LPXAU120M	Mounting adapter for metal actuators (LPS... and LPF...)	10	0.019
LPXAU120	Mounting adapter for chromed plastic actuators (LPC...)	10	0.004

Rear view
(reference for element installation)





Mounting adapters with contact elements

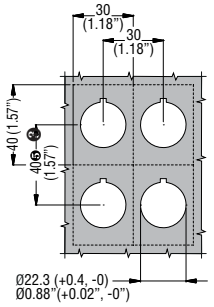
LPXE...M

LPXE...

Order code	Function	Qty per pkg	Wt
		n°	[kg
Screw terminals contact elements. For metal actuators LPS... and LPF... With LPXAU120M mounting adapter.			
LPXE10M❶	3 4 NO❶	5	0.030
LPXE01M ⊖	1 2 ⊖ NC❷	5	0.030
Screw terminals contact elements. For chromed plastic actuators LPC... With LPXAU120 mounting adapter.			
LPXE10❶	3 4 NO❶	10	0.015
LPXE01 ⊖	1 2 ⊖ NC❷	10	0.015

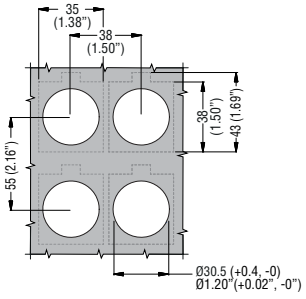
❶ **Use LPXC10A (EM) or LPXC01 (NC) type only with push-push actuators.** Not suitable for push-push actuators.
❷ Direct (positive) opening action ⊖ in accordance with IEC/EN/BS 60947-5-1.

Drillings
Minimum recommended distances for Ø22mm/0.87" actuators.



❸ When using Faston, pitch is 85mm/3.35" minimum.

Minimum recommended distances for Ø30mm/1.18" actuators.



Operational characteristics
- Any mounting position allowed
- For LPXAU120M: the base is fixed to the mounting surface by 2 screws incorporated in the base (Tmax = 0.7Nm/6.1lb.in)
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C.

Certifications and compliance
Certifications: EAC, cULus, CCC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

Contact elements with screw terminals

LPXC...

LPXC02 LPXC20

new

LPXC11

Order code	Function	Qty per pkg	Wt
		n°	[kg
Single contact elements. Screw terminals. Without mounting adapter.			
LPXC10❶	1NO ❶	10	0.011
LPXC10A	1EM ❷	10	0.011
LPXC01 ⊖	1NC ❸	10	0.011
LPXC01D❶ ⊖	1LB ❶❸❹	10	0.011
Double contact elements. Screw terminals. Without mounting adapter.			
LPXC20❶	2NO ❶	10	0.016
LPXC02❶ ⊖	2NC ❶❸	10	0.016
LPXC11❶ ⊖	1NO+1NC ❶❸	10	0.016

❶ **Use LPXC10A (EM) or LPXC01 (NC) type only with push-push actuators.** Not suitable for push-push actuators.
❷ **Normally open contact with early-make operation and suitable for push-push actuators.**
❸ Direct (positive) opening action ⊖ in accordance with IEC/EN/BS 60947-5-1.
❹ Normally closed contact with late break operation.

Operational characteristics for screw terminals
- Any mounting position allowed
- Snap onto LPXAU120M or LPXAU120 mounting adapters:
  - See the combinations given under "Contact elements" in the right-hand column for each type of pushbutton and selector switch.
  - A maximum of 3 contacts or 2 contacts and 1 LED element (LPXL... mounted in the middle position) can be fixed internally on the cover surface of LPZ... control stations for each actuator
- Max. tightening torque for screw terminals: 1Nm/8.8lb.in
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection: IP20.

General characteristics of single contact elements
Wiping action and dual scraping-oscillating effect
IEC rated insulation voltage: 690V
IEC rated thermal current Ith: 10A
Conductivity: 1mA 5V
UL/CSA and IEC/EN/BS 60947-5-1 designation: A600 Q600.

IEC/EN operational characteristics in AC15 category:

[V]	12	24	48	120	240	400	480	500	600
[A]	6	6	6	6	6	3	1.5	1.4	1.2

IEC/EN operational characteristics in DC13 category:

[V]	12	24	48	125	250	440	500	600
[A]	3	3	1. 5	0.55	0.27	0.15	0.13	0.1

Short circuit protection fuse: max calibre: 10A gG/SC.
Contact resistance: ≤20mΩ.
Terminals: clamp screw with washer.

General characteristics of double contact elements
Wiping action and dual scraping-oscillating effect
IEC rated insulation voltage: 250V
IEC rated thermal current Ith: 10A
Conductivity: 1mA 5V
UL/CSA and IEC/EN/BS 60947-5-1 designation: A300 Q300.

IEC/EN operational characteristics in AC15 category:

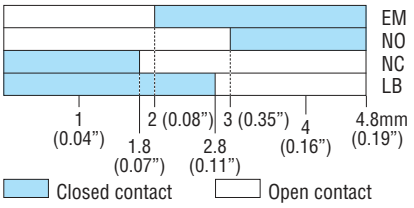
[V]	12	24	48	120	250
[A]	6	6	6	6	6

IEC/EN operational characteristics in DC13 category:

[V]	12	24	48	120	250
[A]	3.5	3.5	1.3	0.6	0.3

Short circuit protection fuse: max calibre: 10A gG/SC.
Contact resistance: ≤20mΩ.
Terminals: clamp screw with washer.

Stroke of contact elements

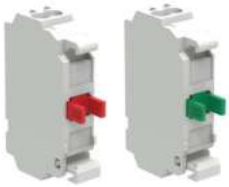


Maximum conductor cross section for screw terminals
- single contact: min. 1x0.75mm² or AWG18, max. 2x2.5mm² or AWG14 cables.
- double contact: min. 1x0.75mm² o AWG18, max. 2x1.5mm² or AWG16 cables.

Mechanical and electrical endurance
Operating force: ≤0.5kg/1.1lb (auxiliary contacts).
Electrical life: 1,000,000 cycles for LPXC10/01/20/02/11; 600,000 cycles for LPXC10A/01D.

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada, (cULus - File E93601), as Auxiliary Devices; EAC, CCC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14..

Contact elements with spring-clamp terminals



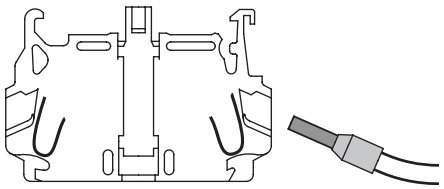
LPXCS01 LPXCS10

Order code	Function	Qty per pkg	Wt
		n°	[kg
Spring-clamp terminals. Without mounting adapter.			
LPXCS10❶	13 14 NO❶	10	0.010
LPXCS01 ⊖	11 12 ⊖ NC❷	10	0.010

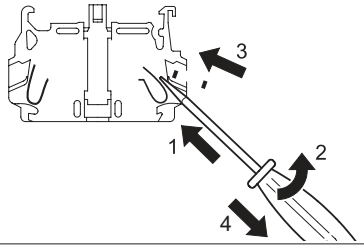
❶ **Not suitable for push-push actuators.**
❷ Direct (positive) opening action ⊖ in accordance with IEC/EN/BS 60947-5-1.

Push-in wiring technology for rigid cables or with ferrules only - no screwdriver needed
Cable retaining force guaranteed over time even in presence of vibrations and/or impacts

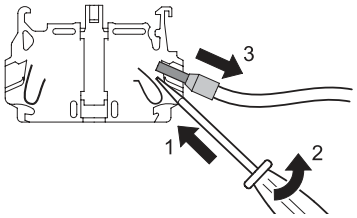
Push-in technology



Wiring with flat-blade screwdriver
(for flexible bare cable without terminal)



Cable removal
(always using flat-blade screwdriver)



Contact elements with Faston terminals

LPXCF01 LPXCF10

Order code	Function	Qty per pkg	Wt
		n°	[kg
Faston terminals. Without mounting adapter.			
LPXCF10❶	13 14 NO❶	10	0.012
LPXCF01 ⊖	11 12 ⊖ NC❷	10	0.012

❶ **Use LPXC10A (EM) or LPXC01 (NC) type only with push-push actuators.** Not suitable for push-push actuators.
❷ Direct opening operation ⊖ in accordance with IEC/EN/BS 60947-5-1.

Operational characteristics for spring-clamp terminals
- Snap onto LPXAU120M or LPXAU120 mounting adapters:
  - A maximum of 3 LPXCS... contacts or 2 contacts and 1 LED element (LPXL... mounted in the middle position) can be fixed internally on the cover surface of LPZ... control stations for each actuator
- Any mounting position allowed
- No other element can be stacked behind LED elements
- See the combinations given under "Contact elements" in the right-hand column for each type of pushbutton and selector switch
- Suitable for applications with vibration and/or impact work conditions; cable retaining force guaranteed over time in these conditions
- Wiring also possible after installation with stacked contacts
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection: IP20.

Operational characteristics for Faston terminals
- Snap onto LPXAU120M or LPXAU120 mounting adapters:
  - A maximum of 3 LPXCF... contacts or 2 contacts and 1 LED element (LPXL... mounted in the middle position) can be fixed internally on the cover surface of LPZ... control stations for each actuator
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection: IP20.

General characteristics
Wiping action and dual scraping-oscillating effect
IEC rated insulation voltage: 690V
IEC rated thermal current Ith: 10A
Conductivity: 5V 1mA
UL/CSA and IEC/EN/BS 60947-5-1 designation: A600 Q600.

IEC/EN operational characteristics in AC15 category:

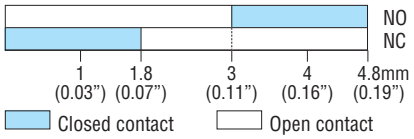
[V]	12	24	48	120	240	400	480	500	600
[A]	6	6	6	6	6	3	1.5	1.4	1.2

IEC/EN operational characteristics in DC13 category:

[V]	12	24	48	125	250	440	500	600
[A]	3	3	1.5	0.55	0.27	0.15	0.13	0.1

Short circuit protection fuse: max calibre: 10A gG/SC.
Contact resistance: ≤20mΩ.
Terminals: Faston 1x6.35mm(0.25") or 2x2.8mm(0.11").

Stroke of contact elements



Maximum conductor cross section
- single contact: min. 1x0.75mm² or AWG18, max. 2x2.5mm² or AWG14. For 2.5mm² section, use rounded cable terminal with metal end at least 10mm.

Mechanical and electrical endurance
Opening force: ≤0.5kg/1.1lb (contacts)
Electrical life: 1,000,000 cycles.

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada, (cULus - File E93601), as Auxiliary Devices; EAC, CCC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

Auto-monitoring contact element with screw terminals

LPXC01M

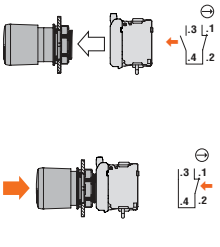
new

Order code	Function	Qty per pkg	Wt
		n°	[kg
Screw terminals. Without mounting adapter. Auto-monitor contact elements for non-illuminated latch mushroom-head pushbuttons.			
LPXC01M	1NC❶	4	0.017

❶ Direct opening operation ⊖ in accordance with IEC/EN/BS 60947-5-1.

Normal operation of auto-monitor contact mounted on surface or on cover of control stations

With contact type LPXC01M (1NC)

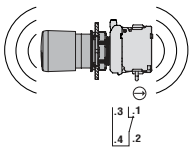


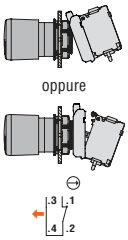
Contact .3-.4 closes when the LPXAU120 mounting adapter and LPXC01M contact are fitted correctly on the mushroom-head latch actuator.
Contact .1-.2 in series does not change state.

When the button is **fully pressed, contact .1-.2 opens** and remains in this state until the button is released.
Contact .3-.4 in series does not change state.

In case of detachment of only the contact element and/or of the mounting adapter with contact element

If the contact LPXC01M detaches from the actuator due to **strong vibrations or shock,** the equipment can be restored to operating state only when proper mounting of the contact with the actuator is re-established resulting in **contact .3-.4 closing.**





Operational characteristics for auto-monitoring contact elements
- Snap onto LPXAU120M or LPXAU120 mounting adapters:
  - Up to 2 LPXC01M contacts can be installed on adapters exclusively on non-illuminated mushroom-head latch actuators with a maximum of 2 single contact elements
  - On the internal surface of LPZ... control station covers, up to 2 LPXC01M contacts with a maximum of 2 single contact elements
- Any mounting position allowed
- Max. tightening torque for screw terminals: 1Nm/8.8lb.in
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection: IP20.

General characteristics for auto-monitoring contact element
Wiping action and dual scraping-oscillating effect
IEC rated insulation voltage: 2500V
IEC rated thermal current Ith: 10A
Conductivity: 5V 1mA
UL/CSA and IEC/EN/BS 60947-5-1 designation: A300 Q300.

IEC/EN operational characteristics in AC15 category:

[V]	12	24	48	120	250
[A]	6	6	6	6	6

IEC/EN operational characteristics in DC13 category:

[V]	12	24	48	120	250
[A]	3.5	3.5	1.3	0.6	0.3

Short-circuit protection fuse: max calibre: 10A gG/SC.
Contact resistance: ≤20mΩ.
Terminals: Clamp screw with washer.

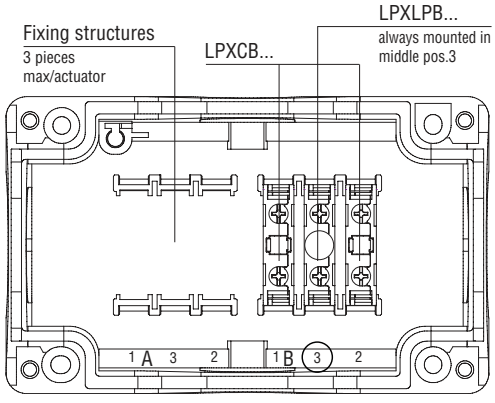
Contact elements, base mount on LPZP... control stations with screw terminals

LPXCB...

Order code	Function	Qty per pkg	Wt
		n°	[kg
Screw terminals. Direct snap-on mounting on LPZP... control station base.			
LPXCB10❶	NO❶	10	0.012
LPXCB01 ⊖	⊖ NC❷	10	0.012

❶ **Not suitable for push-push actuators.**
❷ Direct opening operation ⊖ in accordance with IEC/EN/BS 60947-5-1.

Mounting position on the LPZ... control station base



Operational characteristics for contacts elements for base mount on LPZP... control stations contact elements
Wiping action and dual scraping-oscillating effect
IEC rated insulation voltage: 690V
IEC rated thermal current Ith: 10A
Conductivity: 5V 1mA
UL/CSA and IEC/EN/BS 60947-5-1 designation: A600 Q600.

IEC/EN operational characteristics in AC15 category:

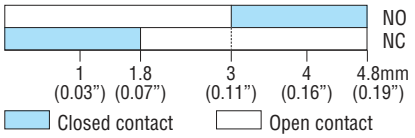
[V]	12	24	48	120	240	400	480	500	600
[A]	6	6	6	6	6	3	1.5	1.4	1.2

IEC/EN operational characteristics in DC13 category:

[V]	12	24	48	125	250	440	500	600
[A]	3	3	1.5	0.55	0.27	0.15	0.13	0.1

Short-circuit protection fuse: max calibre: 10A gG/SC.
Contact resistance: ≤20mΩ.
Terminals: clamp screw with washer.

Stroke of contact elements



Maximum conductor cross section
- Auto-monitoring contact: min. 1x0.75mm² or AWG18, max. 2x1,5mm² or AWG16.
- Contact elements, base mount on LPZP... control stations: min. 1x0,75mm² or AWG18, max. 2x2.5mm² or AWG14.

Mechanical and electrical endurance of contact elements
Opening force: ≤0.5kg/1.1lb
Electrical life: 1,000,000 cycles for LPXC10/01/20/02/11; 600,000 cycles for LPXC10A/01D.

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada, (cULus - File E93601), as Auxiliary Devices; EAC, CCC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

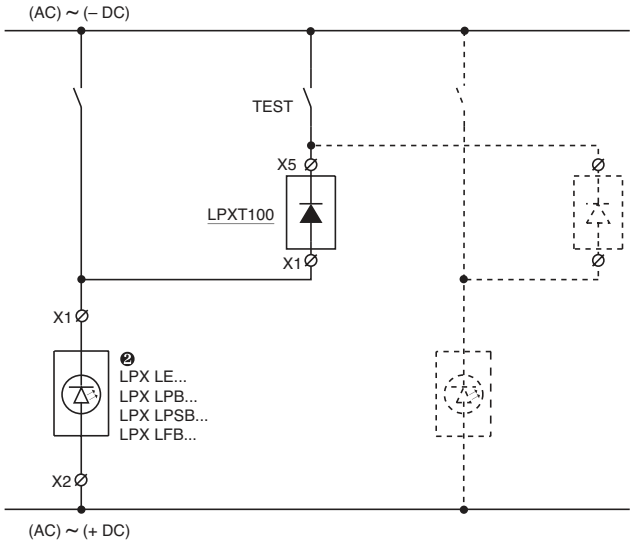
Test elements for steady light LED elements with screw terminals

LPXT...

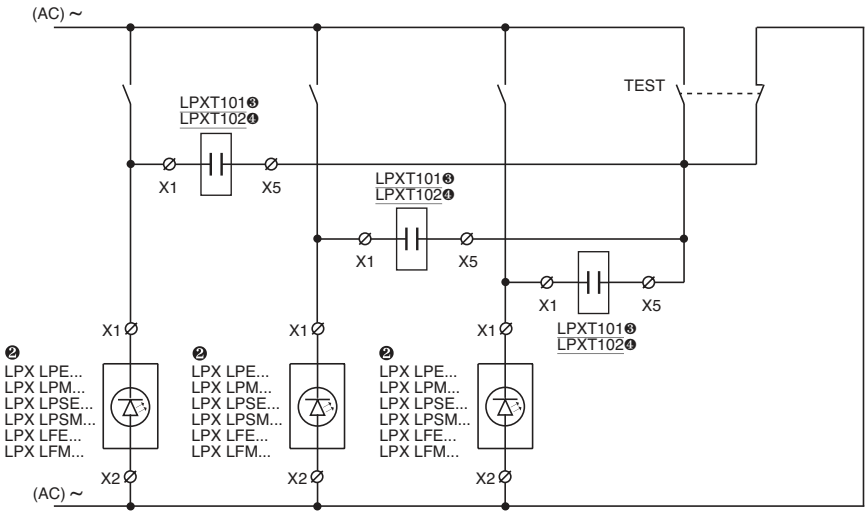
Order code	Description	Qty per pkg	Wt
		n°	[kg]
Screw terminals. Without mounting adapter.			
LPX T100❶❷	Use with LED elements in AC/DC, types LPXLE... (all), LPXLFB..., LPXLPB... and LPXLPSB...	10	0.011
LPX T101❷	Use with LED elements at 85-140VAC for types LPXLFE... LPXLPE... and LPXLPSE...	10	0.011
LPX T102❷	Use with LED elements at 185-265VAC for types LPXLFM..., LPXLPM... and LPXLPSM...	10	0.011

❶ Whenever test circuits include illuminated actuators connected with paralleled load, use two LPXT100 for each LED element.
❷ With DC supply only for LPXT100 type, the LED element works at full voltage and brightness while with AC supply for all LPXT... types, the LED element works at half voltage with reduced brightness level.

For LPXT100 test element



For LPXT101 and LPXT102 test elements



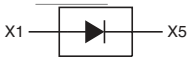
❸ Use with LPXLFE..., LPXLPE... or LPXLPSE... type.
❹ Use with LPXLFM..., LPXLPM... or LPXLPSM... type.

Operational characteristics
- Auxiliary supply voltage:
  - LPXT100 test element:
    - 12...30VAC/DC for LPXLEB/LFB/LPB/LPSB...
    - 85...140VAC/DC for LPXLEE...
    - 185...265VAC/DC for LPXLEM...
  - LPXT101 test element: 85...140VAC
  - LPXT102 test element: 185...265VAC
- For use with LED elements LPXLPBB/LPBE/LPBM... types, consult Technical support; see contact details on inside front cover
- Electrical life: 100,000 hours
- Any mounting position allowed
- Snap onto mounting adapter beside the LED element or stacked behind contact elements; also internally on the LPZ... control station cover
- Maximum tightening torque: 1Nm/8.8lb.in
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection: IP20.

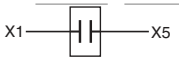
Mounting adapter
See page 8-38.
The mounting adapter directly snaps onto the actuator fixed to the mounting surface.

Maximum conductor cross section
1 or 2 2.5mm² or AWG 12 cables.

Wiring diargram
For LPXT100



For LPXT101 - LPXT102



Certifications and compliance
Certifications obtained: UL Listed for USA and Canada, (cULus - File E93601), as Auxiliary Devices; EAC, CCC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

LED elements steady light with screw terminals

LPXLP...

Total protection against overvoltages and stray currents in wiring, to reduce flickering phenomenon and withstand vibrations.

Order code	Rated supply voltage	LED colour	Qty per pkg.	Wt
	[V]		n°	[kg]
Steady light, screw terminals. Without mounting adapter.				
LPXLPB3	12...30V AC/DC	Green	10	0.016
LPXLPB4		Red	10	0.016
LPXLPB5		Yellow	10	0.016
LPXLPB6		Blue	10	0.016
LPXLPB8		White	10	0.016
LPXLPE3	85...140V AC	Green	10	0.016
LPXLPE4		Red	10	0.016
LPXLPE5		Yellow	10	0.016
LPXLPE6		Blue	10	0.016
LPXLPE8		White	10	0.016
LPXLPM3	185...265V AC	Verde	10	0.016
LPXLPM4		Red	10	0.016
LPXLPM5		Yellow	10	0.016
LPXLPM6		Blue	10	0.016
LPXLPM8		White	10	0.016

LPXLE...

Simple protection against overvoltages and to withstand vibrations.

Order code	Rated supply voltage	LED colour	Qty per pkg.	Wt
	[V]		n°	[kg]
Steady light, screw terminals. Without mounting adapter.				
LPXLEB3	12...30V AC/DC	Green	10	0.016
LPXLEB4		Red	10	0.016
LPXLEB5		Yellow	10	0.016
LPXLEB6		Blue	10	0.016
LPXLEB8		White	10	0.016
LPXLED3	30...60VAC/DC	Green	10	0.016
LPXLED4		Red	10	0.016
LPXLED5		Yellow	10	0.016
LPXLED6		Blue	10	0.016
LPXLED8		White	10	0.016
LPXLEE3	85...140V AC/DC	Green	10	0.016
LPXLEE4		Red	10	0.016
LPXLEE5		Yellow	10	0.016
LPXLEE6		Blue	10	0.016
LPXLEE8		White	10	0.016
LPXLEM3	185...265V AC/DC	Green	10	0.016
LPXLEM4		Red	10	0.016
LPXLEM5		Yellow	10	0.016
LPXLEM6		Blue	10	0.016
LPXLEM8		White	10	0.016

LED elements flashing light with screw terminals

LPXLF...

Total protection against overvoltages and stray currents in wiring, to reduce flickering phenomenon and withstand vibrations.

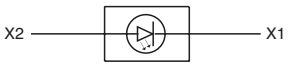
Order code	Rated supply voltage	LED colour	Qty per pkg.	Wt
	[V]		n°	[kg]
Flashing light, screw terminals. Without mounting adapter.				
LPXLFB3	18...30V AC/DC	Green	10	0.016
LPXLFB4		Red	10	0.016
LPXLFB5		Yellow	10	0.016
LPXLFB6		Blue	10	0.016
LPXLFB8		White	10	0.016
LPXLFE3	85...140V AC	Green	10	0.016
LPXLFE4		Red	10	0.016
LPXLFE5		Yellow	10	0.016
LPXLFE6		Blue	10	0.016
LPXLFE8		White	10	0.016
LPXLFM3	185...265V AC	Green	10	0.016
LPXLFM4		Red	10	0.016
LPXLFM5		Yellow	10	0.016
LPXLFM6		Blue	10	0.016
LPXLFM8		White	10	0.016

Operational characteristics
- Rated frequency: 50-60Hz
- Auxiliary supply voltage:
  - LPXLP...: 12...30VAC/DC; 85...140VAC; 185...265VAC
  - LPXLE...: 12...30VAC/DC; 30...60VAC/DC; 85...140VAC/DC; 185...265VAC/DC
  - LPXLF...: 18...30VAC/DC; 85...140VAC, 185...265VAC
- Maximum consumption:
  - LPXLP...: 17mA-0.50W (12...30VAC/DC); 20mA-0.40W (85...140VAC); 18mA-0.55W (185...265VAC)
  - LPXLE...: 11mA-0.33W (12...30VAC/DC); 10.5mA-0.63W (30...60VAC/DC); 5mA-0.72W (85...140VAC/DC); 3mA-0.67W (185...265VAC/DC)
  - LPXLF...: 17mA-0.50W (12...30VAC/DC); 20mA-0.40W (85...140VAC); 18mA-0.55W (185...265VAC)
- Total protection for LPXLP... and LPXLF... types:
  - Against overvoltages
  - Against stray currents in wiring
  - To reduce flickering phenomenon
  - To withstand vibrations
- Simple protection for LPXLE... types:
  - Against overvoltages
  - To withstand vibrations
- Minimum activation voltage:
  - LPXLP...: 4V-1mA (12...30VAC/DC); 30V-4mA (85...140VAC); 55V-4mA (185...265VAC)
  - LPXLE...: 4V-0.5mA (12...30VAC/DC); 7V-1mA (30...60VAC/DC); 15V-0.4mA (85...140VAC/DC); 35V-0.3mA (185...265VAC/DC)
  - LPXLF...: 5V-1.5mA (18...30VAC/DC); 13V-1.5mA (85...140VAC); 25V-1.5mA (185...265VAC)
- Electrical life: 100,000 hours
- Snap onto LPXAU120M or LPXAU120 mounting adapter in the middle position for each illuminated actuator, also internally on the LPZ... control station cover
- No other element can be stacked behind LED elements
- Any mounting position allowed
- Maximum tightening torque: 1Nm/8.8lb.in
- Ambient conditions:
  - Operating temperature: -25...+70°C (-25...+60°C for LPXLE...)
  - Storage temperature: -40...+85°C
- Degree of protection: IP20.

Mounting adapter
See page 8-38.
The mounting adapter directly snaps onto the actuator fixed to the mounting surface.

Maximum conductor cross section
1 or 2 2.5mm² or AWG12 cables.

Wiring diagram



Certifications and compliance
Certifications obtained: UL Listed for USA and Canada, (cULus - File E93601), as Auxiliary Devices; EAC, CCC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

LED elements steady light with spring-clamp terminals

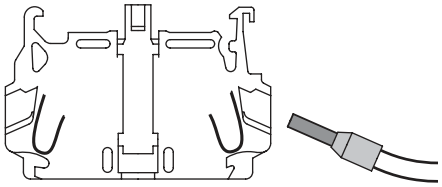
LPXLPS...

Total protection against overvoltages and stray currents in wiring, to reduce flickering phenomenon and withstand vibrations.

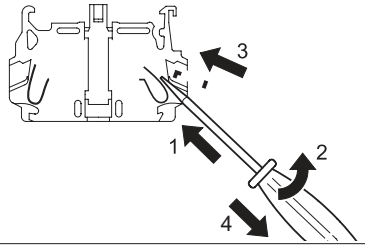
Order code	Rated supply voltage	LED colour	Qty per pkg.	Wt
	[V]		n°	[kg]
Steady light, with spring-clamp terminals. Without mounting adapter.				
LPXLPSB3	12...30VAC/DC	Green	10	0.015
LPXLPSB4		Red	10	0.015
LPXLPSB5		Yellow	10	0.015
LPXLPSB6		Blue	10	0.015
LPXLPSB8		White	10	0.015
LPXLPSE3	85...140VAC	Green	10	0.015
LPXLPSE4		Red	10	0.015
LPXLPSE5		Yellow	10	0.015
LPXLPSE6		Blue	10	0.015
LPXLPSE8		White	10	0.015
LPXLPSM3	185...265VAC	Green	10	0.015
LPXLPSM4		Red	10	0.015
LPXLPSM5		Yellow	10	0.015
LPXLPSM6		Blue	10	0.015
LPXLPSM8		White	10	0.015

Push-in wiring technology for rigid cables or with ferrules only - no screwdriver needed
Cable retaining force guaranteed over time even in presence of vibrations and/or impacts

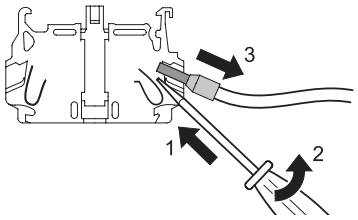
Push-in technology



Wiring with flat-blade screwdriver
(for flexible bare cable without terminal)



Cable removal
(always using flat-blade screwdriver)

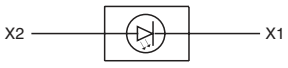


Operational characteristics
- Any mounting position allowed
- Elements snap onto adapter, also internally on LPZ... control station cover (in middle position) per actuator
- No other element can be stacked behind LED elements
- See the combinations given under “Contact elements” in the right-hand column for each type of pushbutton and selector switch
- Suitable for applications with vibration and/or impact work conditions; cable retaining force guaranteed over time in these conditions
- For use with the test elements, see page 8-42
- Wiring also possible after installation with stacked contacts
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection: IP20.

Mounting adapter
See page 8-38.
The mounting adapter directly snaps onto the actuator fixed to the mounting surface.

General characteristics
- Rated frequency: 50-60Hz
- Auxiliary supply voltage: 12...30VAC/DC; 85...140VAC; 185...265VAC
- Maximum consumption: 17mA-0.50W (12...30VAC/DC); 20mA-0.40W (85...140VAC); 18mA-0.55W (185...265VAC)
- Total protection:
  - Against overvoltages
  - Against stray currents in wiring
  - To reduce flickering phenomenon
  - To withstand vibrations
- Minimum activation voltage: 4V-1mA (12...30VAC/DC); 30V-4mA (85...140VAC); 55V-4mA (185...265VAC)
- Electrical life: 100,000 hours.

Wiring diagram for LED elements



Maximum conductor cross section
1 or 2 2.5mm² or AWG14 cables. For 2.5mm² section, use rounded cable terminal with metal end at least 10mm.

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada, (cULus - File E93601), as Auxiliary Devices; EAC, CCC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

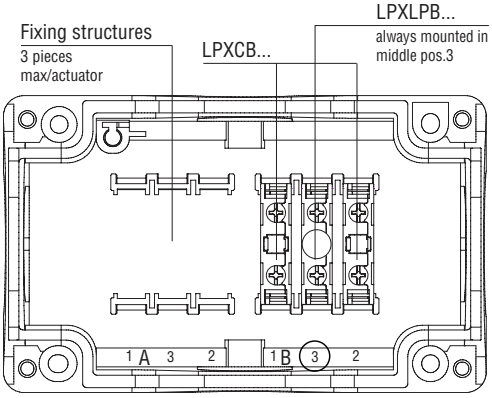
LED elements, steady light base mount on LPZP... control stations with screw terminals

LPXLPB...

Total protection against overvoltages and stray currents in wiring, to reduce flickering phenomenon and withstand vibrations.

Order code	Rated supply voltage	LED colour	Qty per pkg.	Wt
	[V]		n°	[kg]
Screw terminals. Steady light. Direct snap-on mounting on LPZ... control station base.				
LPXLPBB3	12...30V AC/DC	Green	10	0.016
LPXLPBB4		Red	10	0.016
LPXLPBB5		Yellow	10	0.016
LPXLPBB6		Blue	10	0.016
LPXLPBB8		White	10	0.016
LPXLPBE3	85...140V AC	Green	10	0.016
LPXLPBE4		Red	10	0.016
LPXLPBE5		Yellow	10	0.016
LPXLPBE6		Blue	10	0.016
LPXLPBE8		White	10	0.016
LPXLPBM3	185...265V AC	Green	10	0.016
LPXLPBM4		Red	10	0.016
LPXLPBM5		Yellow	10	0.016
LPXLPBM6		Blue	10	0.016
LPXLPBM8		White	10	0.016

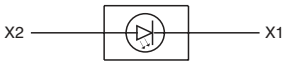
Mounting position on the LPZ... control station base



Operational characteristics
- Any mounting position allowed
- Snap-on mounting into fixing structures of LPZ... control station base (in middle pos. 3) for each actuator
- See the combinations given under “Contact elements” in the right-hand column for each type of pushbutton and selector switch
- For use with test elements, consult Technical support; see contact details on inside front cover
- Maximum tightening torque for screw terminals: 1Nm/8.8lb.in
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection: IP20.

General characteristics
- Rated frequency: 50...60Hz
- Auxiliary supply voltage: 12...30VAC/DC; 85...140VAC; 185...265VAC
- Maximum consumption: 17mA-0.50W (12...30VAC/DC); 20mA-0.40W (85...140VAC); 18mA-0.55W (185...265VAC)
- Total protection:
  - Against overvoltages
  - Against stray currents in wiring
  - To reduce flickering phenomenon
  - To withstand vibrations
- Minimum activation voltage:
  - steady light LPXLPB.....: 4V-1mA (12...30VAC/DC); 30V-4mA (85...140VAC); 55V-4mA (185...265VAC)
- Electrical life: 100,000 hours.

Wiring diagram for LED elements



Maximum conductor cross section
1 or 2 2.5mm² or AWG14 cables.

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada, (cULus - File E93601), as Auxiliary Devices; EAC, CCC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.

Accessories and spare parts for Ø22mm metal LPS... actuators

LPSXB0

LPXA162M

LPXA130

LPXA130B

LPXDIN

LPXAU138

LPXAU158

LPXAU159

LPXA185

LPXAU170

LPXAU100 LPXAU105

LPXAU108 LPXAU109

Order code	Description	Qty pkg	Wt
		n°	[kg]
LPSXB0❶	Flush or extended spring return actuator with no cap	5	0.013
LPSXB3❶	Shrouded spring return actuator with no cap	5	0.014
LPSXQ0❶	Flush or extended push-push actuator with no cap	5	0.013
LPSXQL0❶	Illuminated flush or extended push-push actuator with no lens	5	0.013
LPXA161M	Adapter for Ø30mm/1.18" holes to Ø22mm/0.87" for mushroom actuators	5	0.030
LPXA162M	Adapter for Ø30mm/1.18" holes to Ø22mm/0.87" for pushbuttons and selector switches	5	0.030
LPSXA127	Transparent diffuser for double-touch buttons	5	0.001
LPXA130	Threaded plug for unused drilled holes (grey)	10	0.007
LPXA130B	Threaded plug for unused drilled holes (black)	10	0.007
LPXDIN	Adapter for mounting buttons on DIN rail 35mm/ 1.38" wide (2 modules)	10	0.008
LPXA150	Rod for mechanical reset button (l=150mm/5.90")	10	0.006
Protections.			
LPXAU13❸❹	Rubber boot for flush buttons	10	0.006
LPXAU14❸❹	Rubber boot for extended buttons	10	0.009
LPXAU157	Rubber boot for double and triple-touch buttons (transpar.)	10	0.007
LPXAU167❹❺	Rubber boot for mushroom head buttons, LPSB63/B66/ B67/BL66... (transparent)	10	0.012
LPXAU158❹❻	Padlockable protection, Ø5-8mm/0.2-0.31" locks for buttons LPSB66/B67/B68/ BL664...; for LSCB634... Ø5-6mm/0.2-0.24" locks only	10	0.005
LPXAU159❹❻	Shroud for buttons LPB63/66/67/68/BL666...	10	0.010
LPXAU170	Sealable protection cover for Ø22mm/0.87" metal buttons	5	0.015
LPXAU171	Sealable protection cover with spring closure for metal pushbuttons Ø22mm/0.87"	5	0.016
LPXA185	Yellow shroud for selectors	10	0.004
Label holders and labels. ❼			
LPXAU100	Label holder for LPXAU109 and LPXAU203 labels	50	0.001
LPXAU203	Blank label for writing	50	0.001
LPXAU109	Engravable silver plastic label to use with LPXAU100 holder	50	0.002
LPXAU105	Label holder for LPXAU108 plastic labels	50	0.003
LPXAU108	Engravable silver plastic label to use with LPXAU105 holder	50	0.002
LPXAU102❷	Legend holder for LPXAU202 paper or LPXAU201 plastic labels	50	0.003
LPXAU202	Blank paper label for writing for LPXAU102	50	0.002
LPXAU200	Transparent protection for LPXAU202 label	50	0.001
LPXAU201	Blank plastic label for engraving for LPXAU102	50	0.002

General characteristics
LABEL DIMENSIONS
- LPXAU108: 26.5x15mm/1.04x0.59"
- LPXAU109: 27.5x12.1mm/1.08x0.48"
- LPXAU202: 27.5x15.1mm/1.08x0.59"
- LPXAU201: 27.5x15.1mm/1.08x0.59"
- LPXAU203: 27.5x12.1mm/1.08x0.48"

❶ For actuators caps and lenses see page 8-49.
❷ The use of the LPXAU102 label holder with LPS... actuators does not guarantee the IP65 degree of protection.
❸ For flush and extended push buttons, complete the order code by adding the digit of the required colour:
2 (black); 3 (green); 4 (red); 5 (yellow); 6 (blue); 7 (transparent); 8 (white).
For illuminated push buttons, add only digit 7 (transparent).
❹ Cannot be used when LPXAU100, LPXAU105 or LPXAU102 is fitted.
❺ Cannot be used when LPXAU158 is fitted.
❻ Cannot be used when LPXAU167 is fitted.
❼ For labels with text see page 8-50.

Accessories and spare parts for Ø30mm flat metal LPF... actuators

LPFXB0

LPFXAU00

LPFXAU100

LPFXAU105

LPFXAU100G

LPFXAU105G

Order code	Description	Qty pkg	Wt
		n°	[kg]
LPFXB0❶	Flush or extended spring return actuator with no cap	5	0.013
LPFXQ0❶	Flush or extended push-push actuator with no cap	5	0.013
LPFXQL0❶	Illuminated flush or extended push-push actuator with no cap	5	0.013
LPFXAU00	Metal adapter for actuator fixing	5	0.002
LPFXA130	Threaded plug for unused drilled holes (black)	5	0.007
Label holders and labels. ❷			
LPFXAU100	Label holder for LPXAU109 and LPXAU203 labels (black)	5	0.004
LPFXAU100G	Label holder for LPXAU109 and LPXAU203 labels (grey)	5	0.004
LPXAU203	Blank label for writing	50	0.001
LPFXAU105	Label holder for LPXAU108 plastic labels (black)	5	0.005
LPFXAU105G	Label holder for LPXAU108 plastic labels (grey)	5	0.005
LPXAU109	Engravable silver plastic label to use with LPXAU100 holder	50	0.002
LPXAU108	Engravable silver plastic label to use with LPXAU105 holder	50	0.002

General characteristics
LABEL DIMENSIONS
- LPXAU108: 26.5x15mm/1.04x0.59”
- LPXAU109: 27.5x12.1mm/1.08x0.48”
- LPXAU202: 27.5x15.1mm/1.08x0.59”
- LPXAU201: 27.5x15.1mm/1.08x0.59”
- LPXAU203: 27.5x12.1mm/1.08x0.48”

❶ For actuators caps and lenses see page 8-49.
❷ For labels with text see page 8-50.

Accessories and spare parts for Ø22mm chromed plastic LPC... actuators

LPXB0 LPXA162

LPXA200

LPXAU00 LPXAU01

LPXA130 LPXA130B

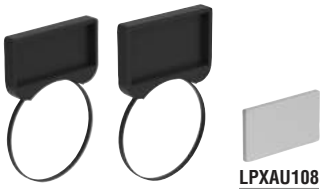
LPXDIN

LPXAU138 LPXAU158

LPXAU159

LPXA185

LPXAU170 LPXAU171


LPXAU100 LPXAU105 LPXAU108 LPXAU109

Order code	Description	Qty pkg	Wt
		n°	[kg]
LPXB0❶	Flush or extended spring return actuator with no cap	10	0.013
LPXB3❶	Shrouded spring return actuator with no cap	10	0.014
LPXQ0❶	Flush or extended push-push actuator with no cap	10	0.013
LPXQL0❶	Illuminated flush or extended push-push actuator with no lens	10	0.013
LPXA161	Adapter for Ø30mm/1.18" holes to Ø22mm/0.87" for mushroom actuators	5	0.018
LPXA162	Adapter for Ø30mm/1.18" holes to Ø22mm/0.87" for pushbuttons and selector switches	5	0.030
LPXA200	Socket spanner/wrench for fixing ring fitting	1	0.003
LPXA127	Transparent diffuser for double-touch buttons	10	0.001
LPXAU00	Plastic threaded ring for actuator fixing	20	0.002
LPXAU01	Metallic threaded ring for actuator fixing	20	0.015
LPXA130	Threaded plug for unused drilled holes (grey)	10	0.007
LPXA130B	Threaded plug for unused drilled holes (black)	10	0.007
LPXDIN	Adapter for mounting buttons on DIN rail 35mm/1.38" wide (2 modules)	10	0.008
LPXA150	Rod for mechanical reset button (l=150mm/5.90")	10	0.006
Protections.			
LPXAU13❸❹	Rubber boot for flush buttons	10	0.006
LPXAU14❸❹	Rubber boot for extended buttons	10	0.009
LPXAU157	Rubber boot for double and triple-touch buttons (transpar.)	10	0.007
LPXAU167❹❺	Rubber boot for mushroom head buttons, LPCB63/B66/ B67/BL66... (transparent)	10	0.012
LPXAU158❹❻	Padlockable protection, Ø5-8mm/0.2-0.31" locks for buttons LPCB66/B67/B68/ BL664...; for LPCB634... Ø5-6mm/0.2-0.24" locks only	10	0.005
LPXAU159❹❻	Shroud for buttons LPCB63/66/67/68/BL666...	10	0.010
LPXA185	Yellow shroud for selectors	10	0.004
LPXAU170	Sealable protection cover for Ø22mm/0.87" plastic buttons	5	0.015
LPXAU171	Sealable protection cover with spring closure for plastic pushbuttons Ø22mm/0.87"	5	0.018
Label holders and labels. ❼			
LPXAU100	Label holder for LPXAU109 and LPXAU203 labels	50	0.001
LPXAU203	Blank label for writing	50	0.001
LPXAU109	Engravable silver plastic label to use with LPXAU100 holder	50	0.002
LPXAU105	Label holder for LPXAU108 plastic labels	50	0.003
LPXAU108	Engravable silver plastic label to use with LPXAU105 holder	50	0.002
LPXAU102❷	Legend holder for LPXAU202 or LPXAU201 labels	50	0.003
LPXAU202	Blank paper label for writing for LPXAU102	50	0.002
LPXAU200	Transparent protection for LPXAU202 label	50	0.001
LPXAU201	Blank plastic label for engraving for LPXAU102	50	0.002

General characteristics
LABEL DIMENSIONS
- LPXAU108: 26.5x15mm/1.04x0.59"
- LPXAU109: 27.5x12.1mm/1.08x0.48"
- LPXAU202: 27.5x15.1mm/1.08x0.59"
- LPXAU201: 27.5x15.1mm/1.08x0.59"
- LPXAU203: 27.5x12.1mm/1.08x0.48".

❶ For actuators caps and lenses see page 8-49.
❷ The use of the LPXAU102 label holder with LPC... actuators does not guarantee the IP65 degree of protection.
❸ For flush and extended push buttons, complete the order code by adding the digit of the required colour:
2 (black); 3 (green); 4 (red); 5 (yellow); 6 (blue); 7 (transparent); 8 (white).
For illuminated push buttons, add only digit 7 (transparent).
❹ Cannot be used when LPXAU100, LPXAU105 or LPXAU102 is fitted.
❺ Cannot be used when LPXAU158 is fitted.
❻ Cannot be used when LPXAU167 is fitted.
❼ For labels with text see page 8-50.

Accessories and spare parts for Ø30mm flat metal actuators, Ø22mm metal and chromed plastic actuators

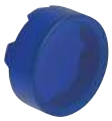
LPXA140

LPXA170...

LPXB104

LPXBL105

LPXB203



LPXBL206

Order code	Description	Qty per pkg	Wt
		n°	[kg]
LPXA140	Action plug for centre contact	50	0.001
LPXA170	Spare standard key set for selector switches or mushroom-head buttons, key code n° 455	10	0.008
LPX A170R❶	Spare key set for selector switches or mushroom head buttons	1	0.008
Flush cap for spring return and push-push actuators.			
LPXB102	Black	10	0.002
LPXB103	Green	10	0.002
LPXB104	Red	10	0.002
LPXB105	Yellow	10	0.002
LPXB106	Blue	10	0.002
LPXB108	White	10	0.002
Extended cap for spring return and push-push actuators.			
LPXB202	Black	10	0.003
LPXB203	Green	10	0.003
LPXB204	Red	10	0.003
LPXB205	Yellow	10	0.003
LPXB206	Blue	10	0.003
LPXB208	White	10	0.003
Flush lens for illuminated spring return and push-push actuators.			
LPXBL103	Green	10	0.002
LPXBL104	Red	10	0.002
LPXBL105	Yellow	10	0.002
LPXBL106	Blue	10	0.002
LPXBL107	Transparent	10	0.002
Extended lens for illuminated spring return and push-push actuators.			
LPXBL203	Green	10	0.003
LPXBL204	Red	10	0.003
LPXBL205	Yellow	10	0.003
LPXBL206	Blue	10	0.003
LPXBL207	Transparent	10	0.003

❶ Versions with different key code. Complete with the numeric code of the key. The following versions are available: 421E, 520E, 3433E, 621E, 622E. Example of complete code: LPXA170R421E.

Labels with text for LPXAU100 and LPFXAU100... legend holders

LPXAGB220

LPXAGB221

LPXAGB212

LPXAGB211

LPXAGB204

Order code	Text	Qty per pkg	Wt
		n°	[kg]
International labels for pushbuttons and selector switches.			
LPXAGB200	O	50	0.001
LPXAGB201	I	50	0.001
LPXAGB202	II	50	0.001
LPXAGB203	O-I	50	0.001
LPXAGB204	I-II	50	0.001
LPXAGB205	I-O-II	50	0.001
Labels for selector switches.			
LPXAGB210	OFF-ON	50	0.001
LPXAGB211	STOP-START	50	0.001
LPXAE211	PAR-MAR	50	0.001
LPXAGB212	AUTO-MAN	50	0.001
LPXAGB213	MAN-AUTO	50	0.001
LPXAGB214	AUTO-O-MAN	50	0.001
LPXAGB215	MAN-O-AUTO	50	0.001
LPXAGB216	REV-O-FWD	50	0.001
LPXAI216	AV.-O-IND.	50	0.001
Labels for general use.			
LPXAGB220	START	50	0.001
LPXAI220	MARCIA	50	0.001
LPXAE220	MARCHA	50	0.001
LPXAGB221	STOP	50	0.001
LPXAI221	ARRESTO	50	0.001
LPXAE221	PARADA	50	0.001
LPXAGB222	RESET	50	0.001
LPXAE222	REARME	50	0.001
LPXAGB223	EMERGENCY	50	0.001
LPXAI223	EMERGENZA	50	0.001
LPXAE223	EMERGENCIA	50	0.001
LPXAGB224	ON	50	0.001
LPXAI224	IN SERVIZIO	50	0.001
LPXAE224	EN SERVICIO	50	0.001
LPXAGB225	POWER ON	50	0.001
LPXAI225	PRESENZA TENSIONE	50	0.001
LPXAGB226	OFF	50	0.001
LPXAGB227	FORWARD	50	0.001
LPXAI227	AVANTI	50	0.001
LPXAGB228	REVERSE	50	0.001
LPXAI228	INDIETRO	50	0.001
LPXAGB229	OPEN	50	0.001
LPXAI229	APERTURA	50	0.001
LPXAGB230	CLOSE	50	0.001
LPXAI230	CHIUSURA	50	0.001
LPXAGB231	RAISE	50	0.001
LPXAI231	SALITA	50	0.001
LPXAE231	SUBIDA	50	0.001
LPXAGB232	LOWER	50	0.001
LPXAI232	DISCESA	50	0.001
LPXAE232	BAJADA	50	0.001
LPXAI233	INTERVENTO TERMICO	50	0.001
LPXAGB234	FAULT	50	0.001
LPXAI235	DISINSERITO	50	0.001
LPXAGB236	LOCK	50	0.001
LPXAGB237	LEFT	50	0.001
LPXAGB238	MAN-AUTO	50	0.001
Blank or with customized text labels.			
LPXAU207❶	Sheet with 108 labels for laser printing	1	0.005
LPXAU208❶❷	Sheet with 108 customized text	1	0.005

❶ Recommended use with LPXAU109 label.
❷ Complete code with required label text (es. LPXAU208STOP).

General characteristics
The labels have indelible scratch-proof black lettering on metalised grey polycarbonate background (adhesive).
All LPXA...2... labels have the following dimensions: 27.5x12.1mm/1.08x0.48".

Special versions
Labels in different languages are available.
Consult Technical support; see contact details on inside front cover.

Plastic disks and adhesive labels for Ø22mm mushroom head pushbuttons

LPXAU114

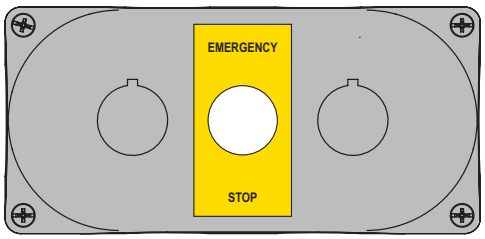
LPXAU113

LPXAU110

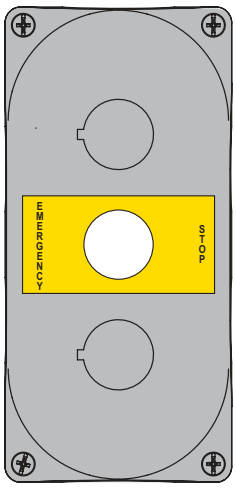
Order code	Text	Qty per pkg	Wt
		n°	[kg]
Ø60mm/2.4" plastic disks.			
LPXAU111	Blank	10	0.005
LPXAU115	EMERGENCY STOP	10	0.003
LPXAU114	EMERGENZA ARRESTO	10	0.003
LPXAU118	ARRET D'URGENCE / NOT-AUS / PARO EMERGENCIA	10	0.003
LPXAU123	IEC60417-5638 symbol according to ISO 13850	10	0.005
Ø90mm/3.5" plastic disks.			
LPXAU113	EMERGENCY STOP	10	0.005
LPXAU112	EMERGENZA ARRESTO	10	0.005
LPXAU124	IEC60417-5638 symbol according to ISO 13850	10	0.005
Adhesive labels.			
LPXAU110	Vertical EMERGENCY STOP (31x61mm/1.22x2.40") for LP...B63/663/664/ 67/68/BL66... buttons and LPZP... control stations	10	0.001
LPXAU110H	Horizontal EMERGENCY STOP (31x61mm/1.22x2.40") for LP...B63/663/664/ 67/68/BL66... buttons and LPZP... control stations	10	0.001
LPXAU110N	Blank (31x61mm/1.22x2.40") for LP...B63/663/664/ 67/68/BL66... buttons and LPZP... control stations	10	0.001

General characteristics
The disks are made of non-adhesive plastic.
Plastic disks cannot be used with LPXAU158 and LPXAU159 protection.

LPXAU110 applied to LPZP...



LPXAU110H applied to LPZP...



Ø60mm emergency illuminated plastic disk for Ø22mm mushroom head pushbuttons

LPXDAU115...

Order code	Text	Qty per pkg	Wt
		n°	[kg]
24VAC/DC auxiliary supply.			
LPXDAU111024	Blank disk	1	0.022
LPXDAU115024	EMERGENCY STOP	1	0.022
LPXDAU114024	EMERGENZA ARRESTO	1	0.022
LPXDAU118024	ARRET D'URGENCE / NOT AUS / PARO EMERGENCIA	1	0.022
LPXDAU123024	IEC60417-5638 symbol according to ISO 13850	1	0.022
110...120VAC auxiliary supply.			
LPXDAU111110	Blank disk	1	0.022
LPXDAU115110	EMERGENCY STOP	1	0.022
LPXDAU114110	EMERGENZA ARRESTO	1	0.022
LPXDAU118110	ARRET D'URGENCE / NOT AUS / PARO EMERGENCIA	1	0.022
LPXDAU123110	IEC60417-5638 symbol according to ISO 13850	1	0.022
220...240VAC auxiliary supply.			
LPXDAU111230	Blank disk	1	0.022
LPXDAU115230	EMERGENCY STOP	1	0.022
LPXDAU114230	EMERGENZA ARRESTO	1	0.022
LPXDAU118230	ARRET D'URGENCE / NOT AUS / PARO EMERGENCIA	1	0.022
LPXDAU123230	IEC60417-5638 symbol according to ISO 13850	1	0.022

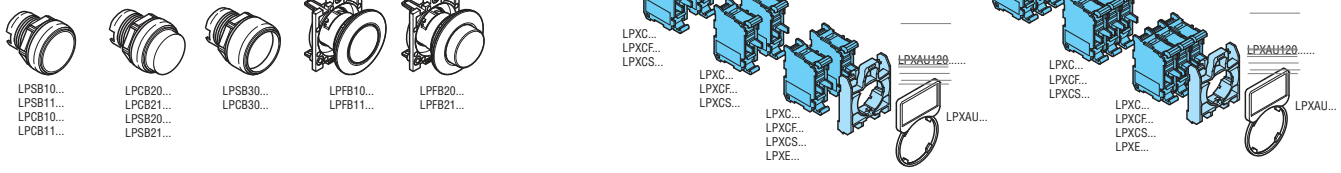
General characteristics
The main function of the illuminated plastic disk is to make the emergency button more identifiable by ensuring its operation in conditions of low visibility.
The illuminated plastic disks integrate two light functions: steady or flashing. The function choice depends on the wiring. They are suitable for use with Ø22mm plastic chrome LPC actuators and Ø22mm metallic LPS actuators.

Operational characteristics
- Auxiliary supply voltage: 24VAC/DC, 110...120VAC or 220...240VAC
- Rated frequency: 50/60Hz
- Electrical life: >30,000 hours
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: type 1, 2, 3R, 4, 4X, 12, 12K.

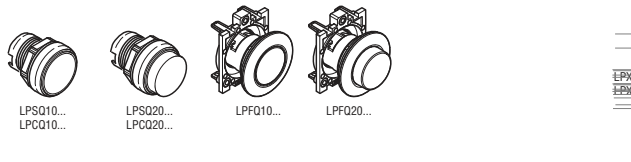
Certifications and compliance
Certifications: cULus obtained for LPXDAU...024, pending for LPXDAU...110 and LPXDAU...230.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n°14.

COMBINATIONS FOR PUSHBUTTONS AND SELECTOR SWITCHES

SPRING RETURN BUTTONS

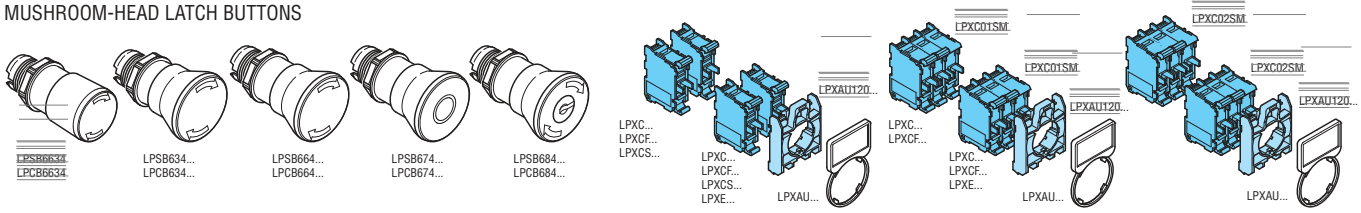


PUSH-PUSH BUTTONS



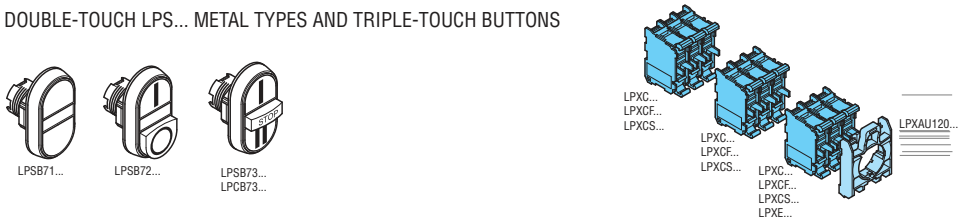
MUSHROOM-HEAD SPRING RETURN BUTTONS

MUSHROOM-HEAD LATCH BUTTONS

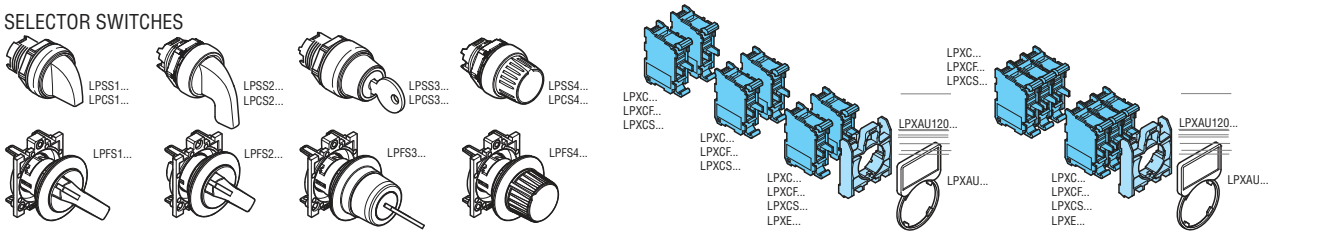


DOUBLE-TOUCH BUTTONS LPC... CHROMED PLASTIC TYPES

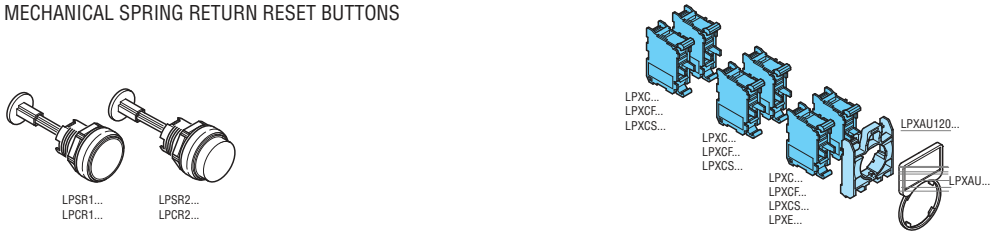
DOUBLE-TOUCH LPS... METAL TYPES AND TRIPLE-TOUCH BUTTONS



SELECTOR SWITCHES

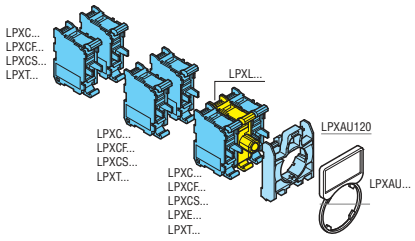


MECHANICAL SPRING RETURN RESET BUTTONS

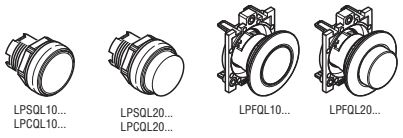


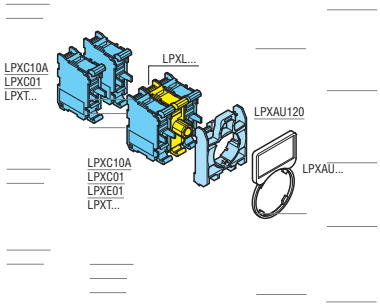
COMBINATIONS FOR ILLUMINATED PUSHBUTTONS AND SELECTOR SWITCHES

SPRING RETURN BUTTONS

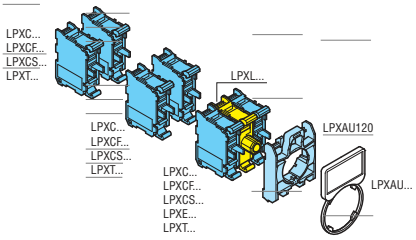


PUSH-PUSH BUTTONS

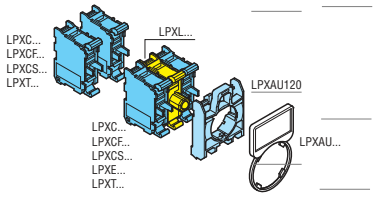




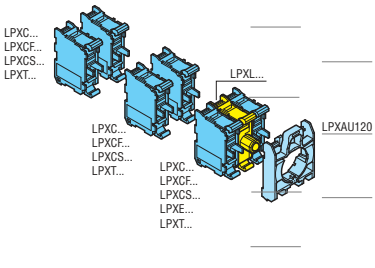
MUSHROOM-HEAD SPRING RETURN BUTTON



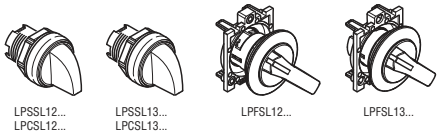
MUSHROOM-HEAD LATCH BUTTON

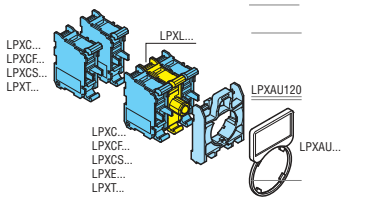


DOUBLE-TOUCH BUTTONS



2 AND 3 POSITION SELECTOR SWITCHES





Without actuators

LPZP1A5

new

LPZP1A5P

LPZP1A5D

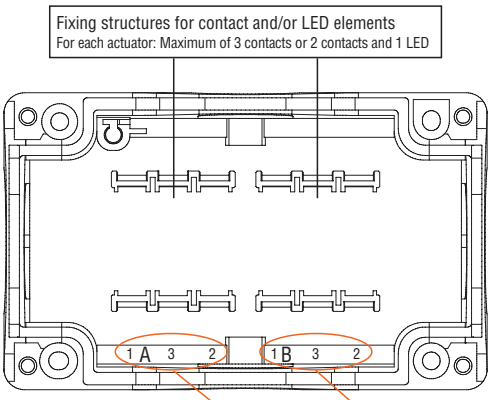
LPZP1A8P

LPZP2A5

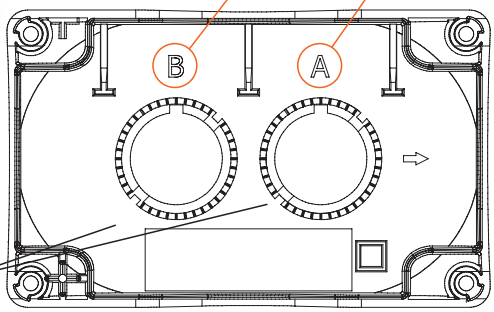
LPZP3A8

Order code	Description	Cover colour	Qty per pkg	Wt
			n°	[kg]
LPZP1A5	For 1 actuator	Yellow	1	0.107
LPZP1A5P	For 1 actuator with shroud	Yellow	1	0.127
LPZP1A5D	For 1 actuator for use with illuminated disk LPXDAU...	Yellow	1	0.127
LPZP1A8P	For 1 actuator with shroud	Grey	1	0.127
LPZP2A5	For 2 actuators	Yellow	1	0.152
LPZP2A8	For 2 actuators	Grey	1	0.152
LPZP3A8	For 3 actuators	Grey	1	0.187
LPZP4A8	For 4 actuators	Grey	1	0.200
LPZP5A8	For 5 actuators	Grey	1	0.240
LPZP6A8	For 6 actuators	Grey	1	0.290

Control station base



Control station cover (inside view)



Anti-loosening action
Anti-rotation indents to extend fixing ring gripping over time

Accessories

LPZXP5

LPZXP8

LPXP01

Order code	Description	Qty per pkg	Wt
		n°	[kg]
LPZXP5	4-piece set yellow screw protection caps	1	0.004
LPZXP8	4-piece set grey screw protection caps	1	0.004
LPXP01	M20 cable gland for LPZP... control stations	50	0.012

General characteristics

CONTROL STATIONS WITHOUT ACTUATOR
- 1 to 6 holes
- Compact dimensions
- Easy wiring for base-mount contact and LED elements; possible use of screw and spring-clamp terminal contact or LED elements on the inside surface of the cover using mounting adapter
- Numerous cable entries.

Operational characteristics
- Cable entry:
  - LPZP1... knockouts:
    - M16/PG11 (1 at rear and 1 on left side)
    - M20/M25/PG13.5/PG16 (1 each on top and bottom)
  - LPZP2... knockouts:
    - M16/PG11 (2 at rear)
    - M20/PG13.5 (1 on each side)
    - M20/M25/PG13.5/PG16 (1 each on top and bottom)
  - LPZP3/P4/P5/P6 A8 knockouts:
    - M16/PG11 (2 at rear)
    - M20/PG13.5 (2 on each side)
    - M20/M25/PG13.5/PG16 (1 each on top and bottom)
- Any mounting position allowed
- Tightening torque of cover screws Tmax = 1.8Nm/16lb.in
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4,4X, 12K.

Materials

Polycarbonate.

Certifications and compliance

Certifications obtained: UL Listed for USA and Canada, (cULus - File E93601), as Auxiliary Devices; EAC, CCC, RINA. Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508A for types without actuators / UL508 for types complete with actuator, CSA C22.2 n° 14.

With 1 actuator

LPZP1B8100

LPZP1B8101

LPZP1B8102

LPZP1B8103

LPZP1B8104

LPZP1B8105

Order code	Description	Contacts config.	Qty per pkg	Wt
			n°	[kg]
Grey control station.				
LPZP1B8100	Green spring return flush pushbutton with “I” symbol	1NO	1	0.145
LPZP1B8101	Green spring return flush pushbutton with “START” symbol	1NO	1	0.145
LPZP1B8102	Red spring return flush pushbutton with “0” symbol	1NC	1	0.145
LPZP1B8103	Red spring return flush pushbutton with “STOP” symbol	1NC	1	0.145
LPZP1B8104	Red spring return extended pushbutton with “0” symbol	1NC	1	0.146
LPZP1B8105	Red spring return extended pushbutton with “STOP” symbol	1NC	1	0.147

LPZP1B8300

LPZP1B8301

LPZP1B8302

LPZP1B8303

Order code	Description	Contacts config.	Qty per pkg	Wt
			n°	[kg]
Grey control station.				
LPZP1B8300	Selector switch lever, 2 position with label “0-I”	1NO	1	0.150
LPZP1B8301	Selector switch key, 2 position with label “0-I”	1NO	1	0.179
LPZP1B8302	Selector switch key, 2 position with label “0-I”	1NO+ 1NC	1	0.189
LPZP1B8303	Selector switch lever, 3 position with label “I-0-II”	2NO	1	0.160

General characteristics
- Compact dimensions
- Easy wiring
- Numerous cable entries
- Contact elements base-mount on control station.

Operational characteristics
- Cable entry knockouts:
  - M16/PG11 (1 at rear and 1 on left side)
  - M20/M25/PG13.5/PG16 (1 each on top and bottom)
- Any mounting position allowed
- Tightening torque of cover screws Tmax = 1.8Nm/16lb.in
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12K.

Materials
Polycarbonate.

Certifications and compliance
Certifications obtained: cULus, EAC, CCC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508A, CSA C22.2 n° 14.

With 1 actuator

LPZP1B5600

LPZP1B5601

LPZP1B5602

LPZP1B5603

LPZP1B5604

LPZP1B5605

LPZP1B5606

LPZP1B5607

Order code	Description	Contacts config.	Qty per pkg	Wt
			n°	[kg]
Yellow control station.				
LPZP1B5600	Mushroom head pushbutton, latch, turn to release for emergency stopping, ISO 13850 with plastic disk EMERGENCY/STO	1NC	1	0.176
LPZP1B5601	Mushroom head pushbutton, latch, turn to release for emergency stopping, ISO 13850	2NC	1	0.183
LPZP1B5602 ❶	Mushroom head pushbutton, latch, turn to release for normal stopping	1NC	1	0.179
LPZP1B5603	Mushroom head pushbutton, latch, turn to release for emergency stopping, ISO 13850	1NC	1	0.173
LPZP1B5604	Mushroom head pushbutton, latch, turn to release for emergency stopping, ISO 13850	1NO+ 1NC	1	0.183
LPZP1B5605	Mushroom head pushbutton, latch, turn key to release for emergency stopping, ISO 13850 with plastic disk EMERGENCY/STOP	1NC	1	0.198
LPZP1B5606	Mushroom head pushbutton, latch, turn key to release for emergency stopping, ISO 13850	2NC	1	0.205
LPZP1B5607	Mushroom head pushbutton, latch, turn key to release for emergency stopping, ISO 13850	1NO+ 1NC	1	0.205

❶ Not included in cULus homologation.

General characteristics
- Compact dimensions
- Easy wiring
- Numerous cable entries
- Contact elements base-mount on control station.

Operational characteristics
- Cable entry knockouts:
  - M16/PG11 (1 at rear and 1 on left side)
  - M20/M25/PG13.5/PG16 (1 each on top and bottom)
- Any mounting position allowed
- Tightening torque of cover screws Tmax = 1.8Nm/16lb.in
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12K.

Materials
Polycarbonate.

Certifications and compliance
Certifications obtained: cULus, EAC, CCC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508A, CSA C22.2 n° 14.

LPZP1B5608

LPZP1B5609

LPZP1B5610

LPZP1B5612

LPZP1B5D603

new

LPZP1B5P603

LPZP1B5611

Order code	Description	Contacts config.	Qty per pkg	Wt
			n°	[kg]
Yellow control station.				
LPZP1B5608 ❶	Mushroom head pushbutton, latch, pull to release for emergency stopping, ISO 13850 with plastic disk EMERGENCY/STOP	1NC	1	0.176
LPZP1B5609 ❶	Mushroom head pushbutton, latch, pull to release for emergency stopping, ISO 13850	2NC	1	0.183
LPZP1B5610 ❶	Mushroom head pushbutton, latch, pull to release for emergency stopping, ISO 13850	1NO+ 1NC	1	0.183
LPZP1B5612	Mushroom head pushbutton, latch, turn to release for emergency stopping, ISO 13850 with label "STOP"	1NC	1	0.180
LPZP1B5D603 ❷	Mushroom head pushbutton, latch, turn to release for emergency stopping, ISO 13850 complete with illuminated disk LPXDAU115024	1NO+ 1NC	1	0.280
Yellow control station with protection.				
LPZP1B5P603	Mushroom head pushbutton, latch, turn to release for emergency stopping, ISO 13850	1NC	1	0.176
LPZP1B5611 ❶	Mushroom head pushbutton, latch, pull to release for emergency stopping, ISO 13850 with padlockable protection	1NC	1	0.178

❶ Not included in cULus homologation.
❷ cULus pending.

General characteristics
- Compact dimensions
- Easy wiring
- Numerous cable entries
- Contact elements base-mount on control station.

Operational characteristics
- Cable entry knockouts:
  - M16/PG11 (1 at rear and 1 on left side)
  - M20/M25/PG13.5/PG16 (1 each on top and bottom)
- Any mounting position allowed
- Tightening torque of cover screws Tmax = 1.8Nm/16lb.in
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12K.

Materials
Polycarbonate.

Certifications and compliance
Certifications obtained: cULus, EAC, CCC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508A, CSA C22.2 n° 14.

With 2 actuators

LPZP2B8900

LPZP2B8901

LPZP2B8902

LPZP2B8903

LPZP2B8904

LPZP2B5905

Order code	Description	Contacts config.	Qty per pkg	Wt
			n°	[kg]
Grey control station.				
LPZP2B8900	Green spring return flush pushbutton with “I” symbol	1NO	1	0.213
	Red spring return flush pushbutton with “0” symbol	1NC	1	
LPZP2B8901	Green spring return flush pushbutton with “I” symbol	1NO	1	0.214
	Red spring return extended pushbutton with “0” symbol	1NC	1	
LPZP2B8902	White spring return flush pushbutton with “up arrow” symbol	1NO	1	0.213
	Black spring return flush pushbutton with “down arrow” symbol	1NO	1	
LPZP2B8903	White spring return flush pushbutton with “right arrow” symbol	1NO	1	0.214
	Black spring return flush pushbutton with “left arrow” symbol	1NO	1	
LPZP2B8904	Green spring return flush pushbutton with “I” symbol	1NO	1	0.240
	Mushroom head pushbutton, latch, turn to release for emergency stopping, ISO 13850	1NC	1	
Yellow control station.				
LPZP2B5905	Mushroom head pushbutton, latch, turn key to release for emergency stopping, ISO 13850	1NO+ 1NC	1	0.272
	Red steady pilot light 12...30VAC/DC	–	1	

General characteristics
- Compact dimensions
- Easy wiring
- Numerous cable entries
- Contact elements and LED elements, base-mount on control station.

Operational characteristics
- Cable entry knockouts:
  - M16/PG11 (2 at rear)
  - M20/PG13.5 (1 on each side)
  - M20/M25/PG13.5/PG16 (1 each on top and bottom)
- Any mounting position allowed
- Tightening torque of cover screws Tmax = 1.8Nm/16lb.in
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12K.

Materials
Polycarbonate.

Certifications and compliance
Certifications obtained: cULus, EAC, CCC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508A, CSA C22.2 n° 14.

With 3 actuators

LPZP3B8900

LPZP3B8901

LPZP3B8902

LPZP3B8903

LPZP3B8904

LPZP3B8905

LPZP3B8906

LPZP3B8907

Order code	Description	Contacts config.	Qty per pkg	Wt
			n°	[kg]
Grey control station.				
LPZP3B8900	Green spring return flush pushbutton with “I” symbol	1NO	1	0.270
	Red spring return flush pushbutton with “0” symbol	1NC	1	
	Red steady pilot light 12...30VAC/DC	–	1	
LPZP3B8901	Green spring return flush pushbutton with “I” symbol	1NO	1	0.271
	Red spring return extended pushbutton with “0” symbol	1NC	1	
	Red steady pilot light 12...30VAC/DC	–	1	
LPZP3B8902	Green spring return flush pushbutton with “I” symbol	1NO	1	0.270
	Red spring return flush pushbutton with “0” symbol	1NC	1	
	Green spring return flush pushbutton with “II” symbol	1NO	1	
LPZP3B8903	Green spring return flush pushbutton with “I” symbol	1NO	1	0.271
	Red spring return extended pushbutton with “0” symbol	1NC	1	
	Green spring return flush pushbutton with “II” symbol	1NO	1	
LPZP3B8904	White spring return flush pushbutton with “I” symbol	1NO	1	0.270
	Red spring return flush pushbutton with “0” symbol	1NC	1	
	White spring return flush pushbutton with “II” symbol	1NO	1	
LPZP3B8905	White spring return flush pushbutton with “I” symbol	1NO	1	0.271
	Red spring return extended pushbutton with “0” symbol	1NC	1	
	White spring return flush pushbutton with “II” symbol	1NO	1	
LPZP3B8906	White spring return flush pushbutton with “up arrow” symbol	1NO	1	0.270
	Red spring return flush pushbutton with “0” symbol	1NC	1	
	Black spring return flush pushbutton with “down arrow” symbol	1NO	1	
LPZP3B8907	White spring return flush pushbutton with “up arrow” symbol	1NO	1	0.271
	Red spring return extended pushbutton with “0” symbol	1NC	1	
	Black spring return flush pushbutton with “down arrow” symbol	1NO	1	

General characteristics
- Compact dimensions
- Easy wiring
- Numerous cable entries
- Contact elements and LED elements, base-mount on control station.

Operational characteristics
- Cable entry knockouts:
  - M16/PG11 (2 at rear)
  - M20/PG13.5 (2 on each side)
  - M20/M25/PG13.5/PG16 (1 each on top and bottom)
- Any mounting position allowed
- Tightening torque of cover screws Tmax = 1.8Nm/16lb.in
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12K.

Materials
Polycarbonate.

Certifications and compliance
Certifications obtained: cULus, EAC, CCC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508A, CSA C22.2 n° 14.

With 3 actuators

LPZP3B8908

LPZP3B8909

LPZP3B8910

LPZP3B8911

LPZP3B8912

Order code	Description	Contacts config.	Qty per pkg	Wt
			n°	[kg]
Grey control station.				
LPZP3B8908	White spring return flush pushbutton with “right arrow” symbol	1NO	1	0.271
	Red spring return flush pushbutton with “0” symbol	1NC	1	
	Black spring return flush pushbutton with “left arrow” symbol	1NO	1	
LPZP3B8909	White spring return flush pushbutton with “right arrow” symbol	1NO	1	0.272
	Red spring return extended pushbutton with “0” symbol	1NC	1	
	Black spring return flush pushbutton with “left arrow” symbol	1NO	1	
LPZP3B8910	Green spring return flush pushbutton with “I” symbol	1NO	1	0.270
	Red spring return flush pushbutton with “0” symbol	1NC	1	
	Green steady pilot light 12...30VAC/DC	–		
LPZP3B8911	Green spring return flush pushbutton with “I” symbol	1NO	1	0.271
	Red spring return extended pushbutton with “0” symbol	1NC	1	
	Green steady pilot light 12...30VAC/DC	–		
LPZP3B8912	Green spring return flush pushbutton	1NO	1	0.278
	Red spring return flush pushbutton	1NC	1	
	Mushroom head spring return pushbutton	1NC	1	

General characteristics
- Compact dimensions
- Easy wiring
- Numerous cable entries
- Contact elements and LED elements, base-mount on control station.

Operational characteristics
- Cable entry knockouts:
  - M16/PG11 (2 at rear)
  - M20/PG13.5 (2 on each side)
  - M20/M25/PG13.5/PG16 (1 each on top and bottom)
- Any mounting position allowed
- Tightening torque of cover screws Tmax = 1.8Nm/16lb.in
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C
- Degree of protection:
  - Per IEC/EN: IP66, IP67 and IP69K
  - Per UL: Type 1, 2, 3R, 4, 4X, 12K.

Materials
Polycarbonate.

Certifications and compliance
Certifications obtained: cULus, EAC, CCC, RINA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508A, CSA C22.2 n° 14.

Type LP4...

LP4P1B5600

LP4P2B8902

LP4P2B8900

new

LP4P2B8100L

IO-Link

Order code	Description	Contacts config.	Qty per pkg	Wt
			n°	[kg]
LP4P1B5600	Mushroom head pushbutton, latch, turn to release for emergency stopping, ISO 13850 compliant	2NC	1	0.108
LP4P2B5900	Mushroom head pushbutton, latch, turn to release for emergency stopping, ISO 13850 compliant	2NC	1	0.116
	White flush illuminated pushbutton, spring return, 5...35VAC/DC	1NO		
LP4P2B8900	White flush pushbutton with "Up Arrow" symbol, spring return	1NO	1	0.105
	White flush pushbutton with "Down Arrow" symbol, spring return	1NO		
LP4P2B8901	White flush illuminated pushbutton, spring return, 5...35VAC/DC	1NO	1	0.106
	White flush illuminated pushbutton, spring return, 5...35VAC/DC	1NO		
LP4P2B8902	Red extended pushbutton with "O" symbol, spring return	1NC	1	0.105
	Green extended pushbutton with "I" symbol, spring return	1NO		
LP4P2B8903	Red extended illuminated pushbutton with "O" symbol, spring return, 5...35VAC/DC	1NC	1	0.105
	Green extended illuminated pushbutton with "I" symbol, spring return, 5...35VAC/DC	1NO		
Control stations with IO-Link interface.				
LP4P1B8100L	Flush illuminated pushbutton ❶ LED RGB	1NO	1	0.115
LP4P2B8100L	Flush illuminated pushbutton ❶ LED RGB	1NO	1	0.121
	Flush illuminated pushbutton ❶ LED RGB	1NO		

❶ The illumination colour can be selected from the RGB combination.

Accessories

LP4XBL103

new

LP4XBL104

LP4X159

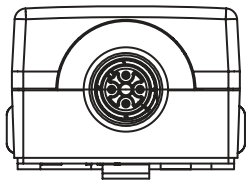
Order code	Description	Qty per pkg	Wt
		n°	[kg]
LP4XBL103	Set of 10 green lenses	1	0.020
LP4XBL104	Set of 10 red lenses	1	0.020
LP4XBL105	Set of 10 yellow lenses	1	0.020
LP4XBL106	Set of 10 blue lenses	1	0.020
LP4XBL100	Set of 4 lenses (1 green, 1 red, 1 yellow and 1 blue)	1	0.008
LP4XBL1163	Set of 5 green lenses with "START" symbol	1	0.010
LP4XBL1132	Set of 5 red lenses with "STOP" symbol	1	0.010
LP4XBL1107	Set of 5 transparent lenses with "O" symbol	1	0.010
LP4XBL1117	Set of 5 transparent lenses with "I" symbol	1	0.010
LP4XBL11507	Set of 5 transparent lenses with "Up Arrow" symbol	1	0.010
LP4XBL11517	Set of 5 transparent lenses with "Down Arrow" symbol	1	0.010
LP4X159	Metallic protection guard for LP4P...B5...	1	0.060

General characteristics
Control stations type LP4... have compact dimensions which make them suitable for installation on a 40mm profile rails. Installation is quick and easy thanks to the metal clip supplied as standard, which is inserted into the groove of the profile rail. The metal clip can also be screwed onto other surfaces.
LP4... control stations for profile rails are supplied complete with operators, contact elements and LED light elements and the wiring is via an integrated M12 connector.
IO-Link control stations type LP4...L are also available: they are an advanced and versatile solution for controlling and monitoring industrial devices. Using IO-Link technology, these control stations enable communication between field devices and the control system, thus offering smarter and more flexible management of industrial processes. They are designed to be integrated into modern industrial environments, offering reliable connectivity and optimal ease of use.

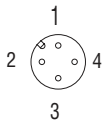
Operational characteristics
- Any mounting position allowed
- Fixing for 40mm profile rails
- Connection: 4 or 8-pin M12 connector
- Rated operating voltage: 5...35VAC/DC; 19.2...28.8V for LP4...L
- Rated operating current: 1...100mA
- Maximum consumption: 250mW
- Electrical life: 1,000,000 cycles (10mA 24VDC)
- B10d: 1,300,000 cycles
- Ambient conditions:
  - Operating temperature: -25...+70°C; -25...+60°C for LP4...L
  - Storage temperature: -40...+80°C
- Degree of protection:
  - Per IEC/EN: IP65
  - Per UL: Type 1.

Certifications and compliance
Certifications obtained: cURus.
Compliant with standards: IEC/EN/BS 60947-5-1, UL508A, UL 60947-1, UL 60947-5-1, CSA C22.2 No. 60947-1-13, CSA C22.2 No. 60947-5-1-14 and only for LP4...B5... UL 60947-5-5.

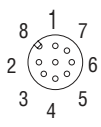
PIN layout



4 pins



8 pins



Order code	PIN	Actuator 1		Actuator 2	
		Contacts	LED	Contacts	LED
LP4P1B5600	4	2NC: 1-2/3-4	–	–	–
LP4P2B5900	8	2NC: 3-4/7-8	–	1NO: 1-2	5-6
LP4P2B8900	4	1NO: 3-4	–	1NO: 1-2	–
LP4P2B8901	8	1NO: 3-4	7-8	1NO: 1-2	5-6
LP4P2B8902	4	1NC: 3-4	–	1NO: 1-2	–
LP4P2B8903	8	1NC: 3-4	7-8	1NO: 1-2	5-6

Order code	PIN1	PIN2	PIN3	PIN4
LP4P...L	L+	–	L-	C/Q

Dimensions
page 8-70

Type LP9...

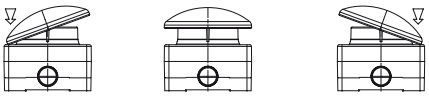
LP9S...R

LP9S...B

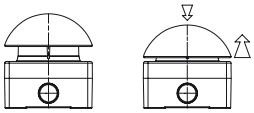
LP9P...R

Order code	Description	Qty per pkg	Wt
		n°	[kg]
LP9S01R	Momentary Ø90mm/3.54" red mushroom. Contacts: 1NC	1	0.210
LP9S11R	Momentary Ø90mm/3.54" red mushroom. Contacts: 1NO+1NC	1	0.220
LP9S10B	Momentary Ø90mm/3.54" black mushroom. Contacts: 1NO	1	0.210
LP9S11B	Momentary Ø90mm/3.54" black mushroom. Contacts: 1NO+1NC	1	0.220
LP9P02R	Emergency Ø90mm/3.54" red mushroom pull-to-release. Contacts: 2NC	1	0.290
LP9P11R	Emergency Ø90mm/3.54" red mushroom pull-to-release. Contacts: 1NO+1NC	1	0.300

Momentary mushroom



Emergency mushroom pull-to-release



Accessories

LP9XC...

Order code	Description	Qty per pkg	Wt
		n°	[kg]
LP9XC10❶	1NO contact	1	0.010
LP9XC01❶	1NC contact	1	0.010

❶ Maximum configuration: n°3 LP9XC... contact elements.

General characteristics
LOVATO Electric palm switches LP9... types are designed for machine stop and immediate service control applications. They are widely used in the most diverse applications, including emergency stop for escalators, gate openers, pedestrian crossing buttons for disabled users, etc...
The ergonomic design and large surface for an easy actuation with the hand, elbow or foot, ensures immediate actuation of machinery and equipment even if the actuator has their hands full.
This new range is split into two versions:
– Momentary mushroom (available in grey/black or grey/red);
– Emergency mushroom "pull-to-release" (available in yellow/red only).

Operational characteristics
– Cable entry (knockout version):
  • M20/PG13.5 (1 on each side)
  • M16/PG11 (2 on the cover bttom)
– Any mounting position allowed
– Tightening torque of cover screws Tmax = 0.8Nm/7lb.in
– Ambient conditions:
  • Operating temperature: -25...+75°C
  • Storage temperature: -40...+85°C
– IEC/EN degree of protection: IP65.

CONTACT ELEMENTS
– Rated insulation voltage: 690V
– Rated thermal current Ith: 10A
– Conductivity: 5V 10mA
– Tightening torque of contact screws: 0.5...0.8Nm
– Conductor cross section: 1 or 2 conductors - 0.5...2.5mm^2
– IEC/EN 60947-5-1 designation: A600 Q300.

Minimum operational characteristics in AC15:

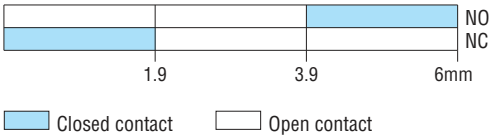
[V]	12	24	48	120	240	400	480	500	600
[A]	6	6	6	6	3	1.9	1.5	1.4	1.2

Minimum operational characteristics in DC13:

[V]	12	24	48	125	250	440	500	600
[A]	3	3	1.5	0.55	0.27	0.15	0.13	0.1

Operational characteristics in AC15: 24V 10A and 400V 4A
– Short-circuit protection fuse: max. calibre 10A gG/gL
– Contact resistance:: ≤25mΩ
– Operating force: ≤2.6N
– Mechanical life: 1,000,000 cycles.

Stroke of contact elements



Material
PC-ABS for button and control station.
PA66 for plastic actuator frame (LP9S...).
Chrome-plated aluminium and zinc alloy (zama) for metal actuator frame (LP9P...).

Compliance
Compliant with standards: IEC60947-5-1.

Enclosures with cut-outs for Ø22mm units

LPZM1A5 LPZM1A5P LPZM1A8

LPZM2A5 LPZM2A8 LPZM3A8

LPZM4A8 LPZM5A8 LPZM6A8

Order code	Description	Cover colour	Qty per pkg	Wt
			n°	[kg]
With holes.				
LPZM1A5	For 1 actuator	Yellow	1	0.343
LPZM1A5P❷	For 1 actuator with shroud	Yellow	1	0.382
LPZM1A8	For 1 actuator	Grey	1	0.349
LPZM2A5	For 2 actuators	Yellow	1	0.456
LPZM2A8	For 2 actuators	Grey	1	0.458
LPZM3A8	For 3 actuators	Grey	1	0.603
LPZM4A8	For 4 actuators	Grey	1	0.581
LPZM5A8	For 5 actuators	Grey	1	0.680
LPZM6A8	For 6 actuators	Grey	1	0.671
With multiholes.				
LPZM4CA8	For 4 actuators	Grey	1	0.570
LPZM6CA8	For 6 actuators	Grey	1	0.660
LPZM8CA8	For 8 actuators	Grey	1	1.060
LPZM12CA8	For 12 actuators	Grey	1	1.360
LPZM16CA8	For 16 actuators	Grey	1	1.650

❷ It is not possible to use plastic disks in combination with enclosure with protection.

LPZM4CA8 LPZM6CA8 LPZM8CA8 LPZM12CA8 LPZM16CA8

General characteristics
Enclosures made of aluminium alloy suitable for pushbuttons, selector switches and pilot lights Ø22mm/0.87" Platinum series.
Possible use of contact elements on the inside surface of the cover using the relevant mounting adapter.
The thickness of the enclosure is suitable for drilling.
Up to 6 contacts can be fitted; 2 each on the left, middle and right, one behind the other. For the possible combinations consult this chapter on the actuator pages.

Operational characteristics
- Cable entry❶: Ø21mm/0.83" (for M20 or PG13.5 cable gland)
- Degree of protection:
  - Per IEC/EN: IP66 and IP67
  - Per UL: Nema 4X
- Earth connection through threaded holes on the base and on the cover (screws supplied)
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C.

Certifications and compliance
Certifications obtained: cULus.
Compliant with standards: IEC/EN/BS 60947-5-1.

❶ Not available for multiholes LPZM...C type.

Order code	Dimensions (X, Y, Z) [mm(in)]	n° of rows vertical	n° of rows horizontal
LPZM1A5/A8	80x80x73 (3.15x3.15x2.87")	1	1
LPZM1A5P	80x80x108 (3.15x3.15x4.25")	1	1
LPZM2A5/A8	80x130x73 (3.15x5.12x2.87")	1	2
LPZM3A8	80x170x73 (3.15x6.69x2.87")	1	3
LPZM4A8	80x170x73 (3.15x6.69x2.87")	1	4
LPZM5A8	80x230x73 (3.15x9.05x2.87")	1	5
LPZM6A8	80x230x73 (3.15x9.05x2.87")	1	6
LPZM4CA8	80x170x73 (3.15x6.69x2.87")	2	2
LPZM6CA8	80x230x73 (3.15x9.05x2.87")	2	3
LPZM8CA8	160x160x90 (6.30x6.30x3.54")	4	2
LPZM12CA8	170x190x90 (6.69x7.48x3.54")	4	3
LPZM16CA8	190x250x90 (7.48x9.84x3.54")	4	4

Enclosures

LPZM1E5 LPZM1E8

LPZM2E8 LPZM3E8 LPZM4E8

LPZM5E8 LPZM6E8

LPZM7E8

Order code	Dimensions (X, Y, Z)	Cover colour	Qty per pkg	Wt.
	[mm (in)]		n°	[kg]
LPZM1E5	80x80x73 (3.15x3.15x2.87")	Yellow	1	0.346
LPZM1E8	80x80x73 (3.15x3.15x2.87")	Grey	1	0.352
LPZM2E8	80x130x73 (3.15x5.12x2.87")	Grey	1	0.462
LPZM3E8	80x170x73 (3.15x6.69x2.87")	Grey	1	0.600
LPZM4E8	80x230x73 (3.15x9.05x2.87")	Grey	1	0.680
LPZM5E8	160x160x90 (6.30x6.30x3.54")	Grey	1	1.100
LPZM6E8	170x190x90 (6.69x7.48x3.54")	Grey	1	1.400
LPZM7E8	190x250x90 (7.48x9.84x3.54")	Grey	1	1.700

General characteristics
Enclosures made of aluminium alloy suitable for pushbuttons, selector switches and pilot lights Ø22mm/0.87" Platinum series.
Possible use of contact elements on the inside surface of the cover using the relevant mounting adapter.
The thickness of the enclosure is suitable for drilling.
Up to 6 contacts can be fitted; 2 each on the left, middle and right, one behind the other.
For the possible combinations consult this chapter on the actuator pages.

Operational characteristics
- Degree of protection:
  - Per IEC/EN: IP66 and IP67
  - Per UL: Nema 4X
- Earth connection through threaded holes on the base and on the cover (screws supplied)
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+85°C.

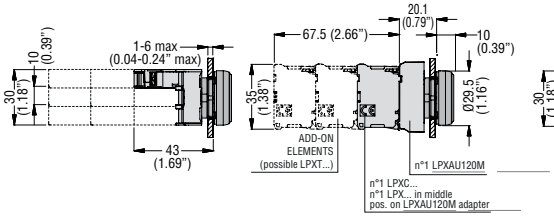
Certifications and compliance
Certifications obtained: cULus.
Compliant with standards: IEC/EN/BS 60947-5-1.

Order code	Max. actuator number	n° of rows vertical	n° of rows horizontal
LPZM1E5/E8	1	1	1
LPZM2E8	2	1	2
LPZM3E8	4	1	3
LPZM4E8	6	1	5
LPZM5E8	8	4	2
LPZM6E8	12	4	3
LPZM7E8	16	4	4

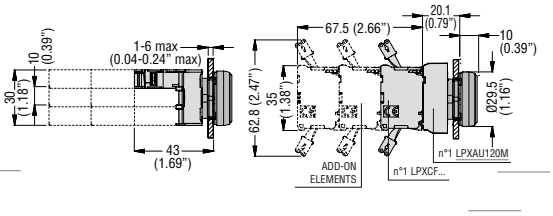
Dimensions page 8-71 and 72

LPXAU120M WITH CONTACT ELEMENTS AND LPS

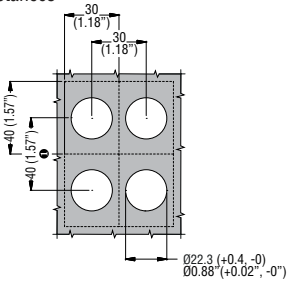
Flush pushbutton with screw terminal single contact or LED or test elements



Flush pushbutton with Faston contact elements



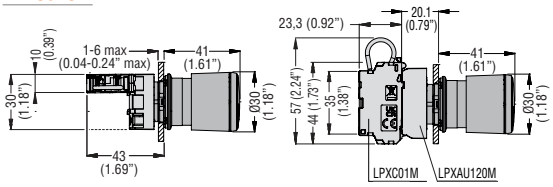
Drillings - Minimum recommended distances



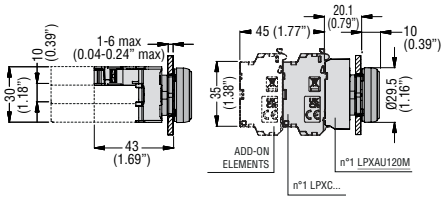
❶ When Faston contacts are used, the vertical pitch must be 85mm minimum.

Mushroom-head pushbutton with auto-monitor contacts

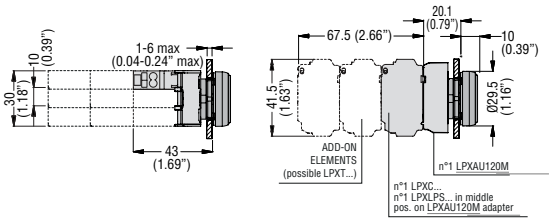
LPXC01SM



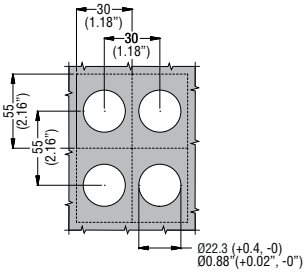
Flush pushbutton with screw terminal double contacts



Flush pushbutton with test element and spring-clamp terminal contact or LED elements **LPXCS... - LPXLPS...**

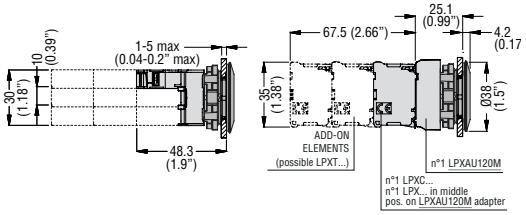


Drillings – Minimum recommended distances with spring-clamp terminal contact or LED elements

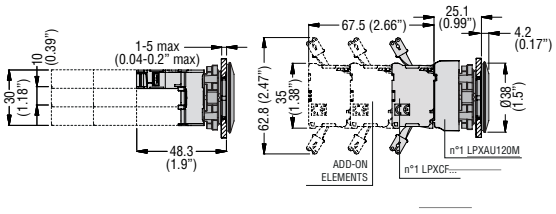


LPXAU120M WITH CONTACT ELEMENTS AND LPF ACTUATORS

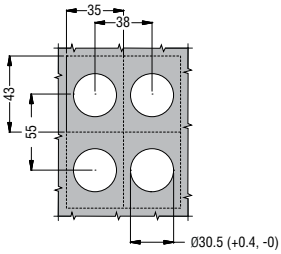
Flush pushbutton with screw terminal single contact or LED or test elements



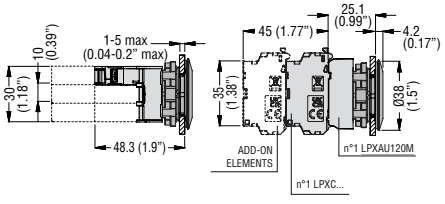
Flush pushbutton with Faston contact elements



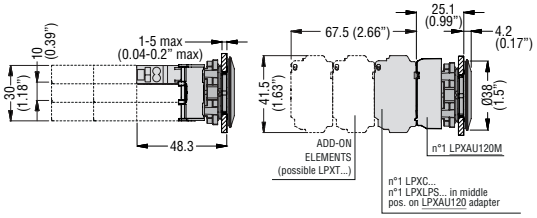
Drillings - Minimum recommended distances



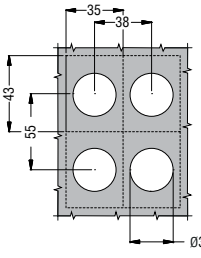
Flush pushbutton with screw terminal double contacts



Flush pushbutton with test element and spring-clamp terminal contact or LED elements **LPXCS... - LPXLPS...**

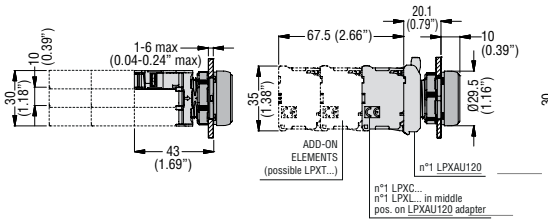


Drillings – Minimum recommended distances with spring-clamp terminal contact or LED elements

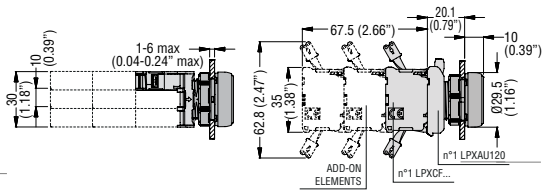


LPXAU120 WITH CONTACT ELEMENTS AND LPC ACTUATORS

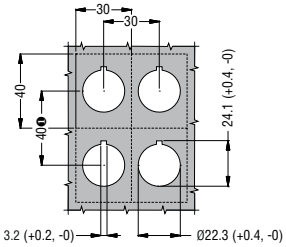
Flush pushbutton with screw terminal single contact or LED or test elements



Flush pushbutton with Faston contact elements

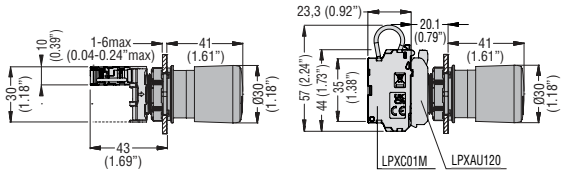


Drillings - Minimum recommended distances

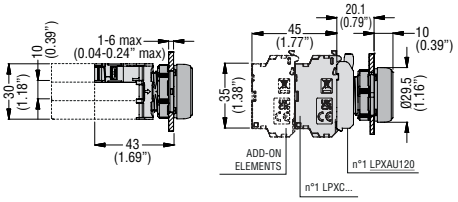


❶ When Faston contacts are used, the vertical pitch must be 85mm minimum.

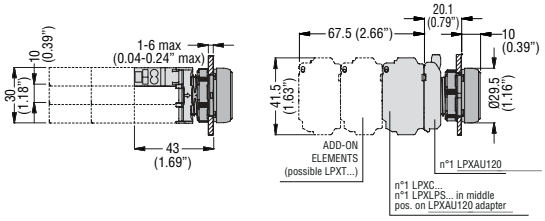
Mushroom-head pushbutton with auto-monitor contacts LPXC01M



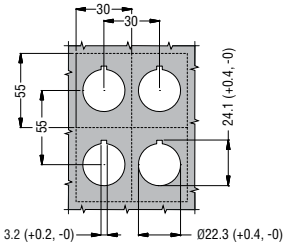
Flush pushbutton with screw terminal double contacts



Flush pushbutton with test element and spring-clamp terminal contact or LED elements LPXCS... - LPXLPS...

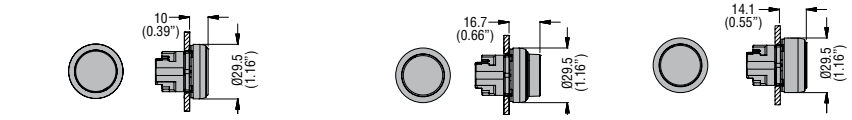


Drillings – Minimum recommended distances with spring-clamp terminal contact or LED elements



LPS TYPES

Spring-return and push-push buttons



Flush
LPSB1...
Illuminated flush
LPSBL1...
LPSXB0❶

Push-push
LPSQ1...
LPSXQ0❶
Illuminated push-push
LPSQL1...

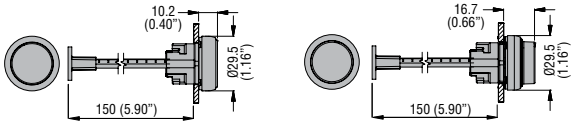
Extended
LPSB2...
Illuminated extended
LPSBL2...

Push-push
LPSQ2...
Illuminated push-push
LPSQL2...
LPSXQL0❶

Shrouded
LPSB30...
LPSXB3❶

❶ Complete with cap or lens.

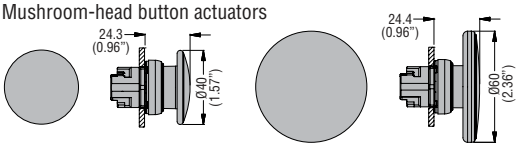
Mechanical buttons



Flush
LPSR1...

Extended
LPSR2004

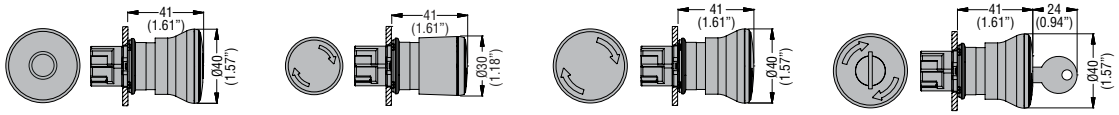
Mushroom-head button actuators



Spring return
LPSB614...
Illuminated spring return
LPSBL614...

Spring return
LPSB616...

Mushroom-head latch button actuators



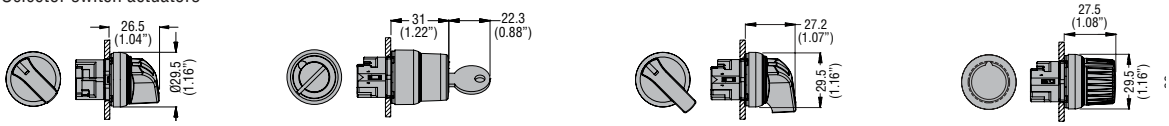
Push-pull
LPSB674...

Turn to release
LPSB6634

Turn to release
LPSB6644
Illuminated turn to release
LPSBL664...

Turn key to release
LPSB684...

Selector switch actuators



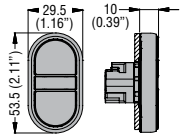
Lever
LPSS1...
Illuminated lever
LPSSL1...

Key
LPSS3...

Long lever
LPSS2...

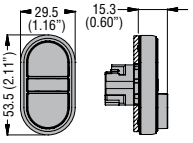
Knob
LPSS4...

Flush double-touch buttons with or without light indicator



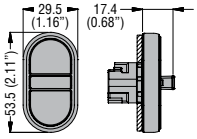
LPSB71... - LPSBL71...

Double-touch buttons with an extended button with or without light indicator



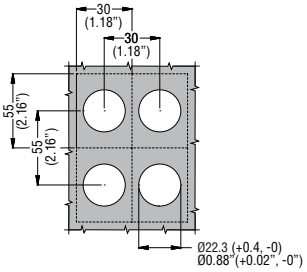
LPSB72... - LPSBL72...

Triple-touch button with middle extended button

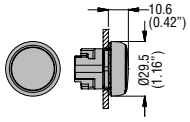


LPSB73...

Drillings - Minimum recommended distances

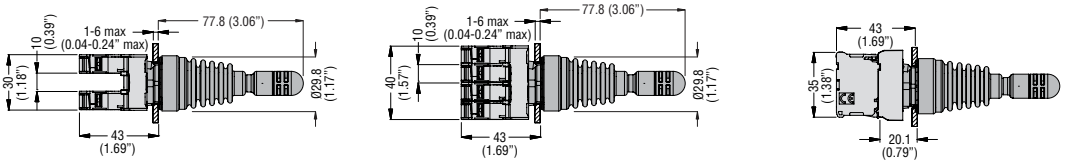


Pilot light head



LPSL...

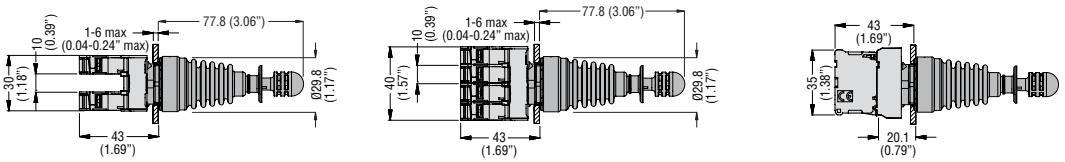
Joystick with free actuation lever



2 positions
LPSJ20...

4 positions
LPSJ40...

Joystick with mechanical latch lever

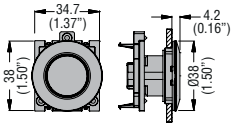


2 positions
LPSJ21...

4 positions
LPSJ41...

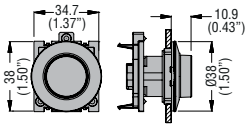
LPF TYPES

Spring-return and push-push buttons



Flush
LPFB1...
Illuminated flush
LPFBL1...
LPFXB0❶

Push-push
LPFQ1...
LPFXQ0❶
Illuminated push-push
LPFQL1...

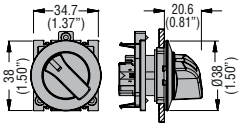


Extended
LPFB2...
Illuminated extended
LPFBL2...

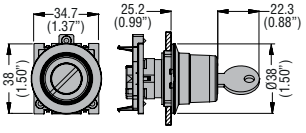
Push-push
LPFQ2...
Illuminated push-push
LPFQL2...
LPFXQL0❶

❶ Complete with cap or lens.

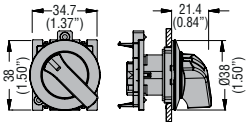
Selector switch actuators



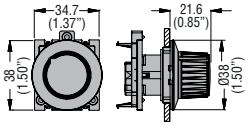
Lever
LPFS1...
Illuminated lever
LPFSL1...



Key
LPFS3...

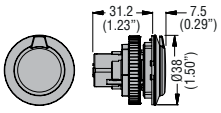


Long lever
LPFS2...

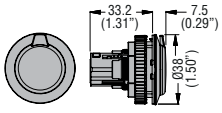


Knob
LPFS4...

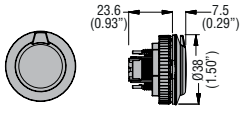
Communication interfaces **LPSD...**



LPFD01

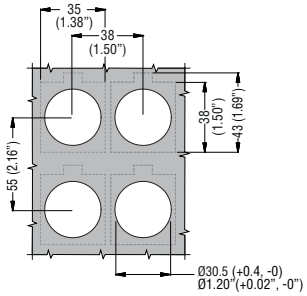


LPFD03 - LPFD05

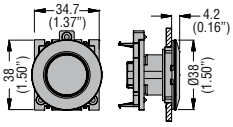


LPFD06

Drillings - Minimum recommended distances



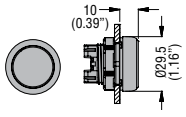
Pilot light head



LPFL...

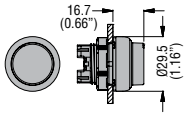
LPC TYPES

Spring-return and push-push buttons



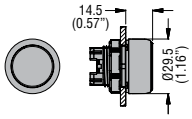
Flush
LPCB1...
Illuminated flush
LPCBL1...
LPXB0❶

Push-push
LPCQ1...
LPXQ0❶
Illuminated push-push
LPCQL1...



Extended
LPCB2...
Illuminated extended
LPCBL2...

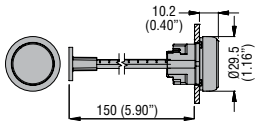
Push-push
LPCQ2...
Illuminated push-push
LPCQL2...
LPXQL0❶



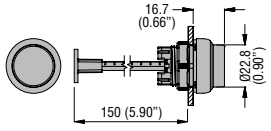
Shrouded
LPCB30...
LPXB3❷

❶ Complete with cap or lens.

Mechanical buttons

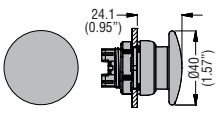


Flush
LPCR1...

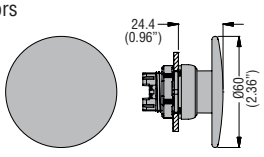


Extended
LPCR2004

Mushroom-head button actuators

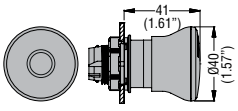


Spring return
LPCB614...
Illuminated spring return
LPCBL614...

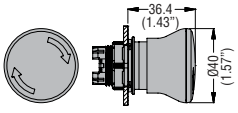


Spring return
LPCB616...

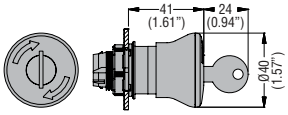
Mushroom-head latch button actuators



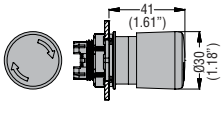
Push-pull
LPCB674...



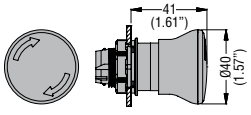
Turn to release
LPCB634...



Turn key to release
LPCB684...



Turn to release
LPCB6634

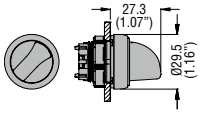


Turn to release
LPCB6644
Illuminated turn to release
LPCBL664...

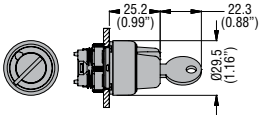
Pushbuttons and selector switches

PLatinum series dimensions [mm (in)]

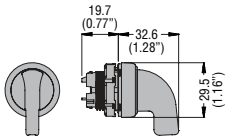
Selector switch actuators



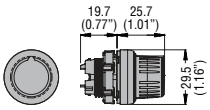
Lever
LPCS1...
Illuminated lever
LPCSL1...



Key
LPCS3...

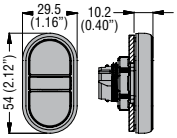


Long lever
LPCS2...



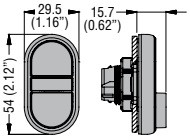
Knob
LPCS4...

Flush double-touch buttons with or without light indicator



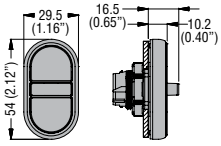
LPCB71... - LPCBL71...

Double-touch buttons with an extended button with or without light indicator



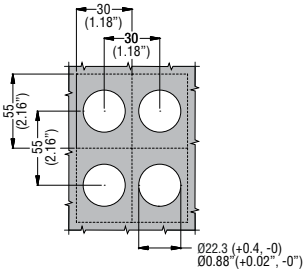
LPCB72... - LPCBL72...

Triple-touch button with middle extended button

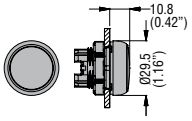


LPCB73...

Drillings - Minimum recommended distances

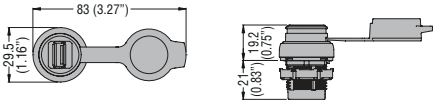


Pilot light head

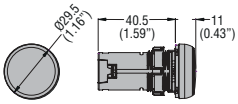


LPL...

Communication interfaces **LPCD...**

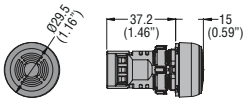


LED-integrated monoblock pilot lights



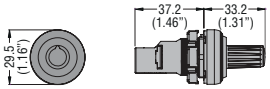
LPM...

Monoblock buzzers



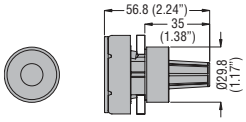
LPCZS...

Monoblock potentiometer



LPCPA...

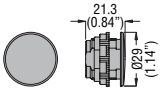
Potentiometer drive



LPXP100 - LPXP110

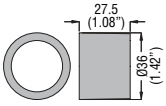
PLATINUM ACCESSORIES

Threaded plug for unused drilled holes



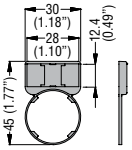
LPXA130

Knob selector switch protection



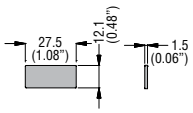
LM2TAU185

Label holder



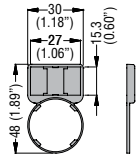
LPXAU100

Label



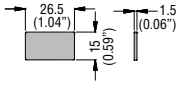
LPXAU109
LM2TA...2...

Label holder



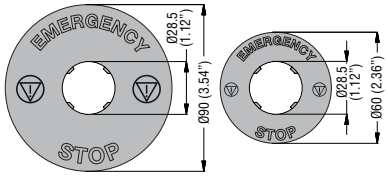
LPXAU105

Label



LPXAU108

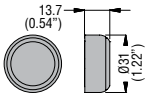
Plastic disk for mushroom-head pushbuttons



LPXAU112
LPXAU113
LPXAU124

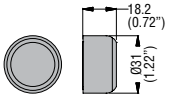
LPXAU111
LPXAU114
LPXAU115
LPXAU118
LPXAU123

Rubber boot for flushbuttons



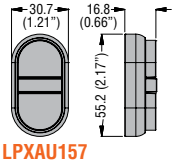
LPXAU13...

Rubber boot for extended buttons



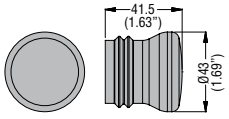
LPXAU14...

Double/triple button boot



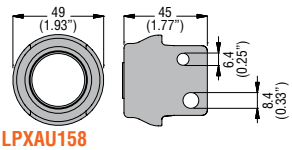
LPXAU157

Rubber boot for mushroom-head buttons



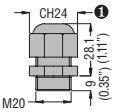
LPXAU167

Padlockable protection for mushroom-head latch buttons



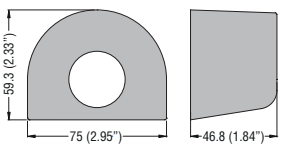
LPXAU158

Cable gland



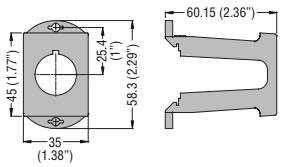
LPXP01

Shroud for mushroom-head latch buttons



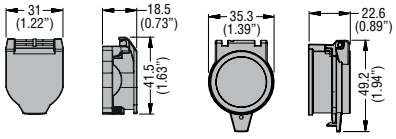
LPXAU159

DIN rail adapter



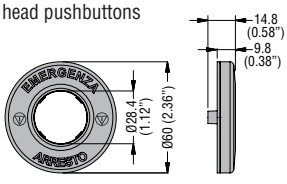
LPXDIN

Protection covers



LPXAU170
LPXAU171

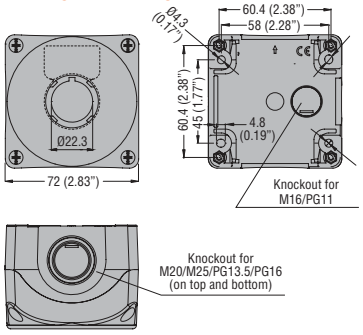
Illuminated disk for mushroom-head pushbuttons



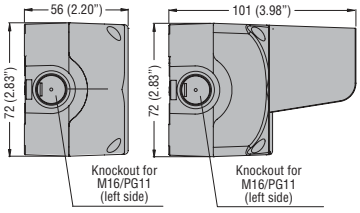
LPXDAU11...

PLASTIC CONTROL STATIONS

LPZP1A5 - LPZP1A5D - LPZP1A8
LPZP1B5... - LPZP1B8...



LPZP1A5P
LPZP1A8P



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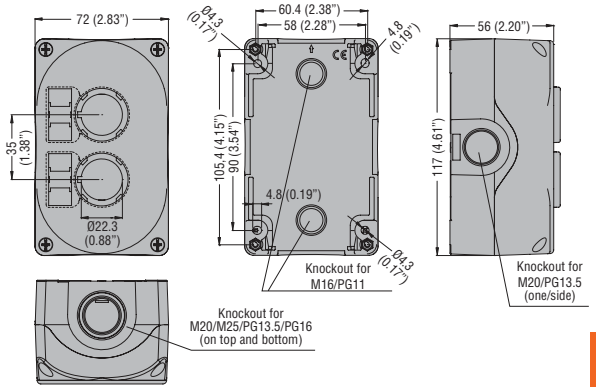

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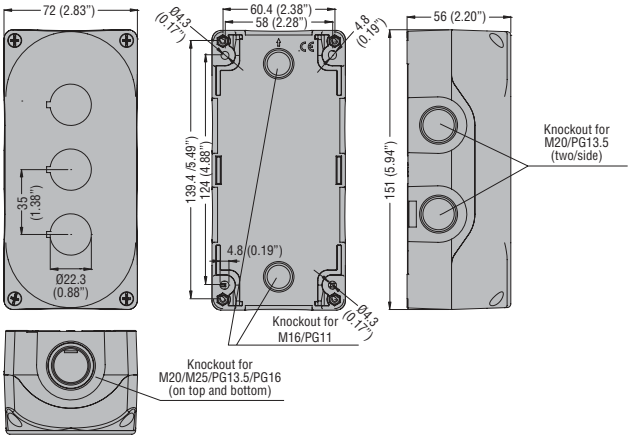

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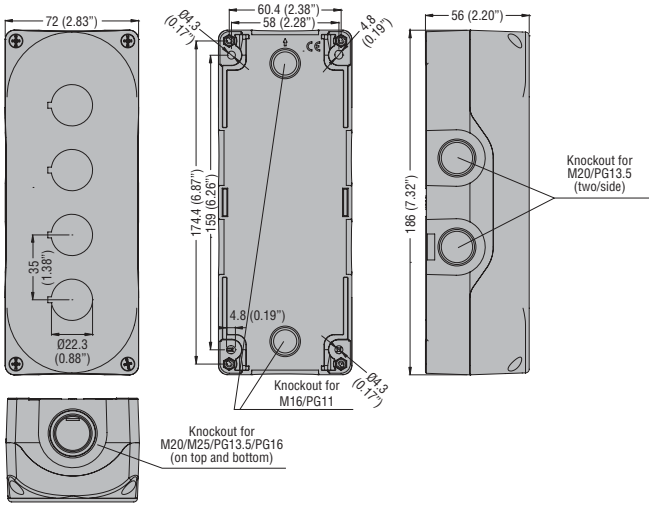

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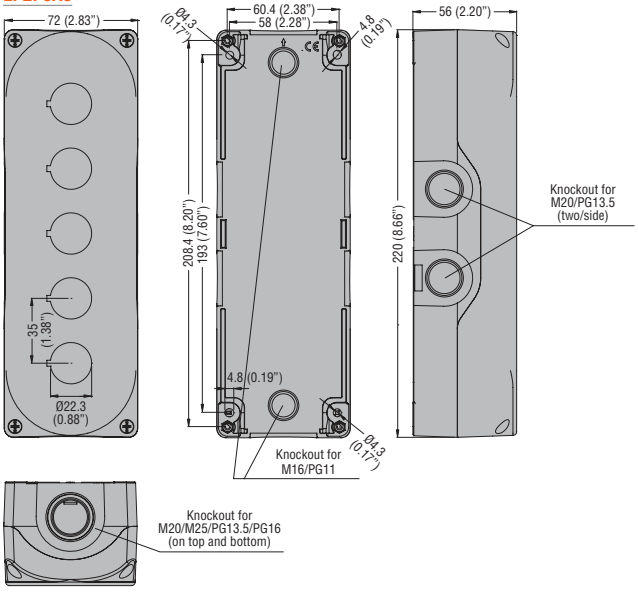

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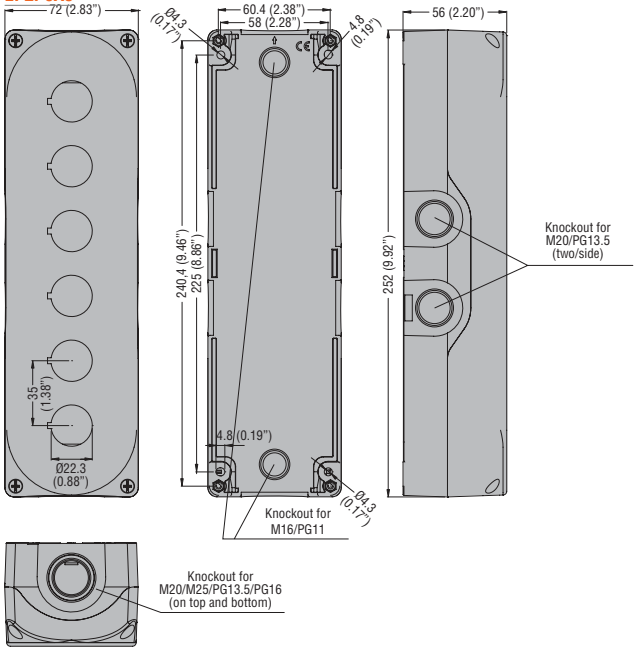

CONTROL STATIONS FOR PROFILE RAILS

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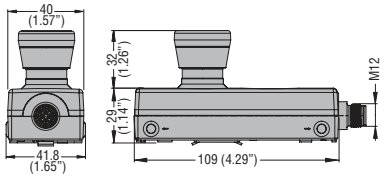

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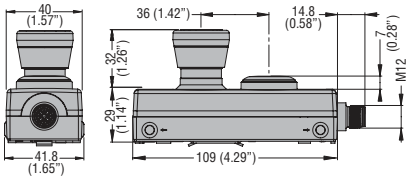

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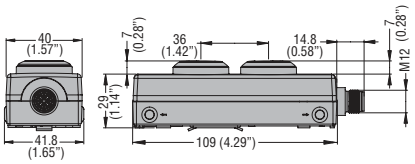

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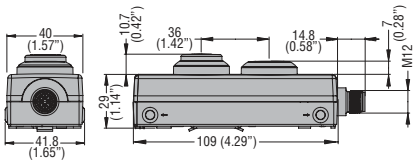

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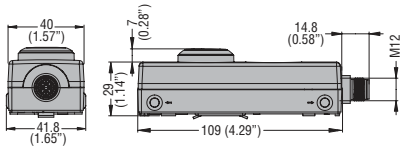

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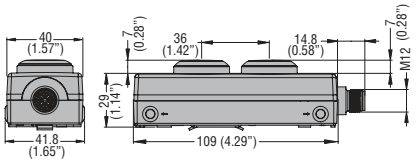

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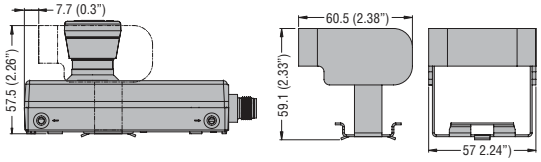
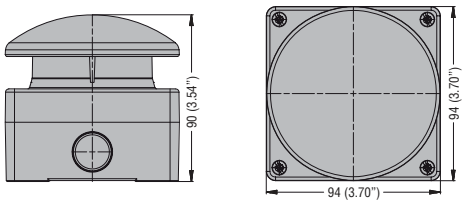


PALM SWITCHES

LP9...



METAL CONTROL STATIONS

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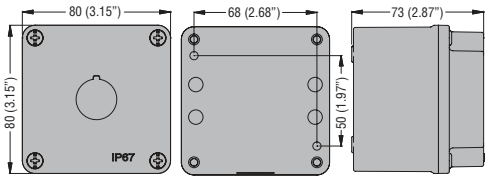

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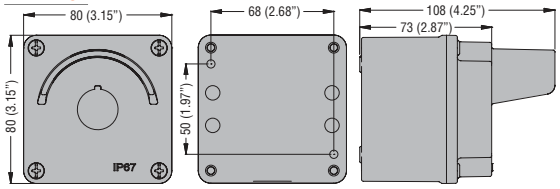

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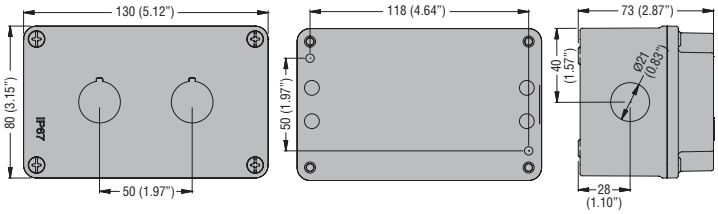

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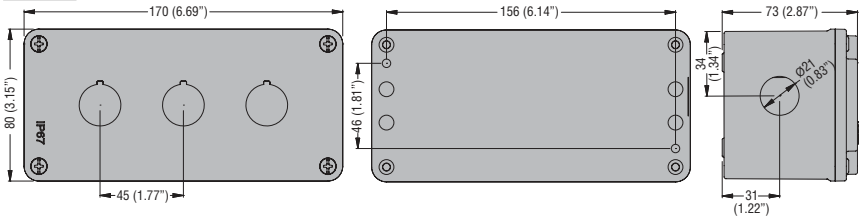

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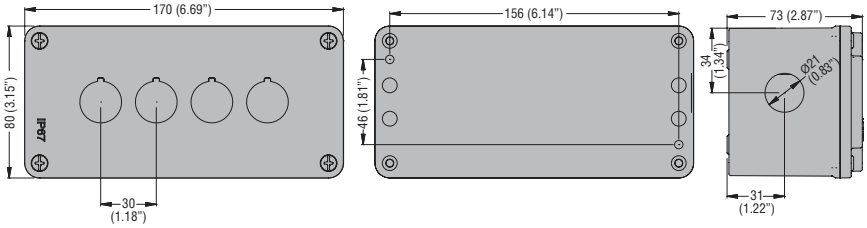

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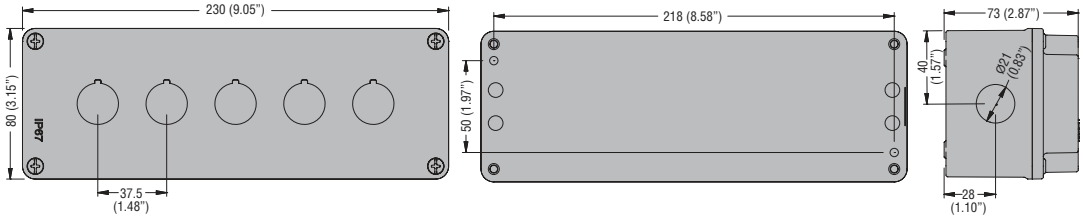

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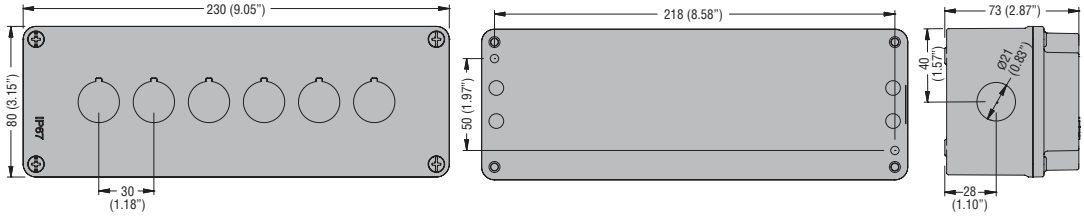

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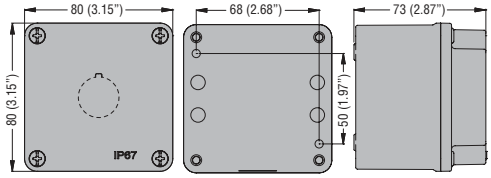

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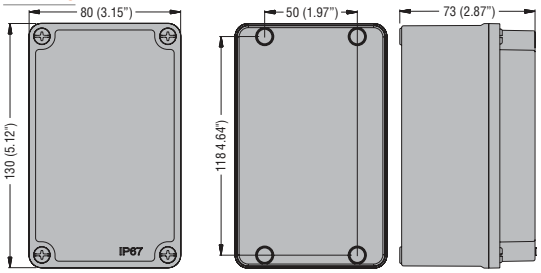

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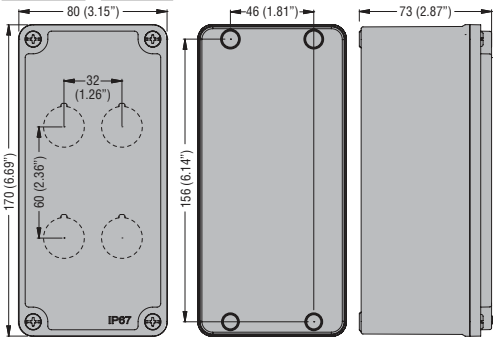

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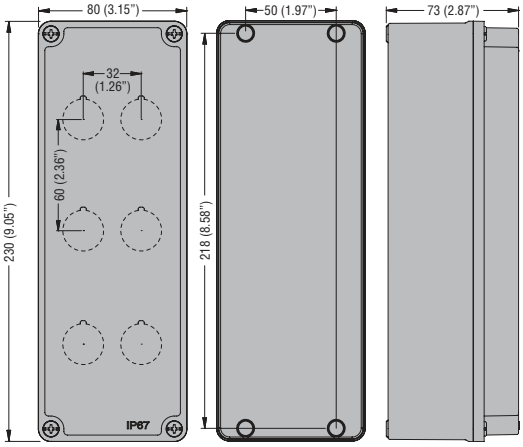

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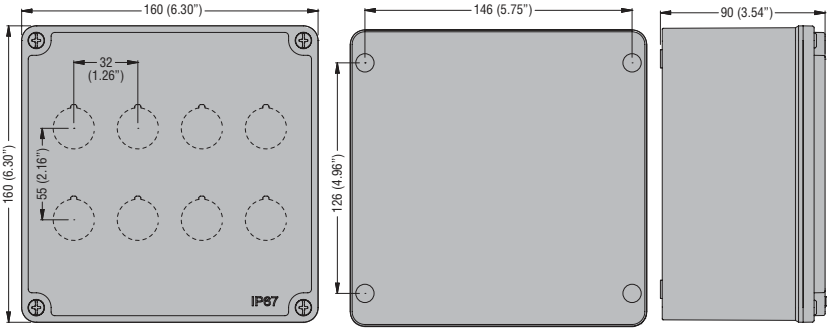

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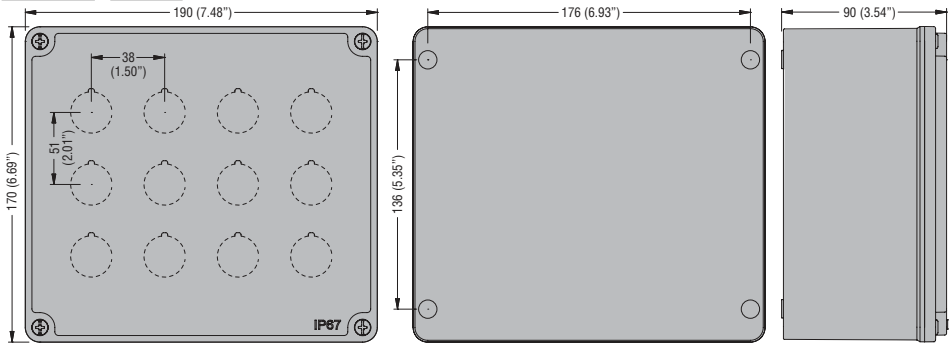

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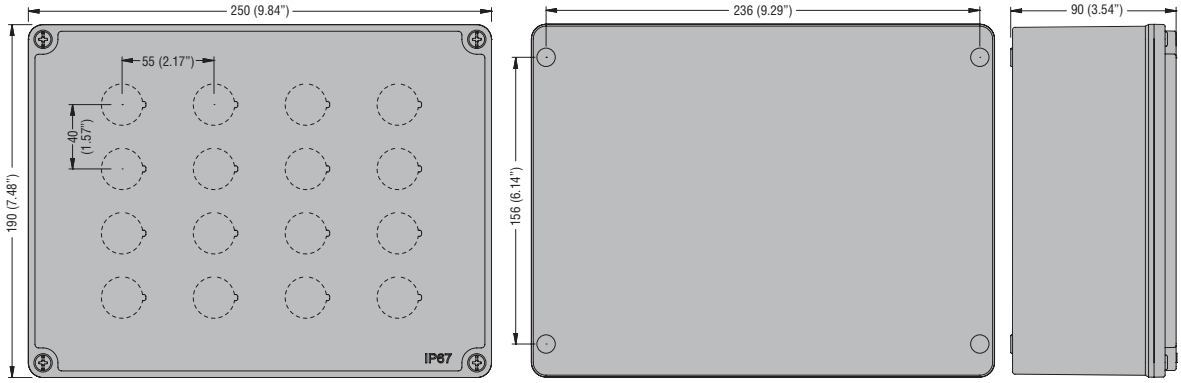
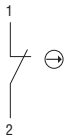


FOR PUSHBUTTONS AND SELECTOR SWITCHES

LPXC10 - LPXE10... - LPXCF10 - LPXCS10 - LPXCB10

LPXC10A

LPXC01 - LPXE01... - LPXCF01 - LPXCS01 - LPXCB01 - LPZP1B...



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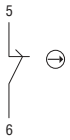

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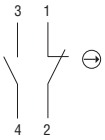
LPXC11



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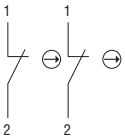

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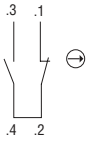

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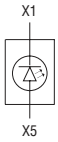
LPXL...



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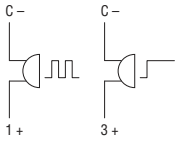

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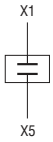
LPXT101
LPXT102



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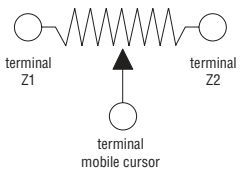

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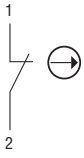

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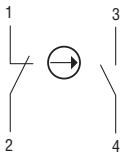
LP9S11R
LP9P11R



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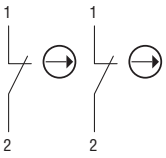

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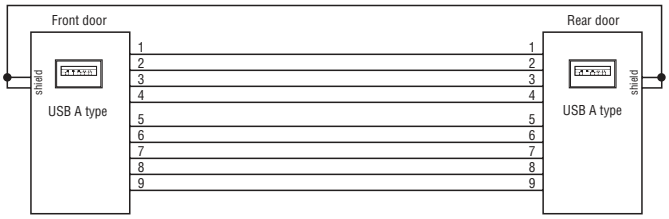

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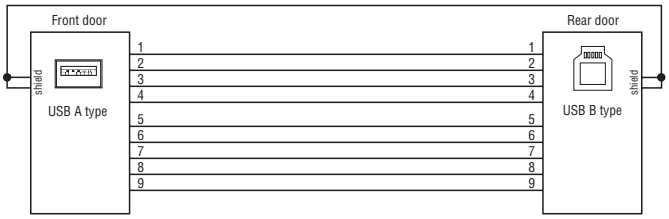

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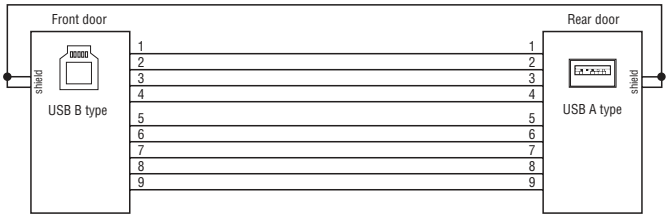

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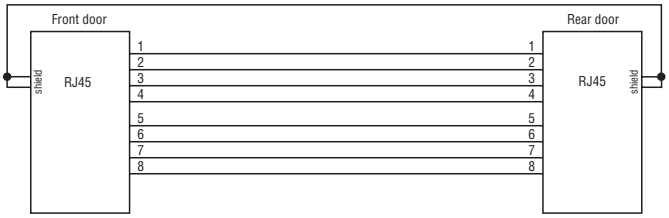

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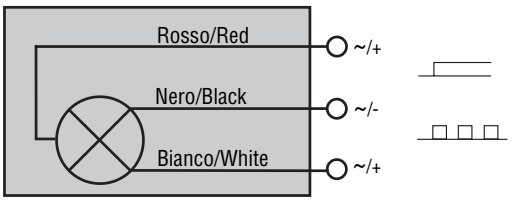
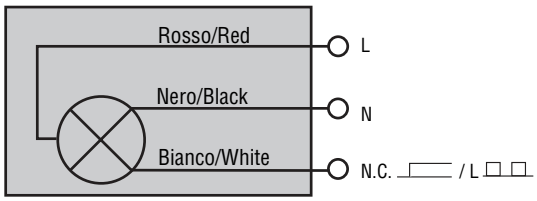


LPXDAU...110 - LPXDAU...230



Signal towers and beacons

- Signal towers ready assembled Ø45mm/1.77” 8LT4... series Steady light and pulsed or continuous sound modules
- Signal towers Ø50mm/1.97” and Ø70mm/2.75” LTN... series Modular and combinations up to 5 modules; steady or blinking light
- Multicoloured signal towers Ø70mm/2.75” 8LT73... type Modular and combinations up to 5 modules; steady light and pulsed or continuous sound modules
- Signal towers Ø70mm/2.75” 8LT7... series Modular and combinations up to 7 modules; steady or blinking light, pulsed or continuous sound modules
- Signal beacons Ø62mm/2.44” 8LB... series Steady or blinking light, pulsed or continuous sound modules.

Signal towers and beacons — SEC. - PAGE

Signal towers ready assembled Ø45mm/1.77” 8LT4... series ..... 9 - 2
Signal towers Ø50mm/1.97” LTN... series ..... 9 - 3
Signal towers Ø70mm/2.75” LTN... series ..... 9 - 4
Multicoloured signal towers Ø70mm/2.75” 8LT73... type ..... 9 - 5
Signal towers Ø70mm/2.75” 8LT7... series ..... 9 - 6
Signal beacons Ø62mm/2.44” 8LB... series ..... 9 - 8

Dimensions ..... **9 - 12**
Wiring diagrams ..... **9 - 17**

Visual code	Red	Yellow Orange	Blue	Green	White
Meaning	Danger. Emergency.	Warning and caution. Abnormal situation.	Mandatory command.	Normal situation. Regular operation.	No specific meaning.
Sound	Fast modulated repetition or high-pitch pulsing.	Continuous short sound.	Alternating sound at constant tone.	Constant and prolonged sound after an alarm.	Other sounds.
Correlated actions	Immediate intervention to deal with dangerous situation.	Control intervention required.	Intervention needed for mandatory action.	No specific action.	Depending on the situation.

Interpretation of light and sound signals for signal towers and beacons
Light and sound signals are a fundamental element for the safety of a system.
To avoid incorrect interpretations, a European standard has been introduced attributing an unambiguous meaning to visual or audible signals.
Each colour or sound alarm corresponds to a specific state of operation of the connected system and various levels of warning, as shown in the table above, according to EN 981-IEC/EN/BS 60073 standards.
The white module can be assigned a meaning as desired.

Page 9-2

SIGNAL TOWERS READY ASSEMBLED Ø45mm/1.77" 8LT4... SERIES

- Signal towers supplied already assembled Ø45mm/1.77"
- Steady light modules
- Pulsed or continuous sound modules
- Built-in LED circuit.

Page 9-3

SIGNAL TOWERS Ø50mm/1.97" LTN... SERIES

- Modular signal towers supplied Ø50mm/1.97"
- Steady light or blinking modules
- Continuous sound modules
- Built-in LED bulb.

Page 9-4

SIGNAL TOWERS Ø70mm/2.75" LTN... SERIES

- Modular signal towers supplied Ø70mm/2.75"
- Steady light or blinking modules
- Continuous sound modules
- Built-in LED bulb.

Page 9-5

MULTICOLOURED SIGNAL TOWERS Ø70mm/2.75" 8LT73... TYPE

- Modular signal towers Ø70mm/2.75"
- Steady light multicoloured modules
- Pulsed or continuous sound multicoloured modules
- Built-in LED circuit.

Page 9-6 and 7

SIGNAL TOWERS Ø70mm/2.75" 8LT7... SERIES

- Modular signal towers supplied Ø70mm/2.75"
- Steady light modules
- Pulsed or continuous sound modules
- Incandescent and LED bulbs.

Page 9-8

SIGNAL BEACONS Ø62mm/2.44"

- Modular signal beacons Ø62mm/2.44"
- Steady light or blinking modules
- Pulsed or continuous sound multicoloured modules
- Incandescent and LED bulbs.

Signal towers ready assembled Ø45mm/1.77”, 8LT4... series

8LT4K02BG

8LT4K05BG

8LT4K09BG

Order	Description	Qty per pkg	Wt
		n°	[kg]
Steady light and pulsed or continuous sound light modules. Built-in LED circuit ❶.			
8LT4K02BG	Green, red, 24VDC	1	0.160
8LT4K03BG	Green, red with continuous or pulsed sound, 24VDC	1	0.240
8LT4K04BG	Green, orange, red, 24VDC	1	0.240
8LT4K05BG	Green, orange, red with continuous or pulsed sound, 24VDC	1	0.320
8LT4K06BG	Green, blue, orange, red, 24VDC	1	0.320
8LT4K07BG	Green, blue, orange, red, with continuous or pulsed sound, 24VDC	1	0.400
8LT4K08BG	White, green, blue, orange, red, 24VDC	1	0.400
8LT4K09BG	White, green, blue, orange, red, with continuous or pulsed sound, 24VDC	1	0.480

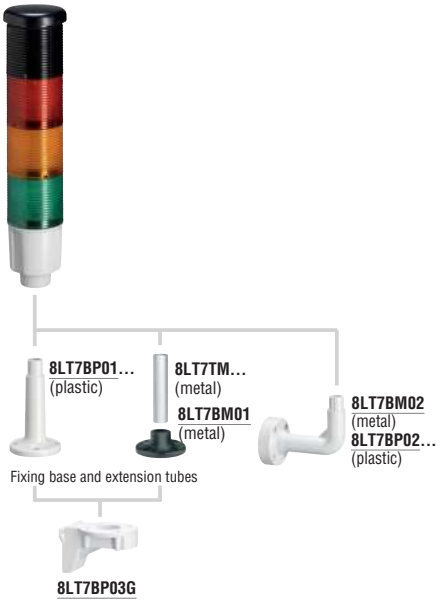
❶ For accessories and spare parts see page 9-9 and 10.

General characteristics
The Ø45mm/1.77” signal towers are supplied completely assembled with the possibility of up to 3 light modules with a sound module. The high-brightness LED circuit lighting ensures low consumption and long life.

Technical characteristics
- Supply voltage: 24VDC (±10%)
- Light module consumption: 37mA per module
- Sound module consumption: 15mA
- Sound intensity: 80dB/1m, pulsed or continuous sound
- Material: polycarbonate
- Connections: screw clamp terminals and maximum conductor section 1.5mm²/16AWG
- Tightening torque: 0.5Nm/4.5lb.in
- Operating temperature: -20...+50°C
- IEC degree of protection: IP54.

Certifications and compliance
Certifications obtained: cULus, EAC.
Compliant with standards: IEC/EN/BS 60947-5-1, IEC/EN/BS 60947-1, UL508, CSA C22.2 n° 14.

Combinations



For accessories and spare parts see page 9-9 and 10.

Signal towers Ø50mm/1.97" LTN... series

LTN50ML1

LTN50MSH

LTN50MSL

LTN50C

LTN50MW024

LTN50MWB024

LTN50BP1

LTN50BM1

LTN50BP2

LTN50BM2

LTN50BP3

LTN50BM3

LTN50P100

LTN50P050

LTN50P100T

LTN50P050T

Order code	Description	Qty per pkg	Wt.
		n°	[kg]
Blinking or steady light modules. Integrated LED lamp.			
LTN50ML1	Orange	1	0.037
LTN50ML3	Green	1	0.037
LTN50ML4	Red	1	0.037
LTN50ML6	Blue	1	0.037
LTN50ML8❶	White	1	0.037
Continuous sound modules❶.			
LTN50MSL	85dB/1m. IP65, Type 4	1	0.050
LTN50MSH	100dB/1m. IP20	1	0.048
Wiring modules.			
LTN50MW024	12...24VDC tube mounting	1	0.136
LTN50MW230	110...230VAC tube mounting	1	0.222
LTN50MWB024	12...24VDC screw mounting	1	0,098
LTN50MWB230	110...230VAC screw mounting	1	0,237
Top cover.			
LTN50C	To be used only if sound module is not present	5	0.010
Fixing bases.			
LTN50BP1	Horizontal surface mounting, grey plastic	1	0.032
LTN50BP2❷	Wall mounting, grey plastic	1	0.046
LTN50BP3	Horizontal surface or wall mounting, grey plastic	1	0.076
LTN50BM1	Horizontal surface mounting, metal	1	0.072
LTN50BM2	Wall mounting, metal	1	0.088
LTN50BM3	Horizontal surface or wall mounting, metal	1	0.173
Extension tubes with threaded end.			
LTN50P050T	50mm/1.97", metal	5	0.014
LTN50P100T	100mm/3.94", metal	5	0.027
LTN50P250T	250mm/9.84", metal	5	0.066
LTN50P400T	400mm/15.75", metal	5	0.108
Extension tubes for LTN50BP2.			
LTN50P050	50mm/1.97", metal	5	0.014
LTN50P100	100mm/3.94", metal	5	0.028
LTN50P250	250mm/9.84", metal	5	0.068
LTN50P400	400mm/15.75", metal	5	0.109

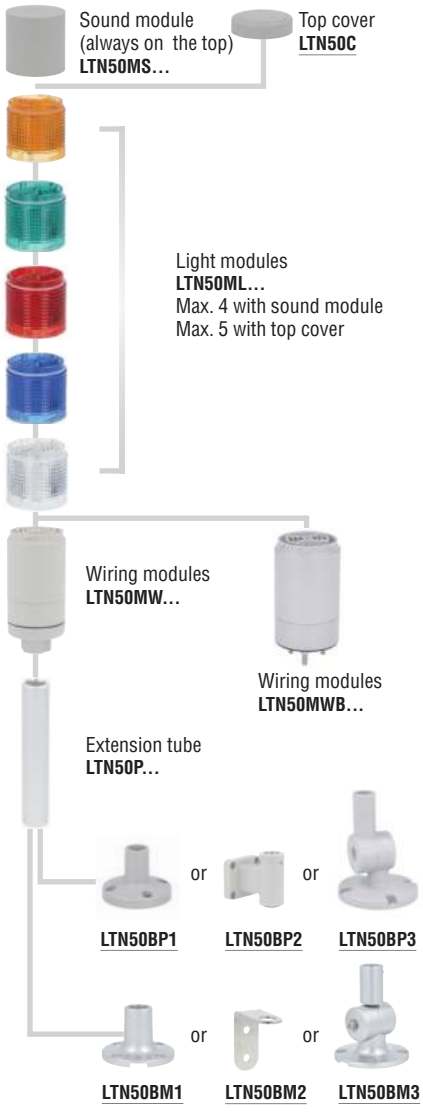
❶ For light towers including both white light module and sound modules please check the wiring diagram at page 9-17.
❷ For fixing base LTN50BP2 the extension tube LTNP... without threaded end has to be used.

General characteristics
Signal towers are fundamental elements in manufacturing processes for the visual and audible signaling of the system status.
The signal towers can be assembled by stacking up to 5 light modules or 4 light modules and 1 sound module.

Technical characteristics
- maximum operational voltage: 26.4VDC - 240VAC
- light, sound and wiring modules consumption:
  - light modules: 1.2VA
  - sound modules: 1.7VA
  - wiring modules: 1VA
- number of stackable modules: 5
- connections: screw clamp terminals and conductor section 0.25...1.5mm²/AWG16...24
- operating temperature: -30...+50°C
- IEC degree of protection: IP65 for wiring modules, light modules, top cover and sound module LTN50MSL.

Certifications and compliance
Certifications obtained: cULus, EAC.
Compliant with standards: IEC/EN/BS 60947-5-1, IEC/EN/BS 60947-1, UL508, CSA C22.2 n° 14.

Combinations



Signal towers Ø70mm/2.75” LTN... series

LTN70ML3

LTN70MSH

LTN70MSL

LTN70C

LTN70MW024

LTN70MWB024

LTN70BP1

LTN70BM1

LTN70BP2

LTN70BM2

LTN70BP3

LTN70BM3

LTN70P100

LTN70P050

LTN70P100T

LTN70P050T

Order code	Description	Qty per pkg	Wt.
		n°	[kg]
Blinking or steady light modules. Integrated LED lamp.			
LTN70ML1	Orange	1	0.066
LTN70ML3	Green	1	0.066
LTN70ML4	Red	1	0.066
LTN70ML6	Blue	1	0.066
LTN70ML8❶	White	1	0.066
Continuous sound modules❶.			
LTN70MSL	85dB/1m. IP65, Type 4	1	0.065
LTN70MSH	100dB/1m. IP20	1	0.062
Wiring modules.			
LTN70MW024	12...24VDC tube mounting	1	0.170
LTN70MW230	110...230VAC tube mounting	1	0.277
LTN70MWB024	12...24VDC screw mounting	1	0.170
LTN70MWB230	110...230VAC screw mounting	1	0.277
Top cover.			
LTN70C	To be used only if sound module is not present	5	0.014
Fixing bases.			
LTN70BP1	Horizontal surface, mounting, grey plastic	1	0.040
LTN70BP2❷	Horizontal surface mounting, grey plastic	1	0.067
LTN70BP3	Horizontal surface or wall mounting, grey plastic	1	0.094
LTN70BM1	Horizontal surface mounting, metal	1	0.101
LTN70BM2	Wall mounting, metal	1	0.131
LTN70BM3	Horizontal surface or wall mounting, metal	1	0.242
Extension tubes with threaded end.			
LTN70P050T	50mm/1.97”, metal	5	0.022
LTN70P100T	100mm/3.94”, metal	5	0.039
LTN70P250T	250mm/9.84, metal	5	0.100
LTN70P400T	400mm/15.75”, metal	5	0.163
Extension tubes for LTN70BP2.			
LTN70P050	50mm/1.97”, metal	5	0.022
LTN70P100	100mm/3.94”, metal	5	0.043
LTN70P250	250mm/9.84, metal	5	0.105
LTN70P400	400mm/15.75”, metal	5	0.167

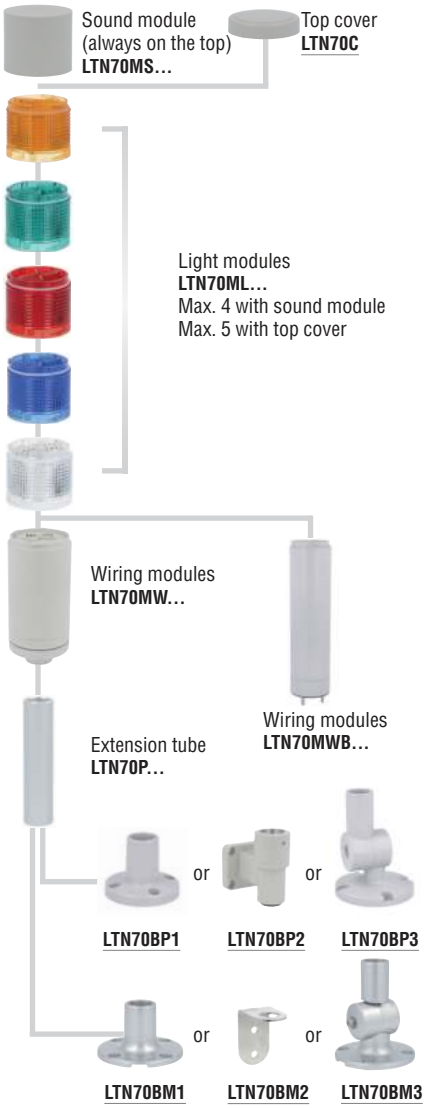
❶ For light towers including both white light module and sound modules please check the wiring diagram at page 9-17.
❷ For fixing base LTN70BP2 the extension tube LTNP... without threaded end has to be used.
❸ Extension tubes with threaded end LTNP...T have to be used for all the fixing bases except for LTN70BP2.

General characteristics
The signal towers can be assembled by stacking up to 5 light modules or 4 light modules and 1 sound module.

Technical characteristics
- maximum operational voltage: 26.4VDC - 240VAC
- light, sound and wiring modules consumption:
  - light modules: 1.2VA
  - sound modules: 1.7VA
  - wiring modules: 1VA
- number of stackable modules: 5
- connections: screw clamp terminals and conductor section 0.25...1,5mm²/AWG16...24
- operating temperature: -30...+50°C
- IEC degree of protection: IP65 for wiring modules, light modules, top cover and sound module LTN70MSL.

Certifications and compliance
Certifications obtained:: cULus, EAC.
Compliant with standards: IEC/EN/BS 60947-5-1, IEC/EN/BS 60947-1, UL508, CSA C22.2 n° 14.

Combinations



Multicoloured signal towers Ø70mm/2.75” 8LT73... type

8LT73S...

8LT73B...

Order code	Description	Qty per pkg	Wt.
		n°	[kg]
Steady light and pulsed or continuous sound multicoloured light modules. Built-in LED circuit ❶.			
8LT73B9A	Green, orange, red, 24VDC	1	0.090
8LT73S2B9A	Green, orange, red, with continuous or pulsed sound 24VDC	1	0.200
8LT73B9B	Blue, orange, red, 24VDC	1	0.090
8LT73S2B9B	Blue, orange, red, with continuous or pulsed sound 24VDC	1	0.200

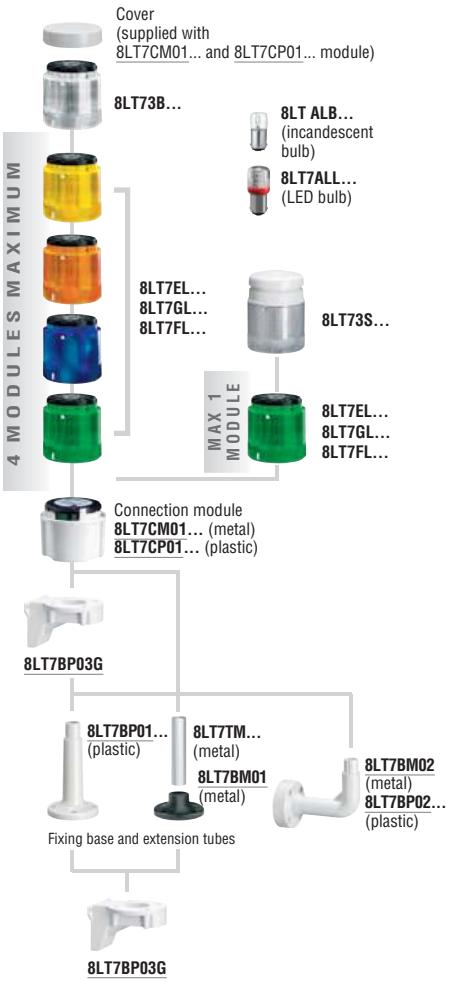
❶ For accessories and spare parts see page 9-9 and 10.

General characteristics
The multicoloured signal towers incorporate the possibility of up to 3 different colours in a single light module.
In the event of two or more alarms, the multicoloured module lights up in alternating colours corresponding to the event. The multicoloured module must always be placed last, at the top of the tower, should it be used together with light modules 8LT7EL... 8LT7GL... or 8LT7FL....

Technical characteristics
- Supply voltage: 24VDC (±10%)
- Light and sound module consumption: 90mA
- Sound intensity: 90dB/1m
- Material: polycarbonate
- Number of stackable elements: 4 with 8LT73B modules, 1 with 8LT73S modules
- Connections: screw clamp terminals and maximum conductor section 1.5mm²/16AWG
- Tightening torque: 0.5Nm/4.5lb.in
- Operating temperature: -20...+50 °C
- IEC degree of protection: IP65.

Certifications and compliance
Certifications obtained: cULus, EAC.
Compliant with standards: IEC/EN/BS 60947-5-1, IEC/EN/BS 60947-1, UL508, CSA C22.2 n° 14.

Combinations



For accessories and spare parts see page 9-9 and 10.

Signal towers Ø70mm/2.75", 8LT7... series

8LT7EL ...
8LT7GL ...
8LT7FL ...

Order code	Description	Qty per pkg	Wt.
		n°	[kg]
Steady light modules. BA15d fitting ❶. Bulb (8LT7ALB... and 8LT7ALL...) not included.			
8LT7EL1	Orange	1	0.082
8LT7EL3	Green	1	0.082
8LT7EL4	Red	1	0.082
8LT7EL5	Yellow	1	0.082
8LT7EL6	Blue	1	0.082
8LT7EL8	White	1	0.082
Blinking light modules. BA15d fitting ❶. Bulb (8LT7ALB... and 8LT7ALL...) not included.			
8LT7GLB1	Orange, 24VAC/DC	1	0.083
8LT7GLB3	Green, 24VAC/DC	1	0.083
8LT7GLB4	Red, 24VAC/DC	1	0.083
8LT7GLB5	Yellow, 24VAC/DC	1	0.083
8LT7GLB6	Blue, 24VAC/DC	1	0.083
8LT7GLB8	White, 24VAC/DC	1	0.083
8LT7GLE1	Orange, 110...120VAC	1	0.083
8LT7GLE3	Green, 110...120VAC	1	0.083
8LT7GLE4	Red, 110...120VAC	1	0.083
8LT7GLE5	Yellow, 110...120VAC	1	0.083
8LT7GLE6	Blue, 110...120VAC	1	0.083
8LT7GLE8	White, 110...120VAC	1	0.083
8LT7GLM1	Orange, 230...240VAC	1	0.083
8LT7GLM3	Green, 230...240VAC	1	0.083
8LT7GLM4	Red, 230...240VAC	1	0.083
8LT7GLM5	Yellow, 230...240VAC	1	0.083
8LT7GLM6	Blue, 230...240VAC	1	0.083
8LT7GLM8	White, 230...240VAC	1	0.083
Flash light modules. With 4-joule xenon bulb ❶.			
8LT7FLB1	Orange, 24VAC/DC	1	0.092
8LT7FLB3	Green, 24VAC/DC	1	0.092
8LT7FLB4	Red, 24VAC/DC	1	0.092
8LT7FLB5	Yellow, 24VAC/DC	1	0.092
8LT7FLB6	Blue, 24VAC/DC	1	0.092
8LT7FLB8	White, 24VAC/DC	1	0.092
8LT7FLE1	Orange, 110...120VAC	1	0.092
8LT7FLE3	Green, 110...120VAC	1	0.092
8LT7FLE4	Red, 110...120VAC	1	0.092
8LT7FLE5	Yellow, 110...120VAC	1	0.092
8LT7FLE6	Blue, 110...120VAC	1	0.092
8LT7FLE8	White, 110...120VAC	1	0.092
8LT7FLM1	Orange, 230...240VAC	1	0.092
8LT7FLM3	Green, 230...240VAC	1	0.092
8LT7FLM4	Red, 230...240VAC	1	0.092
8LT7FLM5	Yellow, 230...240VAC	1	0.092
8LT7FLM6	Blue, 230...240VAC	1	0.092
8LT7FLM8	White, 230...240VAC	1	0.092

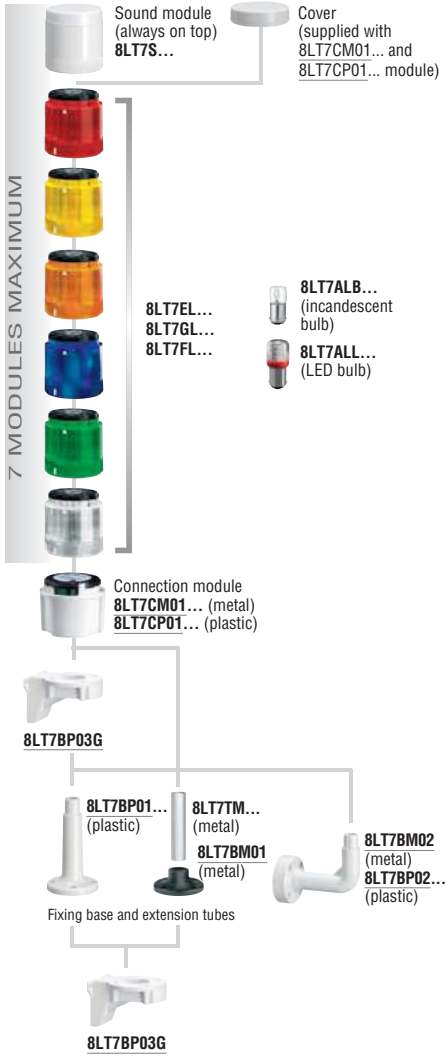
❶ For accessories and spare parts see page 9-9 and 10.

General characteristics
Signal towers are fundamental elements in manufacturing processes for the visual and audible signalling of the system status.
The signal towers can be assembled by stacking up to 7 modules, in the following sequence, starting from the top: red, yellow, orange, blue, green and white.

Technical characteristics
- Maximum operational voltage: 250VAC/DC
- Flash light and sound module consumption:
  - 8LT7FLB... in AC: 135mA
  - 8LT7FLB... in DC: 75mA
  - 8LT7FLE... 20mA
  - 8LT7FLM... 15mA
- Material: polycarbonate or anodised aluminium
- Number of stackable modules: 7
- Connections: screw clamp terminals and maximum conductor section 1.5mm²/16AWG
- Tightening torque: 0.5Nm/4.5lb.in
- Operating temperature: -20...+50°C (12VAC max. up to +40°C)
- IEC degree of protection: IP65.

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus - file E318016) as Power Circuit and motor-mounted Apparatus - Stackable tower lights, EAC.
Compliant with standards: IEC/EN/BS 60947-5-1, IEC/EN/BS 60947-1, UL508, CSA C22.2 n° 14.

Combinations



For accessories and spare parts see page 9-9 and 10.

Signal towers Ø70mm/2.75", 8LT7... series

8LT7S...G

8LT7S...

8LT7CM01G
8LT7CP01G

8LT7CM01
8LT7CP01

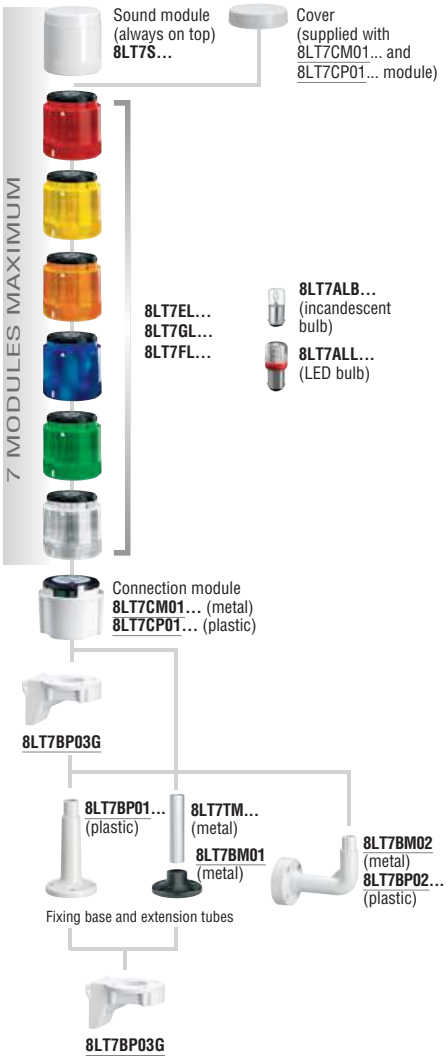
Order code	Description		Qty per pkg	Wt.
			n°	[kg]
Pulsed or continuous sound modules, grey colour ❶.				
8LT7S0BG	24VAC/DC, pulsed (90dB). IP54		1	0.240
8LT7S1BG	24AC/DC, 16 sounds select. (max. 90dB). IP65		1	0.240
8LT7S2BG	24VAC/DC	puls. sound (78dB)❷ or continuous (75dB)❸. IP65	1	0.240
8LT7S2EG	110...120VAC		1	0.240
8LT7S2MG	230...240VAC		1	0.240
Pulsed or continuous sound modules, black colour ❶.				
8LT7S0B	24VAC/DC, pulsed (90dB). IP54		1	0.240
8LT7S1B	24AC/DC, 16 sounds select. (max. 90dB). IP65		1	0.240
8LT7S2B	24VAC/DC	puls. sound (78dB)❷ or continuous (75dB)❸. IP65	1	0.240
8LT7S2E	110...120VAC		1	0.240
8LT7S2M	230...240VAC		1	0.240
Connection modules and cover (bottom entry).				
8LT7CP01G	For plastic tubes, grey colour		1	0.110
8LT7CM01G	For metal tubes, grey colour		1	0.120
8LT7CP01	For plastic tubes, black colour		1	0.110
8LT7CM01	For metal tubes, black colour		1	0.120

❶ For accessories and spare parts see page 9-9 and 10.
❷ For 8LT7S2B... = 84.5dB.
❸ For 8LT7S2B... = 82.6dB.

Technical characteristics
- The sound module must always be placed last, on the top of the tower (it cannot be fitted with an 8LT73... multicoloured module).
- Sound module consumption:
  - 8LT7S0B...: 25mA
  - 8LT7S1B...: 40mA
  - 8LT7S2B...: 200mA
  - 8LT7S2E...: 40mA
  - 8LT7S2M...: 30mA
- Material: polycarbonate
- Max. number of sound modules: 1 per tower
- Connections: screw clamp terminals and maximum conductor section 1.5mm²/16AWG
- Tightening torque: 0.5Nm/4.5lb.in
- Operating temperature: -20...+50°C (12VAC max. up to +40°C)
- IEC degree of protection: IP65 (IP54 if 8LT7S0B... sound module used).

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus - file E318016) as Power Circuit and motor-mounted Apparatus - Stackable tower lights, EAC.
Compliant with standards: IEC/EN/BS 60947-5-1, IEC/EN/BS 60947-1, UL508, CSA C22.2 n° 14.

Combinations



For accessories and spare parts see page 9-9 and 10.

Signal beacons Ø62mm/2.44", 8LB... series

8LB6EL...
8LB6GL...
8LB6S2...

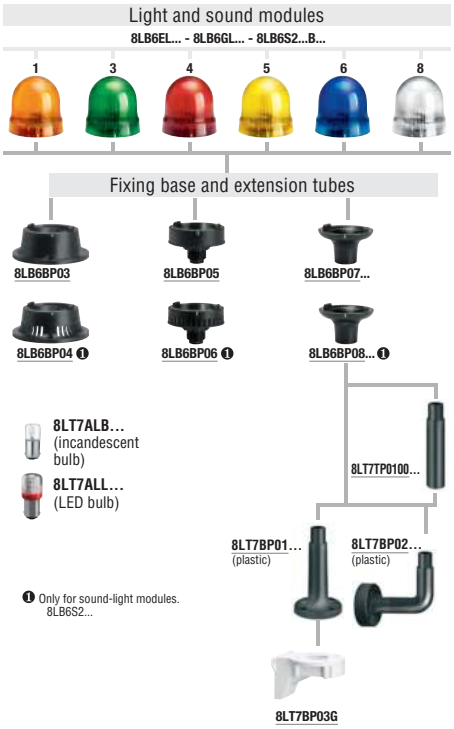
Order code	Description	Qty per pkg	Wt.
		n°	[kg]
Steady light modules. BA15d fitting. Bulb (8LT7ALB... and 8LT7ALL...) not included.			
8LB6EL1	Orange	1	0.060
8LB6EL3	Green	1	0.060
8LB6EL4	Red	1	0.060
8LB6EL5	Yellow	1	0.060
8LB6EL6	Blue	1	0.060
8LB6EL8	White	1	0.060
Blinking or steady light modules. BA15d fitting. Bulb (8LT7ALB... and 8LT7ALL...) not included.			
8LB6GLB1	Orange, 12...48VAC/DC	1	0.060
8LB6GLB3	Green, 12...48VAC/DC	1	0.060
8LB6GLB4	Red, 12...48VAC/DC	1	0.060
8LB6GLB5	Yellow, 12...48VAC/DC	1	0.060
8LB6GLB6	Blue, 12...48VAC/DC	1	0.060
8LB6GLB8	White, 12-48VAC/DC	1	0.060
8LB6GLM1	Orange, 24...230VAC	1	0.060
8LB6GLM3	Green, 24...230VAC	1	0.060
8LB6GLM4	Red, 24...230VAC	1	0.060
8LB6GLM5	Yellow, 24...230VAC	1	0.060
8LB6GLM6	Blue, 24...230VAC	1	0.060
8LB6GLM8	White, 24...230VAC	1	0.060
Light and sound pulsed or continuous sound modules. Bulb included.			
8LB6S2B1	Orange, 24VAC/DC (80dB)	1	0.060
8LB6S2B3	Green, 24VAC/DC (80dB)	1	0.060
8LB6S2B4	Red, 24VAC/DC (80dB)	1	0.060
8LB6S2B5	Yellow, 24VAC/DC (80dB)	1	0.060
8LB6S2B6	Blue, 24VAC/DC (80dB)	1	0.060
8LB6S2B8	White, 24VAC/DC (80dB)	1	0.060

General characteristics
Signal beacons are fundamental elements in manufacturing processes for the visual and audible signalling of the system status.

Technical characteristics
- Maximum operational voltage: 250VAC/DC
- Sound module consumption: 8LB6S2...:150mA
- Material: polycarbonate
- Connections: screw clamp terminals and maximum conductor section 1.5mm²/16AWG
- Tightening torque: 0.5Nm/4.5lb.in
- Operating temperature: -20...+50°C
- IEC degree of protection: IP54 (IP30 if used with bases 8LB6BP04, 8LB6BP06, 8LB6BP08...).

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60947-5-1, IEC/EN/BS 60947-1.

Combinations



Plastic fixing bases and extension tubes for 8LT... and 8LB... series

8LT7BP01G

8LT7BP01

8LT7BP02G

8LT7BP02

8LT7BP03G

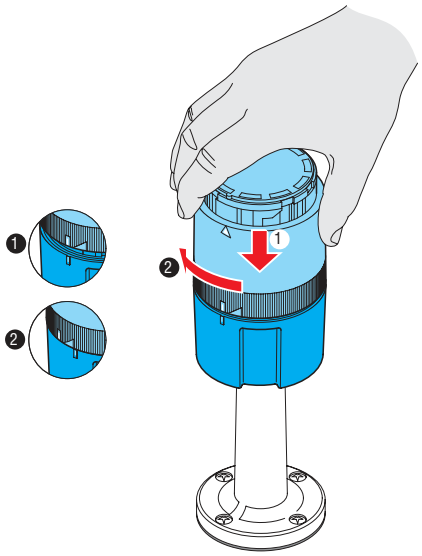
8LT7TP0100G

8LT7TP0100

Order code	Description	Qty per pkg	Wt.
		n°	[kg]
Plastic fixing bases.			
8LT7BP01G	Horizontal surface mount, plastic grey colour with 100mm/3.94" extension	1	0.045
8LT7BP02G	Vertical wall mount, plastic, grey colour	1	0.078
8LT7BP03G	90° vertical wall mount, grey colour	1	0.080
8LT7BP01	Horizontal surface mount, plastic, black colour with 100mm/3.94" extension	1	0.045
8LT7BP02	Vertical wall mount, plastic, black colour	1	0.078
Extension tubes for plastic bases.			
8LT7TP0100G	100mm/3.94", grey colour	1	0.029
8LT7TP0100	100mm/3.94", black colour	1	0.029

General characteristics

The assembly operation for the signal towers is simple and fast and does not require the use of any tools.
The bayonet fitting with slight pressure and simple circular movement makes it possible to mount each element on top of the previous one. There are specific white marks to indicate the correct alignment.



9

Bulbs for 8LT... and 8LB... series

8LT7ALB...

8LT7ALL...

Order code	Description	Qty per pkg	Wt.
		n°	[kg]
Incandescent bulbs, 5W, BA15d fitting.			
8LT7ALBA	12VAC/DC	10	0.006
8LT7ALBB	24VAC/DC	10	0.006
8LT7ALBE	130VAC/DC	10	0.006
8LT7ALBM	260VAC/DC	10	0.006
LED bulbs, BA15d fitting.			
8LT7ALLA4	Red, 12VAC/DC	10	0.010
8LT7ALLA8	White, 12VAC/DC	10	0.010
8LT7ALLB3	Green, 24VAC/DC	10	0.010
8LT7ALLB4	Red, 24VAC/DC	10	0.010
8LT7ALLB5❶	Yellow/Orange, 24VAC/DC	10	0.010
8LT7ALLB6	Blue, 24VAC/DC	10	0.010
8LT7ALLB8	White, 24VAC/DC	10	0.010
8LT7ALLE3	Green, 110...120VAC	10	0.010
8LT7ALLE4	Red, 110...120VAC	10	0.010
8LT7ALLE5❶	Yellow/Orange, 110...120VAC	10	0.010
8LT7ALLE6	Blue, 110...120VAC	10	0.010
8LT7ALLE8	White, 110...120VAC	10	0.010
8LT7ALLM3	Green, 230...240VAC	10	0.010
8LT7ALLM4	Red, 230...240VAC	10	0.010
8LT7ALLM5❶	Yellow/Orange, 230...240VAC	10	0.010
8LT7ALLM6	Blue, 230...240VAC	10	0.010
8LT7ALLM8	White, 230...240VAC	10	0.010

❶ Used with yellow or orange light modules.

Technical characteristics

– Consumption of bulb fitted on light modules:
- 8LT7ALBA: 420mA
- 8LT7ALBB: 210mA
- 8LT7ALBE: 43mA
- 8LT7ALBM: 22mA
- 8LT7ALLA...: <60mA
- 8LT7ALLB...: <30mA
- 8LT7ALLE...: <20mA
- 8LT7ALLM...: <20mA.

Compliance

Compliant with standards: IEC/EN/BS 60947-5-1, IEC/EN/BS 60947-1, UL508, CSA C22.2 n° 14.

Metal fixing bases and extension tube for multicoloured signal towers Ø70mm/2.75” and signal towers assembled Ø45mm/1.77”

8LT7BM01

8LT7BM02

8LT7TM

Order code	Description	Qty per pkg	Wt.
		n°	[kg]
Metal fixing bases.			
8LT7BM01	Horizontal surface mount, metal, black	1	0.099
8LT7BM02	Wall mount, metal	1	0.184
Extension tubes for metal bases, anodised aluminium.			
8LT7TM0100	120mm/4.72”	1	0.016
8LT7TM0200	220mm/8.66”	1	0.024
8LT7TM0300	320mm/12.60”	1	0.048
8LT7TM0400	420mm/16.53”	1	0.064
8LT7TM0500	520mm/20.74”	1	0.080
8LT7TM1000	1020mm/40.16”	1	0.160

Metal fixing bases for 8LB... series

8LB6BP07G

8LB6BP03

8LB6BP05

8LB6BP07

8LB6BP08G

8LB6BP04

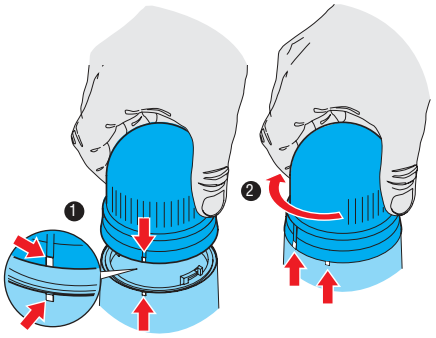
8LB6BP06

8LB6BP08

Order code	Description	Qty per pkg	Wt.
		n°	[kg]
Fixing bases for light modules.			
8LB6BP07G	For extension connection, plastic, grey. Use with fixing bases 8LT7BP01G and 8LT7BP02G	1	0.020
8LB6BP03	For horizontal mount, plastic, black	1	0.040
8LB6BP05	For hole Ø22mm/0.87", plastic, black	1	0.040
8LB6BP07	For extension connection, plastic, black. Use with fixing bases 8LT7BP01 and 8LT7BP02	1	0.020
Fixing bases for light and sound modules.			
8LB6BP08G	For extension connection, plastic, grey. Use with fixing bases 8LT7BP01G and 8LT7BP02G	1	0.020
8LB6BP04	For horizontal mount, plastic, black	1	0.040
8LB6BP06	For hole Ø22mm/0.87", plastic, black	1	0.040
8LB6BP08	For extension connection, plastic, black. Use with fixing bases 8LT7BP01 and 8LT7BP02	1	0.020

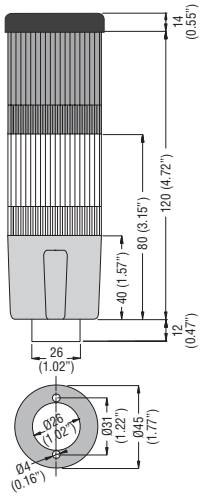
General characteristics

The assembly operation of the light and sound modules is simple and fast and does not require the use of any tools. There are specific white marks to indicate the correct alignment.

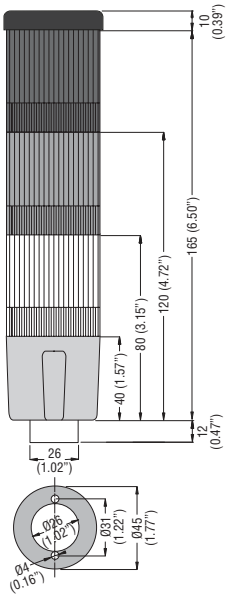


SIGNAL TOWERS READY ASSEMBLED Ø45mm/1.77”

8LT4K02BG



8LT4K03BG



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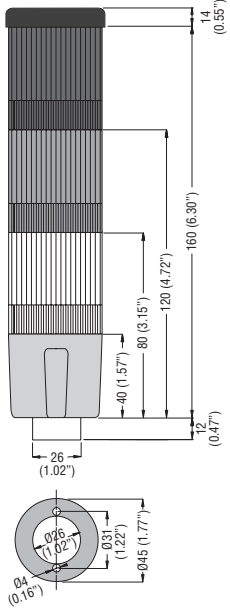

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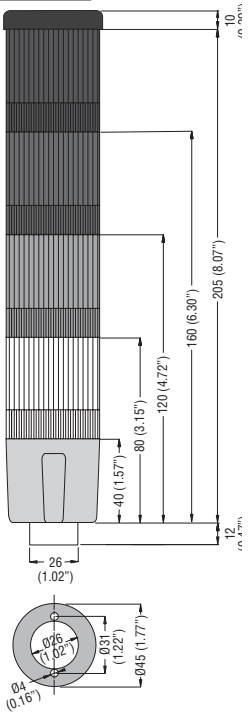

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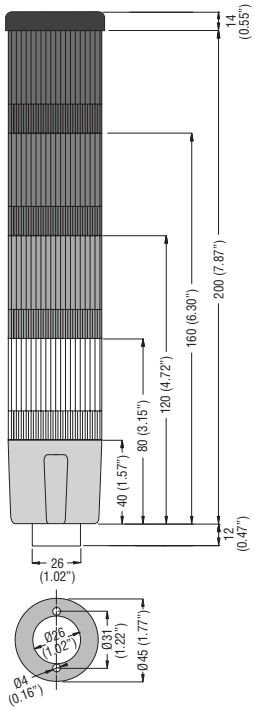

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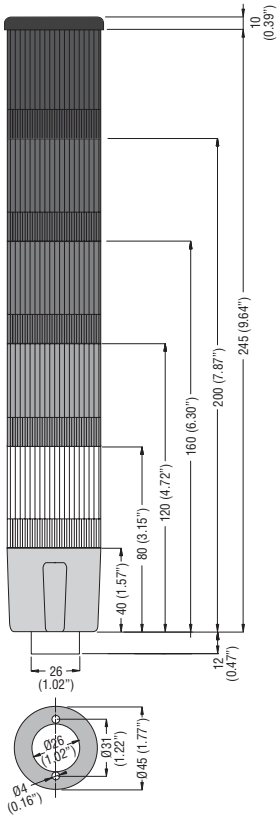

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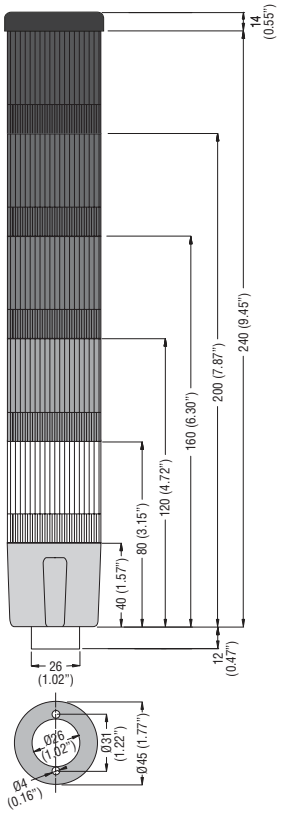

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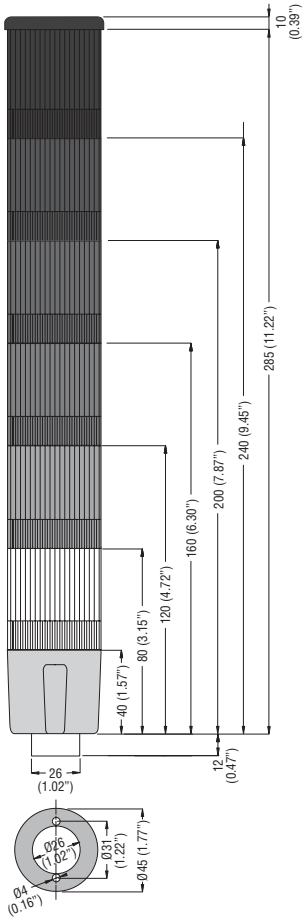
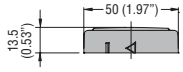
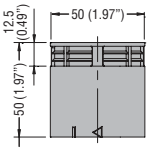


SIGNAL TOWERS Ø50mm/1.97”

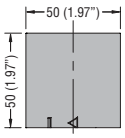
Top cover
LTN50C



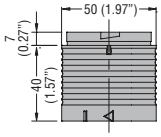
Sound modules
LTN50MSH

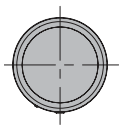


LTN50MSL

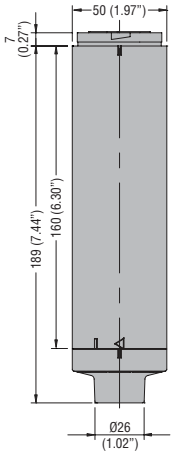


Light modules
LTN50ML

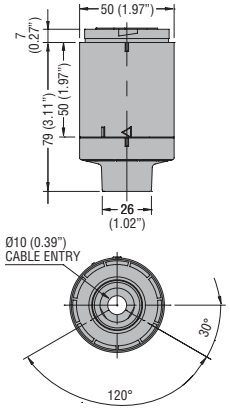




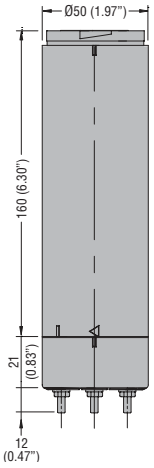
Wiring modules tube mounting
LTN50MW230



LTN50MW024



Wiring modules screw mounting
LTN50MWB230



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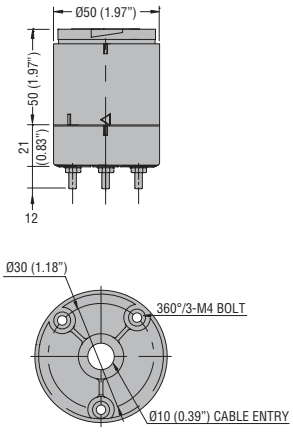
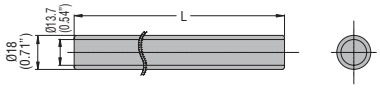
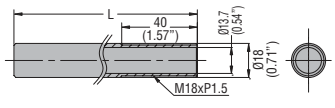


Extension tubes
LTN50P…



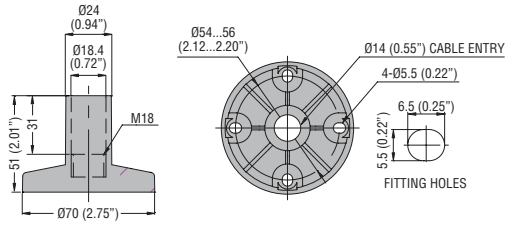
Type	L (mm/in)
LTP50P050	50 (1.97”)
LTP50P100	100 (3.94”)
LTP50P250	250 (9.84”)
LTP50P400	400 (15.75”)

LTN50P…T

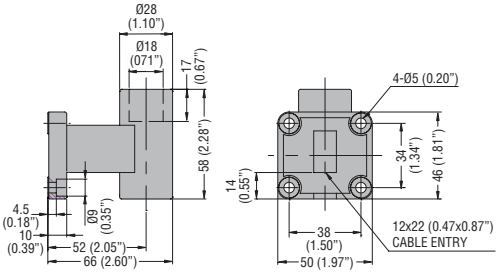


Type	L (mm/in)
LTP50P050T	50 (1.97”)
LTP50P100T	100 (3.94”)
LTP50P250T	250 (9.84”)
LTP50P400T	400 (15.75”)

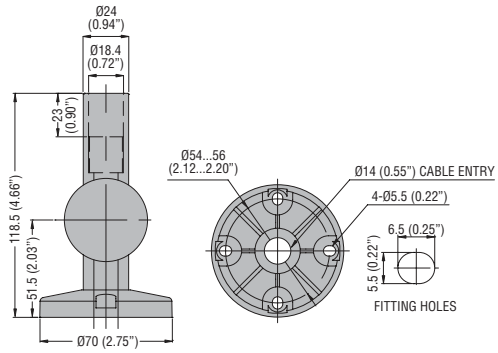
Fixing bases
LTN50BP1



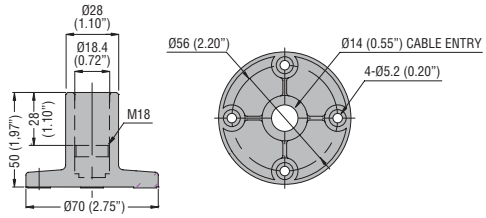
LTN50P2



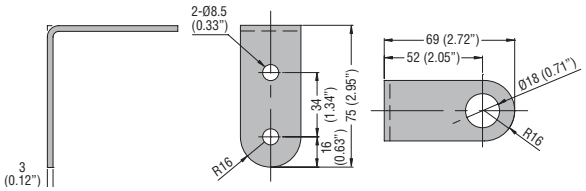
LTN50BP3



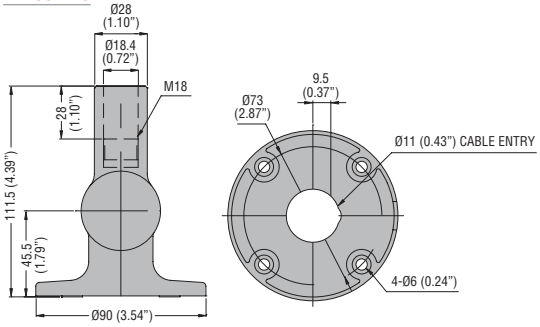
LTN50BM1



LTN50M2

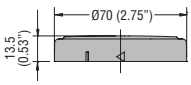


LTN50BM3

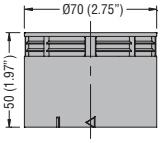


SIGNAL TOWERS Ø70mm/2.75”

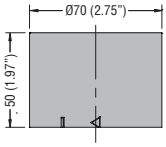
Top cover
LTN70C



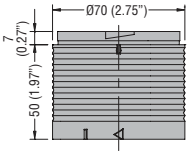
Sound modules
LTN70MSH

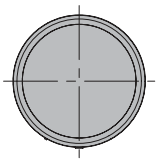


LTN70MSL

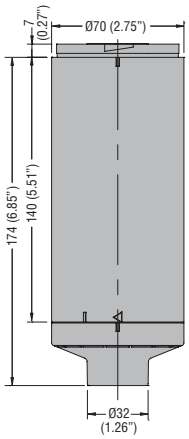


Light modules
LTN70ML

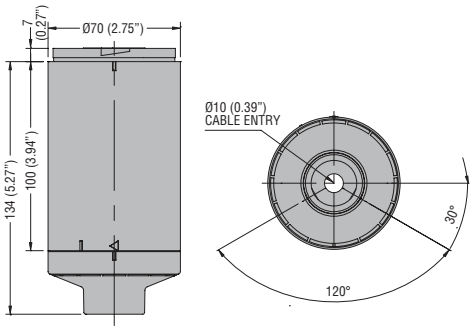




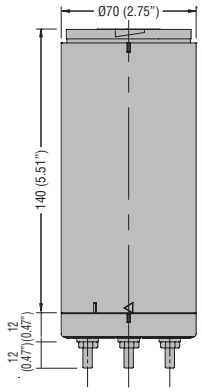
Wiring modules tube mounting
LTN70MW230



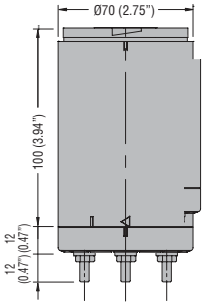
LTN70MW024

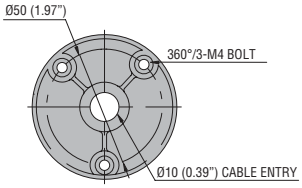


Wiring modules screw mounting
LTN70MWB230

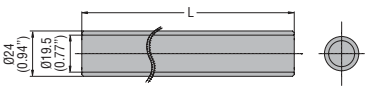


LTN70MWB024



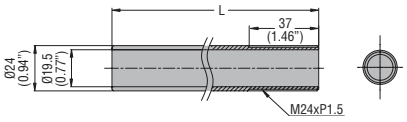


Extension tubes
LTN70P...



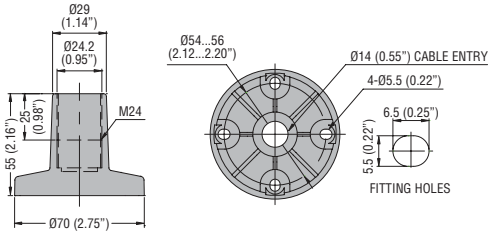
Type	L (mm/in)
LTP70P050	50 (1.97”)
LTP70P100	100 (3.94”)
LTP70P250	250 (9.84”)
LTP70P400	400 (15.75”)

LTN70P...T

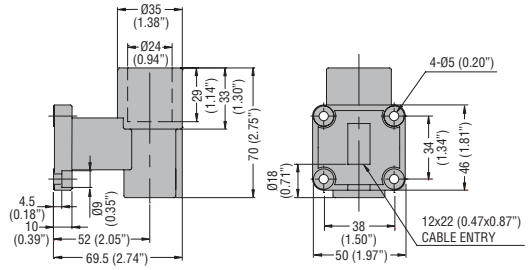


Type	L (mm/in)
LTP70P050T	50 (1.97”)
LTP70P100T	100 (3.94”)
LTP70P250T	250 (9.84”)
LTP70P400T	400 (15.75”)

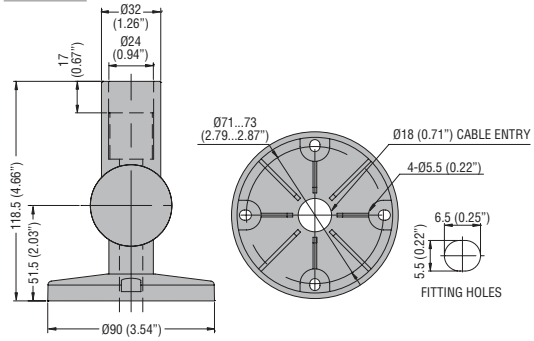
Fixing bases
LTN70BP1



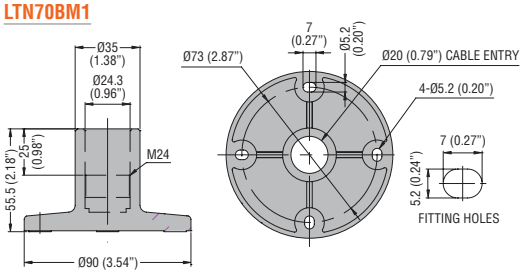
LTN70P2



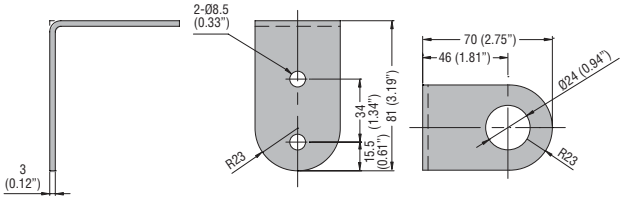
LTN70BP3



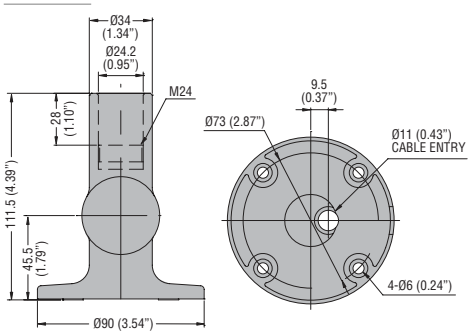
LTN70BM1



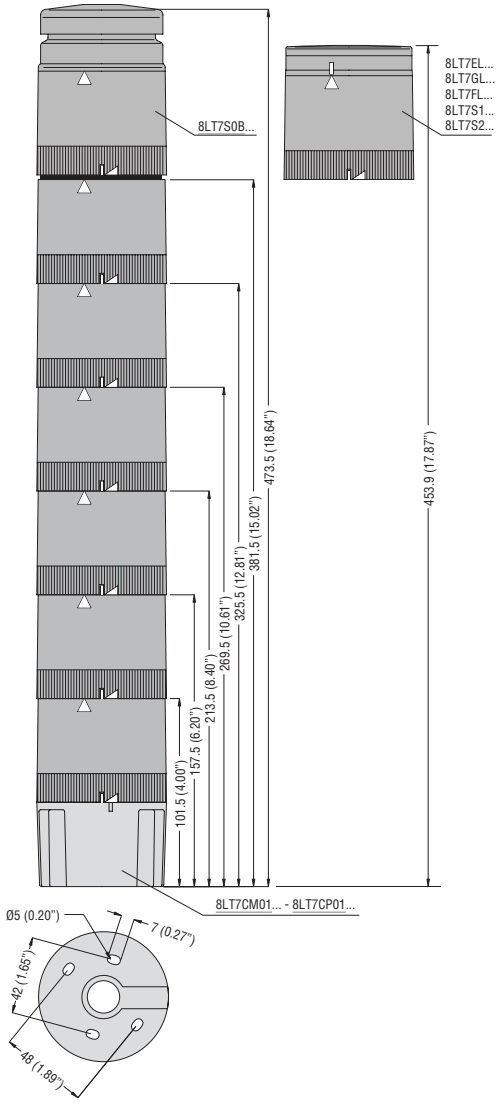
LTN70M2



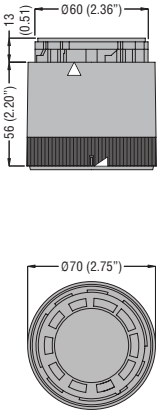
LTN70BM3



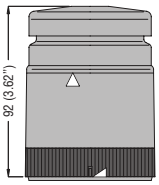
MULTICOLOURED SIGNAL TOWERS Ø70mm/2.75” AND SIGNAL TOWERS Ø70mm/2.75” 8LT... SERIES

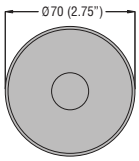


Light modules
8LT7EL...
8LT7GL...
8LT7FL...
8LT73B...

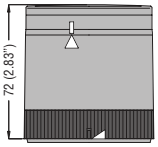


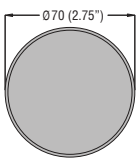
Sound modules
8LT7S0B...
8LT73S2...



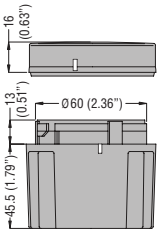


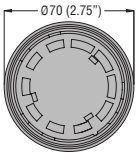
8LT7S1...
8LT7S2...





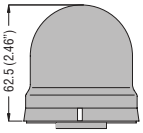
Bases
8LT7CM01...
8LT7CP01...

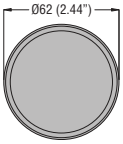




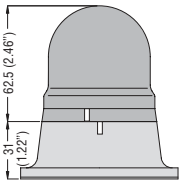
SIGNAL BEACONS Ø62mm/2.44”

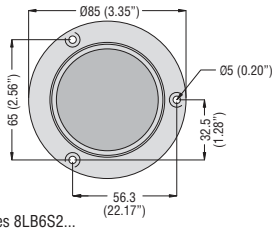
8LB6EL...
8LB6GL...
8LB6S2...



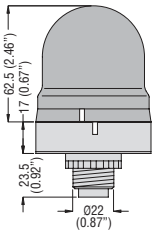


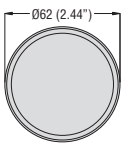
8LB6...
with base **8LB6BP03**
and **8LB6BP04** ❶



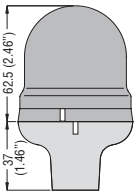


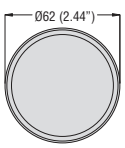
8LB6...
with base **8LB6BP05**
and **8LB6BP06** ❶

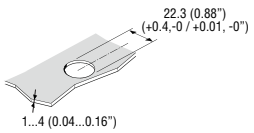




8LB6...
with base **8LB6BP07...**
and **8LB6BP08** ❶...



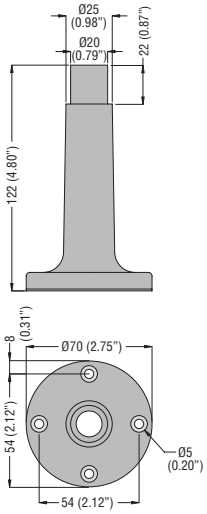




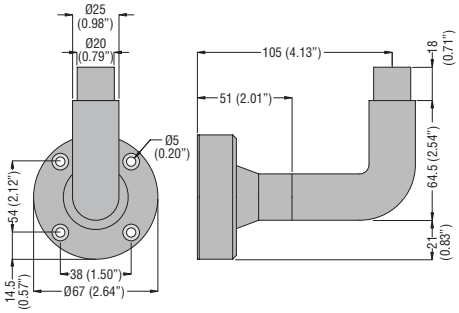
❶ With slits for light and sound modules 8LB6S2...

FIXING BASES AND EXTENSIONS FOR 8LT... SERIES

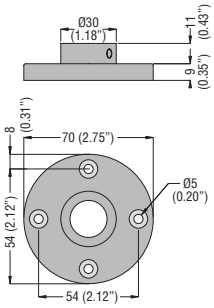
8LT7BP01...



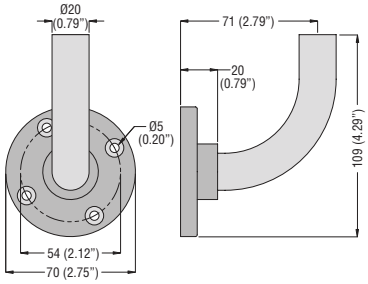
8LT7BP02...



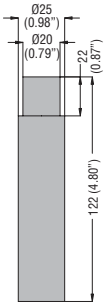
8LT7BM01



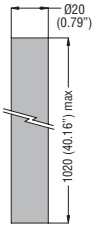
8LT7BM02



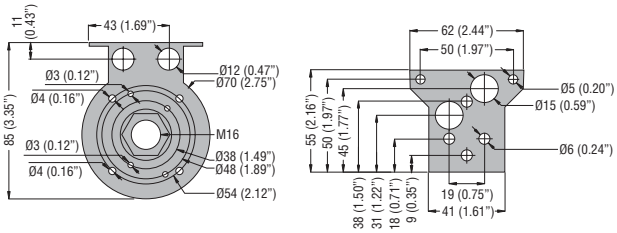
8LT7TP0100...



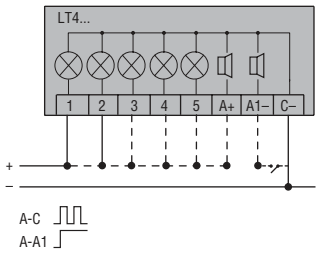
8LT7TM...



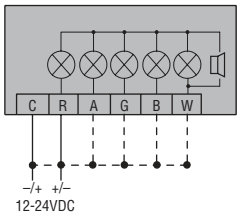
8LT7BP03G

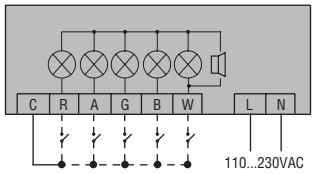


SIGNAL TOWERS ASSEMBLED Ø45mm/1.77”
8LT4...

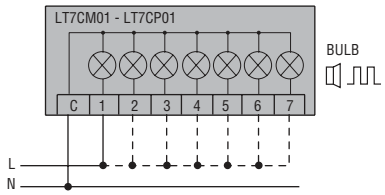


SIGNAL TOWERS Ø50mm/1.97” AND Ø70mm/2.75” LTN... SERIES



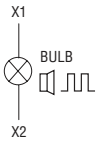


MULTICOLOURED SIGNAL TOWERS Ø70mm/2.75”
AND SIGNAL TOWERS Ø70mm/2.75”
8LT7...



Connect terminals C and 1 as indicated to power the first module.
If other modules are fitted, the respective terminals must be connected accordingly.

SIGNAL BEACONS Ø62mm/2.44”
8LB6...



Control and signalling

Limit, micro and foot switches

- Dimensions compatible to EN/BS 50047
- Direct opening action of NC contacts
- Extensive range of operating heads
- Versions complete with interchangeable and rotatable heads
- Versions with removable and interchangeable auxiliary contact blocks.

	Sec. - Page
Metal and plastic limit switches, K series (dimensions to/compatible to EN/BS 50047)	
Top push rod plunger	10 - 2
Top roller push plunger	10 - 3
Roller centre push lever	10 - 4
Roller side push lever	10 - 5
Roller lever plunger	10 - 6
Adjustable roller lever	10 - 8
Ceramic rod lever	10 - 10
Adjustable rod lever	10 - 11
Wobble stick, omnidirectional	10 - 12
Accessories and spare parts	10 - 13
Prewired metal limit switches	**10 - 15**
Metal limit switches, PL series	
Top push rod plunger, top roller push plunger, roller centre push lever	10 - 16
Latch and manual release	10 - 17
Manual reload and magnetic release	10 - 17
Bi-directional	10 - 17
Rope-pull lever limit switches for normal stopping	**10 - 18**
Plastic micro switches	**10 - 20**
Foot switches	**10 - 21**
Dimensions	**10 - 22**
Wiring diagrams	**10 - 27**

Page 10-2

PLASTIC AND METAL LIMIT SWITCHES K SERIES

- Dimensions to EN/BS 50047 standards for KB and KM types
- Dimensions compatible to EN/BS 50047 for KC and KN types
- Self-extinguishing polymer thermoplastic housing (KB-KC types)
- Aluminium-zinc alloy housing (KM-KN types)
- Removable and interchangeable auxiliary contact blocks
- Bi-directional versions
- Unique fixing mechanism of operating head
- IEC degree of protection IP65
- M20 cable entry; PG13.5 or 1/2 NPT entry available.

Page 10-16

METAL LIMIT SWITCHES PL SERIES

- Aluminium-zinc alloy housing
- Maximum of 2 auxiliary contacts
- IEC degree of protection IP40 and IP65
- PG11 cable entry.

Page 10-20

PLASTIC MICRO SWITCHES

- Polymer thermoplastic housing
- Changeover contact switch
- IEC degree of protection IP00 or IP20.

Page 10-15

PREWIRED METAL LIMIT SWITCHES

- Dimensions to EN/BS 50047 standards
- 2 meter long cable
- IEC degree of protection IP67.

Page 10-18

ROPE-PULL LEVER LIMIT SWITCHES FOR NORMAL STOPPING

- Self-extinguishing polymer thermoplastic housing
- Aluminium-zinc alloy housing
- IEC degree of protection IP40, IP65
- PG11 cable entry.

Page 10-21

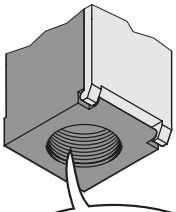
FOOT SWITCHES

- Versions with or without protection cover
- Self-extinguishing polymer thermoplastic housing
- Aluminium-zinc alloy housing
- IEC degree of protection IP20, IP54 and IP65
- M20 cable entry.

Top push rod plunger

KBA... - KMA...

KCA... - KNA...



M20 CABLE ENTRY
For types with PG13.5 cable entry, add the letter P at the end of the order code while for 1/2 NPT, add N.
E.g. KBA1S11P - KBA1S11N

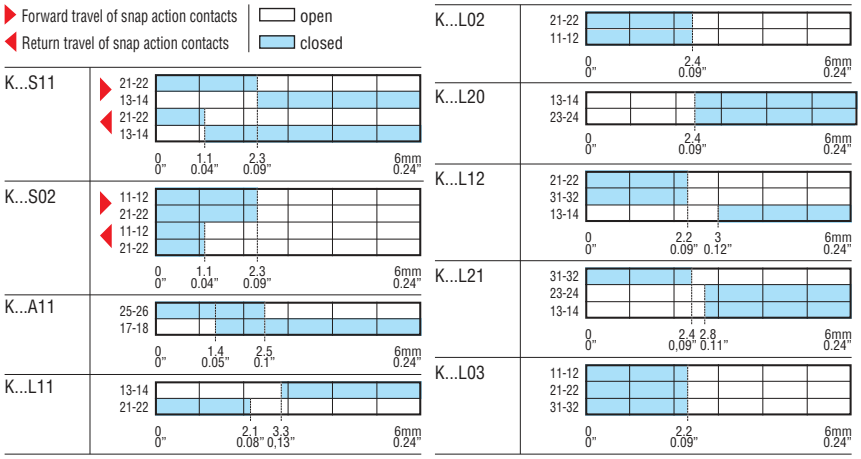
Order code Plastic body	Metal body	Contacts	Plunger material	Qty per pkg	Wt
				n°	[kg]
One bottom cable entry. Dimensions to EN/BS 50047.					
KBA1S11	KMA1S11	1NO+1NC Snap action❶	Metal	5	❷
KBA1S02	KMA1S02	2NC Snap action❶	Metal	5	❷
KBA1A11	KMA1A11	1NO+1NC Slow action make before break❶	Metal	5	❷
KBA1L11	KMA1L11	1NO+1NC Slow action❶	Metal	5	❷
KBA1L02	KMA1L02	2NC Slow action❶	Metal	5	❷
KBA1L20	KMA1L20	2NO Slow action	Metal	5	❷
KBA1L12	KMA1L12	1NO+2NC Slow action❶	Metal	5	❷
KBA1L21	KMA1L21	2NO+1NC Slow action❶	Metal	5	❷
KBA1L03	KMA1L03	3NC Slow action❶	Metal	5	❷
Two side cable entries. Dimensions compatible to EN/BS 50047.					
KCA1S11	KNA1S11	1NO+1NC Snap action❶	Metal	5	❷
KCA1S02	KNA1S02	2NC Snap action❶	Metal	5	❷
KCA1A11	KNA1A11	1NO+1NC Slow action make before break❶	Metal	5	❷
KCA1L11	KNA1L11	1NO+1NC Slow action❶	Metal	5	❷
KCA1L02	KNA1L02	2NC Slow action❶	Metal	5	❷
KCA1L20	KNA1L20	2NO Slow action	Metal	5	❷

❶ Direct (positive) opening action ⊖; safety function according to IEC/EN/BS 60947-5-1.
❷ Consult Technical support for information; see contact details on inside cover.

General characteristics
The LOVATO Electric limit switches have been designed to satisfy requirements comprising quick installation, easy wiring, simple setup, modularity, sturdiness and constant reliability.
The body cover is hinged at the bottom and removable.
The innovative locking bayonet mechanism permits to remove and reposition the operating head in the required configuration with no tools.
The auxiliary contact blocks are removable assuring remarkable wiring ease.

Operational characteristics
- Maximum operating rate: 3600 cycles/h
- Switching speed: 0.5...1.5m/s
- Mechanical life: >10 million cycles
- IEC conventional thermal current Ith: 10A
- UL/CSA and IEC/EN/BS 60947-5-1 designation:
  - A600 Q300 for KB...-KC... types
  - A300 Q300 for KM...-KN... types
- IEC rated insulation voltage Ui:
  - 690VAC for KB...-KC... types
  - 440VAC for KM...-KN... types
- IEC rated impulse withstand voltage Uimp:
  - 6kV for KB...-KC... types
  - 4kV for KM...-KN... types
- Class II insulation for KB...-KC... only
- Contact resistance: <10mΩ
- Short-circuit backup protection: 10A gG/SC quick fuse
- Operators of aluminium-zinc alloy
- Housing:
  - KB...-KC... types: self-extinguishing double-insulation polymer thermoplastic
  - KM...-KN... types: aluminium-zinc alloy
- Cable entry: M20 standard supplied; PG13.5 and 1/2 NPT available (see the side note for details)
- Operating head fixing: locking bayonet insert
- Operating force: 5N / 1.1lb
- Cable connection: self-releasing screw terminal
- Tightening torque:
  - Switch fixing: 2.5Nm / 22.1lb.in
  - Contact terminals: 0.8Nm / 7lb.in
  - Body lid screw fixing: 0.8Nm / 7lb.in
- Conductor section: 1 or 2 2.5mm² max / 16-14AWG
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+70°C
  - Pollution degree: 3
  - IEC degree of protection: IP20 for terminals
  - IEC degree of protection: IP65 for body housing.

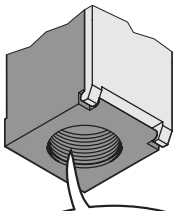
Certifications and compliance
Certifications obtained: UL Listed for USA and Canada (cULus - File E93601), as Auxiliary Devices - Limit switches; EAC, CCC.
Compliant with standards: EN/BS 50047, IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 60204-1, UL508, CSA C22.2 n° 14.



Top roller push plunger

KBB... - KMB...

KCB... - KNB...



M20 CABLE ENTRY
For types with PG13.5 cable entry, add the letter P at the end of the order code while for 1/2 NPT, add N.
E.g. KBB1S11P - KBB1S11N

Order code Plastic body	Metal body	Contacts	Roller material	Qty per pkg	Wt
			Ø11x4	n°	[kg]
One bottom cable entry. Dimensions to EN/BS 50047.					
KBB1S11	KMB1S11	1NO+1NC Snap action❶	Plastic	5	❷
KBB2S11	KMB2S11		Metal	5	❷
KBB1S02	KMB1S02	2NC Snap action❶	Plastic	5	❷
KBB2S02	KMB2S02		Metal	5	❷
KBB1A11	KMB1A11	1NO+1NC Slow action make before break❶	Plastic	5	❷
KBB2A11	KMB2A11		Metal	5	❷
KBB1L11	KMB1L11	1NO+1NC	Plastic	5	❷
KBB2L11	KMB2L11		Metal	5	❷
KBB1L02	KMB1L02	2NC Slow action❶	Plastic	5	❷
KBB2L02	KMB2L02		Metal	5	❷
KBB1L20	KMB1L20	2NO Slow action❶	Plastic	5	❷
KBB2L20	KMB2L20		Metal	5	❷
KBB1L12	KMB1L12	1NO+2NC Slow action	Plastic	5	❷
KBB2L12	KMB2L12		Metal	5	❷
KBB1L21	KMB1L21	2NO+1NC Slow action❶	Plastic	5	❷
KBB2L21	KMB2L21		Metal	5	❷
KBB1L03	KMB1L03	3NC Slow action❶	Plastic	5	❷
KBB2L03	KMB2L03		Metal	5	❷
Two side cable entries. Dimensions compatible to EN/BS 50047.					
KCB1S11	KNB1S11	1NO+1NC Slow action❶	Plastic	5	❷
KCB2S11	KNB2S11		Metal	5	❷
KCB1S02	KNB1S02	2NC Slow action❶	Plastic	5	❷
KCB2S02	KNB2S02		Metal	5	❷
KCB1A11	KNB1A11	1NO+1NC Slow action make before break❶	Plastic	5	❷
KCB2A11	KNB2A11		Metal	5	❷
KCB1L11	KNB1L11	1NO+1NC Slow action❶	Plastic	5	❷
KCB2L11	KNB2L11		Metal	5	❷
KCB1L02	KNB1L02	2NC Slow action❶	Plastic	5	❷
KCB2L02	KNB2L02		Metal	5	❷
KCB1L20	KNB1L20	2NO Slow action	Plastic	5	❷
KCB2L20	KNB2L20		Metal	5	❷

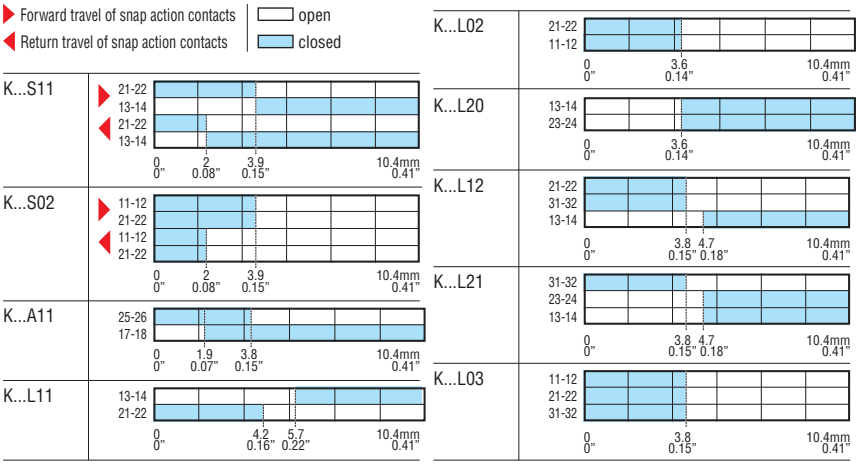
❶ Direct (positive) opening action ⊖; safety function according to IEC/EN/BS 60947-5-1.
❷ Consult Technical support for information; see contact details on inside cover.

Ø11x4mm = Ø0.43x0.16".

General characteristics
The LOVATO Electric limit switches have been designed to satisfy requirements comprising quick installation, easy wiring, simple setup, modularity, sturdiness and constant reliability.
The body cover is hinged at the bottom and removable.
The innovative locking bayonet mechanism permits to remove and reposition the operating head in the required configuration with no tools. The heads have axial rotation of 45° angles.
The auxiliary contact blocks are removable assuring remarkable wiring ease.

Operational characteristics
- Maximum operating rate: 3600 cycles/h
- Switching speed: 0.5...1.5m/s
- Mechanical life: >10 million cycles
- IEC conventional thermal current Ith: 10A
- UL/CSA and IEC/EN/BS 60947-5-1 designation:
  - A600 Q300 for KB...-KC... types
  - A300 Q300 for KM...-KN... types
- IEC rated insulation voltage Ui:
  - 690VAC for KB...-KC... types
  - 440VAC for KM...-KN... types
- IEC rated impulse withstand voltage Uimp:
  - 6kV for KB...-KC... types
  - 4kV for KM...-KN... types
- Class II insulation for KB...-KC... only
- Contact resistance: <10mΩ
- Short-circuit backup protection: 10A gG/SC quick fuse
- Operators of aluminium-zinc alloy
- Housing:
  - KB...-KC... types: self-extinguishing double-insulation polymer thermoplastic
  - KM...-KN... types: aluminium-zinc alloy
- Cable entry: M20 standard supplied; PG13.5 and 1/2 NPT available (see the side note for details)
- Operating head fixing: locking bayonet insert
- Operating force: 5N / 1.1lb
- Cable connection: self-releasing screw terminal
- Tightening torque:
  - Switch fixing: 2.5Nm / 22.1lb.in
  - Contact terminals: 0.8Nm / 7lb.in
  - Body lid screw fixing: 0.8Nm / 7lb.in
- Conductor section: 1 or 2 2.5mm² max / 16-14AWG
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+70°C
  - Pollution degree: 3
  - IEC degree of protection: IP20 for terminals
  - IEC degree of protection: IP65 for body housing.

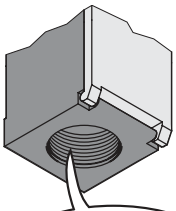
Certifications and compliance
Certifications obtained: UL Listed for USA and Canada (cULus - File E93601), as Auxiliary Devices - Limit switches; EAC, CCC.
Compliant with standards: EN/BS 50047, IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 60204-1, UL508, CSA C22.2 n° 14.



Roller centre push lever

KBC... - KMC...

KCC... - KNC...



M20 CABLE ENTRY
For types with PG13.5 cable entry, add the letter P at the end of the order code while for ½ NPT, add N.
E.g. KBC1S11P - KBC1S11N

Order code Plastic body	Metal body	Contacts	Roller material	Qty per pkg	Wt
			Ø14x5	n°	[kg]
One bottom cable entry. Dimensions to EN/BS 50047.					
KBC1S11	**KMC1S11**	1NO+1NC Snap action❶	Plastic	5	❷
KBC2S11	**KMC2S11**		Metal	5	❷
KBC1S02	**KMC1S02**	2NC Snap action❶	Plastic	5	❷
KBC2S02	**KMC2S02**		Metal	5	❷
KBC1A11	**KMC1A11**	1NO+1NC Slow action make before break❶	Plastic	5	❷
KBC2A11	**KMC2A11**		Metal	5	❷
KBC1L11	**KMC1L11**	1NO+1NC Snap action❶	Plastic	5	❷
KBC2L11	**KMC2L11**		Metal	5	❷
KBC1L02	**KMC1L02**	2NC Snap action❶	Plastic	5	❷
KBC2L02	**KMC2L02**		Metal	5	❷
KBC1L20	**KMC1L20**	2NO Snap action	Plastic	5	❷
KBC2L20	**KMC2L20**		Metal	5	❷
KBC1L12	**KMC1L12**	1NO+2NC Snap action❶	Plastic	5	❷
KBC2L12	**KMC2L12**		Metal	5	❷
KBC1L21	**KMC1L21**	2NO+1NC Snap action❶	Plastic	5	❷
KBC2L21	**KMC2L21**		Metal	5	❷
KBC1L03	**KMC1L03**	3NC Snap action❶	Plastic	5	❷
KBC2L03	**KMC2L03**		Metal	5	❷
Two side cable entries. Dimensions compatible to EN/BS 50047.					
KCC1S11	**KNC1S11**	1NO+1NC Snap action❶	Plastic	5	❷
KCC2S11	**KNC2S11**		Metal	5	❷
KCC1S02	**KNC1S02**	2NC Snap action❶	Plastic	5	❷
KCC2S02	**KNC2S02**		Metal	5	❷
KCC1A11	**KNC1A11**	1NO+1NC Slow action make before break❶	Plastic	5	❷
KCC2A11	**KNC2A11**		Metal	5	❷
KCC1L11	**KNC1L11**	1NO+1NC Snap action❶	Plastic	5	❷
KCC2L11	**KNC2L11**		Metal	5	❷
KCC1L02	**KNC1L02**	2NC Snap action❶	Plastic	5	❷
KCC2L02	**KNC2L02**		Metal	5	❷
KCC1L20	**KNC1L20**	2NO Snap action	Plastic	5	❷
KCC2L20	**KNC2L20**		Metal	5	❷

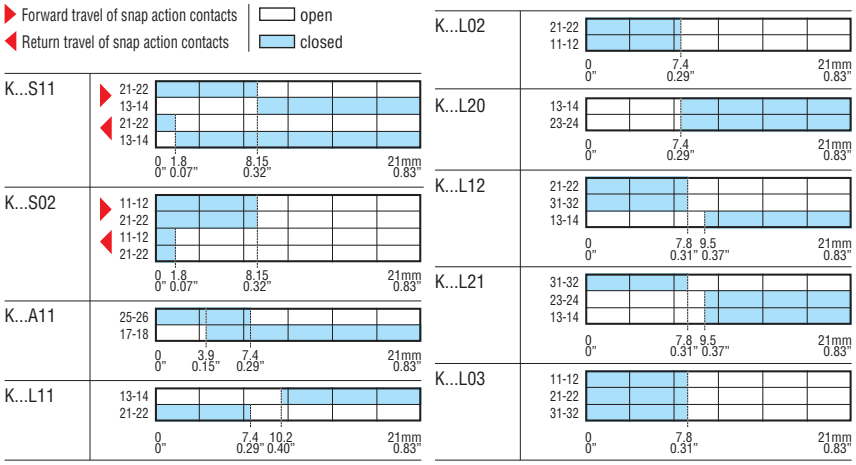
❶ Direct (positive) opening action ⊖; safety function according to IEC/EN/BS 60947-5-1.
❷ Consult Technical support for information; see contact details on inside cover.

Ø14x5mm = Ø0.55x0.2".

General characteristics
The LOVATO Electric limit switches have been designed to satisfy requirements comprising quick installation, easy wiring, simple setup, modularity, sturdiness and constant reliability.
The body cover is hinged at the bottom and removable.
The innovative locking bayonet mechanism permits to remove and reposition the operating head in the required configuration with no tools. The heads have axial rotation of 45° angles.
The auxiliary contact blocks are removable assuring remarkable wiring ease.

Operational characteristics
- Maximum operating rate: 3600 cycles/h
- Switching speed: 0.5...1.5m/s
- Mechanical life: >10 million cycles
- IEC conventional thermal current Ith: 10A
- UL/CSA and IEC/EN/BS 60947-5-1 designation:
  - A600 Q300 for KB...-KC... types
  - A300 Q300 for KM...-KN... types
- IEC rated insulation voltage Ui:
  - 690VAC for KB...-KC... types
  - 440VAC for KM...-KN... types
- IEC rated impulse withstand voltage Uimp:
  - 6kV for KB...-KC... types
  - 4kV for KM...-KN... types
- Class II insulation for KB...-KC... only
- Contact resistance: <10mΩ
- Short-circuit backup protection: 10A gG/SC quick fuse
- Operators of aluminium-zinc alloy
- Housing:
  - KB...-KC... types: self-extinguishing double-insulation polymer thermoplastic
  - KM...-KN... types: aluminium-zinc alloy
- Cable entry: M20 standard supplied; PG13.5 and ½ NPT available (see the side note for details)
- Operating head fixing: locking bayonet insert
- Operating force: 6N / 1.34lb
- Cable connection: self-releasing screw terminal
- Tightening torque:
  - Switch fixing: 2.5Nm / 22.1lb.in
  - Contact terminals: 0.8Nm / 7lb.in
  - Body lid screw fixing: 0.8Nm / 7lb.in
- Conductor section: 1 or 2 2.5mm² max / 16-14AWG
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+70°C
  - Pollution degree: 3
  - IEC degree of protection: IP20 for terminals
  - IEC degree of protection: IP65 for body housing.

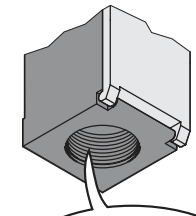
Certifications and compliance
Certifications obtained: UL Listed for USA and Canada (cULus - File E93601), as Auxiliary Devices - Limit switches; EAC, CCC.
Compliant with standards: EN/BS 50047, IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 60204-1, UL508, CSA C22.2 n° 14.



Roller side push lever

KBD... - KMD...

KCD... - KND...



M20 CABLE ENTRY
For types with PG13.5 cable entry, add the letter P at the end of the order code while for 1/2 NPT, add N.
E.g. KBD1S11P - KBD1S11N

Order code Plastic body	Metal body	Contacts	Roller material	Qty per pkg	Wt
			Ø14x5	n°	[kg]
One bottom cable entry. Dimensions to EN/BS 50047.					
KBD1S11	KMD1S11	1NO+1NC Snap action❶	Plastic	5	❷
KBD2S11	KMD2S11		Metal	5	❷
KBD1S02	KMD1S02	2NC Snap action❶	Plastic	5	❷
KBD2S02	KMD2S02		Metal	5	❷
KBD1A11	KMD1A11	1NO+1NC Slow action make before break❶	Plastic	5	❷
KBD2A11	KMD2A11		Metal	5	❷
KBD1L11	KMD1L11	1NO+1NC Snap action❶	Plastic	5	❷
KBD2L11	KMD2L11		Metal	5	❷
KBD1L02	KMD1L02	2NC Snap action❶	Plastic	5	❷
KBD2L02	KMD2L02		Metal	5	❷
KBD1L20	KMD1L20	2NO Snap action	Plastic	5	❷
KBD2L20	KMD2L20		Metal	5	❷
KBD1L12	KMD1L12	1NO+2NC Snap action❶	Plastic	5	❷
KBD2L12	KMD2L12		Metal	5	❷
KBD1L21	KMD1L21	2NO+1NC Snap action❶	Plastic	5	❷
KBD2L21	KMD2L21		Metal	5	❷
KBD1L03	KMD1L03	3NC Snap action❶	Plastic	5	❷
KBD2L03	KMD2L03		Metal	5	❷
Two side cable entries. Dimensions compatible to EN/BS 50047.					
KCD1S11	KND1S11	1NO+1NC Snap action❶	Plastic	5	❷
KCD2S11	KND2S11		Metal	5	❷
KCD1S02	KND1S02	2NC Snap action❶	Plastic	5	❷
KCD2S02	KND2S02		Metal	5	❷
KCD1A11	KND1A11	1NO+1NC Slow action make before break❶	Plastic	5	❷
KCD2A11	KND2A11		Metal	5	❷
KCD1L11	KND1L11	1NO+1NC Snap action❶	Plastic	5	❷
KCD2L11	KND2L11		Metal	5	❷
KCD1L02	KND1L02	2NC Snap action❶	Plastic	5	❷
KCD2L02	KND2L02		Metal	5	❷
KCD1L20	KND1L20	2NO Snap action	Plastic	5	❷
KCD2L20	KND2L20		Metal	5	❷

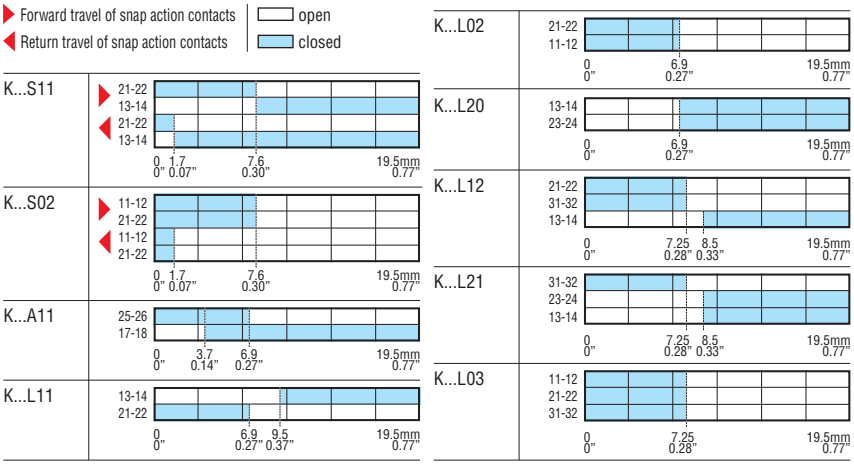
❶ Direct (positive) opening action ⊖; safety function according to IEC/EN/BS 60947-5-1.
❷ Consult Technical support for information; see contact details on inside cover.

Ø14x5mm = Ø0.55x0.2".

General characteristics
The LOVATO Electric limit switches have been designed to satisfy requirements comprising quick installation, easy wiring, simple setup, modularity, sturdiness and constant reliability.
The body cover is hinged at the bottom and removable.
The innovative locking bayonet mechanism permits to remove and reposition the operating head in the required configuration with no tools. The heads have axial rotation of 45° angles.
The auxiliary contact blocks are removable assuring remarkable wiring ease.

Operational characteristics
- Maximum operating rate: 3600 cycles/h
- Switching speed: 0.5...1.5m/s
- Mechanical life: >10 million cycles
- IEC conventional thermal current Ith: 10A
- UL/CSA and IEC/EN/BS 60947-5-1 designation:
  - A600 Q300 for KB...-KC... types
  - A300 Q300 for KM...-KN... types
- IEC rated insulation voltage Ui:
  - 690VAC for KB...-KC... types
  - 440VAC for KM...-KN... types
- IEC rated impulse withstand voltage Uimp:
  - 6kV for KB...-KC... types
  - 4kV for KM...-KN... types
- Class II insulation for KB...-KC... only
- Contact resistance: <10mΩ
- Short-circuit backup protection: 10A gG/SC quick fuse
- Operators of aluminium-zinc alloy
- Housing:
  - KB...-KC... types: self-extinguishing double-insulation polymer thermoplastic
  - KM...-KN... types: aluminium-zinc alloy
- Cable entry: M20 standard supplied; PG13.5 and 1/2 NPT available (see the side note for details)
- Operating head fixing: locking bayonet insert
- Operating force: 6N / 1.34lb
- Cable connection: self-releasing screw terminal
- Tightening torque:
  - Switch fixing: 2.5Nm / 22.1lb.in
  - Contact terminals: 0.8Nm / 7lb.in
  - Body lid screw fixing: 0.8Nm / 7lb.in
- Conductor section: 1 or 2 2.5mm² max / 16-14AWG
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+70°C
  - Pollution degree: 3
  - IEC degree of protection: IP20 for terminals
  - IEC degree of protection: IP65 for body housing.

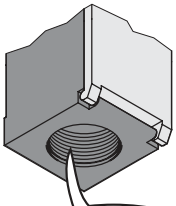
Certifications and compliance
Certifications obtained: UL Listed for USA and Canada (cULus - File E93601), as Auxiliary Devices - Limit switches; EAC, CCC.
Compliant with standards: EN/BS 50047, IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 60204-1, UL508, CSA C22.2 n° 14.



Roller lever plunger

KBE1... - KBE2...
KME1... - KME2...

KBE3... - KME3...



M20 CABLE ENTRY
For types with PG13.5 cable entry, add the letter P at the end of the order code while for ½ NPT, add N.
E.g. KBE1S11P - KBE1S11N

Order code Plastic body	Metal body	Contacts	Roller material	Qty per pkg	Wt
				n°	[kg]
One bottom cable entry. Dimensions to EN/BS 50047.					
KBE1S11	KME1S11	1NO+1NC Slow action❸	Plastic❶	5	❹
KBE2S11	KME2S11		Metal❶	5	❹
KBE3S11	KME3S11		Rubber❷	5	❹
KBE1S02	KME1S02	2NC Slow action❸	Plastic❶	5	❹
KBE2S02	KME2S02		Metal❶	5	❹
KBE3S02	KME3S02		Rubber❷	5	❹
KBE1A11	KME1A11	1NO+1NC Slow action make before break❶	Plastic❶	5	❹
KBE2A11	KME2A11		Metal❶	5	❹
KBE3A11	KME3A11		Rubber❷	5	❹
KBE1L11	KME1L11	1NO+1NC Slow action❸	Plastic❶	5	❹
KBE2L11	KME2L11		Metal❶	5	❹
KBE3L11	KME3L11		Rubber❷	5	❹
KBE1L02	KME1L02	2NC Slow action❸	Plastic❶	5	❹
KBE2L02	KME2L02		Metal❶	5	❹
KBE3L02	KME3L02		Rubber❷	5	❹
KBE1L20	KME1L20	2NO Slow action	Plastic❶	5	❹
KBE2L20	KME2L20		Metal❶	5	❹
KBE3L20	KME3L20		Rubber❷	5	❹
KBE1L12	KME1L12	1NO+2NC Slow action❸	Plastic❶	5	❹
KBE2L12	KME2L12		Metal❶	5	❹
KBE3L12	KME3L12		Rubber❷	5	❹
KBE1L21	KME1L21	2NO+1NC Slow action❸	Plastic❶	5	❹
KBE2L21	KME2L21		Metal❶	5	❹
KBE3L21	KME3L21		Rubber❷	5	❹
KBE1L03	KME1L03	3NC Slow action❸	Plastic❶	5	❹
KBE2L03	KME2L03		Metal❶	5	❹
KBE3L03	KME3L03		Rubber❷	5	❹
BI-DIRECTIONAL. One bottom cable entry. Dimensions to EN/BS 50047.					
KBE1D02	KME1D02	2NC❸ independent	Plastic❶	5	❹

❶ Ø19x5mm = Ø0.75x0,2".
❷ Ø50x10mm = Ø1.97"x0.39".
❸ Direct (positive) opening action ⊖; safety function according to IEC/EN/BS 60947-5-1.
❹ Consult Technical support for information; see contact details on inside cover.

General characteristics
The LOVATO Electric limit switches have been designed to satisfy requirements comprising quick installation, easy wiring, simple setup, modularity, sturdiness and constant reliability.
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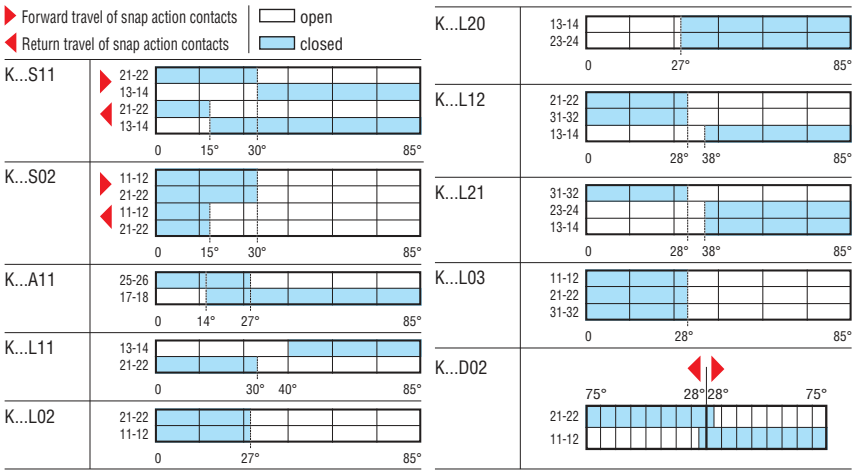
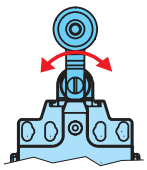
The auxiliary contact blocks are removable assuring remarkable wiring ease.

Operational characteristics
- Maximum operating rate: 3600 cycles/h
- Switching speed: 0.5...1.5m/s
- Mechanical life: >10 million cycles
- IEC conventional thermal current Ith: 10A
- UL/CSA and IEC/EN/BS 60947-5-1 designation:
  - A600 Q300 for KB... types
  - A300 Q300 for KM... types
- IEC rated insulation voltage Ui:
  - 690V for KB... types
  - 440V for KM... types
- IEC rated impulse withstand voltage Uimp:
  - 6kVAC for KB... types
  - 4kVAC for KM... types
- Class II insulation for KB only
- Contact resistance: <10mΩ
- Short-circuit backup protection: 10A gG/SC quick fuse
- Operators of aluminium-zinc alloy
- Housing:
  - KB... types: self-extinguishing double-insulation polymer thermoplastic
  - KM... types: aluminium-zinc alloy
- Cable entry: M20 standard supplied; PG13.5 and ½ NPT available (see the side note for details)
- Operating head fixing: locking bayonet insert
- Operating torque: 3Ncm / 4.25ozin
- Cable connection: self-releasing screw terminal
- Tightening torque:
  - Switch fixing: 2.5Nm / 22.1lb.in
  - Contact terminals: 0.8Nm / 7lb.in
  - Body lid screw fixing: 0.8Nm / 7lb.in
- Conductor section: 1 or 2 2.5mm² max / 16-14AWG
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+70°C
  - Pollution degree: 3
  - IEC degree of protection: IP20 for terminals
  - IEC degree of protection: IP65 for body housing.

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada (cULus - File E93601), as Auxiliary Devices - Limit switches; EAC, CCC.
Compliant with standards: EN/BS 50047, IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 60204-1, UL508, CSA C22.2 n° 14.



Roller lever plunger

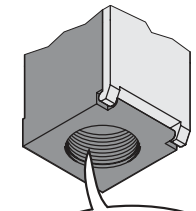


KCE1... - KCE2...
KNE1... - KNE2...

KCE3... - KNE3...

Order code Plastic body	Metal body	Contacts	Roller material	Qty per pkg	Wt
				n°	[kg]
Two side cable entries. Dimensions compatible to EN/BS 50047.					
KCE1S11	KNE1S11	1NO+1NC Snap action❸	Plastic❶	5	❹
KCE2S11	KNE2S11		Metal❶	5	❹
KCE3S11	KNE3S11		Rubber❷	5	❹
KCE1S02	KNE1S02	2NC Snap action❸	Plastic❶	5	❹
KCE2S02	KNE2S02		Metal❶	5	❹
KCE3S02	KNE3S02		Rubber❷	5	❹
KCE1A11	KNE1A11	1NO+1NC Slow action make before break❶	Plastic❶	5	❹
KCE2A11	KNE2A11		Metal❶	5	❹
KCE3A11	KNE3A11		Rubber❷	5	❹
KCE1L11	KNE1L11	1NO+1NC Slow action make before break❸	Plastic❶	5	❹
KCE2L11	KNE2L11		Metal❶	5	❹
KCE3L11	KNE3L11		Rubber❷	5	❹
KCE1L02	KNE1L02	2NC Snap action❸	Plastic❶	5	❹
KCE2L02	KNE2L02		Metal❶	5	❹
KCE3L02	KNE3L02		Rubber❷	5	❹
KCE1L20	KNE1L20	2NO Snap action	Plastic❶	5	❹
KCE2L20	KNE2L20		Metal❶	5	❹
KCE3L20	KNE3L20		Rubber❷	5	❹
BI-DIRECTIONAL. Two side cable entries. Dimensions compatible to EN/BS 50047.					
KCE1D02	KNE1D02	2NC❸ independent	Plastic❶	5	❹

❶ Ø19x5mm = Ø0.75x0,2".
❷ Ø50x10mm = Ø1.97"x0.39".
❸ Direct (positive) opening action ⊖; safety function according to IEC/EN/BS 60947-5-1.
❹ Consult Technical support for information; see contact details on inside cover.

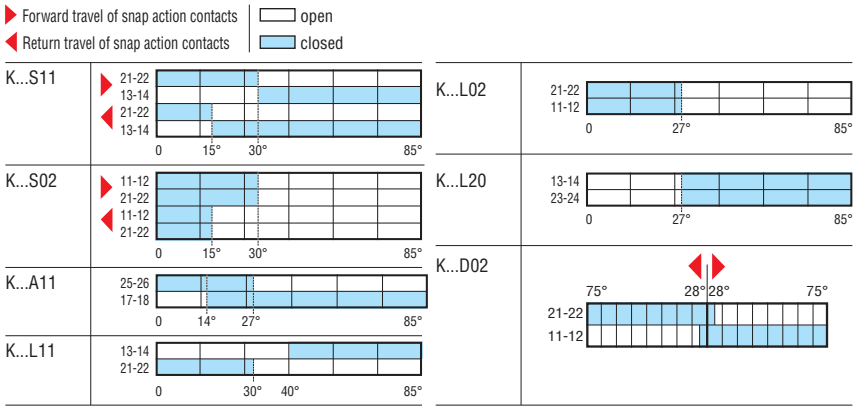


M20 CABLE ENTRY
For types with PG13.5 cable entry, add the letter P at the end of the order code while for 1/2 NPT, add N.
E.g. KCE1S11P - KCE1S11N

General characteristics
The LOVATO Electric limit switches have been designed to satisfy requirements comprising quick installation, easy wiring, simple setup, modularity, sturdiness and constant reliability.
The body cover is hinged at the bottom and removable.
The innovative locking bayonet mechanism permits to remove and reposition the operating head in the required configuration with no tools. The heads have axial rotation of 90° angles.
The auxiliary contact blocks are removable assuring remarkable wiring ease.

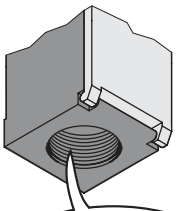
Operational characteristics
- Maximum operating rate: 3600 cycles/h
- Switching speed: 0.5...1.5m/s
- Mechanical life: >10 million cycles
- IEC conventional thermal current Ith: 10A
- UL/CSA and IEC/EN/BS 60947-5-1 designation:
  - A600 Q300 for KC... types
  - A300 Q300 for KN... types
- IEC rated insulation voltage Ui:
  - 690VAC for KC... types
  - 440VAC for KN... types
- IEC rated impulse withstand voltage Uimp:
  - 6kV for KC... types
  - 4kV for KN... types
- Class II insulation for KC only
- Contact resistance: <10mΩ
- Short-circuit backup protection: 10A gG/SC quick fuse
- Operators of aluminium-zinc alloy
- Housing:
  - KC... types: self-extinguishing double-insulation polymer thermoplastic
  - KN... types: aluminium-zinc alloy
- Cable entry: M20 standard supplied; PG13.5 and 1/2 NPT available (see the side note for details)
- Operating head fixing: locking bayonet insert
- Operating torque: 3Ncm/4.25ozin
- Cable connection: self-releasing screw terminal
- Tightening torque:
  - Switch fixing: 2.5Nm / 22.1lb.in
  - Contact terminals: 0.8Nm / 7lb.in
  - Body lid screw fixing: 0.8Nm / 7lb.in
- Conductor section: 1 or 2 2.5mm² max / 16-14AWG
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+70°C
  - Pollution degree: 3
  - IEC degree of protection: IP20 for terminals
  - IEC degree of protection: IP65 for body housing.

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada (cULus - File E93601), as Auxiliary Devices - Limit switches; EAC, CCC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 60204-1, UL508, CSA C22.2 n° 14.



Adjustable roller lever

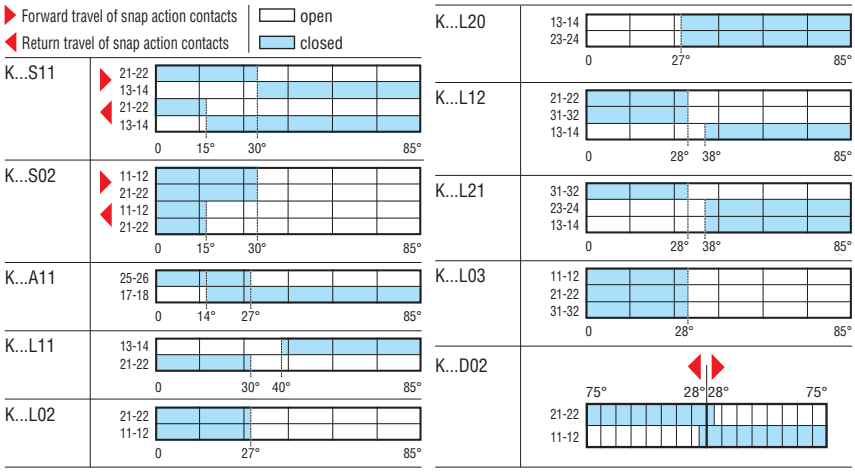
KBF... - KMF...



M20 CABLE ENTRY
For types with PG13.5 cable entry, add the letter P at the end of the order code while for 1/2 NPT, add N.
E.g. KBF1S11P - KBF1S11N

Order code Plastic body	Metal body	Contacts	Roller material	Qty per pkg	Wt
				n°	[kg]
One bottom cable entry. Dimensions to EN/BS 50047.					
KBF1S11	**KMF1S11**	1NO+1NC Snap action❹	Plastic❶	5	❺
KBF2S11	**KMF2S11**		Metal❶	5	❺
KBF3S11	**KMF3S11**		Rubber❷	5	❺
KBF4S11	**KMF4S11**		Rubber❸	5	❺
KBF1S02	**KMF1S02**	2NC Snap action❹	Plastic❶	5	❺
KBF2S02	**KMF2S02**		Metal❶	5	❺
KBF3S02	**KMF3S02**		Rubber❷	5	❺
KBF4S02	**KMF4S02**		Rubber❸	5	❺
KBF1A11	**KMF1A11**	1NO+1NC Slow action make before break❹	Plastic❶	5	❺
KBF2A11	**KMF2A11**		Metal❶	5	❺
KBF3A11	**KMF3A11**		Rubber❷	5	❺
KBF4A11	**KMF4A11**		Rubber❸	5	❺
KBF1L11	**KMF1L11**	1NO+1NC Snap action❹	Plastic❶	5	❺
KBF2L11	**KMF2L11**		Metal❶	5	❺
KBF3L11	**KMF3L11**		Rubber❷	5	❺
KBF4L11	**KMF4L11**		Rubber❸	5	❺
KBF1L02	**KMF1L02**	2NC Snap action❹	Plastic❶	5	❺
KBF2L02	**KMF2L02**		Metal❶	5	❺
KBF3L02	**KMF3L02**		Rubber❷	5	❺
KBF4L02	**KMF4L02**		Rubber❸	5	❺
KBF1L20	**KMF1L20**	2NO Snap action	Plastic❶	5	❺
KBF2L20	**KMF2L20**		Metal❶	5	❺
KBF3L20	**KMF3L20**		Rubber❷	5	❺
KBF4L20	**KMF4L20**		Rubber❸	5	❺
KBF1L12	**KMF1L12**	1NO+2NC Snap action❹	Plastic❶	5	❺
KBF2L12	**KMF2L12**		Metal❶	5	❺
KBF3L12	**KMF3L12**		Rubber❷	5	❺
KBF4L12	**KMF4L12**		Rubber❸	5	❺
KBF1L21	**KMF1L21**	2NO+1NC Snap action❹	Plastic❶	5	❺
KBF2L21	**KMF2L21**		Metal❶	5	❺
KBF3L21	**KMF3L21**		Rubber❷	5	❺
KBF4L21	**KMF4L21**		Rubber❸	5	❺
KBF1L03	**KMF1L03**	3NC Snap action❹	Plastic❶	5	❺
KBF2L03	**KMF2L03**		Metal❶	5	❺
KBF3L03	**KMF3L03**		Rubber❷	5	❺
KBF4L03	**KMF4L03**		Rubber❸	5	❺
BI-DIRECTIONAL. One bottom cable entry. Dimensions to EN/BS 50047.					
KBF1D02	**KMF1D02**	2NC❹ independent	Plastic❶	5	❺

❶ Ø19x5mm = Ø0.75x0.2".
❷ Ø50x10mm = Ø1.97x0.34".
❸ Ø50x10mm (Ø1.97x0.35") with offset alignment.
❹ Direct (positive) opening action ⊖; safety function according to IEC/EN/BS 60947-5-1.
❺ Consult Technical support for information; see contact details on inside cover.

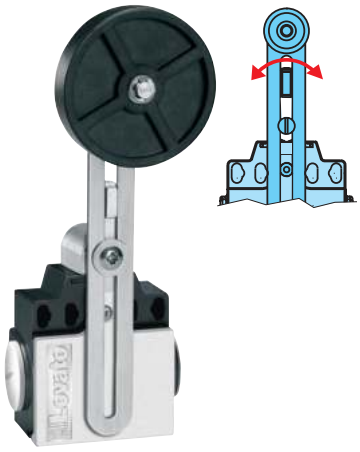


General characteristics
The LOVATO Electric limit switches have been designed to satisfy requirements comprising quick installation, easy wiring, simple setup, modularity, sturdiness and constant reliability.
The body cover is hinged at the bottom and removable.
The innovative locking bayonet mechanism permits to remove and reposition the operating head in the required configuration with no tools. The heads have axial rotation of 180° angles.
The auxiliary contact blocks are removable assuring remarkable wiring ease.

Operational characteristics
- Maximum operating rate: 3600 cycles/h
- Switching speed: 0.5...1.5m/s
- Mechanical life: >10 million cycles
- IEC conventional thermal current Ith: 10A
- UL/CSA and IEC/EN/BS 60947-5-1 designation:
  - A600 Q300 for KB... types
  - A300 Q300 for KM... types
- IEC rated insulation voltage Ui:
  - 690V for KB... types
  - 440V for KM... types
- IEC rated impulse withstand voltage Uimp:
  - 6kVAC for KB... types
  - 4kVAC for KM... types
- Class II insulation for KB only
- Contact resistance: <10mΩ
- Short-circuit backup protection: 10A gG/SC quick fuse
- Operators of aluminium-zinc alloy
- Housing:
  - KB... types: self-extinguishing double-insulation polymer thermoplastic
  - KM... types: aluminium-zinc alloy
- Cable entry: M20 standard supplied; PG13.5 and 1/2 NPT available (see the side note for details)
- Operating head fixing: locking bayonet insert
- Operating force: 3Ncm/4.25ozin
- Cable connection: self-releasing screw terminal
- Tightening torque:
  - Switch fixing: 2.5Nm / 22.1lb.in
  - Contact terminals: 0.8Nm / 7lb.in
  - Body lid screw fixing: 0.8Nm / 7lb.in
- Conductor section: 1 or 2 2.5mm² max / 16-14AWG
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+70°C
  - Pollution degree: 3
  - IEC degree of protection: IP20 for terminals
  - IEC degree of protection: IP65 for body housing.

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada (cULus - File E93601), as Auxiliary Devices - Limit switches; EAC, CCC.
Compliant with standards: EN/BS 50047, IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 60204-1, UL508, CSA C22.2 n° 14.

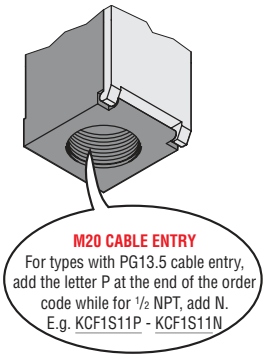
Adjustable roller lever



KCF... - KNF...

Order code Plastic body	Metal body	Contacts	Roller material	Qty per pkg	Wt
				n°	[kg]
Two side cable entries. Dimensions compatible to EN/BS 50047.					
KCF1S11	KNF1S11	1NO+1NC Snap action❸	Plastic❶	5	❹
KCF2S11	KNF2S11		Metal❶	5	❹
KCF3S11	KNF3S11		Rubber❷	5	❹
KCF4S11	KNF4S11		Rubber❷ offset align.	5	❹
KCF1S02	KNF1S02	2NC Snap action❸	Plastic❶	5	❹
KCF2S02	KNF2S02		Metal❶	5	❹
KCF3S02	KNF3S02		Rubber❷	5	❹
KCF4S02	KNF4S02		Rubber❷ offset align.	5	❹
KCF1A11	KNF1A11	1NO+1NC Slow action make before break❶	Plastic❶	5	❹
KCF2A11	KNF2A11		Metal❶	5	❹
KCF3A11	KNF3A11		Rubber❷	5	❹
KCF4A11	KNF4A11		Rubber❷ offset align.	5	❹
KCF1L11	KNF1L11	1NO+1NC Snap action❸	Plastic❶	5	❹
KCF2L11	KNF2L11		Metal❶	5	❹
KCF3L11	KNF3L11		Rubber❷	5	❹
KCF4L11	KNF4L11		Rubber❷ offset align.	5	❹
KCF1L02	KNF1L02	2NC Snap action❸	Plastic❶	5	❹
KCF2L02	KNF2L02		Metal❶	5	❹
KCF3L02	KNF3L02		Rubber❷	5	❹
KCF4L02	KNF4L02		Rubber❷ offset align.	5	❹
KCF1L20	KNF1L20	2NO Snap action	Plastic❶	5	❹
KCF2L20	KNF2L20		Metal❶	5	❹
KCF3L20	KNF3L20		Rubber❷	5	❹
KCF4L20	KNF4L20		Rubber❷ offset align.	5	❹

❶ Ø19x5mm = Ø0.75x0.2".
❷ Ø50x10mm = Ø1.97x0.34".
❸ Direct (positive) opening action ⊖; safety function according to IEC/EN/BS 60947-5-1.
❹ Consult Technical support for information; see contact details on inside cover.



M20 CABLE ENTRY
For types with PG13.5 cable entry, add the letter P at the end of the order code while for 1/2 NPT, add N.
E.g. KCF1S11P - KCF1S11N

General characteristics

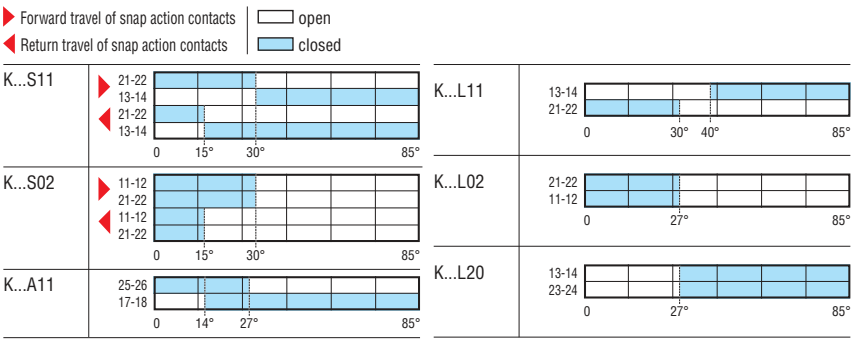
The LOVATO Electric limit switches have been designed to satisfy requirements comprising quick installation, easy wiring, simple setup, modularity, sturdiness and constant reliability.
The body cover is hinged at the bottom and removable.
The innovative locking bayonet mechanism permits to remove and reposition the operating head in the required configuration with no tools. The heads have axial rotation of 180° angles.
The auxiliary contact blocks are removable assuring remarkable wiring ease.

Operational characteristics

- Maximum operating rate: 3600 cycles/h
- Switching speed: 0.5...1.5m/s
- Mechanical life: >10 million cycles
- IEC conventional thermal current Ith: 10A
- UL/CSA and IEC/EN/BS 60947-5-1 designation:
  - A600 Q300 for KC... types
  - A300 Q300 for KN... types
- IEC rated insulation voltage Ui:
  - 690VAC for KC... types
  - 440VAC for KN... types
- IEC rated impulse withstand voltage Uimp:
  - 6kV for KC... types
  - 4kV for KN... types
- Class II insulation for KC only
- Contact resistance: <10mΩ
- Short-circuit backup protection: 10A gG/SC quick fuse
- Operators of aluminium-zinc alloy
- Housing:
  - KC... types: self-extinguishing double-insulation polymer thermoplastic
  - KN... types: aluminium-zinc alloy
- Cable entry: M20 standard supplied; PG13.5 and 1/2 NPT available (see the side note for details)
- Operating head fixing: locking bayonet insert
- Operating force: 3Ncm/4.25ozin
- Cable connection: self-releasing screw terminal
- Tightening torque:
  - Switch fixing: 2.5Nm / 22.1lb.in
  - Contact terminals: 0.8Nm / 7lb.in
  - Body lid screw fixing: 0.8Nm / 7lb.in
- Conductor section: 1 or 2 2.5mm² max / 16-14AWG
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+70°C
  - Pollution degree: 3
  - IEC degree of protection: IP20 for terminals
  - IEC degree of protection: IP65 for body housing.

Certifications and compliance

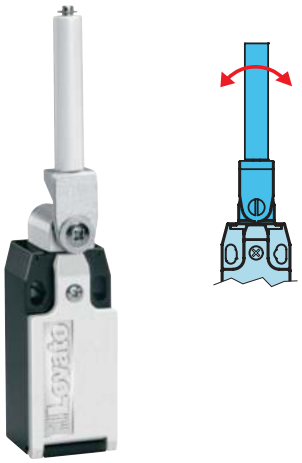
Certifications obtained: UL Listed for USA and Canada (cULus - File E93601), as Auxiliary Devices - Limit switches; EAC, CCC.
Compliant with standards: EN/BS 50047, IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 60204-1, UL508, CSA C22.2 n° 14.



Limit, micro and foot switches

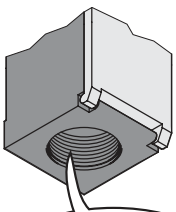
Limit switches, K series. One bottom cable entry. Dimensions to EN/BS 50047
Two side cable entries. Dimensions compatible to EN/BS 50047

Ceramic rod lever



KBH... - KMH...

KCH... - KNH...



M20 CABLE ENTRY
For types with PG13.5 cable entry, add the letter P at the end of the order code while for 1/2 NPT, add N.
E.g. KBH1S11P - KBH1S11N

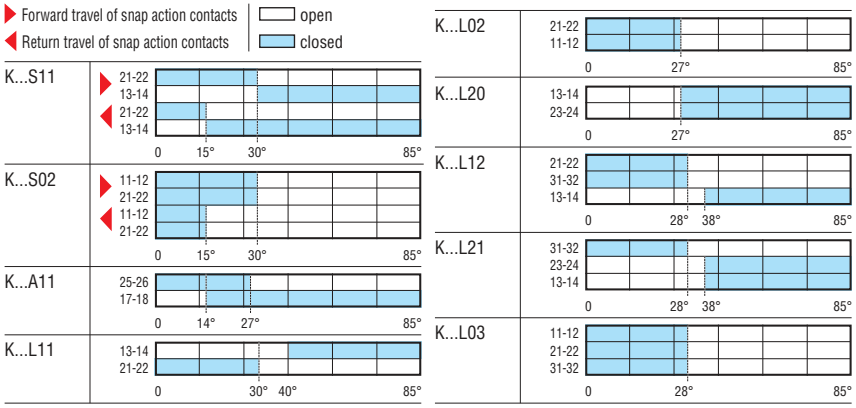
Order code Plastic body	Metal body	Contacts	Rod material	Qty per pkg	Wt
				n°	[kg]
One bottom cable entry. Dimensions to EN/BS 50047.					
KBH1S11	KMH1S11	1NO+1NC Snap action❶	Ceramic	5	❷
KBH1S02	KMH1S02	2NC Snap action❶	Ceramic	5	❷
KBH1A11	KMH1A11	1NO+1NC Slow action make before break❶	Ceramic	5	❷
KBH1L11	KMH1L11	1NO+1NC Snap action❶	Ceramic	5	❷
KBH1L02	KMH1L02	2NC Snap action❶	Ceramic	5	❷
KBH1L20	KMH1L20	2NO Snap action	Ceramic	5	❷
KBH1L12	KMH1L12	1NO+2NC Snap action❶	Ceramic	5	❷
KBH1L21	KMH1L21	2NO+1NC Snap action❶	Ceramic	5	❷
KBH1L03	KMH1L03	3NC Snap action❶	Ceramic	5	❷
Two side cable entries. Dimensions compatible to EN/BS 50047.					
KCH1S11	KNH1S11	1NO+1NC Snap action❶	Ceramic	5	❷
KCH1S02	KNH1S02	2NC Snap action❶	Ceramic	5	❷
KCH1A11	KNH1A11	1NO+1NC Slow action make before break❶	Ceramic	5	❷
KCH1L11	KNH1L11	1NO+1NC Snap action❶	Ceramic	5	❷
KCH1L02	KNH1L02	2NC Snap action❶	Ceramic	5	❷
KCH1L20	KNH1L20	2NO Snap action	Ceramic	5	❷

❶ Direct (positive) opening action ⊖; safety function according to IEC/EN/BS 60947-5-1.
❷ Consult Technical support for information; see contact details on inside cover.

General characteristics
The LOVATO Electric limit switches have been designed to satisfy requirements comprising quick installation, easy wiring, simple setup, modularity, sturdiness and constant reliability.
The body cover is hinged at the bottom and removable.
The innovative locking bayonet mechanism permits to remove and reposition the operating head in the required configuration with no tools. The heads have axial rotation of 45° angles.
The auxiliary contact blocks are removable assuring remarkable wiring ease.

Operational characteristics
- Maximum operating rate: 3600 cycles/h
- Switching speed: 0.5...1.5m/s
- Mechanical life: >10 million cycles
- IEC conventional thermal current Ith: 10A
- UL/CSA and IEC/EN/BS 60947-5-1 designation:
  - A600 Q300 for KB...-KC... types
  - A300 Q300 for KM...-KN... types
- IEC rated insulation voltage Ui:
  - 690VAC for KB...-KC... types
  - 440VAC for KM...-KN... types
- IEC rated impulse withstand voltage Uimp:
  - 6kV for KB...-KC... types
  - 4kV for KM...-KN... types
- Class II insulation for KB...-KC... only
- Contact resistance: <10mΩ
- Short-circuit backup protection: 10A gG/SC quick fuse
- Operators of aluminium-zinc alloy
- Housing:
  - KB...-KC... types: self-extinguishing double-insulation polymer thermoplastic
  - KM...-KN... types: aluminium-zinc alloy
- Cable entry: M20 standard supplied; PG13.5 and 1/2 NPT available (see the side note for details)
- Operating head fixing: locking bayonet insert
- Operating torque: 3Ncm/4.25ozin
- Cable connection: self-releasing screw terminal
- Tightening torque:
  - Switch fixing: 2.5Nm / 22.1lb.in
  - Contact terminals: 0.8Nm / 7lb.in
  - Body lid screw fixing: 0.8Nm / 7lb.in
- Conductor section: 1 or 2 2.5mm² max / 16-14AWG
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+70°C
  - Pollution degree: 3
  - IEC degree of protection: IP20 for terminals
  - IEC degree of protection: IP65 for body housing.

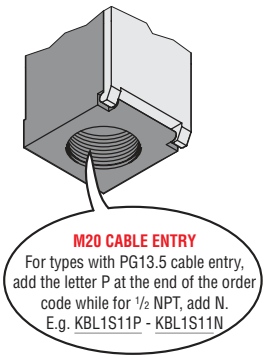
Certifications and compliance
Certifications obtained: UL Listed for USA and Canada (cULus - File E93601), as Auxiliary Devices - Limit switches; EAC, CCC.
Compliant with standards: EN/BS 50047, IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 60204-1, UL508, CSA C22.2 n° 14.



Adjustable rod lever

KBL... - KML...

KCL... - KNL...



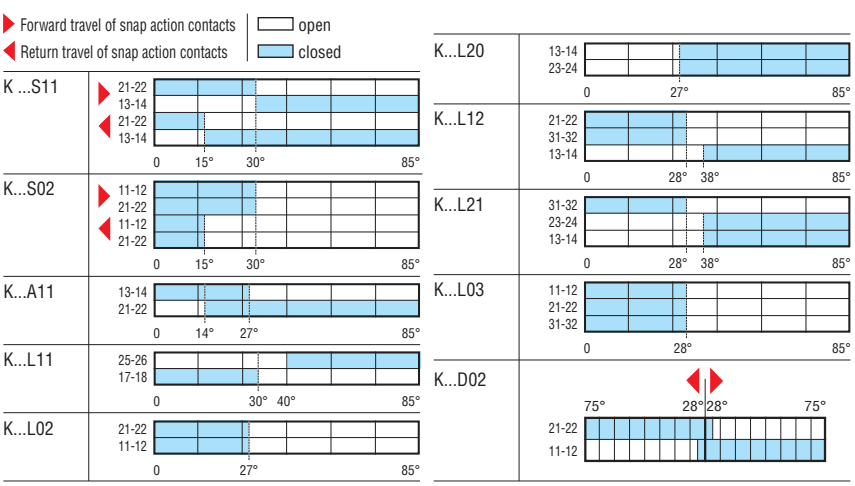
Order code Plastic body	Metal body	Contacts	Rod material	Qty per pkg	Wt
				n°	[kg]
One bottom cable entry. Dimensions to EN/BS 50047.					
KBL1S11	KML1S11	1NO+1NC Slow action❶	Plastic	5	❷
KBL2S11	KML2S11		Steel	5	❷
KBL1S02	KML1S02	2NC Slow action❶	Plastic	5	❷
KBL2S02	KML2S02		Steel	5	❷
KBL1A11	KML1A11	1NO+1NC Slow action make before break❶	Plastica	5	❷
KBL2A11	KML2A11		Steel	5	❷
KBL1L11	KML1L11	1NO+1NC Slow action❶	Plastic	5	❷
KBL2L11	KML2L11		Steel	5	❷
KBL1L02	KML1L02	2NC Slow action❶	Plastic	5	❷
KBL2L02	KML2L02		Steel	5	❷
KBL1L20	KML1L20	2NO Slow action	Plastic	5	❷
KBL2L20	KML2L20		Steel	5	❷
KBL1L12	KML1L12	1NO+2NC Slow action❶	Plastic	5	❷
KBL2L12	KML2L12		Steel	5	❷
KBL1L21	KML1L21	2NO+1NC Slow action❶	Plastic	5	❷
KBL2L21	KML2L21		Steel	5	❷
KBL1L03	KML1L03	3NC Slow action❶	Plastic	5	❷
KBL2L03	KML2L03		Steel	5	❷
Two side cable entries. Dimensions compatible to EN/BS 50047.					
KCL1S11	KNL1S11	1NO+1NC Slow action❶	Plastic	5	❷
KCL2S11	KNL2S11		Steel	5	❷
KCL1S02	KNL1S02	2NC Slow action❶	Plastic	5	❷
KCL2S02	KNL2S02		Steel	5	❷
KCL1A11	KNL1A11	1NO+1NC Slow action make before break❶	Plastic	5	❷
KCL2A11	KNL2A11		Steel	5	❷
KCL1L11	KNL1L11	1NO+1NC Slow action❶	Plastic	5	❷
KCL2L11	KNL2L11		Steel	5	❷
KCL1L02	KNL1L02	2NC Slow action❶	Plastic	5	❷
KCL2L02	KNL2L02		Steel	5	❷
KCL1L20	KNL1L20	2NO Slow action	Plastic	5	❷
KCL2L20	KNL2L20		Steel	5	❷
BI-DIRECTIONAL. One bottom cable entry. Dimensions to EN/BS 50047.					
KBL1D02	KML1D02	2NC❶ independent	Plastic	5	❷
KBL2D02	KML2D02	2NC❶ independent	Steel	5	❷

❶ Direct (positive) opening action ⊖; safety function according to IEC/EN/BS 60947-5-1.
❷ Consult Technical support for information; see contact details on inside cover.

General characteristics
The LOVATO Electric limit switches have been designed to satisfy requirements comprising quick installation, easy wiring, simple setup, modularity, sturdiness and constant reliability.
The body cover is hinged at the bottom and removable.
The innovative locking bayonet mechanism permits to remove and reposition the operating head in the required configuration with no tools. The heads have axial rotation of 90° angles (180° for KC... and KN... types).
The auxiliary contact blocks are removable assuring remarkable wiring ease.

Operational characteristics
- Maximum operating rate: 3600 cycles/h
- Switching speed: 0.5...1.5m/s
- Mechanical life: >10 million cycles
- IEC conventional thermal current Ith: 10A
- UL/CSA and IEC/EN/BS 60947-5-1 designation:
  - A600 Q300 for KB...-KC... types
  - A300 Q300 for KM...-KN... types
- IEC rated insulation voltage Ui:
  - 690VAC for KB...-KC... types
  - 440VAC for KM...-KN... types
- IEC rated impulse withstand voltage Uimp:
  - 6kV for KB...-KC... types
  - 4kV for KM...-KN... types
- Class II insulation for KB...-KC... only
- Contact resistance: <10mΩ
- Short-circuit backup protection: 10A gG/SC quick fuse
- Operators of aluminium-zinc alloy
- Housing:
  - KB...-KC... types: self-extinguishing double-insulation polymer thermoplastic
  - KM...-KN... types: aluminium-zinc alloy
- Cable entry: M20 standard supplied; PG13.5 and 1/2 NPT available (see the side note for details)
- Operating head fixing: locking bayonet insert
- Operating force: 3Ncm/4.25ozin
- Cable connection: self-releasing screw terminal
- Tightening torque:
  - Switch fixing: 2.5Nm / 22.1lb.in
  - Contact terminals: 0.8Nm / 7lb.in
  - Body lid screw fixing: 0.8Nm / 7lb.in
- Conductor section: 1 or 2 2.5mm² max / 16-14AWG
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+70°C
  - Pollution degree: 3
  - IEC degree of protection: IP20 for terminals
  - IEC degree of protection: IP65 for body housing.

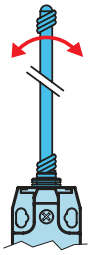
Certifications and compliance
Certifications obtained: UL Listed for USA and Canada (cULus - File E93601), as Auxiliary Devices - Limit switches; EAC, CCC.
Compliant with standards: EN/BS 50047, IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 60204-1, UL508, CSA C22.2 n° 14.



Limit, micro and foot switches

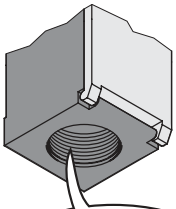
Limit switches, K series. One bottom cable entry. Dimensions to EN/BS 50047
Two side cable entries. Dimensions compatible to EN/BS 50047

Wobble stick, omnidirectional



KBM1... - KMM1...

KCM2... - KNM2...



M20 CABLE ENTRY
For types with PG13.5 cable entry, add the letter P at the end of the order code while for 1/2 NPT, add N.
E.g. KBM1S11P - KBM1S11N

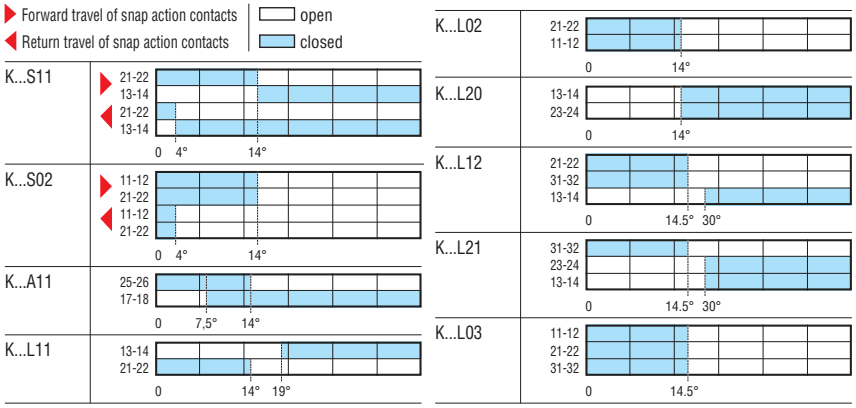
Order code Plastic body	Metal body	Contacts	Rod material	Qty per pkg	Wt
				n°	[kg]
One bottom cable entry. Dimensions to EN/BS 50047.					
KBM1S11	KMM1S11	1NO+1NC Snap action	Flexible	5	❶
KBM2S11	KMM2S11		Semirigid	5	❶
KBM1S02	KMM1S02	2NC Snap action	Flexible	5	❶
KBM2S02	KMM2S02		Semirigid	5	❶
KBM1A11	KMM1A11	1NO+1NC Slow action make before break	Flexible	5	❶
KBM2A11	KMM2A11		Semirigid	5	❶
KBM1L11	KMM1L11	1NO+1NC Slow action	Flexible	5	❶
KBM2L11	KMM2L11		Semirigid	5	❶
KBM1L02	KMM1L02	2NC Slow action	Flexible	5	❶
KBM2L02	KMM2L02		Semirigid	5	❶
KBM1L20	KMM1L20	2NO Slow action	Flexible	5	❶
KBM2L20	KMM2L20		Semirigid	5	❶
KBM1L12	KMM1L12	1NO+2NC Slow action	Flexible	5	❶
KBM2L12	KMM2L12		Semirigid	5	❶
KBM1L21	KMM1L21	2NO+1NC Slow action	Flexible	5	❶
KBM2L21	KMM2L21		Semirigid	5	❶
KBM1L03	KMM1L03	3NC Slow action	Flexible	5	❶
KBM2L03	KMM2L03		Semirigid	5	❶
Two side cable entries. Dimensions compatible to EN/BS 50047.					
KCM1S11	KNM1S11	1O+1NC Snap action	Flexible	5	❶
KCM2S11	KNM2S11		Semirigid	5	❶
KCM1S02	KNM1S02	2NC Snap action	Flexible	5	❶
KCM2S02	KNM2S02		Semirigid	5	❶
KCM1A11	KNM1A11	1NO+1NC Slow action make before break	Flexible	5	❶
KCM2A11	KNM2A11		Semirigid	5	❶
KCM1L11	KNM1L11	1NO+1NC Slow action	Flexible	5	❶
KCM2L11	KNM2L11		Semirigid	5	❶
KCM1L02	KNM1L02	2NC Slow action	Flexible	5	❶
KCM2L02	KNM2L02		Semirigid	5	❶
KCM1L20	KNM1L20	2NO Slow action	Flexible	5	❶
KCM2L20	KNM2L20		Semirigid	5	❶

❶ Consult Technical support for information; see contact details on inside cover.

General characteristics
The LOVATO Electric limit switches have been designed to satisfy requirements comprising quick installation, easy wiring, simple setup, modularity, sturdiness and constant reliability.
The body cover is hinged at the bottom and removable.
The innovative locking bayonet mechanism permits to remove and reposition the operating head in the required configuration with no tools.
The auxiliary contact blocks are removable assuring remarkable wiring ease.

Operational characteristics
- Maximum operating rate: 3600 cycles/h
- Switching speed: 0.5...1.5m/s
- Mechanical life: >10 million cycles
- IEC conventional thermal current Ith: 10A
- UL/CSA and IEC/EN/BS 60947-5-1 designation:
  - A600 Q300 for KB...-KC... types
  - A300 Q300 for KM...-KN... types
- IEC rated insulation voltage Ui:
  - 690VAC for KB...-KC... types
  - 440VAC for KM...-KN... types
- IEC rated impulse withstand voltage Uimp:
  - 6kV for KB...-KC... types
  - 4kV for KM...-KN... types
- Class II insulation for KB...-KC... only
- Contact resistance: <10mΩ
- Short-circuit backup protection: 10A gG/SC quick fuse
- Operators of aluminium-zinc alloy
- Housing:
  - KB...-KC... types: self-extinguishing double-insulation polymer thermoplastic
  - KM...-KN... types: aluminium-zinc alloy
- Cable entry: M20 standard supplied; PG13.5 and 1/2 NPT available (see the side note for details)
- Operating head fixing: locking bayonet insert
- Operating torque: 1Ncm/1.42ozin
- Cable connection: self-releasing screw terminal
- Tightening torque:
  - Switch fixing: 2.5Nm / 22.1lb.in
  - Contact terminals: 0.8Nm / 7lb.in
  - Body lid screw fixing: 0.8Nm / 7lb.in
- Conductor section: 1 or 2 2.5mm² max / 16-14AWG
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+70°C
  - Pollution degree: 3
  - IEC degree of protection: IP20 for terminals
  - IEC degree of protection: IP65 for body housing.

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada (cULus - File E93601), as Auxiliary Devices - Limit switches; EAC, CCC.
Compliant with standards: EN/BS 50047, IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 60204-1, UL508, CSA C22.2 n° 14.



Contact blocks

KXB...

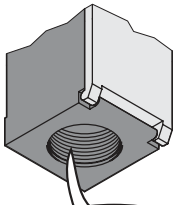
Order code	Contacts	Qty per pkg	Wt
		n°	[kg]
KXBS11	1NO+1NC Snap action❶❷	5	0.022
KXBS02	2NC Snap action❶❷	5	0.022
KXBA11	1NO+1NC Slow action make before break❶❷	5	0.022
KXBL11	1NO+1NC Slow action❷	5	0.022
KXBL02	2NC Slow action❷	5	0.022
KXBL20	2NO Slow action	5	0.022
KXBL12	1NO+2NC Slow action❷❸	5	0.026
KXBL21	2NO+1NC Slow action❷❸	5	0.026
KXBL03	3NC Slow action❷❸	5	0.026

❶ Not suitable for key operated KBN / KCN, hinged operating KBP / KCP / KMP / KNP and slotted lever KBQ / KCQ / KMQ / KNQ types.
❷ Direct (positive) opening action ⊖, safety function according to IEC/EN/BS 60947-5-1.
❸ Not suitable for KC and KN types, KG and KR foot switches.

Body complete with contact block

KXCB... - KXCM...

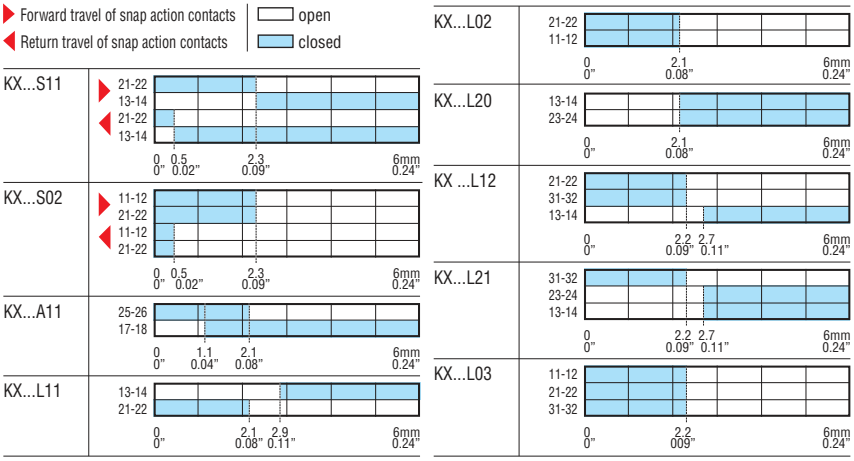
KXCC... - KXCN...



M20 CABLE ENTRY
For types with PG13.5 cable entry, add the letter P at the end of the order code while for ½ NPT, add N.
E.g. KXCCL11P - KXCCL11N

Order code Plastic body	Order code Metal body	Contacts	Qty per pkg	Wt
			n°	[kg]
One bottom cable entry. Dimensions to EN/BS 50047.				
KXCBS11	**KXCMS11**	1NO+1NC Snap action❶❷	5	❹
KXCBS02	**KXCMS02**	2NC Snap action❶❷	5	❹
KXCBA11	**KXCMA11**	1NO+1NC Slow action make before break❶❷	5	❹
KXCBL11	**KXCML11**	1NO+1NC Slow action❷	5	❹
KXCBL02	**KXCML02**	2NC Slow action❷	5	❹
KXCBL20	**KXCML20**	2NO Slow action	5	❹
KXCBL12	**KXCML12**	1NO+2NC Slow action❷❸	5	❹
KXCBL21	**KXCML21**	2NO+1NC Slow action❷❸	5	❹
KXCBL03	**KXCML03**	3NC Slow action❷❸	5	❹
Two side cable entries. Dimensions compatible to EN/BS 50047.				
KXCCS11	**KXCNS11**	1NO+1NC Snap action❶❷	5	❹
KXCCS02	**KXCNS02**	2NC Snap action❶❷	5	❹
KXCCA11	**KXCNA11**	1NO+1NC Slow action make before break❶❷	5	❹
KXCCL11	**KXCNL11**	1NO+1NC Slow action❷	5	❹
KXCCL02	**KXCNL02**	2NC Slow action❷	5	❹
KXCCL20	**KXCNL20**	2NO Slow action	5	❹

❶ Not suitable for key operated KBN / KCN, hinged operating KBP / KCP / KMP / KNP and slotted lever KBQ / KCQ / KMQ / KNQ types.
❷ Direct (positive) opening action ⊖, safety function according to IEC/EN/BS 60947-5-1.
❸ Not suitable for KC and KN types.
❹ Consult Technical support for information; see contact details on inside cover.



General characteristics
The KXB... contact blocks can be used with the K series of limit switches. Combinations of 2 contacts with slow or snap action and, for KB... and KM... types only, 3 slow action contacts are available.
The NC contacts have direct opening operation, a specific safety principle.
The particular four-point contacts warrant high conductivity in any sort of application. The removal of the contacts from the limit switch body provides remarkable wiring ease and reduces installation time as well.
The KXC... bodies, complete with auxiliary contacts, can be used as spare parts for the K series limit switches or coupled with the KXA... operating heads, to obtain complete limit switches in the required configurations.
The body cover is hinged at the bottom and removable to have the best access. Each body includes the innovative locking bayonet mechanism of the operating head. Plastic and metal types are available.

Operational characteristics
- Mechanical life: >10 million cycles
- IEC conventional thermal current Ith: 10A
- Conductivity: 10mA 5V
- UL/CSA and IEC/EN/BS 60947-5-1 designation:
  - A600 Q300 for KXCB...-KXCC... types
  - A300 Q300 for KXCM...-KXCN... types
- IEC rated insulation voltage Ui:
  - 690VAC for KXCB...-KXCC... types
  - 440VAC for KXCM...-KXCN... types
- IEC rated impulse withstand voltage Uimp:
  - 6kV for KXCB...-KXCC... types
  - 4kV for KXCM...-KXCN... types
- Class II insulation for KXCB...-KXCC... only
- Contact resistance: <10mΩ
- Short-circuit backup protection: 10A gG/SC quick fuse
- Housing:
  - KXCB...-KXCC... types: self-extinguishing double-insulation polymer thermoplastic
  - KXCM...-KXCN... types: aluminium-zinc alloy
- Cable entry: M20 standard supplied; PG13.5 and ½ NPT available (see the side note for details)
- Operating head fixing: locking bayonet insert
- Cable connection: self-releasing screw terminal
- Tightening torque:
  - Switch fixing: 2.5Nm / 22.1lb.in
  - Contact terminals: 0.8Nm / 7lb.in
  - Body lid screw fixing: 0.8Nm / 7lb.in
- Conductor section: 1 or 2 2.5mm² max / 16-14AWG
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+70°C
  - Pollution degree: 3
  - IEC degree of protection: IP20 for terminals
  - IEC degree of protection: IP65 for body housing.

Certifications and compliance
Certifications obtained: UL Listed for US and Canada (File E93601), as Auxiliary Devices for KX C... body types only. UL Recognized for USA and Canada (cURus - File E93601) as component - Auxiliary devices for contact blocks only; products having this type of marking are intended for use as components of complete workshop-assembled equipment; EAC for all.
Comply with standards: EN/BS50047, IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 60204-1, UL508, CSA C22.2 n° 14.

Operating heads

KXAA1 KXAB1 KXAB2

KXAC1 KXAC2

KXAD1 KXAD2

KXAE1 KXAE2 KXAE3

KXAF1 KXAF2

KXAF3 KXAF4 KXAH1

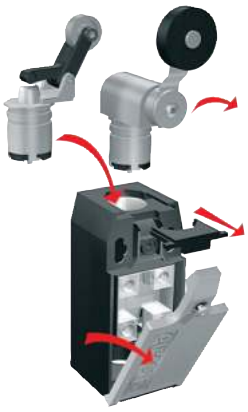
KXAL1 KXAL2

KXAM1 KXAM2

Order code	Description	Qty per pkg	Wt
		n°	[kg]
KXAA1	Top push rod plunger	5	0.013
KXAB1	Plastic top roller push plunger	5	0.019
KXAB2	Metal top roller push plunger	5	0.020
KXAC1	Plastic roller centre push lever	5	0.018
KXAC2	Metal roller centre push lever	5	0.022
KXAD1	Plastic roller side push lever	5	0.018
KXAD2	Metal roller side push lever	5	0.023
KXAE1	Plastic roller lever plunger	5	0.039
KXAE2	Metal roller lever plunger	5	0.048
KXAE3	Rubber Ø50x10mm❷ roller lever plunger	5	0.058
KXAF1	Adjustable plastic roller lever Ø19x5mm❶	5	0.055
KXAF2	Adjustable metal roller lever Ø19x5mm❶	5	0.065
KXAF3	Adjustable rubber Ø50x10mm❷ roller lever	5	0.072
KXAF4	Adjustable offset rubber Ø50x10mm❷ roller lever	5	0.081
KXAH1	Ceramic rod lever	5	0.056
KXAL1	Adjustable plastic rod lever	5	0.043
KXAL2	Adjustable stainless steel rod lever	5	0.051
KXAM1	Flexible wobble stick	5	0.032
KXAM2	Semirigid wobble stick	5	0.023

❶ Ø19x5mm = Ø0.75x0,2".
❷ Ø50x10mm = Ø1.97"x0.39".

General characteristics
The KXA... operating heads can be used as spare parts for the K series limit switches or coupled with the KXC... bodies to obtain complete limit switches in the required configurations.
The heads are made of metal and warrant sturdiness and operating reliability in all conditions.
The shape of the coupling section with the body of the K series switches permits to orient the head in any 45° angle position while the initial lever and rod position can be adjusted 360° at 15° angle positions.
The head fixing to the body is achieved by the innovative locking bayonet mechanism so there is no need of tools.
Tightening torque for eventual operating head actuator fixing is 0.8Nm/7lb.in.



Cable glands and cable conduit

KXP... KXP03

Order code	Description	Qty per pkg	Wt
		n°	[kg]
KXP01	M20 cable gland	50	0.009
KXP02	PG13.5 cable gland	50	0.009
KXP03	M20 rubber cable conduit	50	0.004

General characteristics
The cable glands are in plastic with either M20 or PG13.5 thread and provide to keep the cable in place and maintain the proper IP protection of the limit switch after installation.

Operational characteristics for cable gland
– Material: self-extinguishing polyamide
– IEC degree of protection: IP68
– Gland seal with cable diameter: 6...12mm/0.24...0.47".

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: EN/BS 50262, UL508.

KPA1...

KPA2...

KPB1...

KPB2...

KPB3...

KPB4...

KPB5...

KPB6...

KPB7...

KPB8...

KPE1...

KPE2...

KPF1...

KPL2...

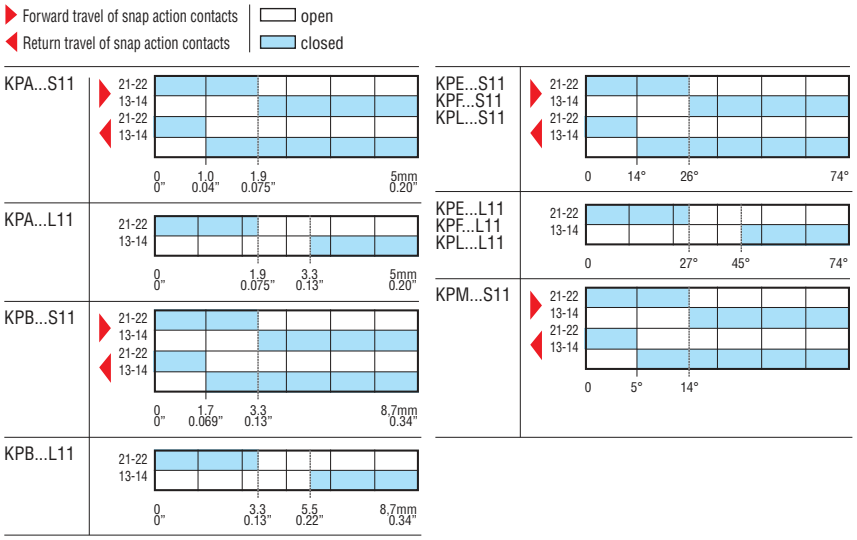
KPM2S11

Order code	Contacts 1NO+1NC	Head material	Cable length ❷	Qty per pkg	Wt
			m	n°	[kg]
TOP PUSH ROD PLUNGER.					
KPA1S11	Snap action❶	Metal	2	1	0.286
KPA1L11	Slow action❶	Metal	2	1	0.286
KPA2S11❸	Snap action❶	Metal	2	1	0.302
KPA2L11❸	Slow action❶	Metal	2	1	0.302
TOP ROLLER PUSH PLUNGER.					
KPB1S11	Snap action❶	Plastic	2	1	0.290
KPB1L11	Slow action❶	Plastic	2	1	0.290
KPB2S11	Snap action❶	Metal	2	1	0.290
KPB2L11	Slow action❶	Metal	2	1	0.290
KPB3S11❹	Snap action❶	Plastic	2	1	0.288
KPB3L11❹	Slow action❶	Plastic	2	1	0.288
KPB4S11❹	Snap action❶	Metal	2	1	0.296
KPB4L11❹	Slow action❶	Metal	2	1	0.296
M12 HEAD TOP ROLLER PUSH PLUNGER.					
KPB5S11	Snap action❶	Plastic	2	1	0.308
KPB5L11	Slow action❶	Plastic	2	1	0.308
KPB6S11	Snap action❶	Metal	2	1	0.310
KPB6L11	Slow action❶	Metal	2	1	0.310
KPB7S11❹	Snap action❶	Plastic	2	1	0.310
KPB7L11❹	Slow action❶	Plastic	2	1	0.310
KPB8S11❹	Snap action❶	Metal	2	1	0.310
KPB8L11❹	Slow action❶	Metal	2	1	0.310
ROLLER LEVER PLUNGER.					
KPE1S11	Snap action❶	Plastic	2	1	0.336
KPE1L11	Slow action❶	Plastic	2	1	0.336
KPE2S11	Snap action❶	Metal	2	1	0.336
KPE2L11	Slow action❶	Metal	2	1	0.336
ADJUSTABLE ROLLER LEVER.					
KPF1S11	Snap action❶	Plastic	2	1	0.344
KPF1L11	Slow action❶	Plastic	2	1	0.344
ADJUSTABLE ROD LEVER.					
KPL2S11	Snap action❶	Metal	2	1	0.342
KPL2L11	Slow action❶	Metal	2	1	0.342
OMNIDIRECTIONAL WOBBLE STICK.					
KPM2S11	Snap action❶	Metal	2	1	0.298

❶ Direct (positive) opening action ⊖; safety function according to IEC/EN/BS 60947-5-1.
❷ For prewired switches with 1m long cable only, add suffix 010 at the end of the order code.
Example: KPA1S11010 for prewired switch, top push metal rod plunger, with 1NO+1NC snap action contacts and 1m long cable.
❸ M12 head fixing.
❹ Roller operation perpendicular to switch body.

Operational characteristics
- 2 meters long cable❷ (5 core, each 0.75mm²/18 AWG)
- Maximum operating rate: 3600 cycles/h
- Mechanical life: >10 million cycles
- IEC conventional thermal current Ith: 10A
- conductivity: 10mA 5V
- UL/CSA and IEC/EN/BS 60947-5-1 designation: B300 R300
- IEC rated insulation voltage Ui: 400VAC
- IEC rated impulse withstand voltage Uimp: 4kV
- Class I insulation
- Contact resistance: <25mΩ
- Body housing: aluminium and zinc alloy
- Operating force/torque:
  - KPA types: 15N / 3.4lb
  - KPB types: 10N / 2.2lb
  - KPE, KPF and KPL types: 0.08Nm / 0.7lb.in
  - KPM types: 0.1Nm / 0.9lb.in
- Tightening torque for switch fixing: 2.5Nm / 22.1lb.in for body housing fixing possible: 0.8Nm / 7lb.in
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+70°C
  - Pollution degree: 3
  - IEC degree of protection: IP67 for body housing.

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada (cULus - File E93601), as Auxiliary Devices - Limit switches; EAC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL508, CSA C22.2 n° 14.



Top push rod plunger

PLN...A...

Order code	Contacts	Degree of protection	Qty per pkg	Wt
			n°	[kg]
PLNA1A	1NC❶	IP40	1	0.240
PLNA1AW		IP65	1	0.240
PLNA2A	2NC❶	IP40	1	0.240
PLNA2AW		IP65	1	0.240
PLNC1A	1NO	IP40	1	0.240
PLNC1AW		IP65	1	0.240
PLNC2A	2NO	IP40	1	0.240
PLNC2AW		IP65	1	0.240
PLNU1A	1NO+1NC	IP40	1	0.240
PLNU1AW		IP65	1	0.240

❶ Direct (positive) opening action ⊖; safety function according to IEC/EN/BS 60947-5-1.

Top roller push plunger

PLN...R...

Order code	Contacts	Degree of protection	Qty per pkg	Wt
			n°	[kg]
PLNA1R	1NC❶	IP40	1	0.230
PLNA1RW		IP65	1	0.230
PLNA2R	2NC❶	IP40	1	0.230
PLNA2RW		IP65	1	0.230
PLNC1R	1NO	IP40	1	0.230
PLNC1RW		IP65	1	0.230
PLNC2R	2NO	IP40	1	0.230
PLNC2RW		IP65	1	0.230
PLNU1R	1NO+1NC	IP40	1	0.230
PLNU1RW		IP65	1	0.230

❶ Direct (positive) opening action ⊖; safety function according to IEC/EN/BS 60947-5-1.

Roller centre push lever

PLN...H

PLN...HSBW

Order code	Contacts	Degree of protection	Qty per pkg	Wt
			n°	[kg]
PLNA1H	1NC❶	IP40	1	0.270
PLNA1HW		IP65	1	0.270
PLNA2H	2NC❶	IP40	1	0.270
PLNA2HW		IP65	1	0.270
PLNU1H	1NO+1NC	IP40	1	0.270
PLNU1HW		IP65	1	0.270
With offset roller.				
PLNA1HSB	1NC❶	IP40	1	0.290
PLNA1HSBW		IP65	1	0.290
PLNA2HSB	2NC❶	IP40	1	0.290
PLNA2HSBW		IP65	1	0.290
PLNU1HSB	1NO+1NC	IP40	1	0.290
PLNU1HSBW		IP65	1	0.290

❶ Direct (positive) opening action ⊖; safety function according to IEC/EN/BS 60947-5-1.

Type	Travel [mm (in)] — open / closed
PLNA1A... PLNA1R...	1.5 0.06" … 11.5 0.45"; 11-12; [mm (in)]
PLNA1H... PLNA1HSB...	2.4 0.09" … 20 0.79"; 11-12; [mm (in)]
PLNA2A... PLNA2R...	1.5 0.06" … 6.5 0.25"; 11-12, 21-22; [mm (in)]
PLNA2H... PLNA2HSB...	2.4 0.09" … 11.5 0.45"; 11-12, 21-22; [mm (in)]
PLNC1A... PLNC1R...	2.2 0.09" … 11.5 0.45"; 13-14; [mm (in)]
PLNC2A... PLNC2R...	4.2 0.16" … 6.4 0.25"; 13-14, 23-24; [mm (in)]
PLNU1A... PLNU1R...	1.5 0.06" … 11.5 0.45"; 21-22, 13-14; 5.9 (0.23") [mm (in)]
PLNU1H... PLNU1HSB...	2.4 0.09" … 20 0.79"; 21-22, 13-14; 10.4 (0.41") [mm (in)]

General characteristics

The PL types are for general purpose use. The extensive range of models with numerous actuators and multiple contact configurations is the optimal solution to the diverse installation requirements.
Overall simple design, oversize contacts and choice materials ensure durable and safe operation. The metal alloy housing and resistant thermoplastic actuators warrant reliable heavy-duty features for any sort of operating conditions.
The PL series limit switches are available with IEC IP40 or IP65 degree of protection; this characteristic is ensured by the use of appropriate sealing gasket.
The IEC IP65 version is easily identified by the "W" suffix of its order code and can be used in adverse ambient conditions.

Operational characteristics

- Maximum operating rate: 3600 cycles/h
- Mechanical life: >10 million cycles
- IEC utilisation category:
  - DC13 duty: 10A 24V
  - AC15 duty: 5A 250V, 3A 400V
- IEC conventional thermal current Ith: 10A
- IEC rated insulation voltage Ui: 400VAC
- Contact resistance: <10mΩ
- Short-circuit backup protection: 10A gG/SC quick fuse
- Housing cable entry: PG11 (PLN...W types only complete with cable gland)
- Cable connection: screw terminal with clamp suitable for cables up to 2.5mm² / 14 AWG
- Tightening torque:
  - Switch fixing: 2.5Nm / 22.1lb.in
  - Contact terminals: 0.8Nm / 7lb.in
  - Body lid screw fixing: 0.8Nm / 7lb.in
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+70°C
  - Pollution degree: 3
  - IEC degree of protection: IP40 / IP65 (see table indications).

Certifications and compliance

Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, EN/BS 81-1.

Latch and manual release

PLNA1RAG

Order code	Contacts	Degree of protection	Qty pre pkg	Wt
		IEC	n°	[kg]
Top roller push plunger.				
PLNA1RAG	1NC ❶	IP40	1	0.220
PLNA1RAGW	1NC ❶	IP65	1	0.230

❶ Direct (positive) opening action ⊖; safety function according to IEC/EN/BS 60947-5-1.

Manual reload and magnetic release

PLA1AM

PLA1RMW

Order code	Contacts	Degree of protection	Qty pre pkg	Wt
		IEC	n°	[kg]
Top push rod plunger.				
PLA1AM	1NC ❶	IP40	1	0.245
PLA1AMW	1NC ❶	IP65	1	0.250
Top roller push plunger.				
PLA1RM	1NC ❶	IP40	1	0.250
PLA1RMW	1NC ❶	IP65	1	0.260

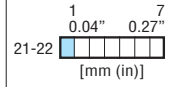
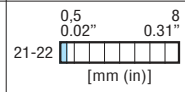
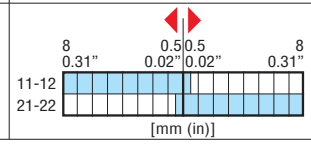
❶ Direct (positive) opening action ⊖; safety function according to IEC/EN/BS 60947-5-1.

Bi-directional

PLN978

Order code	Contacts	Degree of protection	Qty pre pkg	Wt
		IEC	n°	[kg]
Rod plunger.				
PLN978	2NC ❶ independent	IP65	1	0.265

❶ Direct (positive) opening action ⊖; safety function according to IEC/EN/BS 60947-5-1.

Type	Travel [mm (in)] (The arrows indicate the direction of operation)	open / closed
PLNA1RAG PLNA1RAGW		
PLA1AM PLA1AMW PLA1RM PLA1RMW		
PLN978		

General characteristics

The PL limit switches were initially made specifically for hoisting or lifting duty and then used in other diverse applications. The type with latch and manual release as well as the one with manual reload and magnetic release are designed so the switch remains opened after the switching of the NC contact. In the first instance, the contact closing is made by pushing the release button. In the second case, the reloading is obtained by pushing the shaft end or else pulling it from the top for the IP65 types.
The limit switches with dual operation can be replaced by two standard switches, for the stop control of moving mechanisms with two directions of running (e.g. automatic doors). It is equipped with two opposed operating mechanisms and one NC contact for each mechanism (i.e. 2NC).
The simple constructive design, oversize contacts and careful material combinations warrant safe and constant operation. The metal-alloy housing and the thermoplastic mechanism material of first-rate mechanical features assure reliability and durability with any type of operating condition.

Operational characteristics

- Maximum operating rate: 3600 cycles/h
- Mechanical life: >10 million cycles
- IEC utilisation category:
  - DC13 duty: 10A 24V
  - AC15 duty: 5A 250V, 3A 400V
- IEC conventional thermal current Ith: 10A
- IEC rated insulation voltage: 400VAC
- Contact resistance: <10mΩ
- Short-circuit backup protection: 10A gG/SC quick fuse
- Housing cable entry: PG11 (PL...W and PLN978 types only complete with cable gland)
- Cable connection: screw terminal with clamp suitable for cables up to 2.5mm^2 / 14 AWG
- Tightening torque:
  - Switch fixing: 2.5Nm / 22.1lb.in
  - Contact terminals: 0.8Nm / 7lb.in
  - Body lid screw fixing: 0.8Nm / 7lb.in
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+70°C
  - Pollution degree: 3
  - IEC degree of protection: IP40 / IP65 (see table indications).

Certifications and compliance

Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60947-5-1, IEC/EN/BS 60204-1, EN/BS 81-1.

Dimensions to EN/BS 50047

RS113... - RS213... - RS313...

Order code	Contacts	Ring material	Qty per pkg	Wt
			n°	[kg]
Without reset button.				
RS11310	1NO+1NC Snap action	Steel	1	0.090
RS21310	1NO+1NC Slow action	Steel	1	0.090
RS31310	2NO Slow action	Steel	1	0.090

Accessories and spare parts

P33032

P33033

P33034

P33035

P33036

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Accessories.			
P33032	Rope terminal clamp, Ø5mm	10	0.023
P33033	Rope eye, Ø5mm	10	0.007
P33034	Turnbuckle M6x60	10	0.061
P33035	Eye bolt M8	10	0.030
P33036	Steel rope, Ø5mm❶	100[m]	4.900

❶ The P33036 rope is sold in 100m/109.4yd roll; Ø5mm = Ø0.2".

Type	Forward travel of snap action contacts / Return travel of snap action contacts	open / closed
RS113...	21-22 / 13-14 / 21-22 / 13-14	0 [mm (in)] 6 (0.24")
RS213...	21-22 / 13-14	0 [mm (in)] 6 (0.24")
RS313...	21-22 / 11-12	0 [mm (in)] 6 (0.24")

General characteristics
The RS series limit switches are designed and manufactured according to European standards for dimensions and operating characteristics.
The double-insulated housing of the limit switch is made of glass-reinforced self-extinguishing polyamide resin to protect internal circuits against shocks or impacts and in industrial environments, against accidental ingress of tools and accidental contact.
The contacts are dimensioned to ensure self cleaning of the silver-alloy contact surfaces.

Operational characteristics
- Maximum operating rate: 3600 cycles/h for RS...13
- Switching speed: 0.5...1.5m/s
- Mechanical life: >10 million cycles
- IEC utilisation category:
  - DC13 duty: 1.5A 24V
  - AC15 duty: 6A 250V
- IEC conventional thermal current Ith: 10A
- IEC rated insulation voltage Ui: 250VAC
- Contact resistance: <10mΩ
- Short-circuit backup protection: 10A gG/SC quick fuse
- Operating force: 25N/5.6lb
- Cable entry: PG11 (RS...13)
- Cable connection: self-releasing screw terminal
- Tightening torque:
  - Switch fixing: 2.5Nm / 22.1lb.in
  - Contact terminals: 0.8Nm / 7lb.in
  - Body lid screw fixing: 0.8Nm / 7lb.in
- Conductor section: 1 or 2 2.5mm² max / 16-14 AWG
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+70°C
  - Pollution degree: 3
  - IEC degree of protection: IP65 (RS...13).

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada (cULus - File E93601), as Auxiliary Devices - Limit switches; EAC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 60204-1, EN/BS 81-1, EN/BS 50041, UL508, CSA C22.2 n° 14.

Limit, micro and foot switches

Rope-pull lever limit switches for normal stopping

PLN...AT...W

Order code	Contacts	Degree of protection	Operating force	Qty per pkg	Wt
		IEC	[N] / [lb]	n°	[kg]
Without reset button.					
PLNU1AT	1NO+1NC ❶	IP40	10 / 2.2	1	0.240
PLNU1ATW		IP65	10 / 2.2	1	0.240
PLNU1AT25	1NO+1NC ❶	IP40	25 / 5.6	1	0.240
PLNU1AT25W		IP65	25 / 5.6	1	0.240

❶ Direct (positive) opening action ⊖; safety function according to IEC/EN/BS 60947-5-1.

P2L...

Order code	Contacts	Degree of protection	Operating force	Qty per pkg	Wt
		IEC	[N] / [lb]	n°	[kg]
Without reset button.					
P2L81311	1NO+1NC ❶	IP65	40 / 9	1	0.459
P2L81312		IP65	120 / 27	1	0.459
P2L101311	2NO+2NC ❶	IP65	40 / 9	1	0.459
P2L101312		IP65	120 / 27	1	0.459

❶ Direct (positive) opening action ⊖; safety function according to IEC/EN/BS 60947-5-1.

Type	Travel [mm (in)]	open / closed
PLNU1AT...	1,5 0.06" … 11 0.43"; 13-14, 21-22; 6 [mm (in)] 0.24"	
P2L8...	11-12, 21-22; 0 [mm (in)] 10 0.39"	
P2L10...	31-32, 41-42, 13-14, 23-24; 0 [mm (in)] 10 0.39"	

General characteristics

The PLN and P2L types are limit switches for general use. The simple constructive design, oversize contacts and careful material combinations warrant safe and constant operation. The metal-alloy housing and the thermoplastic mechanism material of first-rate mechanical features assure reliability and durability with any type of operating condition.

Operational characteristics

- Maximum operating rate: 3600 cycles/h
- Mechanical life: >10 million cycles
- IEC utilisation category:
  - DC13 duty: 10A 24V
  - AC15 duty: 5A 250V; 3A 400V
- IEC conventional thermal current Ith: 10A for PLN types; 6A for P2L types
- IEC rated insulation voltage Ui: 400VAC
- Contact resistance: <10mΩ
- Short-circuit backup protection: 10A gG/SC quick fuse
- Cable entry: PG11 (PLN...W and P2L types only complete with cable gland)
- Cable connection: self-releasing screw terminal suitable for cables up to 2.5mm² / 14 AWG
- Tightening torque for switch fixing: 2.5Nm/2.21lb.in
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+70°C
  - Pollution degree: 3
  - IEC degree of protection: IP40 / IP65 (see order code table indications).

Certifications and compliance

Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, EN/BS 81-1.

Accessories and spare parts

P33032

P33033

P33034

P33035

P33036

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Accessories.			
P33032	Rope terminal clamp, Ø5mm	10	0.023
P33033	Rope eye, Ø5mm	10	0.007
P33034	Turnbuckle M6x60	10	0.061
P33035	Eye bolt M8	10	0.030
P33036	Steel rope, Ø5mm❶	100[m]	4.900

❶ The P33036 rope is sold in 100m/109.4yd roll; Ø5mm = Ø0.2".

KSA1...

KSA2...

KSA3...

KSA4...

KSA9...

KSB1...

KSB2...

KSC1...

KSC2...

KSC3...

KSC9...

KSL1...

KSL2...

KSL3...

KSSC01

KSSCB2

Order code	Contacts	Terminals	Qty per pkg	Wt
			n°	[kg]
TOP PUSH ROD. METAL PLUNGER. Pin.				
KSA1S	1NO/NC	Solder	10	0.027
KSA1V	1NO/NC	Screw	10	0.027
KSA1F	1NO/NC	Faston	10	0.029
TOP PUSH ROD. METAL PLUNGER. High rod plunger.				
KSA2S	1NO/NC	Solder	10	0.029
KSA2V	1NO/NC	Screw	10	0.029
KSA2F	1NO/NC	Faston	10	0.031
TOP PUSH ROD. METAL PLUNGER. Low rod plunger.				
KSA3S	1NO/NC	Solder	10	0.029
KSA3V	1NO/NC	Screw	10	0.028
KSA3F	1NO/NC	Faston	10	0.030
TOP PUSH ROD. METAL PLUNGER. M12 fixing head.				
KSA4S	1NO/NC	Solder	10	0.048
KSA4V	1NO/NC	Screw	10	0.047
KSA4F	1NO/NC	Faston	10	0.049
PUSH BUTTON.				
KSA9S	1NO/NC	Solder	10	0.029
KSA9V	1NO/NC	Screw	10	0.028
KSA9F	1NO/NC	Faston	10	0.030
TOP ROLLER PUSH PLUNGER. M12 fixing head.				
KSB1S	1NO/NC	Solder	10	0.061
KSB1V	1NO/NC	Screw	10	0.060
KSB1F	1NO/NC	Faston	10	0.062
TOP ROLLER PUSH PLUNGER. M12 fixing head, 90° roller.				
KSB2S	1NO/NC	Solder	10	0.061
KSB2V	1NO/NC	Screw	10	0.060
KSB2F	1NO/NC	Faston	10	0.062
ROLLER CENTRE PUSH LEVER. 26.6mm/1.05" long lever.				
KSC1S	1NO/NC	Solder	10	0.032
KSC1V	1NO/NC	Screw	10	0.031
KSC1F	1NO/NC	Faston	10	0.033
ROLLER CENTRE PUSH LEVER. 48.5mm/1.91" long lever.				
KSC2S	1NO/NC	Solder	10	0.032
KSC2V	1NO/NC	Screw	10	0.031
KSC2F	1NO/NC	Faston	10	0.033
ROLLER CENTRE PUSH LEVER. 37mm/1.45" long lever.				
KSC3S	1NO/NC	Solder	10	0.032
KSC3V	1NO/NC	Screw	10	0.031
KSC3F	1NO/NC	Faston	10	0.033
ROLLER CENTRE PUSH LEVER. One-way roller lever.				
KSC9S	1NO/NC	Solder	10	0.034
KSC9V	1NO/NC	Screw	10	0.033
KSC9F	1NO/NC	Faston	10	0.035
METAL LEVER. 63mm/2.48" long flat lever.				
KSL1S	1NO/NC	Solder	10	0.032
KSL1V	1NO/NC	Screw	10	0.031
KSL1F	1NO/NC	Faston	10	0.033
METAL LEVER. 54mm/2.13" long flat lever.				
KSL2S	1NO/NC	Solder	10	0.032
KSL2V	1NO/NC	Screw	10	0.031
KSL2F	1NO/NC	Faston	10	0.033
METAL LEVER. 168.3mm/6.63" long flat cylindrical lever.				
KSL3S	1NO/NC	Solder	10	0.032
KSL3V	1NO/NC	Screw	10	0.031
KSL3F	1NO/NC	Faston	10	0.033
ACCESSORIES.❶				
KSSC01	Terminal shroud		10	0.006
KSSCB2	Terminal shroud with conduit		10	0.014

❶ Suitable only for KS...V.

Operational characteristics
- Maximum operating rate: 240 cycles/min
- Switching speed: 0.01...1m/s
- Operating speed: 0.05...1m/s
- Electrical life: 500,000 cycles
- Mechanical life: 20 million cycles
- IEC conventional thermal current Ith: 15A
- UL/CSA and IEC/EN/BS 60947-5-1 designation: A600 P300
- Conductivity: 10mA 5V
- IEC rating: AC15 240VAC 3A
- IEC rated insulation voltage Ui: 250VAC
- Contact resistance: <15mΩ
- Body housing: polymer thermoplastic
- Operating force:
  - KSA1-KSA4 and KSB types: 2.5N/9oz
  - KSA9 and KSC3 types: 1.5N/5.4oz
  - KSC1 types: 1N/3.6oz
  - KSC2 and KSL2: 1.3N/4.7oz
  - KSC9 types: 1.7N/6.1oz
  - KSL1 types: 6.4N/23oz
  - KSL3 types: 0.1N/0.36oz
- Tightening torque:
  - For M12 head fixing: 4.9...6.9Nm/43...61lb.in
  - For side screws: 0.6...1Nm/5.3...8.8lb.in
  - For terminal screws: 0.7...1Nm/6.2...8.8lb.in
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+70°C
  - Pollution degree: 3
  - IEC degree of protection: IP00 or IP20 with terminal shroud.

Certifications and compliance
Certifications obtained: UL Recognized for USA and Canada (File E172189) as Industrial Control Switches - Component; products having this type of marking are intended for use as components of complete workshop - assembled equipment; EAC.
Compliance with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 61058-1, UL508, CSA C22.2 n° 14.

KG200 ...
KG220 ...

KR200 ...

KG110 ...

KR210 ...
KR211 ...

KGD003 - KGD004

Order code Plastic body	Metal body	Model	Contacts	Qty per pkg	Wt
				n°	[kg]
ONE PEDAL FOOT SWITCHES. With free actuation.					
KG100S11 ❸	KR100S11 ❸	Open	1NO+1NC Snap action ❶	1	❷
KG100L11 ❸	KR100L11 ❸	Open	1NO+1NC Snap action ❶	1	❷
KG200S11 ❸	KR200S11 ❸	With cover	1NO+1NC Snap action ❶	1	❷
KG200L11 ❸	KR200L11 ❸	With cover	1NO+1NC Snap action ❶	1	❷
With safety lever.					
KG110S11 ❸	KR110S11 ❸	Open	1NO+1NC Slow action ❶	1	❷
KG110L11 ❸	KR110L11 ❸	Open	1NO+1NC Slow action ❶	1	❷
KG210S11 ❸	KR210S11 ❸	With cover	1NO+1NC Snap action ❶	1	❷
KG210S11 ❸	KR210S11 ❸	With cover	1NO+1NC Slow action ❶	1	❷
KG210S22	KR210S22	With cover	2NO+2NC Slow action ❶	1	❷
With pedal actuator lock.					
KG120S11 ❸	KR120S11 ❸	Open	1NO+1NC Snap action ❶	1	❷
KG120L11 ❸	KR120L11 ❸	Open	1NO+1NC Snap action ❶	1	❷
KG220S11 ❸	KR220S11 ❸	With cover	1NO+1NC Snap action ❶	1	❷
KG220L11 ❸	KR220L11 ❸	With cover	1NO+1NC Snap action ❶	1	❷
With two-stage safety lever.					
KG211S22	KR211S22	With cover	2NO+2NC 2-stage snap action ❶	1	❷

Order code Plastic body	Metal body	Model	Contacts (for each pedal)	Qty per pkg	Wt
				n°	[kg]
TWO PEDAL FOOT SWITCHES. With safety lever on both pedals.					
KGD001 ❸	KRD001 ❸	Both w/cover	1NO+1NC Snap action ❶	1	❷
KGD002	KRD002	Both w/cover	2NO+2NC Snap action ❶	1	❷
Left pedal with free actuation and right pedal with safety lever.					
KGD003 ❸	KRD003 ❸	Left open	1NO+1NC Snap action ❶	1	❷
		Right w/cover			
KGD004	KRD004	Left open	1NO+1NC Snap action ❶	1	❷
		Right w/cover	2NO+2NC Snap action ❶		

❶ Direct (positive) opening action ⊖; safety function according to IEC/EN/BS 60947-5-1.
❷ Consult Technical support for information; see contact details on inside cover.
❸ A possible second contact block can be fitted; blocks with only 2 contacts in total can be used. See accessories below.

General characteristics
The KG... and KR... foot switches are used to control machinery and other equipment, leaving the operator's hands free to do other functions. The sturdiness of the metal and plastic body and the wide range of the available versions provide the proper solution for each control need.
Main features are:
– Thermoplastic or metal version.
The plastic or metal body gives adequate robustness to the foot switch, for installation in all ambient and application conditions.
– Versions complete with or without pedal protection cover.
The cover assures protection against accidental foot switch operation, due to sudden tool or heavy material dropping or other shock or vibration. The type without cover, open version, is instead immediately accessible and is preferred when the most important pedal operation is to stop a machine.
– Versions with safety lever.
The safety mechanism prevents unintentional foot switch activation and excludes the pedal pressing if the operator's foot is not completely in place.
– Stable pedal base.
The foot switch is equipped with rubber feet and metal-reinforced base for a firm and non-sliding position and a more reliable and safe activation.

Operational characteristics
– Mechanical life: >10 million cycles
– Conventional thermal current Ith: 10A
– Designation to IEC/EN/BS 60947-5-1:
• A600 Q600 for KG types
• A300 Q300 for KR types
– Tightening torque for contacts: 1Nm/8.8lb.in
– Rated insulation voltage Ui:
• 690VAC for KG types
• 440VAC for KR types
– Rated impulse withstand voltage Uimp:
• 6kV for KG types
• 4kV for KR types
– Class II insulation (KG types only)
– Contact resistance: <10mΩ
– Short-circuit backup protection: 10A gG fuse
– Cable connection: self-releasing screw terminal
– Housing:
• KG types: self-extinguishing double-insulation polymer thermoplastic
• KR types: aluminium-zinc alloy
– Cable entry: M20
– Ambient conditions:
• Operating temperature: -25...+70°C
• Storage temperature: -40...+70°C
• Pollution degree: 3
– IEC degree of protection:
• IP20 for terminals
• IP54 for body housing
• IP65 available on request (add the letter S at the end of the order code. E.g. KG100S11S).

Certifications and compliance
Certifications obtained: cURus for contacts only and EAC for foot switches.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 60204-1, IEC/EN/BS 60447.

Accessories

KXP...

KXP03

❹ A possible second contact block can be fitted on the left-hand pedal; blocks with only 2 contacts in total can be used. See accessories below and contact blocks on page 10-14.

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Accessories.			
KGX01	Kit of elements to activate 2nd contact block ❹	10	0.039
KGX02	Contact block mounting bracket	10	0.022
Cable glands and cable conduit.			
KXP01	M20 cable gland	50	0.009
KXP02	PG13.5 cable gland	50	0.009
KXP03	M20 rubber cable conduit	50	0.004

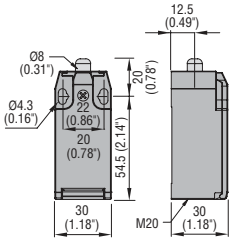
General characteristics
The cable glands are in plastic with either M20 or PG13.5 thread and provide to keep the cable in place and maintain the proper IP protection of the switch after installation.

Operational characteristics for cable gland
– Material: self-extinguishing polyamide
– IEC degree of protection: IP68
– Gland seal with cable diameter: 6...12mm/0.24"...0.47".

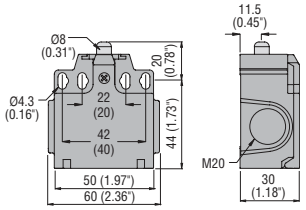
Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: EN/BS 50262, UL508.

LIMIT SWITCHES K SERIES

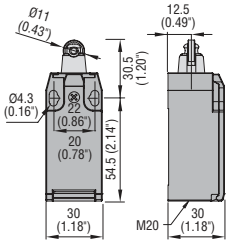
KBA1...
KMA1...



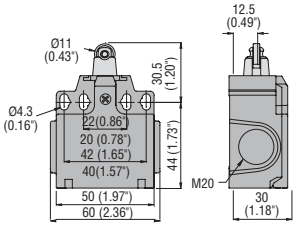
KCA1
KNA1



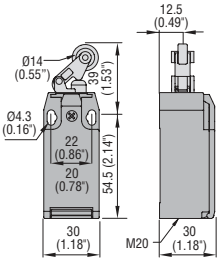
KBB1... - KBB2...
KMB1... - KMB2...



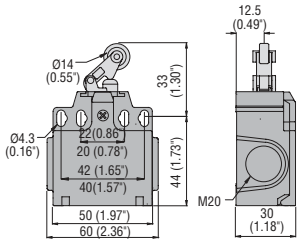
KCB1... - KCB2...
KNB1... - KNB2...



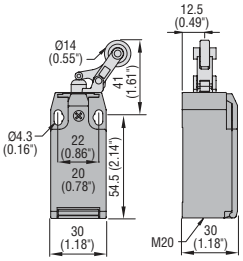
KBC1... - KBC2...
KMC1... - KMC2...



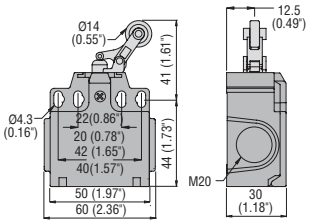
KCC1... - KCC2...
KNC1... - KNC2...



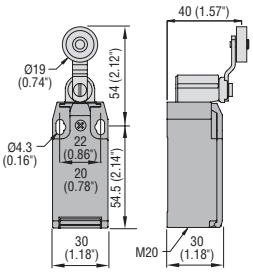
KBD1... - KBD2...
KMD1... - KMD2...



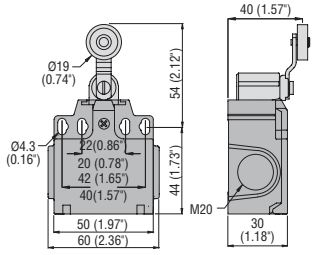
KCD1... - KCD2...
KND1... - KND2...



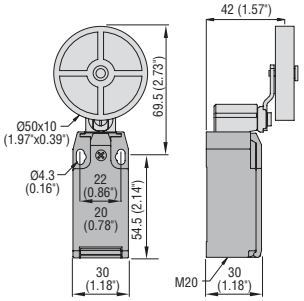
KBE1... - KBE2...
KME1... - KME2...



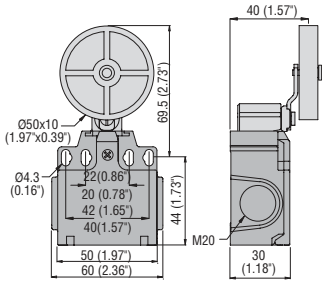
KCE1... - KCE2...
KNE1... - KNE2...



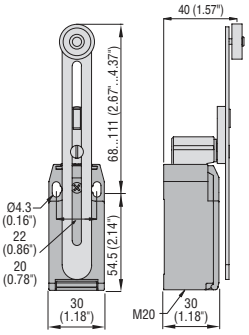
KBE3...
KME3...



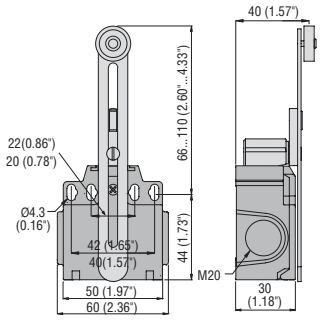
KCE3...
KNE3...



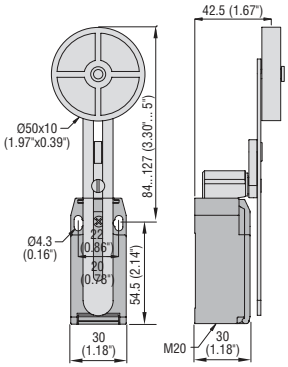
KBF1... - KBF2...
KMF1... - KMF2...



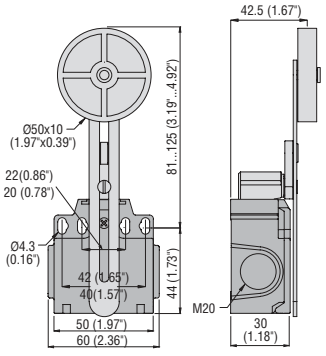
KCF1... - KCF2...
KNF1... - KNF2...



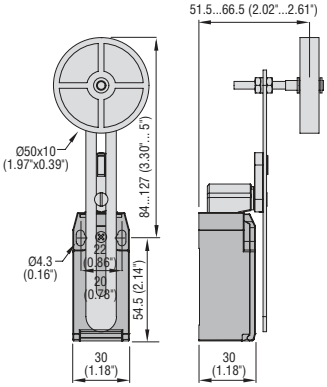
KBF3...
KMF3...



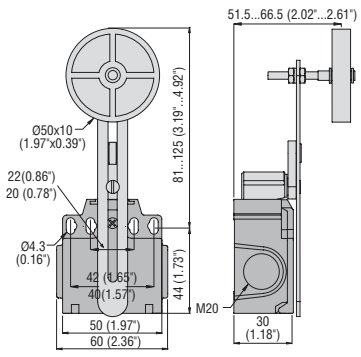
KCF3...
KNF3...



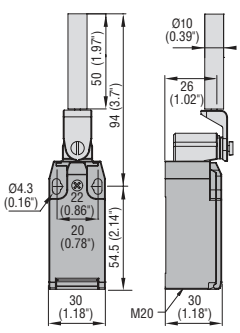
KBF4...
KMF4...



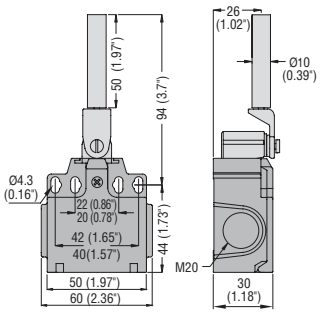
KCF4...
KNF4...



KBH1...
KMH1...

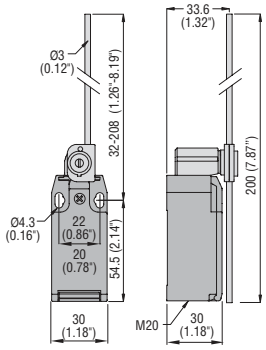


KCH1...
KNH1...

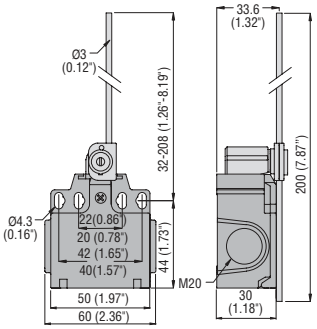


LIMIT SWITCHES K SERIES

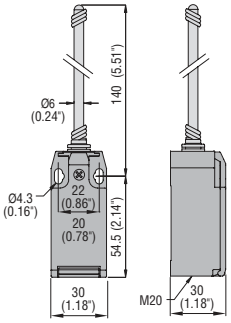
KBL1... - KBL2...
KML1... - KML2...



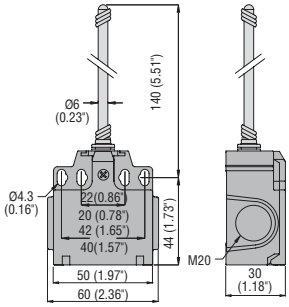
KCL1... - KCL2...
KNL1... - KNL2...



KBM1... - KBM2...
KMM1... - KMM2...

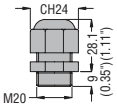


KCM1... - KCM2...
KNM1... - KNM2...



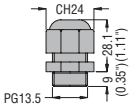
Cable glands

KXP01



CH = Spanner/Wrench

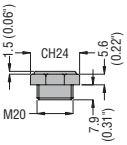
KXP02



CH = Spanner/Wrench

Cable conduit

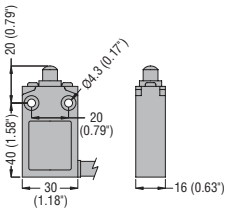
KXP03



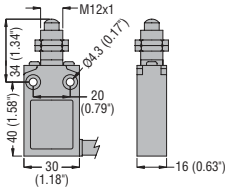
CH = Spanner/Wrench

PREWIRED METAL LIMIT SWITCHES

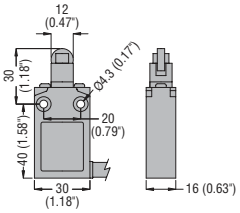
KPA1...



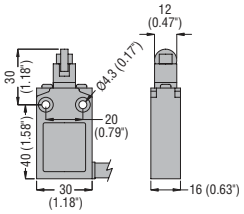
KPA2...



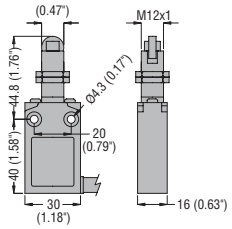
KPB1... - KPB2...



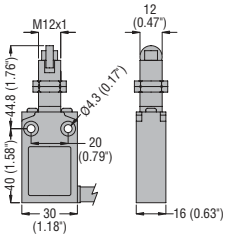
KPB3... - KPB4...



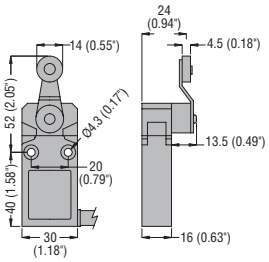
KPB5... - KPB6...



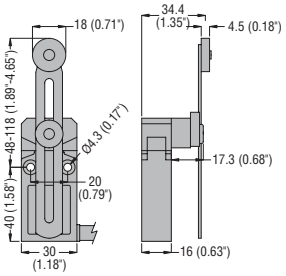
KPB7... - KPB8...



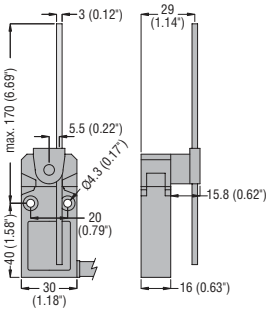
KPE1... - KPE2...



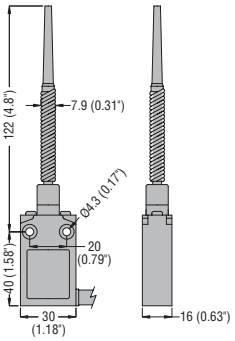
KPF1...



KPL2...

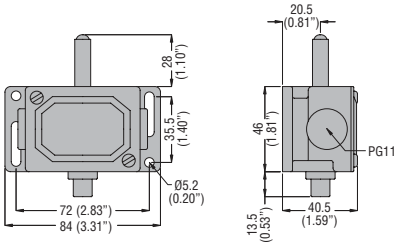


KPM2...

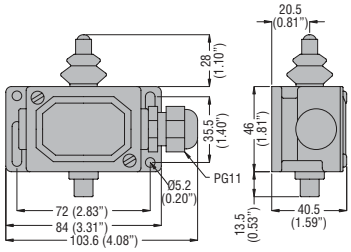


METAL LIMIT SWITCHES, PL SERIES

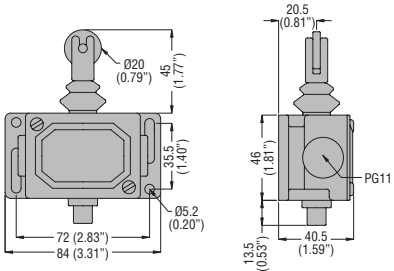
PLN...A



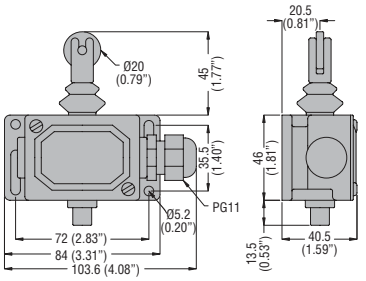
PLN...AW



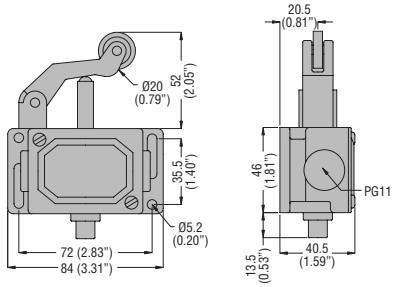
PLN...R



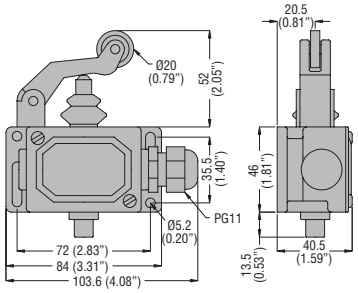
PLN...RW



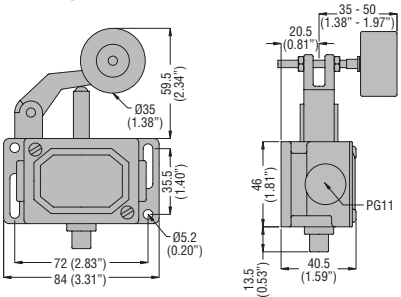
PLN...H



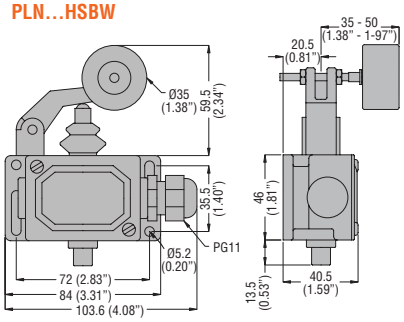
PLN...HW



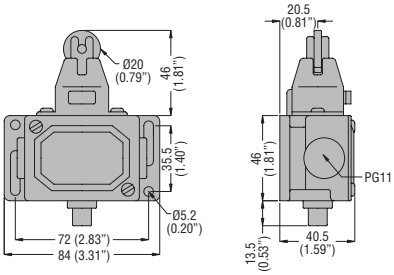
PLN...HSB



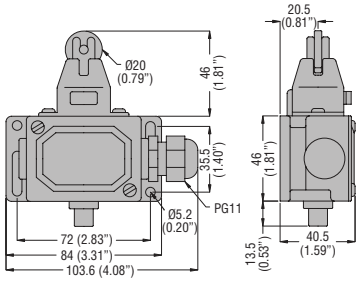
PLN...HSBW



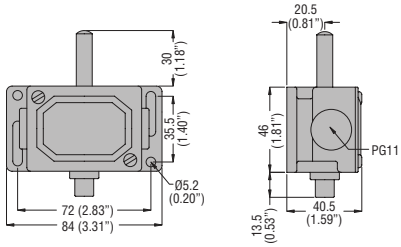
PLNA1RAG



PLNA1RAGW



PLNA1AM



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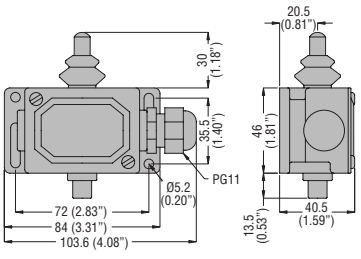
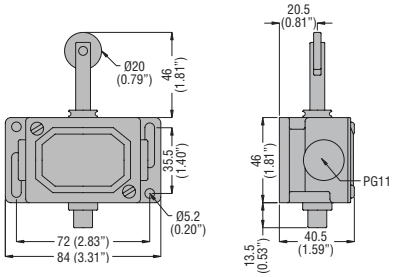
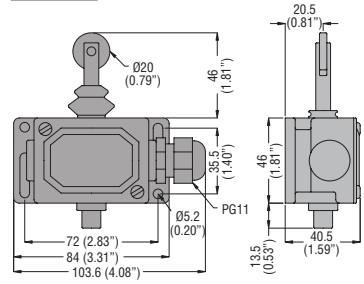


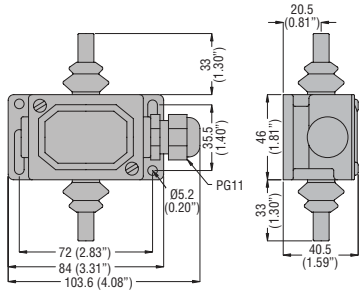
PLA1RM



PLA1RMW

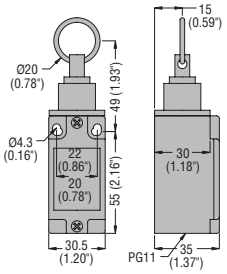


PLN978

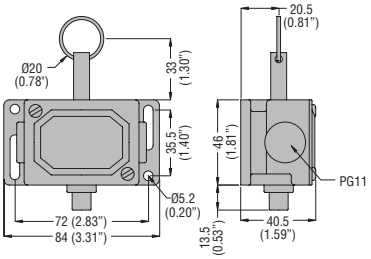


ROPE-PULL LEVER LIMIT SWITCHES FOR NORMAL STOPPING

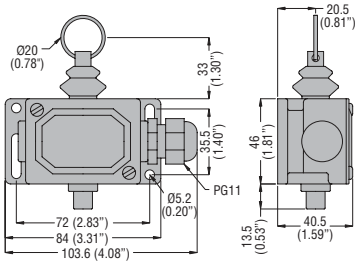
RS113... - RS313...



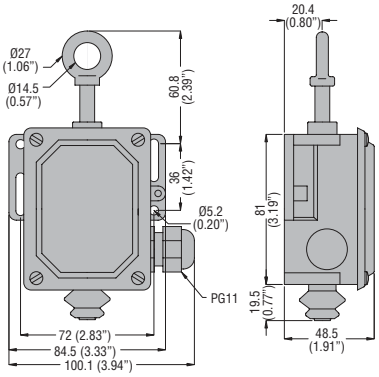
PLN...AT



PLN...ATW

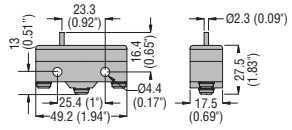


P2L...

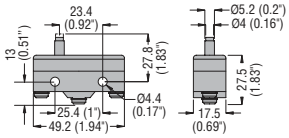


PLASTIC MICRO SWITCHES

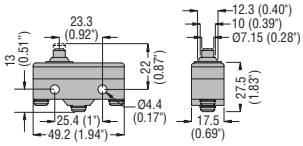
KSA1...



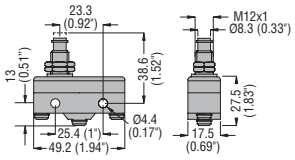
KSA2...



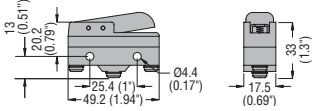
KSA3...



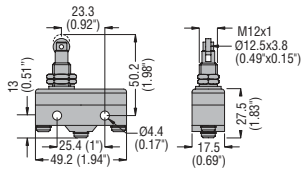
KSA4...



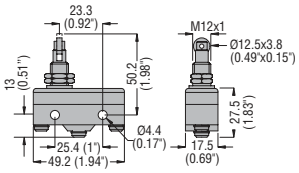
KSA9...



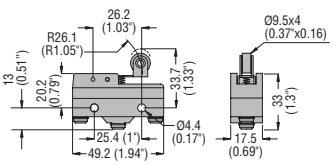
KSB1...



KSB2...



KSC1...



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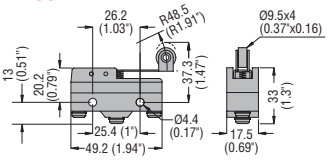
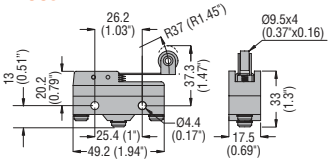
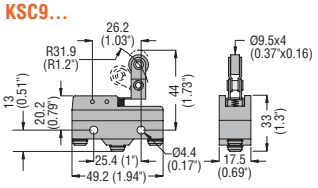


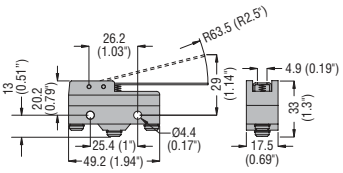
KSC3...



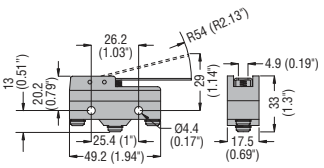
KSC9...



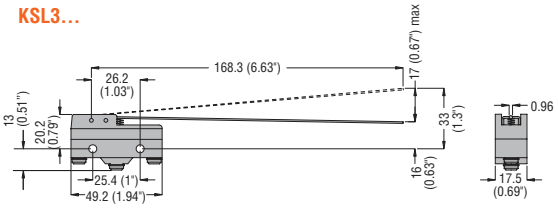
KSL1...



KSL2...

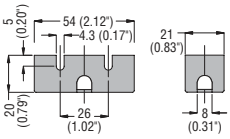


KSL3...

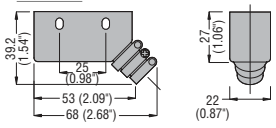


TERMINAL SHROUD

KSSC01

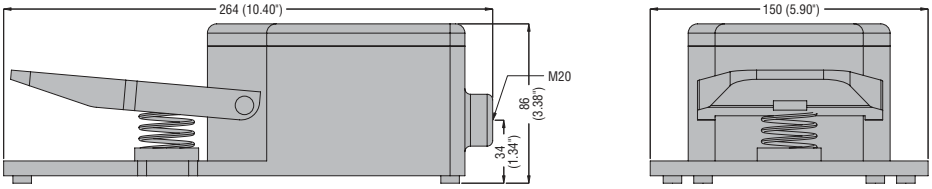


KSSCB2

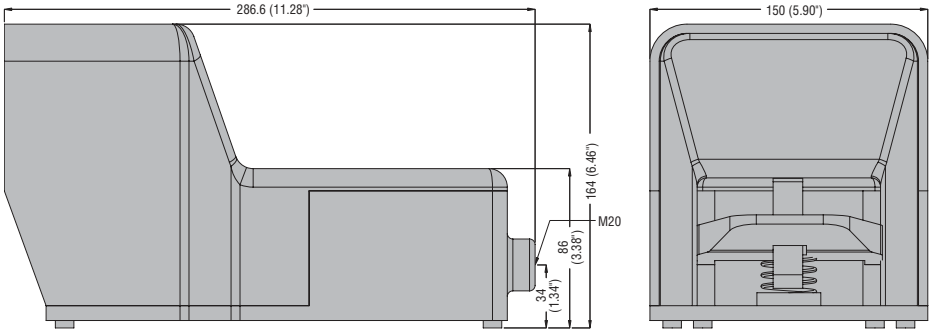


FOOT SWITCHES

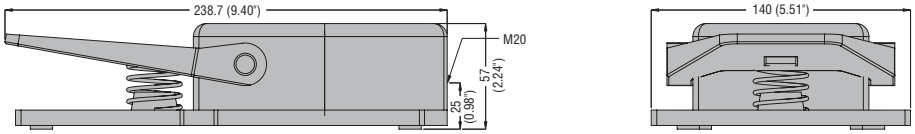
KG1



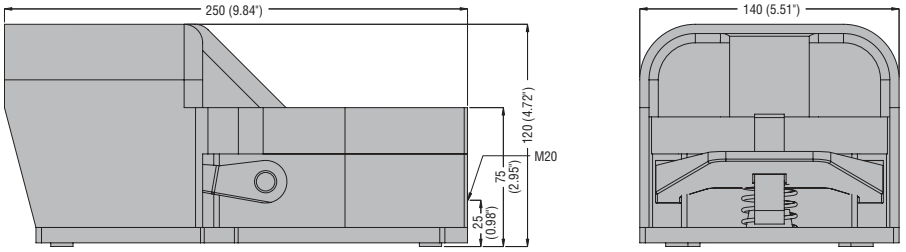
KG2



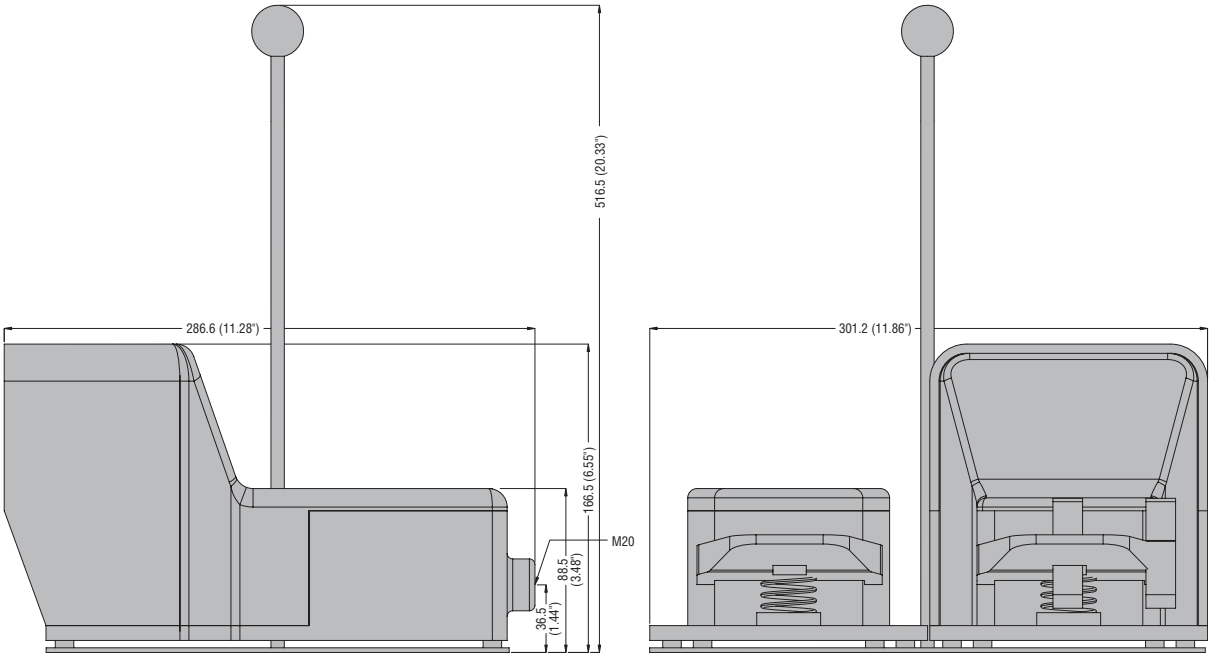
KR1



KR2

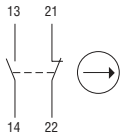


KGD



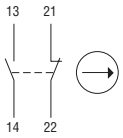
LIMIT SWITCHES, KB - KM - KC - KN TYPES

K...S11 — Snap action



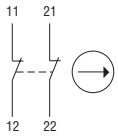
1NO + 1NC

K...L11 — Slow action



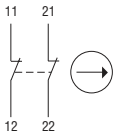
1NO + 1NC

K...L02 — Slow action



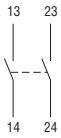
2NC

K...S02
K...D02 — Snap action



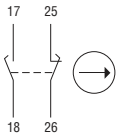
2NC

K...L20 — Slow action



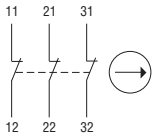
2NO

K...A11 — Slow action



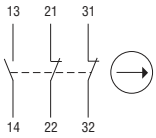
1NO + 1NC
make before break

K...L03 — Slow action



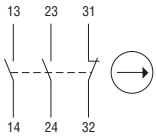
3NC

K...L12 — Slow action



1NO + 2NC

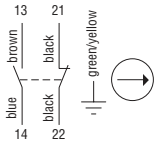
K...L21 — Slow action



2NO + 1NC

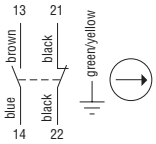
PREWIRED METAL LIMIT SWITCHES

KP...S11 — Snap action



1NO + 1NC

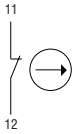
KP...L11 — Slow action



1NO + 1NC

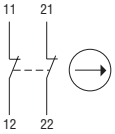
LIMIT SWITCHES, PL TYPE

PLNA1...



1NC

PLNA2...
PLN978

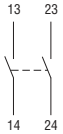


2NC

PLNC1...

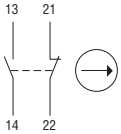
1NO

PLNC2....



2NO

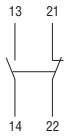
PLNU1...



1NO + 1NC

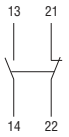
LIMIT SWITCHES FOR NORMAL STOPPING

RS1...
TS1... — Snap action



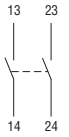
1NO + 1NC

RS2...
TL1... — Slow action



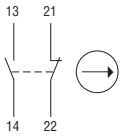
1NO + 1NC

RS3... — Slow action



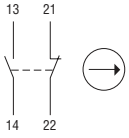
1NO + 1NC

PLNU1AT...



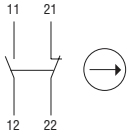
1NO + 1NC

PLNU1...



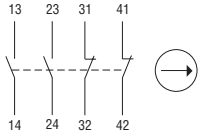
1NO + 1NC

P2L8...



1NO + 1NC

P2L10...



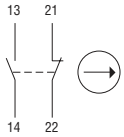
2NO + 2NC

PLASTIC MICRO SWITCHES

KS...

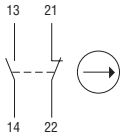
FOOT SWITCHES

K...S11 — Snap action



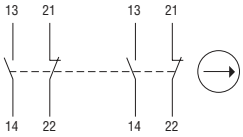
1NO + 1NC

K...L11 — Slow action



1NO + 1NC

K...S22 — Snap action



1NO + 1NC 1NO + 1NC

- Safety relays and RFID safety sensors with perfomance level up to Cat. 4, PLe compliant to EN/BS 13849-1
- Multifunction version with frontal trimmer for function selection
- Programmable version through software
- Dedicated versions for emergency stop, light curtains and two-hand control devices
- Expansion module
- Compact design with 35mm DIN rail mounting
- RFID safety sensors with two different coding levels and two different connectors
- Safety limit switches with dimensions compatible to EN/BS 50047
- Safety limit switches with direct opening action of NC contacts
- Safety limit switches with interchangeable and rotatable heads.

SEC. - PAGE

Safety relays
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	Emergency stop	Safety switch	Magnetic sensors	Two-hand control devices	Safety devices with OSSD outputs (light curtains, laser scanner, RFID,...)	Mechanical safety interlock	Expansion module of safe outputs
SRC...	●	●	●			●	
SRBES...	●	●	●			●	
SRBEM41							●
SRATH21				●			
SRALC21					●		
SRASM20					●		
SRAMF21	●	●	●	●	●	●	
SRPMFA164	●	●	●	●	●	●	

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SAFETY RELAYS SRC... SERIES

- 24VAC/DC auxiliary supply
- For safety control of emergency stop, safety switch and magnetic sensors
- Screw and spring-clamp with Push-in technology terminal versions
- 35mm DIN rail mounting
- 22.5mm width.

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SAFETY RELAYS SRB... SERIES

- 24VAC/DC auxiliary supply
- For safety control of emergency stop, safety switch and magnetic sensors
- Expansion module of safe outputs
- 35mm DIN rail mounting
- 17.8mm width.

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SAFETY RELAYS SRA... SERIES

- 24VDC auxiliary supply
- Multifunction version with frontal trimmer for function selection
- For safety control of light curtains, two-hand control devices, laser scanner and RFID
- 35mm DIN rail mounting
- 22.5mm width.

Page 11-4

PROGRAMMABLE SAFETY RELAY SRP... SERIES

- 24VDC auxiliary supply
- Completely programmable version through software
- For light curtains, photocells, laser scanner, emergency stop buttons, electromechanical switches, interlocked locks, magnetic switches, RFID sensors, sensitive mats and edges, two-hand devices and maintained action enabling pushbuttons
- 35mm DIN rail mounting
- 16 digital inputs and 4 pairs of OSSD safety outputs.

Page 11-5

RFID SAFETY SENSORS

- 24VDC auxiliary supply
- M12 or Pigtail connector
- Generic or Teach-in coding
- 5 and 8-pin versions
- 22mm fixing interaxis
- Signalling LED visible from all directions.

Page 11-6

PLASTIC AND METAL SAFETY LIMIT SWITCHES

- Dimensions to EN/BS 50047 standards for KB and KM types
- Dimensions compatible to EN/BS 50047 for KC and KN types
- Self-extinguishing polymer thermoplastic housing (KB-KC types)
- Aluminium-zinc alloy housing (KM-KN types)
- Unique fixing mechanism of operating head
- IEC degree of protection IP65
- M20 cable entry; PG13.5 or 1/2 NPT entry available.

Page 11-11

ROPE-PULL LEVER LIMIT SWITCHES FOR EMERGENCY STOPPING

- Compliant to ISO 13850 standards
- IEC degree of protection IP65 and IP66
- PG11 and PG13.5 cable entry.

Page 11-9

SAFETY SWITCHES WITH SOLENOID AND SEPARATE ACTUATOR

- Actuator locked by solenoid
- For safety applications up to:
  - Safety integrity level (SIL), category 3: according to EN/BS 62061
  - PLe according to EN/BS ISO 13849-1
- Interlock with mechanical lock Type 2 according to EN/BS ISO 14119
- Self-extinguishing polymer thermoplastic housing and actuator head
- IEC degree of protection IP65
- Three threaded conduit entries M20.

Lovato electric

SRC... series

SRCES...

SRCES...S

new

Order code	Auxiliary supply voltage	Type of output contact	Function	Qty per pkg	Wt
	[V]			n°	[kg]
Single function. Screw terminals.					
SRCES20	24V AC/DC	2NO	Emergency stop	1	0.164
SRCES31		3NO+1NC	Emergency stop	1	0.164
Single function. Spring-clamp terminals (Push-in).					
SRCES20S	24V AC/DC	2NO	Emergency stop	1	0.164
SRCES31S		3NO+1NC	Emergency stop	1	0.164

General characteristics
LOVATO Electric safety relays are designed for applications up to Cat. 4 and performance level PL up to PLe according to EN/ISO/BS 13849-1.
The SRC... safety relays are designed in order to monitor and control safety circuits in applications with:
- Emergency stops
- Safety accesses
- Magnetic safety switches
- Safety limit switches
- Electromechanical interlocks

Operational characteristics
- Auxiliary supply voltage: 24VAC/DC
- 35mm DIN rail mounting (IEC/EN/BS 60715)
- Dimensions: 22.5mm wide
- Double or single channel operation
- Control up to 3 NO safety outputs with electromechanical relay with forced guidance
- Start / Reset operating mode (manual, automatic or monitored manual)
- Diagnostics of the safety circuit through indications of LEDs for power supply, safety input status and status of the safety outputs
- The short circuit between the two input channels is detected
- In the event of a fault, the safe outputs are deactivated (contacts opened)
- 1 NC auxiliary output (SRBES31...) that can be used for remote status indication
- Removable screw or spring-clamp (Push-in) terminal connection
- Front protection degree: IP40
- Terminal protection degree: IP20.

Certifications and compliance
Certifications obtained: cULus, TÜV (pending).
Compliant with standards: Cat. 4, PLe according to EN/BS 13849-1, EN/BS 81-20, EN/BS 81-50.

SRB... series

SRBES...

SRBEM41

Order code	Auxiliary supply voltage	Type of output contact	Function	Qty per pkg	Wt
	[V]			n°	[kg]
Single function. Screw terminals.					
SRBES20	24V AC/DC	2NO	Emergency stop	1	0.209
SRBES31		3NO+1NC	Emergency stop	1	0.230
Safe outputs expansion module. Screw terminals.					
SRBEM41	24V AC/DC	4NO+1NC	Expansion module	1	0.239

General characteristics
LOVATO Electric safety relays are designed for applications up to Category 4 and performance level up to PLe according to EN/ISO/BS 13849-1.
The SRB ... safety relays are designed in order to monitor and control safety circuits in applications with:
- Emergency stops
- Safety accesses
- Magnetic safety switches
- Safety limit switches
- Electromechanical interlocks.

They are also used to safely control the circuits for lift cabin leveling and inspection of the lifting pit, according to EN/BS 81-20 and EN/BS 81-50 lift standards.
SRBEM41 is an expansion module to extend the number of safe outputs.

Operational characteristics
- Auxiliary supply voltage: 24VAC/DC
- 35mm DIN rail mounting (IEC/EN/BS 60715)
- Compact size: 17.8mm wide
- Double or single channel operation
- Control up to 3 NO safety outputs with electromechanical relay with forced guidance
- Start / Reset operating mode (manual, automatic or monitored manual)
- Diagnostics of the safety circuit through indications of LEDs for power supply, safety input status and status of the safety outputs
- The short circuit between the two input channels is detected
- In the event of a fault, the safe outputs are deactivated (contacts opened)
- 1 NC auxiliary output (SRBES31) that can be used for remote status indication
- Removable screw terminal connection
- Front protection degree: IP40
- Terminal protection degree: IP20.

Certifications and compliance
Certifications obtained: cULus, TÜV.
Compliant with standards: Cat. 4, PLe according to EN/BS 13849-1, EN/BS 81-20, EN/BS 81-50 (SRBES20 and SRBES31 only).

SRA... series

SRATH21

SRAMF21

Order code	Auxiliary supply voltage	Type of output contact	Function	Qty per pkg	Wt
	[V]			n°	[kg]
Single function. Screw terminals.					
SRATH21	24VDC	2NO+ 1PNP	Two-hand control devices	1	0.150
SRALC21	24VDC	2NO+ 1PNP	Devices OSSD	1	0.150
SRASM20	24VDC	2NO	Devices OSSD	1	0.150
Multifunction. Screw terminals.					
SRAMF21	24VDC	2NO+ 1PNP	Multi-function	1	0.150

General characteristics

LOVATO Electric safety relays are designed for applications up to Cat. 4 and performance level PL up to PLe according to EN/ISO/BS 13849-1 and up tp SIL CL.3 according to IEC/EN/BS 62061.

The single function SRA... safety relays are designed in order to monitor and control safety circuits in applications with:

- SRATH21: monitoring of two-hand control devices
- SRALC21: monitoring of safety devices equipped with OSSD (light curtains, laser scanner, RFID)
- SRASM20: monitoring of devices equipped with OSSD and integrated safety functions.

The SRAMF21 multifunction safety relay offers the possibility of having all the safety functions of SRB series and the three SRA codes above in one device. This is achieved by simply selecting the desired function using the dedicated frontal trimmer.

The SRAMF21 multifunction safety relay monitors and controls safety circuits in applications with:

- Emergency stops
- Safety accesses
- Magnetic safety switches
- Safety limit switches
- Electromechanical interlocks
- Input from OSSD (for ESPE and RFID), automatic restart or monitored manual restart
- Command of two-hand control devices
- Control for type 2 photocells, manual or automatic restart.

Operational characteristics

- Auxiliary supply voltage: 24VDC
- 35mm DIN rail mounting (IEC / EN / BS 60715)
- Dimensions: 22.5mm wide
- 1 PNP output for system monitoring
- 1 feedback input from external contactors
- 1 test input (for light curtains)
- Alarm diagnostics through LED flashing
- Front protection degree: IP20
- Terminal protection degree: IP20.

Certifications and compliance

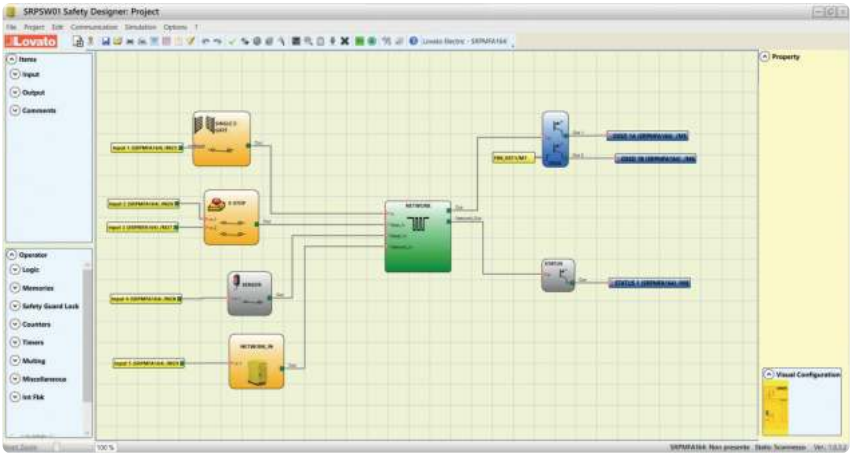
Certifications (pending): cULus, TÜV.
Compliant with standards: EN/BS/ISO 13849-1 (Cat 4, PLe), EN/BS/IEC 61496-1 (Type 4), EN/BS 61508-1, EN/BS 61508-2, EN/BS 61508-3 (SIL3), IEC/BS 62061 (max. SIL 3).

Programmable SRP... series

SRPMFA164

new

Order code	Inputs	Outputs	Function	Qty per pkg	Wt
				n°	[kg]
Programmable multi-function. Auxiliary supply voltage: 24VDC. Screw terminals.					
SRPMFA164	16 digital inputs and 4 Restart/ EDM inputs	4 OSSD outputs, 4 output status and 4 output test	Multi-function	1	0.248



SRPSW01
Programming software freely downloadable from www.LovatoElectric.com

General characteristics
The SRPMFA164 programmable safety relay is a stand alone safety device able to manage the main safety functions of a machinery or plant. Fully configurable, it allows you to simplify wiring and reduce costs. It can in fact monitor and control safety circuits in applications with: light curtains, photocells, laser scanners, emergency stops, electromechanical interlocks, interlocked locks, magnetic safety switches, RFID sensors, sensitive mats and edges, two-hand devices and and maintained action enabling pushbuttons.
The SRPMFA164 programmable safety relay offers several advantages, including:
- The reduction in the number of components, therefore the size and quantity of wiring
- Speeding up the construction times of the electrical panel
- The creation of safety systems resistant to tampering attempts
- Less wiring time: all the logic is created using the SRPSW01 configuration software, which can be downloaded free of charge from the website www.LovatoElectric.com, and not with a less safe and more complicated traditional electromechanical solution.
- Fewer components means better performance level and therefore greater safety.

SRPSW01 configuration software.
The configuration software is available in 10 languages, is easy to use and can be downloaded free of charge from www.LovatoElectric.com. The drag & drop function allows the creation of logical scenarios in a machine directive-compliant environment. Programming and design is thus simplified thanks to the user-friendly interface and a number of integrated functions including the monitoring function, automatic project validation, simulation function and the issuing of reports and log files, as well as the possibility of protecting the program using passwords.

Operational characteristics
- Auxiliary supply voltage: 24VDC
- 35mm DIN rail mounting (IEC/EN/BS 60715)
- Compact size: 45mm wide
- Fully programmable via USB serial port on the front
- 16 digital inputs (configurable individually as a single channel or in pairs as a double channel)
- 4 individual inputs for restart interlock, EDM or single input devices
- 4 pairs of OSSD safety outputs (PNP 400mA)
- 4 SIL 1/PL c status outputs (PNP 100mA)
- 4 test outputs
- 64 logical operators
- Possibility of timing each output
- Safety circuit diagnostics via LED indications for power supply, safety input status and safety output status
- The short circuit between the two input channels is detected
- OSSD safety outputs are periodically tested for possible lockouts at 0V or +24VDC or for faulty connections (e.g. two OSSD outputs shorted). If the test results are not consistent, the system fails and goes into a safe state.
- Removable screw terminal connection
- Front protection degree: IP40
- Terminal protection degree: IP20.

Certifications and compliance
Certifications obtained: cULus, TÜV.
Compliant with standards: EN/BS/ISO 13849-1 (Cat 4, PLe), EN/BS/IEC 61496-1 (Type 4), EN/BS 61508-1, EN/BS 61508-2, EN/BS 61508-3 (SIL3), IEC/BS 62061 (max. SIL 3), EN/BS 81-20, EN/BS 81-50.

SSF... series

SSF8TM

new

SSF8TP

Order code	Auxiliary supply voltage	Connector type	Coding type	Qty per pkg	Wt
	[V]			n°	[kg]
5-pin version.					
SSF5GM	24VDC	M12 connector	Generic	1	0.044
SSF5GP	24VDC	M12 Pigtail connector 15cm	Generic	1	0.056
8-pin version.					
SSF8GM	24VDC	M12 connector	Generic	1	0.044
SSF8GP	24VDC	M12 Pigtail connector 15cm	Generic	1	0.056
SSF8TM	24VDC	M12 connector	Teach-in	1	0.044
SSF8TP	24VDC	M12 Pigtail connector 15cm	Teach-in	1	0.056

General characteristics
The applications of the SSF... series RFID safety sensors are extremely various thanks to the compact design and versatility of the product.
The SSR... RFID safety sensors series is available in 2 different versions based on needs:
– With M12 connector
– With Pigtail, which consists of a 15cm cable with a pre-wired M12 connector.
They also differ in 2 further variants:
– 5-pin version, which allows operation only with automatic reset
– 8-pin version, which also allows manual reset, contactor feedback control (EDM) and to connect up to 16 SSF... RFID safety sensors in series...
RFID technology allows you to choose sensors coded in two different levels, allowing the user to adopt the technology that best suits the level of protection required by the application. The safest configuration is those where the sensor can only be coupled with the actuator assigned in production (Teach-in). Instead, a sensor with generic coding can be coupled with any actuator of the same coding.

The RFID technology used allows the PL e/SIL 3 safety level to be reached even when the sensors are connected in series.

Operational characteristics
– Auxiliary supply voltage: 24VDC
– 22mm interaxis (with anti-tampering protection caps)
– 2 OSSD outputs (300mA at 24VDC) with short circuit protection
– 2 different types of connector: M12 or Pigtail with M12 connector
– 2 different types of coded levels: generic coding or Teach-in coding
– 2 different configurations: 5 or 8 pins
– 5-pin version allows operation only with automatic reset
– 8-pin version allows operation with automatic or manual reset, automatic without EDM and series connection (with status information) of up to 16 SSF safety RFID sensors...
– Very high visibility status LED
– Possibility of mounting sensor and actuator in both directions
– Degree of protection (sensor and actuator) IP67 and IP69K.

Certifications and compliance
Certifications obtained: cULus, TÜV.
Compliant with standards: Cat. 4, PLe according to EN/BS 13849-1, EN/BS 61508-1(SIL 3), EN/BS 61508-2 (SIL 3), EN/BS 61508-3 (SIL3), IEC/BS 62061 (max. SIL 3).

Accessories

SSFXC55

new

SSFXC58

SSFX01

Order code	Description	Qty per pkg	Wt
		n°	[kg]
SSFXC55	5-5 pin RFID sensor connector	1	0.026
SSFXC58	5-8 pin RFID sensor connector	1	0.026
SSFX01	Fixing bracket to adapt to 78mm interaxis	1	0.013

LED SIGNALS
The sensor is equipped with a multicolor LED that signals its status in real time.

Colour	Sensor status	Meaning	Output status
RED	Break	OSSD outputs deactivated	Low level
GREEN	Guard	OSSD outputs active	High level
YELLOW	Restart	waiting for Restart	-
Flashing GREEN/RED	Guard input OFF	One or more sensors are in break condition	-
Flashing GREEN	Programming	Programming (Teach-in)	-
Flashing YELLOW	Configuration	Type of configuration	-
Flashing RED	FAIL	Error condition	See manual

Hinge operating

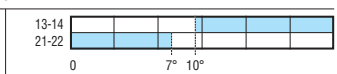
KBP... - KMP...

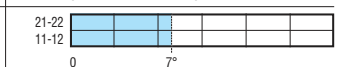
Order code Plastic body	Metal body	Contacts	Shaft features	Qty per pkg	Wt
				n°	[kg]
One bottom cable entry. Dimensions to EN/BS 50047.					
KBP1L11	KMP1L11	1NO+1NC Slow action❶	Short cylinder	5	❷
KBP2L11	KMP2L11	1NO+1NC Slow action❶	Long solid	5	❷
KBP3L11	KMP3L11	1NO+1NC Slow action❶	Long solid w/ reduction	5	❷
KBP1L02	KMP1L02	2NC Slow action❶	Short cylinder	5	❷
KBP2L02	KMP2L02	2NC Slow action❶	Long solid	5	❷
KBP3L02	KMP3L02	2NC Slow action❶	Long solid w/ reduction	5	❷
KBP1L12	KMP1L12	1NO+2NC Slow action❶	Short cylinder	5	❷
KBP2L12	KMP2L12	1NO+2NC Slow action❶	Long solid	5	❷
KBP3L12	KMP3L12	1NO+2NC Slow action❶	Long solid w/ reduction	5	❷
KBP1L21	KMP1L21	2NO+1NC Slow action❶	Short cylinder	5	❷
KBP2L21	KMP2L21	2NO+1NC Slow action❶	Long solid	5	❷
KBP3L21	KMP3L21	2NO+1NC Slow action❶	Long solid w/ reduction	5	❷
KBP1L03	KMP1L03	3NC Slow action❶	Short cylinder	5	❷
KBP2L03	KMP2L03	3NC Slow action❶	Long solid	5	❷
KBP3L03	KMP3L03	3NC Slow action❶	Long solid w/ reduction	5	❷
Two side cable entries. Dimensions compatible to EN/BS 50047.					
KCP1L11	KNP1L11	1NO+1NC Slow action❶	Short cylinder	5	❷
KCP2L11	KNP2L11	1NO+1NC Slow action❶	Long solid	5	❷
KCP3L11	KNP3L11	1NO+1NC Slow action❶	Long solid w/ reduction	5	❷
KCP1L02	KNP1L02	2NC Slow action❶	Short cylinder	5	❷
KCP2L02	KNP2L02	2NC Slow action❶	Long solid	5	❷
KCP3L02	KNP3L02	2NC Slow action❶	Long solid w/ reduction	5	❷

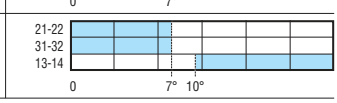
❶ Direct (positive) opening action ⊖; safety function according to IEC/EN/BS 60947-5-1.
❷ Consult Technical support for information; see contact details on inside cover.

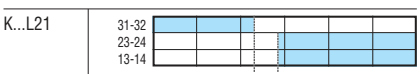
KCP... - KNP...

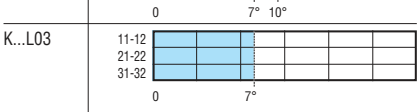
open
closed

K...L11


K...L02


K...L12


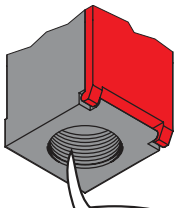
K...L21


K...L03


General characteristics
The LOVATO Electric safety limit switches have been designed to satisfy requirements comprising quick installation, easy wiring, simple setup, modularity, sturdiness and constant reliability.
The body cover is hinged at the bottom and removable.
The innovative locking bayonet mechanism permits to remove and reposition the operating head in the required configuration with no tools.
The auxiliary contact blocks are removable assuring remarkable wiring ease.

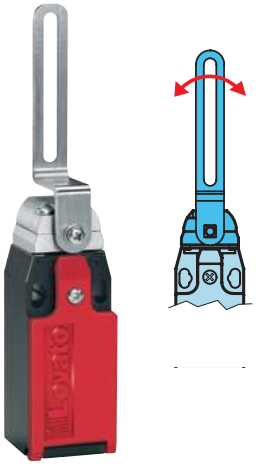
Operational characteristics
- Maximum operating rate: 3600 cycles/h
- Switching speed: 0.5...1.5m/s
- Mechanical life: 100,000 cycles
- B10d: 100,000 cycles
- IEC conventional thermal current Ith: 10A
- UL/CSA and IEC/EN/BS 60947-5-1 designation:
  - A600 Q300 for KB...-KC... types
  - A300 Q300 for KM...-KN... types
- IEC rated insulation voltage Ui:
  - 690VAC for KB...-KC... types
  - 440VAC for KM...-KN... types
- IEC rated impulse withstand voltage Uimp:
  - 6kV for KB...-KC... types
  - 4kV for KM...-KN... types
- Class II insulation for KB...-KC... only
- Contact resistance: <10mΩ
- Short-circuit backup protection: 10A gG/SC quick fuse
- Operators of aluminium-zinc alloy
- Housing:
  - KB...-KC... types: self-extinguishing double-insulation polymer thermoplastic
  - KM...-KN... types: aluminium-zinc alloy
- Cable entry: M20 standard supplied; PG13.5 and 1/2 NPT available (see the below note for details)
- Operating head fixing: locking bayonet insert
- Operating torque: 15Ncm/21.2ozin
- Cable connection: self-releasing screw terminal
- Tightening torque:
  - Switch fixing: 2.5Nm / 22.1lb.in
  - Contact terminals: 0.8Nm / 7lb.in
  - Body lid screw fixing: 0.8Nm / 7lb.in
- Conductor section: 1 or 2 2.5mm² max / 16-14AWG
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+70°C
  - Pollution degree: 3
  - IEC degree of protection: IP20 for terminals
  - IEC degree of protection: IP65 for body housing.

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada (cULus - File E93601), as Auxiliary Devices - Limit switches; EAC, CCC.
Compliant with standards: EN/BS 50047, IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 60204-1, UL508, CSA C22.2 n° 14.



M20 CABLE ENTRY
For types with PG13.5 cable entry, add the letter P at the end of the order code while for 1/2 NPT, add N.
E.g. KBP1L11P - KBP1L11N

Slotted lever



KBQ... - KMQ...

KCQ... - KNQ...

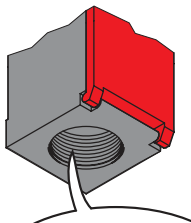
Order code Plastic body	Metal body	Contacts	Qty per pkg	Wt
			n°	[kg]
One bottom cable entry. Dimensions to EN/BS 50047.				
KBQ1L11	**KMQ1L11**	1NO+1NC Slow action❶	5	❷
KBQ1L02	**KMQ1L02**	2NC Slow action❶	5	❷
KBQ1L12	**KMQ1L12**	1NO+2NC Slow action❶	5	❷
KBQ1L21	**KMQ1L21**	2NO+1NC Slow action❶	5	❷
KBQ1L03	**KMQ1L03**	3NC Slow action❶	5	❷
Two side cable entries. Dimensions compatible to EN/BS 50047.				
KCQ1L11	**KNQ1L11**	1NO+1NC Slow action❶	5	❷
KCQ1L02	**KNQ1L02**	2NC Slow action❶	5	❷

❶ Direct (positive) opening action ⊖; safety function according to IEC/EN/BS 60947-5-1.
❷ Consult Technical support for information; see contact details on inside cover.

General characteristics
The LOVATO Electric safety limit switches have been designed to satisfy requirements comprising quick installation, easy wiring, simple setup, modularity, sturdiness and constant reliability.
The body cover is hinged at the bottom and removable.
The innovative locking bayonet mechanism permits to remove and reposition the operating head in the required configuration with no tools.
The auxiliary contact blocks are removable assuring remarkable wiring ease.

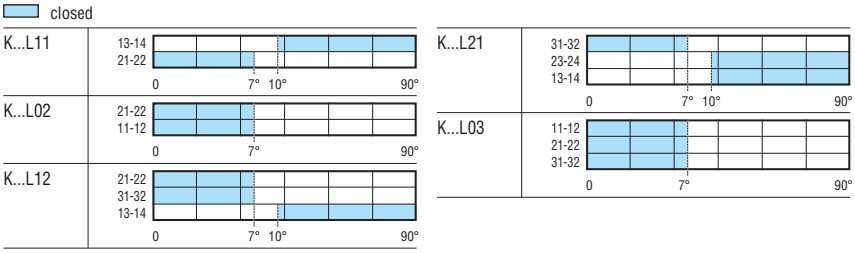
Operational characteristics
- Maximum operating rate: 3600 cycles/h
- Switching speed: 0.5...1.5m/s
- Mechanical life: 100,000 cycles
- B10d: 100,000 cycles
- IEC conventional thermal current Ith: 10A
- UL/CSA and IEC/EN/BS 60947-5-1 designation:
  - A600 Q300 for KB...-KC... types
  - A300 Q300 for KM...-KN... types
- IEC rated insulation voltage Ui:
  - 690VAC for KB...-KC... types
  - 440VAC for KM...-KN... types
- IEC rated impulse withstand voltage Uimp:
  - 6kV for KB...-KC... types
  - 4kV for KM...-KN... types
- Class II insulation for KB...-KC... only
- Contact resistance: <10mΩ
- Short-circuit backup protection: 10A gG/SC quick fuse
- Operators of aluminium-zinc alloy
- Housing:
  - KB...-KC... types: self-extinguishing double-insulation polymer thermoplastic
  - KM...-KN... types: aluminium-zinc alloy
- Cable entry: M20 standard supplied; PG13.5 and 1/2 NPT available (see the below note for details)
- Operating head fixing: locking bayonet insert
- Operating torque: 15Ncm/21.2ozin
- Cable connection: self-releasing screw terminal
- Tightening torque:
  - Switch fixing: 2.5Nm / 22.1lb.in
  - Contact terminals: 0.8Nm / 7lb.in
  - Body lid screw fixing: 0.8Nm / 7lb.in
- Conductor section: 1 or 2 2.5mm² max / 16-14AWG
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+70°C
  - Pollution degree: 3
  - IEC degree of protection: IP20 for terminals
  - IEC degree of protection: IP65 for body housing.

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada (cULus - File E93601), as Auxiliary Devices - Limit switches; EAC, CCC.
Compliant with standards: EN/BS 50047, IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 60204-1, UL508, CSA C22.2 n° 14.



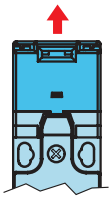
M20 CABLE ENTRY
For types with PG13.5 cable entry, add the letter P at the end of the order code while for 1/2 NPT, add N.
E.g. KBQ1L11P - KBQ1L11N

open
closed



Key operated

KBN...



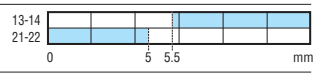
KCN...

Order code Plastic body	Contacts	Key shape❷	Qty per pkg	Wt
			n°	[kg]
One bottom cable entry. Dimensions to EN/BS 50047.				
KBN1L11	1NO+1NC Slow action❶	Straight	5	0.092
KBN2L11		Angled	5	0.092
KBN3L11		Straight “T”	5	0.092
KBN4L11		Angled “T”	5	0.092
KBN1L02	2NC Slow action❶	Straight	5	0.092
KBN2L02		Angled	5	0.092
KBN3L02		Straight “T”	5	0.092
KBN4L02		Angled “T”	5	0.092
KBN1L12	1NO+2NC Slow action❶	Straight	5	0.096
KBN2L12		Angled	5	0.096
KBN3L12		Straight “T”	5	0.096
KBN4L12		Angled “T”	5	0.096
KBN1L21	2NO+1NC Slow action❶	Straight	5	0.096
KBN2L21		Angled	5	0.096
KBN3L21		Straight “T”	5	0.096
KBN4L21		Angled “T”	5	0.096
KBN1L03	3NC Slow action❶	Straight	5	0.096
KBN2L03		Angled	5	0.096
KBN3L03		Straight “T”	5	0.096
KBN4L03		Angled “T”	5	0.096
Two side cable entries. Dimensions compatible to EN/BS 50047.				
KCN1L11	1NO+1NC Slow action❶	Straight	5	0.107
KCN2L11		Angled	5	0.107
KCN3L11		Straight “T”	5	0.107
KCN4L11		Angled “T”	5	0.107
KCN1L02	2NC Slow action❶	Straight	5	0.107
KCN2L02		Angled	5	0.107
KCN3L02		Straight “T”	5	0.107
KCN4L02		Angled “T”	5	0.107

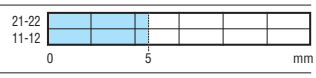
❶ Direct (positive) opening action ⊖; safety function according to IEC/EN/BS 60947-5-1.
❷ The key is standard supplied.

open
closed

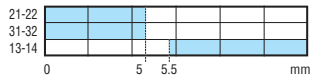
K...L11



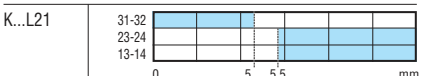
K...L02



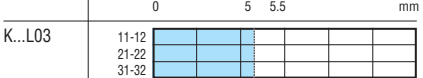
K...L12



K...L21



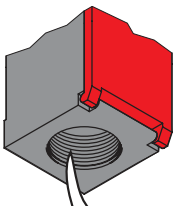
K...L03



General characteristics
The LOVATO Electric safety limit switches have been designed to satisfy requirements comprising quick installation, easy wiring, simple setup, modularity, sturdiness and constant reliability.
The body cover is hinged at the bottom and removable.
The heads have axial rotation in any of 4 positions at 90° angles.
The auxiliary contact blocks are removable assuring remarkable wiring ease.

Operational characteristics
- Maximum operating rate: 3600 cycles/h
- Switching speed: 0.5...1.5m/s
- Mechanical life: 100,000 cycles
- B10d: 100,000 cycles
- IEC conventional thermal current Ith: 10A
- UL/CSA and IEC/EN/BS 60947-5-1 designation:
  - A600 Q600
- IEC rated insulation voltage Ui: 690V
- IEC rated impulse withstand voltage Uimp: 6kV
- Class II insulation
- Contact resistance: <10mΩ
- Short-circuit backup protection: 10A gG/SC quick fuse
- Housing and operators in self-extinguishing double-insulation polymer thermoplastic
- Cable entry: M20 standard supplied; PG13.5 and 1/2 NPT available (see the below note for details)
- Operating head fixing: locking bayonet insert
- Operating force: 8N/1.8lb
- Cable connection: self-releasing screw terminal
- Tightening torque:
  - Switch fixing: 2.5Nm / 22.1lb.in
  - Contact terminals: 0.8Nm / 7lb.in
  - Body lid screw fixing: 0.8Nm / 7lb.in
- Conductor section: 1 or 2 2.5mm² max / 16-14AWG
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+70°C
  - Pollution degree: 3
  - IEC degree of protection: IP20 for terminals
  - IEC degree of protection: IP65 for body housing.

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada (cULus - File E93601), as Auxiliary Devices - Limit switches; EAC, CCC.
Compliant with standards: EN/BS 50047, IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 60204-1, UL508, CSA C22.2 n° 14.



M20 CABLE ENTRY
For types with PG13.5 cable entry, add the letter P at the end of the order code while for 1/2 NPT, add N.
E.g. KBN1L11P - KBN1L11N

Accessories and spare parts

KXN1

KXN2

KXN3

KXN4

KXN5

Order code	Description	Qty per pkg	Wt
		n°	[kg]
KXN1	Straight key	5	0.013
KXN2	Angled key	5	0.013
KXN3	Straight “T” key	5	0.012
KXN4	Angled “T” key	5	0.012
KXN5	Toggle key	5	0.019

Safety switches with solenoid

KEN1...

Order code	Key actuated contacts ❶	Solenoid actuated contacts ❶	Solenoid rated voltage	Qty per pkg	Wt
			[V]	n°	[kg]
Locked actuator with energised solenoid ❷.					
KEN1E1024F	1NC	2NC+1NO	24V AC/DC	1	0.440
KEN1E2024F	1NO	2NC+1NO		1	0.440
KEN1E3024F	1NO+1NC	2NC		1	0.440
KEN1E1120F	1NC	2NC+1NO	120V AC/DC	1	0.440
KEN1E2120F	1NO	2NC+1NO		1	0.440
KEN1E3120F	1NO+1NC	2NC		1	0.440
KEN1E1230F	1NC	2NC+1NO	230V AC/DC	1	0.440
KEN1E2230F	1NO	2NC+1NO		1	0.440
KEN1E3230F	1NO+1NC	2NC		1	0.440
Locked actuator with de-energised solenoid ❷.					
KEN1M1024F	1NC	2NC+1NO	24V AC/DC	1	0.440
KEN1M2024F	1NO	2NC+1NO		1	0.440
KEN1M3024F	1NO+1NC	2NC		1	0.440
KEN1M1120F	1NC	2NC+1NO	120V AC/DC	1	0.440
KEN1M2120F	1NO	2NC+1NO		1	0.440
KEN1M3120F	1NO+1NC	2NC		1	0.440
KEN1M1230F	1NC	2NC+1NO	230V AC/DC	1	0.440
KEN1M2230F	1NO	2NC+1NO		1	0.440
KEN1M3230F	1NO+1NC	2NC		1	0.440

❶ Contacts status are referred to the operating condition (KEN1E...:energised solenoid and inserted key actuator / KEN1M...: de-energised solenoid and inserted key actuator).

❷ Key actuator has to be ordered separately

Keys

KEXN1

KEXN2

KEXN5

Order code	Description	Qty per pkg	Wt
		n°	[kg]
KEXN1	Straight key	1	0.013
KEXN2	Angled key	1	0.013
KEXN5	Toggle key	1	0.019

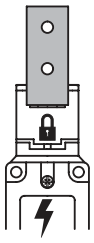
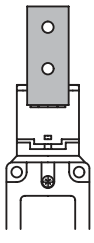
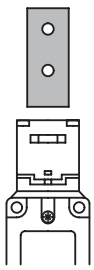
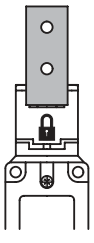
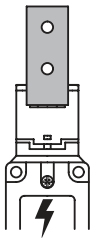
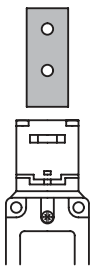
ACTUATOR HEAD ORIENTATION

Follow these steps in order to properly direct the actuator head of KEN... safety switches:
- Unscrew the 4 Ø2 Pozidriv 1 screws
- Remove the actuator
- Check the gasket is properly placed
- Put the actuator head in the desired position and press for fixing it into the case
- Screw the the 4 Ø2 Pozidriv 1 screws (tightening torque 0.8Nm / 7lb.in)
- Before start using the new configuration, repeat the functional tests of the system.

General characteristics
The safety switches with solenoid avoid access in hazardous areas until the receiving of an appropriate signal: the actuator key could be locked or released through a solenoid dependent upon it's powered state (locked actuator with energised solenoid for KEN1E... /locked actuator with de-energised solenoid for KEN1M...).
A manual emergency release is available.
Three different electric contact combinations are available.
Contacts are actuated separately by key actuator or by solenoid and allow to cover the installations' main common needs.

Operational characteristics
- For safety applications up to:
  - Safety integrity level (SIL), category 3 according to EN/BS 62061
  - PLe according to EN/BS ISO 13849-1
- Interlock with mechanical lock Type 2 according to EN/BS ISO 14119.
- Actuator insertion force: 15N
- Release actuator extraction force: 30N
- Locked actuator holding force: 1200N
- Maximum operating rate: 600 cycles/h
- Mechanical life: 1.000.000 cycles
- B10d: 4.000.000 cycles
- IEC conventional thermal current: 10A
- IEC/EN/BS 60947-5-1 designation: A300 Q300
- AC15 duty:
  - 24V - 10A
  - 230V - 4A
- DC13 duty:
  - 24V - 4A
- IEC rated insulation voltage Ui: 250V
- Rated impulse withstand voltage: 2.5kV
- Short-circuit backup protection: 10A Gg
- Max solenoid consumption:
  - 24V: 8.3W
  - 120V: 8.1W
  - 230V: 6.8W
- IEC terminals degree of protection: IP20
- IEC body housing degree of protection: IP65
- Self-extinguishing polymer thermoplastic housing and actuator head
- Actuator head orientation can be modified by the user in 4 axial positions (90° step)
- Cables entries: 3 x M20
- Cable connection: self-releasing screw terminal
- Tightening torque:
  - Case cover: 0.8Nm / 7lb.in
  - Manual release: 0.5Nm / 4.3lb.in
  - Head actuator fixing: 0.8Nm / 7lb.in
  - Contact terminals: 0.5Nm / 4.3lb.in
  - Supply terminals: 0.5Nm / 4.3lb.in
- Conductor section: 1 or 2 conductors 1.5mm^2 max
- Ambient conditions:
  - Operating temperature: -25...+55°C
  - Storage temperature: -40...+70°C
  - Pollution degree: 3.

Certifications and compliance
Certifications obtained: cULus, EAC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 60204, UNI EN/BS ISO 14119, UL508, CSA C22.2 n°14.

		KEN1E...: locked actuator with energised solenoid			KEN1M...: locked actuator with de-energised solenoid		
	Key actuator status	inserted and locked	inserted and unlocked	not inserted	inserted and locked	inserted and unlocked	not inserted
	Solenoid status	energised	de-energised	-	de-energised	energised	-
							
	Contact activation						
KEN1...1...	Key actuator	11 — 12	11 — 12	11 — 12	11 — 12	11 — 12	11 — 12
	Solenoid	21 — 22	21 — 22	21 — 22	21 — 22	21 — 22	21 — 22
	Solenoid	33 — 34	33 — 34	33 — 34	33 — 34	33 — 34	33 — 34
	Solenoid	41 — 42	41 — 42	41 — 42	41 — 42	41 — 42	41 — 42
KEN1...2...	Key actuator	13 — 14	13 — 14	13 — 14	13 — 14	13 — 14	13 — 14
	Solenoid	21 — 22	21 — 22	21 — 22	21 — 22	21 — 22	21 — 22
	Solenoid	33 — 34	33 — 34	33 — 34	33 — 34	33 — 34	33 — 34
	Solenoid	41 — 42	41 — 42	41 — 42	41 — 42	41 — 42	41 — 42
KEN1...3...	Key actuator	13 — 14	13 — 14	13 — 14	13 — 14	13 — 14	13 — 14
	Solenoid	21 — 22	21 — 22	21 — 22	21 — 22	21 — 22	21 — 22
	Key actuator	31 — 32	31 — 32	31 — 32	31 — 32	31 — 32	31 — 32
	Solenoid	41 — 42	41 — 42	41 — 42	41 — 42	41 — 42	41 — 42

Order code	Contacts	Force	Qty per pkg	Wt
		[N]	n°	[kg]
With reset button.				
RS131310❷	1NO + 1NC❶	25	1	0.092
PLN131311	1NO + 1NC❶	60	1	0.248
P2L131311	1NO + 1NC❶	40	1	0.459
P2L131312	1NO + 1NC❶	120	1	0.459
P2L151311	2NO + 2NC❶	40	1	0.459
P2L151312	2NO + 2NC❶	120	1	0.459

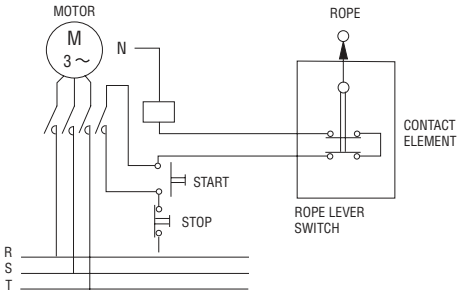
❶ Direct (positive) opening action ⊖; safety function according to IEC/EN/BS 60947-5-1.
❷ Dimensions according with EN/BS 50047.

RS131310

PLN131311

P2L...

Example of wiring diagram



Type	open / closed
RS...	13-14, 21-22 — 0 mm 6
PLN...	11-12, 21-22 — 0 mm 8
P2L13...	31-32, 41-42 — 0 mm 10
P2L15...	31-32, 41-42, 13-14, 23-24 — 0 mm 10

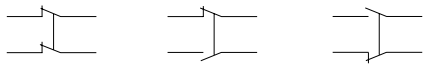
General characteristics

The rope-operated switches for emergency stop are mainly suitable for emergency stop or alarm systems for machinery which occupies a large space. This emergency stop can be achieved from any point when the rope is manually pulled each time.
The choice of the body, between plastic and metal, can satisfy the most diversified requirements for sturdiness and size.

Operational characteristics

- Maximum operating rate: 1800 cycles/h
- Mechanical life: 100,000 cycles
- IEC utilisation category:
  - DC13 duty: 1.5A 24V (10A 24V only for PLN-P2L)
  - AC15 duty: 6A 250V (3A 400V only for PLN-P2L)
- IEC conventional thermal current Ith:
  10A for RS and PLN; 6A for P2L
- IEC rated insulation voltage Ui:
  250VAC (400V for PLN-P2L)
- Contact resistance: <10mΩ
- Short-circuit backup protection: 10A gG/SC quick fuse
- Cable entry: PG11 for RS, PLN and P2L types (PLN and P2L complete with cable gland)
- Cable connection: self-releasing screw terminal
- Tightening torque:
  - Switch fixing: 2.5Nm / 22.1lb.in
  - Contact terminals: 0.8Nm / 7lb.in (for RS), 1.8Nm / 15.9lb.in (for PL and P2L)
  - Body lid screw fixing: 0.8Nm / 7lb.in
- Conductor section: 1 or 2 2.5mm² max / 16-14 AWG
- Ambient conditions:
  - Operating temperature: -25...+70°C
  - Storage temperature: -40...+70°C
  - Pollution degree: 3
  - IEC degree of protection: IP65 (T type: IP66).

Operation



Certification and compliance

Certifications obtained: UL Listed for USA and Canada (cULus - File E93601), as Auxiliary Devices - Limit swtches for RS13... and TL13... types only; EAC for all.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 60204-1, ISO 13850; also UL508, CSA-C22.2 n° 14 for RS types.

Accessories and spare parts

P33032

P33033

P33034

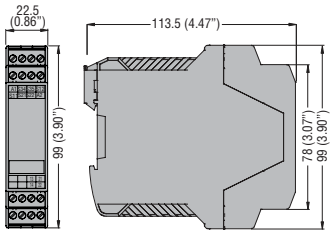
P33035

P33036

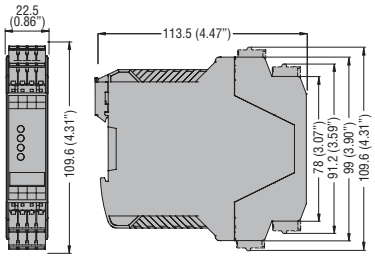
Order code	Description	Qty per pkg	Wt
		n°	[kg]
Accessories.			
P33032	Rope terminal clamp, Ø5mm	10	0.023
P33033	Rope eye,Ø5mm	10	0.007
P33034	Turnbuckle M6x60	10	0.061
P33035	Eye bolt M8	10	0.030
P33036	Steel rope, Ø5mm❶	100[m]	4.900

❶ The P33036 rope is sold in 100/109.4yd roll; Ø5mm = Ø0.2".

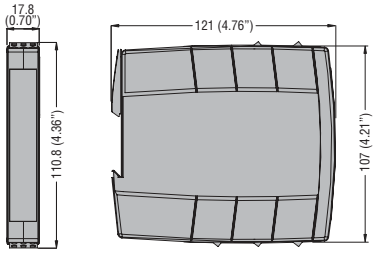
SRCES20 - SRCES31



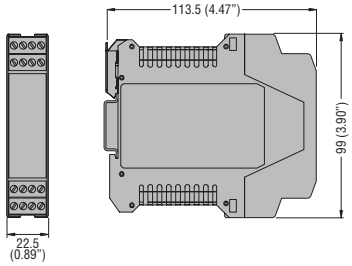
SRCES20S - SRCES31S



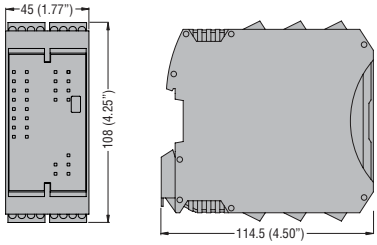
SRBES20 - SRBES31 - SRBEM41



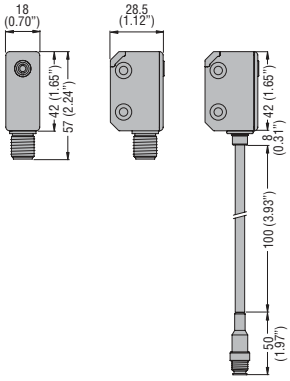
SRATH21 - SRALC21 - SRASM20 - SRAMF21



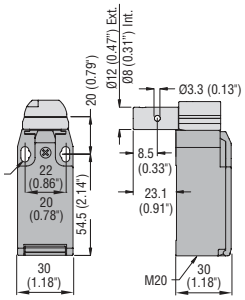
SRPMFA164



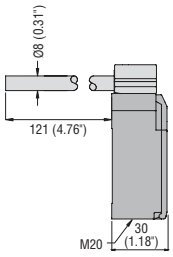
SSF...



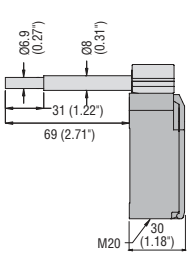
KBP1... KMP1...



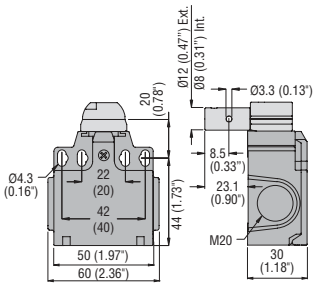
KBP2... KMP2...



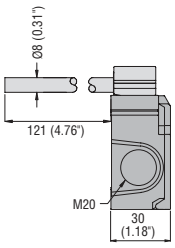
KBP3... KMP3...



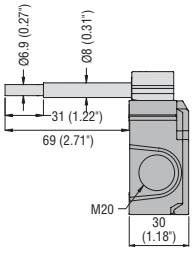
KCP1... KNP1...



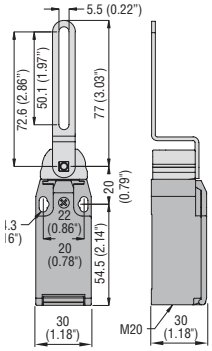
KCP2... KNP2...



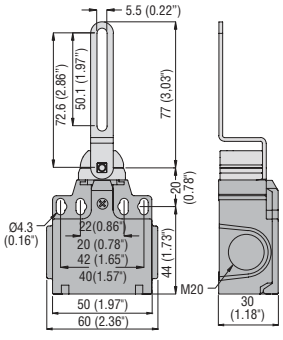
KCP3... KNP3...



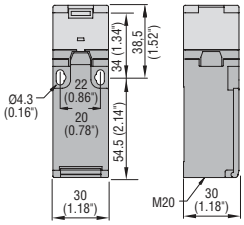
KBQ1L... KMQ1L...



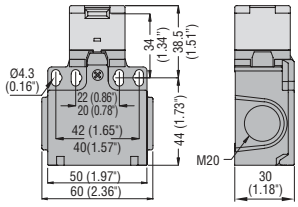
KCQ1L... KNQ1L...



KBN1... - KBN2... KMN1... - KMN2...

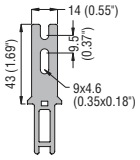


KCN...

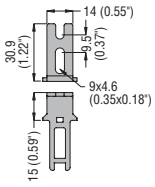


Keys

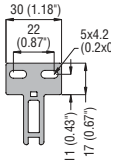
KXN1



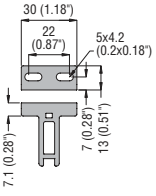
KXN2



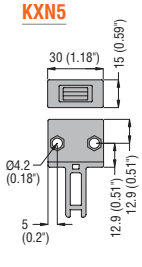
KXN3



KXN4

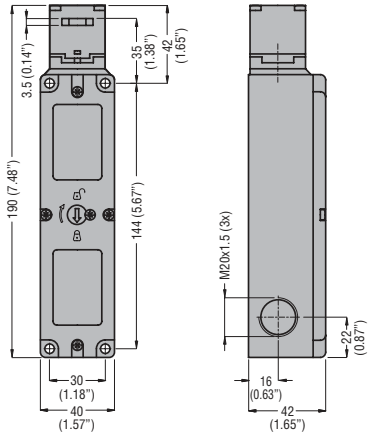


KXN5

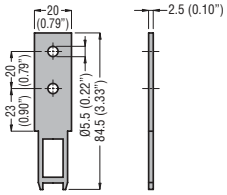


SAFETY SWITCHES WITH SOLENOID

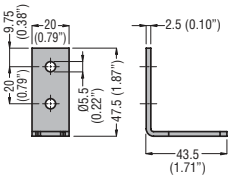
KEN1...



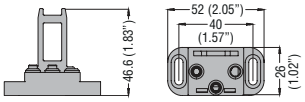
KEXN1



KEXN2

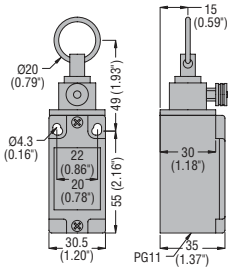


KEXN5

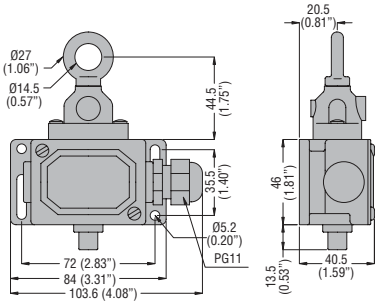


ROPE-PULL SAFETY LIMIT SWITCHES, ISO 13850 COMPLIANT

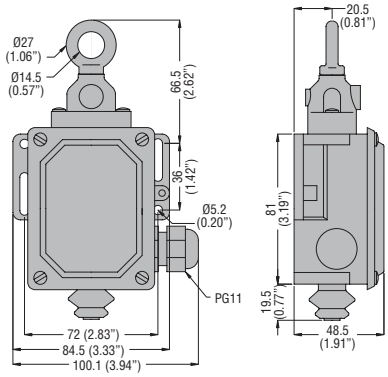
RS131310



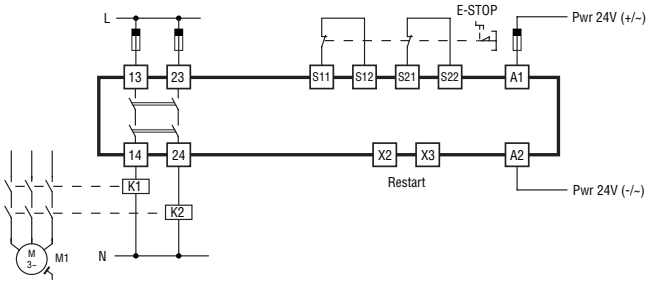
PLN131311



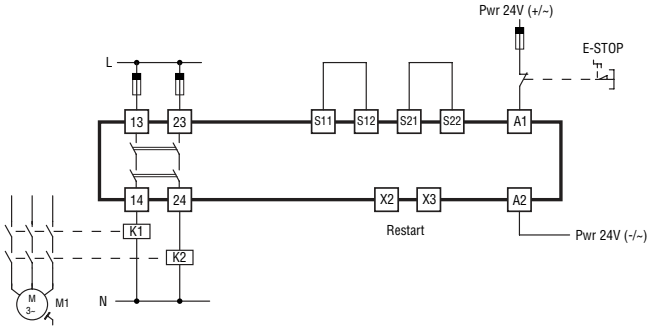
P2L13... - P2L15...



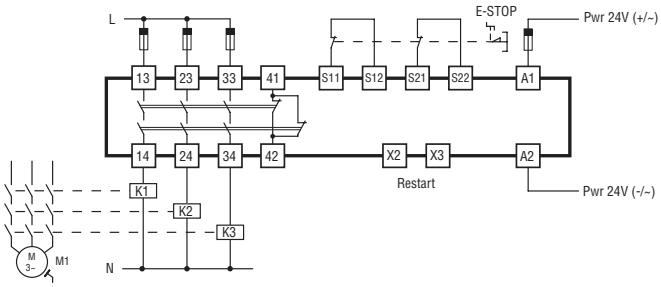
SRCES20
Double channel mode, manual start



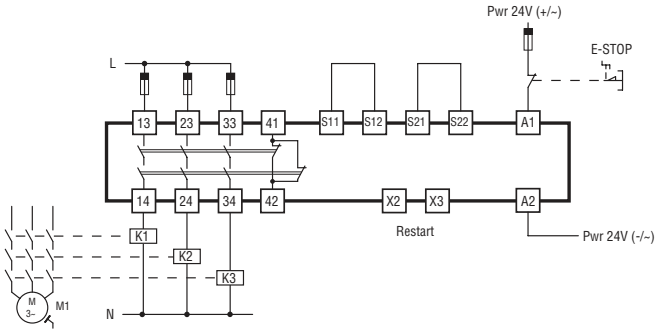
SRCES20
Single channel mode, manual start



SRCES31
Double channel mode, manual start



SRCES31
Single channel mode, manual start



SRBES20
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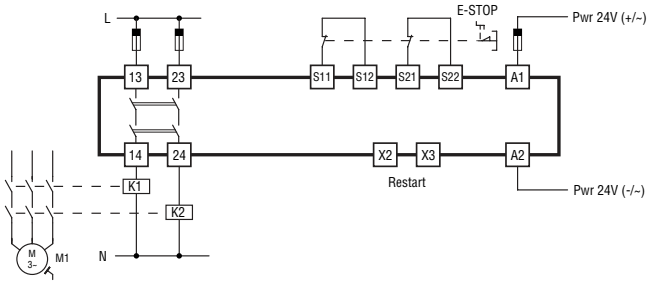

SRBES20
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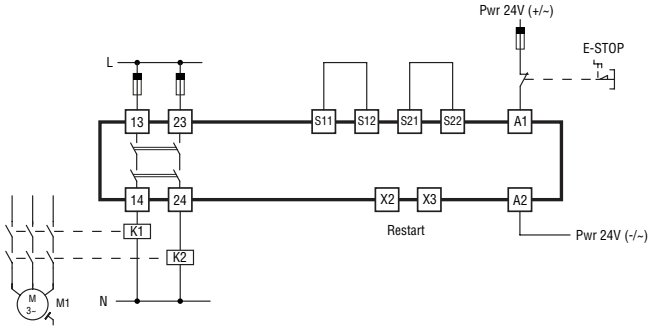
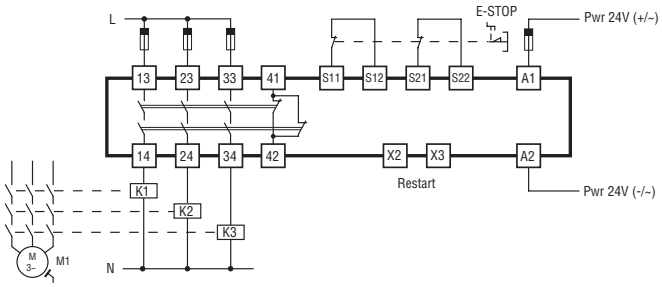
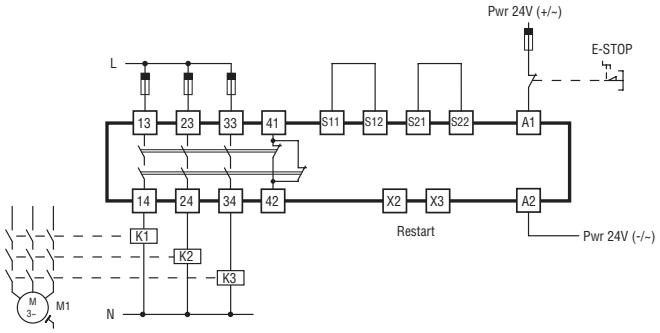


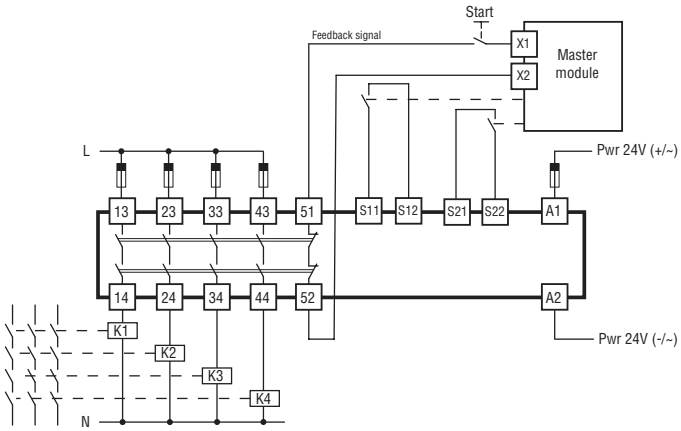
SRBES31
Double channel mode, manual start



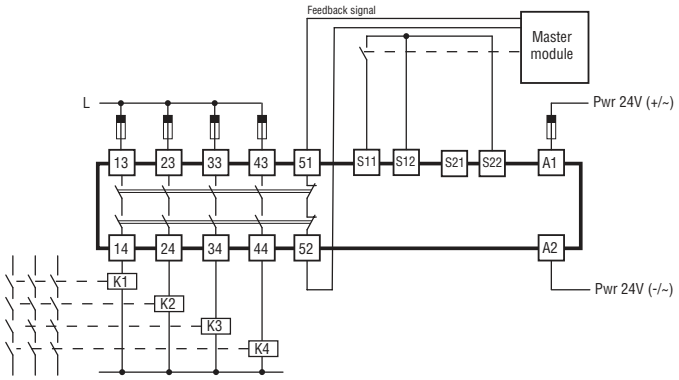
SRBES31
Single channel mode, manual start



SRBEM41
Double channel mode

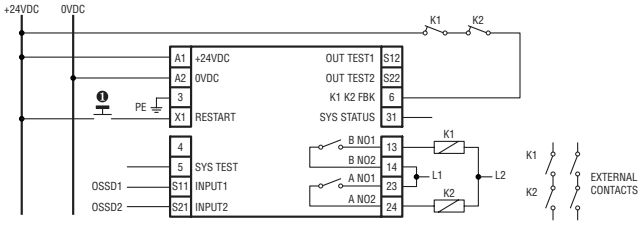


SRBEM41
Single channel mode

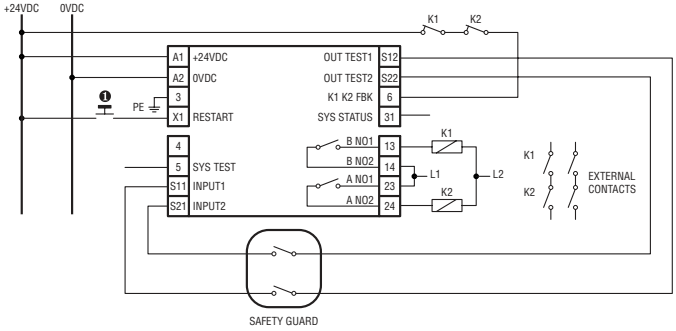


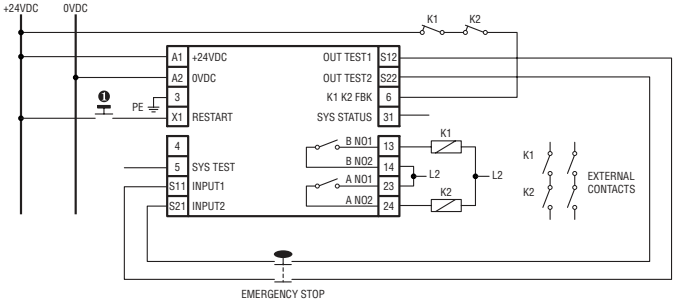
SRAMF21

1A, 1C mode: OSSD inputs

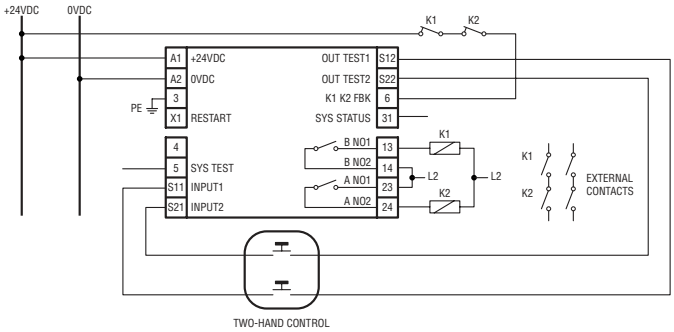


2A, 2M, 2C mode: safety accesses and emergency stops

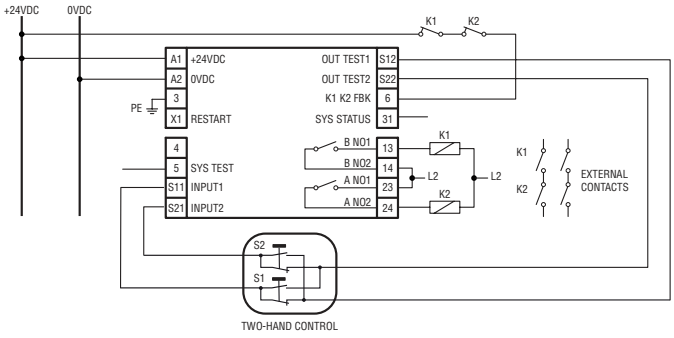




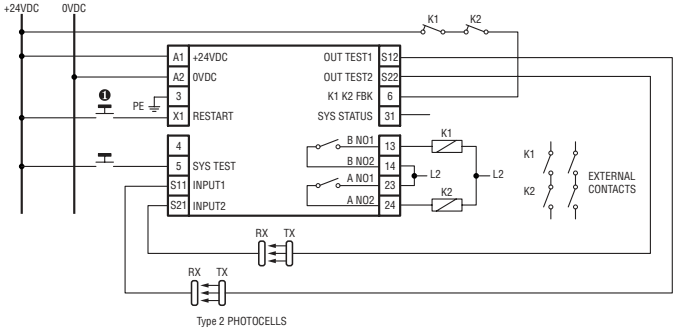
Mode 3A: two-hand control devices



Mode 3C: two-hand control devices, changeover contacts

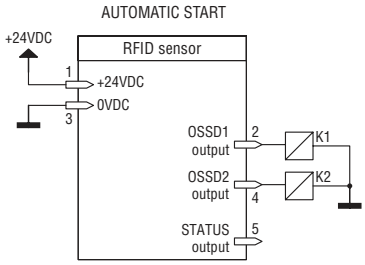


Mode 4A, 4C: light curtains

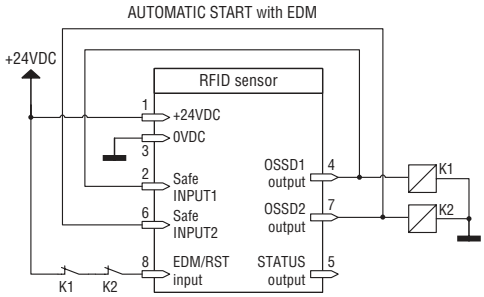


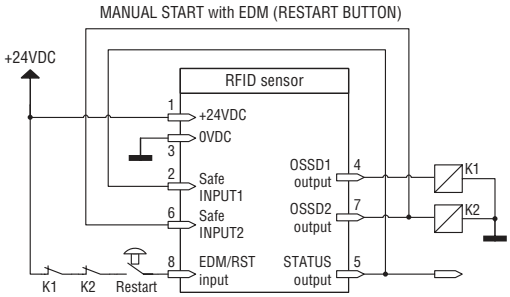
❶ Not necessary when used in automatic mode.

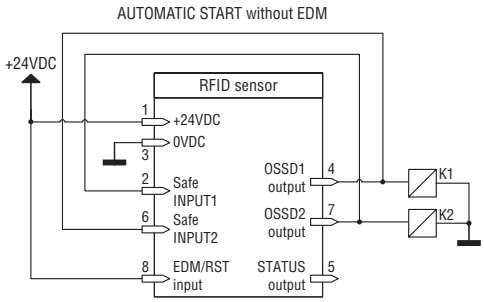
SSF5...

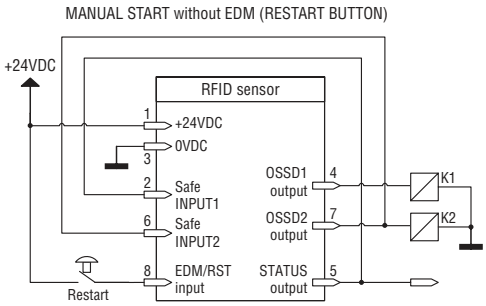


SSF8...



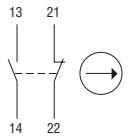






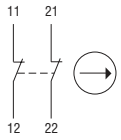
LIMIT SWITCHES, KB - KM - KC - KN TYPES

K...L11 — Slow action



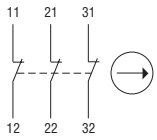
1NO + 1NC

K...L02 — Slow action



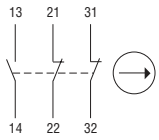
2NC

K...L03 — Slow action



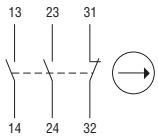
3NC

K...L12 — Slow action



1NO + 2NC

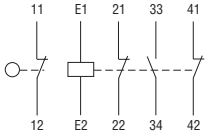
K...L21 — Slow action



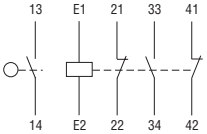
2NO + 1NC

SAFETY SWITCHES WITH SOLENOID
Actuator inserted and unlocked

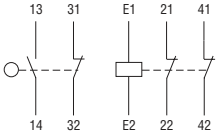
KEN1E1...KEN1M1....



KEN1E2...KEN1M2....

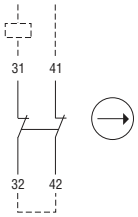


KEN1E3...KEN1M3....

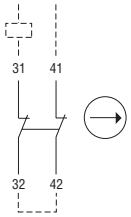


LIMIT SWITCHES FOR EMERGENCY STOPPING

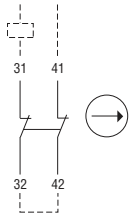
RS13...



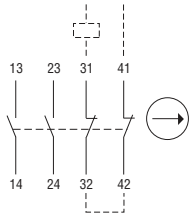
PLN13...



P2L13...



P2L15...



Type	SRCES20 - SRCES20S	SRCES31 - SRCES31S	SRBES20	SRBES31	SRBEM41
AUXILIARY SUPPLY					
Nominal auxiliary voltage supply	24VAC/DC		24VAC/DC		
Operating range	22...26VAC/DC		22...26VDC, 20.4...27.6VAC		
Frequency range	60-50Hz		60-50Hz		
Overvoltage category	III		III		
Insulation voltage	4kV		4kV		
Protection	Short circuit with PTC		Short circuit with PTC		
INPUTS					
Number	2		2		
Input current	Typical 50mA		Typical 5mA		
Input voltage	–		–		0-35VDC
Number of feedback/RESTART inputs	–		–		
OUTPUTS					
Number of safe outputs NO	2	3	2	3	4
Number of safe outputs OSSD	–		–		
Number of auxiliary outputs NC	–	1	–	1	–
Number of feedback outputs	–	–	–	–	1NC
Number of test outputs	–		–		
Safe output type	Voltage free contacts, relays with forced guided contacts		Voltage free contacts, relays with forced guided contacts		
Ratings	AC1 250V: 6A - 1500VA AC15 250V: 5A - DC1 24V: 6A DC13 24V: 6A		AC1 250V: 6A - 2000VA AC15 230V: 3A - DC1 24V: 6A DC13 24V: 2.5A		
UL 508 ratings	Pilot duty: B300 - R300		Pilot duty: B300 - R300		
Mechanical life	$>10^7$ operations		$>10^7$ operations		
Electrical life AC1 at 360 commutations/h	10^5 operations		10^5 operations		
SAFETY PARAMETERS					
ISO 13849-1 safety category	Cat. 4		Cat. 4		
ISO 13849-1 performance level	PLe		PLe		
AMBIENT CONDITIONS					
Degree of protection	IP40 on front, IP20 on terminals		IP40 on front, IP20 on terminals		
Degree of pollution	2		2		
Operating temperature	-20..+55°C		-25...+60°C		
Storage temperature	-20...+85°C		-30...+70°C		
Relative humidity	R.H. ≤93%		R.H. ≤95%		
CERTIFICATIONS AND COMPLIANCE					
Certifications	cULus, TÜV (pending)		cULus, TÜV		
Compliance	Cat. 4, PLe according to EN/BS 13849-1, EN/BS 81-20, EN/BS 81-50		Cat. 4, PLe according to EN/BS 13849-1, EN/BS 81-20, EN/BS 81-50		Cat. 4, PLe according to EN/BS 13849-1

	SRATH21	SRALC21	SRASM20	SRAMF21	SRPMFA164
	24VDC				24VDC
	19...29VDC				19...29VDC
	–				–
	III				III
	4kV				4kV
	Signaling output protected from overload		–	Signaling output protected from overload	Signaling output protected from overload
	2				16
	Typical 4.3mA				–
	0-30VDC				–
	–				4
	2				–
	–				4 pairs
	–				–
	1PNP	1PNP	–	1PNP	–
	–				4
	Relays with forced guided contacts				OSSD safe outputs
	AC1 250V: 6A - 2000VA AC15 230V: 5A DC13 24V: 2A				400mA - 24VDC
	Pilot duty: B300 - Q300				–
	$>10^7$ operations				–
	$>10^7$ operations				–
	Cat. 4				Cat. 4
	PLe				PLe
	IP20 on front, IP20 on terminals				IP20 on front, IP20 on terminals
	2				2
	-25...+55°C				-25...+55°C
	-30...+70°C				-30...+70°C
	R.H. ≤95%				R.H. ≤95%
	cULus, TÜV				cULus, TÜV
	Type 4 according to EN/BS 61496 Cat. 4, Ple according to EN/BS 13849-1		–	Cat. 4, PLe according to EN/BS 13849-1, EN/BS/IEC 61496-1 (Type 4), EN/BS 61508-1, EN/BS 61508-2, EN/BS 61508-3 (SIL3), IEC/BS 62061 (max. SIL 3)	Cat. 4, PLe according to EN/BS 13849-1, EN/BS 61508-1(SIL 3), EN/BS 61508-2 (SIL 3), EN/BS 61508-3 (SIL3), IEC/BS 62061 (max. SIL 3)

Rotary cam switches

- Suitable for circuit connection, changeover, switching ON and OFF as well as motor starting
- Possible special circuit schemes
- IEC IP40 or IP65 front degree of protection
- Door mount, rear mount or in enclosure versions
- Wide range of features.

SEC. - PAGE

Order code structure ..... **12 - 2**
Special circuit scheme form ..... **12 - 3**

Switching
ON/OFF switches, front mounting, U version ..... 12 - 4
ON/OFF switches, rear mounting, O version ..... 12 - 7
ON/OFF switches in enclosure, P/L version ..... 12 - 9
Changeover switches with or without 0, front mounting, U version ..... 12 - 10
Changeover switches with or without 0, rear mounting, O version ..... 12 - 12
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Multi-step
Starting with 1, front mounting, U version ..... 12 - 14
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Measuring
Voltmeter and ammeter switches, front mounting, U version ..... 12 - 22
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Motor starting
Motor reversing, star-delta, Dahlander motor control, separate winding switches, front mounting, U version ..... 12 - 26
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Motor reversing, star-delta, Dahlander motor control, separate winding switches, in enclosure, P/L version ..... 12 - 34

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Accessories ..... **12 - 43**
Wiring diagrams ..... **12 - 44**
Technical characteristics ..... **12 - 48**

GF SERIES
- IEC conventional free air thermal current Ith 10A and 20A
- Up to 24 contacts
- Direct (positive) opening action ⊖; according to IEC/EN/BS 60947-5-1
- Up to 12 switching positions
- Rotation angles: 30°, 45°, 60°, 90°
- Possibility of side-by-side installation
- IEC IP20 degree of protection of contacts
- IEC IP40 degree of protection of front, standard supplied.

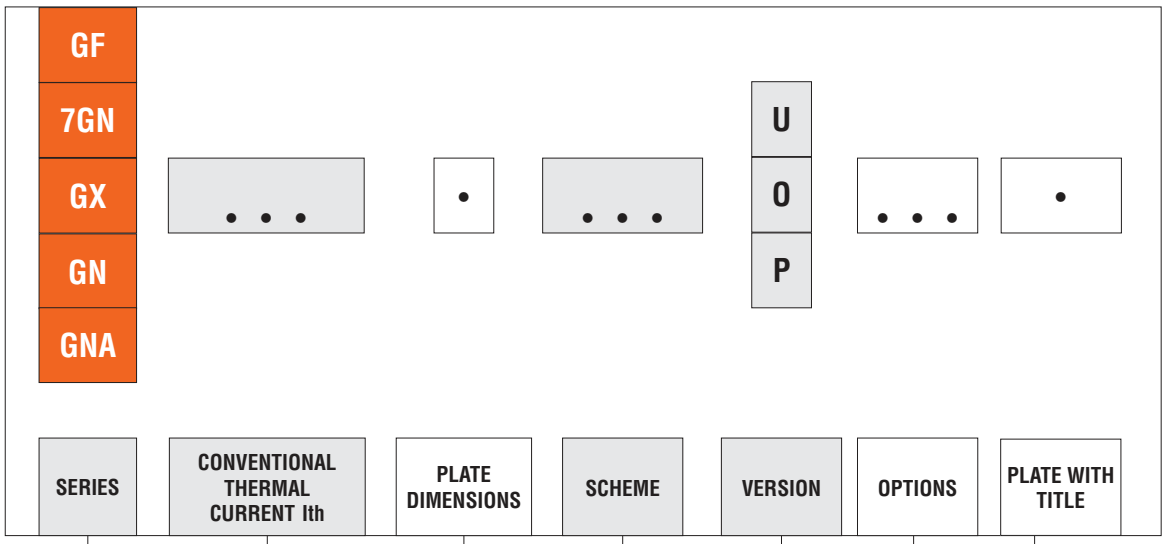
7GN SERIES
- IEC conventional free air thermal current Ith 16...125A
- Round-shaped contact body
- Up to 24 contacts
- Direct (positive) opening action ⊖; according to IEC/EN/BS 60947-5-1
- Up to 12 switching positions
- Rotation angles: 30°, 45°, 60°, 90°
- Available versions in plastic enclosure
- IEC IP40 degree of protection of front, standard supplied.

GX SERIES
- IEC conventional free air thermal current Ith 16...40A
- Square-shaped contact body
- Up to 24 contacts
- Direct (positive) opening action ⊖; according to IEC/EN/BS 60947-5-1
- Up to 12 switching positions
- Rotation angles: 30°, 45°, 60°, 90°
- Available versions in plastic enclosure
- Possibility of side-by-side installation
- IEC IP20 degree of protection of contacts
- IEC IP65 degree of protection of front, standard supplied.

GN SERIES
- IEC conventional free air thermal current Ith 200...315A
- Available on request versions up to 2000A
- Up to 24 contacts
- Direct (positive) opening action ⊖; according to IEC/EN/BS 60947-5-1
- Up to 12 switching positions
- Rotation angles: 30°, 45°, 60°, 90°
- Available versions in metal enclosure
- 200A to 315A versions cURus approved.

Page 12-42

GNA20 SERIES
- IEC conventional free air thermal current Ith 20A
- Up to 48 contacts
- Direct (positive) opening action ⊖; according to IEC/EN/BS 60947-5-1
- 4 contacts for each element
- Reduced depth
- Rotation angles: 30°, 45°, 60°, 90°
- Available versions in plastic enclosure
- IEC IP20 degree of protection of contacts.



GF
IEC protection:
Front = IP40
Contacts = IP20

7GN
IEC protection:
Front = IP40
Contacts = IP00

GX
IEC protection:
Front = IP65
Contacts = IP20

GN
IEC protection:
Front = IP40
Contacts = IP00

GNA
IEC protection:
Front = IP40
Contacts = IP20

GF	7GN	GX	GN	GNA
10A	16A	16A	200A	20A
20A	20A	20A	315A	
	25A	32A		
	32A	40A		
	40A			
	63A			
	125A			

90
91
10
92
99
100
....
❶

U = Front mount
O = Rear mount
P = In plastic enclosure
L = In metal enclosure (only for GN series)

N = Add N for version with front plate with title and neutral label

Insert H when an enlarged front plate is required

Standard plate	Enlarged plate
30x30mm	48x48mm
48x48mm	65x65mm
65x65mm	90x90mm

Front plate standard dimension in the different options are available from 12-36.

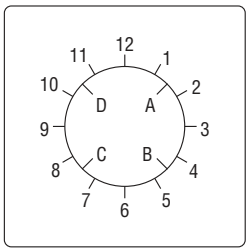
25	Front mounting with red/yellow handle padlockable in 0 and protection covers
65	Front mounting with red/yellow handle padlockable in 0 and protection covers (7GN only)
11	Front mounting with black handle without front plate for hole Ø22mm fixing
12	Front mounting without front plate with key operation for hole Ø22mm fixing
47	Snap on front mounting with black handle for hole Ø22mm fixing
48	Modular service cover for 35mm DIN rail mounting with black handle
88	Rear mounting with red/yellow handle padlockable in 0, door coupling and protection covers
98	Rear mounting with red/yellow handle padlockable in 0, door coupling and protection covers (7GN only)
4V	Front mounting with 4 screws fixing
51	Front mounting with black handle with IP65 front protection
24	Front mounting with red/yellow handle not padlockable in 0 and without protection covers
29	Front mounting with front plate with key operation for hole Ø22mm fixing
29D	Snap on front mounting with key operation for hole Ø22mm fixing
06	Front mounting with black handle padlockable in 0
49	Modular service cover for 35mm DIN rail mounting with key operation

Example for ordering:
GX1653P = Changeover switch, 16A, 3 poles, 3 positions, 3 wafers in 90x90mm IEC IP65 enclosure.
7GN25H90U51 = ON-OFF switch, 25A, 1 pole, 2 positions, 1 wafer with enlarged 65x65mm front plate and IEC IP65 protection.

Consult Technical support for information; see contact details on inside front cover.

❶ Special schemes are available on request; complete the form on page 12-3.

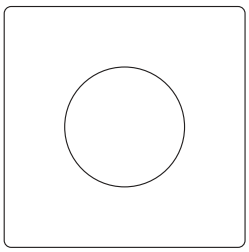
Consult manual I230 on the website www.LovatoElectric.com for further information (configuration of contacts, diagrams, plate indications, etc.).



1	4	5	8	9	12	13	16	17	20	21	24	25	28	29	32	33	36	37	40	41	44	45	48
2	3	6	7	10	11	14	15	18	19	22	23	26	27	30	31	34	35	38	39	42	43	46	47

Plate indication	Pos.	
		7
	C	
		8
		9
		10
	D	
		11
		12
		1
	A	
		2
		3
		4
	B	
		5
		6

Front plate



	Overlapping contacts		Close contact in 2 or more positions	Open/ passing contact		Closed contact		Spring return
1	X		X			X		
				X				
2		X	X					X

SERIES:	GF	7GN	GX	GN	GNA	Current rating .....
VERSION:	Front mount		Rear mount	Enclosed		Other .....
FINISH:	Standard ❶		Red/yellow padlockable			Special .....
FIXING:	2 screws		4 screws	Snap		

Qty:..... Company name: .....

Contact details: .....

❶ Standard supplied finish is black front plate while 0-12 indication and the handle are black; any other is considered special.
Also consult technical instruction I230 on the website www.LovatoElectric.com.

ON/OFF SWITCHES

Front mounting with black handle **(U)❶**

				WIRING DIAGRAMS	❷90	❷91	❷10	❷92	❸05	❸06	❸07	❸08	❸03
				Poles	1	2	3	4	1	2	3	4	3
Series	Front plate size	Rated thermal current Ith	UL/CSA general use										
	[mm]	[A]	[A]										
GF...	□30	10	10		GF1090U	GF1091U	GF1010U	GF1092U	GF1005U	GF1006U	GF1007U	GF1008U	GF1003U
	□48	20	15		GF2090U	GF2091U	GF2010U	GF2092U	GF2005U	GF2006U	GF2007U	GF2008U	GF2003U
7GN...	□48	16	15		7GN1290U	7GN1291U	7GN1210U	7GN1292U	7GN1205U	7GN1206U	7GN1207U	7GN1208U	7GN1203U
		20	20		7GN2090U	7GN2091U	7GN2010U	7GN2092U	7GN2005U	7GN2006U	7GN2007U	7GN2008U	7GN2003U
		25	30		7GN2590U	7GN2591U	7GN2510U	7GN2592U	7GN2505U	7GN2506U	7GN2507U	7GN2508U	7GN2503U
	□65	32	40		7GN3290U	7GN3291U	7GN3210U	7GN3292U	7GN3205U	7GN3206U	7GN3207U	7GN3208U	7GN3203U
		40	50		7GN4090U	7GN4091U	7GN4010U	7GN4092U	7GN4005U	7GN4006U	7GN4007U	7GN4008U	7GN4003U
		63	60		—	—	7GN6310U	7GN6392U	—	—	7GN6307U	7GN6308U	7GN6303U
	□90	125	130		—	—	7GN12510U	7GN12592U	—	—	7GN12507U	7GN12508U	7GN12503U
GX...	□48	16	12		GX1690U	GX1691U	GX1610U	GX1692U	GX1605U	GX1606U	GX1607U	GX1608U	GX1603U
		20	15		GX2090U	GX2091U	GX2010U	GX2092U	GX2005U	GX2006U	GX2007U	GX2008U	GX2003U
	□65	32	32		GX3290U	GX3291U	GX3210U	GX3292U	GX3205U	GX3206U	GX3207U	GX3208U	GX3203U
		40	40		GX4090U	GX4091U	GX4010U	GX4092U	GX4005U	GX4006U	GX4007U	GX4008U	GX4003U
GN...	□132	200	200		—	—	GN20010U	GN20092U	—	—	GN20007U	GN20008U	GN20003U
		315	255		—	—	GN31510U	GN31592U	—	—	GN31507U	GN31508U	GN31503U

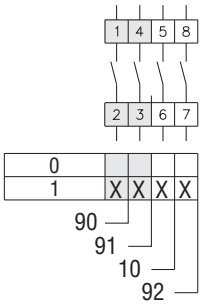
Front mounting with red/yellow handle padlockable in 0 and protection covers **(U25)❹**

				WIRING DIAGRAMS	❷90	❷91	❷10	❷92	❸05	❸06	❸07	❸08
				Poles	1	2	3	4	1	2	3	4
Series	Front plate size	Rated thermal current Ith	UL/CSA general use									
	[mm]	[A]	[A]									
GF...	□48	20	15		GF2090U25	GF2091U25	GF2010U25	GF2092U25	GF2005U25	GF2006U25	GF2007U25	GF2008U25
7GN...	□65	16	15		7GN1290U25	7GN1291U25	7GN1210U25	7GN1292U25	7GN1205U25	7GN1206U25	7GN1207U25	7GN1208U25
		20	20		7GN2090U25	7GN2091U25	7GN2010U25	7GN2092U25	7GN2005U25	7GN2006U25	7GN2007U25	7GN2008U25
		25	30		7GN2590U25	7GN2591U25	7GN2510U25	7GN2592U25	7GN2505U25	7GN2506U25	7GN2507U25	7GN2508U25
		32	40		7GN3290U25	7GN3291U25	7GN3210U25	7GN3292U25	7GN3205U25	7GN3206U25	7GN3207U25	7GN3208U25
		40	50		7GN4090U25	7GN4091U25	7GN4010U25	7GN4092U25	7GN4005U25	7GN4006U25	7GN4007U25	7GN4008U25
GX...	□48	16	12		GX1690U25	GX1691U25	GX1610U25	GX1692U25	GX1605U25	GX1606U25	GX1607U25	GX1608U25
		20	15		GX2090U25	GX2091U25	GX2010U25	GX2092U25	GX2005U25	GX2006U25	GX2007U25	GX2008U25
	□65	32	32		GX3290U25	GX3291U25	GX3210U25	GX3292U25	GX3205U25	GX3206U25	GX3207U25	GX3208U25
		40	40		GX4090U25	GX4091U25	GX4010U25	GX4092U25	GX4005U25	GX4006U25	GX4007U25	GX4008U25

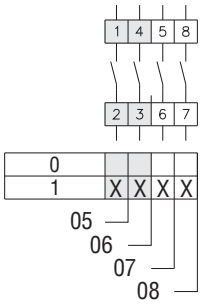
❶ For version with black handle padlockable in 0 without protection cover add 06 (e.g. GF1090U06).
❷ Standard version provided with 0-1 front plate. For version with O-I front plate add C (e.g. GF20C90U). For version with OFF-ON front plate add D (e.g. GF20D90U).
❸ For version with OFF-ON front plate add C (e.g. GF20C05U).
❹ For version with red/yellow not padlockable handle without protection covers replace U25 with U24 (e.g. GF2090U24).

WIRING DIAGRAMS

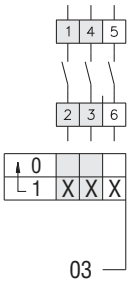
90-91-10-92



05-06-07-08



03



ON/OFF SWITCHES

Front mounting with red/yellow handle padlockable in 0 and protection covers **(U65)**

				WIRING DIAGRAMS	❶90	❶91	❶10	❶92	❷05	❷06	❷07	❷08
				Poles	1	2	3	4	1	2	3	4
Series	Front plate size	Rated thermal current Ith	UL/CSA general use									
	[mm]	[A]	[A]									
7GN...	☐65	16	15		7GN1290U65	7GN1291U65	7GN1210U65	7GN1292U65	7GN1205U65	7GN1206U65	7GN1207U65	7GN1208U65
		20	20		7GN2090U65	7GN2091U65	7GN2010U65	7GN2092U65	7GN2005U65	7GN2006U65	7GN2007U65	7GN2008U65
		25	30		7GN2590U65	7GN2591U65	7GN2510U65	7GN2592U65	7GN2505U65	7GN2506U65	7GN2507U65	7GN2508U65
		32	40		7GN3290U65	7GN3291U65	7GN3210U65	7GN3292U65	7GN3205U65	7GN3206U65	7GN3207U65	7GN3208U65
		40	50		7GN4090U65	7GN4091U65	7GN4010U65	7GN4092U65	7GN4005U65	7GN4006U65	7GN4007U65	7GN4008U65
		63	60		—	—	7GN6310U65	7GN6392U65	—	—	7GN6307U65	7GN6308U65
	☐90	125	130		—	—	7GN12510U65	7GN12592U65	—	—	7GN12507U65	7GN12508U65

Front mounting with black handle without front plate for hole Ø22mm fixing **(U11)**

				WIRING DIAGRAMS	90	91	10	92	05	06	07	08	03
				Poles	1	2	3	4	1	2	3	4	3
Series	Front plate size	Rated thermal current Ith	UL/CSA general use										
	[mm]	[A]	[A]										
GF...	—	20	15		GF2090U11	GF2091U11	GF2010U11	GF2092U11	GF2005U11	GF2006U11	GF2007U11	GF2008U11	GF2003U11
7GN...	—	16	15		7GN1290U11	7GN1291U11	7GN1210U11	7GN1292U11	7GN1205U11	7GN1206U11	7GN1207U11	7GN1208U11	7GN1203U11
		20	20		7GN2090U11	7GN2091U11	7GN2010U11	7GN2092U11	7GN2005U11	7GN2006U11	7GN2007U11	7GN2008U11	7GN2003U11
		25	30		7GN2590U11	7GN2591U11	7GN2510U11	7GN2592U11	7GN2505U11	7GN2506U11	7GN2507U11	7GN2508U11	7GN2503U11
GX...	—	16	12		GX1690U11	GX1691U11	GX1610U11	GX1692U11	GX1605U11	GX1606U11	GX1607U11	GX1608U11	GX1603U11
		20	15		GX2090U11	GX2091U11	GX2010U11	GX2092U11	GX2005U11	GX2006U11	GX2007U11	GX2008U11	GX2003U11

❶ Standard version provided with 0-1 front plate. For version with O-I front plate add C (e.g. 7GN12C90U65). For version with OFF-ON front plate add D (e.g. 7GN12D90U65).
❷ For version with OFF-ON front plate add C (e.g. 7GN12C05U65).

Technical characteristics

Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GF10...	10	10	—	0.75	2	—	—	0.75	3
GF20...	20	15	—	1	3	—	—	2	7.5
7GN12...	16	15	0.5	1	3	—	—	1.7	5.5
7GN20...	20	20	0.75	2	3	7.5	10	2.5	7.5
7GN25...	25	30	1.5	3	5	10	15	3.7	11
7GN32...	32	40	2	5	10	15	15	4	15
7GN40...	40	50	2	5	10	20	20	6	18.5
7GN63...	63	60	3	10	15	25	25	7.5	30
7GN125...	125	130	5	15	25	50	40	11	45

Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GX16...	16	12	0.75	1	3	5	5	1.8	6.5
GX20...	20	15	0.75	1.5	3	5	5	2.2	7.5
GX32...	32	32	1.5	3	7.5	15	15	3.5	15
GX40...	40	40	2	5	10	15	15	5.2	18.5
GN200	200	200	15	30	50	100	75	—	47
GN315	315	255	15	30	50	100	75	37	110

ON/OFF SWITCHES

Front mounting without front plate with key operation for hole Ø22mm fixing **(U12)❶**

				WIRING DIAGRAMS	90	91	10	92	05	06	07	08	03
				Poles	1	2	3	4	1	2	3	4	3
Series	Front plate size	Rated thermal current Ith	UL/CSA general use										
	[mm]	[A]	[A]										
GF...	—	20	15		GF2090U12	GF2091U12	GF2010U12	GF2092U12	GF2005U12	GF2006U12	GF2007U12	GF2008U12	GF2003U12
7GN...	—	16	15		7GN1290U12	7GN1291U12	7GN1210U12	7GN1292U12	7GN1205U12	7GN1206U12	7GN1207U12	7GN1208U12	7GN1203U12
		20	20		7GN2090U12	7GN2091U12	7GN2010U12	7GN2092U12	7GN2005U12	7GN2006U12	7GN2007U12	7GN2008U12	7GN2003U12
		25	30		7GN2590U12	7GN2591U12	7GN2510U12	7GN2592U12	7GN2505U12	7GN2506U12	7GN2507U12	7GN2508U12	7GN2503U12
GX...	—	16	12		GX1690U12	GX1691U12	GX1610U12	GX1692U12	GX1605U12	GX1606U12	GX1607U12	GX1608U12	GX1603U12
		20	15		GX2090U12	GX2091U12	GX2010U12	GX2092U12	GX2005U12	GX2006U12	GX2007U12	GX2008U12	GX2003U12

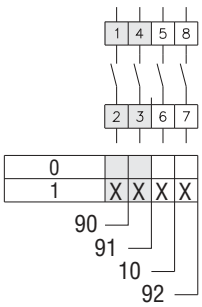
Snap on front mounting with black handle for hole Ø22mm fixing **(U47)❹**

				WIRING DIAGRAMS	❷90	❷91	❷10	❷92	❸05	❸06	❸07	❸08	❸03
				Poles	1	2	3	4	1	2	3	4	3
Series	Front plate size	Rated thermal current Ith	UL/CSA general use										
	[mm]	[A]	[A]										
GF...	□30	10	10		GF1090U47	GF1091U47	GF1010U47	GF1092U47	GF1005U47	GF1006U47	GF1007U47	GF1008U47	GF1003U47
	□48	20	15		GF2090U47	GF2091U47	GF2010U47	GF2092U47	GF2005U47	GF2006U47	GF2007U47	GF2008U47	GF2003U47
7GN...	□48	16	15		7GN1290U47	7GN1291U47	7GN1210U47	7GN1292U47	7GN1205U47	7GN1206U47	7GN1207U47	7GN1208U47	7GN1203U47
		20	20		7GN2090U47	7GN2091U47	7GN2010U47	7GN2092U47	7GN2005U47	7GN2006U47	7GN2007U47	7GN2008U47	7GN2003U47
		25	30		7GN2590U47	7GN2591U47	7GN2510U47	7GN2592U47	7GN2505U47	7GN2506U47	7GN2507U47	7GN2508U47	7GN2503U47
GX...	□48	16	12		GX1690U47	GX1691U47	GX1610U47	GX1692U47	GX1605U47	GX1606U47	GX1607U47	GX1608U47	GX1603U47
		20	15		GX2090U47	GX2091U47	GX2010U47	GX2092U47	GX2005U47	GX2006U47	GX2007U47	GX2008U47	GX2003U47

❶ For version with front plate replace U12 with U29 (e.g. GF2090U29).
❷ Standard version provided with 0-1 front plate. For version with 0-I front plate add C (e.g. GF20C90U12). For version with OFF-ON front plate add D (e.g. GF20D90U12).
❸ For version with OFF-ON front plate add C (e.g. GF20C05U12).
❹ For key operation version replace U47 with U29D (e.g. GF2090U29D).

WIRING DIAGRAMS

90-91-10-92



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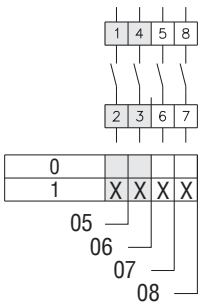

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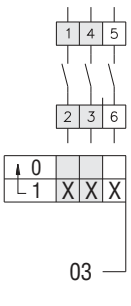


ON/OFF SWITCHES

Rear mounting with black handle **(0)**

				WIRING DIAGRAMS	❶90	❶91	❶10	❶92	❸05	❸06	❸07	❸08	❸03
				Poles	1	2	3	4	1	2	3	4	3
Series	Front plate size	Rated thermal current Ith	UL/CSA general use										
	[mm]	[A]	[A]										
GF...	□48	20	15		GF20900	GF20910	GF20100	GF20920	GF20050	GF20060	GF20070	GF20080	GF20030
7GN...	□48	16	15		7GN12900	7GN12910	7GN12100	7GN12920	7GN12050	7GN12060	7GN12070	7GN12080	7GN12030
		20	20		7GN20900	7GN20910	7GN20100	7GN20920	7GN20050	7GN20060	7GN20070	7GN20080	7GN20030
		25	30		7GN25900	7GN25910	7GN25100	7GN25920	7GN25050	7GN25060	7GN25070	7GN25080	7GN25030
	□65	32	40		7GN32900	7GN32910	7GN32100	7GN32920	7GN32050	7GN32060	7GN32070	7GN32080	7GN32030
		40	50		7GN40900	7GN40910	7GN40100	7GN40920	7GN40050	7GN40060	7GN40070	7GN40080	7GN40030
		63	60		—	—	7GN63100	7GN63920	—	—	7GN63070	7GN63080	7GN63030
	□90	125	130		—	—	7GN125100	7GN125920	—	—	7GN125070	7GN125080	7GN125030
GX...	□48	16	12		GX16900	GX16910	GX16100	GX16920	GX16050	GX16060	GX16070	GX16080	GX16030
		20	15		GX20900	GX20910	GX20100	GX20920	GX20050	GX20060	GX20070	GX20080	GX20030
	□65	32	32		GX32900	GX32910	GX32100	GX32920	GX32050	GX32060	GX32070	GX32080	GX32030
		40	40		GX40900	GX40910	GX40100	GX40920	GX40050	GX40060	GX40070	GX40080	GX40030
GN...	□132	200	200		—	—	GN200100	GN200920	—	—	GN200070	GN200080	GN200030
		315	255		—	—	GN315100	GN315920	—	—	GN315070	GN315080	GN315030

Modular service cover for 35mm DIN rail mounting with black handle **(048)❷**

				WIRING DIAGRAMS	❶90	❶91	❶10	❶92	❸05	❸06	❸07	❸08
				Poles	1	2	3	4	1	2	3	4
Series	Enclosure size	Rated thermal current Ith	UL/CSA general use									
	[mm]	[A]	[A]									
GF...	45x54	20	15		GF2090048	GF2091048	GF2010048	GF2092048	GF2005048	GF2006048	GF2007048	GF2008048
7GN...	45x54	16	15		7GN1290048	7GN1291048	7GN1210048	7GN1292048	7GN1205048	7GN1206048	7GN1207048	7GN1208048
		20	20		7GN2090048	7GN2091048	7GN2010048	7GN2092048	7GN2005048	7GN2006048	7GN2007048	7GN2008048
		25	30		7GN2590048	7GN2591048	7GN2510048	7GN2592048	7GN2505048	7GN2506048	7GN2507048	7GN2508048
GX...	45x54	16	12		GX1690048	GX1691048	GX1610048	GX1692048	GX1605048	GX1606048	GX1607048	GX1608048
		20	15		GX2090048	GX2091048	GX2010048	GX2092048	GX2005048	GX2006048	GX2007048	GX2008048

❶ Standard version provided with 0-1 front plate. For version with O-I front plate add C (e.g. GF20C900). For version with OFF-ON front plate add D (e.g. GF20D900).
❷ For key operation version replace 048 with 049 (e.g. GF2090049).
❸ For version with OFF-ON front plate add C (e.g. GF20C050).

Technical characteristics

Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GF10...	10	10	—	0.75	2	—	—	0.75	3
GF20...	20	15	—	1	3	—	—	2	7.5
7GN12...	16	15	0.5	1	3	—	—	1.7	5.5
7GN20...	20	20	0.75	2	3	7.5	10	2.5	7.5
7GN25...	25	30	1.5	3	5	10	15	3.7	11
7GN32...	32	40	2	5	10	15	15	4	15
7GN40...	40	50	2	5	10	20	20	6	18.5
7GN63...	63	60	3	10	15	25	25	7.5	30
7GN125...	125	130	5	15	25	50	40	11	45

Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GX16...	16	12	0.75	1	3	5	5	1.8	6.5
GX20...	20	15	0.75	1.5	3	5	5	2.2	7.5
GX32...	32	32	1.5	3	7.5	15	15	3.5	15
GX40...	40	40	2	5	10	15	15	5.2	18.5
GN200	200	200	15	30	50	100	75	—	47
GN315	315	255	15	30	50	100	75	37	110

ON/OFF SWITCHES

Rear mounting with red/yellow handle padlockable in 0, door coupling and protection covers **(088)**

				WIRING DIAGRAMS	❶90	❶91	❶10	❶92	❷05	❷06	❷07	❷08
				Poles	1	2	3	4	1	2	3	4
Series	Front plate size	Rated thermal current Ith	UL/CSA general use									
	[mm]	[A]	[A]									
GF...	□48	20	15		GF2090088	GF2091088	GF2010088	GF2092088	GF2005088	GF2006088	GF2007088	GF2008088
7GN...	□65	16	15		7GN1290088	7GN1291088	7GN1210088	7GN1292088	7GN1205088	7GN1206088	7GN1207088	7GN1208088
		20	20		7GN2090088	7GN2091088	7GN2010088	7GN2092088	7GN2005088	7GN2006088	7GN2007088	7GN2008088
		25	30		7GN2590088	7GN2591088	7GN2510088	7GN2592088	7GN2505088	7GN2506088	7GN2507088	7GN2508088
		32	40		7GN3290088	7GN3291088	7GN3210088	7GN3292088	7GN3205088	7GN3206088	7GN3207088	7GN3208088
		40	50		7GN4090088	7GN4091088	7GN4010088	7GN4092088	7GN4005088	7GN4006088	7GN4007088	7GN4008088
GX...	□48	16	12		GX1690088	GX1691088	GX1610088	GX1692088	GX1605088	GX1606088	GX1607088	GX1608088
		20	15		GX2090088	GX2091088	GX2010088	GX2092088	GX2005088	GX2006088	GX2007088	GX2008088
	□65	32	32		GX3290088	GX3291088	GX3210088	GX3292088	GX3205088	GX3206088	GX3207088	GX3208088
		40	40		GX4090088	GX4091088	GX4010088	GX4092088	GX4005088	GX4006088	GX4007088	GX4008088

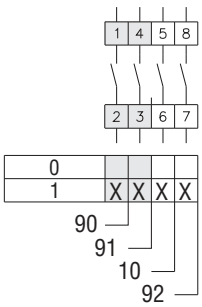
Rear mounting with red/yellow handle padlockable in 0, door coupling and protection covers **(098)**

				WIRING DIAGRAMS	❶90	❶91	❶10	❶92	❷05	❷06	❷07	❷08
				Poles	1	2	3	4	1	2	3	4
Series	Front plate size	Rated thermal current Ith	UL/CSA general use									
	[mm]	[A]	[A]									
7GN...	□65	16	15		7GN1290098	7GN1291098	7GN1210098	7GN1292098	7GN1205098	7GN1206098	7GN1207098	7GN1208098
		20	20		7GN2090098	7GN2091098	7GN2010098	7GN2092098	7GN2005098	7GN2006098	7GN2007098	7GN2008098
		25	30		7GN2590098	7GN2591098	7GN2510098	7GN2592098	7GN2505098	7GN2506098	7GN2507098	7GN2508098
		32	40		7GN3290098	7GN3291098	7GN3210098	7GN3292098	7GN3205098	7GN3206098	7GN3207098	7GN3208098
		40	50		7GN4090098	7GN4091098	7GN4010098	7GN4092098	7GN4005098	7GN4006098	7GN4007098	7GN4008098
		63	60		—	—	7GN6310098	7GN6392098	—	—	7GN6307098	7GN6308098

❶ Standard version provided with 0-1 front plate. For version with O-I front plate add C (e.g. GF20C90088). For version with OFF-ON front plate add D (e.g. GF20D90088).
❷ For version with OFF-ON front plate add C (e.g. GF20C05088).

WIRING DIAGRAMS

90-91-10-92



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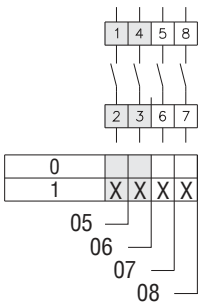

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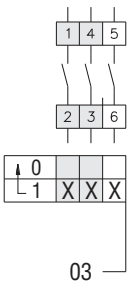


ON/OFF SWITCHES

Cam switch in plastic enclosure with black handle **(P)**
Cam switch in metallic enclosure with black handle **(L)**

				WIRING DIAGRAMS	❶90	❶91	❶10	❶92	❷05	❷06	❷07	❷08	❷03
				Poles	1	2	3	4	1	2	3	4	3
Series	Enclosure size	Rated thermal current Ith	UL/CSA general use										
	[mm]	[A]	[A]										
7GN...	75x75	16	15		7GN1290P	7GN1291P	7GN1210P	7GN1292P	7GN1205P	7GN1206P	7GN1207P	7GN1208P	7GN1203P
		20	20		7GN2090P	7GN2091P	7GN2010P	7GN2092P	7GN2005P	7GN2006P	7GN2007P	7GN2008P	7GN2003P
		25	30		7GN2590P	7GN2591P	7GN2510P	7GN2592P	7GN2505P	7GN2506P	7GN2507P	7GN2508P	7GN2503P
	90x90	32	40		7GN3290P	7GN3291P	7GN3210P	7GN3292P	7GN3205P	7GN3206P	7GN3207P	7GN3208P	7GN3203P
	110x110	40	50		7GN4090P	7GN4091P	7GN4010P	7GN4092P	7GN4005P	7GN4006P	7GN4007P	7GN4008P	7GN4003P
	125x175	63	60		—	—	7GN6310P	7GN6392P	—	—	7GN6307P	7GN6308P	7GN6303P
	198x248	125	130		—	—	7GN12510P	7GN12592P	—	—	7GN12507P	7GN12508P	7GN12503P
GX...	90x90	16	12		GX1690P	GX1691P	GX1610P	GX1692P	GX1605P	GX1606P	GX1607P	GX1608P	GX1603P
		20	15		GX2090P	GX2091P	GX2010P	GX2092P	GX2005P	GX2006P	GX2007P	GX2008P	GX2003P
	110x110	32	32		GX3290P	GX3291P	GX3210P	GX3292P	GX3205P	GX3206P	GX3207P	GX3208P	GX3203P
		40	40		GX4090P	GX4091P	GX4010P	GX4092P	GX4005P	GX4006P	GX4007P	GX4008P	GX4003P
GN...	250x316	200	200		—	—	GN20010L	GN20092L	—	—	GN20007L	GN20008L	GN20003L
		315	255		—	—	GN31510L	GN31592L	—	—	GN31507L	GN31508L	GN31503L

Cam switch in plastic enclosure with red/yellow handle padlockable in 0 **(P25)**

				WIRING DIAGRAMS	❶90	❶91	❶10	❶92	❷05	❷06	❷07	❷08
				Poles	1	2	3	4	1	2	3	4
Series	Enclosure size	Rated thermal current Ith	UL/CSA general use									
	[mm]	[A]	[A]									
7GN...	75x75 or 90x90❸	16	15		7GN1290P25	7GN1291P25	7GN1210P25	7GN1292P25	7GN1205P25	7GN1206P25	7GN1207P25	7GN1208P25
		20	20		7GN2090P25	7GN2091P25	7GN2010P25	7GN2092P25	7GN2005P25	7GN2006P25	7GN2007P25	7GN2008P25
		25	30		7GN2590P25	7GN2591P25	7GN2510P25	7GN2592P25	7GN2505P25	7GN2506P25	7GN2507P25	7GN2508P25
	90x90	32	40		7GN3290P25	7GN3291P25	7GN3210P25	7GN3292P25	7GN3205P25	7GN3206P25	7GN3207P25	7GN3208P25
	110x110	40	50		7GN4090P25	7GN4091P25	7GN4010P25	7GN4092P25	7GN4005P25	7GN4006P25	7GN4007P25	7GN4008P25
	125x175	63	60		—	—	7GN6310P25	7GN6392P25	—	—	7GN6307P25	7GN6308P25
	198x248	125	130		—	—	7GN12510P25	—	—	—	7GN12507P25	7GN12508P25
GX...	90x90	16	12		GX1690P25	GX1691P25	GX1610P25	GX1692P25	GX1605P25	GX1606P25	GX1607P25	GX1608P25
		20	15		GX2090P25	GX2091P25	GX2010P25	GX2092P25	GX2005P25	GX2006P25	GX2007P25	GX2008P25
	110x110	32	32		GX3290P25	GX3291P25	GX3210P25	GX3292P25	GX3205P25	GX3206P25	GX3207P25	GX3208P25
		40	40		GX4090P25	GX4091P25	GX4010P25	GX4092P25	GX4005P25	GX4006P25	GX4007P25	GX4008P25

❶ Standard version provided with 0-1 front plate. For version with O-I front plate add C (e.g. 7GN12C90P). For version with OFF-ON front plate add D (e.g. 7GN12D90P).
❷ For version with OFF-ON front plate add C (e.g. 7GN12C05P).
❸ Standard enclosure is 90X90mm. 75x75mm enclosure is available by adding B0 at the end of the part number. E.g. 7GN1290P25B0.

Technical characteristics

Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GF20...	20	15	—	1	3	—	—	2	7.5
7GN12...	16	15	0.5	1	3	—	—	1.7	5.5
7GN20...	20	20	0.75	2	3	7.5	10	2.5	7.5
7GN25...	25	30	1.5	3	5	10	15	3.7	11
7GN32...	32	40	2	5	10	15	15	4	15
7GN40...	40	50	2	5	10	20	20	6	18.5
7GN63...	63	60	3	10	15	25	25	7.5	30
7GN125...	125	130	5	15	25	50	40	11	45

Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GX16...	16	12	0.75	1	3	5	5	1.8	6.5
GX20...	20	15	0.75	1.5	3	5	5	2.2	7.5
GX32...	32	32	1.5	3	7.5	15	15	3.5	15
GX40...	40	40	2	5	10	15	15	5.2	18.5
GN200	200	200	15	30	50	100	75	—	47
GN315	315	255	15	30	50	100	75	37	110

CHANGEOVER SWITCHES WITH OR WITHOUT 0

Front mounting with black handle **(U)**

				Type	Changeover switches with 0				Changeover switches without 0			
				WIRING DIAGRAMS	❶51	❶52	❶53	❶75	54	55	56	69
				Poles	1	2	3	4	1	2	3	4
Series	Front plate size	Rated thermal current Ith	UL/CSA general use									
	[mm]	[A]	[A]									
GF...	□30	10	10		GF1051U	GF1052U	GF1053U	GF1075U	GF1054U	GF1055U	GF1056U	GF1069U
	□48	20	15		GF2051U	GF2052U	GF2053U	GF2075U	GF2054U	GF2055U	GF2056U	GF2069U
7GN...	□48	16	15		7GN1251U	7GN1252U	7GN1253U	7GN1275U	7GN1254U	7GN1255U	7GN1256U	7GN1269U
		20	20		7GN2051U	7GN2052U	7GN2053U	7GN2075U	7GN2054U	7GN2055U	7GN2056U	7GN2069U
		25	30		7GN2551U	7GN2552U	7GN2553U	7GN2575U	7GN2554U	7GN2555U	7GN2556U	7GN2569U
	□65	32	40		7GN3251U	7GN3252U	7GN3253U	7GN3275U	7GN3254U	7GN3255U	7GN3256U	7GN3269U
		40	50		7GN4051U	7GN4052U	7GN4053U	7GN4075U	7GN4054U	7GN4055U	7GN4056U	7GN4069U
		63	60		—	7GN6352U	7GN6353U	7GN6375U	—	7GN6355U	7GN6356U	7GN6369U
	□90	125	130		—	7GN12552U	7GN12553U	7GN12575U	—	7GN12555U	7GN12556U	7GN12569U
GX...	□48	16	12		GX1651U	GX1652U	GX1653U	GX1675U	GX1654U	GX1655U	GX1656U	GX1669U
		20	15		GX2051U	GX2052U	GX2053U	GX2075U	GX2054U	GX2055U	GX2056U	GX2069U
	□65	32	32		GX3251U	GX3252U	GX3253U	GX3275U	GX3254U	GX3255U	GX3256U	GX3269U
		40	40		GX4051U	GX4052U	GX4053U	GX4075U	GX4054U	GX4055U	GX4056U	GX4069U
GN...	□132	200	200		—	GN20052U	GN20053U	GN20075U	—	GN20055U	GN20056U	GN20069U
		315	255		—	GN31552U	GN31553U	GN31575U	—	GN31555U	GN31556U	GN31569U

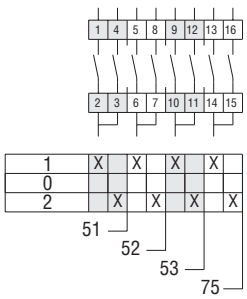
Front mounting with black handle without front plate for hole Ø22mm fixing **(U11)**

				Type	Changeover switches with 0				Changeover switches without 0			
				WIRING DIAGRAMS	51	52	53	75	54	55	56	69
				Poles	1	2	3	4	1	2	3	4
Series	Front plate size	Rated thermal current Ith	UL/CSA general use									
	[mm]	[A]	[A]									
GF	—	20	15		GF2051U11	GF2052U11	GF2053U11	GF2075U11	GF2054U11	GF2055U11	GF2056U11	GF2069U11
7GN...	—	16	15		7GN1251U11	7GN1252U11	7GN1253U11	7GN1275U11	7GN1254U11	7GN1255U11	7GN1256U11	7GN1269U11
		20	20		7GN2051U11	7GN2052U11	7GN2053U11	7GN2075U11	7GN2054U11	7GN2055U11	7GN2056U11	7GN2069U11
		25	30		7GN2551U11	7GN2552U11	7GN2553U11	7GN2575U11	7GN2554U11	7GN2555U11	7GN2556U11	7GN2569U11
GX...	—	16	12		GX1651U11	GX1652U11	GX1653U11	GX1675U11	GX1654U11	GX1655U11	GX1656U11	GX1669U11
		20	15		GX2051U11	GX2052U11	GX2053U11	GX2075U11	GX2054U11	GX2055U11	GX2056U11	GX2069U11

❶ For version with MAN-O-AUTO front plate add D (e.g. GF10D51U).

WIRING DIAGRAMS

51-52-53-75



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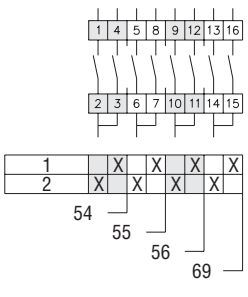


CHANGEOVER SWITCHES WITH OR WITHOUT 0

Front mounting without front plate with key operation for hole Ø22mm fixing **(U12)❶**

Type				Changeover switches with 0				Changeover switches without 0			
WIRING DIAGRAMS				51	52	53	75	54	55	56	69
Poles				1	2	3	4	1	2	3	4
Series	Front plate size	Rated thermal current Ith	UL/CSA general use								
	[mm]	[A]	[A]								
GF	—	20	15	GF2051U12	GF2052U12	GF2053U12	GF2075U12	GF2054U12	GF2055U12	GF2056U12	GF2069U12
7GN...	—	16	15	7GN1251U12	7GN1252U12	7GN1253U12	7GN1275U12	7GN1254U12	7GN1255U12	7GN1256U12	7GN1269U12
		20	20	7GN2051U12	7GN2052U12	7GN2053U12	7GN2075U12	7GN2054U12	7GN2055U12	7GN2056U12	7GN2069U12
		25	30	7GN2551U12	7GN2552U12	7GN2553U12	7GN2575U12	7GN2554U12	7GN2555U12	7GN2556U12	7GN2569U12
GX...	—	16	12	GX1651U12	GX1652U12	GX1653U12	GX1675U12	GX1654U12	GX1655U12	GX1656U12	GX1669U12
		20	15	GX2051U12	GX2052U12	GX2053U12	GX2075U12	GX2054U12	GX2055U12	GX2056U12	GX2069U12

Snap on front mounting with black handle for hole Ø22mm fixing **(U47)❸**

Type				Changeover switches with 0				Changeover switches without 0			
WIRING DIAGRAMS				❷51	❷52	❷53	❷75	54	55	56	69
Poles				1	2	3	4	1	2	3	4
Series	Front plate size	Rated thermal current Ith	UL/CSA general use								
	[mm]	[A]	[A]								
GF	□30	10	10	GF1051U47	GF1052U47	GF1053U47	GF1075U47	GF1054U47	GF1055U47	GF1056U47	GF1069U47
	□48	20	15	GF2051U47	GF2052U47	GF2053U47	GF2075U47	GF2054U47	GF2055U47	GF2056U47	GF2069U47
7GN...	□48	16	15	7GN1251U47	7GN1252U47	7GN1253U47	7GN1275U47	7GN1254U47	7GN1255U47	7GN1256U47	7GN1269U47
		20	20	7GN2051U47	7GN2052U47	7GN2053U47	7GN2075U47	7GN2054U47	7GN2055U47	7GN2056U47	7GN2069U47
		25	30	7GN2551U47	7GN2552U47	7GN2553U47	7GN2575U47	7GN2554U47	7GN2555U47	7GN2556U47	7GN2569U47
GX...	□48	16	12	GX1651U47	GX1652U47	GX1653U47	GX1675U47	GX1654U47	GX1655U47	GX1656U47	GX1669U47
		20	15	GX2051U47	GX2052U47	GX2053U47	GX2075U47	GX2054U47	GX2055U47	GX2056U47	GX2069U47

❶ For version with front plate replace U12 with U29 (e.g. GF2051U29).
❷ For version with MAN-O-AUTO front plate add D (e.g. GF20D51U12).
❸ For key operation version replace U47 with U29D (e.g. GF2051U29D).

Technical characteristics

Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GF10...	10	10	—	0.75	2	—	—	0.75	3
GF20...	20	15	—	1	3	—	—	2	7.5
7GN12...	16	15	0.5	1	3	—	—	1.7	5.5
7GN20...	20	20	0.75	2	3	7.5	10	2.5	7.5
7GN25...	25	30	1.5	3	5	10	15	3.7	11
7GN32...	32	40	2	5	10	15	15	4	15
7GN40...	40	50	2	5	10	20	20	6	18.5
7GN63...	63	60	3	10	15	25	25	7.5	30
7GN125...	125	130	5	15	25	50	40	11	45

Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GX16...	16	12	0.75	1	3	5	5	1.8	6.5
GX20...	20	15	0.75	1.5	3	5	5	2.2	7.5
GX32...	32	32	1.5	3	7.5	15	15	3.5	15
GX40...	40	40	2	5	10	15	15	5.2	18.5
GN200	200	200	15	30	50	100	75	—	47
GN315	315	255	15	30	50	100	75	37	110

CHANGEOVER SWITCHES WITH OR WITHOUT 0

Rear mounting with black handle **(0)**

				Type	Changeover switches with 0				Changeover switches without 0			
				WIRING DIAGRAMS	❶51	❶52	❶53	❶75	54	55	56	69
				Poles	1	2	3	4	1	2	3	4
Series	Front plate size	Rated thermal current Ith	UL/CSA general use									
	[mm]	[A]	[A]									
GF...	☐48	20	15		GF20510	GF20520	GF20530	GF20750	GF20540	GF20550	GF20560	GF20690
7GN...	☐48	16	15		7GN12510	7GN12520	7GN12530	7GN12750	7GN12540	7GN12550	7GN12560	7GN12690
		20	20		7GN20510	7GN20520	7GN20530	7GN20750	7GN20540	7GN20550	7GN20560	7GN20690
		25	30		7GN25510	7GN25520	7GN25530	7GN25750	7GN25540	7GN25550	7GN25560	7GN25690
	☐65	32	40		7GN32510	7GN32520	7GN32530	7GN32750	7GN32540	7GN32550	7GN32560	7GN32690
		40	50		7GN40510	7GN40520	7GN40530	7GN40750	7GN40540	7GN40550	7GN40560	7GN40690
		63	60		—	7GN63520	7GN63530	7GN63750	—	7GN63550	7GN63560	7GN63690
	☐90	125	130		—	7GN125520	7GN125530	7GN125750	—	7GN125550	7GN125560	7GN125690
GX...	☐48	16	12		GX16510	GX16520	GX16530	GX16750	GX16540	GX16550	GX16560	GX16690
		20	15		GX20510	GX20520	GX20530	GX20750	GX20540	GX20550	GX20560	GX20690
	☐65	32	32		GX32510	GX32520	GX32530	GX32750	GX32540	GX32550	GX32560	GX32690
		40	40		GX40510	GX40520	GX40530	GX40750	GX40540	GX40550	GX40560	GX40690
GN...	☐132	200	200		—	GN200520	GN200530	GN200750	—	GN200550	GN200560	GN200690
		315	255		—	GN315520	GN315530	GN315750	—	GN315550	GN315560	GN315690

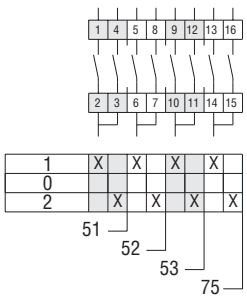
Modular service cover for 35mm DIN rail mounting with black handle **(048)❷**

				Type	Changeover switches with 0				Changeover switches without 0			
				WIRING DIAGRAMS	❶51	❶52	❶53	❶75	54	55	56	69
				Poles	1	2	3	4	1	2	3	4
Series	Front plate size	Rated thermal current Ith	UL/CSA general use									
	[mm]	[A]	[A]									
GF	45x54	20	15		GF2051048	GF2052048	GF2053048	GF2075048	GF2054048	GF2055048	GF2056048	GF2069048
7GN...	45x54	16	15		7GN1251048	7GN1252048	7GN1253048	7GN1275048	7GN1254048	7GN1255048	7GN1256048	7GN1269048
		20	20		7GN2051048	7GN2052048	7GN2053048	7GN2075048	7GN2054048	7GN2055048	7GN2056048	7GN2069048
		25	30		7GN2551048	7GN2552048	7GN2553048	7GN2575048	7GN2554048	7GN2555048	7GN2556048	7GN2569048
GX...	45x54	16	12		GX1651048	GX1652048	GX1653048	GX1675048	GX1654048	GX1655048	GX1656048	GX1669048
		20	15		GX2051048	GX2052048	GX2053048	GX2075048	GX2054048	GX2055048	GX2056048	GX2069048

❶ For version with MAN-O-AUTO front plate add D (e.g. GF20D510).
❷ For key operation version replace 048 with 049 (e.g. GF2051049).

WIRING DIAGRAMS

51-52-53-75



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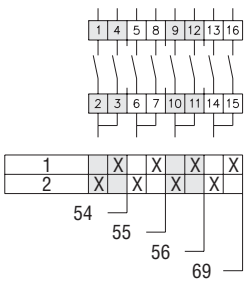


CHANGEOVER SWITCHES WITH OR WITHOUT 0

Cam switch in plastic enclosure with black handle **(P)**
Cam switch in metallic enclosure with black handle **(L)**

				Type	Changeover switches with 0				Changeover switches without 0			
				WIRING DIAGRAMS	❶51	❶52	❶53	❶75	54	55	56	69
				Poles	1	2	3	4	1	2	3	4
Series	Enclosure size	Rated thermal current Ith	UL/CSA general use									
	[mm]	[A]	[A]									
7GN...	75x75	16	15		7GN1251P	7GN1252P	7GN1253P	7GN1275P	7GN1254P	7GN1255P	7GN1256P	7GN1269P
		20	20		7GN2051P	7GN2052P	7GN2053P	7GN2075P	7GN2054P	7GN2055P	7GN2056P	7GN2069P
		25	30		7GN2551P	7GN2552P	7GN2553P	7GN2575P❷	7GN2554P	7GN2555P	7GN2556P	7GN2569P❷
	90x90	32	40		7GN3251P	7GN3252P	7GN3253P	7GN3275P	7GN3254P	7GN3255P	7GN3256P	7GN3269P
	110x110	40	50		7GN4051P	7GN4052P	7GN4053P	7GN4075P	7GN4054P	7GN4055P	7GN4056P	7GN4069P
	125x175	63	60		—	7GN6352P	7GN6353P	7GN6375P	—	7GN6355P	7GN6356P	7GN6369P
	198x248	125	130		—	7GN12552P	7GN12553P	7GN12575P	—	7GN12555P	7GN12556P	7GN12569P
GX...	90x90	16	12		GX1651P	GX1652P	GX1653P	GX1675P	GX1654P	GX1655P	GX1656P	GX1669P
		20	15		GX2051P	GX2052P	GX2053P	GX2075P	GX2054P	GX2055P	GX2056P	GX2069P
	110x110	32	32		GX3251P	GX3252P	GX3253P	GX3275P	GX3254P	GX3255P	GX3256P	GX3269P
		40	40		GX4051P	GX4052P	GX4053P	GX4075P	GX4054P	GX4055P	GX4056P	GX4069P
GN...	250x316	200	200		—	GN20052L	GN20053L	GN20075L	—	GN20055L	GN20056L	GN20069L
		315	255		—	GN31552L	GN31553L	GN31575L	—	GN31555L	GN31556L	GN31569L

❶ For version with MAN-O-AUTO front plate add D (e.g. 7GN12D51P).
❷ Enclosure size 90x90mm.

12

Technical characteristics

Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GF20...	20	15	—	1	3	—	—	2	7.5
7GN12...	16	15	0.5	1	3	—	—	1.7	5.5
7GN20...	20	20	0.75	2	3	7.5	10	2.5	7.5
7GN25...	25	30	1.5	3	5	10	15	3.7	11
7GN32...	32	40	2	5	10	15	15	4	15
7GN40...	40	50	2	5	10	20	20	6	18.5
7GN63...	63	60	3	10	15	25	25	7.5	30
7GN125...	125	130	5	15	25	50	40	11	45

Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GX16...	16	12	0.75	1	3	5	5	1.8	6.5
GX20...	20	15	0.75	1.5	3	5	5	2.2	7.5
GX32...	32	32	1.5	3	7.5	15	15	3.5	15
GX40...	40	40	2	5	10	15	15	5.2	18.5
GN200	200	200	15	30	50	100	75	—	47
GN315	315	255	15	30	50	100	75	37	110

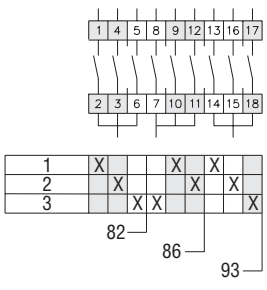
STARTING WITH 1

Front mounting with black handle **(U)**

	WIRING DIAGRAMS			82	86	93	83	87	94	84	85
			Poles	1	2	3	1	2	3	1	1
Series	Front plate size	Rated thermal current Ith	UL/CSA general use								
	[mm]	[A]	[A]								
GF...	□30	10	10	GF1082U	GF1086U	GF1093U	GF1083U	GF1087U	GF1094U	GF1084U	GF1085U
	□48	20	15	GF2082U	GF2086U	GF2093U	GF2083U	GF2087U	GF2094U	GF2084U	GF2085U
7GN...	□48	16	15	7GN1282U	7GN1286U	7GN1293U	7GN1283U	7GN1287U	7GN1294U	7GN1284U	7GN1285U
		20	20	7GN2082U	7GN2086U	7GN2093U	7GN2083U	7GN2087U	7GN2094U	7GN2084U	7GN2085U
		25	30	7GN2582U	7GN2586U	7GN2593U	7GN2583U	7GN2587U	7GN2594U	7GN2584U	7GN2585U
	□65	32	40	7GN3282U	7GN3286U	7GN3293U	7GN3283U	7GN3287U	7GN3294U	7GN3284U	7GN3285U
		40	50	7GN4082U	7GN4086U	7GN4093U	7GN4083U	7GN4087U	7GN4094U	7GN4084U	7GN4085U
		63	60	7GN6382U	7GN6386U	7GN6393U	7GN6383U	7GN6387U	7GN6394U	7GN6384U	7GN6385U
	□90	125	130	7GN12582U	7GN12586U	7GN12593U	7GN12583U	7GN12587U	7GN12594U	7GN12584U	7GN12585U
GX...	□48	16	12	GX1682U	GX1686U	GX1693U	GX1683U	GX1687U	GX1694U	GX1684U	GX1685U
		20	15	GX2082U	GX2086U	GX2093U	GX2083U	GX2087U	GX2094U	GX2084U	GX2085U
	□65	32	32	GX3282U	GX3286U	GX3293U	GX3283U	GX3287U	GX3294U	GX3284U	GX3285U
		40	40	GX4082U	GX4086U	GX4093U	GX4083U	GX4087U	GX4094U	GX4084U	GX4085U
GN...	□132	200	200	GN20082U	GN20086U	GN20093U	GN20083U	GN20087U	GN20094U	GN20084U	GN20085U
		315	255	GN31582U	GN31586U	GN31593U	GN31583U	GN31587U	GN31594U	GN31584U	GN31585U

WIRING DIAGRAMS

82-86-93



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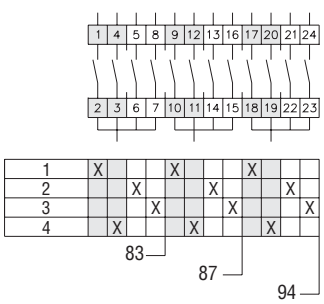

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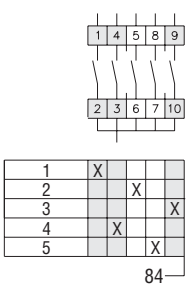

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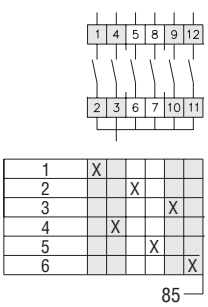

STARTING WITH 1

Snap on front mounting with black handle for hole Ø22mm fixing **(U47)❶**

				WIRING DIAGRAMS	82	86	93	83	87	94	84	85
				Poles	1	2	3	1	2	3	1	1
Series	Front plate size	Rated thermal current Ith	UL/CSA general use									
	[mm]	[A]	[A]									
GF...	□30	10	10		**GF1082U47**	**GF1086U47**	**GF1093U47**	**GF1083U47**	**GF1087U47**	**GF1094U47**	**GF1084U47**	**GF1085U47**
	□48	20	15		**GF2082U47**	**GF2086U47**	**GF2093U47**	**GF2083U47**	**GF2087U47**	**GF2094U47**	**GF2084U47**	**GF2085U47**
7GN...	□48	16	15		**7GN1282U47**	**7GN1286U47**	**7GN1293U47**	**7GN1283U47**	**7GN1287U47**	**7GN1294U47**	**7GN1284U47**	**7GN1285U47**
		20	20		**7GN2082U47**	**7GN2086U47**	**7GN2093U47**	**7GN2083U47**	**7GN2087U47**	**7GN2094U47**	**7GN2084U47**	**7GN2085U47**
		25	30		**7GN2582U47**	**7GN2586U47**	**7GN2593U47**	**7GN2583U47**	**7GN2587U47**	**7GN2594U47**	**7GN2584U47**	**7GN2585U47**
GX...	□48	16	12		**GX1682U47**	**GX1686U47**	**GX1693U47**	**GX1683U47**	**GX1687U47**	**GX1694U47**	**GX1684U47**	**GX1685U47**
		20	15		**GX2082U47**	**GX2086U47**	**GX2093U47**	**GX2083U47**	**GX2087U47**	**GX2094U47**	**GX2084U47**	**GX2085U47**

❶ For key operation version replace U47 with U29D (e.g. GF2082U29D).

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Technical characteristics

Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GF10...	10	10	—	0.75	2	—	—	0.75	3
GF20...	20	15	—	1	3	—	—	2	7.5
7GN12...	16	15	0.5	1	3	—	—	1.7	5.5
7GN20...	20	20	0.75	2	3	7.5	10	2.5	7.5
7GN25...	25	30	1.5	3	5	10	15	3.7	11
7GN32...	32	40	2	5	10	15	15	4	15
7GN40...	40	50	2	5	10	20	20	6	18.5
7GN63...	63	60	3	10	15	25	25	7.5	30
7GN125...	125	130	5	15	25	50	40	11	45

Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GX16...	16	12	0.75	1	3	5	5	1.8	6.5
GX20...	20	15	0.75	1.5	3	5	5	2.2	7.5
GX32...	32	32	1.5	3	7.5	15	15	3.5	15
GX40...	40	40	2	5	10	15	15	5.2	18.5
GN200	200	200	15	30	50	100	75	—	47
GN315	315	255	15	30	50	100	75	37	110

STARTING WITH 1

Rear mounting with black handle **(0)**

	WIRING DIAGRAMS	82	86	93	83	87	94	84	85
	Poles	1	2	3	1	2	3	1	1
Series	Front plate size	Rated thermal current Ith	UL/CSA general use								
	[mm]	[A]	[A]								
GF...	□48	20	15	GF20820	GF20860	GF20930	GF20830	GF20870	GF20940	GF20840	GF20850
7GN...	□48	16	15	7GN12820	7GN12860	7GN12930	7GN12830	7GN12870	7GN12940	7GN12840	7GN12850
		20	20	7GN20820	7GN20860	7GN20930	7GN20830	7GN20870	7GN20940	7GN20840	7GN20850
		25	30	7GN25820	7GN25860	7GN25930	7GN25830	7GN25870	7GN25940	7GN25840	7GN25850
	□65	32	40	7GN32820	7GN32860	7GN32930	7GN32830	7GN32870	7GN32940	7GN32840	7GN32850
		40	50	7GN40820	7GN40860	7GN40930	7GN40830	7GN40870	7GN40940	7GN40840	7GN40850
		63	60	7GN63820	7GN63860	7GN63930	7GN63830	7GN63870	7GN63940	7GN63840	7GN63850
	□90	125	130	7GN125820	7GN125860	7GN125930	7GN125830	7GN125870	7GN125940	7GN125840	7GN125850
GX...	□48	16	12	GX16820	GX16860	GX16930	GX16830	GX16870	GX16940	GX16840	GX16850
		20	15	GX20820	GX20860	GX20930	GX20830	GX20870	GX20940	GX20840	GX20850
	□65	32	32	GX32820	GX32860	GX32930	GX32830	GX32870	GX32940	GX32840	GX32850
		40	40	GX40820	GX40860	GX40930	GX40830	GX40870	GX40940	GX40840	GX40850
GN...	□132	200	200	GN200820	GN200860	GN200930	GN200830	GN200870	GN200940	GN200840	GN200850
		315	255	GN315820	GN315860	GN315930	GN315830	GN315870	GN315940	GN315840	GN315850

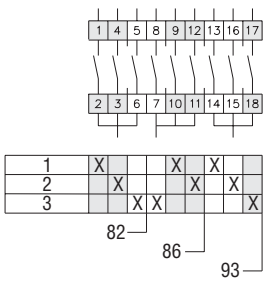
Modular service cover for 35mm DIN rail mounting with black handle **(048)**❶

	WIRING DIAGRAMS	82	86	93	83	87	94	84	85
	Poles	1	2	3	1	2	3	1	1
Series	Enclosure size	Rated thermal current Ith	UL/CSA general use								
	[mm]	[A]	[A]								
GF...	45x54	20	15	GF2082048	GF2086048	GF2093048	GF2083048	GF2087048	GF2094048	GF2084048	GF2085048
7GN...	45x54	16	15	7GN1282048	7GN1286048	7GN1293048	7GN1283048	7GN1287048	7GN1294048	7GN1284048	7GN1285048
		20	20	7GN2082048	7GN2086048	7GN2093048	7GN2083048	7GN2087048	7GN2094048	7GN2084048	7GN2085048
		25	30	7GN2582048	7GN2586048	7GN2593048	7GN2583048	7GN2587048	7GN2594048	7GN2584048	7GN2585048
GX...	45x54	16	12	GX1682048	GX1686048	GX1693048	GX1683048	GX1687048	GX1694048	GX1684048	GX1685048
		20	15	GX2082048	GX2086048	GX2093048	GX2083048	GX2087048	GX2094048	GX2084048	GX2085048

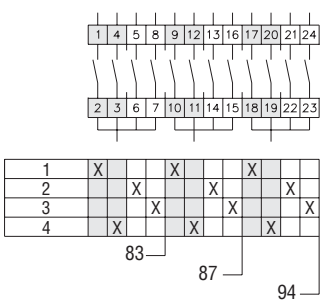
❶ For key operation version replace 048 with 049 (e.g. GF2082049).

WIRING DIAGRAMS

82-86-93



83-87-94



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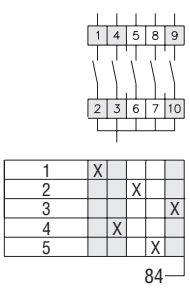

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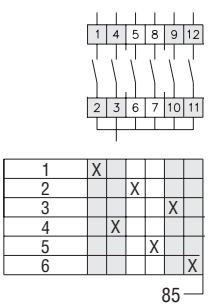

STARTING WITH 1

Cam switch in plastic enclosure with black handle **(P)**
Cam switch in metallic enclosure with black handle **(L)**

			WIRING DIAGRAMS	82	86	93	83	87	94	84	85
			Poles	1	2	3	1	2	3	1	1
Series	Enclosure size	Rated thermal current Ith	UL/CSA general use								
	[mm]	[A]	[A]								
7GN...	75x75	16	15	7GN1282P	7GN1286P	7GN1293P❶	7GN1283P	7GN1287P	7GN1294P❶	7GN1284P	7GN1285P
		20	20	7GN2082P	7GN2086P	7GN2093P❶	7GN2083P	7GN2087P	7GN2094P❶	7GN2084P	7GN2085P
		25	30	7GN2582P	7GN2586P	7GN2593P❷	7GN2583P	7GN2587P❶	—	7GN2584P	7GN2585P❶
	90x90	32	40	7GN3282P	7GN3286P	7GN3293P	7GN3283P	7GN3287P	7GN3294P❶	7GN3284P	7GN3285P
	110x110	40	50	7GN4082P	7GN4086P	7GN4093P	7GN4083P	7GN4087P	7GN4094P❸	7GN4084P	7GN4085P
	125x175	63	60	7GN6382P	7GN6386P	7GN6393P❸	7GN6383P	7GN6387P	7GN6394P❸	7GN6384P	7GN6385P❸
	198x248	125	130	7GN12582P	7GN12586P	—	7GN12583P	7GN12587P	—	7GN12584P	—
GX...	90x90	16	12	GX1682P	GX1686P	GX1693P	GX1683P	GX1687P	GX1694P❷	GX1684P	GX1685P
		20	15	GX2082P	GX2086P	GX2093P	GX2083P	GX2087P	GX2094P❷	GX2084P	GX2085P
	110x110	32	32	GX3282P	GX3286P	—	GX3283P	GX3287P	—	GX3284P	—
		40	40	GX4082P	GX4086P	—	GX4083P	GX4087P	—	GX4084P	—
GN...	250x316	200	200	GN20082L	GN20086L	GN20093L	GN20083L	GN20087L	GN20094L	GN20084L	GN20085L
		315	255	GN31582L	GN31586L	GN31593L	GN31583L	GN31587L	GN31594L	GN31584L	GN31585L

❶ Enclosure size 90x90mm.
❷ Enclosure size 110x110mm.
❸ Enclosure size 198x248mm.

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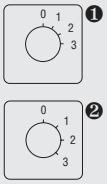
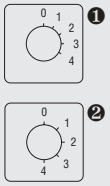
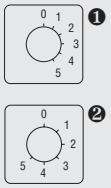
Technical characteristics

Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
7GN12...	16	15	0.5	1	3	—	—	1.7	5.5
7GN20...	20	20	0.75	2	3	7.5	10	2.5	7.5
7GN25...	25	30	1.5	3	5	10	15	3.7	11
7GN32...	32	40	2	5	10	15	15	4	15
7GN40...	40	50	2	5	10	20	20	6	18.5
7GN63...	63	60	3	10	15	25	25	7.5	30
7GN125...	125	130	5	15	25	50	40	11	45

Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GX16...	16	12	0.75	1	3	5	5	1.8	6.5
GX20...	20	15	0.75	1.5	3	5	5	2.2	7.5
GX32...	32	32	1.5	3	7.5	15	15	3.5	15
GX40...	40	40	2	5	10	15	15	5.2	18.5
GN200	200	200	15	30	50	100	75	—	47
GN315	315	255	15	30	50	100	75	37	110

STARTING WITH 0

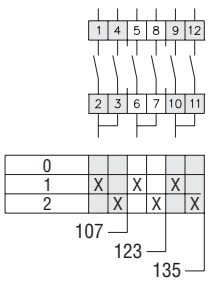
Front mounting with black handle **(U)**

WIRING DIAGRAMS				107	123	135	108	124	136	109	110
Poles				1	2	3	1	2	3	1	1
Series	Front plate size	Rated thermal current Ith	UL/CSA general use								
	[mm]	[A]	[A]								
GF...	□30	10	10	GF10107U	GF10123U	GF10135U	GF10108U	GF10124U	GF10136U	GF10109U	GF10110U
	□48	20	15	GF20107U	GF20123U	GF20135U	GF20108U	GF20124U	GF20136U	GF20109U	GF20110U
7GN...	□48	16	15	7GN12107U	7GN12123U	7GN12135U	7GN12108U	7GN12124U	7GN12136U	7GN12109U	7GN12110U
		20	20	7GN20107U	7GN20123U	7GN20135U	7GN20108U	7GN20124U	7GN20136U	7GN20109U	7GN20110U
		25	30	7GN25107U	7GN25123U	7GN25135U	7GN25108U	7GN25124U	7GN25136U	7GN25109U	7GN25110U
	□65	32	40	7GN32107U	7GN32123U	7GN32135U	7GN32108U	7GN32124U	7GN32136U	7GN32109U	7GN32110U
		40	50	7GN40107U	7GN40123U	7GN40135U	7GN40108U	7GN40124U	7GN40136U	7GN40109U	7GN40110U
		63	60	7GN63107U	7GN63123U	7GN63135U	7GN63108U	7GN63124U	7GN63136U	7GN63109U	7GN63110U
	□90	125	130	7GN125107U	7GN125123U	7GN125135U	7GN125108U	7GN125124U	7GN125136U	7GN125109U	7GN125110U
GX...	□48	16	12	GX16107U	GX16123U	GX16135U	GX16108U	GX16124U	GX16136U	GX16109U	GX16110U
		20	15	GX20107U	GX20123U	GX20135U	GX20108U	GX20124U	GX20136U	GX20109U	GX20110U
	□65	32	32	GX32107U	GX32123U	GX32135U	GX32108U	GX32124U	GX32136U	GX32109U	GX32110U
		40	40	GX40107U	GX40123U	GX40135U	GX40108U	GX40124U	GX40136U	GX40109U	GX40110U
GN...	□132	200	200	GN200107U	GN200123U	GN200135U	GN200108U	GN200124U	GN200136U	GN200109U	GN200110U
		315	255	GN315107U	GN315123U	GN315135U	GN315108U	GN315124U	GN315136U	GN315109U	GN315110U

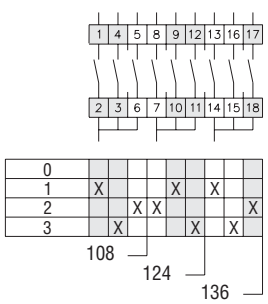
❶ Front plate for GF... , 7GN12... to 7GN63.... , GX... , GN...
❷ Front plate for 7GN125...

WIRING DIAGRAMS

107-123-135



108-124-136



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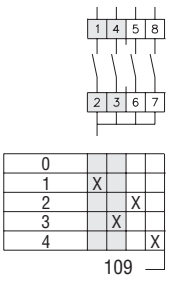

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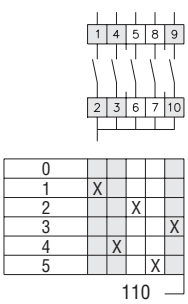

STARTING WITH 0

Snap on front mounting with black handle for hole Ø22mm fixing **(U47)❶**

				WIRING DIAGRAMS	107	123	135	108	124	136	109	110
				Poles	1	2	3	1	2	3	1	1
Series	Front plate size	Rated thermal current Ith	UL/CSA general use									
	[mm]	[A]	[A]									
GF...	□30	10	10		**GF10107U47**	**GF10123U47**	**GF10135U47**	**GF10108U47**	**GF10124U47**	**GF10136U47**	**GF10109U47**	**GF10110U47**
	□48	20	15		**GF20107U47**	**GF20123U47**	**GF20135U47**	**GF20108U47**	**GF20124U47**	**GF20136U47**	**GF20109U47**	**GF20110U47**
7GN...	□48	16	15		**7GN12107U47**	**7GN12123U47**	**7GN12135U47**	**7GN12108U47**	**7GN12124U47**	**7GN12136U47**	**7GN12109U47**	**7GN12110U47**
		20	20		**7GN20107U47**	**7GN20123U47**	**7GN20135U47**	**7GN20108U47**	**7GN20124U47**	**7GN20136U47**	**7GN20109U47**	**7GN20110U47**
		25	30		**7GN25107U47**	**7GN25123U47**	**7GN25135U47**	**7GN25108U47**	**7GN25124U47**	**7GN25136U47**	**7GN25109U47**	**7GN25110U47**
GX...	□48	16	12		**GX16107U47**	**GX16123U47**	**GX16135U47**	**GX16108U47**	**GX16124U47**	**GX16136U47**	**GX16109U47**	**GX16110U47**
		20	15		**GX20107U47**	**GX20123U47**	**GX20135U47**	**GX20108U47**	**GX20124U47**	**GX20136U47**	**GX20109U47**	**GX20110U47**

❶ For key operation version replace U47 with U29D (e.g. GF20107U29D).

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Technical characteristics

Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GF10...	10	10	—	0.75	2	—	—	0.75	3
GF20...	20	15	—	1	3	—	—	2	7.5
7GN12...	16	15	0.5	1	3	—	—	1.7	5.5
7GN20...	20	20	0.75	2	3	7.5	10	2.5	7.5
7GN25...	25	30	1.5	3	5	10	15	3.7	11
7GN32...	32	40	2	5	10	15	15	4	15
7GN40...	40	50	2	5	10	20	20	6	18.5
7GN63...	63	60	3	10	15	25	25	7.5	30
7GN125...	125	130	5	15	25	50	40	11	45

Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GX16...	16	12	0.75	1	3	5	5	1.8	6.5
GX20...	20	15	0.75	1.5	3	5	5	2.2	7.5
GX32...	32	32	1.5	3	7.5	15	15	3.5	15
GX40...	40	40	2	5	10	15	15	5.2	18.5
GN200	200	200	15	30	50	100	75	—	47
GN315	315	255	15	30	50	100	75	37	110

STARTING WITH 0

Rear mounting with black handle **(0)**

WIRING DIAGRAMS				107	123	135	108	124	136	109	110
Poles				1	2	3	1	2	3	1	1
Series	Front plate size	Rated thermal current Ith	UL/CSA general use								
	[mm]	[A]	[A]								
GF...	☐48	20	15	GF201070	GF201230	GF201350	GF201080	GF201240	GF201360	GF201090	GF201100
7GN...	☐48	16	15	7GN121070	7GN121230	7GN121350	7GN121080	7GN121240	7GN121360	7GN121090	7GN121100
		20	20	7GN201070	7GN201230	7GN201350	7GN201080	7GN201240	7GN201360	7GN201090	7GN201100
		25	30	7GN251070	7GN251230	7GN251350	7GN251080	7GN251240	7GN251360	7GN251090	7GN251100
	☐65	32	40	7GN321070	7GN321230	7GN321350	7GN321080	7GN321240	7GN321360	7GN321090	7GN321100
		40	50	7GN401070	7GN401230	7GN401350	7GN401080	7GN401240	7GN401360	7GN401090	7GN401100
		63	60	7GN631070	7GN631230	7GN631350	7GN631080	7GN631240	7GN631360	7GN631090	7GN631100
	☐90	125	130	7GN1251070	7GN1251230	7GN1251350	7GN1251080	7GN1251240	7GN1251360	7GN1251090	7GN1251100
GX...	☐48	16	12	GX161070	GX161230	GX161350	GX161080	GX161240	GX161360	GX161090	GX161100
		20	15	GX201070	GX201230	GX201350	GX201080	GX201240	GX201360	GX201090	GX201100
	☐65	32	32	GX321070	GX321230	GX321350	GX321080	GX321240	GX321360	GX321090	GX321100
		40	40	GX401070	GX401230	GX401350	GX401080	GX401240	GX401360	GX401090	GX401100
GN...	☐132	200	200	GN2001070	GN2001230	GN2001350	GN2001080	GN2001240	GN2001360	GN2001090	GN2001100
		315	255	GN3151070	GN3151230	GN3151350	GN3151080	GN3151240	GN3151360	GN3151090	GN3151100

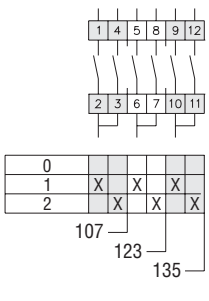
Modular service cover for 35mm DIN rail mounting with black handle **(048)❸**

WIRING DIAGRAMS				107	123	135	108	124	136	109	110
Poles				1	2	3	1	2	3	1	1
Series	Front plate size	Rated thermal current Ith	UL/CSA general use								
	[mm]	[A]	[A]								
GF...	45x54	20	15	GF20107048	GF20123048	GF20135048	GF20108048	GF20124048	GF20136048	GF20109048	GF20110048
7GN...	45x54	16	15	7GN12107048	7GN12123048	7GN12135048	7GN12108048	7GN12124048	7GN12136048	7GN12109048	7GN12110048
		20	20	7GN20107048	7GN20123048	7GN20135048	7GN20108048	7GN20124048	7GN20136048	7GN20109048	7GN20110048
		25	30	7GN25107048	7GN25123048	7GN25135048	7GN25108048	7GN25124048	7GN25136048	7GN25109048	7GN25110048
GX...	45x54	16	12	GX16107048	GX16123048	GX16135048	GX16108048	GX16124048	GX16136048	GX16109048	GX16110048
		20	15	GX20107048	GX20123048	GX20135048	GX20108048	GX20124048	GX20136048	GX20109048	GX20110048

❶ Front plate for GF... , 7GN12... to 7GN63... , GX... , GN...
❷ Front plate for 7GN125...
❸ For key operation version replace 048 with 049 (e.g. GF20107049).

WIRING DIAGRAMS

107-123-135



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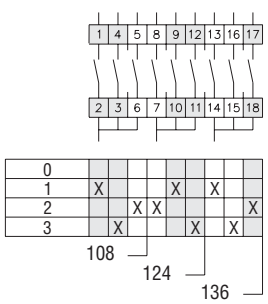

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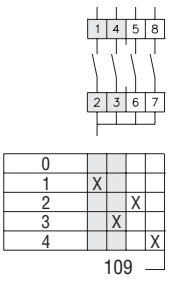

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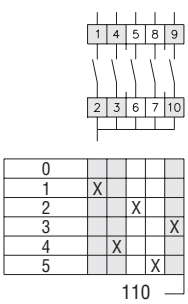

STARTING WITH 0

Cam switch in plastic enclosure with black handle **(P)**
Cam switch in metallic enclosure with black handle **(L)**

				WIRING DIAGRAMS	107	123	135	108	124	136	109	110
				Poles	1	2	3	1	2	3	1	1
Series	Enclosure size	Rated thermal current Ith	UL/CSA general use									
	[mm]	[A]	[A]									
7GN...	75x75	16	15		7GN12107P	7GN12123P	7GN12135P	7GN12108P	7GN12124P	7GN12136P❸	7GN12109P	7GN12110P
		20	20		7GN20107P	7GN20123P	7GN20135P	7GN20108P	7GN20124P	7GN20136P❸	7GN20109P	7GN20110P
		25	30		7GN25107P	7GN25123P	7GN25135P	7GN25108P	7GN25124P	7GN25136P❹	7GN25109P	7GN25110P
	90x90	32	40		7GN32107P	7GN32123P	7GN32135P	7GN32108P	7GN32124P	7GN32136P	7GN32109P	7GN32110P
	110x110	40	50		7GN40107P	7GN40123P	7GN40135P	7GN40108P	7GN40124P	7GN40136P	7GN40109P	7GN40110P
	125x175	63	60		7GN63107P	7GN63123P	7GN63135P	7GN63108P	7GN63124P	7GN63136P❺	7GN63109P	7GN63110P
	198x248	125	130		7GN125107P	7GN125123P	7GN125135P	7GN125108P	7GN125124P	—	7GN125109P	7GN125110P
GX...	90x90	16	12		GX16107P	GX16123P	GX16135P	GX16108P	GX16124P	GX16136P	GX16109P	GX16110P
		20	15		GX20107P	GX20123P	GX20135P	GX20108P	GX20124P	GX20136P	GX20109P	GX20110P
	110x110	32	32		GX32107P	GX32123P	GX32135P	GX32108P	GX32124P	—	GX32109P	GX32110P
		40	40		GX40107P	GX40123P	GX40135P	GX40108P	GX40124P	—	GX40109P	GX40110P
GN...	250x316	200	200		GN200107L	GN200123L	GN200135L	GN200108L	GN200124L	GN200136L	GN200109L	GN200110L
		315	255		GN315107L	GN315123L	GN315135L	GN315108L	GN315124L	GN315136L	GN315109L	GN315110L

❶ Front plate for GF... , 7GN12... to 7GN63.... GX... , GN...
❷ Front plate for 7GN125...
❸ Enclosure size 90x90mm.
❹ Enclosure size 110x110mm.
❺ Enclosure size 198x248mm.

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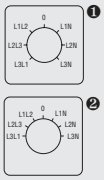
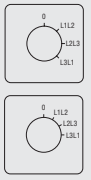
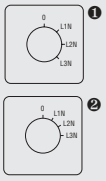
Technical characteristics

Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GF20...	20	15	—	1	3	—	—	2	7.5
7GN12...	16	15	0.5	1	3	—	—	1.7	5.5
7GN20...	20	20	0.75	2	3	7.5	10	2.5	7.5
7GN25...	25	30	1.5	3	5	10	15	3.7	11
7GN32...	32	40	2	5	10	15	15	4	15
7GN40...	40	50	2	5	10	20	20	6	18.5
7GN63...	63	60	3	10	15	25	25	7.5	30
7GN125...	125	130	5	15	25	50	40	11	45

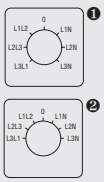
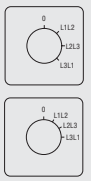
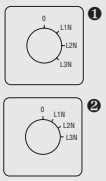
Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GX16...	16	12	0.75	1	3	5	5	1.8	6.5
GX20...	20	15	0.75	1.5	3	5	5	2.2	7.5
GX32...	32	32	1.5	3	7.5	15	15	3.5	15
GX40...	40	40	2	5	10	15	15	5.2	18.5
GN200	200	200	15	30	50	100	75	—	47
GN315	315	255	15	30	50	100	75	37	110

VOLTMETER AND AMMETER SWITCHES

Front mounting with black handle **(U)**

Type				Voltmeter switches			Ammeter switches	
WIRING DIAGRAMS				66	67	68	97	98
Series	Front plate size	Rated thermal current Ith	UL/CSA general use					
	[mm]	[A]	[A]					
GF...	□30	10	10	GF1066U	GF1067U	GF1068U	GF1097U	GF1098U
	□48	20	15	GF2066U	GF2067U	GF2068U	GF2097U	GF2098U
7GN...	□48	16	15	7GN1266U	7GN1267U	7GN1268U	7GN1297U	7GN1298U
		20	20	7GN2066U	7GN2067U	7GN2068U	7GN2097U	7GN2098U
		25	30	7GN2566U	7GN2567U	7GN2568U	7GN2597U	7GN2598U
	□65	32	40	7GN3266U	7GN3267U	7GN3268U	7GN3297U	7GN3298U
		40	50	7GN4066U	7GN4067U	7GN4068U	7GN4097U	7GN4098U
GX...	□48	16	12	GX1666U	GX1667U	GX1668U	GX1697U	GX1698U
		20	15	GX2066U	GX2067U	GX2068U	GX2097U	GX2098U
	□65	32	32	GX3266U	GX3267U	GX3268U	GX3297U	GX3298U
		40	40	GX4066U	GX4067U	GX4068U	GX4097U	GX4098U

Snap on front mounting with black handle for hole Ø22mm fixing **(U47)❸**

Type				Voltmeter switches			Ammeter switches	
WIRING DIAGRAMS				66	67	68	97	98
Series	Front plate size	Rated thermal current Ith	UL/CSA general use					
	[mm]	[A]	[A]					
GF...	□30	10	10	GF1066U47	GF1067U47	GF1068U47	GF1097U47	GF1098U47
	□48	20	15	GF2066U47	GF2067U47	GF2068U47	GF2097U47	GF2098U47
7GN...	□48	16	15	7GN1266U47	7GN1267U47	7GN1268U47	7GN1297U47	7GN1298U47
		20	20	7GN2066U47	7GN2067U47	7GN2068U47	7GN2097U47	7GN2098U47
		25	30	7GN2566U47	7GN2567U47	7GN2568U47	7GN2597U47	7GN2598U47
GX...	□48	16	12	GX1666U47	GX1667U47	GX1668U47	GX1697U47	GX1698U47
		20	15	GX2066U47	GX2067U47	GX2068U47	GX2097U47	GX2098U47

❶ Front plate for GF20... , 7GN... , GX... , GN...
❷ Front plate for GF10... .
❸ For key operation version replace U47 with U29D (e.g. GF2066U29D).

WIRING DIAGRAMS

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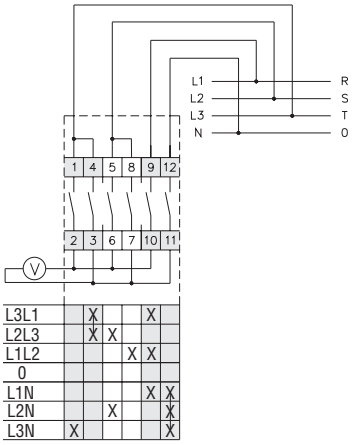

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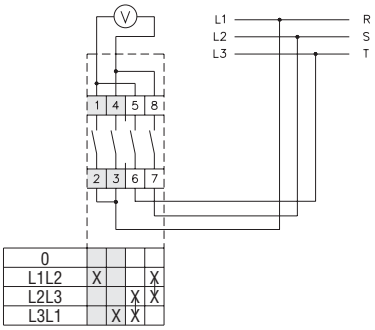

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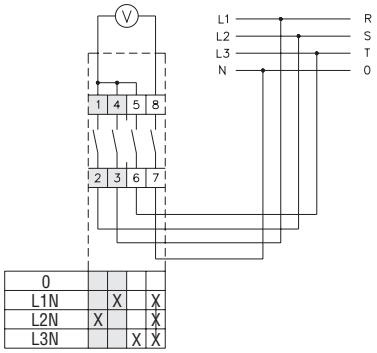

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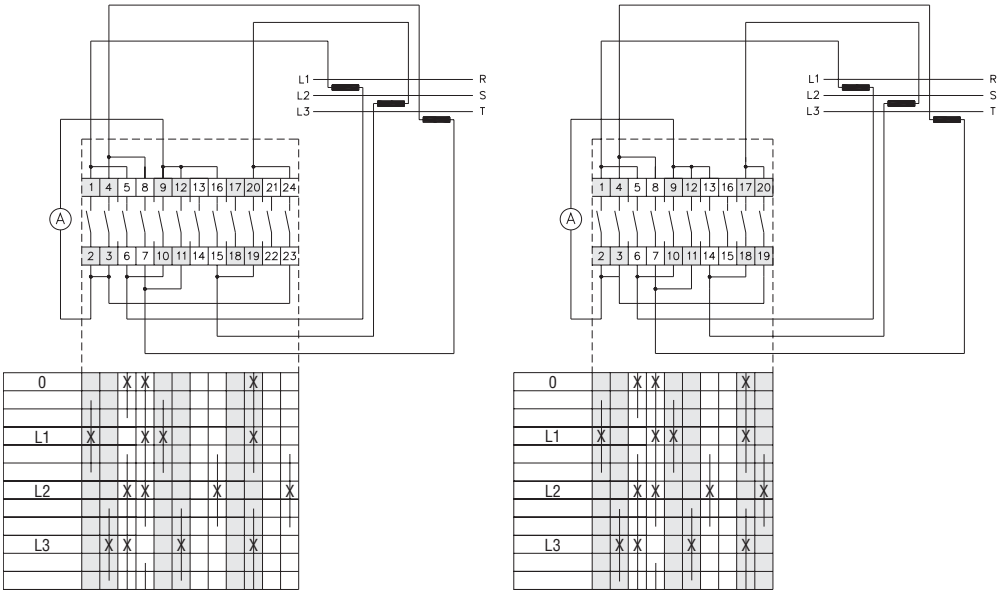

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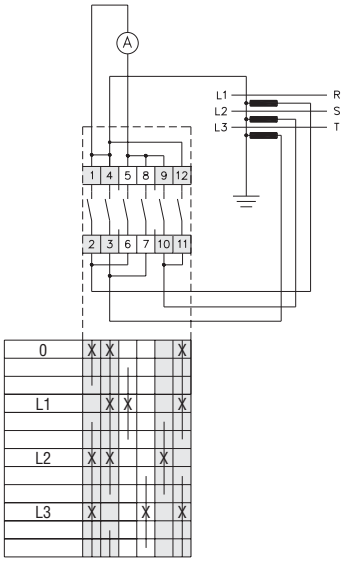


Technical characteristics

Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GF10…	10	10	—	0.75	2	—	—	0.75	3
GF20…	20	15	—	1	3	—	—	2	7.5
7GN12…	16	15	0.5	1	3	—	—	1.7	5.5
7GN20…	20	20	0.75	2	3	7.5	10	2.5	7.5
7GN25…	25	30	1.5	3	5	10	15	3.7	11
7GN32…	32	40	2	5	10	15	15	4	15
7GN40…	40	50	2	5	10	20	20	6	18.5

Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GX16…	16	12	0.75	1	3	5	5	1.8	6.5
GX20…	20	15	0.75	1.5	3	5	5	2.2	7.5
GX32…	32	32	1.5	3	7.5	15	15	3.5	15
GX40…	40	40	2	5	10	15	15	5.2	18.5

VOLTMETER AND AMMETER SWITCHES

Rear mounting with black handle **(0)**

				Type	Voltmeter switches			Ammeter switches	
				WIRING DIAGRAMS	66	67	68	97	98
Series	Front plate size	Rated thermal current Ith	UL/CSA general use						
	[mm]	[A]	[A]						
GF...	□48	20	15		**GF2066O**	**GF2067O**	**GF2068O**	**GF2097O**	**GF2098O**
7GN...	□48	16	15		**7GN1266O**	**7GN1267O**	**7GN1268O**	**7GN1297O**	**7GN1298O**
		20	20		**7GN2066O**	**7GN2067O**	**7GN2068O**	**7GN2097O**	**7GN2098O**
		25	30		**7GN2566O**	**7GN2567O**	**7GN2568O**	**7GN2597O**	**7GN2598O**
	□65	32	40		**7GN3266O**	**7GN3267O**	**7GN3268O**	**7GN3297O**	**7GN3298O**
		40	50		**7GN4066O**	**7GN4067O**	**7GN4068O**	**7GN4097O**	**7GN4098O**
GX...	□48	16	12		**GX1666O**	**GX1667O**	**GX1668O**	**GX1697O**	**GX1698O**
		20	15		**GX2066O**	**GX2067O**	**GX2068O**	**GX2097O**	**GX2098O**
	□65	32	32		**GX3266O**	**GX3267O**	**GX3268O**	**GX3297O**	**GX3298O**
		40	40		**GX4066O**	**GX4067O**	**GX4068O**	**GX4097O**	**GX4098O**

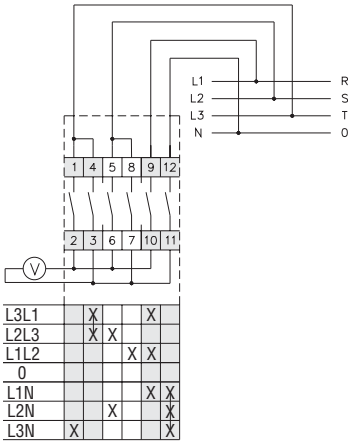
Modular service cover for 35mm DIN rail mounting with black handle **(O48)**❶

				Type	Voltmeter switches			Ammeter switches	
				WIRING DIAGRAMS	66	67	68	97	98
Series	Front plate size	Rated thermal current Ith	UL/CSA general use						
	[mm]	[A]	[A]						
GF...	□45X54	20	15		**GF2066O48**	**GF2067O48**	**GF2068O48**	**GF2097O48**	**GF2098O48**
7GN...	□45X54	16	15		**7GN1266O48**	**7GN1267O48**	**7GN1268O48**	**7GN1297O48**	**7GN1298O48**
		20	20		**7GN2066O48**	**7GN2067O48**	**7GN2068O48**	**7GN2097O48**	**7GN2098O48**
		25	30		**7GN2566O48**	**7GN2567O48**	**7GN2568O48**	**7GN2597O48**	**7GN2598O48**
GX...	□45X54	16	12		**GX1666O48**	**GX1667O48**	**GX1668O48**	**GX1697O48**	**GX1698O48**
		20	15		**GX2066O48**	**GX2067O48**	**GX2068O48**	**GX2097O48**	**GX2098O48**

❶ For key operation version replace O48 with O49 (e.g. GF2066O49).

WIRING DIAGRAMS

66



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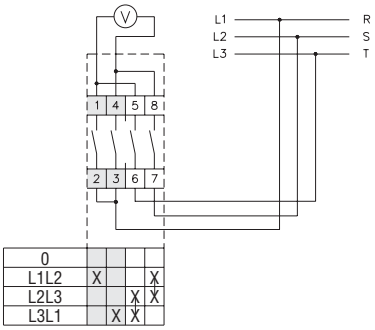

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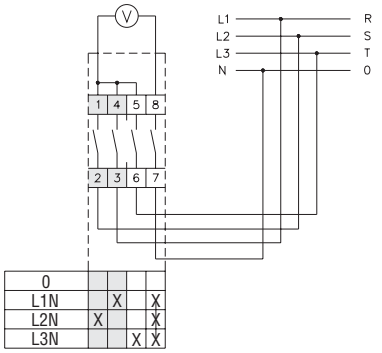

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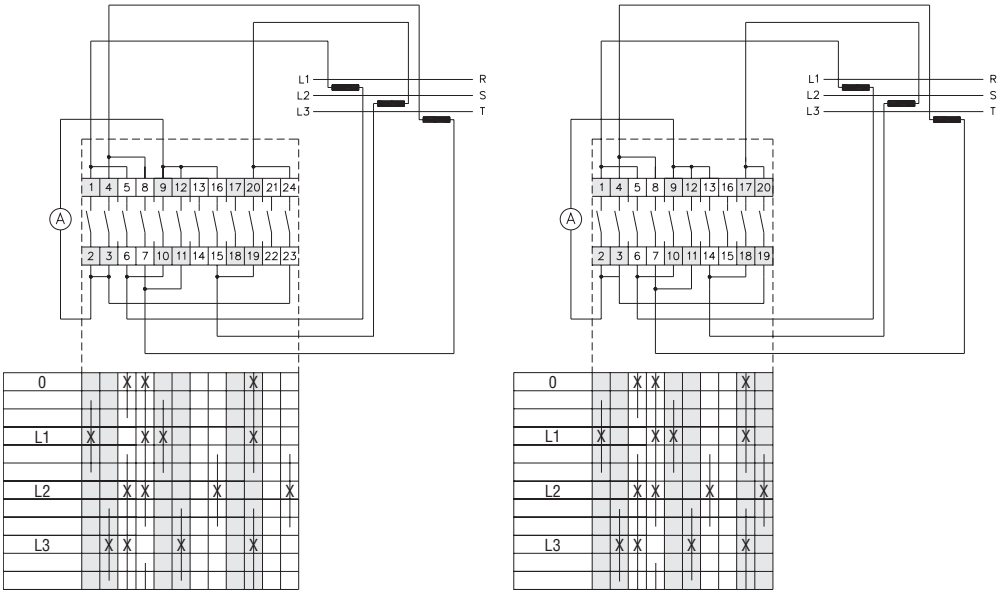

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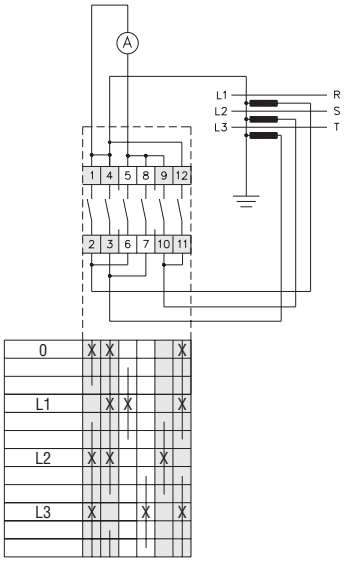


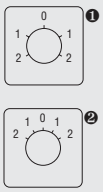
Technical characteristics

Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GF10...	10	10	—	0.75	2	—	—	0.75	3
GF20...	20	15	—	1	3	—	—	2	7.5
7GN12...	16	15	0.5	1	3	—	—	1.7	5.5
7GN20...	20	20	0.75	2	3	7.5	10	2.5	7.5
7GN25...	25	30	1.5	3	5	10	15	3.7	11
7GN32...	32	40	2	5	10	15	15	4	15
7GN40...	40	50	2	5	10	20	20	6	18.5

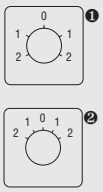
Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GX16...	16	12	0.75	1	3	5	5	1.8	6.5
GX20...	20	15	0.75	1.5	3	5	5	2.2	7.5
GX32...	32	32	1.5	3	7.5	15	15	3.5	15
GX40...	40	40	2	5	10	15	15	5.2	18.5

MOTOR REVERSING, STAR-DELTA, DAHLANDER MOTOR CONTROL, SEPARATE WINDINGS SWITCHES

Front mount with black handle **(U)**

			Type	Motor reversing			Star-delta	Dahlander motor control			Separate windings
			WIRING DIAGRAMS	25	11	26	12	13	19	20	53
Series	Front plate size	Rated thermal current Ith	UL/CSA general use								
	[mm]	[A]	[A]								
GF...	□30	10	10	GF1025U	GF1011U	GF1026U	GF1012U	GF1013U	GF1019U	GF1020U	GF1053U
	□48	20	15	GF2025U	GF2011U	GF2026U	GF2012U	GF2013U	GF2019U	GF2020U	GF2053U
7GN...	□48	16	15	7GN1225U	7GN1211U	7GN1226U	7GN1212U	7GN1213U	7GN1219U	7GN1220U	7GN1253U
		20	20	7GN2025U	7GN2011U	7GN2026U	7GN2012U	7GN2013U	7GN2019U	7GN2020U	7GN2053U
		25	30	7GN2525U	7GN2511U	7GN2526U	7GN2512U	7GN2513U	7GN2519U	7GN2520U	7GN2553U
	□65	32	40	7GN3225U	7GN3211U	7GN3226U	7GN3212U	7GN3213U	7GN3219U	7GN3220U	7GN3253U
		40	50	7GN4025U	7GN4011U	7GN4026U	7GN4012U	7GN4013U	7GN4019U	7GN4020U	7GN4053U
		63	60	7GN6325U	7GN6311U	7GN6326U	7GN6312U	7GN6313U	7GN6319U	7GN6320U	7GN6353U
	□90	125	130	7GN12525U	7GN12511U	7GN12526U	7GN12512U	7GN12513U	7GN12519U	7GN12520U	7GN12553U
GX...	□48	16	12	GX1625U	GX1611U	GX1626U	GX1612U	GX1613U	GX1619U	GX1620U	GX1653U
		20	15	GX2025U	GX2011U	GX2026U	GX2012U	GX2013U	GX2019U	GX2020U	GX2053U
	□65	32	32	GX3225U	GX3211U	GX3226U	GX3212U	GX3213U	GX3219U	GX3220U	GX3253U
		40	40	GX4025U	GX4011U	GX4026U	GX4012U	GX4013U	GX4019U	GX4020U	GX4053U
GN...	□132	200	200	GN20025U	GN20011U	GN20026U	GN20012U	GN20013U	GN20019U	GN20020U	GN20053U
		315	255	GN31525U	GN31511U	GN31526U	GN31512U	GN31513U	GN31519U	GN31520U	GN31553U

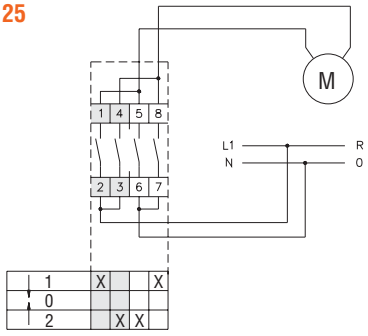
Front mounting with red/yellow handle padlockable in 0 and protection covers **(U25)❸**

			Type	Motor reversing			Star-delta	Dahlander motor control			Separate windings
			WIRING DIAGRAMS	25	11	26	12	13	19	20	53
Series	Front plate size	Rated thermal current Ith	UL/CSA general use								
	[mm]	[A]	[A]								
GF...	□48	20	15	GF2025U25	GF2011U25	GF2026U25	GF2012U25	GF2013U25	GF2019U25	GF2020U25	GF2053U25
GX...	□48	16	12	GX1625U25	GX1611U25	GX1626U25	GX1612U25	GX1613U25	GX1619U25	GX1620U25	GX1653U25
		20	15	GX2025U25	GX2011U25	GX2026U25	GX2012U25	GX2013U25	GX2019U25	GX2020U25	GX2053U25
	□65	32	32	GX3225U25	GX3211U25	GX3226U25	GX3212U25	GX3213U25	GX3219U25	GX3220U25	GX3253U25
		40	40	GX4025U25	GX4011U25	GX4026U25	GX4012U25	GX4013U25	GX4019U25	GX4020U25	GX4053U25

❶ Front plate for GF20... , 7GN... , GX...
❷ Front plate for GF10... , GN...
❸ For version not padlockable and without protection covers replace U25 with U24 (e.g. GF1025U24).

WIRING DIAGRAMS

25



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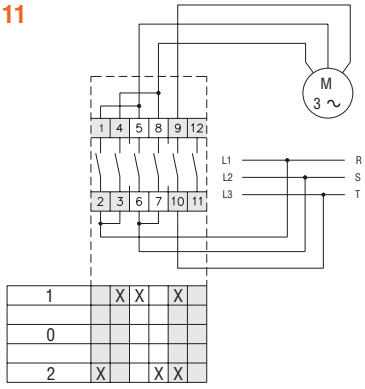

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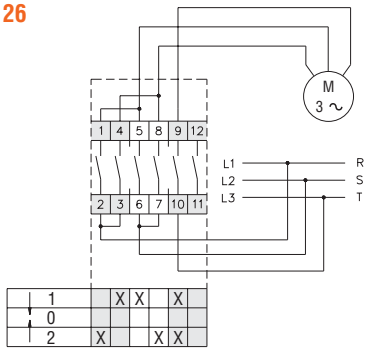

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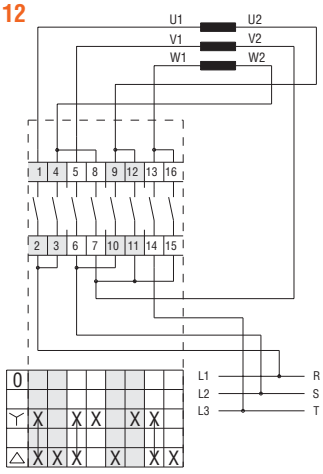

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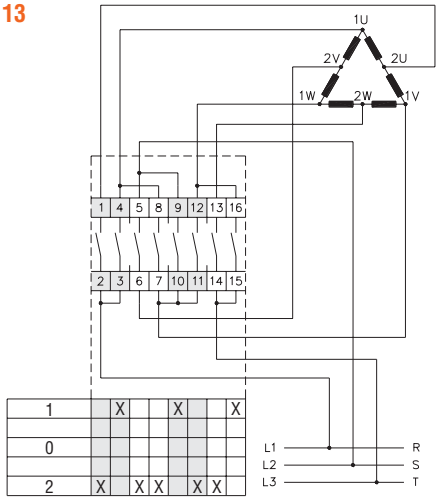

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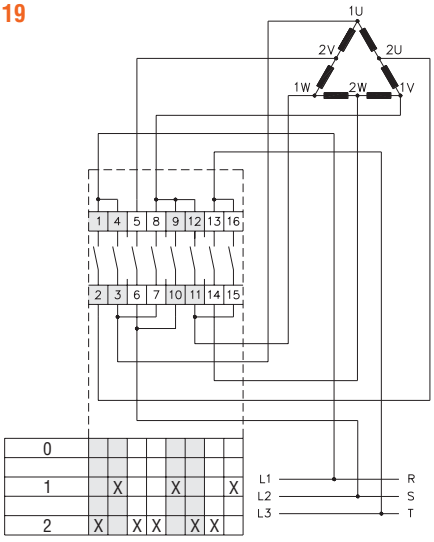

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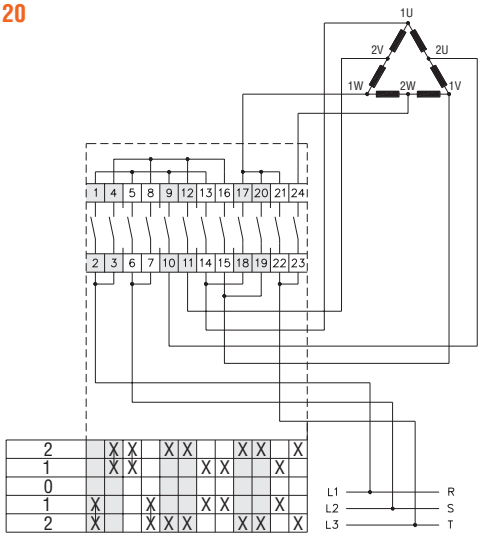

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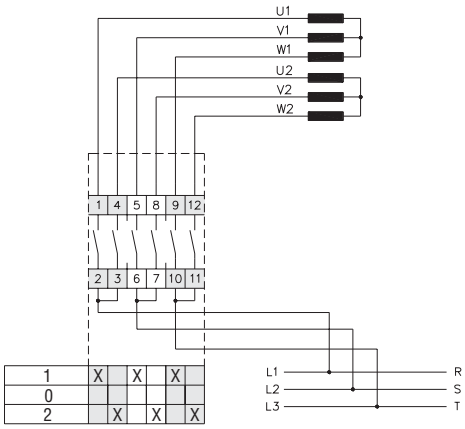


Technical characteristics

Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GF10...	10	10	—	0.75	2	—	—	0.75	3
GF20...	20	15	—	1	3	—	—	2	7.5
7GN12...	16	15	0.5	1	3	—	—	1.7	5.5
7GN20...	20	20	0.75	2	3	7.5	10	2.5	7.5
7GN25...	25	30	1.5	3	5	10	15	3.7	11
7GN32...	32	40	2	5	10	15	15	4	15
7GN40...	40	50	2	5	10	20	20	6	18.5
7GN63...	63	60	3	10	15	25	25	7.5	30
7GN125...	125	130	5	15	25	50	40	11	45

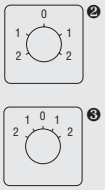
Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GX16...	16	12	0.75	1	3	5	5	1.8	6.5
GX20...	20	15	0.75	1.5	3	5	5	2.2	7.5
GX32...	32	32	1.5	3	7.5	15	15	3.5	15
GX40...	40	40	2	5	10	15	15	5.2	18.5
GN200	200	200	15	30	50	100	75	—	47
GN315	315	255	15	30	50	100	75	37	110

MOTOR REVERSING, STAR-DELTA, DAHLANDER MOTOR CONTROL, SEPARATE WINDINGS SWITCHES

Front mounting with red/yellow handle padlockable in 0 and protection covers **(U65)**

			Type	Motor reversing			Star-delta	Dahlander motor control			Separate windings
			WIRING DIAGRAMS	25	11	26	12	13	19	20	53
Series	Front plate size	Rated thermal current Ith	UL/CSA general use								
	[mm]	[A]	[A]								
7GN...	☐65	16	15	7GN1225U65	7GN1211U65	7GN1226U65	7GN1212U65	7GN1213U65	7GN1219U65	7GN1220U65	7GN1253U65
		20	20	7GN2025U65	7GN2011U65	7GN2026U65	7GN2012U65	7GN2013U65	7GN2019U65	7GN2020U65	7GN2053U65
		25	30	7GN2525U65	7GN2511U65	7GN2526U65	7GN2512U65	7GN2513U65	7GN2519U65	7GN2520U65	7GN2553U65
		32	40	7GN3225U65	7GN3211U65	7GN3226U65	7GN3212U65	7GN3213U65	7GN3219U65	7GN3220U65	7GN3253U65
		40	50	7GN4025U65	7GN4011U65	7GN4026U65	7GN4012U65	7GN4013U65	7GN4019U65	7GN4020U65	7GN4053U65
		63	60	7GN6325U65	7GN6311U65	7GN6326U65	7GN6312U65	7GN6313U65	7GN6319U65	7GN6320U65	7GN6353U65
	☐90	125	130	7GN12525U65	7GN12511U65	7GN12526U65	7GN12512U65	7GN12513U65	7GN12519U65	7GN12520U65	7GN12553U65

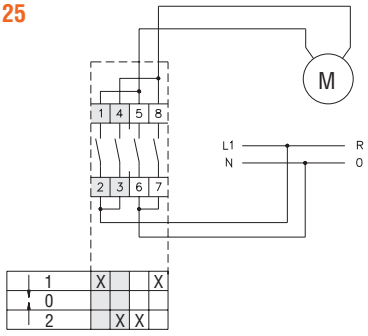
Snap on front mounting with black handle for hole Ø22mm fixing **(U47)❶**

			Type	Motor reversing			Star-delta	Dahlander motor control			Separate windings
			WIRING DIAGRAMS	25	11	26	12	13	19	20	53
Series	Front plate size	Rated thermal current Ith	UL/CSA general use								
	[mm]	[A]	[A]								
GF...	☐30	10	10	GF1025U47	GF1011U47	GF1026U47	GF1012U47	GF1013U47	GF1019U47	GF1020U47	GF1053U47
	☐48	20	15	GF2025U47	GF2011U47	GF2026U47	GF2012U47	GF2013U47	GF2019U47	GF2020U47	GF2053U47
7GN...	☐48	16	15	7GN1225U47	7GN1211U47	7GN1226U47	7GN1212U47	7GN1213U47	7GN1219U47	7GN1220U47	7GN1253U47
		20	20	7GN2025U47	7GN2011U47	7GN2026U47	7GN2012U47	7GN2013U47	7GN2019U47	7GN2020U47	7GN2053U47
		25	30	7GN2525U47	7GN2511U47	7GN2526U47	7GN2512U47	7GN2513U47	7GN2519U47	7GN2520U47	7GN2553U47
GX...	☐48	16	12	GX1625U47	GX1611U47	GX1626U47	GX1612U47	GX1613U47	GX1619U47	GX1620U47	GX1653U47
		20	15	GX2025U47	GX2011U47	GX2026U47	GX2012U47	GX2013U47	GX2019U47	GX2020U47	GX2053U47

❶ For key operation version replace U47 with U29D (e.g. GF2025U29D).
❷ Front plate for GF20... , 7GN... , GX...
❸ Front plate for GF10... , GN...

WIRING DIAGRAMS

25



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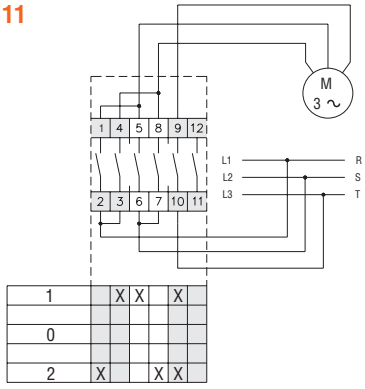

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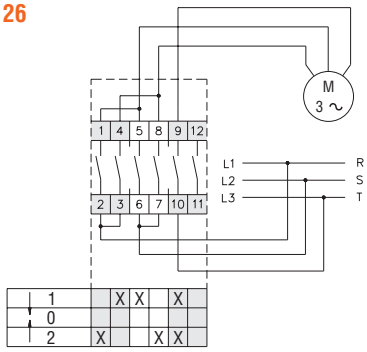

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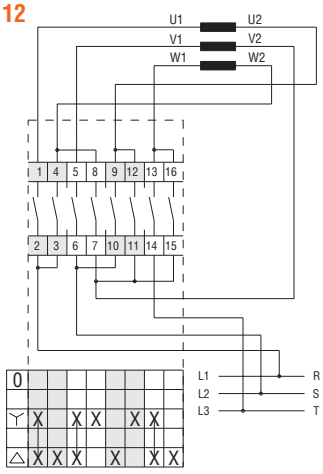

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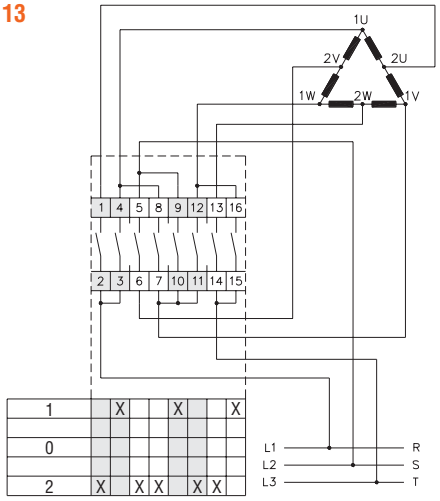

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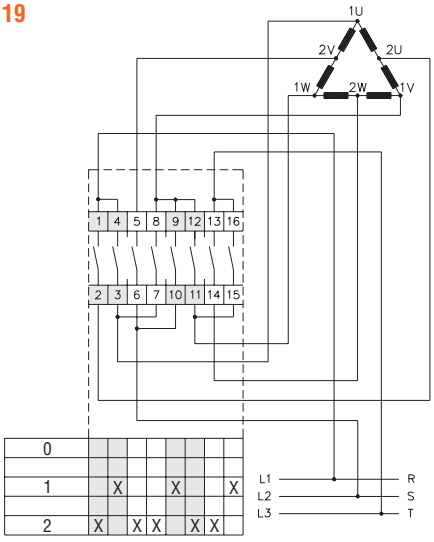

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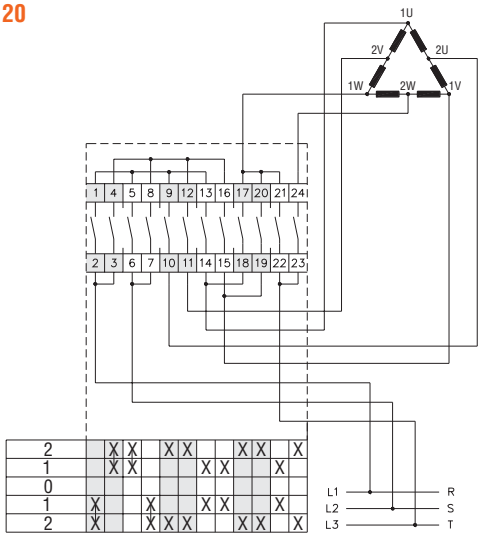

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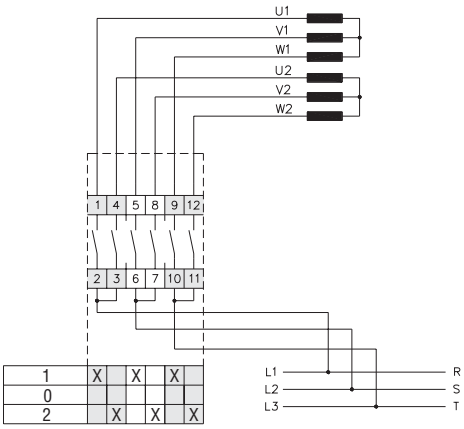


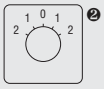
Technical characteristics

Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GF10...	10	10	—	0.75	2	—	—	0.75	3
GF20...	20	15	—	1	3	—	—	2	7.5
7GN12...	16	15	0.5	1	3	—	—	1.7	5.5
7GN20...	20	20	0.75	2	3	7.5	10	2.5	7.5
7GN25...	25	30	1.5	3	5	10	15	3.7	11
7GN32...	32	40	2	5	10	15	15	4	15
7GN40...	40	50	2	5	10	20	20	6	18.5
7GN63...	63	60	3	10	15	25	25	7.5	30
7GN125...	125	130	5	15	25	50	40	11	45

Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GX16...	16	12	0.75	1	3	5	5	1.8	6.5
GX20...	20	15	0.75	1.5	3	5	5	2.2	7.5

MOTOR REVERSING, STAR-DELTA, DAHLANDER MOTOR CONTROL, SEPARATE WINDINGS SWITCHES

Rear mounting with black handle **(0)**

			Type	Motor reversing			Star-delta	Dahlander motor control			Separate windings
			WIRING DIAGRAMS	25	11	26	12	13	19	20	53
Series	Front plate size	Rated thermal current Ith	UL/CSA general use							❶  ❷	
	[mm]	[A]	[A]								
GF...	□48	20	15	GF20250	GF20110	GF20260	GF20120	GF20130	GF20190	GF20200	GF20530
7GN...	□48	16	15	7GN12250	7GN12110	7GN12260	7GN12120	7GN12130	7GN12190	7GN12200	7GN12530
		20	20	7GN20250	7GN20110	7GN20260	7GN20120	7GN20130	7GN20190	7GN20200	7GN20530
		25	30	7GN25250	7GN25110	7GN25260	7GN25120	7GN25130	7GN25190	7GN25200	7GN25530
	□65	32	40	7GN32250	7GN32110	7GN32260	7GN32120	7GN32130	7GN32190	7GN32200	7GN32530
		40	50	7GN40250	7GN40110	7GN40260	7GN40120	7GN40130	7GN40190	7GN40200	7GN40530
		63	60	7GN63250	7GN63110	7GN63260	7GN63120	7GN63130	7GN63190	7GN63200	7GN63530
	□90	125	130	7GN125250	7GN125110	7GN125260	7GN125120	7GN125130	7GN125190	7GN125200	7GN125530
GX...	□48	16	12	GX16250	GX16110	GX16260	GX16120	GX16130	GX16190	GX16200	GX16530
		20	15	GX20250	GX20110	GX20260	GX20120	GX20130	GX20190	GX20200	GX20530
	□65	32	32	GX32250	GX32110	GX32260	GX32120	GX32130	GX32190	GX32200	GX32530
		40	40	GX40250	GX40110	GX40260	GX40120	GX40130	GX40190	GX40200	GX40530
GN...	□132	200	200	GN200250	GN200110	GN200260	GN200120	GN200130	GN200190	GN200200	GN200530
		315	255	GN315250	GN315110	GN315260	GN315120	GN315130	GN315190	GN315200	GN315530

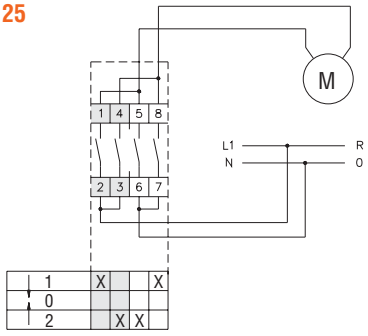
Modular service cover for 35mm DIN rail mounting with black handle **(048)❸**

			Type	Motor reversing			Star-delta	Dahlander motor control			Separate windings
			WIRING DIAGRAMS	25	11	26	12	13	19	20	53
Series	Front plate size	Rated thermal current Ith	UL/CSA general use								
	[mm]	[A]	[A]								
GF...	45x54	20	15	GF2025048	GF2011048	GF2026048	GF2012048	GF2013048	GF2019048	GF2020048	GF2053048
7GN...	45x54	16	15	7GN1225048	7GN1211048	7GN1226048	7GN1212048	7GN1213048	7GN1219048	7GN1220048	7GN1253048
		20	20	7GN2025048	7GN2011048	7GN2026048	7GN2012048	7GN2013048	7GN2019048	7GN2020048	7GN2053048
		25	30	7GN2525048	7GN2511048	7GN2526048	7GN2512048	7GN2513048	7GN2519048	7GN2520048	7GN2553048
GX...	45x54	16	12	GX1625048	GX1611048	GX1626048	GX1612048	GX1613048	GX1619048	GX1620048	GX1653048
		20	15	GX2025048	GX2011048	GX2026048	GX2012048	GX2013048	GX2019048	GX2020048	GX2053048

❶ Front plate for GF20... , 7GN... , GX...
❷ Front plate for GF10... , GN...
❸ For key operation version replace 048 with 049 (e.g. GF2025049).

WIRING DIAGRAMS

25



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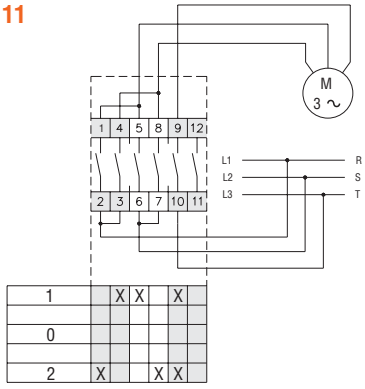

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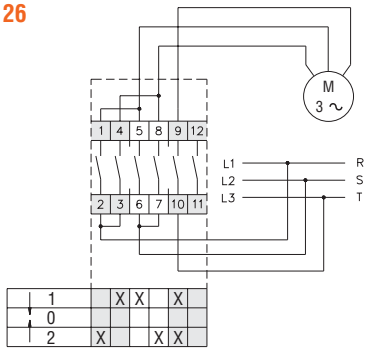

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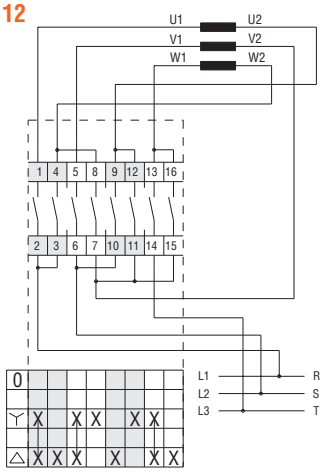

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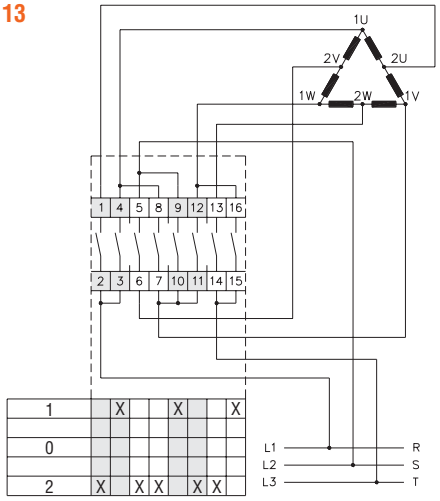

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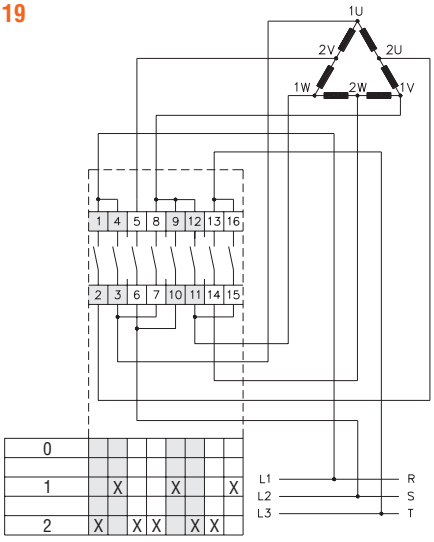

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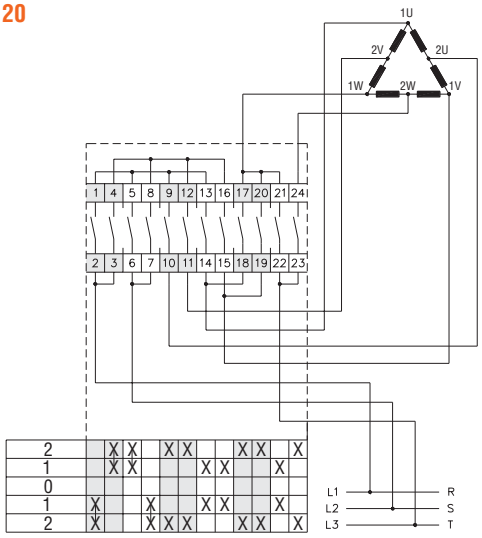

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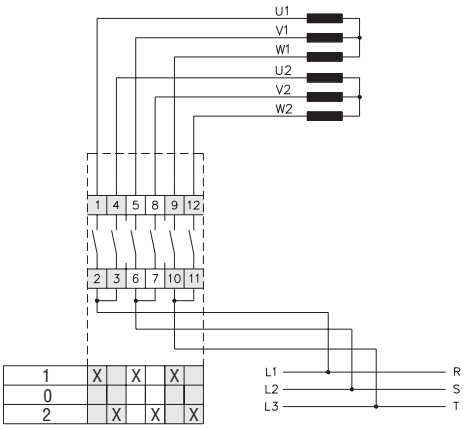

Technical characteristics

Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GF20...	20	15	—	1	3	—	—	2	7.5
7GN12...	16	15	0.5	1	3	—	—	1.7	5.5
7GN20...	20	20	0.75	2	3	7.5	10	2.5	7.5
7GN25...	25	30	1.5	3	5	10	15	3.7	11
7GN32...	32	40	2	5	10	15	15	4	15
7GN40...	40	50	2	5	10	20	20	6	18.5
7GN63...	63	60	3	10	15	25	25	7.5	30
7GN125...	125	130	5	15	25	50	40	11	45

Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GX16...	16	12	0.75	1	3	5	5	1.8	6.5
GX20...	20	15	0.75	1.5	3	5	5	2.2	7.5
GX32...	32	32	1.5	3	7.5	15	15	3.5	15
GX40...	40	40	2	5	10	15	15	5.2	18.5
GN200	200	200	15	30	50	100	75	—	47
GN315	315	255	15	30	50	100	75	37	110

MOTOR REVERSING, STAR-DELTA, DAHLANDER MOTOR CONTROL, SEPARATE WINDINGS SWITCHES

Rear mounting with red/yellow handle padlockable in 0, door coupling and protection covers **(O88)**

Type				Motor reversing			Star-delta	Dahlander motor control			Separate windings
WIRING DIAGRAMS				25	11	26	12	13	19	20	53
Series	Front plate size	Rated thermal current Ith	UL/CSA general use								
	[mm]	[A]	[A]								
GF...	□48	20	15	**GF2025O88**	**GF2011O88**	**GF2026O88**	**GF2012O88**	**GF2013O88**	**GF2019O88**	**GF2020O88**	**GF2053O88**
GX...	□48	16	12	**GX1625O88**	**GX1611O88**	**GX1626O88**	**GX1612O88**	**GX1613O88**	**GX1619O88**	**GX1620O88**	**GX1653O88**
		20	15	**GX2025O88**	**GX2011O88**	**GX2026O88**	**GX2012O88**	**GX2013O88**	**GX2019O88**	**GX2020O88**	**GX2053O88**
	□65	32	32	**GX3225O88**	**GX3211O88**	**GX3226O88**	**GX3212O88**	**GX3213O88**	**GX3219O88**	**GX3220O88**	**GX3253O88**
		40	40	**GX4025O88**	**GX4011O88**	**GX4026O88**	**GX4012O88**	**GX4013O88**	**GX4019O88**	**GX4020O88**	**GX4053O88**

Rear mounting with red/yellow handle padlockable in 0, door coupling and protection covers **(O98)**

Type				Motor reversing			Star-delta	Dahlander motor control			Separate windings
WIRING DIAGRAMS				25	11	26	12	13	19	20	53
Series	Front plate size	Rated thermal current Ith	UL/CSA general use								
	[mm]	[A]	[A]								
7GN...	□65	16	15	**7GN1225O98**	**7GN1211O98**	**7GN1226O98**	**7GN1212O98**	**7GN1213O98**	**7GN1219O98**	**7GN1220O98**	**7GN1253O98**
		20	20	**7GN2025O98**	**7GN2011O98**	**7GN2026O98**	**7GN2012O98**	**7GN2013O98**	**7GN2019O98**	**7GN2020O98**	**7GN2053O98**
		25	30	**7GN2525O98**	**7GN2511O98**	**7GN2526O98**	**7GN2512O98**	**7GN2513O98**	**7GN2519O98**	**7GN2520O98**	**7GN2553O98**
		32	40	**7GN3225O98**	**7GN3211O98**	**7GN3226O98**	**7GN3212O98**	**7GN3213O98**	**7GN3219O98**	**7GN3220O98**	**7GN3253O98**
		40	50	**7GN4025O98**	**7GN4011O98**	**7GN4026O98**	**7GN4012O98**	**7GN4013O98**	**7GN4019O98**	**7GN4020O98**	**7GN4053O98**

WIRING DIAGRAMS

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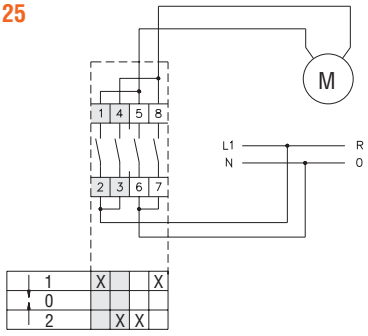

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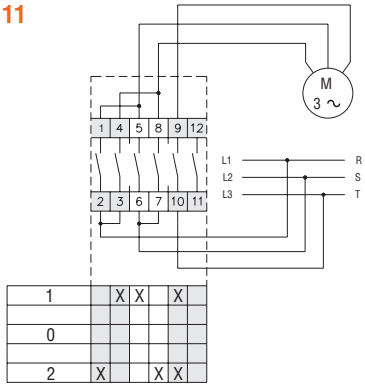

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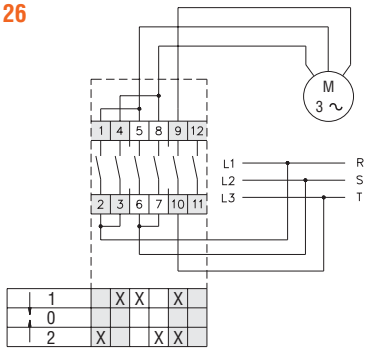

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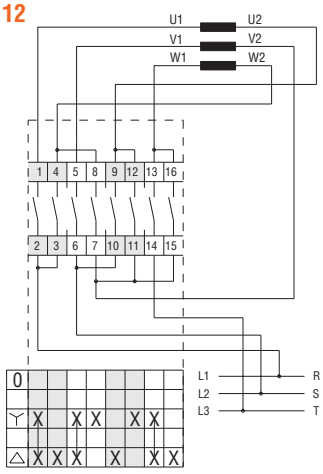

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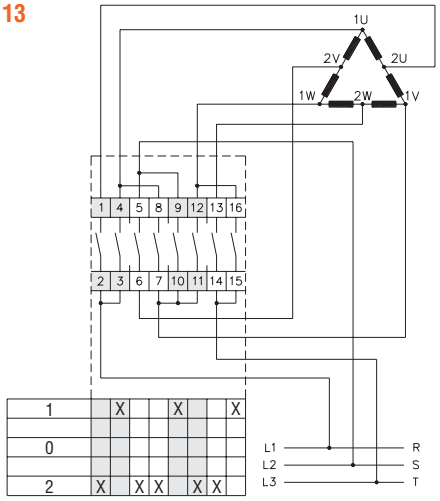

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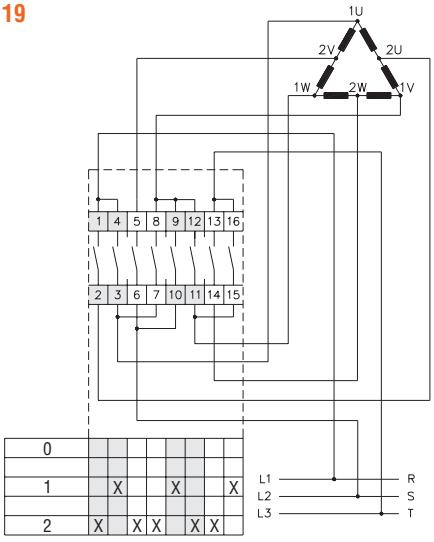

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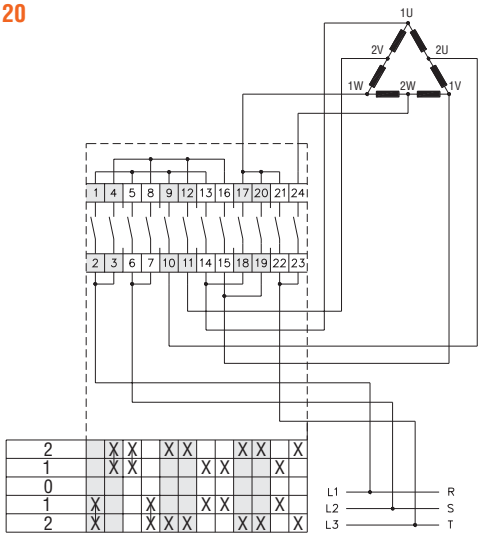

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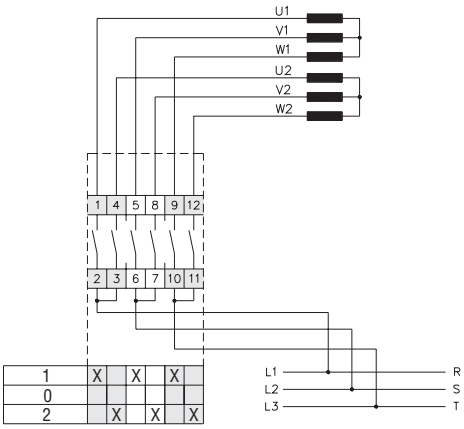


Technical characteristics

Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GF20...	20	15	—	1	3	—	—	2	7.5
7GN12...	16	15	0.5	1	3	—	—	1.7	5.5
7GN20...	20	20	0.75	2	3	7.5	10	2.5	7.5
7GN25...	25	30	1.5	3	5	10	15	3.7	11
7GN32...	32	40	2	5	10	15	15	4	15
7GN40...	40	50	2	5	10	20	20	6	18.5

Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GX16...	16	12	0.75	1	3	5	5	1.8	6.5
GX20...	20	15	0.75	1.5	3	5	5	2.2	7.5
GX32...	32	32	1.5	3	7.5	15	15	3.5	15
GX40...	40	40	2	5	10	15	15	5.2	18.5

MOTOR REVERSING, STAR-DELTA, DAHLANDER MOTOR CONTROL, SEPARATE WINDINGS SWITCHES

Cam switch in plastic enclosure with black handle **(P)**
Cam switch in metallic enclosure with black handle **(L)**

			Type	Motor reversing			Star-delta	Dahlander motor control			Separate windings
			WIRING DIAGRAMS	25	11	26	12	13	19	20	53
Series	Enclosure size	Rated thermal current Ith	UL/CSA general use								
	[mm]	[A]	[A]								
7GN...	75x75	16	15	7GN1225P	7GN1211P	7GN1226P	7GN1212P	7GN1213P	7GN1219P	—	7GN1253P
		20	20	7GN2025P	7GN2011P	7GN2026P	7GN2012P	7GN2013P	7GN2019P	—	7GN2053P
		25	30	7GN2525P	7GN2511P	7GN2526P	7GN2512P❶	7GN2513P❶	7GN2519P❶	—	7GN2553P
	90x90	32	40	7GN3225P	7GN3211P	7GN3226P	7GN3212P	7GN3213P	7GN3219P	—	7GN3253P
	110x110	40	50	7GN4025P	7GN4011P	7GN4026P	7GN4012P	7GN4013P	7GN4019P	—	7GN4053P
	125x175	63	60	7GN6325P	7GN6311P	7GN6326P	7GN6312P	7GN6313P	7GN6319P	—	7GN6353P
	198x248	125	130	7GN12525P	7GN12511P	7GN12526P	7GN12512P	7GN12513P	7GN12519P	—	7GN12553P
GX...	90x90	16	12	GX1625P	GX1611P	GX1626P	GX1612P	GX1613P	GX1619P	—	GX1653P
		20	15	GX2025P	GX2011P	GX2026P	GX2012P	GX2013P	GX2019P	—	GX2053P
	110x110	32	32	GX3225P	GX3211P	GX3226P	GX3212P	GX3213P	GX3219P	—	GX3253P
		40	40	GX4025P	GX4011P	GX4026P	GX4012P	GX4013P	GX4019P	—	GX4053P
GN...	250x316	200	200	GN20025L	GN20011L	GN20026L	GN20012L	GN20013L	GN20019L	GN20020L	GN20053L
		315	255	GN31525L	GN31511L	GN31526L	GN31512L	GN31513L	GN31519L	GN31520L	GN31553L

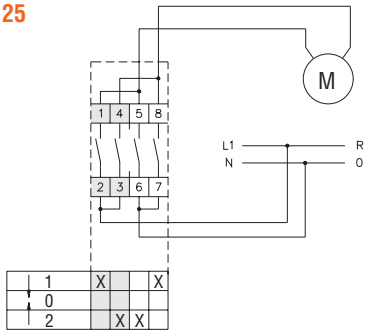
Cam switch in plastic enclosure with red/yellow handle padlockable in 0 **(P25)**

			Type	Motor reversing			Star-delta	Dahlander motor control		Separate windings
			WIRING DIAGRAMS	25	11	26	12	13	19	53
Series	Enclosure size	Rated thermal current Ith	UL/CSA general use							
	[mm]	[A]	[A]							
7GN...	90x90	16	15	7GN1225P25	7GN1211P25	7GN1226P25	7GN1212P25	7GN1213P25	7GN1219P25	7GN1253P25
		20	20	7GN2025P25	7GN2011P25	7GN2026P25	7GN2012P25	7GN2013P25	7GN2019P25	7GN2053P25
		25	30	7GN2525P25	7GN2511P25	7GN2526P25	7GN2512P25❸	7GN2513P25❸	7GN2519P25❸	7GN2553P25
		32	40	7GN3225P25	7GN3211P25	7GN3226P25	7GN3212P25	7GN3213P25	7GN3219P25	7GN3253P25
	110x110	40	50	7GN4025P25	7GN4011P25	7GN4026P25	7GN4012P25	7GN4013P25	7GN4019P25	7GN4053P25
	125x175	63	60	7GN6325P25	7GN6311P25	7GN6326P25	7GN6312P25	7GN6313P25	7GN6319P25	7GN6353P25
	198x248	125	130	7GN12525P25	7GN12511P25	7GN12526P25	7GN12512P25	7GN12513P25	7GN12519P25	7GN12553P25
GX...	90x90	16	12	GX1625P25	GX1611P25	GX1626P25	GX1612P25	GX1613P25	GX1619P25	GX1653P25
		20	15	GX2025P25	GX2011P25	GX2026P25	GX2012P25	GX2013P25	GX2019P25	GX2053P25
	110x110	32	32	GX3225P25	GX3211P25	GX3226P25	GX3212P25	GX3213P25	GX3219P25	GX3253P25
		40	40	GX4025P25	GX4011P25	GX4026P25	GX4012P25	GX4013P25	GX4019P25	GX4053P25

❶ Enclosure size 90x90mm.

WIRING DIAGRAMS

25



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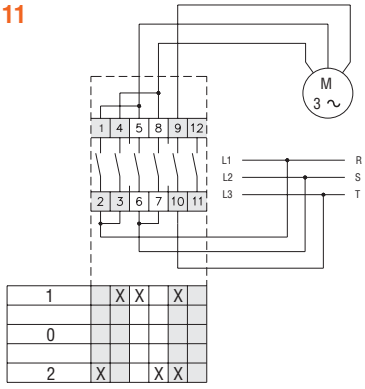

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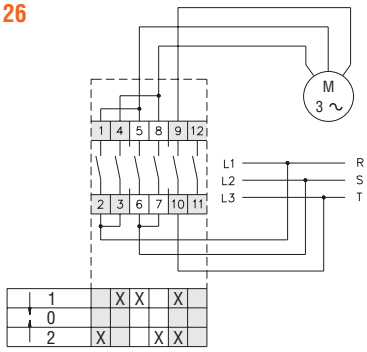

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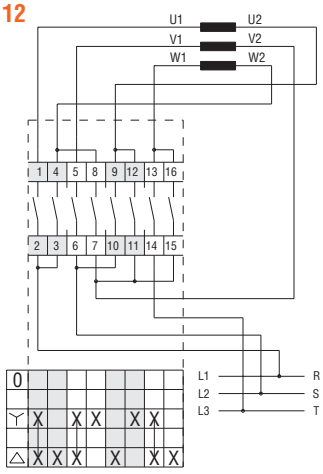

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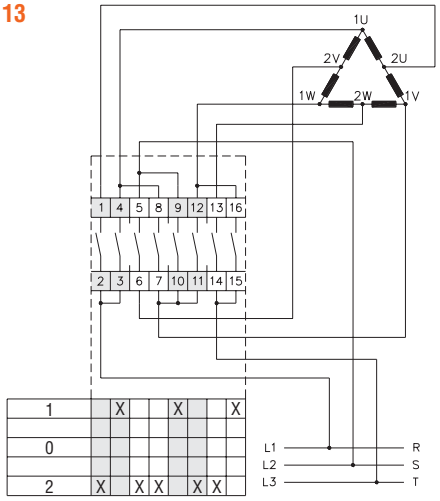

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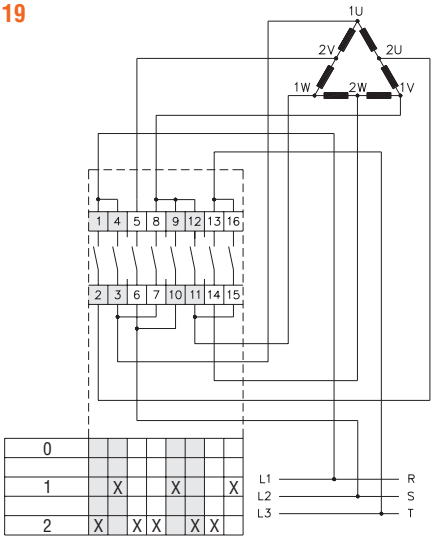

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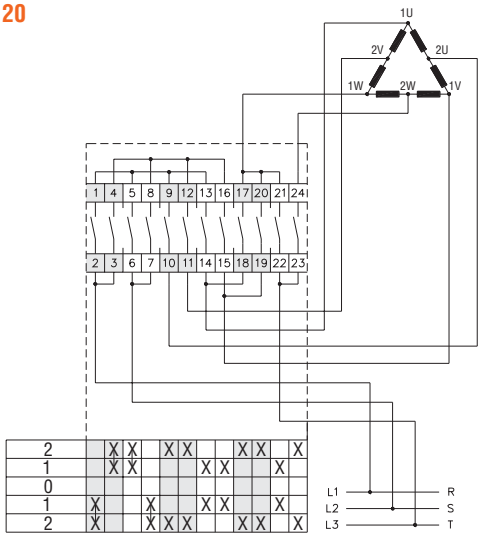

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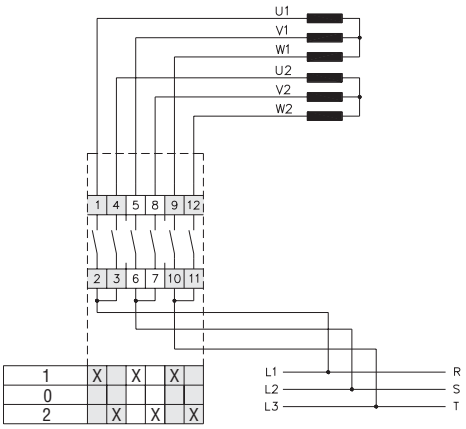


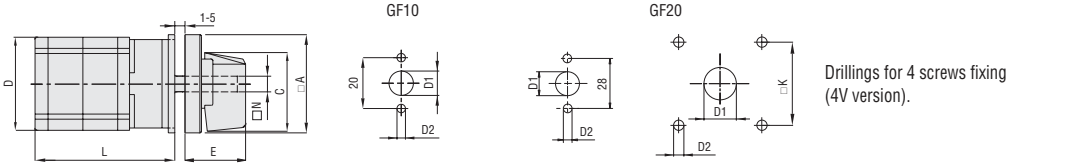
Technical characteristics

Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
7GN12…	16	15	0.5	1	3	—	—	1.7	5.5
7GN20…	20	20	0.75	2	3	7.5	10	2.5	7.5
7GN25…	25	30	1.5	3	5	10	15	3.7	11
7GN32…	32	40	2	5	10	15	15	4	15
7GN40…	40	50	2	5	10	20	20	6	18.5
7GN63…	63	60	3	10	15	25	25	7.5	30
7GN125…	125	130	5	15	25	50	40	11	45

Series	Rated thermal current Ith	UL/CSA general use	UL/CSA horsepower ratings					Max. IEC AC23 power 1 phase	Max. IEC AC23 power 3 phases
			1 phase		3 phases				
	[A]	[A]	120V [HP]	240V [HP]	240V [HP]	480V [HP]	600V [HP]	[kW] at 230V	[kW] at 400V
GX16…	16	12	0.75	1	3	5	5	1.8	6.5
GX20…	20	15	0.75	1.5	3	5	5	2.2	7.5
GX32…	32	32	1.5	3	7.5	15	15	3.5	15
GX40…	40	40	2	5	10	15	15	5.2	18.5
GN200	200	200	15	30	50	100	75	—	47
GN315	315	255	15	30	50	100	75	37	110

Front mounting with black handle (U)

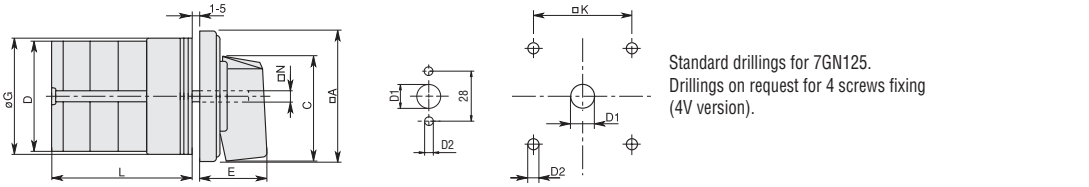
GF...



Drillings for 4 screws fixing (4V version).

Series	Dimensions								L Number of elements											
	□A	C	D	ØD1	ØD2	E	□K	N	1	2	3	4	5	6	7	8	9	10	11	12
GF10	30	24	29	9	3.2	18.5	–	Ø5	40	52	64	76	88	100	112	124	–	–	–	–
GF20	48	39.5	36	12	5	26.5	36	□6	44	57.5	71	84.5	98	111.5	125	138.5	152	165.5	179	192.5

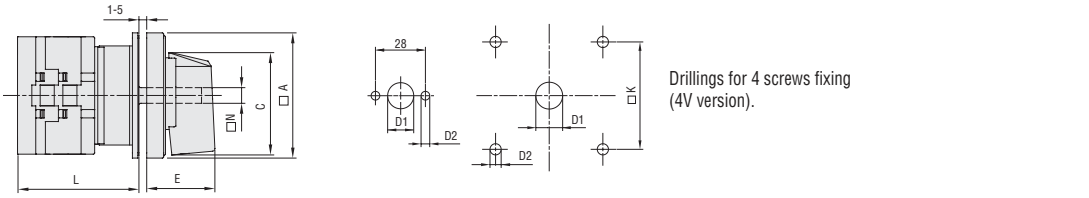
7GN...



Standard drillings for 7GN125.
Drillings on request for 4 screws fixing (4V version).

Series	Dimensions									L Number of elements											
	□A	C	ØD	ØD1	ØD2	E	ØG	□K	□N	1	2	3	4	5	6	7	8	9	10	11	12
7GN12	48	39.5	39	12	5	26.5	38	36	6	36.1	45.8	55.5	65.2	74.9	84.6	94.3	104	113.7	123.4	133.1	142.8
7GN20	48	39.5	39	12	5	26.5	38	36	6	36.1	45.8	55.5	65.2	74.9	84.6	94.3	104	113.7	123.4	133.1	142.8
7GN25	48	39.5	43	12	5	26.5	38	36	6	40.5	54.1	67.7	81.3	94.9	108.5	122.1	135.7	147.3	162.9	176.5	190.1
7GN32	65	53	58	14	5	34.5	58.5	48	7	46.5	61.6	76.7	91.8	106.9	122	137.1	152.2	167.3	182.4	197.5	212.6
7GN40	65	53	58	14	5	34.5	58.5	48	7	46.5	61.6	76.7	91.8	106.9	122	137.1	152.2	167.3	182.4	197.5	212.6
7GN63	65	53	62	14	5	34.5	58.5	48	7	50.3	68.4	86.5	104.6	122.7	140.8	158.9	177	195.1	213.2	231.3	249.4
7GN125	90	70.5	86	16	6	41.5	84	68	9	67.3	96.4	125.5	154.6	183.7	220.3	249.4	278.5	307.6	336.7	365.8	394.9

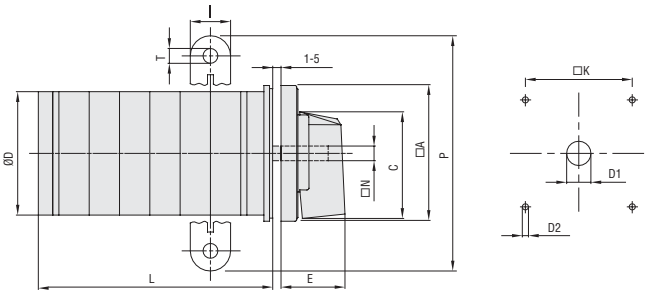
GX...



Drillings for 4 screws fixing (4V version).

Series	Dimensions							L Number of elements											
	□A	C	ØD1	ØD2	E	□K	□N	1	2	3	4	5	6	7	8	9	10	11	12
GX16	48	39.5	12	5	26.5	36	6	43	51.5	60	68.5	77	85.5	94	102.5	111	119.5	128	136.5
GX20	48	39.5	12	5	26.5	36	6	43	51.5	60	68.5	77	85.5	94	102.5	111	119.5	128	136.5
GX32	65	53	14	5	34.5	48	7	51	63	75	85	99	111	123	135	147	159	171	183
GX40	65	53	14	5	34.5	48	7	51	63	75	85	99	111	123	135	147	159	171	183

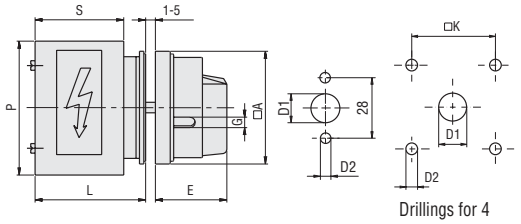
GN...



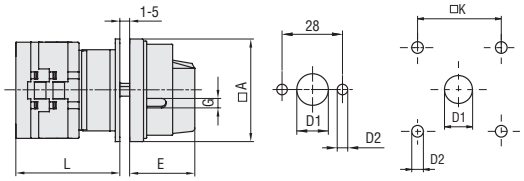
Series	Dimensions											L Number of elements ❶											
	□A	C	ØD	ØD1	ØD2	E	I	□K	□N	P	ØT	1	2	3	4	5	6	7	8	9	10	11	12
GN200	132	104	120	16	5.3	56	20	104	10	140	10.5	77	107	136	166	196	226	284	314	343	373	402	432
GN315	132	104	120	16	5.3	56	20	104	10	145	10.5	77	107	136	166	196	226	284	314	343	373	402	432

❶ For devices with 6 or more elements plese consult Technical support, see contact details on inside front cover.

Front mounting with red/yellow padlockable in 0 handle and protection covers (U25)



Drillings for 4 screws fixing (4V version).



Drillings for 4 screws fixing (4V version).

GF series

Series	Dimensions						L			
	□A	D1	D2	E	G	□K	1	2	3.....12	
GF20	48	12	5	34.2	5	36	44	57.5	71	192.5

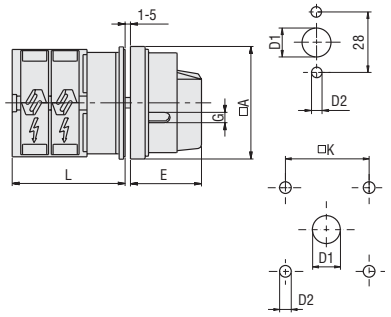
GX series

Series	Dimensions						L			
	□A	D1	D2	E	G	□K	1	2	3.....12	
GX16	48	12	5	34.2	5	36	43	51.5	60	136.5
GX20	48	12	5	34.2	5	36	43	51.5	60	136.5
GX32	65	14	5	38	6	48	51	63	75	183
GX40	65	14	5	38	6	48	51	63	75	183

7GN series

Series	Dimensions								
	□A	D1	D2	E	G	□K	S	P	L
7GN12	65	12	5	34.2	5	36	43	64	54.3
7GN20	65	12	5	34.2	5	36	43	64	54.3
7GN25	65	12	5	34.2	5	36	51	68	62.6
7GN32	65	14	5	38	6	48	55	77	71.7
7GN40	65	14	5	38	6	48	55	77	71.7

Front mounting with red/yellow handle padlockable in 0 and protection covers (U65)

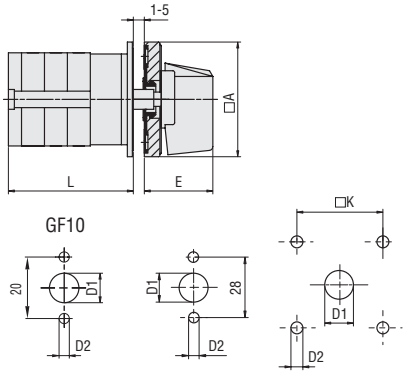


Standard drillings for 7GN125.
Drillings on request for 4 screws fixing (4V version).

7GN series

Series	Dimensions						L			
	□A	D1	D2	E	G	□K	1	2	3.....12	
7GN12	65	12	5	34.2	5	36	36.1	45.8	55.5	142.8
7GN20	65	12	5	34.2	5	36	36.1	45.8	55.5	142.8
7GN25	65	12	5	34.2	5	36	40.5	54.1	67.7	190.1
7GN32	65	14	5	38	6	48	46.5	61.6	76.7	212.6
7GN40	65	14	5	38	6	48	46.5	61.6	76.7	212.6
7GN63	65	14	5	38	6	48	50.3	68.4	86.5	249.4
7GN125	90	16	6	49	7	68	67.3	96.4	125.5	394.9

Front mounting with black handle with IP65 front protection (U51)



Standard drillings for 7GN125.
Drillings on request for 4 screws fixing (4V version).

GF series

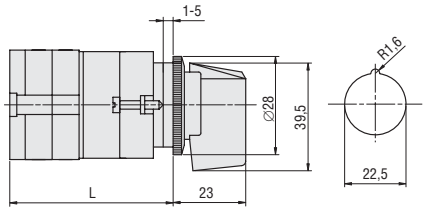
Series	Dimensions					L			
	□A	D1	D2	E	□K	1	2	3.....12	
GF10	30	9	3.2	18.5	-	40	52	64	❶
GF20	48	12	5	26.5	36	44	57.5	71	192.5

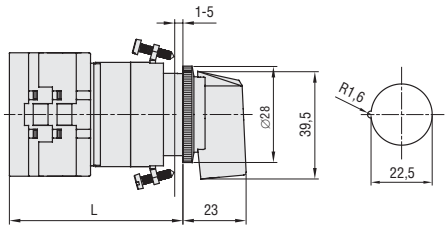
❶ GF10: max. 8 elements.

7GN series

Series	Dimensions					L			
	□A	D1	D2	E	□K	1	2	3.....12	
7GN12	48	12	5	26.5	36	36.1	45.8	55.5	142.8
7GN20	48	12	5	26.5	36	36.1	45.8	55.5	142.8
7GN25	48	12	5	26.5	36	40.5	54.1	67.7	190.1
7GN32	65	14	5	34.5	48	46.5	61.6	76.7	212.6
7GN40	65	14	5	34.5	48	46.5	61.6	76.7	212.6
7GN63	65	14	5	34.5	48	50.3	68.4	86.5	249.4
7GN125	90	16	6	41.5	68	67.3	96.4	125.5	394.9

Front mounting with black handle without front plate for hole Ø22mm fixing (U11)





GF series

Series	L			
	1	2	3.....12	
GF20	54.5	68	81.5	203

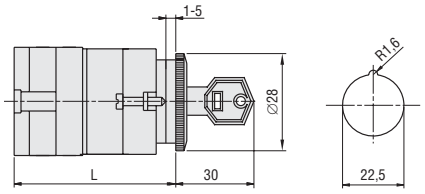
7GN series

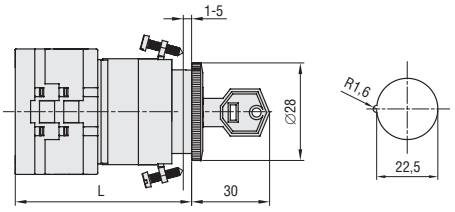
Series	L			
	1	2	3.....8	
7GN12	47	56.7	66.4	114.9
7GN20	47	56.7	66.4	114.9
7GN25	51.4	65	78.6	146.6

GX series

Series	L			
	1	2	3.....12	
GX16	54	62.5	71	147.5
GX20	54	62.5	71	147.5

Front mounting without front plate with key operation for hole Ø22mm fixing (U12)





GF series

Series	L			
	1	2	3.....8	
GF20	54.5	68	81.5	149

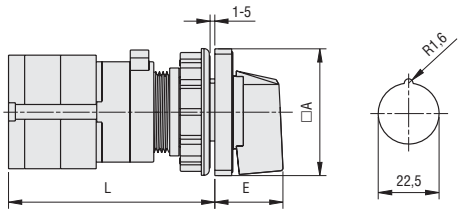
7GN series

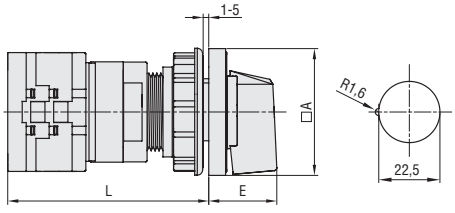
Series	L			
	1	2	3.....8	
7GN12	47	56.7	66.4	114.9
7GN20	47	56.7	66.4	114.9
7GN25	51.4	65	78.6	146.6

GX series

Series	L			
	1	2	3.....8	
GX16	54	62.5	71	113.4
GX20	54	62.5	71	113.4

Snap on front mounting with black handle for hole Ø22mm fixing (U47)





GF series

Series	Dimensions		L			
	□A	E	1	2	3.....8	
GF10	30	18.5	60	72	84	144
GF20	48	26.5	56	69.5	83	150.5

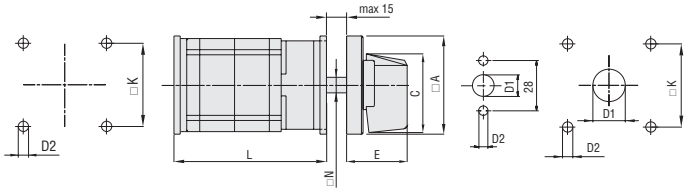
7GN series

Series	Dimensions		L			
	□A	E	1	2	3.....8	
7GN12	48	26.5	58	67.7	77.4	125.9
7GN20	48	26.5	58	67.7	77.4	125.9
7GN25	48	26.5	62.4	76	89.6	157.6

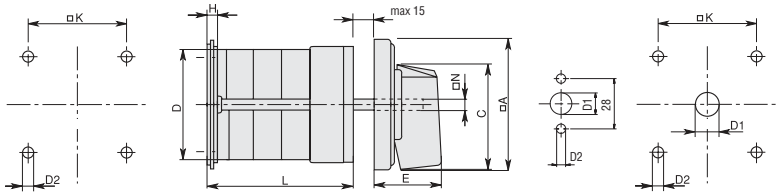
GX series

Series	Dimensions		L			
	□A	E	1	2	3.....8	
GX16	48	26.5	64.9	73.4	81.9	124.4
GX20	48	26.5	64.9	73.4	81.9	124.4

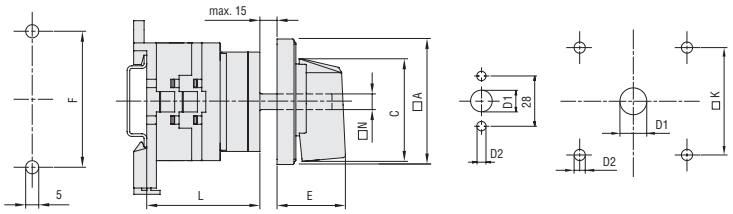
Rear mounting with black handle (0)



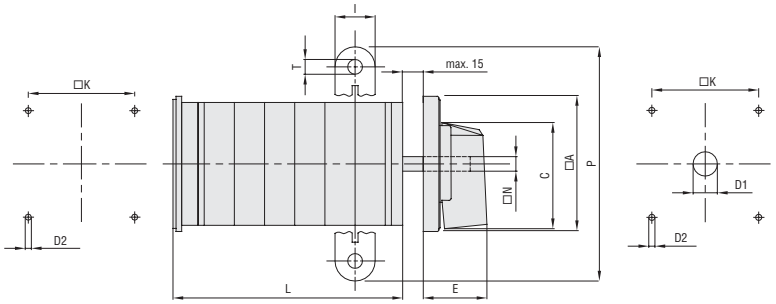
Series	Dimensions							L Number of elements											
	□A	C	ØD1	ØD2	E	□K	N	1	2	3	4	5	6	7	8	9	10	11	12
GF20	48	39.5	12	5	26.5	36	□6	46	59.5	73	86.5	100	113.5	127	140.5	154	167.5	181	194.5



Series	Dimensions								L Number of elements											
	□A	C	ØD	ØD2	E	H	□K	□N	1	2	3	4	5	6	7	8	9	10	11	12
7GN12	48	39.5	39	5	26.5	5	36	6	38.1	47.8	57.5	67.2	76.9	86.6	96.3	106	115.7	125.4	135.1	144.8
7GN20	48	39.5	39	5	26.5	5	36	6	38.1	47.8	57.5	67.2	76.9	86.6	96.3	106	115.7	125.4	135.1	144.8
7GN25	48	39.5	43	5	26.5	5	36	6	42.5	56.1	69.7	83.3	96.9	110.5	124.1	137.7	151.3	164.9	178.5	192.1
7GN32	65	53	58	5	34.5	5.5	48	7	48.5	63.6	78.7	93.8	108.9	124	139.1	154.2	169.3	184.4	199.5	214.6
7GN40	65	53	58	5	34.5	5.5	48	7	48.5	63.6	78.7	93.8	108.9	124	139.1	154.2	169.3	184.4	199.5	214.6
7GN63	65	53	62	6	34.5	7.5	68	7	53.3	71.4	89.5	107.6	125.7	143.8	161.9	180	198.1	216.2	234.3	252.4
7GN125	90	70.5	86	6	41.4	7.5	68	9	74.8	103.9	133	162.1	191.2	220.3	249.4	278.5	307.6	336.7	365.8	394.9



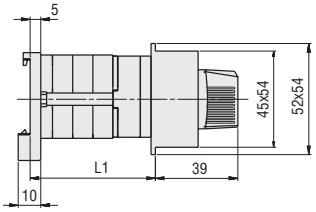
Series	Dimensions					L Number of elements											
	□A	C	E	F	□N	1	2	3	4	5	6	7	8	9	10	11	12
GX16	48	39.5	26.5	52	6	37	45.5	54	62.5	71	79.5	88	96.5	105	113.5	122	130.5
GX20	48	39.5	26.5	52	6	37	45.5	54	62.5	71	79.5	88	96.5	105	113.5	122	130.5
GX32	65	53	34.5	68	7	48	60	72	84	96	108	120	132	144	156	168	180
GX40	65	53	34.5	68	7	48	60	72	84	96	108	120	132	144	156	168	180

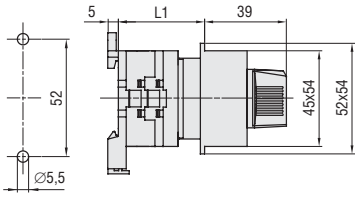


Series	Dimensions									L Number of elements ❶										
	□A	C	ØD2	E	I	□K	□N	P	ØT	1	2	3	4	5	6	7	8	9	10	11	12
GN200	132	104	5.3	56	20	104	10	140	10.5	77	107	136	166	196	226	284	314	343	373	402	432
GN315	132	104	5.3	56	20	104	10	145	10.5	77	107	136	166	196	226	284	314	343	373	402	432

❶ For devices with 6 or more elements plese contact plese consult Technical support, see contact details on inside front cover.

Modular service cover for 35mm DIN rail mounting with black handle (048)





GF series

Series	L1		
	1	2	3
GF20	40	53.5	67

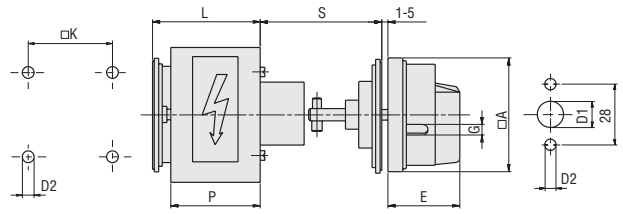
GX series

Series	L1		
	1	2	3
GX16	33	41.5	50
GX20	33	41.5	50

7GN series

Series	L1		
	1	2	3
7GN12	38.1	47.8	57.5
7GN20	38.1	47.8	57.5
7GN25	42.5	56.1	69.7

Rear mounting with red/yellow handle padlockable in 0, door coupling and protection covers (088)

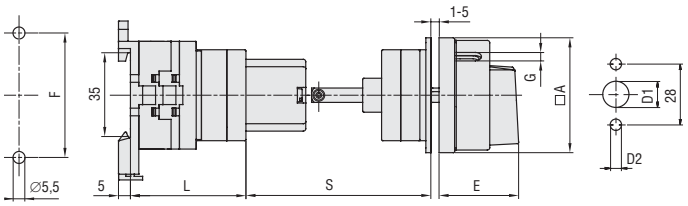


GF series

Series	Dimensions							L			
	□A	D1	D2	E	G	□K	S	1	2	3.....12	
GF20	48	12	5	34.2	5	36	45-55	46	59.5	73	194.5

7GN series

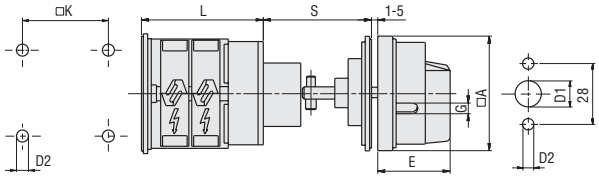
Series	Dimensions								
	□A	D1	D2	E	G	□K	S	P	L
7GN12	65	12	5	34.2	5	36	45-55	43	51.3
7GN20	65	12	5	34.2	5	36	45-55	43	51.3
7GN25	65	12	5	34.2	5	36	45-55	51	59.6
7GN32	65	14	5	38	6	48	45-55	55	68.7
7GN40	65	14	5	38	6	48	45-55	55	68.7



GX series

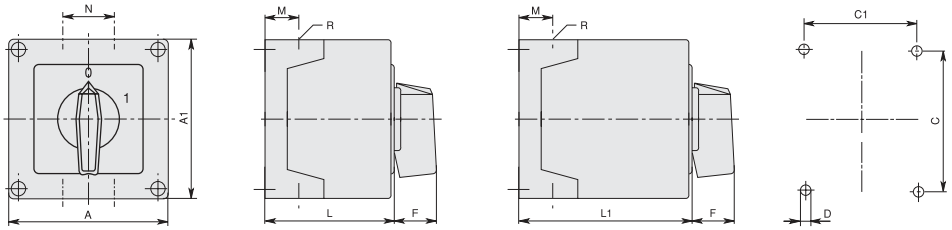
Series	Dimensions								L			
	□A	D1	D2	E	F	□K	G	S	1	2	3.....12	
GX16	48	12	5	34.2	52	36	5	45-55	40	48.5	57	133.5
GX20	48	12	5	34.2	52	36	5	45-55	40	48.5	57	133.5
GX32	65	14	5	38	68	48	6	45-55	51	63	75	183
GX40	65	14	5	38	68	48	6	45-55	51	63	75	183

Rear mounting with red/yellow handle padlockable in 0, door coupling and protection covers (098)

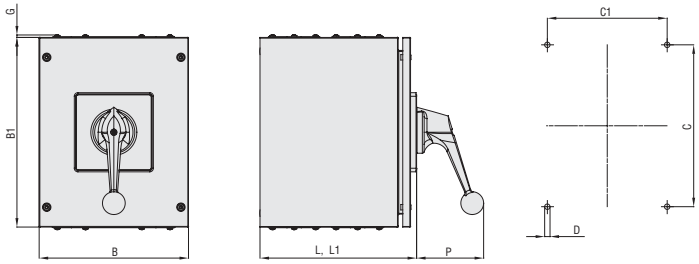


Series	Dimensions							L			
	□A	D1	D2	E	G	□K	S	1	2	3.....12	
7GN12	65	12	5	34.2	5	36	45-55	41.1	50.8	60.5	147.8
7GN20	65	12	5	34.2	5	36	45-55	41.1	50.8	60.5	147.8
7GN25	65	14	5	38	6	48	45-55	51.5	66.6	81.7	217.6
7GN40	65	14	5	38	6	48	45-55	51.5	66.6	81.7	217.6
7GN63	65	14	6	38	6	68	45-55	57.3	75.4	93.5	256.4

Cam switch in plastic enclosure with black handle (P)
Cam switch in metallic enclosure with black handle (L)
Cam switch in plastic enclosure with red/yellow handle padlockable in 0 (P25)



Series	Enclosure size	Number of elements		Dimensions										Cable entry	Protection degree
		L	L1	A	A1	C	C1	D	F	M	N	L	L1		
7GN12❶	75x75❸	1 - 2	3 - 4	75	75	50	64	4.5	19	14	28	57.5	79.8	4xPG13.5	IP65
7GN20❶		1 - 2	3 - 4												
7GN25❶		1	2 - 3												
7GN12❷	90x90	1 - 3	4 - 6	90	90	79	63	4.5	25	19	30	71.3	98.3	4xPG16	IP65
7GN20❷		1 - 3	4 - 6												
7GN25❷		1 - 2	3 - 4												
7GN32❶		1 - 2	3 - 4												
7GN40		1	2 - 3												
7GN12	110x110	1 - 4	5 - 8	110	110	98.4	83	4.5	32	21	39.5	85.5	119.5	4xPG21	IP65
7GN20		1 - 4	5 - 8												
7GN25		1 - 3	4 - 5												
7GN32❷		1 - 3	4 - 5												
7GN40❶		1 - 2	3 - 5												
7GN63		1 - 2	3 - 4												
7GN32	125x175	1 - 3	4 - 5	125	175	146	112	5.5	32	21	68	84.3	118.3	4xPG21 2xPG11	IP65
7GN40❷		1 - 2	3 - 4												
7GN63❶		1 - 2	3 - 4												
7GN125		1	2												
7GN32	198x248	–	1 - 8	198	248	190-210	140-180	5.5	32	35	104	–	166.5	6xPG16-21-29	IP65
7GN40		–	1 - 7												
7GN63❷		–	1 - 6												
7GN125❶❷		–	1 - 4												
GX16❶❷	90x90	1 - 2	3 - 5	90	90	79	79	4.5	25	19	30	71.3	98.3	4xPG16	IP65
GX20❶❷		1 - 2	3 - 5												
GX16	110x110	1 - 3	4 - 7	110	110	98.4	83	4.5	32	21	39.5	85.5	119.5	4xPG21	IP65
GX20		1 - 3	4 - 7												
GX32❶❷		1 - 2	3 - 4												
GX40❶❷		1 - 2	3 - 4												



Series	Enclosure size	Number of elements		Dimensions									Protection degree
		L	L1	L	L1	B	B1	C	C1	D	G	P	
GN200	250x316	1 - 3	4 - 6	162	252	250	316	270	200	9	4.5	98	IP54
GN315		1 - 3	4 - 6	162	252	250	316	270	200	9	4.5	98	IP54

❶ Standard dimensions for cam switch in plastic enclosure with black handle (P).
❷ DStandard dimensions for cam switch in plastic enclosure with red/yellow handle padlockable in 0 (P25).
❸ Only for cam switch in plastic enclosure with black handle (P).

ROTARY CAM SWITCH GNA20 SERIES

- IEC CONVENTIONAL FREE AIR THERMAL CURRENT ITH 20A.
- AVAILABLE VERSIONS IN PLASTIC ENCLOSURE.
- 48 AVAILABLE CONTACTS

The GNA20 series of cam switches has 4 contacts for each element. It can have a maximum of 12 control positions with 12 switching elements for a total of **48 contacts available**.

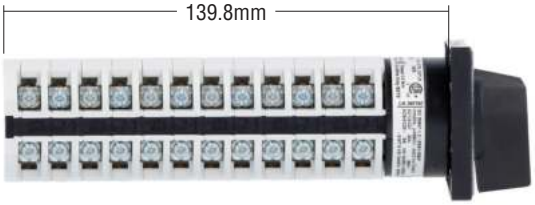
- REDUCED DEPTH

The GNA20 series cam switches are used in applications where the depths available inside the panel are limited.

Comparison example between GNA20 and 7GN series:

GNA20 series: 6 elements, 24 contacts.

7GN series: 12 elements, 24 contacts.



Front mounting with black handle

Front mounting with padlockable yellow/red handle

Rear mounting with black handle

Consult Technical support to determine the order codes relating to the GNA20 series; see contact details on inside front cover.

Accessories for rotary cam switches

7A014 - 7AR114 - 7A114 - 7AR214

7AR124 - 7A124 - 7AR224 - 7AR324

GXM0 - GXM1 - GXM2 - GXM3 - GXM4

GXM5 - GXM6 - GXM7

7A019... - 7A119...

7A169...

7A180 - 7A181

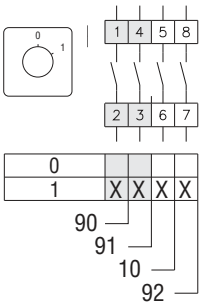
7A44...

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Black operating handle❶.			
7A014	For 48x48mm front plate ☐6mm/0.24"	1	0.005
7AR114	For 65x65mm front plate ☐6mm/0.24"	1	0.010
7A114	For 65x65mm front plate ☐7mm/0.28"	1	0.010
7AR214	For 90x90mm front plate ☐7mm/0.28"	1	0.013
Black operating lever❶.			
7AR124	For 65x65mm front plate ☐6mm/0.24"	1	0.019
7A124	For 65x65mm front plate ☐7mm/0.28"	1	0.020
7AR224	For 90x90mm front plate ☐7mm/0.28"	1	0.038
7AR324	For 132x132mm front plate	1	0.050
Red/yellow 0-1 padlockable handle.			
GXA01	48x48mm ☐6mm/0.24"	1	0.030
GXA01H	65x65mm ☐6mm/0.24"	1	0.047
GXA11	65x65mm ☐7mm/0.28"	1	0.047
IP40 front plate.			
GXM0	30x30mm/1.2x1.2" blank front plate	1	0.012
GXM1	48x48mm/1.9x1.9" blank front plate	1	0.018
GXM2	65x65mm/2.6x2.6" blank front plate	1	0.023
GXM3	90x90mm/3.6x3.6" blank front plate	1	0.030
GXM4	132x132mm/5.2x5.2" blank front plate	1	0.040
IP40 front plate with legend plate.			
GXM5	48x60mm/1.9x2.6" blank front plate with legend	1	0.017
GXM6	65x80mm/2.6x3.1" blank front plate with legend	1	0.033
GXM7	90x110mm/3.6x4.4" blank front plate with legend	1	0.055
IEC IP20 finger protection shroud for supply terminals. For 2 wafers complete with screws and bracket.			
7A0191	For 7GN12-7GN20	1	0.017
7A0192	For 7GN25	1	0.021
7A119U	For 7GN32-7GN40 U version	1	0.033
7A119O	For 7GN32-7GN40 O version	1	0.101
2-piece kit, snap-on fixing for 1 wafer.			
7A1691	For 7GN32-7GN40	1	0.005
7A1692	For 7GN63	1	0.006
7A1693	For 7GN125	1	0.020
7A1694	For 7GN12-7GN20	1	0.005
7A1695	For 7GN25	1	0.005
35mm DIN rail (IEC/EN/BS 60715) base mounting piece for U version.			
7A180	For 7GN12...7GN25 and GF20	1	0.011
7A181	For 7GN32...7GN63	1	0.018
IP42 rubber protection❷. Plug-in.			
7A441	Ø57mm/2.3" - 90mm/3.6" long for 7GN12-7GN20-7GN25 up to 2 elements	1	0.045
7A442	Ø57mm/2.3" - 115mm/4.6" long for 7GN12-7GN20-7GN25 up to 4 elements	1	0.065
7A443	Ø57mm/2.3" - 140mm/5.5" long for 7GN12-7GN20-7GN25 up to 6 elements	1	0.063
7A444	Ø87mm/3.4" - 112mm/4.0" long for 7GN32...7GN40 up to 4 elements, for 7GN63 up to 3 elements	1	0.065
Spare keys.			
GXA170	2-pcs key set, key code n° 122	1	0.008

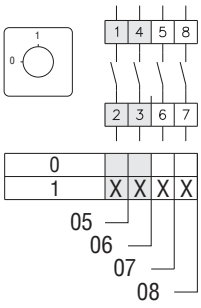
❶ For shaft dimensions, refer to the dimension ☐N present in the various executions.
❷ Increases contact degree of protection from IEC IP00 to IP20.

ON/OFF SWITCHES

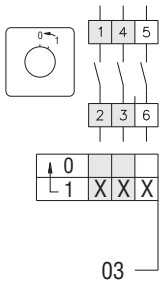
90-91-10-92



05-06-07-08

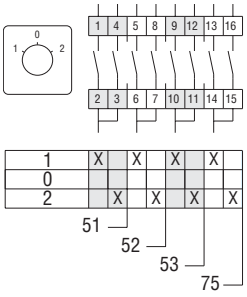


03



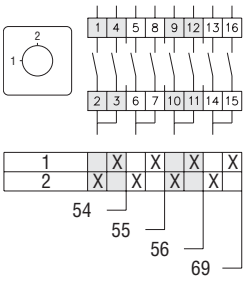
CHANGEOVER SWITCHES WITH 0

51-52-53-75



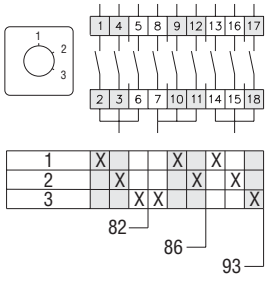
CHANGEOVER SWITCHES WITHOUT 0

54-55-56-69

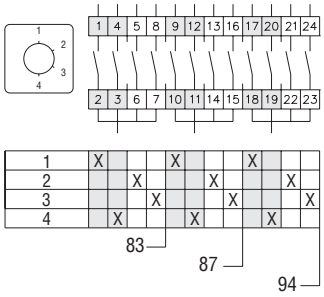


MULTI STEP STARTING WITH 1

82-86-93



83-87-94



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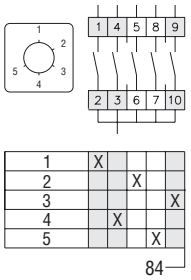

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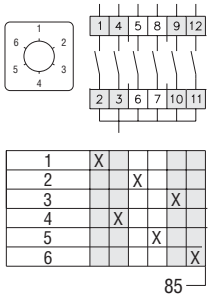
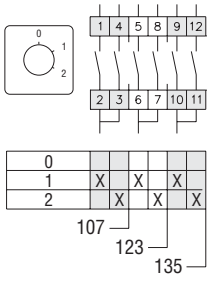
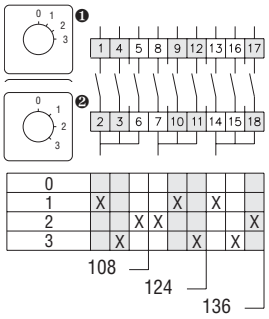


MULTI STEP STARTING WITH 0

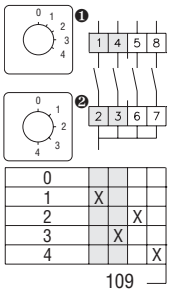
107-123-135



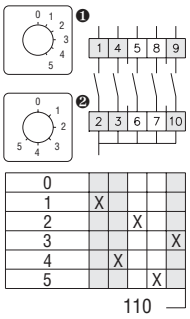
108-124-136



109



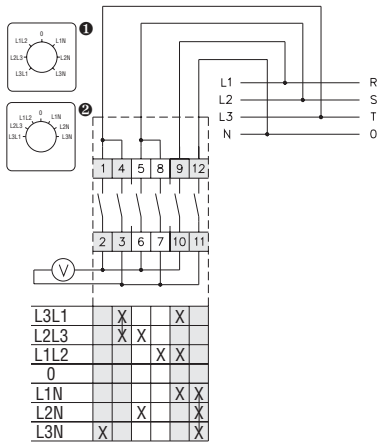
110



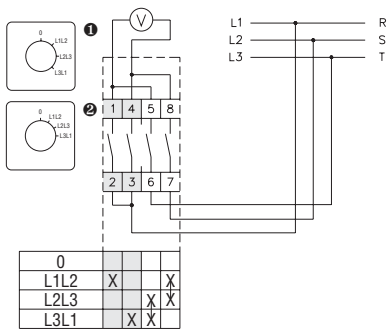
❶ Front plate for GF... , 7GN12... to 7GN63.... , GX... , GN...
❷ Front plate for 7GN125...

VOLTMETER SWITCHES

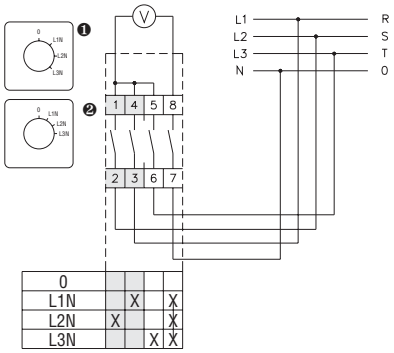
66



67



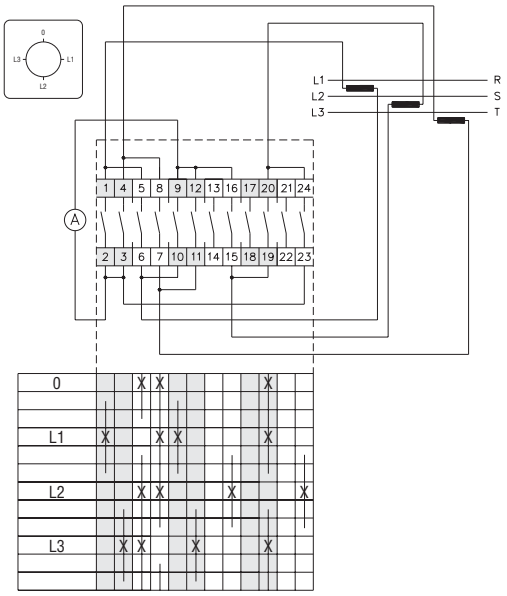
68

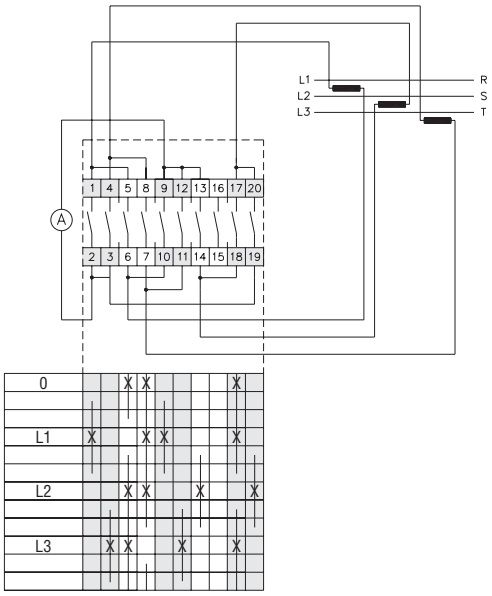


❶ Front plate for GF20... , 7GN... , GX... , GN...
❷ Front plate for GF10... .

AMMETER SWITCHES

97





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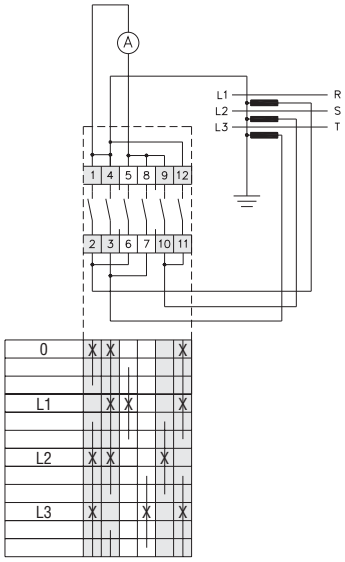
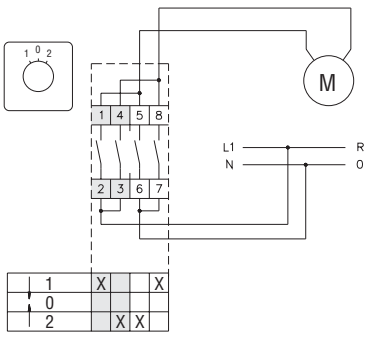


MOTOR REVERSING

25



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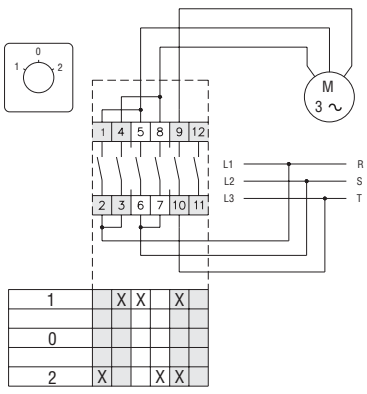
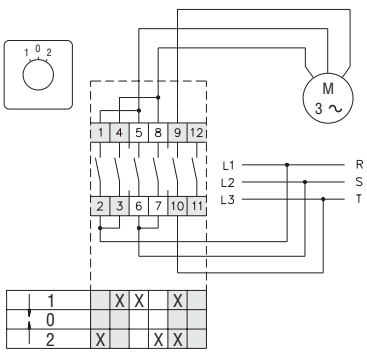
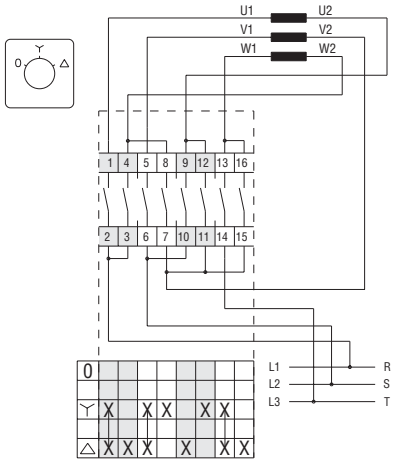


26



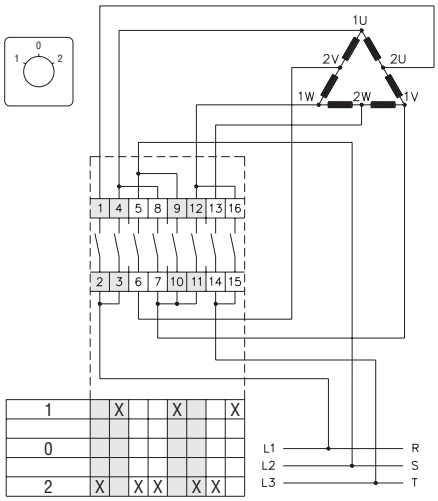
STAR-DELTA

12



DAHLANDER MOTOR CONTROL

13



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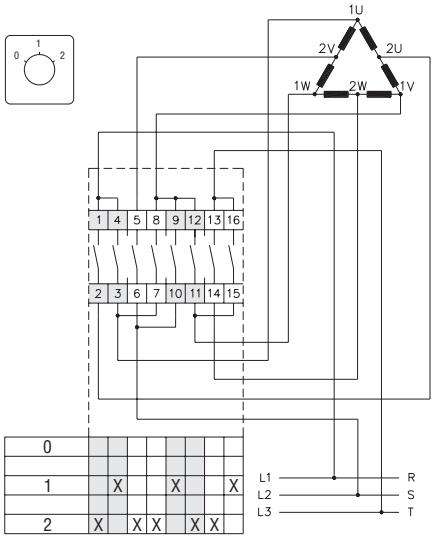
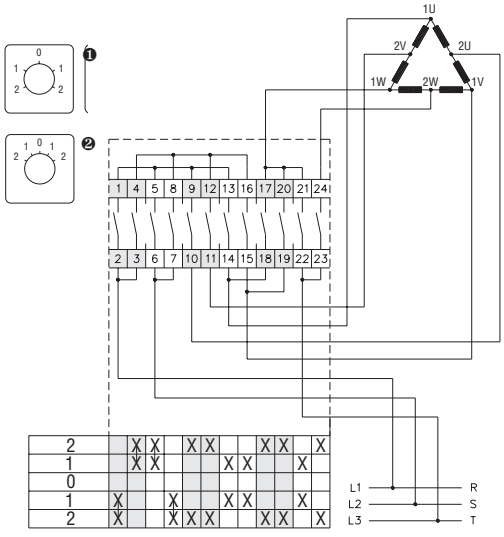


20



❶ Front plate for GF20... , 7GN... , GX...
❷ Front plate for GF10... , GN...

SEPARATE WINDINGS SWITCHES

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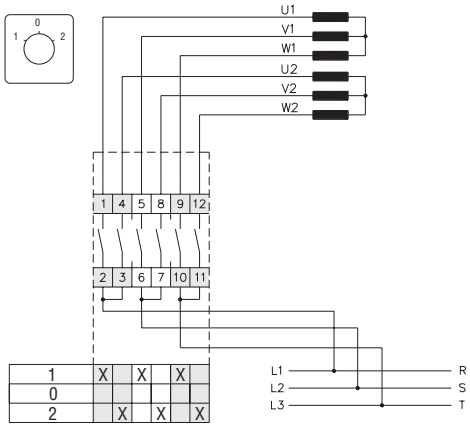

TYPE			GF10	GF20	7GN12	7GN20	7GN25	7GN32	7GN40	7GN63	7GN125	GX16	GX20	GX32	GX40	GN200	GN315	GNA20
Rated insulation voltage																		
Ui	IEC/EN	V	480	480	690	690	690	690	690	690	690	690	690	690	690	690	690	690
	UL/CSA	V	240	240	600	600	600	600	600	600	600	600	600	600	600	600	600	600
Rated impulse withstand voltage Uimp	IEC/EN/BS 60947-3	kV	4	4	6	6	6	6	6	6	6	6	6	6	6	8	8	6
Conventional free air thermal current																		
Ui	IEC/EN	A	10	20	16	20	25	32	40	63	125	16	20	32	40	200	315	20
	UL/CSA (general purpose)	A	10	15	15	20	30	40	50	60	130	12	15	32	40	200	255	15
Rated operating maximum voltage (only for switch)		V	480	480	480	480	480	480	480	480	690	440	440	440	440	690	690	480
Rated operational impulse voltage (only for switch)		kV	4	4	4	4	4	4	4	4	6	4	4	4	4	6	6	4
Maximum fuse size for short-circuit protection In (gG)	10kA	A	16	20	16	20	25	32	40	63	125	16	20	35	40	200❷	315❷	20
	15kA	A	–	20	10	16	25	32	40	63	100	16	20	35	35	200❷	315❷	20
	25kA	A	–	20	10	16	25	32	40	63	100	16	20	35	35	–	–	20
	50kA	A	–	–	–	–	–	32	40	63	100	–	–	–	–	–	–	–
	63kA	A	–	–	–	–	–	–	40	63	100	–	–	–	–	–	–	–
Short-time withstand current Icw	1sec	A	250	250	200	250	400	800	1000	1600	2100	250	250	1000	1000	3300	5200	220
Conductivity		mA/V	10/5	10/5	10/5	10/5	10/5	10/5	10/5	10/5	10/5	10/5	10/5	10/5	10/5	–	–	10/5
Rated operational current Ie	AC1/AC21A (IEC/EN)	A	10	20	16	20	25	32	40	63	125	16	20	32	40	200	315	20
	AC15 (IEC/EN) 110...120V	A	5	10	10	10	16	25	25	32	40	10	10	25	25	–	–	–
	220...230V	A	3	8	8	8	12	20	22	25	28	8	8	20	22	–	–	–
	380...400V	A	2	6	4	6	8	10	12	15	15	4	6	10	12	–	–	–
	660...690V	A	–	–	1.5	1.5	2	2	2	4	5	1.5	1.5	2	2	–	–	–
Motor power for switches in AC utilisation category																		
AC3	(IEC/EN) 220...230V	kW	1.5	3	2.5	3	5.5	7.5	8	11	18.5	3.5	3.7	7.5	7.5	27.5	37	3
	3 phases 380...440V	kW	2.2	5	4	5.5	7.5	11	15	18.5	37	4.5	5.5	11	15	47	55	5.5
	500...690V	kW	–	–	5.5	5.5	7.5	11	15	18.5	33	5.5	5.5	11	15	–	69	5.5
	1 phase (2 poles) 110...120V	kW	0.3	0.5	0.8	0.8	1.5	2.2	3	3.7	5	0.55	0.75	1.8	2.2	–	11	0.6
	220...230V	kW	0.55	1.5	1.5	2.2	3	4	6.5	6.5	11	1.5	1.8	3.5	4.4	–	22	2.2
	380...440V	kW	0.75	2	2.2	3	5.5	6.5	8	11.5	15	2.2	3	5.5	7	–	30	3
AC23A (IEC/EN)❶	220...230V	kW	1.8	4	3	5	6.5	8	8	12.5	30	3.7	4	8	9	–	75	3.7
	3 phases 380...440V	kW	3	7.5	5.5	7.5	11	15	18.5	30	45	6.5	7.5	15	18.5	47	110	7.5
	500...690V	kW	–	–	7.5	7.5	11	18.5	22	30	37	7.5	7.5	15	15	–	45	7.5
	1 phase (2 poles) 110...120V	kW	0.7	0.75	0.8	0.8	1.5	2.2	3	3.7	5	0.75	0.75	2.2	3	–	15	0.75
	220...230V	kW	0.75	2	1.7	2.5	3.7	4	6	7.5	11	1.8	2.2	3.5	5.2	–	37	2.2
	380...440V	kW	1.1	2.5	3	3.7	5.5	7.5	11	12.5	15	3	3.5	6	7.5	–	55	3.7

❶ For GN200 and GN315 the use category is AC23B.
❷ aR fuses.

TYPE			GF10	GF20	7GN12	7GN20	7GN25	7GN32	7GN40	7GN63	7GN125	GX16	GX20	GX32	GX40	GN200	GN315	GNA20
Motor power for direct-on-line control (UL/CSA-DOL) 3 phases	120V	HP	–	–	1.5	1.5	3	5	5	7.5	15	1.5	1.5	3	5	30	30	1.5
	240V	HP	2	3	3	3	5	10	10	15	25	3	3	7.5	10	50	50	2
	480V	HP	–	–	–	7.5	10	15	20	25	50	5	5	15	15	100	100	5
	600V	HP	–	–	–	10	15	15	20	25	40	5	5	15	15	75	75	5
1 phase (2 poles)	120V	HP	–	–	0.5	0.75	1.5	2	2	3	5	0.75	0.75	1.5	2	15	15	–
	240V	HP	0.75	1	1	2	3	5	5	10	15	1	1.5	3	5	30	30	–
Motor power for switches in DC utilisation category																		
DC21A	48V	A	10	20	12	20	25	32	40	63	125	16	20	32	40	200	200	–
	60V	A	7	20	12	20	25	32	40	50	80	16	20	32	40	200	200	–
Ie	110V	A	2	4	4	4	4	6	6	8	10	4	4	5	6	35	35	–
	220V	A	0.7	0.7	0.6	0.6	0.7	0.9	0.9	1	1.2	0.6	0.6	0.8	0.8	2.5	2.5	–
	440V	A	0.2	0.2	0.25	0.25	–	–	–	–	–	0.25	0.25	0.25	0.25	0.9	0.9	–
DC23A	24V	A	–	–	10(1)	20(1)	25(1)	32(1)	40(1)	50(1)	125(1)	16(1)	20(1)	32(1)	40(1)	–	–	–
	48V	A	–	–	10(2)	20(2)	25(2)	32(2)	40(2)	50(2)	125(2)	16(2)	20(2)	32(2)	40(1)	–	–	–
Ie	60V	A	–	–	10(3)	20(3)	25(3)	32(3)	40(3)	50(3)	125(3)	16(3)	20(3)	32(3)	40(3)	–	–	–
No. of contacts connected in series are indicated in brackets	110V	A	–	–	5(3)	10(3)	12(3)	15(3)	20(3)	25(3)	50(3)	10(3)	10(3)	15(3)	40(3)	–	–	–
	220V	A	–	–	5(4)	8(4)	10(4)	12(4)	12(4)	15(4)	20(4)	7(4)	8(4)	12(4)	12(4)	–	–	–
DC13	24V	A	3	6	12	20	25	32	40	63	125	16	20	32	40	–	–	–
	48V	A	3	6	10	16	20	25	32	40	100	14	16	25	32	–	–	–
	60V	A	2	3	8	12	16	16	16	28	50	10	12	14	16	–	–	–
Ie	110V	A	1	1	1	1	1.5	3	3	3.3	4	1	1	3	3	–	–	–
	220V	A	0.3	0.4	0.4	0.4	0.4	0.5	–	–	–	0.4	0.4	0.5	0.5	–	–	–
	440V	A	0.1	0.15	0.15	0.15	–	–	–	–	–	0.15	0.15	0.15	0.15	–	–	–
Power dissipation		w/pole	0.4	0.8	0.8	0.8	1.1	1.5	2.0	3.4	6.3	0.6	0.6	1.6	1.6	26	64.5	1
Mechanical life		cycles	$1x10^6$	$1x10^6$	$3x10^6$	$5x10^6$	$5x10^6$	$5x10^6$	$5x10^6$	$5x10^6$	$1x10^6$	$1x10^6$	$1x10^6$	$1x10^6$	$1x10^6$	$2x10^5$	$2x10^5$	$1x10^6$
Terminal screw		M	2.5	3	3	3	3.5	4	4	5	2x5	3	3	4	4	10	10	3
Tightening torque	max	Nm	0.4	0.5	0.5	0.5	0.8	1.2	1.2	2	2	0.5	0.8	1.2	1.2	10	10	0.5
Conductor cross section	max. r/f	$2xmm^2$	1.5/1.5	2.5/2.5	2.5/2.5	2.5/2.5	4/4	6/4	10/6	16/10	50/50	2.5/2.5	2.5/2.5	10/6	10/6	1x95	1x185	2.5/25
		2xAWG	14/14	12/12	12/14	12/14	10/12	8/10	8/10	6/8	1/0 / 1/0	12/12	12/12	8/10	8/10	1x3/0	1xmcm 350	12/14
r: rigid/solid	min. r/f	$2xmm^2$	0.5/0.5	0.5/0.5	0.5/0.5	0.5/0.5	0.5/0.5	1.5/1.5	1.5/1.5	2.5/2.5	2.5/2.5	0.5/0.5	0.5/0.5	1.5/1.5	1.5/1.5	–	–	0.5/0.5
f: flexible/stranded		2xAWG	20/20	20/20	20/20	20/20	20/20	16/16	16/16	14/14	14/14	20/20	20/20	16/16	16/16	–	–	20/20
AMBIENT CONDITIONS																		
Operating temperature		°C	–25...+55															
Storage temperature		°C	–40...+70															

Moulded case circuit breakers

- Three-pole, IEC standard
- Four-pole, IEC standard
- Three-pole, UL489 standard
- Electronic trip unit
- Test button
- Trip indication on front
- Alarm LED on front
- Wide range of accessories.

	Sec. - Page
Moulded case circuit breakers	
Overview	13 - 2
Three-pole, IEC standard	13 - 4
Four-pole, IEC standard	13 - 4
Three-pole, UL489 standard	13 - 4
Accessories	**13 - 5**
Dimensions	**13 - 9**
Technical characteristics	**13 - 2**

Page 13-4

THREE-POLE, IEC STANDARD

- From 100A to 800A
- Electronic trip unit
- Breaking capacity Icu at 400V: from 50kA to 65kA
- Wide range of adjustable tripping current
- Short circuit tripping delay is selectable.

Page 13-4

FOUR-POLE, IEC STANDARD

- From 100A to 800A
- Electronic trip unit
- Breaking capacity Icu at 400V: from 50kA to 65kA
- Wide range of adjustable tripping current
- 4th pole on the left side
- Adjustable 4th pole protection
- Short circuit tripping delay is selectable.

Page 13-4

THREE-POLE, UL489 STANDARD

- From 100A to 600A
- Electronic trip unit
- Breaking capacity Icu at 480V: 65kA
- Wide range of adjustable tripping current
- Short circuit tripping delay.

IEC/EN/BS 60947-2 version								
	3-pole	**P5ME3PS0100**	**P5ME3PS0160**	**P5ME3PS0250**	**P5ME3PS0400**	**P5ME3PS0630**	**P5ME3PS0800**
	4-pole	**P5ME4PS0100**	**P5ME4PS0160**	**P5ME4PS0250**	**P5ME4PS0400**	**P5ME4PS0630**	**P5ME4PS0800**
Rated current (≤40°C)	A	100	160	250	400	630	800
Electronic overload trip adjustment range	A	40...100	64...160	100...250	160...400	252...630	320...800
Electronic short circuit trip adjustment range	A	60...1000	96...1600	150...2500	240...4000	378...6300	480...8000
AC rated operational voltage Ue	V	690	690	690	690	690	690
Rated insulation voltage Ui	V	1000	1000	1000	1000	1000	1000
Rated impulse withstand voltage Uimp	kV	8	8	8	8	8	8
Short circuit breaking capacity Icu							
220...240VAC 50/60Hz	kA	100	100	100	100	100	100
380...415VAC 50/60Hz	kA	50	50	50	65	65	65
440...460VAC 50/60Hz	kA	50	50	50	65	65	65
480...500VAC 50/60Hz	kA	42	42	42	42	42	42
525VAC 50/60Hz	kA	22	22	22	22	22	22
660...690VAC 50/60Hz	kA	10	10	10	10	10	10
Short circuit breaking capacity Ics							
220...240VAC 50/60Hz	kA	100	100	100	100	100	100
380...415VAC 50/60Hz	kA	50	50	50	65	65	65
440...460VAC 50/60Hz	kA	50	50	50	65	65	65
480...500VAC 50/60Hz	kA	42	42	42	42	42	42
525VAC 50/60Hz	kA	22	22	22	22	22	22
660...690VAC 50/60Hz	kA	5	5	5	10	10	10
Heat dissipation per pole (max)	W	9.6	16	16	48	83	76
Resistance per pole	mΩ	0.96	0.62	0.25	0.3	0.21	0.12
AMBIENT CONDITIONS							
Operating temperature	°C	-20...+70					
Storage temperature	°C	-40...+80					
Current derating for temperature > 40°C 50°C	A	94	150	234	375	591	750
60°C	A	88	141	220	353	555	705
70°C	A	82	131	205	328	517	656
Operating position Normal		On vertical plane					
Allowable		Any					
Fixing		Screw					
LIFE							
Mechanical	cycles	25,000			20,000	20,000	10,000
Electrical (Ie at 400V)	cycles	10,000			10,000	6,000	3,000
DIMENSIONS							
3P (WxHxD)	mm	105x160x86			140x260x110		210x320x135
4P (WxHxD)	mm	140x160x86			186x260x110		280x320x135

UL489 version

			P5ME3PH0100UL	P5ME3PH0250UL	P5ME3PH0400UL	P5ME3PH0600UL
	3-pole					
Rated current		A	100	250	400	600
Electronic overload trip adjustment range		A	40...100	80...250	150...400	225...600
Electronic short circuit trip adjustment range		A	60...1100	120...2750	225...4400	338...6600
AC rated operational voltage Ue		V	600	600	600	600
Rated insulation voltage Ui		V	750	750	750	750
Rated impulse withstand voltage Uimp		kV	8	8	8	8
UL489 short circuit breaking capacity						
240VAC 50/60Hz		kA	100	100	100	100
480VAC 50/60Hz		kA	65	65	65	65
600VAC 50/60Hz		kA	35	35	35	35
IEC60947-2 Icu short circuit breaking capacity						
220...240VAC 50/60Hz		kA	100	100	100	100
380...415VAC 50/60Hz		kA	65	65	65	65
480...500VAC 50/60Hz		kA	35	35	35	35
Heat dissipation per pole (max)		W	9.6	16	48	83
Resistance per pole		mΩ	0.96	0.25	0.3	0.21
AMBIENT CONDITIONS						
Operating temperature		°C	-20...+70			
Storage temperature		°C	-40...+80			
Current derating for temperature > 40°C	50°C	A	94	234	375	591
	60°C	A	88	220	353	555
	70°C	A	82	205	328	517
Operating position	Normal		On vertical plane			
	Allowable		Any			
Fixing			Screw			
LIFE						
Mechanical		cycles	25,000	25,000	20,000	20,000
Electrical (Ie at 400V)		cycles	10,000	10,000	10,000	6,000
DIMENSIONS						
3P (WxHxD)			105x165x87	105x190x87	140x290x110	140x340x110

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Electronic short circuit and overload protection IEC standard

P5ME3PS0100

new

Order code	Overload trip adjustment range	Short circuit trip adjustment range	Short circuit breaking capacity at 400V Icu	Ics	Qty per pkg	Wt
	[A]	[A]	[kA]	[kA]	n°	[kg]
Three-pole, IEC standard.						
P5ME3PS0100	40...100	60...1000	50	50	1	2.000
P5ME3PS0160	64...160	96...1600	50	50	1	2.000
P5ME3PS0250	100...250	150...2500	50	50	1	2.000
P5ME3PS0400	160...400	240...4000	65	65	1	5.400
P5ME3PS0630	252...630	378...6300	65	65	1	5.400
P5ME3PS0800	320...800	480...8000	65	65	1	15.100

P5ME4PS0100

new

Order code	Overload trip adjustment range	Short circuit trip adjustment range	Short circuit breaking capacity at 400V Icu	Ics	Qty per pkg	Wt
	[A]	[A]	[kA]	[kA]	n°	[kg]
Four-pole, IEC standard. Fourth pole on the left side.						
P5ME4PS0100	40...100	60...1000	50	50	1	2.600
P5ME4PS0160	64...160	96...1600	50	50	1	2.600
P5ME4PS0250	100...250	150...2500	50	50	1	2.600
P5ME4PS0400	160...400	240...4000	65	65	1	7.200
P5ME4PS0630	252...630	378...6300	65	65	1	7.200
P5ME4PS0800	320...800	480...8000	65	65	1	19.600

Electronic short circuit and overload protection UL489 standard

P5ME3PS0100

new

Order code	Overload trip adjustment range	Short circuit trip adjustment range	Short circuit breaking capacity at 480V	Qty per pkg	Wt
	[A]	[A]	[kA]	n°	[kg]
Three-pole, UL489 standard.					
P5ME3PH0100UL	40...100	60...1100	65	1	1.790
P5ME3PH0250UL	80...250	120...2750	65	1	2.040
P5ME3PH0400UL	150...400	225...4400	65	1	6.300
P5ME3PH0600UL	225...600	338...6600	65	1	7.160

General characteristics

Lovato Electric MOULDED CASE CIRCUIT BREAKERS (MCCBs) are technologically advanced devices with electronic trip units. These breakers offer a wide current adjustment range, ensuring high precision in tripping and providing the flexibility to set a short tripping delay in the event of a short circuit. The incorporation of a modern and efficient contact operating system joined with high-performance arc chambers improves the reliability and functionality of these circuit breakers. This comprehensive range includes MCCBs compliant with either IEC or UL standards.

The operating lever is equipped with a trip position, serving as an indicator for openings resulting from faults in the plant. A useful test button facilitates the verification of the plant's signalling system. Additionally, a LED on the MCCB's front signals a high current level that may cause the breaker to trip. In the four pole version, a dedicated adjuster allows for the specific setting of tripping current on the 4th pole, which can differ from the three main poles.

Moreover, Lovato Electric MCCBs distinguish themselves by offering a wide range of accessories, making them the ideal choice for constructing modern and efficient systems.

All the MCCB are supplied with a kit of fixing screws and, for IEC versions, also with phase barriers.

Operational characteristics

- IEC rated insulation voltage Ui: 1000V
- IEC rated impulse withstand voltage: 8kV
- IEC rated frequency: 50/60Hz
- IEC breaking capacity: See table on page 13-2
- Mounting position: Any
- IEC degree of protection: IP20 on front
- Storage temperature: -40°C...+80°C
- Operating temperature: -20°C...+70°C (with derating above 40°C)

Certifications and compliance

Certifications obtained: cULus for P5ME...UL versions.

Compliant with standards: IEC/EN/BS 60947-2; UL489 for P5ME…UL versions.

Add-on blocks and accessories

P5X1011

P5X1311

P5X14....

P5X16....

new

P5X1847...

P5X19...

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Add-on auxiliary contacts.			
P5X1011❶	One changeover contact. Screw terminals.	1	0.025
Add-on auxiliary contacts for tripping indication.			
P5X1311❶	One changeover contact for overload and short circuit tripping indication and shunt trip or undervoltage release. Wired.	1	0.038
P5X1311E	One changeover contact for overload and short circuit tripping indication. Wired.	1	0.038
Undervoltage trip releases.			
P5X14E024❶	24VAC/DC	1	0.095
P5X14E048❶	48VAC/DC	1	0.095
P5X14E110❶	110...130VAC/DC	1	0.095
P5X14E230❶	220...240VAC - 250VDC	1	0.095
P5X14A400❶	380...440VAC	1	0.095
P5X14A440❶	440...480VAC	1	0.095
Shunt trip releases.			
P5X16D012❶	12VDC	1	0.095
P5X16E024❶	24VAC/DC	1	0.095
P5X16E048❶	48VAC/DC	1	0.095
P5X16E110❶	110...130VAC/DC	1	0.095
P5X16E230❶	220...240VAC - 250VDC	1	0.095
P5X16A400❶	380...500VAC	1	0.095
IP65 (UL Type 4 / 4X) red/yellow padlockable door coupling handle complete with shaft.			
P5X18471	For P5ME…0100..., P5ME...0160... and P5ME...0250...; shaft length 469mm/18.5”	1	0.750
P5X18472	For P5ME...0400... and P5ME...0630...; shaft length 469mm/18.5”	1	0.830
P5X18473	For P5ME...0800; shaft length 469mm/18.5”	1	0.940
IP65 (UL Type 4 / 4X) grey padlockable door coupling handle complete with shaft.			
P5X18471B	For P5ME...0100..., P5ME...0160... and P5ME...0250...; shaft length 469mm/18.5”	1	0.850
P5X18472B	For P5ME...0400... and P5ME...0630...; shaft length 469mm/18.5”	1	0.830
P5X18473B	For P5ME...0800; shaft length 469mm/18.5”	1	0.940
Motor operator for remote operation.			
P5X191D024	24VDC for P5ME...0100..., P5ME...0160... and P5ME...0250...	1	0.850
P5X191E110	110VAC/DC for P5ME...0100..., P5ME...0160... and P5ME...0250...	1	0.850
P5X191E230	230VAC / 220VDC for P5ME...0100..., P5ME...0160... and P5ME...0250...	1	0.850
P5X192D024	24VDC for P5ME...0400... and P5ME...0630...	1	1.130
P5X192E110	110VAC/DC for P5ME...0400... and P5ME...0630...	1	1.130
P5X192E230	230VAC / 220VDC for P5ME...0400... and P5ME...0630...	1	1.130
P5X193D024	24VDC for P5ME...0800	1	1.130
P5X193E110	110VAC/DC for P5ME...0800	1	1.130
P5X193E230	230VAC / 220VDC for P5ME...0800	1	1.130

❶ Add UL at the end of the code for accessories to be added to UL certified MCCBs.

ADD-ON AUXILIARY CONTACTS
- Snap mounting under the front cover
- Max 2 blocks for MCCBs up to 250A
- Max 3 blocks for MCCBs from 400A to 800A
- Screw connection
- Screw tightening tool: Pozidriv 2
- Conductor cross section minimum-maximum: 0.5...1.5mm² or 20...16AWG
- Tightening torque: 0.8Nm/7lb.in
- 250VAC - 3A; 250VDC 0.2A.

ADD-ON AUXILIARY CONTACTS FOR TRIPPING INDICATION
- Snap mounting under the front cover
- Max 2 blocks for MCCBs up to 250A (1x P5X1311 and 1x P5X1311E)
- Max 3 blocks for MCCBs from 400A to 800A (2x P5X1311 and 1x P5X1311E)
- Wired with 500mm (20”) long wires
- 250VAC - 3A; 250VDC 0.2A.

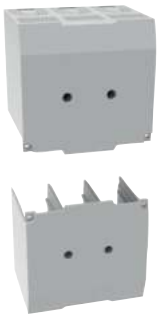
UNDERVOLTAGE TRIP RELEASES
- Snap mounting under the front cover
- Consumption AC version: ≤1.7VA
- Consumption DC version: ≤1.4W
- Release voltage: 0.35...0.7Us
- Operating voltage: 0.85...1.1Us
- Screw connection
- Screw tightening tool: Pozidriv 2
- Conductor cross section minimum-maximum: 0.5...1.5mm² or 20...16AWG
- Tightening torque: 0.8Nm/7lb.in.

SHUNT TRIP RELEASES
- Snap mounting under the front cover
- Consumption AC version: ≤1.8VA
- Consumption DC version: ≤1.9W
- Operating voltage: 0.7...1.1Us
- Screw connection
- Screw tightening tool: Pozidriv 2
- Conductor cross section minimum-maximum: 0.5...1.5mm² or 20...16AWG
- Tightening torque: 0.8Nm/7lb.in.

PADLOCKABLE DOOR COUPLING HANDLES
- IEC degree of protection: IP65
- Degree of protection according to UL: Type 1, 2, 3R, 12, 12K, 4, 4X; external use
- Padlock diameter required: 6mm (0.24”) max
- Door coupling feature defeatable per UL508A
- Front plate dimensions: 76x76mm (3”x3”).

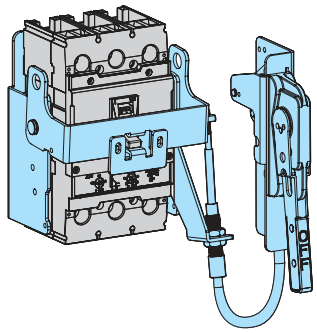
MOTOR OPERATOR
- Manual operation possible
- Front On/Off/Trip indicator
- Trip test button
- On/Off/Reset selection lever
- Man/Auto selection lever
- Operating time closing/opening
  P5X191... 350/230ms
  P5X192... 500/350ms
  P5X193... 700/420ms
- Mechanical life
  P5X191... 25.000 cycles
  P5X192... 20.000 cycles
  P5X193... 10.000 cycles
- Tightening torque: 1.2Nm/10lb.in.

Add-on blocks and accessories



P5X831L

P5X504



P5X194X...

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Power terminal protections. Long version. Three-pole terminal cover.			
P5X831L	For P5ME3PS0100, P5ME3PS0160 and P5ME3PS0250	1	0.295
P5X832L	For P5ME3PS0400 and P5ME3PS0630	1	0.350
P5X833L	For P5ME3PS0800	1	0.440
Four-pole terminal covers.			
P5X841L	For P5ME4PS0100, P5ME4PS0160 and P5ME4PS0250	1	0.395
P5X842L	For P5ME4PS0400 and P5ME4PS0630	1	0.468
P5X843L	For P5ME4PS0800	1	0.585
Power terminal protections. Short version. Three-pole terminal cover.			
P5X831S	For P5ME3PS0100, P5ME3PS0160 and P5ME3PS0250	1	0.142
P5X832S	For P5ME3PS0400 and P5ME3PS0630	1	0.175
P5X833S	For P5ME3PS0800	1	0.240
Four-pole terminal covers.			
P5X841S	For P5ME4PS0100, P5ME4PS0160 and P5ME4PS0250	1	0.190
P5X842S	For P5ME4PS0400 and P5ME4PS0630	1	0.283
P5X843S	For P5ME4PS0800	1	0.320
Terminal clamp sets for rigid and flexible cables.			
P5X501	For P5ME3PH0100UL; 3-piece set	1	0.450
P5X502	For P5ME3PH0250UL; 3-piece set	1	0.660
P5X503	For P5ME3PH0400UL; 6-piece set	1	0.180
P5X504	For P5ME3PH0600UL; 6-piece set	1	0.220
Handles with cable operating mechanism.			
P5X194X1UL	Handle for P5ME3PH0100UL and P5ME3PH0250UL. Degree of protection according to UL: Type 4, 4X	1	1.230
P5X194X2UL	Handle for P5ME3PH0400UL and P5ME3PH0600UL. Degree of protection according to UL: Type 4, 4X	1	1.710
P5X19L36UL	Cable for handle P5X194X... 36 inch long (915mm)	1	0.630
P5X19L48UL	Cable for handle P5X194X... 48 inch long (1219mm)	1	0.840
P5X19L60UL	Cable for handle P5X194X... 60 inch long (1524mm)	1	1.050

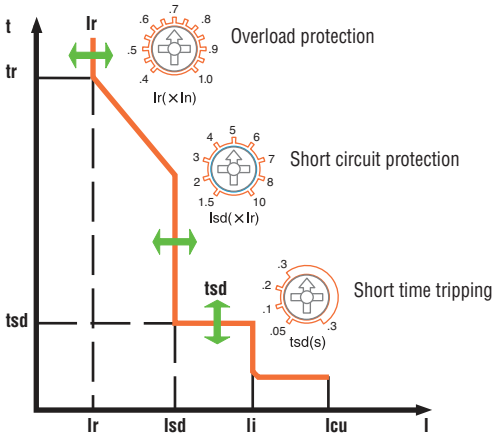
new

POWER TERMINAL PROTECTIONS
The availability of two versions, the long and short covers, ensures adaptability in protection to accommodate various types of wiring configurations.

TERMINAL CLAMP SETS
Terminal clamp sets are required for MCCBs UL certified. They are robust aluminium clamps with allen key screws.

HANDLES WITH CABLE OPERATING MECHANISM
Mounted on the panel door or structure, this device is used to operate MCCBs according with NFPA and UL508A Standards. It achieves this through the utilization of cables of various lengths, 36, 48 or 60 inches, which operate the MCCB by means a structure positioned on the front of the circuit breaker.
The handles have NEMA protection degree 4, 4X.

MCCB setting for IEC version



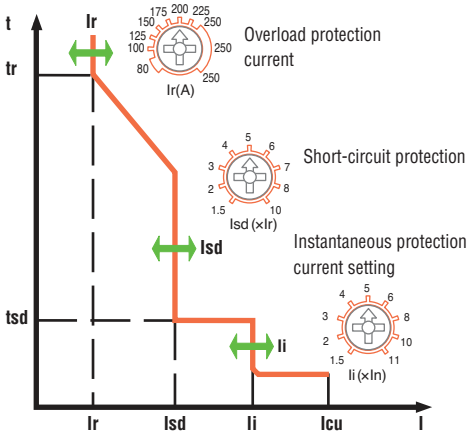
1. Overload protection Ir(xIn).
The adjuster sets the rated overload protection current of the MCCB. The value indicated in the scale must be multiplied by the rated current of the MCCB.
E.G. If we set .5 on a MCCB with a rated current of 250A the overload overload protection level will be 250x0.5=125A.

2. Short circuit protection Isd(xIr).
The adjuster sets the short circuit current tripping threshold. The value indicated on the scale must be multiplied by the overload protection current Ir(xIn).
See explanation above.
E.G. If we set 8 on the adjuster when the overload protection is set at 250A the short circuit protection threshold will be 250x8=2000A.

3. Short time tripping delay tsd(s).
The adjuster set a tripping delay in case of a short circuit which gives time for downstream protections to trip, avoiding the simultaneous opening of both the general protection and the protection of the individual section of the system ensuring continuity of service of the plant branches not involved in the failure.
The delay can be set from 0.05s to 0.3s.
NOTE: the delay is valid with a short circuit current up to Inx11.
E.g. On an MCCB rated 250A, with a current over 250x11=2750A, the tripping will be instantaneous.

4th pole settings
The 4th pole has a dedicated adjuster to select a specific protection. It can be set as: no protection, protection at 50% of In, 100% of In.

MCCB setting for UL489 version



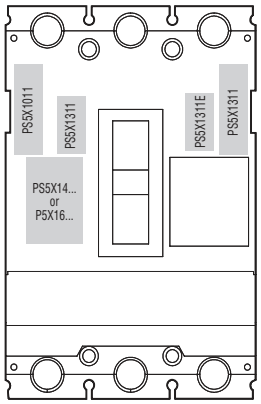
1. Overload protection Ir(A).
The adjuster sets the rated overload protection current of the MCCB. If we set 100A on an MCCB with a rated current of 250A, the overload protection threshold will be 100A.
The tripping time at 6xIr is fixed at 16s. For lower overloads, the tripping time increases up to 150s with an overload current of 2xIr.

2. Short circuit protection Isd(xIr).
The adjuster sets the short circuit current tripping threshold. The value indicated on the scale must be multiplied by the overload protection current Ir(A).
See explanation above.
E.G. If we set 8 on the adjuster when the overload protection is set at 250A the short circuit protection threshold will be 250x8=2000A.
NOTE: The MCCB has a non-adjustable tripping delay of 70ms...140ms. For instantaneous tripping see item 3.

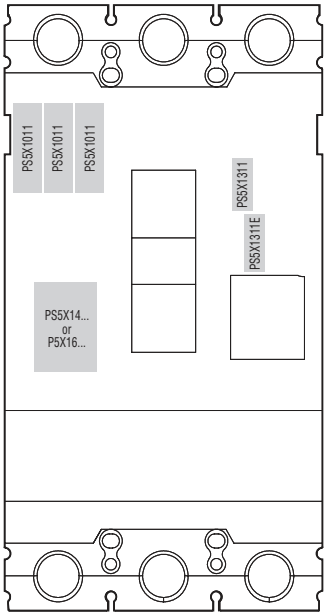
3. Instantaneous protection current setting Ii (xIn).
The adjuster sets the instantaneous tripping threshold. The value indicated on the scale must be multiplied by the rated current of the MCCB.
E.G. If we set 10 on the adjuster of an MCCB with a rated current In of 250A, the short circuit protection threshold will be 250x10=2500A.
The tripping time is less than 60ms.

Combinations for IEC version

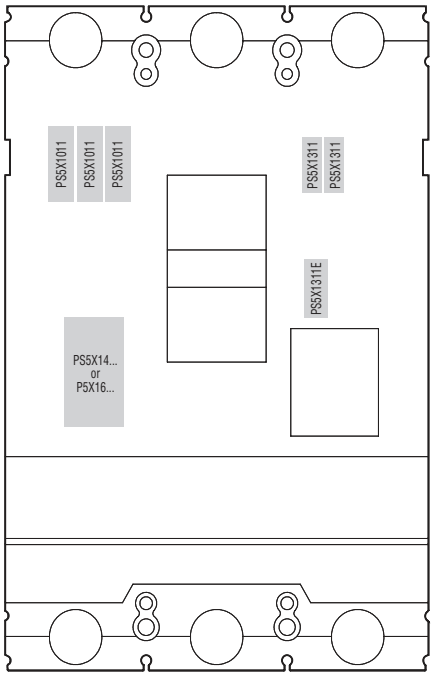
P5ME3PS0100
P5ME3PS0160
P5ME3PS0250



P5ME3PS0400
P5ME3PS0630



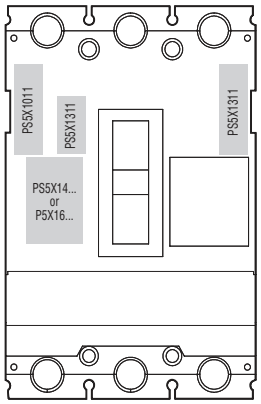
P5ME3PS0800



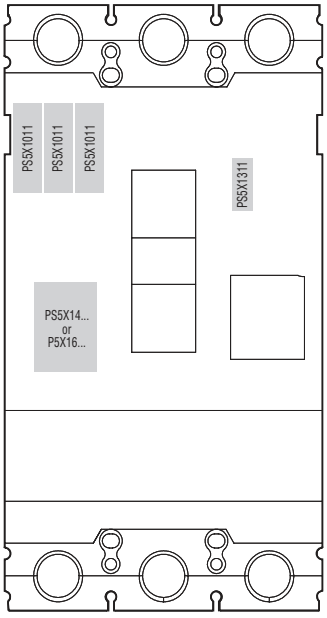
P5X1011 Auxiliary contact.
P5X1311 Auxiliary contacts for tripping indication.
P5X1311E Auxiliary contacts for tripping indication.
P5X14... Undervoltage trip releases.
P5X16... Shunt trip releases.

Combinations for UL489 version

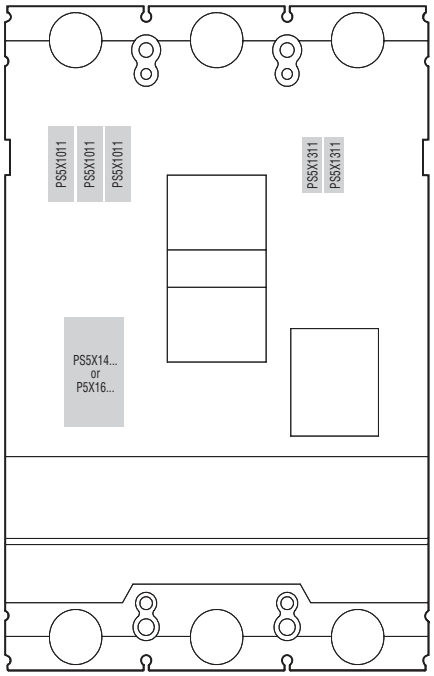
P5ME3PH0100UL
P5ME3PH0250UL



P5ME3PH0400UL

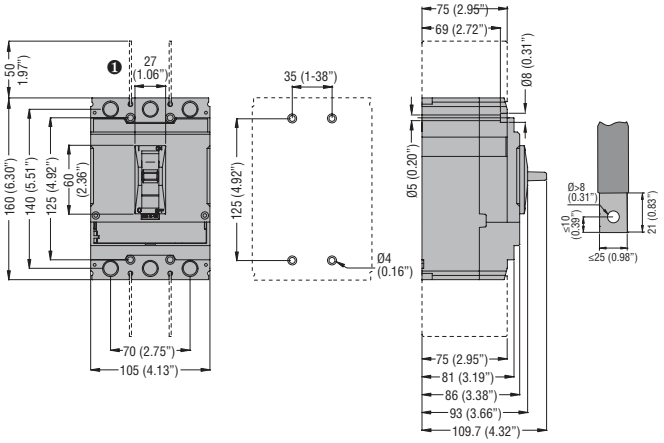


P5ME3PH0600UL

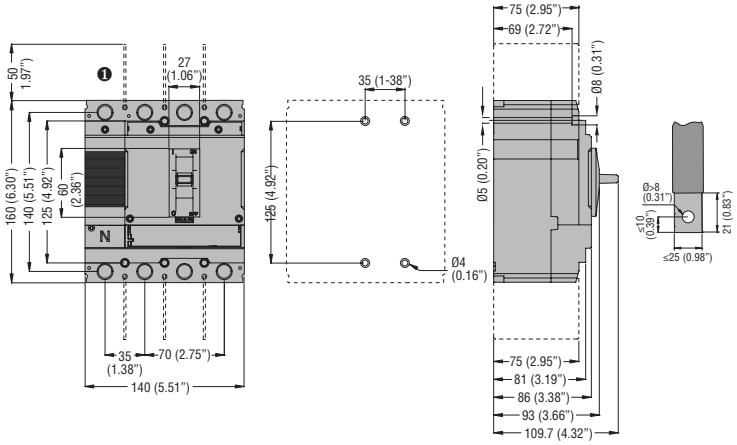


P5X1011UL Auxiliary contact.
P5X1311UL Auxiliary contacts for tripping indication.
P5X14...UL Undervoltage trip releases.
P5X16...UL Shunt trip releases.

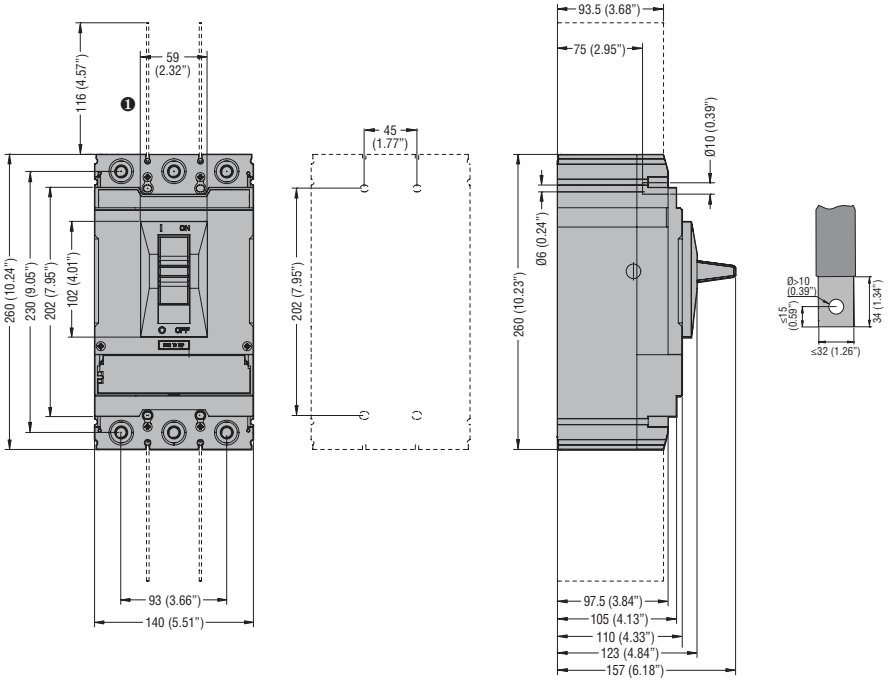
P5ME3PS0100 - P5ME3PS0160 - P5ME3PS0250



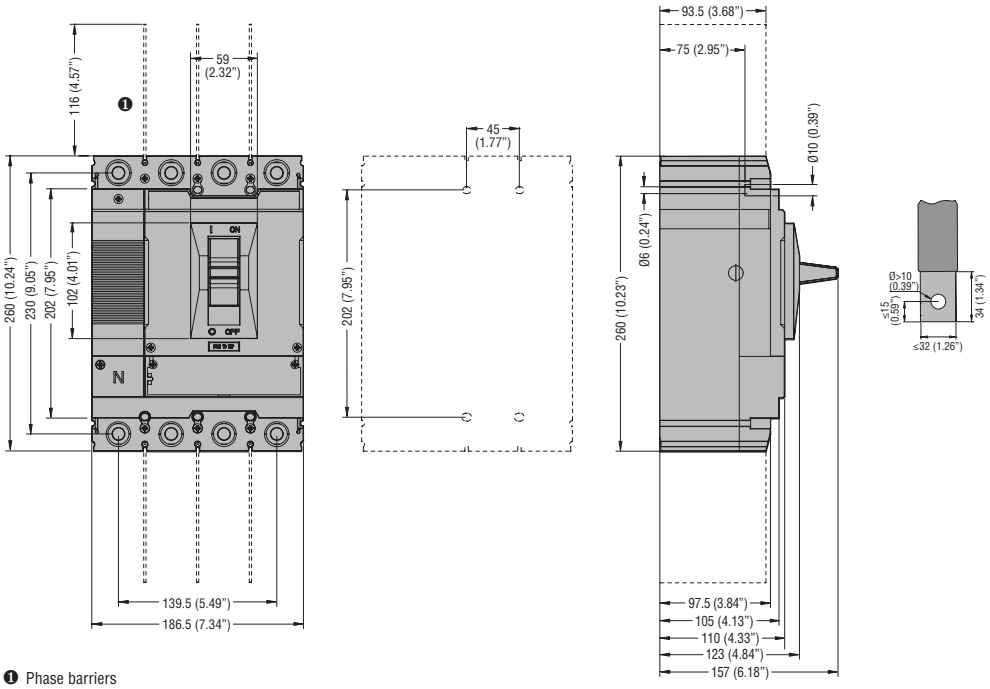
P5ME4PS0100 - P5ME4PS0160 - P5ME4PS0250



P5ME3PS0400 - P5ME3PS0630

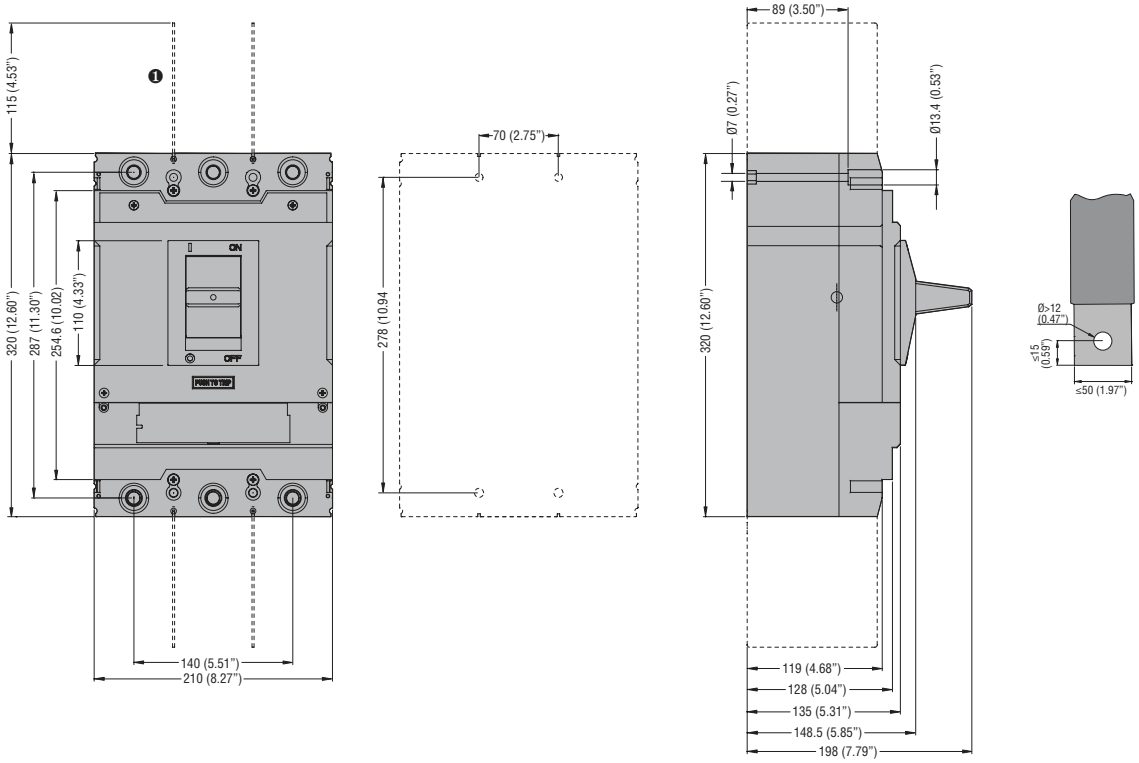


P5ME4PS0400 - P5ME4PS0630

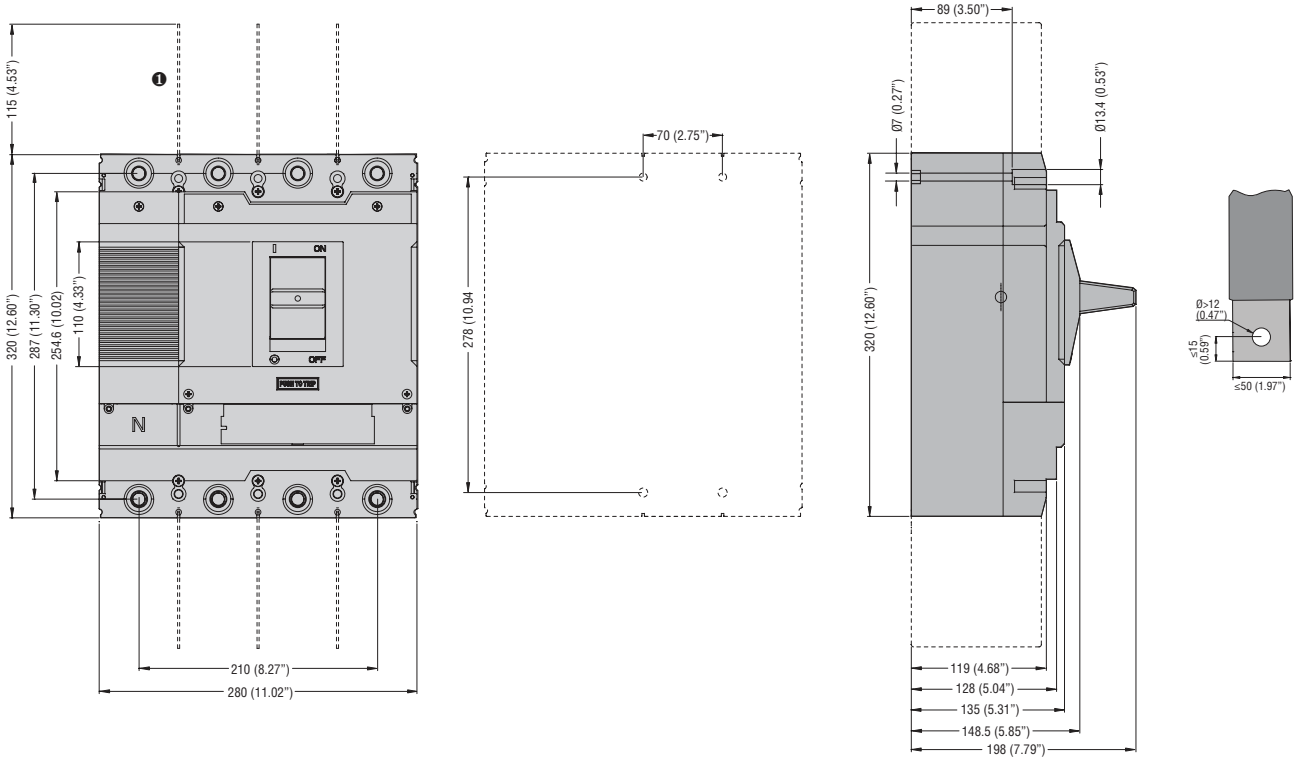


❶ Phase barriers

P5ME3PS0800

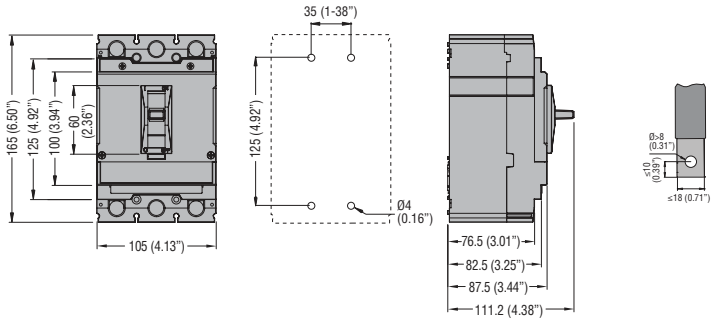


P5ME4PS0800

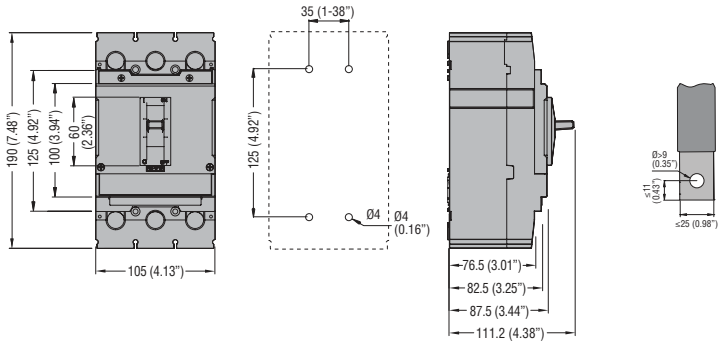


❶ Phase barriers

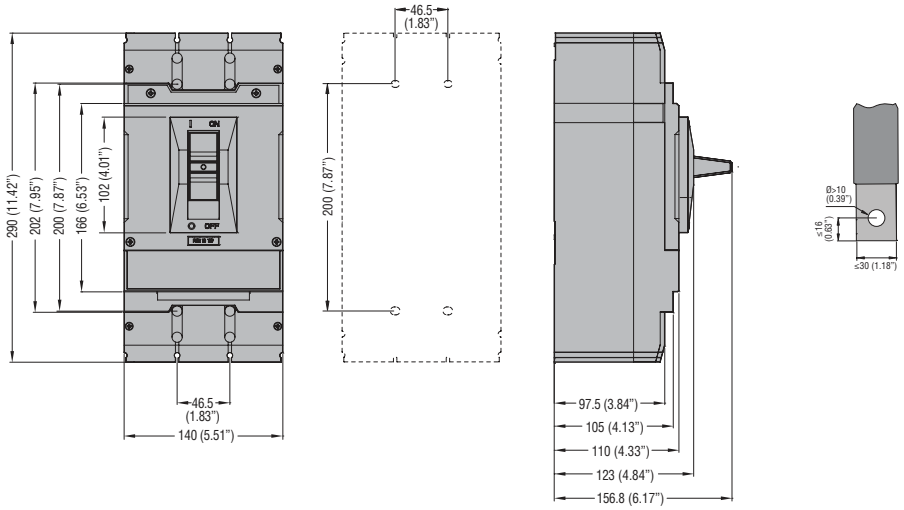
P5ME3PH0100UL



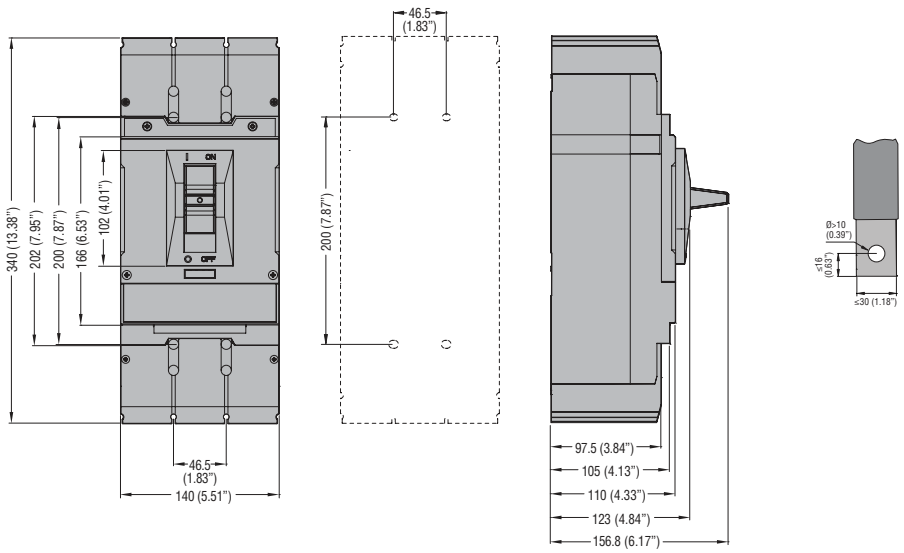
P5ME3PH0250UL



P5ME3PH0400UL



P5ME3PH0600UL



Switch disconnectors

- 16A to 3150A ratings
- Versions: direct operating handle, door coupling, door mount and in enclosure
- Wide range of accessories
- Versions for photovoltaic applications up to 850A at 1000VDC (DC21B) and up to 315A at 1500VDC (DCPV1)
- Switch disconnectors and manual changeover switches in plastic and metal enclosure.

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GA SERIES
16A TO 160A (AC21A)

- UL60947-4-1 and UL98 certified three-pole switch disconnectors; add-on fourth pole available
- Switch disconnectors with direct operating handle and door coupling version
- Switch disconnectors door mount version
- Switch disconnectors in plastic, metal and AISI 304 stainless-steel enclosure
- Manual changeover switches in plastic and metal enclosure.

Page 14-32

GL SERIES
100A TO 1000A (AC23A)

- IEC/EN/BS and UL98 certified three-pole switch disconnectors; add-on fourth pole available
- Switch disconnectors with direct operating handle and door coupling version
- IEC/EN/BS and UL1008 certified manual changeover switches
- IEC/EN/BS and UL1008 certified motorised changeover switches
- Switch disconnectors in metal enclosure
- Manual changeover switches in metal enclosure.

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GE SERIES
50A TO 3150A (AC21A)

- IEC/EN/BS version three and four-pole switch disconnectors
- IEC/EN/BS version three and four-pole switch disconnectors with NFC and NH fuse holders
- Switch disconnectors with direct operating and door coupling version
- Three and four-pole changeover switches; add-on motorised control unit available.

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GM SERIES
30A TO 800A (AC21A)

- UL98 certified three-pole switch disconnectors with CC, J and L type fuse holders
- Switch disconnectors with fuse holders direct operating handle and door coupling version.

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FOR PHOTOVOLTAIC APPLICATIONS UP TO 850A AT 1000VDC (DC21B) AND UP TO 315A AT 1500VDC (DCPV1)

- Switch disconnectors
- Direct operating and door coupling versions
- Switch disconnectors in plastic enclosure.

GA series
16A to 160A

	DIRECT OPERATING HANDLE AND DOOR COUPLING VERSION											DOOR MOUNT VERSION										
	36mm/1.42" width					70mm/2.75" width						36mm/1.42" width					70mm/2.75" width					
AC21A (IEC/EN/BS)	16A	25A	32A	40A	63A	30A	63A	80A	100A	125A	160A	16A	25A	32A	40A	63A	30A	63A	80A	100A	125A	160A
GENERAL USE 600VAC (UL/CSA)	16A	25A	32A	40A	60A	30A	60A	100A	100A	100A	–	16A	25A	32A	40A	–	30A	60A	100A	100A	100A	–
SWITCH DISCONNECTORS																						
Certifications UL60947-4-1	●	●	●	●	●							●	●	●	●							
UL98						●	●	●	●	●							●	●	●	●	●	
Three-pole	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
4th pole - simultaneous closing		●			●		●	●	●	●	●			●				●	●	●	●	●
4th pole - early make		●			●			●						●					●			
Fuse holder 10x38mm		●																				
Fuse holder 10x38mm type CC		●																				
Mechanical 6-8 pole coupling system			●					●														
Mechanical interlock for line switching			●						●													
MANUAL CHANGEOVER SWITCHES																						
Three-pole IEC/EN/BS		●		●	●			●		●	●											
Four-pole IEC/EN/BS		●		●	●			●		●	●											

GA series
16A to 160A
in enclosure

	PLASTIC ENCLOSED VERSION WITH RED/YELLOW OR BLACK HANDLE										METAL ENCLOSED VERSION WITH RED/YELLOW OR BLACK HANDLE									
AC21A (IEC/EN/BS)	16A	25A	32A	40A	63A	63A	80A	100A	125A	160A	16A	25A	32A	40A	63A	63A	80A	100A	125A	160A
GENERAL USE 600VAC (UL/CSA)	16A	25A	32A	40A	60A	60A	100A	100A	100A	-	-	-	-	-	-	-	-	-	-	-
SWITCH DISCONNECTORS																				
Three-pole IEC/EN/BS	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Four-pole IEC/EN/BS	●		●	●	●	●		●	●	●	●		●	●	●	●		●	●	●
Three-pole UL 60947-4-1	●	●	●	●	●															
Three-pole UL98						●	●	●	●											
Four-pole UL 60947-4-1																				
Four-pole UL98						●		●	●											
MANUAL CHANGEOVER SWITCHES																				
Three-pole IEC/EN/BS												●		●	●		●		●	●
Four-pole IEC/EN/BS												●		●	●		●		●	●
Three-pole UL 60947-4-1		●		●	●															
Three-pole UL98							●		●											
Four-pole UL 60947-4-1		●		●	●															
Four-pole UL98							●		●											

	STAINLESS STEEL AISI 304 ENCLOSED VERSION WITH RED/YELLOW OR BLACK HANDLE						
AC21A (IEC/EN/BS)	16A	25A	32A	40A	63A	63A	100A
SWITCH DISCONNECTORS							
Three-pole IEC/EN/BS	●	●	●	●	●	●	●

GL series
100A to 1000A

	DIRECT OPERATING HANDLE AND DOOR COUPLING VERSION												METAL ENCLOSED VERSION			
AC21A (IEC/EN/BS)	-	125A	160A	200A	250A	315A	320A	400A	500A	630A	800A	1000A	160A	200A	250A	315A
GENERAL USE 600VAC (UL/CSA)	100A	-	-	200A	-	-	-	400A	-	600A	800A	-	-	-	-	-
SWITCH DISCONNECTORS																
Three-pole IEC/EN/BS			●	●	●	●	●	●	●	●	●	●	●	●	●	●
Three-pole UL98	●			●				●		●	●					
4th pole - simultaneous closing	●							●					●	●	●	●
MANUAL CHANGEOVER SWITCHES																
Three and four-pole IEC/EN/BS			●	●	●	●	●	●	●	●	●	●	●	●	●	●
Three and four-pole UL1008	●			●				●								
MOTORISED CHANGEOVER SWITCHES																
Three and four-pole IEC/EN/BS		●	●	●	●	●										
Three and four-pole UL1008	●			●												

GE series
50A to 3150A

	DIRECT OPERATING AND DOOR COUPLING VERSION																		
AC21A (IEC/EN/BS)	50A	63A	100A	125A	160A	200A	250A	315A	400A	500A	630A	800A	1000A	1250A	1600A	2000A	2500A	3150A
SWITCH DISCONNECTORS																		
Three and four-pole					●	●	●	●	●	●	●	●	●	●	●			
Three and four-pole with NFC fuse holder	●		●	●														
Three and four-pole with NH fuse holder		●	●	●	●		●		●		●	●						
CHANGEOVER SWITCHES																		
Three and four-pole					●	●	●	●	●	●	●	●	●	●	●	●	●	●
Motorised control unit						●		●			●			●	●	●	●	●

GM series
30A to 800A

	DIRECT OPERATING AND DOOR COUPLING VERSION						
GENERAL USE 600VAC (UL/CSA)	30A	60A	100A	200A	400A	600A	800A
DISCONNECT SWITCHES WITH FUSE HOLDERS							
UL98 three-pole with CC type fuse holders	●						
UL98 three-pole with J type fuse holders		●	●	●	●	●	
UL98 three-pole with L type fuse holders							●

For photovoltaic applications

CONVENTIONAL THERMAL CURRENT Ith DC21B (800V)	DIRECT OPERATING AND DOOR COUPLING VERSION														PLASTIC ENCLOSED VERSION		
	15A	25A	32A	40A	100A	125A	160A	200A	250A	280A	315A	600A	630A	1000A	25A	32A	40A
Switch disconnectors GA series	●																
Switch disconnectors GD series		●❷	●❷	●❷											●❷	●❷	●❷
Switch disconnectors GLD series					●❶		●❶	●❶	●❶		●❷						
Switch disconnectors GE series						●			●	●		●	●	●			

❶ Up to 1500V (DCPV1). ❷ Up to 1000V (DCPV1).

Switch disconnectors and manual changeover switches
GA series

Type		IEC conventional free air thermal current Ith AC21A (≤690V)	IEC rated operational current Ie			General purpose current	Max 3-phase horse-power rating	IEC reactive power for control of capacitors	Fourth pole	
Direct operating or door coupling	Door mounting		AC23A (400V)	AC23A (500V)	AC23A (690V)	(UL)	(UL)	400V	Direct operating or door coupling	Door mounting
Order code	Order code	[A]	[A]	[A]	[A]	[A]	[HP/V]	[kvar]	Order code	Order code
IEC/EN/BS and UL60947-4-1 three-pole switch disconnectors GA series.										
GA016A	**GA016C**	16	16	16	16	16	5/240 10/480 10/600	7.5	**GAX42040A** **GAX41040A**	**GAX42040C** **GAX41040C**
GA025A	**GA025C**	25	25	25	25	25	7.5/240 15/480 20/600	10		
GA032A	**GA032C**	32	32	25	25	32	10/240 20/480 20/600	12.5		
GA040A	**GA040C**	40	40	25	25	40	15/240 20/480 25/600	15		
GA063SA	**GA063SC**	63	45	25	25	60	15/240 30/480 32/600	15	**GAX42063SA**	**GAX42063SC**
IEC/EN/BS and UL98 three-pole switch disconnectors GA series.										
GA030A	**GA030C**	30	30	30	30	30	10/240 20/480 30/600	12.5	**GAX42063A** **GAX41125A**	**GAX42063C** **GAX41125C**
GA063A	**GA063C**	63	63	63	47	60	20/240 40/480 40/600	25		
GA080A	**GA080C**	80	80	63	47	100	25/240 40/480 40/600	30	**GAX42080A** **GAX41125A**	**GAX42080C** **GAX41125C**
GA100A	**GA100C**	100	100	80	47	100	30/240 50/480 50/600	40	**GAX42100A** **GAX41125A**	**GAX42100C** **GAX41125C**
GA125A	**GA125C**	125	125	100	47	100	30/240 60/480 60/600	50	**GAX42125A** **GAX41125A**	**GAX42125C** **GAX41125C**
IEC/EN/BS three-pole switch disconnectors GA series.										
GA160A	**GA160C**	160	125	100	47	–	–	50	**GAX42160A**	**GAX42160C**
IEC/EN/BS three-pole manual changeover switches GA series.										
GA025ET6	–	25	25	25	25	–	–	–	**GAX42040A** **GAX41040A**	–
GA040ET6		40	40	25	25					
GA063SAET6		63	45	25	25				**GAX42063SA**	
GA080ET6		80	80	63	47				**GAX42080A** **GAX41125A**	
GA125ET6		125	125	100	47				**GAX42125A** **GAX41125A**	
GA160ET6		160	125	100	47				**GAX42160A**	
IEC/EN/BS four-pole manual changeover switches GA series.										
GA025ET8	–	25	25	25	25	–	–	–	**Integrated fourth pole GAX42...**	–
GA040ET8		40	40	25	25					
GA063SAET8		63	45	25	25					
GA080ET8		80	80	63	47					
GA125ET8		125	125	100	47					
GA160ET8		160	125	100	57					

❶ Only for GA...A..., GA016C...GA040C, GA063SC.
❷ Only for GA...A...
❸ Only for GA030A..., GA063A...GA160A....
❹ Only for GA016A...GA040A..., GA063SA..., GA016C...GA040C, GA063SC.

	Neutral terminal		Earth/ground terminal		Direct operating handle (only for GA...C)		Door coupling handle (only for GA...A)		Shaft extensions for door coupling handles	Auxiliary contacts	Terminal covers
	Direct operating or door coupling	Door mounting	Direct operating or door coupling	Door mounting	Black	Red/yellow	Black	Red/yellow			
	Order code	Order code	Order code	Order code	Order code	Order code	Order code	Order code	Order code	Order code	Order code
	GAX31A	GAX31C	GAX33A	GAX33C	GAX61B GAX62B GAX63B GAX63KB GAX631B GAX632B GAX64B GAX68B	GAX61 GAX62 GAX63 GAX63K GAX632 GAX64 GAX68	GAX61B GAX62B GAX63B GAX63KB GAX631B GAX632B GAX64B GAX68B	GAX61 GAX62 GAX63 GAX63K GAX632 GAX64 GAX68	GAX7055 GAX7070 GAX7090 GAX7150 GAX7200 GAX7300 GAX7400 GAX7500	GAX1011A GAX1020A GAX1110EA	GAX83 GAX81
	GAX32A	GAX32C	GAX34A	GAX34C	GAX61B GAX62B GAX63B❶ GAX63KB❶ GAX631B❶ GAX632B❷ GAX64B❷ GAX66NB❸ GAX68B❹	GAX61 GAX62 GAX63❶ GAX63K❶ GAX632❷ GAX64❷ GAX66N❸ GAX68❹	GAX61B GAX62B GAX63B❶ GAX63KB❶ GAX631B❶ GAX632B❷ GAX64B❷ GAX66NB❸ GAX68B❹	GAX61 GAX62 GAX63❶ GAX63K❶ GAX632❷ GAX64❷ GAX66N❸ GAX68❹	GAX7055 GAX7070 GAX7090 GAX7150 GAX7200 GAX7300 GAX7400 GAX7500 GAX7150AN GAX7200AN GAX7300AN GAX7400AN GAX7500AN	GAX1011A GAX1020A GAX1210EA	GAX84 GAX82
	GAX32A	GAX32C	GAX34A	GAX34C	GAX61B GAX62B GAX63B GAX63KB GAX631B GAX632B GAX64B GAX66NB GAX68B	GAX61 GAX62 GAX63 GAX63K GAX632 GAX64 GAX66N GAX68	GAX61B GAX62B GAX63B GAX63KB GAX631B GAX632B GAX64B GAX66NB GAX68B	GAX61 GAX62 GAX63 GAX63K GAX632 GAX64 GAX66N GAX68	GAX7055 GAX7070 GAX7090 GAX7150... GAX7200... GAX7300... GAX7400... GAX7500...	GAX1011A GAX1020A GAX1210EA	GAX84 GAX82
	GAX31A	–	GAX33A	–	Built-in with mechanical interlock	–	GAX67B	–	GAX7055 GAX7070 GAX7090 GAX7150 GAX7200 GAX7300 GAX7400 GAX7500	GAX1011A GAX1020A GAX1110EA	GAX83 GAX81
	GAX32A		GAX34A							GAX1011A GAX1020A GAX1110EA	GAX84 GAX82
	GAX31A	–	GAX33A	–	Built-in with mechanical interlock	–	GAX67B	–	GAX7055 GAX7070 GAX7090 GAX7150 GAX7200 GAX7300 GAX7400 GAX7500	GAX1011A GAX1020A GAX1110EA	GAX83 GAX81
	GAX32A		GAX34A							GAX1011A GAX1020A GAX1110EA	GAX84 GAX82

Switch disconnectors and manual changeover switches IEC/EN/BS
GL series

IEC/EN/BS

Type	IEC conventional free air thermal current Ith	IEC rated operational current Ie		IEC reactive power for control of capacitors 400V	Fourth pole	Neutral terminal	Earth/ ground terminal	Direct operating handle	
	AC21A (≤690V)	AC23A (≤400V)	AC23A (≤500V)					Black	Red/Yellow
Order code	[A]	[A]	[A]	[kvar]	Order code	Order code	Order code	Order code	Order code
IEC/EN/BS three-pole switch disconnectors.									
GL0160C1	160	160	160	80	**GLX420315**	**GLX300**	**GLX301**	**GLX61DB**	**GLX61D**
GL0200C1	200	200	200	100					
GL0250C1	250	250	250	115					
GL0315C1	315	315	250	145					
GL0320C1	320	320	320	145	**GLX420320**	**GLX302**	**GLX303**	**GLX62DB**	**GLX62D**
GL0400C1	400	400	400	180	**GLX420400**				
GL0500C1	500	500	500	200	**GLX420500**				
GL0630C1	630	630	500	250	**GLX420630**				
GL0631C1	630	630	630	250	**GLX420631**	**GLX304**	**GLX305**	**GLX63DB**	**GLX63D**
GL0800C1	800	800	800	310	**GLX420800**				
GL1000C1	1000	1000	800	460	**GLX421000**	**GLX306**	**GLX307**		
IEC/EN/BS three-pole manual changeover switches.									
GLC0160C1	160	160	160	–	–	–	–	**GLX61DB**	–
GLC0200C1	200	200	200						
GLC0250C1	250	250	250						
GLC0315C1	315	315	250						
GLC0320C1	320	320	320					**GLX62DB**	
GLC0400C1	400	400	400						
GLC0500C1	500	500	500						
GLC0630C1	630	630	500						
GLC0631C1	630	630	630	–	–	–	–	**GLX63DB**	–
GLC0800C1	800	800	800						
GLC1000C1	1000	1000	800						
IEC/EN/BS four-pole manual changeover switches.									
GLC0160T4C1	160	160	160	–	–	–	–	**GLX61DB**	–
GLC0200T4C1	200	200	200						
GLC0250T4C1	250	250	250						
GLC0315T4C1	315	315	250						
GLC0320T4C1	320	320	320					**GLX62DB**	
GLC0400T4C1	400	400	400						
GLC0500T4C1	500	500	500						
GLC0630T4C1	630	630	500						
GLC0631T4C1	630	630	630	–	–	–	–	**GLX63DB**	–
GLC0800T4C1	800	800	800						
GLC1000T4C1	1000	1000	800						

❶ 1-piece set. 1 terminal connection for single cable:
– Maximum conductor cross section: 120mm²/250kcmil;
– Minimum conductor cross section: 16mm²/6AWG.

❷ 3-piece set. 3 terminals connection for single cable:
– Maximum conductor cross section: 120mm²/250kcmil;
– Minimum conductor cross section: 16mm²/6AWG.

❸ 1-piece set. 1 terminal connection for single cable:
– Maximum conductor cross section: 304mm²/600kcmil;
– Minimum conductor cross section: 33.6mm²/2AWG.

❹ 3-piece set. 3 terminals connection for single cable:
– Maximum conductor cross section: 304mm²/600kcmil;
– Minimum conductor cross section: 33.6mm²/2AWG.

❺ 1-piece set. 1 terminal connection for double cables:
– Maximum conductor cross section: 2x152mm²/2x300kcmil;
– Minimum conductor cross section: 2x21.2mm²/2x4AWG.

❻ 3-piece set. 3 terminals connection for double cables:
– Maximum conductor cross section: 2x152mm²/2x300kcmil;
– Minimum conductor cross section: 2x21.2mm²/2x4AWG.

❼ 1-piece set. 1 terminals connection for double cables:
– Maximum conductor cross section: 4x304mm²/4x600kcmil;
– Minimum conductor cross section: 4x33.6mm²/4x2AWG.

❽ 3-piece set. 3 terminals connection for double cables:
– Maximum conductor cross section: 4x304mm²/4x600kcmil;
– Minimum conductor cross section: 4x33.6mm²/4x2AWG.

Door coupling handle		Shaft extensions for door coupling handles				Shaft alignment ring	Auxiliary contacts	Terminal covers	Phase barriers	Terminal clamps	Bridging bars	Captive nuts
Black	Red/yellow		Panel depth		Shaft section							
Order code	Order code	Order code	min [mm/in]	min [mm/in]	□ [mm/in]	Order code	Order code	Order code	Order code	Order code	Order code	Order code
GLX61B	**GLX61**	**GLX7150S10** **GLX7200S10** **GLX7300S10** **GLX7400S10** **GLX7500S10**	124/ 4.88”	194/7.64” 244/9.61” 344/13.54” 444/17.48” 544/21.42”	10/0.4”	**GLX00**	**GLX1001** (1NC) **GLX1010EA** (1EB)	**GLX800** (3 pcs) **GLX801** (4 pcs)	**GLX900** (6 pcs) **GLX901** (8 pcs)	**GLX500❶** **GLX501❷**	–	**GLX550** (8 pcs)
GLX62B	**GLX62**	**GLX7150S10** **GLX7200S10** **GLX7300S10** **GLX7400S10** **GLX7500S10**	157/ 6.18”	227/8.94” 277/10.90” 377/14.84” 477/18.78” 577/22.72”				**GLX802** (3 pcs) **GLX803** (4 pcs)	**GLX902** (6 pcs) **GLX903** (8 pcs) Built-in	**GLX502❸** **GLX503❹** **GLX 504❺** **GLX505❻**		**GLX551** (8 pcs)
GLX63B	**GLX63**	**GLX7150S12** **GLX7200S12** **GLX7300S12** **GLX7400S12** **GLX7500S12**	212/ 8.34”	232/9.13” 282/11.10” 382/15.03” 482/18.97” 582/22.91”	12/0.47”			**GLX804** (3 pcs) **GLX805** (4 pcs)	**GLX904** (6 pcs) **GLX905** (8 pcs) Built-in	**GLX506❼** **GLX507❽**	–	**GLX552** (8 pcs) **GLX553** (8 pcs)
GLX61CB	–	**GLX7150S10** **GLX7200S10** **GLX7300S10** **GLX7400S10** **GLX7500S10**	220/ 8.66”	290/11.42” 340/13.38” 440/17.32” 540/21.26” 640/25.20”	10/0.4”	**GLX00**	**GLX1001** (1NC) **GLX1010EA** (1EB)	**GLX800** (3 pcs) **GLX801** (4 pcs)	**GLX900** (6 pcs) **GLX901** (8 pcs)	**GLX500❶** **GLX501❷**	**GLX201** (3 pcs) **GLX202** (4 pcs)	**GLX550** (8 pcs)
GLX62CB		**GLX7150S10** **GLX7200S10** **GLX7300S10** **GLX7400S10** **GLX7500S10**	267/ 10.51”	337/13.27” 387/15.24” 487/19.17” 587/23.11” 687/27.05”				**GLX802** (3 pcs) **GLX803** (4 pcs)	**GLX902** (6 pcs) **GLX903** (8 pcs) Built-in	**GLX502❸** **GLX503❹** **GLX504❺** **GLX505❻**	**GLX206** (3 pcs) **GLX207** (4 pcs)	**GLX551** (8 pcs)
GLX63CB	–	**GLX7150S12** **GLX7200S12** **GLX7300S12** **GLX7400S12** **GLX7500S12**	308/ 12.12”	378/14.88” 428/16.85” 528/20.78” 628/24.72” 728/28.66”	12/0.47”			**GLX804** (3 pcs) **GLX805** (4 pcs)	**GLX904** (6 pcs) **GLX905** (8 pcs) Built-in	**GLX506❼** **GLX507❽**	**GLX208** (3 pcs) **GLX209** (4 pcs)	**GLX552** (8 pcs) **GLX553** (8 pcs)
GLX61CB	–	**GLX7150S10** **GLX7200S10** **GLX7300S10** **GLX7400S10** **GLX7500S10**	220/ 8.66”	290/11.42” 340/13.38” 440/17.32” 540/21.26” 640/25.20”	10/0.4”	**GLX00**	**GLX1001** (1NC) **GLX1010EA** (1EB)	**GLX800** (3 pcs) **GLX801** (4 pcs)	**GLX900** (6 pcs) **GLX901** (8 pcs)	**GLX500❶** **GLX501❷**	**GLX201** (3 pcs) **GLX202** (4 pcs)	**GLX550** (8 pcs)
GLX62CB		**GLX7150S10** **GLX7200S10** **GLX7300S10** **GLX7400S10** **GLX7500S10**	267/ 10.51”	337/13.27” 387/15.24” 487/19.17” 587/23.11” 687/27.05”				**GLX802** (3 pcs) **GLX803** (4 pcs)	**GLX902** (6 pcs) **GLX903** (8 pcs) Built-in	**GLX502❸** **GLX503❹** **GLX504❺** **GLX505❻**	**GLX206** (3 pcs) **GLX207** (4 pcs)	**GLX551** (8 pcs)
GLX63CB	–	**GLX7150S12** **GLX7200S12** **GLX7300S12** **GLX7400S12** **GLX7500S12**	308/ 12.12”	378/14.88” 428/16.85” 528/20.78” 628/24.72” 728/28.66”	12/0.47”			**GLX804** (3 pcs) **GLX805** (4 pcs)	**GLX904** (6 pcs) **GLX905** (8 pcs) Built-in	**GLX506❼** **GLX507❽**	**GLX208** (3 pcs) **GLX209** (4 pcs)	**GLX552** (8 pcs) **GLX553** (8 pcs)

Switch disconnectors and manual changeover switches cULus
GL series

cULus

new

Type	General purpose current	Max 3-phase horsepower rating			Fourth pole	Neutral terminal	Earth/ground terminal	Direct operating handle		
		240V	480V	600V				Black	Red/Yellow	
Order code	[A]	[HP]	[HP]	[HP]	Order code	Order code	Order code	Order code	Order code	
UL98 three-pole switch disconnectors.										
GL0100C1UL	100	30	75	100	**GLX420100UL**	**GLX300**	**GLX301**	**GLX61DB**	**GLX61D**	
GL0200C1UL	200	75	150	200	**GLX420200UL**					
GL0400C1UL	400	125	250	350	**GLX420400UL**	**GLX302**	**GLX303**	**GLX62DB**	**GLX62D**	
GL0600C1UL	600	200	450	500	**GLX420600UL**	**GLX304**	**GLX305**	**GLX63DB**	**GLX63D**	
GL0800C1UL	800	250	500	500	**GLX420800UL**	**GLX306**	**GLX307**			
UL1008 three-pole manual changeover switches.										
GLC0100C1UL	100	30	75	100	–	–	–	**GLX61DB**	–	
GLC0200C1UL	200	75	150	200						
GLC0400C1UL	400	125	250	350				**GLX62DB**		
UL1008 four-pole manual changeover switches.										
GL0C100T4C1UL	100	30	75	100	–	–	–	**GLX61DB**	–	
GL0C200T4C1UL	200	75	150	200						
GLC0400T4C1UL	400	125	250	350				**GLX62DB**		

❶ 1-piece set. 1 terminal connection for single cable:
– Maximum conductor cross section: 120mm²/250kcmil;
– Minimum conductor cross section: 16mm²/6AWG.

❷ 3-piece set. 3 terminals connection for single cable:
– Maximum conductor cross section: 120mm²/250kcmil;
– Minimum conductor cross section: 16mm²/6AWG.

❸ 1-piece set. 1 terminal connection for single cable:
– Maximum conductor cross section: 304mm²/600kcmil;
– Minimum conductor cross section: 33.6mm²/2AWG.

❹ 3-piece set. 3 terminals connection for single cable:
– Maximum conductor cross section: 304mm²/600kcmil;
– Minimum conductor cross section: 33.6mm²/2AWG.

❺ 1-piece set. 1 terminal connection for double cables:
– Maximum conductor cross section: 2x152mm²/2x300kcmil;
– Minimum conductor cross section: 2x21.2mm²/2x4AWG.

❻ 3-piece set. 3 terminals connection for double cables:
– Maximum conductor cross section: 2x152mm²/2x300kcmil;
– Minimum conductor cross section: 2x21.2mm²/2x4AWG.

❼ 1-piece set. 1 terminals connection for double cables:
– Maximum conductor cross section: 4x304mm²/4x600kcmil;
– Minimum conductor cross section: 4x33.6mm²/4x2AWG.

❽ 3-piece set. 3 terminals connection for double cables:
– Maximum conductor cross section: 4x304mm²/4x600kcmil;
– Minimum conductor cross section: 4x33.6mm²/4x2AWG.

	Door coupling handle		Shaft extensions for door coupling handles				Shaft alignment ring	Auxiliary contacts	Terminal covers	Phase barriers	Terminal clamps	Bridging bars	Captive nuts
	Black	Red/Yellow		Panel depth		Shaft section							
	Order code	Order code	Order code	min [mm/in]	max [mm/in]	□ [mm/in]	Order code	Order code	Order code	Order code	Order code	Order code	Order code
	GLX61B	**GLX61**	**GLX7150S10** **GLX7200S10** **GLX7300S10** **GLX7400S10** **GLX7500S10**	124/ 4.88”	194/7.64” 244/9.61” 344/13.54” 444/17.48” 544/21.42”	10/0.4”	**GLX00**	**GLX1001** (1NC) **GLX1010EA** (1EB)	**GLX800** (3 pcs) **GLX801** (4 pcs)	Built-in	**GLX500❶** **GLX501❷**	–	**GLX550** (8 pcs)
	GLX62B	**GLX62**	**GLX7150S10** **GLX7200S10** **GLX7300S10** **GLX7400S10** **GLX7500S10**	157/ 6.18”	227/8.94” 277/10.90” 377/14.84” 477/18.78” 577/22.72”				**GLX802** (3 pcs) **GLX803** (4 pcs)	Built-in	**GLX502❸** **GLX503❹** **GLX504❺** **GLX505❻**		**GLX551** (8 pcs)
	GLX63B	**GLX63**	**GLX7150S12** **GLX7200S12** **GLX7300S12** **GLX7400S12** **GLX7500S12**	212/ 8.34”	232/9.13” 282/11.10” 382/15.03” 482/18.97” 582/22.91”	12/0.47”			**GLX804** (3 pcs) **GLX805** (4 pcs)	**GLX904** (6 pcs) **GLX905** (8 pcs)	**GLX506❼** **GLX507❽**	–	**GLX552** (8 pcs)
										Built-in			**GLX553** (8 pcs)
	GLX61CB	–	**GLX7150S10** **GLX7200S10** **GLX7300S10** **GLX7400S10** **GLX7500S10**	220/ 8.66”	290/11.42” 340/13.38” 440/17.32” 540/21.26” 640/25.20”	10/0.4”	**GLX00**	**GLX1001** (1NC) **GLX1010EA** (1EB)	**GLX800** (3 pcs) **GLX801** (4 pcs)	Built-in	**GLX500❶** **GLX501❷**	**GLX201** (3 pcs) **GLX202** (4 pcs)	**GLX550** (8 pcs)
	GLX62CB		**GLX7150S10** **GLX7200S10** **GLX7300S10** **GLX7400S10** **GLX7500S10**	267/ 10.51”	337/13.27” 387/15.24” 487/19.17” 587/23.11” 687/27.05”				**GLX802** (3 pcs) **GLX803** (4 pcs)	Built-in	**GLX502❸** **GLX503❹** **GLX504❺** **GLX505❻**	**GLX206** (3 pcs) **GLX207** (4 pcs)	**GLX551** (8 pcs)
	GLX61CB	–	**GLX7150S10** **GLX7200S10** **GLX7300S10** **GLX7400S10** **GLX7500S10**	220/ 8.66”	290/11.42” 340/13.38” 440/17.32” 540/21.26” 640/25.20”	10/0.4”	**GLX00**	**GLX1001** (1NC) **GLX1010EA** (1EB)	**GLX800** (3 pcs) **GLX801** (4 pcs)	Built-in	**GLX500❶** **GLX501❷**	**GLX201** (3 pcs) **GLX202** (4 pcs)	**GLX550** (8 pcs)
	GLX62CB		**GLX7150S10** **GLX7200S10** **GLX7300S10** **GLX7400S10** **GLX7500S10**	267/ 10.51”	337/13.27” 387/15.24” 487/19.17” 587/23.11” 687/27.05”				**GLX802** (3 pcs) **GLX803** (4 pcs)	Built-in	**GLX502❸** **GLX503❹** **GLX504❺** **GLX505❻**	**GLX206** (3 pcs) **GLX207** (4 pcs)	**GLX551** (8 pcs)

Motorised changeover switches
GL series

IEC/EN/BS

Type	Rated motor auxiliary supply voltage	IEC conventional free air thermal current Ith	IEC rated operational current Ie		Direct operating handle (standard supplied)	
		AC21A (≤690V)	AC23A (≤400V)	AC23A (≤500V)	Black	
Order code	[V]	[A]	[A]	[A]	Order code	
IEC/EN/BS three-pole motorised changeover switches.						
GLCMB0125D024	24VDC	125	125	125	**GLX61DB**	
GLCMB0160D024		160	160	160		
GLCMB0200D024		200	200	200		
GLCMB0250D024		250	250	250		
GLCMB0315D024		315	315	250		
GLCMB0125E110	110...125VAC/DC	125	125	125		
GLCMB0160E110		160	160	160		
GLCMB0200E110		200	200	200		
GLCMB0250E110		250	250	250		
GLCMB0315E110		315	315	250		
GLCMB0125A230	208...277VAC	125	125	125		
GLCMB0160A230		160	160	160		
GLCMB0200A230		200	200	200		
GLCMB0250A230		250	250	250		
GLCMB0315A230		315	315	250		
IEC/EN/BS four-pole motorised changeover switches.						
GLCMB0125T4D024	24VDC	125	125	125	**GLX61DB**	
GLCMB0160T4D024		160	160	160		
GLCMB0200T4D024		200	200	200		
GLCMB0250T4D024		250	250	250		
GLCMB0315T4D024		315	315	250		
GLCMB0125T4E110	110...125VAC/DC	125	125	125		
GLCMB0160T4E110		160	160	160		
GLCMB0200T4E110		200	200	200		
GLCMB0250T4E110		250	250	250		
GLCMB0315T4E110		315	315	250		
GLCMB0125T4A230	208...277VAC	125	125	125		
GLCMB0160T4A230		160	160	160		
GLCMB0200T4A230		200	200	200		
GLCMB0250T4A230		250	250	250		
GLCMB0315T4A230		315	315	250		

cULus

Type	Rated motor auxiliary supply voltage	General purpose current	Max 3-phase horsepower rating			Direct operating handle (standard supplied)	
		≤600V	240V	480V	600V	Black	
Order code	[V]	[A]	[HP]	[HP]	[HP]	Order code	
UL1008 three-pole motorised changeover switches.							
GLCMB0100D024UL	24VDC	100	30	75	100	**GLX61DB**	
GLCMB0200D024UL		200	75	150	200		
GLCMB0100E110UL	110...125VAC/DC	100	30	75	100		
GLCMB0200E110UL		200	75	150	200		
GLCMB0100A230UL	208...277VAC	100	30	75	100		
GLCMB0200A230UL		200	75	150	200		
UL1008 four-pole motorised changeover switches.							
GLCMB0100T4D024UL	24VDC	100	30	75	100	**GLX61DB**	
GLCMB0200T4D024UL		200	75	150	200		
GLCMB0100T4E110UL	110...125VAC/DC	100	30	75	100		
GLCMB0200T4E110UL		200	75	150	200		
GLCMB0100T4A230UL	208...277VAC	100	30	75	100		
GLCMB0200T4A230UL		200	75	150	200		

❶ 1-piece set. 1 terminal connection for single cable:
– Maximum conductor cross section: 120mm²/250kcmil;
– Minimum conductor cross section: 16mm²/6AWG.

❷ 3-piece set. 3 terminals connection for single cable:
– Maximum conductor cross section: 120mm²/250kcmil;
– Minimum conductor cross section: 16mm²/6AWG.

	Auxiliary contacts	Terminal covers	Phase barriers	Terminal clamps	Bridging bars	Captive nuts	Voltage sensing connector	Spare motor operator	Direct operating handle holder (standard supplied)
	Order code	Order code	Order code	Order code	Order code	Order code	Order code	Order code	Order code
	GLX1001 (1NC) **GLX1010EA** (1EB)	**GLX800** (3 pcs) **GLX801** (4 pcs)	**GLX900** (6 pcs) **GLX901** (8 pcs)	**GLX500❶** **GLX501❷**	**GLX201** (3 pcs) **GLX202** (4 pcs)	**GLX550** (8 pcs)	**GLXVS00** (6 pcs) **GLXXS01** (8 pcs)	**GLXM1D024** **GLXM1E110** **GLXM1A230**	**GLXHS1**
	GLX1001 (1NC) **GLX1010EA** (1EB)	**GLX800** (3 pcs) **GLX801** (4 pcs)	**GLX900** (6 pcs) **GLX901** (8 pcs)	**GLX500❶** **GLX501❷**	**GLX201** (3 pcs) **GLX202** (4 pcs)	**GLX550** (8 pcs)	**GLXVS00** (6 pcs) **GLXXS01** (8 pcs)	**GLXM1D024** **GLXM1E110** **GLXM1A230**	**GLXHS1**

	Auxiliary contacts	Terminal covers	Phase barriers	Terminal clamps	Bridging bars	Captive nuts	Voltage sensing connector	Spare motor operator	Direct operating handle holder (standard supplied)
	Order code	Order code	Order code	Order code	Order code	Order code	Order code	Order code	Order code
	GLX1001 (1NC) **GLX1010EA** (1EB)	**GLX800** (3 pcs) **GLX801** (4 pcs)	**GLX900** (6 pcs) **GLX901** (8 pcs)	**GLX500❶** **GLX501❷**	**GLX201** (3 pcs) **GLX202** (4 pcs)	**GLX550** (8 pcs)	**GLXVS00** (6 pcs) **GLXXS01** (8 pcs)	**GLXM1D024** **GLXM1E110** **GLXM1A230**	**GLXHS1**
	GLX1001 (1NC) **GLX1010EA** (1EB)	**GLX800** (3 pcs) **GLX801** (4 pcs)	**GLX900** (6 pcs) **GLX901** (8 pcs)	**GLX500❶** **GLX501❷**	**GLX201** (3 pcs) **GLX202** (4 pcs)	**GLX550** (8 pcs)	**GLXVS00** (6 pcs) **GLXXS01** (8 pcs)	**GLXM1D024** **GLXM1E110** **GLXM1A230**	**GLXHS1**

VERSATILITY!

COMPACT SIZE
The three-pole 16A to 63A switch disconnectors, are made up of a single unit body, merely 36mm/1.42” wide, while the 63A to 160A ratings, of another frame size of only 70mm/2.75” wide.

ACCESSORY FLEXIBILITY
Mounting and removal of the fourth pole and add-on blocks are simple and quick operations with no need for tools.

VERSIONS FOR PHOTOVOLTAIC APPLICATIONS
The GA... series switch disconnectors are suitable for small domestic installations as well as those with a large number of solar cells.
Use up to 800V in DC21B category.

CERTIFICATIONS
The 16A to 63A types are listed for the USA and Canada, certified according to UL60947-4-1/CSA C22.2 n° 60947-4-1.
The 30A to 125A types are listed for Canada and the USA, certified according to UL98A/CSA C22.2 n° 4.

SIDE MOUNT ADD-ON FOURTH POLE
Simultaneous closing or early-make contact operation of the fourth pole with respect to the switch disconnector poles.

ADD-ON AUXILIARY CONTACTS
Only one add-on block suitable for all the 9 ratings of switch disconnectors, having simultaneous closing with the switch disconnector poles. There are versions with an early-break NO contact with respect to the switch disconnector.

MAXIMUM COMBINATIONS
Mounting up to 4 auxiliary contacts or 1 fourth pole and 3 auxiliary contacts (2 blocks always on the right and 2 on the left side) of each switch disconnector. The earth and neutral terminals and fuse holder also can be added.

SWITCH STATUS INDICATION
The switch open or closed state is clearly and unequivocally seen at a distance thanks to the simple and modern design of the handles.

TERMINAL ADAPTABILITY
Terminals are suitable to accept any type of cable: flexible, rigid, AWG wire. The terminals can withstand high tightening torques.

6 AND 8 POLE VERSION
Mechanical coupling systems are available for switch disconnectors with direct operating handle to provide 6/8 pole disconnectors or a mechanical interlock mechanism for the line changeover function (I - 0 - II).
The enclosed switches are cULus certified.

FUSE HOLDERS

A three-pole fuse holder can be added to 16A to 32A switch disconnectors, with direct operating handle, to provide a single compact unit.
Access to the fuse can be made only when the disconnector is in OFF position.

HIGH BREAKING CAPACITY
The rated currents Ie in AC23 at 690VAC are the highest of the category.

TORX SCREW TERMINALS

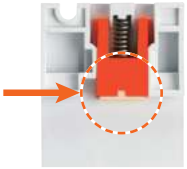
Version with Torx screw terminals available on request.

MODULARITY
The switch disconnectors can be mounted in modular panels.

IP65 PADLOCKABLE HANDLES
Wide range of selector or pistol grip handles, with screw or ring fixing.
All handles are equipped with built-in padlockable mechanism.
The selector handle GAX63... snaps onto the door mount switch disconnectors in 16A to 40A ratings, with no need for tools.

DIN RAIL FIXING
Switch disconnector mounting on and removal from the 35mm DIN rail are done by simply pressing it downwards with no need for tools.

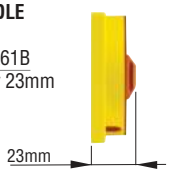
ANTI-SLIDE INSERT FOR DIN RAIL



A rubber pad insert prevents the sliding of switch disconnectors on the DIN rail even when out of tolerance or mounted vertically.

DOOR COUPLING HANDLE WITH FRONT DIMENSIONS 48X48MM
The GAX68 and GAX68B handles can be used in panels and boxes of limited dimensions.

REDUCED HANDLE THICKNESS
GAX61 and GAX61B handles are only 23mm thick.



HANDLE IP69K (GAX63K and GAX63KB)

HANDLE ADAPTABILITY
The extensive number of fixing holes in the front handle plate can replace switch disconnectors, normally found out in the field, without having to drill others.

UL508A HANDLE VERSION
In compliance with UL508A standards, which require internal panel inspection by authorised personnel with power applied, selector and pistol handles are available with defeatable feature of the door coupling when the switch disconnector is closed, i.e. in ON position.

Three-pole switch disconnectors with direct operating handle and door coupling version

GA016A…
GA040A
GA063SA

GA030A
GA063A…
GA160A

Order code	IEC conventional free air thermal current Ith AC21A (≤690V)	IEC rated operational current Ie AC22A (≤690V) AC23A (≤400V)	Qty per pkg	Wt
	[A]	[A]	n°	[kg]
Direct operating version, complete with black handle. For door coupling version, separately purchase the handle and shaft extension (see pages 14-18 to 14-20). According to UL60947-4-1.				
GA016A	16	16	1	0.146
GA025A	25	25	1	0.146
GA032A	32	32	1	0.146
GA040A	40	40	1	0.146
GA063SA	63	45	1	0.148
According to UL98.				
GA030A	30	30	1	0.388
GA063A	63	63	1	0.388
GA080A	80	80	1	0.388
GA100A	100	100	1	0.388
GA125A	125	125	1	0.388
According to IEC/EN/BS.				
GA160A	160	125	1	0.388

GA0…ARY

GA063…ARY

Order code	IEC conventional free air thermal current Ith AC21A (≤690V)	IEC rated operational current Ie AC22A (≤690V) AC23A (≤400V)	Qty per pkg	Wt
	[A]	[A]	n°	[kg]
Direct operating version, complete with red/yellow handle. For door coupling version, separately purchase the handle and shaft extension (see pages 14-18 to 14-20). According to UL60947-4-1.				
GA016ARY	16	16	1	0.146
GA025ARY	25	25	1	0.146
GA032ARY	32	32	1	0.146
GA040ARY	40	40	1	0.146
GA063SARY	63	45	1	0.148
According to UL98.				
GA030ARY	30	30	1	0.388
GA063ARY	63	63	1	0.388
GA080ARY	80	80	1	0.388
GA100ARY	100	100	1	0.388
GA125ARY	125	125	1	0.388
According to IEC/EN/BS.				
GA160ARY	160	125	1	0.388

Fourth pole add-on

GAX42…A
GAX41…A
GAX42063SA
GAX41063SA

Order code	IEC conventional free air thermal current Ith AC21A (≤690V)	IEC rated operational current Ie AC22A (≤690V) AC23A (≤400V)	Qty per pkg	Wt
	[A]	[A]	n°	[kg]
Simultaneous closing operation as switch disconnector poles. For GA...A... version.				
GAX42040A❶	40	40	1	0.045
GAX42063SA❷	63	45	1	0.045
GAX42063A❸	63	63	1	0.126
GAX42080A	80	80	1	0.126
GAX42100A	100	100	1	0.126
GAX42125A	125	125	1	0.126
GAX42160A	160	125	1	0.126
Early make closing operation with respect to switch disconnector poles. For GA...A... version.				
GAX41040A❶	40	40	1	0.046
GAX41063SA❷	63	45	1	0.046
GAX41125A❹	125	125	1	0.116

❶ Only for GA016A...GA040A....
❷ Only for GA063SA....
❸ Only for GA030A... and GA063A....
❹ Only for GA030A... and GA063A...GA125A....

General characteristics
- 16A to 160A
- Available versions:
  - Direct operating
  - Door coupling. Use switch disconnector with direct operating handle and separately purchase the handle and shaft extension for this version. See pages 14-18 to 14-20
- Version with Torx screw terminals available on request
- Compact and modular size
- Screw or 35mm DIN rail fixing
- Padlockable in 0 position with no extra accessory.

Operational characteristics
- Rated insulation voltage Ui: 1000V
- Rated impulse withstand Uimp: 8kV
- Electrical life in AC21A:
  - 100,000 cycles GA016...GA040..., GAX...40A
  - 15,000 cycles GA063SA..., GAX...063SA
  - 30,000 cycles GA030... and GA063...GA125..., GAX...063...125A
  - 1,500 cycles GA160A..., GAX42160A
- Mechanical life:
  - 100,000 cycles GA016...GA040A..., GA063SA..., GAX...40A, GAX...063SA
  - 30,000 cycles GA030... and GA063...GA160A..., GAX...063...125A, GAX42160A.

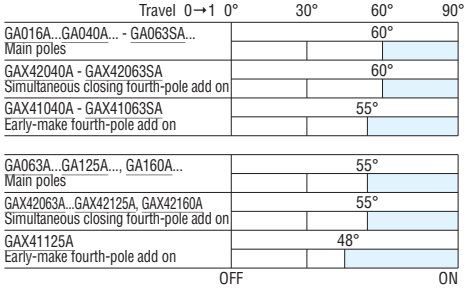
Certifications and compliance
Certifications obtained:

Type	cULus according to UL60947-4-1 / CSA C22.2 n°60947-4-1	cULus according to UL98 / CSA C22.2 n°4	EAC
GA016A...GA040A...	●	—	●
GA063SA...	●	—	●
GA030A... and GA063A...GA125A...	—	●	●
GA160A...-GAX42160A	—	—	●
GAX41040A-GAX42040A	●	—	●
GAX41063SA-GAX42063SA	●	—	●
GAX41125A	—	●	●
GAX42063A...GAX42125A	—	●	●

● Certification obtained.

Compliant with standards: IEC/EN/BS 60947-3, IEC/EN/BS 60947-1, UL60947-4-1, UL98, CSA C22.2.

Strokes of GA...A... poles
(main poles and add-on pole)



Three-pole switch disconnectors door mount version

GA016C...
GA040C
GA063SC

GA063C...
GA160C

Order code	IEC conventional free air thermal current Ith AC21A (≤690V)	IEC rated operational current Ie AC22A (≤690V) AC23A (≤400V)	Qty per pkg	Wt
	[A]	[A]	n°	[kg]
Door mount version, complete with shaft extension (purchase handle separately, see page 14-18 and 14-19). According to UL60947-4-1.				
GA016C	16	16	1	0.170
GA025C	25	25	1	0.170
GA032C	32	32	1	0.170
GA040C	40	40	1	0.170
According to IEC.				
GA063SC	63	40	1	0.170
According to UL98.				
GA030C	30	30	1	0.404
GA063C	63	63	1	0.404
GA080C	80	80	1	0.404
GA100C	100	100	1	0.404
GA125C	125	125	1	0.404
According to IEC.				
GA160C	160	125	1	0.404

Fourth pole add-on

GAX42040C
GAX41040C

Order code	IEC conventional free air thermal current Ith AC21A (≤690V)	IEC rated operational current Ie AC22A (≤690V) AC23A (≤400V)	Qty per pkg	Wt
	[A]	[A]	n°	[kg]
Simultaneous closing operation as switch disconnector poles. For GA...C version.				
GAX42040C❶	40	40	1	0.045
GAX42063SC	63	40	1	0.045
GAX42063C❷	63	63	1	0.128
GAX42080C	80	80	1	0.128
GAX42100C	100	100	1	0.128
GAX42125C	125	125	1	0.128
GAX42160C	160	125	1	0.128
Early make closing operation with respect to switch disconnector poles. For GA...C version.				
GAX41040C❶	40	40	1	0.046
GAX41125C❸	125	125	1	0.128

❶ For GA016C...GA040C only.
❷ For GA030C and GA063C only.
❸ For GA030C and GA063C...GA125C only.

General characteristics
- 16A to 160A
- Available versions:
  - Door mount
- Compact and modular size.

Operational characteristics
- Rated insulation voltage Ui: 1000V
- Rated impulse withstand Uimp: 8kV
- Electrical life in AC21A:
  - 100,000 cycles GA016...GA040C, GAX...40C
  - 15,000 cycles GA063SC, GAX42063SC
  - 30,000 cycles GA030C and GA063...GA125C, GAX...063...125C
  - 1,500 cycles GA160C, GAX42160C
- Mechanical life:
  - 100,000 cycles GA016...GA040C..., GA063SC..., GAX...40C, GAX...063SC
  - 30,000 cycles GA030... and GA063...GA160C..., GAX...063...125C, GAX42160C.

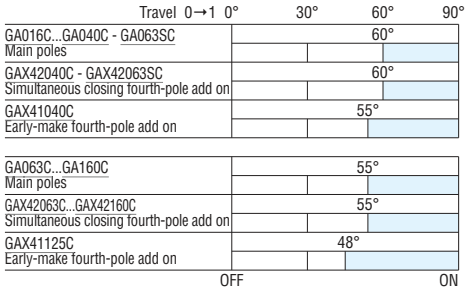
Certifications and compliance
Certifications obtained:

Type	cULus according to UL60947-4-1 / CSA C22.2 n°60947-4-1	cULus according to UL98 / CSA C22.2 n°4	EAC
GA016C...GA040C	●	—	●
GA160C	—	—	●
GAX41040C-GAX42040C	●	—	●
GAX42063SC	—	—	●
GAX42063C...GAX42125C	—	●	●
GAX42160C	—	—	●

● Certification obtained.

Compliant with standards: IEC/EN 60947-3, IEC/EN 60947-1, UL60947-4-1, UL98, CSA C22.2.

Strokes of GA...C poles
(main poles and add-on pole)



Add-on blocks

GAX1011A
GAX1020A

GAX1011C

GAX1110EA
GAX1210EA

GAX3…A

GAX3…C

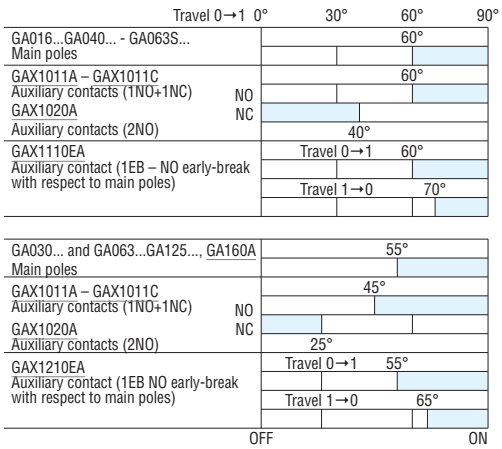
GAX50…

GAX60…

Order code	Characteristics	Qty	Wt
		n°	[kg]
Auxiliary contacts, simultaneous closing as poles of switch disconnector.			
GAX1011A	1NO + 1NC for GA...A..., and GA040D	1	0.030
GAX1020A	2NO for GA...A... and GA040D	1	0.030
GAX1011C	1NO + 1NC for GA...C	1	0.030
Auxiliary contacts, early-break operation with respect to poles of switch disconnector.			
GAX1110EA	1EB(NO) for GA016A... GA040A..., GA063SA... and GA040D	1	0.035
GAX1210EA	1EB(NO) for GA030A... and GA063A...GA160A...	1	0.035
Neutral terminal.			
GAX31A	For GA016A...GA040A..., GA063SA... and GA040D	1	0.040
GAX32A	For GA030A... and GA063A...GA160A...	1	0.110
GAX31C	For GA016C...GA040C and GA063SC	1	0.040
GAX32C	For GA030C and GA063C...GA160C	1	0.110
Earth/Ground terminal.			
GAX33A	For GA016A...GA040A, GA063SA and GA...D	1	0.040
GAX34A	For GA030A and GA063A...GA160A	1	0.110
GAX33C	For GA016C...GA040C and GA063SC	1	0.040
GAX34C	For GA030C and GA063C...GA160C	1	0.110
Mechanical interlock for line changeover (I-0-II).			
GAX5000	For GA016A...GA040A..., GA063SA..., GA040D and GAX67B; 5mm/0.2" ❶	1	0.050
GAX5001	For GA030A..., GA063A...GA160A... and GAX67B; 5mm/0.2" ❶	1	0.075
Mechanical coupling system for 6-8 pole switch disconnectors.			
GAX6000	For GA016A...GA040A..., GA063SA... and GA040D; 5mm/0.2" ❶	1	0.050
GAX6001	For GA030A... and GA063A...GA125A..., 7mm/0.3" ❷❸	1	0.075

❶ Use GAX7... shaft extensions.
❷ Use GAX66N... handles and GAX7...AN extensions for a door coupling version.
❸ Cannot be used with GA160A....

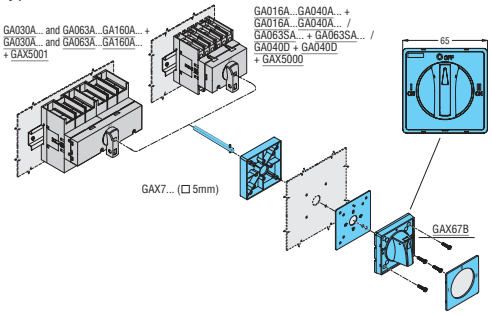
Strokes of GA poles (main poles with auxiliary contacts)



Operational characteristics of auxiliary contacts
- Conventional free air thermal current Ith: 10A
- UL/CSA and IEC/EN/BS 60947-5-1 designation: A600-Q600
- Tightening torque: 0.8Nm/7.1lb.in
- Electrical life in AC15: 100,000 cycles
- Mechanical life: 100,000 cycles.

Operational characteristics for other devices
- Tightening torque:
  - GAX31A/C-GAX33A/C terminals: 1.8...2Nm/16...18lb.in
  - GAX32A/C-GAX34A/C terminals: 5...6Nm/45...54lb.in
  - GAX5000/1-GAX6000/1 fixing: 0.5Nm/4.4lb.in; extension with handle: 0.8Nm/7.1lb.in.

Transformation of direct operating version into door coupling type:



Certifications and compliance
Certifications obtained:

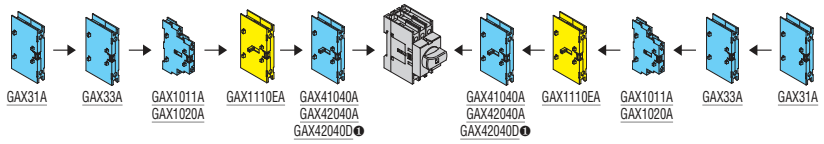
Type	cULus according to UL 60947-4-1 / CSA C22.2 n°14	cULus according to UL98 / CSA C22.2 n°4	EAC
GAX1011A - GAX1011C	●	●	●
GAX1110EA	●	—	●
GAX1210EA	—	●	●
GAX31A – GAX31C	●	—	●
GAX32A – GAX32C	—	●	●
GAX33A – GAX33C	●	—	●
GAX34A – GAX34C	—	●	●
GAX5000 – GAX6000	●	—	●
GAX5001 – GAX6001	—	●	●

● Certification obtained.

Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-3, IEC/EN/BS 60947-5-1, UL 60947-4-1, UL98, CSA C22.2.

Maximum combinations

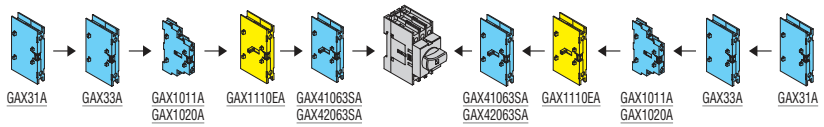
GA016A…GA040A… GA040D Sequence and maximum combination of add-on blocks on direct operating switch disconnectors.



1	1	1	—	1		—	—	2	1	1
1	1	2	—	—		1	—	1	1	1
1	1	1	—	1	**GA016A…**	—	1	1	1	1
1	1	1	1	—	**GA025A…**	1	—	1	1	1
1	1	1	1	—	**GA032A…**	—	—	2	1	1
1	1	2	—	—	**GA040A…**	—	1	1	1	1
1	1	2	—	—		—	—	2	1	1
1	1	—	—	—	**GA040D❶**	1	—	—	1	1
1	1	—	—	1		—	—	—	1	1
1	1	—	—	—		—	—	—	1	1

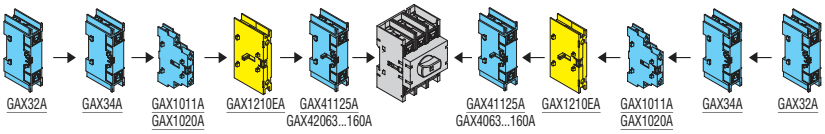
❶ GAX42040D can be used with GA040D switch only.

GA063SA…



1	1	1	—	1		—	—	2	1	1
1	1	2	—	—		1	—	1	1	1
1	1	1	—	1		—	1	1	1	1
1	1	1	1	—		1	—	1	1	1
1	1	1	1	—	**GA063SA…**	—	—	2	1	1
1	1	2	—	—		—	1	1	1	1
1	1	2	—	—		—	—	2	1	1
1	1	—	—	—		1	—	—	1	1
1	1	—	—	1		—	—	—	1	1
1	1	—	—	—		—	—	—	1	1

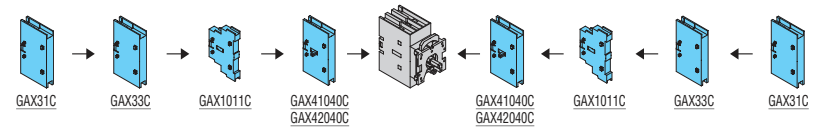
GA030A… and GA063A…GA160A…



—	—	1	—	1		—	—	2	—	—
—	—	2	—	—		1	—	1	—	—
—	—	1	—	1	**GA030A…**	—	1	1	—	—
—	—	1	1	—	**GA063A…**	1	—	1	—	—
—	—	1	1	—	**GA080A…**	—	—	2	—	—
—	—	2	—	—	**GA100A…**	—	1	1	—	—
—	—	2	—	—	**GA125A…**	—	—	2	—	—
1	1	—	—	—	**GA160A…❶**	1	—	—	1	1
1	1	—	—	1		—	—	—	1	1
1	1	—	—	—		—	—	—	1	1

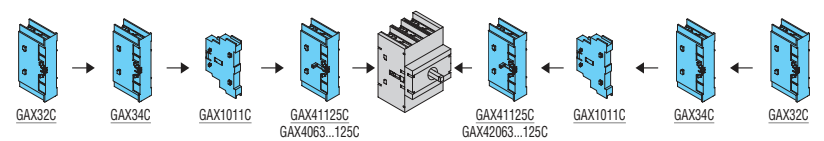
❶ GA160A... can be fitted with 1 single 4th pole (GAX42160A) on one side and an auxiliary contact on the other.

GA016C…GA040C Sequence and maximum combination of add-on blocks on door mount switch disconnectors.



1	1	1	1	**GA016C**	—	1	1	1
1	1	1	—	**GA025C**	1	1	1	1
1	1	—	1	**GA032C**	—	1	1	1
1	1	1	—	**GA040C**	1	—	1	1
1	1	1	—	**GA063SC**	—	1	1	1
1	1	—	—		—	—	1	1

GA030C and GA063C…GA125C

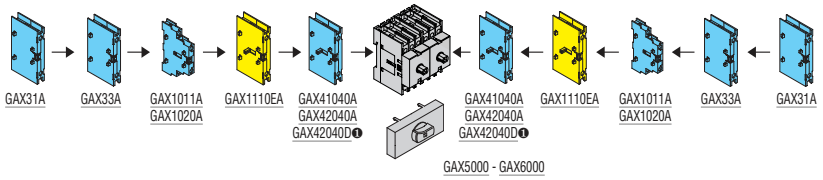


—	—	1	1	**GA030C**	—	1	—	—
—	—	1	—	**GA063C**	1	1	—	—
1	1	—	1	**GA080C**	—	1	—	—
—	—	1	—	**GA100C**	1	—	1	1
—	—	1	—	**GA125C**	—	1	—	—
1	1	—	—	**GA160C**	—	—	1	1

Maximum combinations

GA016A...GA040A... GA040D + GAX5000 - GAX6000

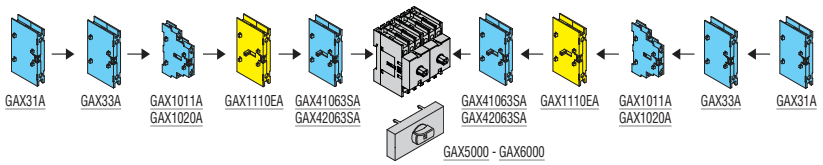
Sequence and maximum combination for mechanical coupling and mechanical interlock for line changeover.



1	1	1	—	1		1	—	1	1	1
1	1	1	—	1	GA016A ...+ GA016A ...	—	—	2	1	1
1	1	2	—	—		1	—	1	1	1
1	1	1	—	1	GA025A... + GA025A...	—	1	1	1	1
1	1	1	1	—	GA032A... + GA032A...	1	—	1	1	1
1	1	1	1	—		—	—	2	1	1
1	1	2	—	—	GA040A... + GA040A...	—	1	1	1	1
1	1	2	—	—		—	—	2	1	1
1	1	—	—	1	GA040D + GA040D ❶	1	—	—	1	1
1	1	—	—	—		—	—	—	1	1

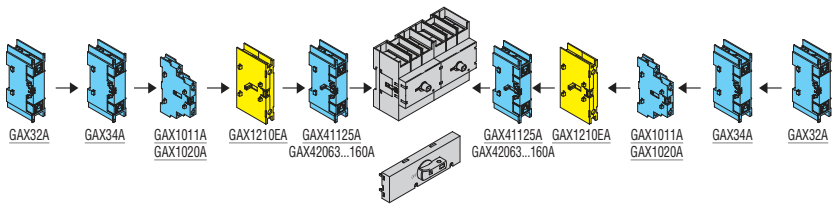
❶ GAX42040D can be used with GA040D switch only.

GA063SA... + GAX5000 - GAX6000



1	1	1	—	1		1	—	1	1	1
1	1	1	—	1		—	—	2	1	1
1	1	2	—	—		1	—	1	1	1
1	1	1	—	1		—	1	1	1	1
1	1	1	1	—	GA063SA...+ GA063SA...	1	—	1	1	1
1	1	1	1	—		—	—	2	1	1
1	1	2	—	—		—	1	1	1	1
1	1	2	—	—		—	—	2	1	1
1	1	—	—	1		1	—	—	1	1
1	1	—	—	—		—	—	—	1	1

GA030A... and GA063A...GA160A... + GAX5001 - GAX6001



—	—	1	—	1	GA030A... + GA030A...	1	—	1	—	—
—	—	1	—	1		—	—	2	—	—
—	—	2	—	—	GA063A... + GA063A...	1	—	1	—	—
—	—	1	—	1		—	1	1	—	—
—	—	1	1	—	GA080A... + GA080A...	1	—	1	—	—
—	—	1	1	—		—	—	2	—	—
—	—	2	—	—	GA100A... + GA100A...	—	1	1	—	—
—	—	2	—	—		—	—	2	—	—
1	1	—	—	1	GA125A... + GA125A...	1	—	—	1	1
1	1	—	—	—	GA160A... ❶	—	—	—	1	1

❶ GA160A... can be fitted with a single auxiliary contact (GAX1011A or GAX1020A) per side.
❷ Cannot be used with GA160A....

Handles

GAX61

GAX63

GAX66N

GAX68

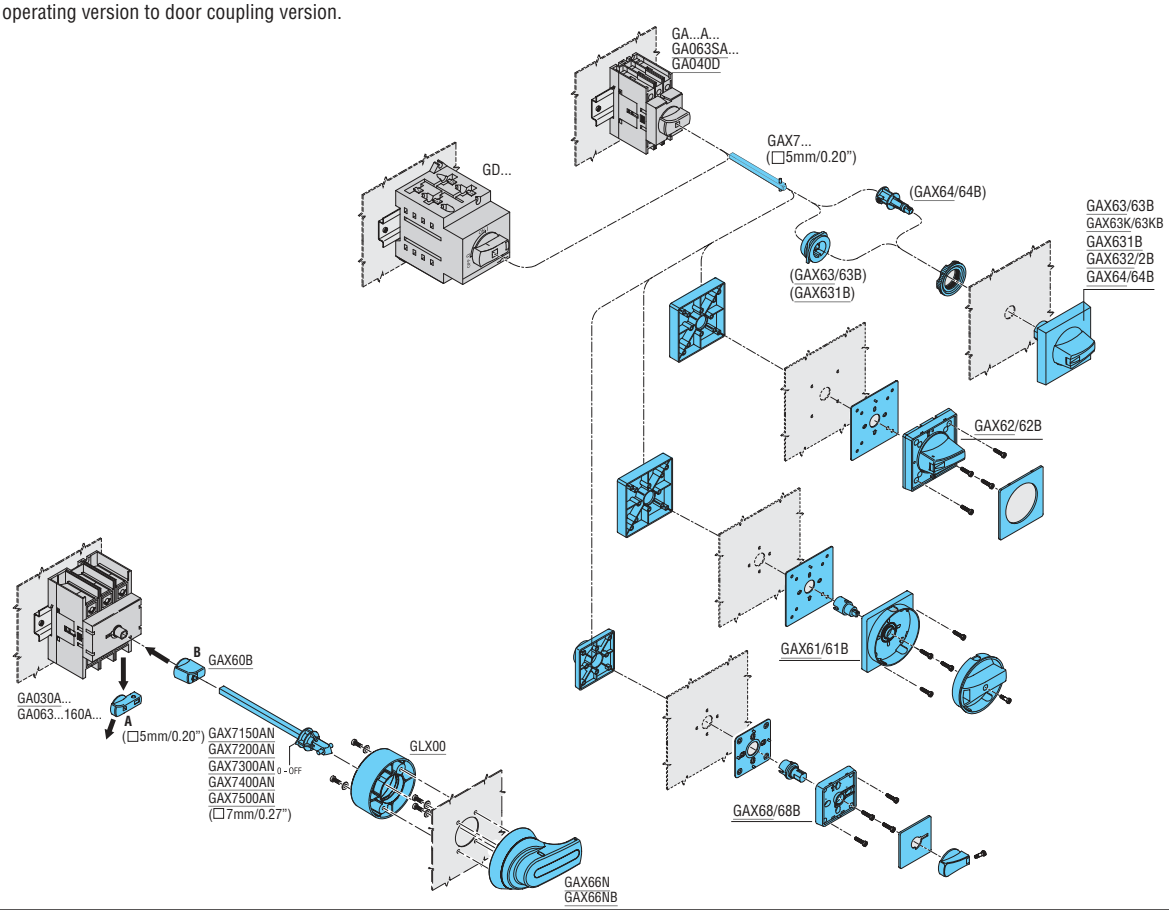
❶ For GA...A..., GA040D and GD... switch disconnectors, separately purchase extension GAX7...
❷ Snap-on fixing of GA016C...GA040C and GA063SC switch disconnectors with the handle.
❸ Separately purchase GAX7...AN shaft extension and GAX60B adaptor.

Order code	Characteristics	Qty per pkg	Wt
		n°	[kg]
DOOR COUPLING VERSION PADLOCKABLE, IP65 (TYPE 4X). Red/yellow.			
GAX61	For GA...A..., GA...C, GA040D and GD... Screw fixing. Handle with selector flush-mounted ❶. ☐ 5mm/0.2”	1	0.073
GAX62	For GA...A..., GA...C, GA040D and GD... Screw fixing. Handle with selector protruding ❶. ☐ 5mm/0.2”	1	0.072
GAX63	For GA...A..., GA016C...GA040C, GA063SC, GA040D and GD... Ring fixing. Handle with selector protruding ❶❷. ☐ 5mm/0.2”	1	0.068
GAX63K	For GA...A..., GA016C...GA040C, GA063SC, GA040D and GD... Ring fixing. Handle with selector protruding ❶❷. ☐ 5mm/0.2” IP69K	1	0.068
GAX632	For GA...A..., GA040D and GD... Ring fixing low profile. Handle with selector protruding. ☐ 5mm/0.2”❶	1	0.057
GAX64	For GA...A..., GA040D and GD... Ring fixing. Handle with selector protruding - defeatable (requirement UL508A)❶. ☐ 5mm/0.2”	1	0.064
GAX66N	For GA030A..., GA063A...GA160A... and GAX6001. Screw fixing. Pistol handle - defeatable (req. UL 508A)❸. ☐ 7mm/0.3”	1	0.140
GAX68	For GA016A...GA040A..., GA063SA, GA040D, GA016C...GA040C, GA063SC and GD.... Screw fixing. Handle with selector lowered ❶. ☐ 5mm/0.2”	1	0.060

General and operational characteristics
- Choice of handle fixing: ring or screw
- Handle fixing centres:
  - GAX61/61B-GAX62/62B-GAX67B: 36x36mm/1.42x1.42” or 48x48mm/1.89x1.89”
  - GAX66N/66NB: 28x40mm/1.10x1.57”
  - GAX68/68B: 28x28mm/1.10x1.10” or 36x36mm/1.42x1.42”
  - Compatible with pre-existing drillings of most common types in the marketplace
- 1 to 3 padlocks in the Ø4...8mm/0.16...0.31” for all handles except:
  - GAX68 only 1 padlock in the Ø4...8mm/0.16...0.31”
  - GAX61 up to 3 padlocks in the Ø5...8mm/0.20...0.31”
- Front plate dimensions:
  - GAX61/61B-GAX62/62B-GAX63/63B-GAX64/64B-GAX67/67B: 65x65mm/2.56x2.56”
  - GAX66N/66NB: Ø76mm/2.99”
  - GAX68/68B: 48x48mm/1.89x1.89”
- Tightening torque:
  - Fixing ring types: 2.3Nm/20.4lb.in
  - GAX60B: 0.8Nm/7lb.in
  - GAX66N/66NB: 1.5Nm/13.3lb.in
  - All others: 0.8Nm/7lb.in
- Degree of protection for GAX63K/63KB and GAX66N/66NB: IP66, IP69K; for UL/CSA data see detail on page 14-20
- Degree of protection for all others handles: IP65.

Certifications and compliance
See the table on page 14-20.

From direct operating version to door coupling version.



Handles

GAX61B

GAX63...B

GAX632B

GAX67B

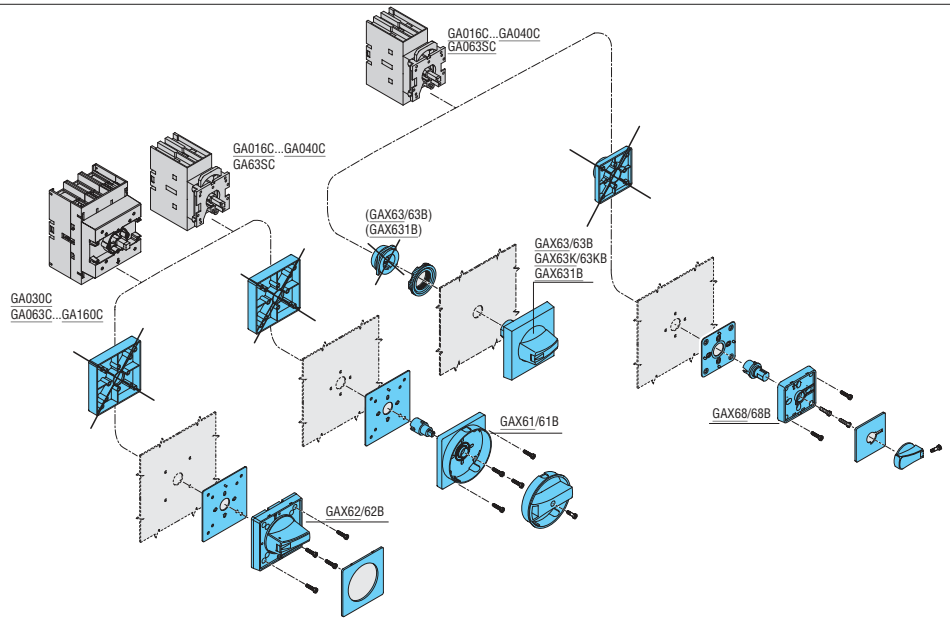
Order code	Characteristics	Qty per pkg	Wt
		n°	[kg]
DOOR COUPLING VERSION PADLOCKABLE, IP65 (TYPE 4X). Black.			
GAX61B	For GA...A..., GA...C, GA040D and GD... Screw fixing. Handle with selector flush-mounted ❶. ☐ 5mm/0.2”	1	0.073
GAX62B	For GA...A..., GA...C, GA040D and GD... Screw fixing. Handle with selector protruding ❶. ☐ 5mm/0.2”	1	0.072
GAX63B	For GA...A..., GA016C...GA040C, GA063SC, GA040D and GD... Ring fixing. Handle with selector protruding ❶❷. ☐ 5mm/0.2”	1	0.068
GAX63KB	For GA...A..., GA016C...GA040C, GA063SC, GA040D and GD... Ring fixing. Handle with selector protruding ❶❷. ☐ 5mm/0.2”. IP69K	1	0.068
GAX631B	For GA...A..., GA016C...GA040C, GA063SC, GA040D and GD... Ring fixing. Handle with selector protruding padlockable in ON pos. (UNI 9490 and UNI EN 12845) ❶❷. ☐ 5mm/0.2”	1	0.074
GAX632B	For GA...A..., GA040D and GD... Ring fixing low profile. Handle with selector protruding. ☐ 5mm/0.2”❶	1	0.057
GAX64B	For GA...A..., GA040D and GD... Ring fixing. Handle with selector protruding - defeatable (requir. UL508A)❶. ☐ 5mm/0.2”	1	0.064
GAX66NB	For GA030A..., GA063A...GA160A... and GAX6001. Screw fixing. Pistol handle - defeatable (req. UL 508A)❸. ☐ 7mm/0.3”	1	0.140
GAX67B	For mechanical interlock GAX50... (I-O-II)❶. ☐ 5mm/0.2”	1	0.078
GAX68B	For GA016A...GA040A..., GA063SA, GA040D, GA016C...GA040C, GA063SC and GD.... Screw fixing. Handle with selector lowered ❶. ☐ 5mm/0.2”	1	0.060

❶ For GA...A..., GA040D and GD... switch disconnectors, separately purchase extension GAX7...
❷ Snap-on fixing of GA016C...GA040C and GA063SC switch disconnectors with the handle.
❸ Separately purchase GAX7...AN shaft extension and GAX60B adaptor.

General and operational characteristics
- Choice of handle fixing: ring or screw
- Handle fixing centres:
  - GAX61/61B-GAX62/62B-GAX67B: 36x36mm/1.42x1.42” or 48x48mm/1.89x1.89”
  - GAX66N/66NB: 28x40mm/1.10x1.57”
  - GAX68/68B: 28x28mm/1.10x1.10” or 36x36mm/1.42x1.42”
  - Compatible with pre-existing drillings of most common types in the marketplace
- 1 to 3 padlocks in the Ø4...8mm/0.16...0.31” for all handles except:
  - GAX68 only 1 padlock in the Ø4...8mm/0.16...0.31”
  - GAX61 up to 3 padlocks in the Ø5...8mm/0.20...0.31”
- Front plate dimensions:
  - GAX61/61B-GAX62/62B-GAX63/63B-GAX64/64B-GAX67/67B: 65x65mm/2.56x2.56”
  - GAX66N/66NB: Ø76mm/2.99”
  - GAX68/68B: 48x48mm/1.89x1.89”
- Tightening torque:
  - Fixing ring types: 2.3Nm/20.4lb.in
  - GAX60B: 0.8Nm/7lb.in
  - GAX66N/66NB: 1.5Nm/13.3lb.in
  - All others: 0.8Nm/7lb.in
- Degree of protection for GAX63K/63KB and GAX66N/66NB: IP66, IP69K; for UL/CSA data see detail on page 14-20
- Degree of protection for all others handles: IP65.

Certifications and compliance
See the table on page 14-20.

Door mount version.



Shaft extensions
Terminal covers
Fuse holders

GAX7...

GAX7... AN

GLX00

GAX60B

GAX18S0...

GAX8...

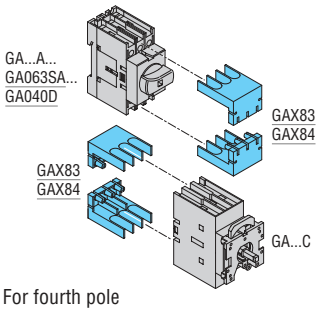
GAX391...

Order code	Characteristics	Qty per pkg	Wt
		n°	[kg]
Shaft extension for door coupling handles GAX61..., GAX62..., GAX63..., GAX64..., GAX68..., GAX67B, and mechanical interlock type GAX5000, GAX5001 and mechanical coupling GAX6000 ❶.			
GAX7055	55mm/2.16” long ☐ 5mm/0.2”	1	0.012
GAX7070	70mm/2.75” long ☐ 5mm/0.2”	1	0.014
GAX7090	90mm/3.54” long ☐ 5mm/0.2”	1	0.018
GAX7150	150mm/5.90” long ☐ 5mm/0.2”	1	0.032
GAX7200	200mm/7.87” long ☐ 5mm/0.2”	1	0.070
GAX7300	300mm/11.81” long ☐ 5mm/0.2”	1	0.068
GAX7400	400mm/15.75” long ☐ 5mm/0.2”	1	0.072
GAX7500	500mm/19.68” long ☐ 5mm/0.2”	1	0.090
Shaft extension for door coupling handles GAX66N, GAX66NB and mechanical coupling system GAX6001.			
GAX7150AN	150mm/5.90” long ☐ 7mm/0.3”	1	0.090
GAX7200AN	200mm/7.87” long ☐ 7mm/0.3”	1	0.112
GAX7300AN	300mm/11.81” long ☐ 7mm/0.3”	1	0.160
GAX7400AN	400mm/15.74” long ☐ 7mm/0.3”	1	0.200
GAX7500AN	500mm/19.68” long ☐ 7mm/0.3”	1	0.250
Adaptor for GAX66N and GAX66NB handles.			
GAX60B	Adaptor ☐ 7mm/0.3” for GA030A..., GA063A...GA160A...	1	0.010
Accessory for shaft extension.			
GLX00	Shaft alignment ring	1	0.040
Support for shaft extension.			
GAX18S05	☐ 5mm/0.2”	1	0.160
GAX18S07	☐ 7mm/0.27”	1	0.160
Set of 2 one-pole terminal covers for fourth pole.			
GAX81	For GAX42040A, GAX42063SA, GAX42040C, GAX42063SC, GAX42040D, GAX41040A, GAX41063SA and GAX41040C	1	0.009
GAX82	For GAX42063A...GAX42160A, GAX42063C...GAX42160C, GAX41125A and GAX41125C	1	0.012
Set of 2 three-pole terminal covers.			
GAX83	For GA016A...GA040A..., GA063SA..., GA016C...GA063C, GA063SC and GA040D	1	0.011
GAX84	For GA030A..., GA063A...GA160A..., GA030C..., GA063C...GA160C	1	0.030
Fuse holder for switch disconnectors.			
GAX391	For GA016A...GA032A... Suitable for 10.3x38 fuse size	1	0.132
GAX391UL	For GA016A...GA025A... Suitable for Class CC 10.3x38 fuse size	1	0.135

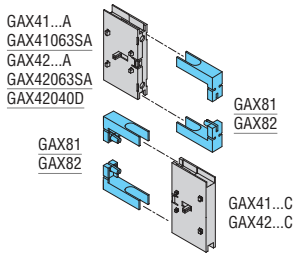
❶ Other lengths available on request.

Operational characteristics of fuse holder
- IEC rated insulation voltage Ui: 1000V
- IEC rated impulse withstand Uimp: 8kV
- The fuse holders connect directly to the switch disconnectors
- Access to fuses only when the switch disconnectors are in OFF position.

Terminal covers
For switch disconnectors



For fourth pole



Certifications and compliance
Certifications obtained:

Type	cULus according to UL60947-4-1 / CSA C22.2 n°60947-4-1	cULus according to UL98 / CSA C22.2 n°4	EAC
GAX61-GAX61B	●	●	●
GAX62-GAX62B	●	●	●
GAX63-GAX63B	●	●	●
GAX63K-GAX63KB	—	—	●
GAX631B	—	—	●
GAX632-GAX632B	●	●	●
GAX64-GAX64B	●	●	●
GAX66N-GAX66NB	—	●	●
GAX67B	●	●	●
GAX68-GAX68B	●	—	●
GAX60B	—	●	●
GAX7055...GAX7500	●	●	●
GAX7150A...GAX7300A	—	●	●
GAX81-GAX83	●	—	●
GAX82-GAX84	—	●	●
GAX391	—	—	●
GAX391UL	●	—	—

● Certification obtained.

NOTE: types GAX61/61B, GAX62/62B, GAX63/63B, GAX63K/63KB, GAX632/632B, GAX64/64B, GAX68/68B, GAX67B are UL/CSA Type 1, 2, 3R, 12, 12K, 4, 4X external use when used with types GA016...40A/C, GA040D and GA063SA/C.
GAX61/61B, GAX62/62B, GAX63/63B, GAX63K/63KB, GAX632/632B, GAX64/64B, GAX66N/66NB, GAX67B are UL/CSA Type 1, 3R, 12, 12K, 4, 4X external use when used with types GA030A/C and GA063...GA125A/C.

Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-3, UL60947-4-1, UL98, CSA C22.2.

Assembled manual changeover switches

GA025…063…ET6

GA080…160ET6

GA025…063…ET8

GA080…160ET8

Order code	IEC conventional thermal current Ith AC21A (≤690V)	IEC rated operational current Ie AC22A (≤690V) AC23A (≤400V)	Qty per pkg	Wt
	[A]	[A]	n°	[kg]
Three-pole versions.				
GA025ET6	25	25	1	0.350
GA040ET6	40	40	1	0.350
GA063SAET6	63	45	1	0.350
GA080ET6	80	80	1	0.881
GA125ET6	125	125	1	0.881
GA160ET6	160	125	1	0.881
Four-pole versions.				
GA025ET8	25	25	1	1.250
GA040ET8	40	40	1	1.250
GA063SAET8	63	45	1	1.250
GA080ET8	80	80	1	1.133
GA125ET8	125	125	1	1.133
GA160ET8	160	125	1	1.133

Components

Switch disconnector	Fourth pole	Mechanical interlock
2 x GA025A	-	GAX5000
2 x GA040A	-	GAX5000
2 x GA063SA	-	GAX5000
2 x GA080A	-	GAX5001
2 x GA125A	-	GAX5001
2 x GA160A	-	GAX5001
2 x GA025A	2 x GAX42040A	GAX5000
2 x GA040A	2 x GAX42040A	GAX5000
2 x GA063SA	2 x GAX42063SA	GAX5000
2 x GA080A	2 x GAX42080A	GAX5001
2 x GA125A	2 x GAX42125A	GAX5001
2 x GA160A	2 x GAX42160A	GAX5001

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Switch disconnectors complete with shaft extension, door-coupling handle and terminal covers

GA…A…K…

Order code	IEC conventional thermal current Ith AC21A (≤690V)	IEC rated operational current Ie AC22A (≤690V) AC23A (≤400V)	Poles	Qty per pkg	Wt
	[A]	[A]	n°	n°	[kg]
Three-pole versions.					
GA025AK30063	25	25	3P	1	0.302
GA040AK30063	40	40	3P	1	0.302
GA063SAK30063	63	45	3P	1	0.302
Four-pole versions.					
GA025AK30063T4	25	25	4P	1	0.356
GA040AK30063T4	40	40	4P	1	0.356
GA063SAK30063T4	63	45	4P	1	0.356

Components

Switch disconnector	Fourth pole	Terminal cover	
		3P	1P
GA025A	–	GAX83	–
GA040A	–	GAX83	–
GA063SA	–	GAX83	–
GA025A	GAX42040A	GAX83	GAX81
GA040A	GAX42040A	GAX83	GAX81
GA063SA	GAX42063SA	GAX83	GAX81

– 300mm/11.8” shaft extension: GAX7300
– Red/yellow door-coupling handle: GAX63
– 2 pcs-set of terminal covers for both line and load terminals protection.

Empty plastic enclosures IEC/EN/BS IP65 type

GAZ1

GAZ2

GAZ3

GAX30

Order code	Description	Qty per pkg	Wt
		n°	[kg]
For switch disconnectors. With red/yellow handle. Complete with shaft extension.			
GAZ1	For GA016A...GA040A.../D	1	0.320
GAZ2	For GA063SA..., GA030A... and GA063A...GA100A...	1	0.780
GAZ3	For GA125A...GA160A...	1	1.900
With black handle. Complete with shaft extension.			
GAZ1B	For GA016A...GA040A.../D	1	0.320
GAZ2B	For GA063SA..., GA030A... and GA063A...GA100A...	1	0.730
GAZ3B	For GA125A...GA160A...	1	1.900
Accessory.			
GAX30	Shielded cable fixing kit for GAZ1 and GAZ1B	1	0.083

The empty enclosures are supplied with the following accessories:

Enclosure	GAZ1 GAZ1B	GAZ2 GAZ2B	GAZ3 GAZ3B
Red/yellow handle	GAX61	GAX61	GAX61
Black handle	GAX61B	GAX61B	GAX61B
Extension	1	1	1
Neutral plate terminal	1	1	-
Earth/Ground plate terminal	1	1	-

General characteristics
- Enclosure material: ABS
- Padlockable handles
- Sealable cover
- Tightening torque for cover screws:
  - GAZ1...: 1.3Nm/16lb.in
  - GAZ2... and GAZ3...: 1.5Nm/13lb.in
- Degree of protection: IP65
- Cable entry:
  - GAZ1... types: PG16/M25 and PG13.5/M20 knockouts
  - GAZ2... types: PG16/M25 and PG29/M32 knockouts
  - GAZ3... types: smooth surfaces; can be drilled by customer.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60947-3, IEC/EN/BS 60947-1.

Empty plastic enclosures UL/CSA Type 4/4X

GAZ1UL

GAZ2UL

GAX30

Order code	Description	Qty per pkg	Wt
		n°	[kg]
For switch disconnectors. With red/yellow handle. Complete with shaft extension.			
GAZ1UL	For GA016A...GA040A... and GA040D	1	0.320
GAZ2UL	For GA063SA...	1	0.730
With black handle. Complete with shaft extension.			
GAZ1BUL	For GA016A...GA040A... and GA040D	1	0.320
GAZ2BUL	For GA063SA...	1	0.730
Accessory.			
GAX30	Shielded cable fixing kit for GAZ1UL and GAZ1BUL	1	0.083

The empty enclosures are supplied with the following accessories:

Enclosure	GAZ1UL GAZ1BUL	GAZ2UL GAZ2BUL
Red/yellow handle	GAX61	GAX61
Black handle	GAX61B	GAX61B
Extension	1	1
Neutral plate terminal	1	1
Earth/Ground plate terminal	1	1

General characteristics
- Enclosure material: polycarbonate
- Padlockable handles
- Sealable cover
- Tightening torque for cover screws:
  - GAZ1...UL: 1.3Nm/16lb.in
  - GAZ2...UL: 1.5Nm/13lb.in
- Degree of protection: IP65; UL/CSA Type 4/4X
- Cable entry:
  - GAZ1...UL types: PG16/M25 and PG13.5/M20 knockouts
  - GAZ2...UL types: PG16/M25 and PG29/M32 knockouts.

Certifications and compliance
Certifications obtained: cULus for GAZ016...GAZ125...UL, GAZ1...UL and GAZ2...UL types; EAC for all.
Compliant with standards: IEC/EN/BS 60947-3, IEC/EN/BS 60947-1, UL60947-4-1 e CSA C22.2 n°60947-4-1 (up to GAZ063SA...), UL98 and CSA C22.2 n°4 (for all others types).

Dimensions pages 14-60 and 61

Switch disconnectors in plastic enclosure IEC/EN/BS IP65

GAZ016...GAZ040...

GAZ016...B...GAZ040...B

GAZ063...100C...

GAZ063...B...100C...B

GAZ125... GAZ160...

GAZ125...B... GAZ160...B

Order code	IEC conventional thermal current Ith AC21A (≤690V)	IEC rated operational current Ie AC23B (≤400V)	AC23B (≤500V)	Qty per pkg	Wt
	[A]	[A]	[A]	n°	[kg]
THREE-POLE. With red/yellow handle.					
GAZ016	16	16	16	1	0.450
GAZ025	25	25	25	1	0.450
GAZ032	32	32	25	1	0.450
GAZ040	40	40	25	1	0.450
GAZ063SA	63	45	25	1	0.870
GAZ063C	63	63	63	1	1.220
GAZ080C	80	80	63	1	1.220
GAZ100C	100	100	80	1	1.220
GAZ125	125	125	100	1	2.220
GAZ160	160	125	100	1	2.220
THREE-POLE. With black handle.					
GAZ016B	16	16	16	1	0.450
GAZ025B	25	25	25	1	0.450
GAZ032B	32	32	25	1	0.450
GAZ040B	40	40	25	1	0.450
GAZ063SAB	63	45	25	1	0.870
GAZ063CB	63	63	63	1	1.220
GAZ080CB	80	80	63	1	1.220
GAZ100CB	100	100	80	1	1.220
GAZ125B	125	125	100	1	2.220
GAZ160B	160	125	100	1	2.220
FOUR-POLE. With red/yellow handle.					
GAZ016T4	16	16	16	1	0.550
GAZ032T4	32	32	25	1	0.550
GAZ040T4	40	40	25	1	0.550
GAZ063SAT4	63	45	25	1	0.780
GAZ063CT4	63	63	63	1	1.250
GAZ100CT4	100	100	80	1	1.250
GAZ125T4	125	125	100	1	2.500
GAZ160T4	160	125	100	1	2.500
FOUR-POLE. With black handle.					
GAZ016T4B	16	16	16	1	0.550
GAZ032T4B	32	32	25	1	0.550
GAZ040T4B	40	40	25	1	0.550
GAZ063SAT4B	63	45	25	1	0.780
GAZ063CT4B	63	63	63	1	1.250
GAZ100CT4B	100	100	80	1	1.250
GAZ125T4B	125	125	100	1	2.500
GAZ160T4B	160	125	100	1	2.500

Components

Enclosure	Switch disconnector	Handle standard supplied with GAZ...
GAZ1	GA016A	GAX61
GAZ1	GA025A	GAX61
GAZ1	GA032A	GAX61
GAZ1	GA040A	GAX61
GAZ2	GA063SA	GAX61
GAZ2	GA063A	GAX61
GAZ2	GA080A	GAX61
GAZ2	GA100A	GAX61
GAZ3	GA125A	GAX61
GAZ3	GA160A	GAX61
GAZ1B	GA016A	GAX61B
GAZ1B	GA025A	GAX61B
GAZ1B	GA032A	GAX61B
GAZ1B	GA040A	GAX61B
GAZ2B	GA063SA	GAX61B
GAZ2B	GA063A	GAX61B
GAZ2B	GA080A	GAX61B
GAZ2B	GA100A	GAX61B
GAZ3B	GA125A	GAX61B
GAZ3B	GA160A	GAX61B

Enclosure	Switch disconnector	4th pole	Handle standard supplied with GAZ...
GAZ1	GA016A	GAX42040A	GAX61
GAZ1	GA032A	GAX42040A	GAX61
GAZ1	GA040A	GAX42040A	GAX61
GAZ2	GA063SA	GAX42063SA	GAX61
GAZ2	GA063A	GAX42063A	GAX61
GAZ2	GA100A	GAX42100A	GAX61
GAZ3	GA125A	GAX42125A	GAX61
GAZ3	GA160A	GAX42160A	GAX61
GAZ1B	GA016A	GAX42040A	GAX61B
GAZ1B	GA032A	GAX42040A	GAX61B
GAZ1B	GA040A	GAX42040A	GAX61B
GAZ2B	GA063SA	GAX42063SA	GAX61B
GAZ2B	GA063A	GAX42063A	GAX61B
GAZ2B	GA100A	GAX42100A	GAX61B
GAZ3B	GA125A	GAX42125A	GAX61B
GAZ3B	GA160A	GAX42160A	GAX61B

General characteristics

- Enclosure material: ABS
- For four-pole types not indicated, separately purchase corresponding fourth pole GAX42...A and install on enclosed 3-pole version
- Possible accessories to mount afterwards, if any required:
  - GAX30 to provide shielded cable connection continuity (e.g. with static converters)
  - GAZ016...GAZ040...: 1 contact block both on the right and left disconnector side unless 4th pole is installed
  - Other types: 2 contact blocks both on the right and left disconnector side unless 4th pole is installed
  - GAZ125...GAZ160...: if any earth/ground and/or neutral terminal required, separately purchase types GAX3... given on page 14-15
- Padlockable handles
- Sealable cover
- Tightening torque for cover screws:
  - GAZ016...GAZ040...: 1.3Nm/16lb.in
  - Other types: 1.5Nm/13lb.in
- Degree of protection: IP65
- Cable entry:
  - GAZ016..., GAZ040... types: PG16/M25 and PG13.5/M20 knockouts
  - GAZ063SA...GAZ100... types: PG16/M25 and PG29/M32 knockouts
  - GAZ125..., GAZ160... types: smooth surfaces; can be drilled by customer.

Certifications and compliance

Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60947-3, IEC/EN/BS 60947-1.

Switch disconnectors in plastic enclosure UL/CSA Type 4/4X

GAZ016...UL...GAZ040...UL

GAZ016...BUL...GAZ040...BUL

GAZ063...UL...100...UL

GAZ063...BUL...100...BUL

GAZ125...UL

GAZ125...BUL

Order code	IEC conventional thermal current Ith AC21A (≤690V)	IEC rated operational current Ie AC23B (≤400V)	AC23B (≤500V)	Qty per pkg	Wt
	[A]	[A]	[A]	n°	[kg]
THREE-POLE. With red/yellow handle.					
GAZ016UL	16	16	16	1	0.450
GAZ025UL	25	25	25	1	0.450
GAZ032UL	32	32	25	1	0.450
GAZ040UL	40	40	25	1	0.450
GAZ063SAUL	63	45	25	1	0.870
GAZ063UL	63	63	63	1	1.220
GAZ080UL	80	80	63	1	2.220
GAZ100UL	100	100	80	1	2.220
GAZ125UL	125	125	100	1	2.220
THREE-POLE. With black handle.					
GAZ016BUL	16	16	16	1	0.450
GAZ025BUL	25	25	25	1	0.450
GAZ032BUL	32	32	25	1	0.450
GAZ040BUL	40	40	25	1	0.450
GAZ063SABUL	63	45	25	1	0.870
GAZ063BUL	63	63	63	1	1.220
GAZ080BUL	80	80	63	1	2.220
GAZ100BUL	100	100	80	1	2.220
GAZ125BUL	125	125	100	1	2.220
FOUR-POLE. With red/yellow handle.					
GAZ016T4UL	16	16	16	1	0.550
GAZ032T4UL	32	32	25	1	0.550
GAZ063T4UL	63	63	63	1	1.150
GAZ100T4UL	100	100	80	1	2.500
GAZ125T4UL	125	125	100	1	2.500
FOUR-POLE. With black handle.					
GAZ016T4BUL	16	16	16	1	0.550
GAZ032T4BUL	32	32	25	1	0.550
GAZ063T4BUL	63	63	63	1	1.150
GAZ100T4BUL	100	100	80	1	2.500
GAZ125T4BUL	125	125	100	1	2.500

❶ Extension shaft GAX7150 to be cut at 114mm/4.49" of total length.

Components

Enclosure	Switch disconnector	Handle standard supplied with GAZ...
GAZ1UL	GA016A	GAX61
GAZ1UL	GA025A	GAX61
GAZ1UL	GA032A	GAX61
GAZ1UL	GA040A	GAX61
GAZ2UL	GA063SA	GAX61
M3NUL+GAX7150 ❶	GA063A	GAX61
M3NUL+GAX7150 ❶	GA080A	GAX61
M3NUL+GAX7150 ❶	GA100A	GAX61
M3NUL+GAX7150 ❶	GA125A	GAX61

GAZ1BUL	GA016A	GAX61B
GAZ1BUL	GA025A	GAX61B
GAZ1BUL	GA032A	GAX61B
GAZ1BUL	GA040A	GAX61B
GAZ2BUL	GA063SA	GAX61B
M3NUL+GAX7150 ❶	GA063A	GAX61B
M3NUL+GAX7150 ❶	GA080A	GAX61B
M3NUL+GAX7150 ❶	GA100A	GAX61B
M3NUL+GAX7150 ❶	GA125A	GAX61B

Enclosure	Switch disconnector	4th pole	Handle standard supplied with GAZ...
GAZ1UL	GA016A	GAX42040A	GAX61
GAZ1UL	GA032A	GAX42040A	GAX61
M3NUL+GAX7150 ❶	GA063A	GAX42063A	GAX61
M3NUL+GAX7150 ❶	GA100A	GAX42100A	GAX61
M3NUL+GAX7150 ❶	GA125A	GAX42125A	GAX61

GAZ1BUL	GA016A	GAX42040A	GAX61B
GAZ1BUL	GA032A	GAX42040A	GAX61B
M3NUL+GAX7150 ❶	GA063A	GAX42063A	GAX61B
M3NUL+GAX7150 ❶	GA100A	GAX42100A	GAX61B
M3NUL+GAX7150 ❶	GA125A	GAX42125A	GAX61B

General characteristics

- Enclosure material: polycarbonate
- For four-pole types not indicated, separately purchase corresponding fourth pole GAX4...A and install on enclosed 3-pole UL-suffix version
- Possible accessories to mount afterwards, if any required:
  - GAX30 to provide shielded cable connection continuity (e.g. with static converters)
  - GAZ016...GAZ040...: 1 contact block both on the right and left disconnector side unless 4th pole is installed
  - Other types: 2 contact blocks both on the right and left disconnector side unless 4th pole is installed
- Padlockable handles
- Sealable cover
- Tightening torque for cover screws:
  - GAZ016...GAZ040...UL: 1.3Nm/16lb.in
  - Other types: 1.5Nm/13lb.in
- Degree of protection: IP65; UL/CSA Type 4/4X
- Cable entry:
  - GAZ016...GAZ040...UL types: PG16/M25 and PG13.5/M20 knockouts
  - GAZ063SA...UL types: PG16/M25 and PG29/M32 knockouts
  - GAZ063...GAZ125...UL types: smooth surfaces; can be drilled by customer.

Certifications and compliance

Certifications obtained: cULus for GAZ016... GAZ125...UL, GAZ1...UL and GAZ2...UL types; EAC for all.
Compliant with standards: IEC/EN/BS 60947-3, IEC/EN/BS 60947-1, UL60947-4-1 and CSA C22.2 n°60947-4-1 (up to GAZ063SA...), UL98 and CSA C22.2 n°4 (for all others).

Manual changeover switches in plastic enclosure UL/CSA Type 4/4X

GAZ025E...GAZ063SAE...

GAZ080E...
GAZ160E...

Order code	IEC conventional free air thermal current Ith AC21A (≤690V)	IEC rated operational current Ie AC23B (≤400V)	IEC rated operational current Ie AC23B (≤500V)	Qty per pkg	Wt
	[A]	[A]	[A]	n°	[kg]
3-pole line changeover switches I-0-II. Black handle.					
GAZ025ET6	25	25	25	1	1.060
GAZ040ET6	40	40	25	1	1.060
GAZ063SAET6	63	45	25	1	1.070
GAZ080ET6	80	80	63	1	2.950
GAZ125ET6	125	125	100	1	2.950
GAZ160ET6	160	125	100	1	2.950
4-pole line changeover switches I-0-II. Black handle.					
GAZ025ET8	25	25	25	1	1.060
GAZ040ET8	40	40	25	1	1.060
GAZ063SAET8	63	45	25	1	1.070
GAZ080ET8	80	80	63	1	2.950
GAZ125ET8	125	125	100	1	2.950
GAZ160ET8	160	125	100	1	2.950

Components

Enclosure	Switch disconnectors	Mechanical interlock	Handle
M25N+GAX7090	2xGA025A	GAX5000	GAX67B
M25N+GAX7090	2xGA040A	GAX5000	GAX67B
M25N+GAX7090	2xGA063SA	GAX5000	GAX67B
M3NUL+GAX7090	2xGA080A	GAX5001	GAX67B
M3NUL+GAX7090	2xGA125A	GAX5001	GAX67B
M3NUL+GAX7090	2xGA160A	GAX5001	GAX67B
Enclosure	Switch disconnectors	Mechanical interlock	Handle
M25N+GAX7090	2xGA025A + 2xGAX42040A	GAX5000	GAX67B
M25N+GAX7090	2xGA040A + 2xGAX42040A	GAX5000	GAX67B
M25N+GAX7090	2xGA063SA + 2xGAX42063SA	GAX5000	GAX67B
M3NUL+GAX7090	2xGA080A + 2xGAX42080A	GAX5001	GAX67B
M3NUL+GAX7090	2xGA125A + 2xGAX42125A	GAX5001	GAX67B
M3NUL+GAX7090	2xGA160A + 2xGAX42160A	GAX5001	GAX67B

General characteristics
- Enclosure material: polycarbonate
- Possibility of fitting:
  - 2 contact blocks both on the right and left side for GAZ...ET6 types
  - 1 contact block both on the right and left side for GAZ... ET8 types
- Padlockable handle complete with extension
- Earth and neutral plate terminals
- Sealable enclosure cover
- Tightening torque for cover screws: 1.5Nm/13lb.in
- Degree of protection: IP65; UL/CSA Type 4/4X
- Cable entry:
  - GAZ025...GAZ063SA... types: PG16/M25 and PG29/M32 knockouts
  - GAZ080... and GAZ160... types: smooth surfaces; can be drilled by customer.

Certifications and compliance
Certifications obtained: cULus (except GAZ160E...), EAC.
Compliant with standards: IEC/EN/BS 60947-3, IEC/EN/BS 60947-1, UL60947-4-1 and CSA C22.2 n°60947-4-1 (up to GAZ063SA...), UL98 and CSA C22.2 n°4 (for all others except GAZ160E...).

UL/CSA ratings

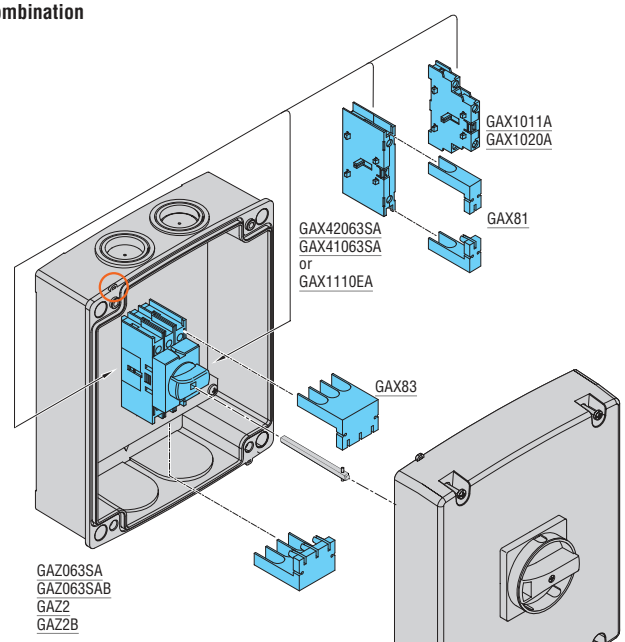
Type	1 phase [HP]		3 phase [HP]				General use at 600VAC	Short-circuit rating at 600VAC	Fuse class - max rating at 600V
	120V	240V	200-208V	240V	480V	600V	[A]	[kA]	Type - [A]
GAZ016...	1	2	5	5	10	10	16	5	RK5 - 20A
GAZ025...	1 1/2	3	7 1/2	7 1/2	15	20	25	5	RK5 - 30A
GAZ032...	2	5	10	10	20	20	32	5	RK5 - 35A
GAZ040...	2	5	10	15	20	25	40	5	RK5 - 45A
GAZ063S...	2	7 1/2	10	15	30	30	60	5	RK5 - 45A

NOTE: Above ratings are valid for GAZ016 - GAZ063S...UL types, according to UL508 and CSA 22.2 n°14.

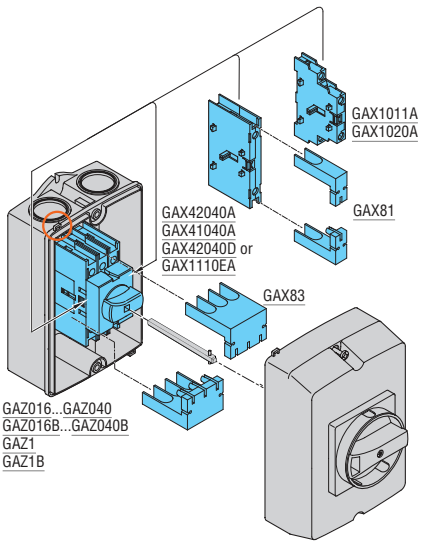
Type ❶	1 phase [HP]		3 phase [HP]				General use at 600VAC	Short-circuit rating at 600VAC	Fuse class - max rating at 600V
	120V	240V	200-208V❷	240V	480V	600V	[A]	[kA]	Type - [A]
GAZ063C...	3	7 1/2	20	20	40	40	60	10	100
GAZ080...	3	10	25	25	40	40	100	10	100
GAZ100...	5	10	30	30	50	50	100	10	100
GAZ125...	7 1/2	10	30	30	60	60	100	10	100

NOTE: Above ratings are valid for GAZ063C - GAZ125... types, according to UL98 and CSA C22.2 n°4.
❶ Lower ratings in this same UL/CSA category are available on specific request for volume orders. For information, consult Technical support; see contact details on inside front cover.
❷ Voltage value not considered in UL98 / CSA 22.2 n°4 standards.

Maximum combination
Enclosures

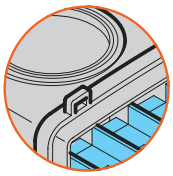


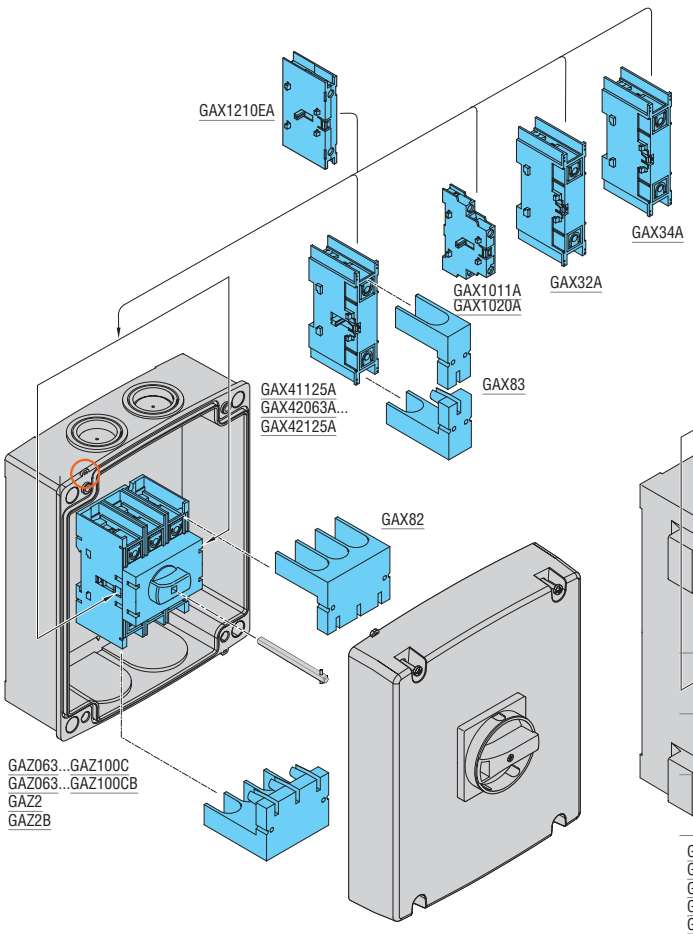
Two auxiliary contacts blocks can be fitted both on the right and left sides of the disconnector unless the fourth pole is installed. The earth and neutral plate terminals are standard supplied on the enclosure base.

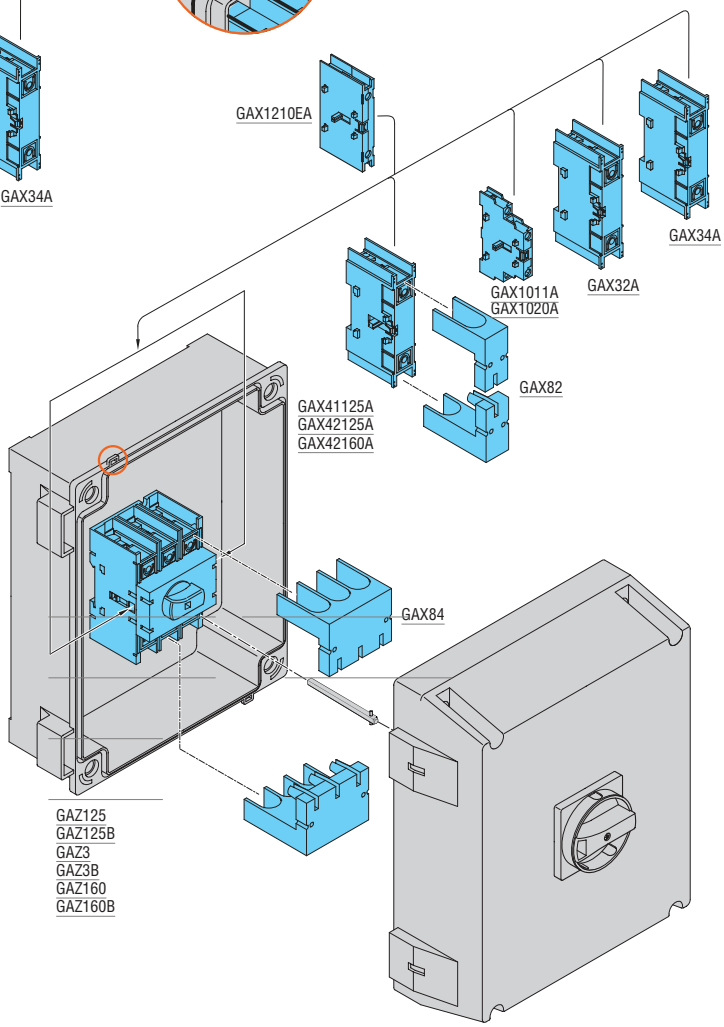


One auxiliary contact block can be fitted on the right and left sides of the disconnector unless the fourth pole is installed. The earth and neutral plate terminals are standard supplied on the enclosure base.

Sealing eyelet







Two auxiliary contact blocks can be fitted both on the right and left sides of the disconnector unless the fourth pole is installed.
Earth and neutral plate terminals are standard supplied on the box base
If any earth/ground and/or neutral terminals are required, type GAX3..., purchase separately.

Switch disconnectors in metal enclosure IEC/EN/BS IP65

GAZM016...GAZM100...

GAZM016...B...GAZM100...B

GAZM125...GAZM160...

GAZM125...B...GAZM160...B

Order code	IEC conventional thermal current Ith AC21A (≤690V)	IEC rated operational current Ie AC23B (≤400V)	AC23B (≤500V)	Qty per pkg	Wt
	[A]	[A]	[A]	n°	[kg]
THREE-POLE. With red/yellow handle.					
GAZM016	16	16	16	1	2.150
GAZM025	25	25	25	1	2.150
GAZM032	32	32	25	1	2.150
GAZM040	40	40	25	1	2.150
GAZM063SA	63	45	25	1	2.150
GAZM063	63	63	63	1	2.380
GAZM080	80	80	63	1	2.380
GAZM100	100	100	80	1	2.380
GAZM125	125	125	100	1	3.550
GAZM160	160	125	100	1	3.550
THREE-POLE. With black handle.					
GAZM016B	16	16	16	1	2.150
GAZM025B	25	25	25	1	2.150
GAZM032B	32	32	25	1	2.150
GAZM040B	40	40	25	1	2.150
GAZM063SAB	63	45	25	1	2.150
GAZM063B	63	63	63	1	2.380
GAZM080B	80	80	63	1	2.380
GAZM100B	100	100	80	1	2.380
GAZM125B	125	125	100	1	3.550
GAZM160B	160	125	100	1	3.550
FOUR-POLE. With red/yellow handle.					
GAZM016T4	16	16	16	1	2.195
GAZM032T4	32	32	25	1	2.195
GAZM040T4	40	40	25	1	2.195
GAZM063SAT4	63	45	25	1	2.195
GAZM063T4	63	63	63	1	2.506
GAZM100T4	100	100	80	1	2.506
GAZM125T4	125	125	100	1	3.676
GAZM160T4	160	125	100	1	3.676
FOUR-POLE. With black handle.					
GAZM016T4B	16	16	16	1	2.195
GAZM032T4B	32	32	25	1	2.195
GAZM040T4B	40	40	25	1	2.195
GAZM063SAT4B	63	45	25	1	2.195
GAZM063T4B	63	63	63	1	2.506
GAZM100T4B	100	100	80	1	2.506
GAZM125T4B	125	125	100	1	3.676
GAZM160T4B	160	125	100	1	3.676

Components[1]

Enclosure	Switch disconnector	Handle
GAZM1	GA016A	GAX61
GAZM1	GA025A	GAX61
GAZM1	GA032A	GAX61
GAZM1	GA040A	GAX61
GAZM1	GA063SA	GAX61
GAZM1	GA063A	GAX61
GAZM1	GA080A	GAX61
GAZM1	GA100A	GAX61
GAZM2	GA125A	GAX61
GAZM2	GA160A	GAX61
GAZM1	GA016A	GAX61B
GAZM1	GA025A	GAX61B
GAZM1	GA032A	GAX61B
GAZM1	GA040A	GAX61B
GAZM1	GA063SA	GAX61B
GAZM1	GA063A	GAX61B
GAZM1	GA080A	GAX61B
GAZM1	GA100A	GAX61B
GAZM2	GA125A	GAX61B
GAZM2	GA160A	GAX61B

Enclosure	Switch disconnector	4th pole	Handle
GAZM1	GA016A	GAX42040A	GAX61
GAZM1	GA032A	GAX42040A	GAX61
GAZM1	GA040A	GAX42040A	GAX61
GAZM1	GA063SA	GAX42063SA	GAX61
GAZM1	GA063A	GAX42063A	GAX61
GAZM1	GA100A	GAX42100A	GAX61
GAZM2	GA125A	GAX42125A	GAX61
GAZM2	GA160A	GAX42160A	GAX61
GAZM1	GA016A	GAX42040A	GAX61B
GAZM1	GA032A	GAX42040A	GAX61B
GAZM1	GA040A	GAX42040A	GAX61B
GAZM1	GA063SA	GAX42063SA	GAX61B
GAZM1	GA063A	GAX42063A	GAX61B
GAZM1	GA100A	GAX42100A	GAX61B
GAZM2	GA125A	GAX42125A	GAX61B
GAZM2	GA160A	GAX42160A	GAX61B

[1] Extension shaft GAX7... cut to a specific length has to be added; for more details contact our Technical support; see contact details on inside front cover.

General characteristics
- Enclosure material: painted sheet steel
- Padlockable handle
- Front door closing with screws
- Degree of protection: IP65
- Cable entry: smooth surfaces; can be drilled by customer.

Certifications and compliance
Compliant with standards: IEC/EN/BS 60947-3, IEC/EN/BS 60947-1.

Manual changeover switches in metal enclosure IEC/EN/BS IP65

GAZM080ET...GAZM160ET...

Order code	IEC conventional thermal current Ith AC21A (≤690V)	IEC rated operational current Ie AC23B (≤400V)	AC23B (≤500V)	Qty per pkg	Wt
	[A]	[A]	[A]	n°	[kg]
3-pole line changeover switches I-0-II. Black handle.					
GAZM025ET6	25	25	25	1	1.983
GAZM040ET6	40	40	25	1	1.983
GAZM063SAET6	63	45	25	1	1.983
GAZM080ET6	80	80	63	1	3.156
GAZM125ET6	125	125	100	1	3.156
GAZM160ET6	160	125	100	1	3.156
4-pole line changeover switches I-0-II. Black handle.					
GAZM025ET8	25	25	25	1	2.100
GAZM040ET8	40	40	25	1	2.100
GAZM063SAET8	63	45	25	1	2.100
GAZM080ET8	80	80	63	1	5.953
GAZM125ET8	125	125	100	1	5.953
GAZM160ET8	160	125	100	1	5.953

Components❶

Enclosure	Switches disconnectors	Mechanical interlock	Handle
GAZM1	2 x GA025A	GAX5000	GAX67B
GAZM1	2 x GA040A	GAX5000	GAX67B
GAZM1	2 x GA063SA	GAX5000	GAX67B
GAZM2	2 x GA080A	GAX5001	GAX67B
GAZM2	2 x GA125A	GAX5001	GAX67B
GAZM2	2 x GA160A	GAX5001	GAX67B
GAZM1	2 x GA025A + 2 x GAX42040A	GAX5000	GAX67B
GAZM1	2 x GA040A + 2 x GAX42040A	GAX5000	GAX67B
GAZM1	2 x GA063SA + 2 x GAX42063SA	GAX5000	GAX67B
GAZM3	2 x GA080A + 2 x GAX42080A	GAX5001	GAX67B
GAZM3	2 x GA125A + 2 x GAX42125A	GAX5001	GAX67B
GAZM3	2 x GA160A + 2 x GAX42160A	GAX5001	GAX67B

General characteristics
- Enclosure material: painted sheet steel
- Padlockable handle
- Front door closing with screws and hinges on the right side of the enclosure (GAZM080ET8...GAZM160ET8...)
- Degree of protection: IP65
- Cable entry: smooth surfaces; can be drilled by customer.

Certifications and compliance
Compliant with standards: IEC/EN/BS 60947-3, IEC/EN/BS 60947-1.

Switch disconnectors in stainless steel AISI 304 enclosure IEC/EN/BS IP65

GAZS016...GAZS100...

Order code	IEC conventional thermal current Ith AC21A (≤690V)	IEC rated operational current Ie AC23B (≤400V)	AC23B (≤500V)	Qty per pkg	Wt
	[A]	[A]	[A]	n°	[kg]
THREE-POLE. With red/yellow handle.					
GAZS016	16	16	16	1	2.150
GAZS025	25	25	25	1	2.150
GAZS032	32	32	25	1	2.150
GAZS040	40	40	25	1	2.150
GAZS063SA	63	45	25	1	2.150
GAZS063	63	63	63	1	2.380
GAZS100	100	100	80	1	2.380
THREE-POLE. With black handle.					
GAZS016B	16	16	16	1	2.150
GAZS025B	25	25	25	1	2.150
GAZS032B	32	32	25	1	2.150
GAZS040B	40	40	25	1	2.150
GAZS063SAB	63	45	25	1	2.150
GAZS063B	63	63	63	1	2.380
GAZS100B	100	100	80	1	2.380

❶ Extension shaft GAX7... cut to a specific length has to be added; for more details contact our Technical support; see contact details on inside front cover.

Components❶

Enclosure	Switch disconnector	Handle
GAZS1	GA016A	GAX61
GAZS1	GA025A	GAX61
GAZS1	GA032A	GAX61
GAZS1	GA040A	GAX61
GAZS1	GA063SA	GAX61
GAZS1	GA063A	GAX61
GAZS1	GA100A	GAX61
GAZS1	GA016A	GAX61B
GAZS1	GA025A	GAX61B
GAZS1	GA032A	GAX61B
GAZS1	GA040A	GAX61B
GAZS1	GA063SA	GAX61B
GAZS1	GA063A	GAX61B
GAZS1	GA100A	GAX61B

General characteristics
- Enclosure material: AISI 304 stainless steel
- Padlockable handle
- Front door closing with screws
- Degree of protection: IP65
- Cable entry: smooth surfaces; can be drilled by customer
- For four-pole versions add the corresponding GAX42...A fourth pole to the switch disconnector.

Certifications and compliance
Compliant with standards: IEC/EN/BS 60947-3, IEC/EN/BS 60947-1.

Empty metal enclosures IEC/EN/BS IP65

GAZM1

GAZM2

GAZM3

GAZS1

Order code	Enclosure dimensions	Qty per pkg	Wt
	[mm (in)]	n°	[kg]
For switch disconnectors. Painted sheet steel enclosures.			
GAZM1	150x200x120 (5.90x7.87x4.72)	1	1.680
GAZM2	200x300x120 (7.87x11.81x4.72)	1	3.000
GAZM3	300x400x120 (11.8x15.75x4.72)	1	4.900
AISI 304 stainless steel enclosures.			
GAZS1	150x200x120 (5.90x7.87x4.72)	1	1.900

General characteristics
- Painted sheet steel enclosures for GAZM...
- AISI 304 stainless steel enclosures for GAZS1
- Front door closing with screws for GAZM1, GAZM2 and GAZS1
- Front door closing with screws and hinges on the right side of the enclosures for GAZM3
- Drilled cover for handle assembly
- Factory mounted 35mm DIN rail on the base
- Ground terminal included
- Degree of protection: IP65
- Cable entry: smooth surfaces; can be drilled by customer
- For compatible components see pages 12-27 and 28.

Compliance
Compliant with standards: IEC/EN/BS 60947-1.

SWITCH DISCONNECTORS

COMPACT SIZE
The three-pole switch disconnectors are made up of a body with compact dimensions: 162mm/6.38" wide up to 315A, 203mm/7.99" from 320A to 500A, 231mm/9.09" for 630A, 284mm/11.18" from 630A to 800A and 314mm/12.36" for 1000A.

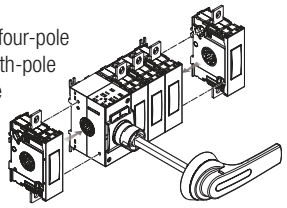
EASY INSTALLATION ON DIN RAIL
The switch disconnectors can be mounted on a DIN rail (for sizes from 160A to 315A) or on a plate by screw fixing.

UL98 VERSION
Switch disconnectors are listed for USA and Canada, certified according to UL98/CSA C22.2 n° 4.
General use current: 100-200-400-600-800A.

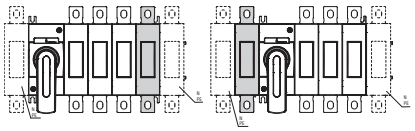
ANTI-SLIDE INSERT FOR DIN RAIL
For sizes from 160A to 315A there are two rubber pad inserts that prevent the sliding of the switch disconnectors on the DIN rail.

FLEXIBLE INSTALLATION ORIENTATION
Switch disconnectors can be installed in all directions. The clips for screw fixing can be adjusted both in rotation and position (flexible fixing).

FOUR-POLE VERSION AVAILABLE
Switch disconnectors are supplied with three-pole configuration.
To realise the four-pole version, a fourth-pole add-on can be purchased.



COMPONENT FLEXIBILITY
It is possible to mount the fourth pole, neutral and earth/ground terminals on both sides of the switch disconnectors using 2 screws.



MANUAL CHANGEOVER SWITCHES

COMPACT SIZE
Manual changeover switches are made up of a body with compact dimensions:
- 185mm/7.28" wide for three-pole versions up to 315A, 237mm/9.33" from 320A to 500A, 263mm/10.35" for 630A, 340mm/13.39" from 631A to 800A and 370mm/14.67" for 1000A;
- 220mm/8.66" wide for the four-pole versions up to 315A, 281mm/11.06" from 320A to 500A, 317mm/12.48" for 630A, 405mm/15.94" from 631A to 800A and 445mm/17.52" for 1000A.

EASY INSTALLATION
The manual changeover switches can be mounted on a plate by screws.

UL1008 VERSION
The manual changeover switches are listed for USA and Canada, certified according to UL1008/CSA C22.2 n° 178.
General use current: 100-200-400A.

THREE AND FOUR-POLE VERSION
Manual changeover switches are already supplied assembled in three-pole and four-pole configuration.

MOTORISED CHANGEOVER SWITCHES

COMPACT SIZE
Motorised changeover switches are made up of a body with compact dimensions: 294mm/11.57" wide for three-pole versions and 328mm/12.91" wide for the four-pole versions.

FUNCTIONING LOGIC
Motor command is possible in 2 different ways:
- Impulse logic: the changeover switch moves to a specific position after receiving an impulse on the command inputs I-0-II.
- Contactor logic: the changeover switch moves to a specific position (I or II) and it remains in that position as long as the command is held. If the command I or II is removed, the switch returns to the position 0 (the auxiliary power supply must be available).

EXPANDABILITY
It is possible to add further additional relay outputs or a Modbus-RTU RS485 communication port by the means of the expansion slot integrated in the motorized changeover switch.

THREE AND FOUR-POLE VERSION
Motorised changeover switches are already supplied assembled in three-pole and four-pole configuration.

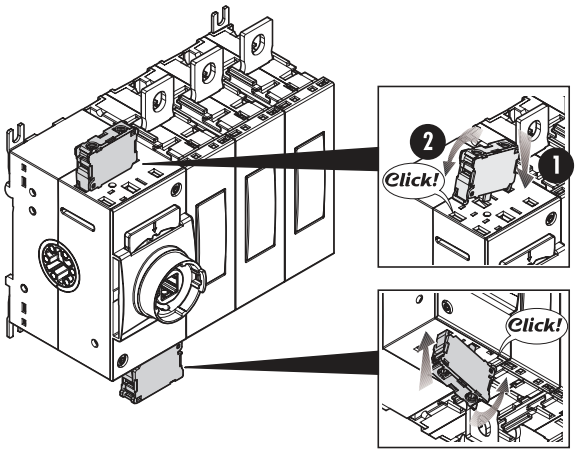
WIDE RANGE OF MOTOR SUPPLY VOLTAGE
3 motor supply voltages are available:
- 24VDC (19.2...31.2VDC):
- 110...125VAC/DC (77...165VAC/DC);
- 208...277VAC (166...332VAC).

UL1008 VERSION
The motorised changeover switches are listed for USA and Canada, certified according to UL1008/CSA C22.2 n° 178. General use current: 100-200A.

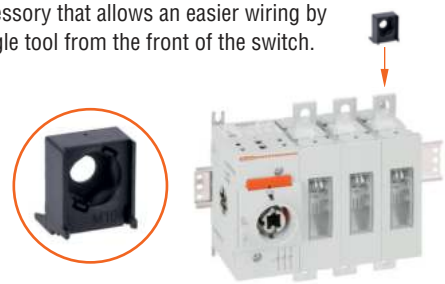
WIDE RANGE OF ACCESSORIES
A wide choice of auxiliary contacts, terminal covers, phase barriers, terminal clamps, bridging bars, shafts and handles are available to satisfy every installation need.

HIGH IEC ELECTRICAL CAPABILITY
The rated currents in AC23A up to 1000A-415V and 800A-690V are the highest of the category.

ADD-ON AUXILIARY CONTACTS
The same add-on block is suitable for all the switch disconnectors and changeover switches. Contacts are mounted on main switching actuator (max 8 contacts for switch disconnectors; max 4 contacts for changeover switches).



CAPTIVE NUT
It is an accessory that allows an easier wiring by using a single tool from the front of the switch.

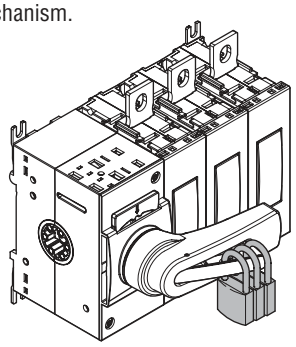


VISIBLE CONTACTS: MAXIMUM SECURITY!
Thanks to the window on the individual power poles the open or closed switch status is clearly visible at a distance.

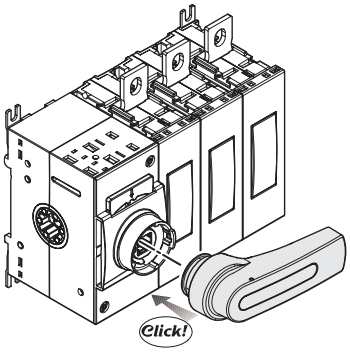
UL508A DEFEATABLE HANDLE
In compliance with UL508A standards, which require internal panel inspection by authorized personnel with power applied, pistol handles are available with defeatable feature of the door coupling when the switch disconnector or the changeover switch is closed, i.e. in ON position.

IP66, IP69K AND NEMA 4X HANDLES
A wide range of screw fixing pistol grip handles are available with the maximum degree of protection on the market.

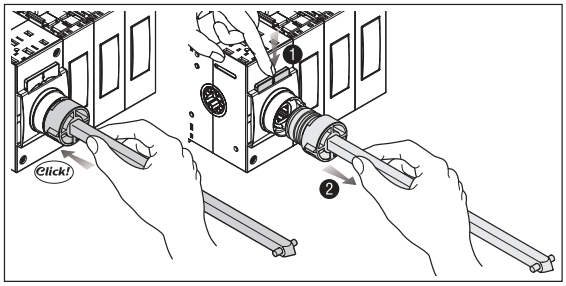
PADLOCKABLE HANDLES
All direct and door coupling handles are equipped with integrated padlock mechanism.



HANDLES
Switch disconnectors and changeover switches are standard supplied without any handles. By purchasing the direct operating handle separately it is possible to create a direct operating version. The handles can be mounted and removed very easily thanks to the snap-on assembly.
By purchasing a shaft extension and a door coupling handle separately it is possible to create the door coupling version.



SNAP-ON SHAFT MOUNTING
Shafts can be mounted and removed very easily by snapping on the front of the switch. This feature allows fast installation and easy accessibility to the panel in case of maintenance.



Three-pole switch disconnectors IEC/EN/BS

GL0160C1...GL0315C1

GL0320C1...GL0500C1

GL0631C1...GL0800C1

Order code	IEC conventional free air thermal current Ith AC21A (≤690V)	IEC rated operational current Ie AC23A (≤415V)	IEC rated operational current Ie AC23A (≤690V)	Qty per pkg	Wt
	[A]	[A]	[A]	n°	[kg]
Supplied without handle. Complete the switch disconnector by selecting shaft extension and handle for door coupling version or the handle for direct operating version.					
GL0160C1	160	160	160	1	1.740
GL0200C1	200	200	200	1	1.740
GL0250C1	250	250	250	1	1.740
GL0315C1	315	315	250	1	1.740
GL0320C1	320	320	320	1	3.460
GL0400C1	400	400	400	1	3.460
GL0500C1	500	500	500	1	3.460
GL0630C1	630	630	500	1	3.780
GL0631C1	630	630	630	1	7.450
GL0800C1	800	800	800	1	7.450
GL1000C1	1000	1000	800	1	7.950

new

Three-pole switch disconnectors UL98

cULus

GL...C1UL

Order code	General purpose current	Max. 3-phase horsepower rating	Qty per pkg	Wt
	[A]	[HP/V]	n°	[kg]
Supplied without handle. Complete the switch disconnector by selecting shaft extension and handle for door coupling version or the handle for direct operating version.				
GL0100C1UL	100	30/240 75/480 100/600	1	1.900
GL0200C1UL	200	75/240 150/480 200/600	1	1.900
GL0400C1UL	400	125/240 250/480 350/600	1	3.780
GL0600C1UL	600	200/240 450/480 500/600	1	7.450
GL0800C1UL	800	250/240 500/480 500/600	1	7.950

new

General characteristics
- 160 to 1000A AC23 versions
- 100A, 200A, 400A, 600A and 800A general purpose according to UL98
- Compact dimensions and add-on fourth-pole
- Screw or 35mm DIN rail fixing to 315A. Only on a plate from 320A to 1000A
- Possibility to adjust the position of the clips for screw fixing on plate
- Visible contacts
- Maximum number of power poles: 4.

Operational characteristics
- Rated insulation voltage Ui: 1,000V
- Rated impulse withstand Uimp: 12kV
- Mechanical life:
  - 20,000 cycles from 160A to 315A
  - 10,000 cycles from 320A to 630A
  - 5,000 cycles from 630A (GL0631...) to 1,000A.

Certifications and compliance
Certifications obtained: cULus according to UL98 / CSA C22.2 n°4 for GL...UL and GLX42...UL types.
Compliant with standards: IEC/EN/BS 60947-3, IEC/EN/BS 60947-1.

Add-on fourth pole IEC/EN/BS

GLX420315 GLX420500 GLX420630

GLX420631…800 GLX421000

Order code	IEC conventional free air thermal current Ith AC21A (≤690V)	IEC rated operational current Ie AC23A (≤400V)	AC23A (≤690V)	Qty per pkg	Wt
	[A]	[A]	[A]	n°	[kg]
Simultaneous closing operation as switch disconnector poles. For switch disconnectors GL0160C1...GL0315C1 versions.					
GLX420315	315	315	250	1	0.400
For switch disconnectors GL0320C1...GL0630C1 versions.					
GLX420320	320	320	320	1	0.900
GLX420400	400	400	400	1	0.900
GLX420500	500	500	500	1	0.900
GLX420630	630	630	500	1	0.900
For switch disconnectors GL0631C1...GL1000C1 versions.					
GLX420631	630	630	630	1	1.860
GLX420800	800	800	800	1	1.860
GLX421000	1000	1000	800	1	1.860

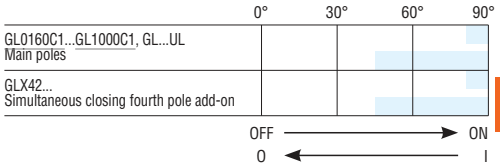
new

General characteristics
- 160 to 1000A AC23 versions
- 100A, 200A, 400A, 600A and 800A general purpose according to UL98
- Compact dimensions and add-on fourth-pole
- Visible contacts
- Maximum number of power poles: 4.

Operational characteristics
- Rated insulation voltage Ui: 1,000V
- Rated impulse withstand Uimp: 12kV
- Mechanical life:
  - 20,000 cycles from 160A to 315A
  - 10,000 cycles from 320A to 630A
  - 5,000 cycles from 630A (GL0631...) to 1,000A.

Certifications and compliance
Certifications obtained: cULus according to UL98 / CSA C22.2 n°4 for GL...UL and GLX42...UL types.
Compliant with standards: IEC/EN/BS 60947-3, IEC/EN/BS 60947-1.

Strokes of GL poles
(main poles and add-on pole)



14

Add-on fourth pole UL98

cULus

GLX420200UL GLX420400UL

Order code	General purpose current	Max. 3-phase horsepower rating	Qty per pkg	Wt
	[A]	[HP/V]	n°	[kg]
Simultaneous closing operation as switch disconnector poles. For switch disconnectors GL0100C1UL version.				
GLX420100UL	100	30/240 75/480 100/600	1	0.410
For switch disconnectors GL0200C1UL version.				
GLX420200UL	200	75/240 150/480 200/600	1	0.410
For switch disconnectors GL0400C1UL version.				
GLX420400UL	400	125/240 250/480 350/600	1	0.900
For switch disconnectors GL0600C1UL version.				
GLX420600UL	600	200/240 450/480 500/600	1	1.860
For switch disconnectors GL0800C1UL version.				
GLX420800UL	800	250/240 500/480 500/600	1	1.980

new

Manual three-pole changeover switches IEC/EN/BS

GLC0160C1...GLC0315C1

Order code	IEC conventional free air thermal current Ith AC21A (≤690V)	IEC rated operational current Ie AC33B (≤400V)	IEC rated operational current Ie AC33B (≤690V)	Qty per pkg	Wt
	[A]	[A]	[A]	n°	[kg]
Supplied without handle.					
GLC0160C1	160	160	160	1	3.550
GLC0200C1	200	200	200	1	3.550
GLC0250C1	250	250	250	1	3.550
GLC0315C1	315	315	250	1	3.550
GLC0320C1	320	320	320	1	7.060
GLC0400C1	400	400	400	1	7.060
GLC0500C1	500	500	500	1	7.060
GLC0630C1	630	630	500	1	7.720
GLC0631C1	630	630	630	1	16.500
GLC0800C1	800	800	800	1	16.500
GLC1000C1	1000	1000	800	1	18.000

new

Manual four-pole changeover switches IEC/EN/BS

GLC0160T4C1...GLC0315T4C1

Order code	IEC conventional free air thermal current Ith AC21A (≤690V)	IEC rated operational current Ie AC33B (≤400V)	IEC rated operational current Ie AC33B (≤690V)	Qty per pkg	Wt
	[A]	[A]	[A]	n°	[kg]
Supplied without handle.					
GLC0160T4C1	160	160	160	1	4.330
GLC0200T4C1	200	200	200	1	4.330
GLC0250T4C1	250	250	250	1	4.330
GLC0315T4C1	315	315	250	1	4.330
GLC0320T4C1	320	320	320	1	8.810
GLC0400T4C1	400	400	400	1	8.810
GLC0500T4C1	500	500	500	1	8.810
GLC0630T4C1	630	630	500	1	9.460
GLC0631T4C1	630	630	630	1	18.600
GLC0800T4C1	800	800	800	1	18.600
GLC1000T4C1	1000	1000	800	1	17.800

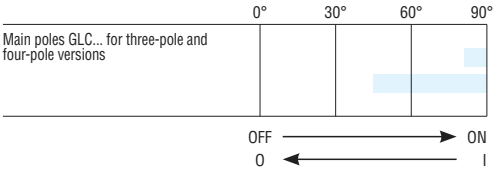
new

General characteristics
- 160 to 1000A AC33 versions
- Screw fixing on plate
- Visible contacts.

Operational characteristics
- Rated insulation voltage Ui: 1,000V
- Rated impulse withstand Uimp: 12kV
- Mechanical life:
  - 20,000 cycles from 160A to 315A
  - 10,000 cycles from 320A to 630A
  - 5,000 cycles from 630A (GLC0631...) to 1000A

Certifications and compliance
Compliant with standards: IEC/EN/BS 60947-6-1, IEC/EN/BS 60947- 3.

Strokes of GLC... poles



Manual three-pole changeover switches UL1008

cULus

GLC0200C1UL

Order code	General purpose current	Max. 3-phase horsepower rating	Qty per pkg	Wt
	[A]	[HP/V]	n°	[kg]
Supplied without handle.				
GLC0100C1UL	100	30/240 75/480 100/600	1	3.800
GLC0200C1UL	200	75/240 150/480 200/600	1	3.800
GLC0400C1UL	400	125/240 250/480 350/600	1	7.560

Manual four-pole changeover switches UL1008

cULus

GLC0200T4C1UL

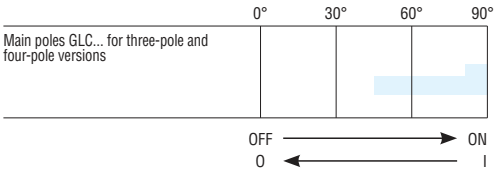
Order code	General purpose current	Max. 3-phase horsepower rating	Qty per pkg	Wt
	[A]	[HP/V]	n°	[kg]
Supplied without handle.				
GLC0100T4C1UL	100	30/240 75/480 100/600	1	4.590
GLC0200T4C1UL	200	75/240 150/480 200/600	1	4.590
GLC0400T4C1UL	400	125/240 250/480 350/600	1	7.680

General characteristics
- 100A, 200A and 400A general purpose according to UL1008
- Screw fixing on plate
- Visible contacts.

Operational characteristics
- Rated insulation voltage Ui: 1,000V
- Rated impulse withstand Uimp: 12kV

Certifications and compliance
Certifications obtained: cULus according to standard UL1008. Compliant with standards: IEC/EN 60947-6-1, IEC/EN 60947-3.

Strokes of GLC... poles



Motorised three-pole changeover switches IEC/EN/BS

GLCM0160C1...GLCM0315C1

new

Order code	IEC conventional free air thermal current Ith AC21A (≤690V)	IEC rated operational current Ie AC33B (≤400V)	IEC rated operational current Ie AC33B (≤690V)	Qty per pkg	Wt
	[A]	[A]	[A]	n°	[kg]
Rated motor auxiliary supply voltage 24VDC.					
GLCMB0125D024	125	125	125	1	6.350
GLCMB0160D024	160	160	160	1	6.350
GLCMB0200D024	200	200	200	1	6.350
GLCMB0250D024	250	250	250	1	6.350
GLCMB0315D024	315	315	250	1	6.350
Rated motor auxiliary supply voltage 110...125VAC/DC.					
GLCMB0125E110	125	125	125	1	6.350
GLCMB0160E110	160	160	160	1	6.350
GLCMB0200E110	200	200	200	1	6.350
GLCMB0250E110	250	250	250	1	6.350
GLCMB0315E110	315	315	250	1	6.350
Rated motor auxiliary supply voltage 208...277VAC.					
GLCMB0125A230	125	125	125	1	6.350
GLCMB0160A230	160	160	160	1	6.350
GLCMB0200A230	200	200	200	1	6.350
GLCMB0250A230	250	250	250	1	6.350
GLCMB0315A230	315	315	250	1	6.350

Motorised four-pole changeover switches IEC/EN/BS

GLCM0160T4C1...GLCM0315T4C1

new

Order code	IEC conventional free air thermal current Ith AC21A (≤690V)	IEC rated operational current Ie AC33B (≤400V)	IEC rated operational current Ie AC33B (≤690V)	Qty per pkg	Wt
	[A]	[A]	[A]	n°	[kg]
Rated motor auxiliary supply voltage 24VDC.					
GLCMB0125T4D024	125	125	125	1	7.130
GLCMB0160T4D024	160	160	160	1	7.130
GLCMB0200T4D024	200	200	200	1	7.130
GLCMB0250T4D024	250	250	250	1	7.130
GLCMB0315T4D024	315	315	250	1	7.130
Rated motor auxiliary supply voltage 110...125VAC/DC.					
GLCMB0125T4E110	125	125	125	1	7.130
GLCMB0160T4E110	160	160	160	1	7.130
GLCMB0200T4E110	200	200	200	1	7.130
GLCMB0250T4E110	250	250	250	1	7.130
GLCMB0315T4E110	315	315	250	1	7.130
Rated motor auxiliary supply voltage 208...277VAC.					
GLCMB0125T4A230	125	125	125	1	7.130
GLCMB0160T4A230	160	160	160	1	7.130
GLCMB0200T4A230	200	200	200	1	7.130
GLCMB0250T4A230	250	250	250	1	7.130
GLCMB0315T4A230	315	315	250	1	7.130

EXP10...

Order code	Description
EXPANSION MODULES Outputs.	
EXP1003	2C/O relay outputs 5A 250VAC
EXP1006	2NO relay outputs 5A 250VAC
Communication port.	
EXP1012	Opto-isolated RS485 interface

General characteristics
- 125 to 315A AC33 versions
- Screw fixing on plate
- Visible contacts
- Open transition (I – 0 – II positions)
- Electrically or manually operated
- Direct handle for manual operation supplied as standard, padlockable to prevent electrical operations
- Terminal blocks with removable screws fixing for power supply and switch control to ensure connection stability
- Expandable with EXP... expansion modules:
  - EXP1003: 2C/O relay outputs 5A 250VAC
  - EXP1006: 2NO relay outputs 5A 250VAC
  - EXP1012: RS485 communication port, Modbus-RTU.

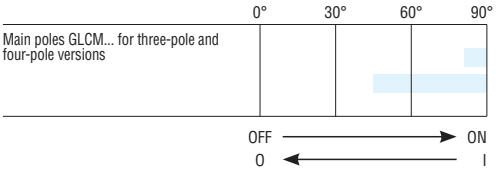
EXP series expansion modules
See section 35.

Operational characteristics
- Rated insulation voltage Ui: 1,000V
- Rated impulse withstand Uimp: 12kV
- Mechanical life: 20,000 cycles.

Rated motor auxiliary supply voltage
- 24VDC (19.2...31.2VDC) for GLCM...D024:
- 110...125VAC/DC (77...165VAC/DC) for GLCM...E110;
- 208...277VAC (166...332VAC) for GLCM...A230.

Certifications and compliance
Compliant with standards: IEC/EN/BS 60947-6-1, IEC/EN/BS 60947- 3.

Strokes of GLCM... power poles



Motorised three-pole changeover switches UL1008

cULus

new

GLCM0200C1UL

Order code	General purpose current	Max. 3-phase horsepower rating	Qty per pkg	Wt
	[A]	[HP/V]	n°	[kg]
Rated motor auxiliary supply voltage 24VDC.				
GLCMB0100D024UL	100	30/240 75/480 100/600	1	6.600
GLCMB0200D024UL	200	75/240 150/480 200/600	1	6.600
Rated motor auxiliary supply voltage 110...125VAC/DC.				
GLCMB0100E110UL	100	30/240 75/480 100/600	1	6.600
GLCMB0200E110UL	200	75/240 150/480 200/600	1	6.600
Rated motor auxiliary supply voltage 208...277VAC.				
GLCMB0100A230UL	100	30/240 75/480 100/600	1	6.600
GLCMB0200A230UL	200	75/240 150/480 200/600	1	6.600

General characteristics
- 100A and 200A general purpose according to UL1008
- Screw fixing on plate
- Visible contacts
- Open transition (I – 0 – II positions)
- Electrically or manually operated
- Direct handle for manual operation supplied as standard, padlockable to prevent electrical operations
- Terminal blocks with removable screws fixing for power supply and switch control to ensure connection stability
- Expandable with EXP... expansion modules:
  - EXP1003: 2C/O relay outputs 5A 250VAC
  - EXP1006: 2NO relay outputs 5A 250VAC
  - EXP1012: RS485 communication port, Modbus-RTU.

EXP series expansion modules
See section 35.

Operational characteristics
- Rated insulation voltage Ui: 1,000V
- Rated impulse withstand Uimp: 12kV
- Mechanical life: 20,000 cycles.

Rated motor auxiliary supply voltage
- 24VDC (19.2...31.2VDC) for GLCM...D024:
- 110...125VAC/DC (77...165VAC/DC) for GLCM...E110;
- 208...277VAC (166...332VAC) for GLCM...A230.

Certifications and compliance
Certifications obtained: cULus according to standard UL1008. Compliant with standards: IEC/EN 60947-6-1, IEC/EN 60947-3.

14

Motorised four-pole changeover switches UL1008

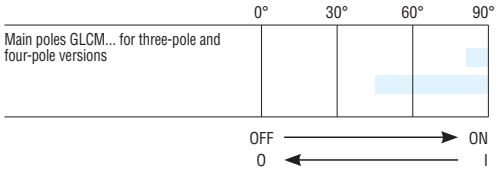
cULus

new

GLCM0200T4C1UL

Order code	General purpose current	Max. 3-phase horsepower rating	Qty per pkg	Wt
	[A]	[HP/V]	n°	[kg]
Rated motor auxiliary supply voltage 24VDC.				
GLCMB0100T4D024UL	100	30/240 75/480 100/600	1	7.390
GLCMB0200T4D024UL	200	75/240 150/480 200/600	1	7.390
Rated motor auxiliary supply voltage 110...125VAC/DC.				
GLCMB0100T4E110UL	100	30/240 75/480 100/600	1	7.390
GLCMB0200T4E110UL	200	75/240 150/480 200/600	1	7.390
Rated motor auxiliary supply voltage 208...277VAC.				
GLCMB0100T4A230UL	100	30/240 75/480 100/600	1	7.390
GLCMB0200T4A230UL	200	75/240 150/480 200/600	1	7.390

Strokes of GLCM... power poles



EXP10...

Order code	Description
EXPANSION MODULES Outputs.	
EXP1003	2C/O relay outputs 5A 250VAC
EXP1006	2NO relay outputs 5A 250VAC
Communication port.	
EXP1012	Opto-isolated RS485 interface

Add-on blocks

GLX1010EA

GLX1001

GLX300

GLX301

GLX8…

GLDX800

GLX9…

GLDX9…

Order code	Characteristics	Qty per pkg	Wt
		n°	[kg]
Auxiliary contacts.			
GLX1001	1NC with screw terminals	1	0.100
GLX1010EA	1EB with screw terminals	1	0.100
Neutral terminal.			
GLX300	For GL0100...GL0315	1	0.340
GLX302	For GL0320...GL0630	1	0.680
new **GLX304**	For GL0600C1UL and GL0631...GL0800	1	1.860
GLX306	For GL0800C1UL and GL1000	1	1.980
Earth/ground terminal.			
GLX301	For GL0100...GL0315	1	0.340
GLX303	For GL0320...GL0630	1	0.680
new **GLX305**	For GL0600C1UL and GL0631...GL0800	1	1.860
GLX307	For GL0800C1UL and GL1000	1	1.980
One-pole terminal covers.			
GLX800	3-piece set. 3 terminals protections. For GL0100... GL0315, GLC0100...GLC0315 and GLCMB0125...GLCMB0315	1	0.060
GLX801	4-piece set. 4 terminals protections. For GL0100... GL0315, GLC0100...GLC0315, GLCMB0125...GLCMB0315 and GLD...	1	0.080
GLX802	3-piece set. 3 terminals protections. For GL0320...GL0630 and GLC0320...GLC0630	1	0.070
GLX803	4-piece set. 4 terminals protections. For GL0320...GL0630 and GLC0320...GLC0630	1	0.095
GLX804	3-piece set. 3 terminals protections. For GL0600... GL0800C1UL, GL0631...GL1000 and GLC0631...GLC1000	1	0.085
new **GLX805**	4-piece set. 4 terminals protections. For GL0600... GL0800C1UL, GL0631...GL1000 and GLC0631...GLC1000	1	0.115
Two-pole terminal covers.			
new **GLDX800**	2-piece set. 4 terminals protections with series connections. For GLD...T4...	1	0,060
One-pole phase barrier (needed for voltages > 500VAC).			
GLX900	6-piece set. For GL0100... GL0315, GLC0100...GLC0315 and GLCMB0125...GLCMB0315	1	0.070
GLX901	8-piece set. For GL0100... GL0315, GLC0100...GLC0315 and GLCMB0125...GLCMB0315	1	0.090
GLX902	6-piece set. For GL0320...GL0500 and GLC0320...GLC0500	1	0.011
GLX903	8-piece set. For GL0320...GL0500 and GLC0320...GLC0500	1	0.011
GLX904	6-piece set. For GL0600C1UL, GL0631...GL0800 and GLC0631...GLC0800	1	0.160
new **GLX905**	8-piece set. For GL0600C1UL, GL0631...GL0800 and GLC0631...GLC0800	1	0.210
GLDX900	2-piece set. For GLD...T4C3	1	0.052
GLDX901 ❶	2-piece set. For GLD...T4C3UL	1	0.052

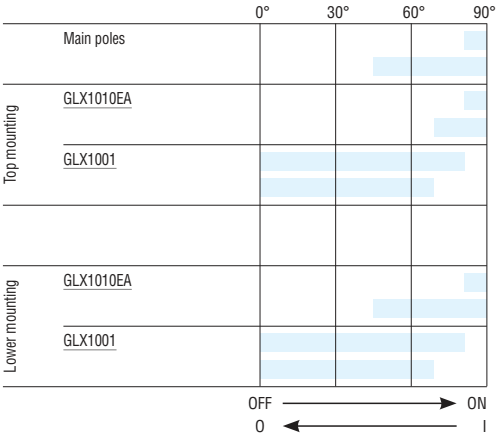
❶ Phase barriers standard supplied for GLD...T4C3UL. They provide increased protection than GLX900 and GLX901. They can be used also together with GL0100...GL0315.

Operational characteristics of auxiliary contacts GLX10…
- Conventional free air thermal current Ith: 10A
- Rated insulation voltage: 690V
- Conductivity: 5V, 1mA
- UL/CSA and IEC/EN/BS 60947-5-1 designation: A600 Q600
- Tightening torque: 0.8Nm/7.1lb.in
- Maximum 8 contacts (2 for slot) for GL0160...GL1000 switch disconnectors
- Maximum 4 contacts for position (1 for slot) for GLC...and GLCM... changeover switches
- Snap-on assembly without the use of tools.

Operational characteristics of neutral and earth/ground terminals GLX3…
- Add-on only on GL0160...GL1000 switch disconnectors
- Tightening torque for GLX300 and GLX301: 15...22Nm/132.7...194.7lb.in
- Tightening torque for GLX302 and GLX303: 30...37Nm/265...327lb.in.
- Tightening torque for GLX304, GLX305, GLX306, GLX307: 50...75Nm/442...664lb.in.

Operational characteristics for terminal covers and phase barriers GLX8…, GLX9…
- Snap-on mounting.

Strokes of switch disconnectors GL... poles



Add-on blocks

GLX500 - GLX501

GLX502 - GLX503

GLX504 - GLX505

GLDX501

GLX55...

GLXV...

GLXHS1

	Order code	Characteristics	Qty per pkg	Wt
			n°	[kg]
	Terminal clamp sets for rigid and flexible cables.			
	GLX500	1-piece set. 1 terminal connection for single cable. For GL0100... GL0315, GLC0100...GLC0315, GLCMB0125...GLCMB0315 and GLD...	1	0.050
	GLX501	3-piece set. 3 terminals connection for single cable. For GL0100... GL0315, GLC0100...GLC0315, GLCMB0125...GLCMB0315 and GLD...	1	0.140
	GLX502	1-piece set. 1 terminal connection for single cable. For GL0320...GL0630 and GLC0320...GLC0630	1	0.100
	GLX503	3-piece set. 3 terminals connection for single cable. For GL0320...GL0630 and GLC0320...GLC0630	1	0.280
	GLX504	1-piece set. 1 terminal connection for double cables. For GL0320...GL0630 and GLC0320...GLC0630	1	0.110
	GLX505	3-piece set. 3 terminals connection for double cables. For GL0320...GL0630 and GLC0320...GLC0630	1	0.310
	GLX506	1-piece set. 1 terminal connection for four cables. For GL0600...GL0800C1UL, GL0631...GL1000 and GLC0631...GLC1000	1	0.200
new	**GLX507**	3-piece set. 3 terminal connection for four cables. For GL0600...GL0800C1UL, GL0631...GL1000 and GLC0631...GLC1000	1	0.600
	GLDX501	4-piece set. 4 terminal connection for four cables. For GLD...UL, GL0100...GL0315, GLC0100...GLC0315 and GLCMB0125...GLCMB0315	1	0.600
	Captive nuts.			
	GLX550	8-piece set. For GL0100...GL0315, GLC0100...GLC0315 and GLCMB0125...GLCMB0315	1	0.010
	GLX551	8-piece set. For GL0320...GL0630 for GLC0320...GLC0630	1	0.010
	GLX552	8-piece set. For GL0600C1UL, GL0631...GL0800 and GLC0631...GLC0800	1	0.015
new	**GLX553**	8-piece set. For GL0800C1UL, GL1000 and GLC1000	1	0.015
	GLDX550	4-piece set. For GLD..., GL0100...GL0315, GLC0100...GLC0315 and GLCMB0125...GLCMB0315	1	0.015
	Voltage sensing connectors.			
	GLXVS00	6-piece set. For GLD..., GL0100...GL0315, GLC0100...GLC0315 and GLCMB0125...GLCMB0315	1	0.030
new	**GLXVS00**	8-piece set. For GLD..., GL0100...GL0315, GLC0100...GLC0315 and GLCMB0125...GLCMB0315	1	0.040
new	Direct operating handle holder for motorised changeover switches GLCM...			
	GLXHS1	For GLX61DB handle	1	0.018

Operational characteristics for terminal clamps

GLX500-GLX501
- Maximum conductor cross section: 120mm²/250kcmil
- Minimum conductor cross section: 16mm²/6AWG
- Tightening torque: 35Nm/309.7lb.in.

GLX502-GLX503
- Maximum conductor cross section: 304mm²/600kcmil
- Minimum conductor cross section: 33.6mm²/2AWG
- Tightening torque: 42.4Nm/375lb.in

GLX504-GLX505
- Maximum conductor cross section: 2x152mm²/2x300kcmil
- Minimum conductor cross section: 2x21.2mm²/2x4AWG
- Tightening torque: 22.6Nm/200lb.in

GLX506-GLX507
- Maximum conductor cross section: 2x304mm²/2x600kcmil
- Minimum conductor cross section: 2x33.6mm²/2x2AWG
- Tightening torque: 22.6Nm/200lb.in

GLDX501
- Maximum conductor cross section: 152mm²/300kcmil
- Minimum conductor cross section: 16mm²/6AWG
- Tightening torque: 42.4Nm/375lb.in.

Certifications and compliance

Certifications obtained: cULus
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-3.

Bridging bars

GLX2...

GLDX201

new

Order code	Characteristics	Qty per pkg	Wt
		n°	[kg]
One-pole bridging bars for changeover parallel connection.			
GLX201	3-piece set. Connection 3 poles. For GLC0100...GLC0315 and GLCMB0125...GLCMB0315	1	0.180
GLX202	4-piece set. Connection 4 poles. For GLC0100...GLC0315 and GLCMB0125...GLCMB0315	1	0.200
GLX206	3-piece set. Connection 3 poles. For GLC0320...GLC0630	1	0.190
GLX207	4-piece set. Connection 4 poles. For GLC0320...GLC0630	1	0.255
GLX208	3-piece set. Connection 3 poles. For Per GLC0631... GLC1000	1	0.850
GLX209	4-piece set. Connection 4 poles. For GLC0631...GLC1000	1	0.850
2-pole bridging bar for switch disconnectors for photovoltaic applications series connection.			
GLDX201❶	2-piece set. Connection 2 poles. For GLD...T4...	1	0.120

❶ Bridging bar standard supplied with GLD...T4...

Spare motor operator

GLXM1...

new

Order code	Characteristics	Qty per pkg	Wt
		n°	[kg]
Spare motor operator for motorised changeover switches.			
GLXM1D024	For GLCM...D024	1	2.800
GLXM1E110	For GLCM...E110	1	2.800
GLXM1A230	For GLCM...A230	1	2.800

Communication device

CX01

Order code	Characteristics	Qty per pkg	Wt
		n°	[kg]
CX01	USB connection device PC ↔ GLCM with optical connector for programming, data download, diagnostics and firmware upgrade	1	0.090

General characteristics
For general characteristics of this accessory see section 35.

Handles and shafts

GLX61DB

GLX61D

GLX62DB

GLX61

GLX61B

GLX61CB

GLX00

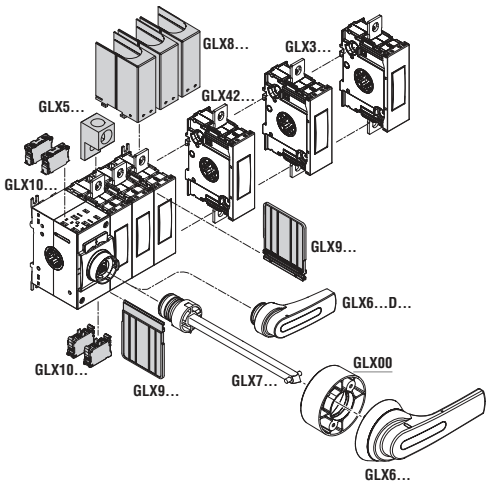
GLX7...

	Order code	Characteristics	Qty per pkg	Wt
			n°	[kg]
	Direct operating handles.			
	GLX61DB	For GL0100...GL0315, GLC0100... GLC0315 and GLD... Black	1	0.075
	GLX61D	For GL0100...GL0315 and GLD... Red/yellow	1	0.095
	GLX62DB	For GL0320...GL0630 and GLC0320...GLC0630. Black	1	0.140
	GLX62D	For GL0320...GL0630. Red/yellow	1	0.170
new	**GLX63DB**	For GL0600...GL0800C1UL, GL0631...GL1000 and GLC0631... GLC1000. Black	1	0.210
new	**GLX63D**	For GL0600...GL0800C1UL and GL0631...GL1000. Red/yellow	1	0.260
	Door coupling handles for switch disconnectors.			
	GLX61	For GL0100...GL0315 and GLD... Screw fixing. 125mm/4.92" lever length pistol handle - defeatable (req. UL508A). Red/yellow. ☐10mm/0.39"	1	0.220
	GLX61B	For GL0100...GL0315 and GLD... Screw fixing. 125mm/4.92" lever length pistol handle - defeatable (req. UL508A). Black. ☐10mm/0.39"	1	0.220
	GLX62	For GL0320...GL0630. Screw fixing. 175mm/6.89" lever length pistol handle - defeatable (req. UL508A). Red/yellow. ☐ 10mm/0.39"	1	0.240
	GLX62B	For GL0320...GL0630. Screw fixing. 175mm/6.89" lever length pistol handle - defeatable (req. UL508A). Black. ☐ 10mm/0.39"	1	0.240
new	**GLX63**	For GL0600...GL0800C1UL and GL0631...GL1000. Screw fixing. 175mm/6.89" lever length pistol handle - defeatable (req. UL508A). Red/yellow. ☐12mm/0.47"	1	0.310
new	**GLX63B**	For GL0600...GL0800C1UL and GL0631...GL1000. Screw fixing. 175mm/6.89" lever length pistol handle - defeatable (req. UL508A). Black. ☐12mm/0.47"	1	0.310
	Door coupling handles for changeover switches.			
	GLX61CB	For GLC0100...GLC0315. Screw fixing. 125mm/4.92" lever length pistol handle - defeatable (req. UL508A). Black. ☐ 10mm/0.39"	1	0.215
	GLX62CB	For GLC0320...GLC0630. Screw fixing. 175mm/6.89" lever length pistol handle - defeatable (req. UL508A). Black. ☐ 10mm/0.39"	1	0,240
new	**GLX63CB**	For GLC0631...GLC1000. Screw fixing. defeatable, 175mm/6.89" - with release (req. UL508A). Black. ☐12mm/0.47"	1	0.310
	Accessories for door coupling handles.			
	GLX00	Shaft alignment ring	1	0.040
	Shaft extensions for door coupling handles GLX61, GLX61B, GLX61CB, GLX62, GLX62B, GLX62CB, GLX63, GLX63B, GLX63CB			
	GLX7150S10	150mm/5.90", ☐10mm/0.39"	1	0.150
	GLX7200S10	200mm/7.87", ☐10mm/0.39"	1	0.190
	GLX7300S10	300mm/11.81", ☐10mm/0.39"	1	0.270
	GLX7400S10	400mm/15.75", ☐10mm/0.39"	1	0.350
	GLX7500S10	500mm/19.68", ☐10mm/0.39"	1	0.430
	GLX7150S12	150mm/5.90", ☐12mm/0.47"	1	0.180
new	**GLX7200S12**	200mm/7.87", ☐12mm/0.47"	1	0.240
new	**GLX7300S12**	300mm/11.81", ☐12mm/0.47"	1	0.360
new	**GLX7400S12**	400mm/157.48", ☐12mm/0.47"	1	0.480
new	**GLX7500S12**	500mm/196.85", ☐12mm/0.47"	1	0.600

Operational characteristics for direct operating handles
- Snap-on mounting on switch disconnectors and changeover switches
- 1 to 3 padlocks in the Ø4...6mm/0.16...0.24".
- standard supplied with GLCM...

Operational characteristics for door coupling handles
- Handle fixing centres: 28x40mm/1.10x1.57"
- 1 to 3 padlocks in the Ø4...8mm/0.16...0.31"
- Tightening torque: 1.5Nm/13.3lb.in
- Degree of protection:
  - Per IEC/EN: IP66 and IP69K
  - Per UL: Type 1, 2, 3R, 12, 12K, 4, 4X external use.

Certifications and compliance
Certifications obtained: cULus.
Compliant with standards: IEC/EN 60947-1, IEC/EN 60947-3.



14

Switch disconnectors in metal enclosure IEC/EN/BS IP65

GLZM0160...GLZM315...

GLZM0160...B...GLZM315...B

Order	IEC conventional thermal current Ith AC21A (≤690V)	IEC rated operational current Ie AC23A (≤400V)	Qty per pkg	Wt
	[A]	[A]	n°	[kg]
THREE-POLE. With red/yellow handle.				
GLZM0160	160	160	1	9.750
GLZM0200	200	200	1	9.750
GLZM0250	250	250	1	9.750
GLZM0315	315	315	1	9.750
THREE-POLE. With black handle.				
GLZM0160B	160	160	1	9.750
GLZM0200B	200	200	1	9.750
GLZM0250B	250	250	1	9.750
GLZM0315B	315	315	1	9.750
FOUR-POLE. With red/yellow handle.				
GLZM0160T4	160	160	1	9.950
GLZM0200T4	200	200	1	9.950
GLZM0250T4	250	250	1	9.950
GLZM0315T4	315	315	1	9.950
FOUR-POLE. With black handle.				
GLZM0160T4B	160	160	1	9.950
GLZM0200T4B	200	200	1	9.950
GLZM0250T4B	250	250	1	9.950
GLZM0315T4B	315	315	1	9.950

Components ❶

Enclosure	Switch disconnector		Handle
GLZM1	GL0160C1		GLX61
GLZM1	GL0200C1		GLX61
GLZM1	GL0250C1		GLX61
GLZM1	GL0315C1		GLX61
GLZM1	GL0160C1		GLX61B
GLZM1	GL0200C1		GLX61B
GLZM1	GL0250C1		GLX61B
GLZM1	GL0315C1		GLX61B
Enclosure	Switch disconnector	4th pole	Handle
GLZM1	GL0160C1	GLX420315	GLX61
GLZM1	GL0200C1	GLX420315	GLX61
GLZM1	GL0250C1	GLX420315	GLX61
GLZM1	GL0315C1	GLX420315	GLX61
GLZM1	GL0160C1	GLX420315	GLX61B
GLZM1	GL0200C1	GLX420315	GLX61B
GLZM1	GL0250C1	GLX420315	GLX61B
GLZM1	GL0315C1	GLX420315	GLX61B

❶ Extension shaft GLX7200S10 has to be added. Metal rod included has to be cut at 185mm/7.28" of total length.

General characteristics
- Enclosure material: painted sheet steel
- Padlockable handle
- Front door closing with screws and hinges on the right side of the enclosure
- Degree of protection: IP65
- Cable entry: smooth surfaces; can be drilled by customer.

Certifications and compliance
Compliant with standards: IEC/EN/BS 60947-3, IEC/EN/BS 60947-1.

Manual changeover switches in metal enclosure IEC/EN/BS IP65

GLZM0160ET...GLZM0315ET...

Order code	IEC conventional thermal current Ith AC21A (≤690V)	IEC rated operational current Ie AC33B (≤400V)	AC33B (≤500V)	Qty per pkg	Wt
	[A]	[A]	[A]	n°	[kg]
3-pole line changeover switches I-0-II. Black handle.					
GLZM0160ET6	160	160	160	1	11.780
GLZM0200ET6	200	200	200	1	11.780
GLZM0250ET6	250	250	250	1	11.780
GLZM0315ET6	315	315	250	1	11.780
4-pole line changeover switches I-0-II. Black handle.					
GLZM0160ET8	160	160	160	1	12.180
GLZM0200ET8	200	200	200	1	12.180
GLZM0250ET8	250	250	250	1	12.180
GLZM0315ET8	315	315	250	1	12.180

Components ❶

Enclosure	Changeover switch	Handle
GLZM1	GLC0160C1	GLX61CB
GLZM1	GLC0200C1	GLX61CB
GLZM1	GLC0250C1	GLX61CB
GLZM1	GLC0315C1	GLX61CB
Enclosure	**Changeover switches**	**Handle**
GLZM1	GLC0160T4C1	GLX61CB
GLZM1	GLC0200T4C1	GLX61CB
GLZM1	GLC0250T4C1	GLX61CB
GLZM1	GLC0315T4C1	GLX61CB

❶ Extension shaft GLX7150S10 has to be added. Metal rod included has to be cut at 92mm/3.62" of total length.

General characteristics
- Enclosure material: painted sheet steel
- Padlockable handle
- Front door closing with screws and hinges on the right side of the enclosure
- Degree of protection: IP65
- Cable entry: smooth surfaces; can be drilled by customer.

Certifications and compliance
Compliant with standards: IEC/EN/BS 60947-6-1, IEC/EN/BS 60947-1.

Empty metal enclosures IEC/EN/BS IP65

GLZM1

Order code	Enclosure dimensions	Qty per pkg	Wt
	[mm (in)]	n°	[kg]
For switch disconnectors and changeover switches Painted sheet steel enclosures.			
GLZM1	300x400x250 (11.8x15.75x9.84)	1	5.700

General characteristics
- Painted sheet steel enclosures
- Front door closing with screws and hinges on the right side of the enclosures
- Drilled cover for handle assembly
- Ground terminal included
- Degree of protection: IP65
- Cable entry: smooth surfaces; can be drilled by customer.

Compliance
Compliant with standards: IEC/EN/BS 60947-1.

Three-pole switch disconnectors IEC/EN/BS

GE...

Order code	IEC conventional free air thermal current Ith AC21A (≤500V)	IEC rated operational current Ie AC23A (≤400V)	AC23A (≤500V)	Qty per pkg	Wt
	[A]	[A]	[A]	n°	[kg]
Separately purchase the handle and shaft extension ❶.					
GE0160P❸	160	160	125	1	0.850
GE0160	160	160	125	1	0.850
GE0200	200	160	125	1	0.900
GE0250	250❹	160	125	1	0.900
GE0251	250	250	200	1	1.700
GE0315	315	315	250	1	1.700
GE0400	400	400	315	1	1.900
GE0500	500	500	400	1	4.200
GE0630	630	630	500	1	4.200
GE0800	800	800	500	1	4.200
GE1000	1000	1000	800	1	7.000
GE1250	1250	1000	800	1	7.600
GE1600	1600	1000	900	1	20.800

Three-pole switch disconnectors with fuse holder IEC/EN/BS

GEF... F - GEF...N

new

GE...N

Order code	IEC conventional free air thermal current Ith AC21A (≤500V)	IEC rated operational current Ie AC23A (≤400V)	AC23A (≤500V)	Qty per pkg	Wt
	[A]	[A]	[A]	n°	[kg]
With NFC fuse holder. Separately purchase the handle and shaft extension ❶❷.					
GEF0050F	50	50	50	1	0.850
GEF0100F	100	80	63	1	1.000
GEF0125F	125	125	125	1	1.300
With NH fuse holder. Separately purchase the handle and shaft extension ❶❷.					
GEF0063N	63	63	50	1	0.850
GEF0100N	100	80	63	1	1.000
GEF0125N	125	125	125	1	1.300
GEF0160N	160	160 ❺	125	1	1.300
GEF0250N	250	250	200	1	3.400
GE0400N	400	400	400	1	6.600
GE0630N	630	630	630	1	13.000
GE0800N	800	630	630	1	13.000

❶ To select the right handle refer to the summary table of combinations at page 14-50. Extension shafts of direct operating handles are standard supplied.
❷ See table on page 14-50 for the types of fuses.
❸ Standard supplied with IEC IP20 terminal protection.
❹ 250A Ith; 200A AC21A ≤500V.
❺ 160A AC23B ≤415V.

General characteristics
- 50A to 1600A
- Available versions: direct operating and door coupling
- Screw fixing: 35mm DIN rail mount adapter kit for GE0160P on page 14-47
- Padlockable in 0 position with no extra accessory.

Operational characteristics
- IEC rated insulation voltage Ui: 1000V
- Mechanical life:
  - 30,000 cycles for GE0160...GE0250, GE0160P
  - 20,000 cycles for GE0251...GE0400
  - 10,000 cycles for GE0500...GE1600, GEF0050... GEF0100..., GE0400N
  - 8,000 cycles for GEF0125...GEF0250...
  - 5,000 cycles for GE0630N and GE0800N.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-3.

Four-pole switch disconnectors IEC/EN/BS

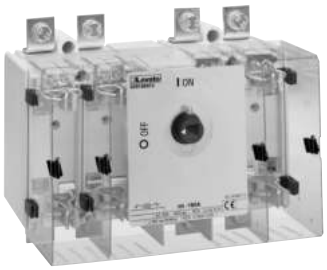
GE...T4...

Order code	IEC conventional free air thermal current Ith AC21A (≤500V)	IEC rated operational current Ie AC23A (≤400V)	IEC rated operational current Ie AC23A (≤500V)	Qty per pkg	Wt
	[A]	[A]	[A]	n°	[kg]
Separately purchase the handle and shaft extension ❶.					
GE0160T4P❸	160	160	125	1	1.000
GE0160T4	160	160	125	1	1.000
GE0200T4	200	160	125	1	1.000
GE0250T4	250❹	160	125	1	1.000
GE0251T4	250	250	200	1	1.900
GE0315T4	315	315	250	1	1.900
GE0400T4	400	400	315	1	2.100
GE0500T4	500	500	400	1	4.500
GE0630T4	630	630	500	1	4.500
GE0800T4	800	800	500	1	4.500
GE1000T4	1000	1000	800	1	7.600
GE1250T4	1250	1000	800	1	7.600
GE1600T4	1600	1000	900	1	20.800

Four-pole switch disconnectors with fuse holder IEC/EN/BS

GEF... FT4 - GEF...NT4

new



GE...NT4

Order code	IEC conventional free air thermal current Ith AC21A (≤500V)	IEC rated operational current Ie AC23A (≤400V)	IEC rated operational current Ie AC23A (≤500V)	Qty per pkg	Wt
	[A]	[A]	[A]	n°	[kg]
With NFC fuse holder. Separately purchase the handle and shaft extension ❶❷.					
GEF0050FT4	50	50	50	1	1.100
GEF0100FT4	100	80	63	1	1.300
GEF0125FT4	125	125	125	1	1.600
With NH fuse holder. Separately purchase the handle and shaft extension ❶❷.					
GEF0063NT4	63	63	50	1	1.100
GEF0100NT4	100	80	63	1	1.300
GEF0125NT4	125	125	125	1	1.600
GEF0160NT4	160	160 ❺	125	1	1.600
GEF0250NT4	250	250	200	1	4.200
GE0400NT4	400	400	400	1	8.000
GE0630NT4	630	630	630	1	15.000
GE0800NT4	800	630	630	1	15.000

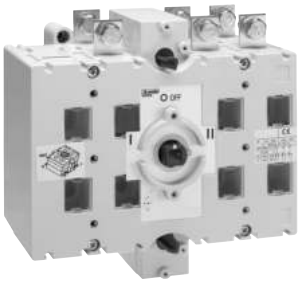
❶ To select the right handle refer to the summary table of combinations at page 14-50. Extension shafts of direct operating handles are standard supplied.
❷ See table on page 14-50 for the types of fuses.
❸ Standard supplied with IEC IP20 terminal protection.
❹ 250A Ith; 200A AC21A ≤500V.
❺ 160A AC23B ≤415V.

General characteristics
- 50A to 1600A
- 4-pole types (3P+N) with early-make late-break neutral pole
- Available versions: direct operating and door coupling
- Screw fixing: 35mm DIN rail mount adapter kit for GE0160T4P on page 14-47
- Padlockable in 0 position with no extra accessory.

Operational characteristics
- IEC rated insulation voltage Ui: 1000V
- Mechanical life:
  - 30,000 cycles for GE0160T4...GE0250T4, GE0160T4P
  - 20,000 cycles for GE0251T4...GE0400T4
  - 10,000 cycles for GE0500T4...GE1600T4, GEF0050...GEF0100...T4, GE0400N
  - 8,000 cycles for GEF0125...GEF0250...T4
  - 5,000 cycles for GE0630N and GE0800N.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-3.

Three-pole changeover switches IEC/EN/BS



GE...E

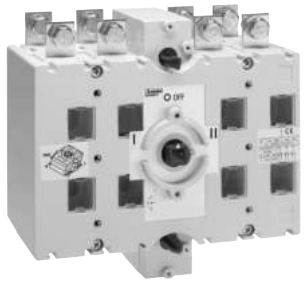
Order code	IEC conventional free air thermal current Ith AC21A (≤500V)	IEC rated operational current Ie AC23A (≤400V)	IEC rated operational current Ie AC23A (≤500V)	Qty per pkg	Wt
	[A]	[A]	[A]	n°	[kg]
Separately purchase the handle and shaft extension ❶.					
GE0160E	160	160	125	1	1.800
GE0200E	200	160	125	1	1.900
GE0201E	200	160	125	1	4.800
GE0250E	250	180	150	1	4.800
GE0315E	315	200	160	1	5.000
GE0400E	400	250	200	1	5.000
GE0500E	500	400	250	1	11.500
GE0630E	630	500	315	1	11.500
GE0800E	800	630	400	1	11.900
GE1000E	1000	1000	800	1	21.800
GE1250E	1250	1000	900	1	23.600
GE1600E	1600	1000	900	1	50.000
GE2000E	2000	1250	500	1	52.000
GE2500E	2500	1800	1250	1	119.000
GE3150E	3150	1800	1400	1	139.000

General characteristics
- 160A to 3150A
- 4-pole types (3P+N) with early-make late-break neutral pole
- Available versions: direct operating and door coupling
- Screw fixing
- Padlockable in 0 position with no extra accessory.

Operational characteristics
- IEC rated insulation voltage Ui: 1000V
- Mechanical life: 30,000 cycles for GE0160E/ET4 and GE0200E/ET4 only; 10,000 cycles for other types.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-3.

Four-pole changeover switches IEC/EN/BS



GE...ET4

Order code	IEC conventional free air thermal current Ith AC21A (≤500V)	IEC rated operational current Ie AC23A (≤400V)	IEC rated operational current Ie AC23A (≤500V)	Qty per pkg	Wt
	[A]	[A]	[A]	n°	[kg]
Separately purchase the handle and shaft extension ❶.					
GE0160ET4	160	160	125	1	2.100
GE0200ET4	200	160	125	1	2.200
GE0201ET4	200	160	125	1	5.300
GE0250ET4	250	180	150	1	5.300
GE0315ET4	315	200	160	1	5.500
GE0400ET4	400	250	200	1	5.500
GE0500ET4	500	400	250	1	12.600
GE0630ET4	630	500	315	1	12.600
GE0800ET4	800	630	400	1	13.200
GE1000ET4	1000	1000	800	1	24.300
GE1250ET4	1250	1000	900	1	26.700
GE1600ET4	1600	1000	900	1	55.000
GE2000ET4	2000	1250	500	1	69.000
GE2500ET4	2500	1800	1250	1	159.000
GE3150ET4	3150	1800	1400	1	186.000

❶ To select the right handle refer to the summary table of combinations at page 14-49. Extension shafts of direct operating handles are standard supplied.

Motorised control unit for changeover switches IEC/EN/BS

GEX69...

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Complete with control handle, shaft extension and fixing elements.			
GEX690C	For GE0160E...GE0200E and GE0160ET4...GE0200ET4	1	3.000
GEX691C	For GE0201E...GE0400E and GE0201ET4...GE0400ET4	1	3.000
GEX692C	For GE0500E...GE0800E and GE0500ET4...GE0800ET4	1	3.000
GEX693C	For GE1000E...GE1250E and GE1000ET4...GE1250ET4	1	5.753
GEX694C	For GE1600...2000E and GE1600...2000ET4	1	5.900
GEX695C	For GE2500...3150E and GE2500...3150ET4	1	5.900

General characteristics
- IEC rated auxiliary supply voltage: 230VAC
- 4 static outputs, 24VDC 120mA total
- 4 inputs, contacts powered at 24VDC or 5VDC (500mA) for changeover control (pulsed or continuous)
- RS485-Modbus (only for GEX692C, GEX693C and GEX694C) serial port for control, monitoring, programming
- Padlockable at 0 position
- Programming by position inputs
- 4-digit display for status-error indications.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-3.

Add-on blocks

GEX10... - GEFX10...

GEFX10S...

GEX8900

GEX8... - GEFX8...

GEFX9...

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Auxiliary contacts ❶.			
GEX1011	1NO/1NC changeover	1	0.032
GEX1022	2NO/2NC changeover	1	0.032
Auxiliary contacts for switch disconnectors with fuse holder type GEF...			
GEFX1011❷	1NO/1NC changeover	1	0.032
Auxiliary contacts type GEFX1011 mounting support ❸.			
GEFX10S1	For simultaneous closing. For GEF0050...GEF0160...	1	0.080
GEFX10SEA1	For early-make contact operation, to be only used for 2NO/2NC configuration. For GEF0050...GEF0160...	1	0.080
GEFX10S2	For simultaneous closing. For GEF0250...	1	0.100
GEFX10SEA2	For early-make contact operation, to be only used for 2NO/2NC configuration. For GEF0250...	1	0.100
Auxiliary contacts for switch disconnector types GE0160...GE0200E, GE0160...GE0200ET4, GE1600...GE3150E, GE1600...GE3150ET4.			
GEX1011M	1NO/1NC changeover	1	0.016
Adapter kit for 35mm DIN fixing.			
GEX8900	For GE...P types only	1	0.040
Set of terminal covers consisting of pieces given below. Screw fixing.			
GEX8101	1-piece set, transparent sheet covering 4 poles	1	0.048
GEX8111	2-piece set, each covers two poles	1	0.080
GEX8121	2-piece set, each covers two poles	1	0.140
GEX8131	2-piece set, each covers two poles	1	0.170
GEX8141	2-piece set, each covers two poles	1	0.440
Snap-on fixing.			
GEX8211	3-piece set, each covers one pole	1	0.120
GEX8221	3-piece set, each covers one pole	1	0.240
GEX8222	3-piece set, each covers one pole	1	0.240
GEX8223	4-piece set, each covers one pole	1	0.320
GEX8231	3-piece set, each covers one pole	1	0.340
GEX8232	3-piece set, each covers one pole	1	0.340
GEX8233	4-piece set, each covers one pole	1	0.440
GEX8311	3-piece set, each covers one pole	1	0.120
GEX8312	4-piece set, each covers one pole	1	0.160
GEX8321	3-piece set, each covers one pole	1	0.260
GEX8322	4-piece set, each covers one pole	1	0.340
GEX8331	3-piece set, each covers one pole	1	0.360
GEX8332	4-piece set, each covers one pole	1	0.460
GEFX800	3-piece set, each covers one pole	1	0.090
GEFX801	4-piece set, each covers one pole	1	0.120
GEFX802	3-piece set, each covers one pole	1	0.120
GEFX803	4-piece set, each covers one pole	1	0.160
Phase barriers for GEF... ❹			
GEFX900	2-piece set, for three-pole GEF...	1	0.090
GEFX901	3-piece set, for four-pole GEF...	1	0.120
GEFX902	2-piece set, for three-pole GEF...	1	0.120
GEFX903	3-piece set, for four-pole GEF...	1	0.180

new

new

❶ Unsuitable for switch disconnectors type GEF..., GE0160E, GE0200E, GE0160ET4, GE0200ET4, GE1600E e GE1600ET4.
❷ Max 2 auxiliary contacts can be mounted.
❸ It is possible to mount only one GEFX1011 with early-make contact operation without any support. For simultaneous closing or 2 auxiliary contacts select the right support.
❹ Phase barrier is not needed between command pole and the next power pole.

Refer to the combinations given on pages 12-49 to 51 and 14-56 and 57 for a correct choice based on the switch disconnector type used.

General characteristics for auxiliary contacts
IEC conventional free air thermal current Ith: 16A.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-3.

Refer to the combinations given on pages 12-49 to 51 and 14-56 and 57 for a correct choice based on the switch disconnector type used.

Handles and shaft extensions

GEX...D - GEX...E

GEX62NE

GEFX6...DB

GAX66N

GEFX61

GEX68N

GEX67NB

GAX7...AN

GEX7...GEFX7...

	Order code	Characteristics	Qty per pkg	Wt
			n°	[kg]
	DIRECT OPERATING LEVER HANDLE, PADLOCKABLE. Rotating type with screw fixing on switch disconnector. Complete with shaft extension.			
	GEX61E	50mm/2" black lever	1	0.052
	GEX62NE	143mm/5.6" black lever	1	0.266
	GEX63D	245mm/9.6" black lever	1	0.536
	GEX63NE	176mm/6.9" black lever	1	0.424
	GEX64D	360mm/14.2" black lever	1	0.612
	GEX64NE	396mm/15.6" black lever	1	0.612
	GEX641NE	396mm/15.6" black lever	1	0.620
	GEX65D	50mm/2" black lever	1	0.054
	GEX66ND	115mm/4.5" black lever	1	0.216
	GEX67ND	143mm/5.6" black lever	1	0.322
	GEX68ND	396mm/15.6" black lever	1	0.328
	GEX69ND	604mm/25.2" black lever	1	0.740
new	**GEFX61DB**	50mm/2" black lever	1	0.055
new	**GEFX62DB**	65mm/ 2.6" black lever	1	0.075
	DOOR COUPLING LEVER HANDLE, PADLOCKABLE. Red/yellow rotating type with screw fixing on door. Shaft extension to order separately. Defeatable (requirement UL508A).			
	GAX66N	115mm/4.5". □10mm/0.4". IP65	1	0.248
	GEX67N	143mm/5.6". □14mm/0.6". IP65	1	0.302
	GEX68N	396mm/15.6". □14mm/0.6". IP65	1	0.312
new	**GEFX61**	94mm/3.7". □7mm/0.3". IP65	1	0.075
new	**GEFX62**	115mm/4.5". □10mm/0.4". IP65	1	0.216
	DOOR COUPLING LEVER HANDLE, PADLOCKABLE. Black rotating type with screw fixing on door. Shaft extension to order separately. Defeatable (requirement UL508A).			
	GAX66NB	65mm/2.6". □7mm/0.3". IP66	1	0.075
	GEX61NC	94mm/3.7". □7mm/0.3". IP65	1	0.074
	GEX62NC	143mm/5.6". □10mm/0.4". IP65	1	0.252
	GEX63NC	176mm/6.9". □14mm/0.6". IP65	1	0.302
	GEX64NC	396mm/15.6". □14mm/0.6". IP65	1	0.488
	GEX641NC	396mm/15.6". □14mm/0.6". IP65	1	0.500
	GEX67NB	143mm/5.6". □14mm/0.6". IP65	1	0.298
	GEX68NB	396mm/15.6". □14mm/0.6". IP65	1	0.310
	GEX69NB	604mm/25.2". □14mm/0.6". IP65	1	0.740
new	**GEFX61B**	94mm/3.7". □7mm/0.3". IP65	1	0.302
new	**GEFX62B**	115mm/4.5". □10mm/0.4". IP65	1	0.312
	SHAFT EXTENSIONS for door coupling handles.			
	GAX7150AN	150mm/5.9", □7mm/0.3"	1	0.090
	GAX7200AN	200mm/7.9", □7mm/0.3"	1	0.112
	GAX7300AN	300mm/11.8", □7mm/0.3"	1	0.160
	GAX7400AN	400mm/15.7", □7mm/0.3"	1	0.200
	GAX7500AN	500mm/19.7", □7mm/0.3"	1	0.250
	GEX7162N	177mm/7", □7mm/0.3"	1	0.056
	GEX7195N	195mm/7.7", □14mm/0.6"	1	0.248
	GEX7227N	227mm/8.9", □10mm/0.4"	1	0.154
	GEX7239N	239mm/9.4", □14mm/0.6"	1	0.310
	GEX7250N	250mm/9.8", □7mm/0.3"	1	0.084
	GEX7345N	345mm/13.6", □14mm/0.6"	1	0.480
	GEX7375N	375mm/14.7", □10mm/0.4"	1	0.274
	GEX7387N	387mm/15.2", □7mm/0.3"	1	0.142
	GEX7536N	536mm/21.1", □10mm/0.4"	1	0.408
	GEX7535N	535mm/21", □14mm/0.6"	1	0.784
	GEX7485N	485mm/19.1", □14mm/0.6"	1	0.930
	GEFX7177	177mm/7", □7mm/0.3"	1	0.077
new	**GEFX7250**	250mm/9.8", □7mm/0.3"	1	0.084
new	**GEFX7387**	387mm/15.2", □7mm/0.3"	1	0.142
new	**GEFX7227**	227mm/8.9", □10mm/0.4"	1	0.184
new	**GEFX7375**	375mm/14.8", □10mm/0.4"	1	0.274
new	**GEFX7536**	536mm/21.1", □10mm/0.4"	1	0.408

Refer to the combinations given on pages 14-49 to 51 and 14-56 and 57 for a correct choice based on the switch disconnector type used.

Certifications and compliance
Certification obtained: cULus according to UL98A/CSA C22.2 n°4 only for types GAX66N... and GAX7...AN;
EAC for all.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-3.

Form and handle length	Handle types
50mm/2"	GEX61E - GEX65D - GEFX61DB
65mm/2.6"	GAX66N - GAX66NB - GEFX62DB
94mm/3.7"	GEX61NC - GEFX61 - GEFX61B
115mm/4.5"	GEX66ND - GEFX62 - GEFX62B
143mm/5.6"	GEX62NC - GEX62NE GEX67N - GEX67NB GEX67ND
176mm/6.9"	GEX63NC - GEX63NE
245mm/9.6"	2-hand GEX63D
360mm/14.2"	2-hand GEX64D
396mm/15.6"	2-hand GEX64NC - GEX64NE - GEX641NC - GEX641NE - GEX68N - GEX68NB - GEX68ND
604mm/25.2"	2-hand GEX69ND - GEX69NB

Refer to the combinations given on pages 12-49 to 51 and 14-56 and 57 for a correct choice based on the switch disconnector type used.

Summary table of combinations - Three and four-pole changeover switches

Type	IEC conventional thermal current Ith	IEC rated operational current Ie		Direct operating handle	Door coupling handles		Shaft extensions for door coupling handles (the last 3 digits of GEX code indicate length in mm/in)			Auxiliary contacts 1NO/1NC	Motorised control unit	Terminal covers for:		
	AC21A (≤500V)	AC23B (≤400V)	AC23B (≤500V)	Black	Black	Red/yellow		Exten. section	Max panel depth			Line 1	Line 2	Load
Order code	[A]	[A]	[A]	Order code	Order code	Order code	Order code	□	[mm/in]	Order code	Order code	Order code	Order code	Order code
Three-pole changeover switches IEC/EN/BS.														
GE0160E	160	160	125	GEX61E	GEX61NC	—	GEX7162N	7mm/ 0.3”	269/10.59”	GEX1011M	GEX690C	GEX8101 ❶	❶	GEX8101
GE0200E	200	160	125				GEX7250N		342/13.36”					
							GEX7387N		479/18.86”					
GE0201E	200	160	125	GEX62NE	GEX62NC	—	GEX7227N	10mm/ 0.4”	279/10.98”	GEX1011 GEX1022	GEX691C	GEX8212	GEX8211	GEX831
GE0250E	250	180	150				GEX7375N		427/16.81”					
GE0315E	315	200	160				GEX7536N		588/23.15”					
GE0400E	400	250	200											
GE0500E	500	400	250	GEX63NE	GEX63NC	—	GEX7195N	14mm/ 0.6”	257/10.12”		GEX692C	GEX8222	GEX8221	GEX832
GE0630E	630	500	315				GEX7345N		407/16.02”					
GE0800E	800	630	400				GEX7535N		597/23.50”					
GE1000E	1000	1000	800	GEX64NE	GEX64NC	—			280/11.02”		GEX693C	GEX8232	GEX8231	GEX8331
GE1250E	1250	1000	900						430/16.93”					
									620/24.41”					
GE1600E	1600	1000	900			—	GEX7239N		579/22.79”	GEX1011M	GEX694C	GEX8141	—	GEX8141
							GEX7485N		825/32.48”					
GE2000E	2000	1250	500	GEX641NE	GEX641NC	—	Included	—	602/23.7”		GEX694C	—	—	—
GE2500E	2500	1800	1250	GEX69ND	GEX69NB	—		—	938/36.9”		GEX695C	—	—	—
GE3150E	3150	1800	1400			—		—			GEX695C	—	—	—
Four-pole changeover switches IEC/EN/BS.														
GE0160ET4	160	160	125	GEX61E	GEX61NC	—	GEX7162N	7mm/ 0.3”	269/10.59”	GEX1011M	GEX690C	GEX8101 ❶	❶	GEX8101
GE0200ET4	200	160	125				GEX7250N		342/13.36”					
							GEX7387N		479/18.86”					
GE0201ET4	200	160	125	GEX62NE	GEX62NC	—	GEX7227N	10mm/ 0.4”	279/10.98”	GEX1011 GEX1022	GEX691C	GEX8213	GEX8213	GEX8312
GE0250ET4	250	180	150				GEX7375N		427/16.81”					
GE0315ET4	315	200	160				GEX7536N		588/23.15”					
GE0400ET4	400	250	200											
GE0500ET4	500	400	250	GEX63NE	GEX63NC	—	GEX7195N	14mm/ 0.6”	257/10.12”		GEX692C	GEX8223	GEX8223	GEX8322
GE0630ET4	630	500	315				GEX7345N		407/16.02”					
GE0800ET4	800	630	400				GEX7535N		597/23.50”					
GE1000ET4	1000	1000	800	GEX64NE	GEX64NC	—			280/11.02”		GEX693C	GEX8233	GEX8233	GEX833
GE1250ET4	1250	1000	900						430/16.93”					
									620/24.41”					
GE1600ET4	1600	1000	900			—	GEX7239N		579/22.79”	GEX1011M	GEX694C	GEX8141	—	GEX8141
							GEX7485N		825/32.48”					
GE2000ET4	2000	1250	500	GEX641NE	GEX641NC	—	Included	—	602/23.7”		GEX694C	—	—	—
GE2500ET4	2500	1800	1250	GEX641NE	GEX641NC	—		—	938/36.9”		GEX695C	—	—	—
GE3150ET4	3150	1800	1400			—		—			GEX695C	—	—	—

❶ GEX8101 terminal cover protects the input of both Line 1 and Line 2; nothing else is required for Line 2.

Summary table of combinations - Three-pole switch disconnectors

Three pole type ❶	IEC conventional thermal current Ith	IEC rated operational current Ie		Direct operating handle	Door coupling handles		Shaft extensions for door coupling handles (the last 3 digits of GEX code indicate length in mm/in)			Auxiliary contacts 1NO/1NC	Type of fuse	Terminal covers for:	Phase barriers
	AC21A (≤500V)	AC23A (≤400V)	AC23A (≤500V)	Black	Black	Red/yellow		Exten. section	Max panel depth			Line/Load	
Order code	[A]	[A]	[A]	Order code	Order code	Order code	Order code	□	[mm/in]	Order code		Order code	Order code
Switch disconnectors IEC/EN/BS.													
GE0160P❷	160	160	125	**GEX65D**	**GAX66NB**	**GAX66N**	**GAX7150AN❸**	7mm/ 0.3”	214/8.42”	**GEX1011**	—	**❷**	—
GE0160	160	160	125				**GAX7200AN❸**		264/10.39”	**GEX1022**		**GEX8101**	
GE0200	200	160	125				**GAX7300AN❸**		364/14.33”				
GE0250	250	160	125				**GAX7400AN❸**		464/18.27”				
							GAX7500AN❸		564/22.20”				
GE0251	250	250	200	**GEX66ND**	**GEX66NB**	**GEX66N**	**GEX7227N**	10mm/ 0.4”	267/10.51”			**GEX8111**	
GE0315	315	315	250				**GEX7375N**		415/16.34”				
GE0400	400	400	315				**GEX7536N**		576/22.68”				
GE0500	500	500	400	**GEX67ND**	**GEX67NB**	**GEX67N**	**GEX7195N**	14mm/ 0.6”	251/9.88”			**GEX8121**	
GE0630	630	630	500				**GEX7345N**		401/15.79”				
GE0800	800	800	500				**GEX7535N**		591/23.27”				
GE1000	1000	1000	800	**GEX68ND**	**GEX68NB**	**GEX68N**			267/10.51”			**GEX8131**	
GE1250	1250	1000	800						417/16.42”				
									607/23.90”				
GE1600	1600	1000	900				**GEX7239N**	14mm/ 0.6”	399/15.71”			**GEX8141**	
							GEX7485N		645/25.39”				
Switch disconnectors with NFC fuse holder IEC/EN/BS.													
GEF0050F	50	50	50	**GEFX61DB**	**GEFX61B**	**GEFX61**	**GEFX7177**	7mm/ 0.3”	248/9.76”	**GEFX1011**	14x51	—	—
GEF0100F	100	100	80				**GEFX7250**		321/12.63”	**❹**	22x58		
							GEFX7387		458/18.03”				
GEF0125F	125	125	125						280/11.02”			**GEFX800**	**GEFX900**
									353/13.89”				
									490/19.29”				
Switch disconnectors with NH fuse holder IEC/EN/BS.													
GEF0063N	63	63	63	**GEFX61DB**	**GEFX61B**	**GEFX61**	**GEFX7177**	7mm/ 0.3”	270/10.63”	**GEFX1011**	000	—	—
GEF0100N	100	100	80				**GEFX7250**		343/13.5”	**❹**			
GEF0125N	125	125	125				**GEFX7387**		480/18.89”		00	**GEFX800**	**GEFX900**
GEF0160N	160	160	160 ❺										
GEF0250N	250	250	250	**GEFX62DB**	**GEFX62B**	**GEFX62**	**GEFX7227**	10mm/ 0.4”	341/32.32”		1	**GEFX802**	**GEFX902**
							GEFX7375		489/19.25”				
							GEFX7536		650/25,59”				
GE0400N	400	400	400	**GEX63D**	**GEX67NB**	**GEX67N**	**GEX7195N**	14mm	271/10.67”	**GEX1011**	2	**GEX8221/**	—
							GEX7345N		421/16.57”	**GEX1022**		**GEX8222**	
							GEX7535N		611/24.05”				
GE0630N	630	630	630	**GEX64D**	**GEX68NB**	**GEX68N**			285/11.22”		3	**GEX8231/**	
GE0800N	800	630	630						435/17.12”			**GEX8232**	
									625/24.61”				

❶ The motorised control unit cannot be installed.
❷ Standard supplied with IP20 terminal protection warranted by wired equipment with only maximum conductor section of 95mm². Suitable for mounting on 35mm DIN rail, GEX8900 kit is available on page 14-47.
❸ Extension length for type GAX7150AN is 186mm/7.32”, type GAX7200AN 236mm/9.29”, type GAX7300AN 336mm/13.23”, type GAX7400AN 436mm/17.16” and type GAX7500AN 536mm/21.10”.
❹ Refer to page 14-47 to select the right GEFX10S... mounting support.
❺ 160A AC23B (≤415V).

Summary table of combinations - Four-pole switch disconnectors

Three pole type ❶	IEC conventional thermal current Ith	IEC rated operational current Ie		Direct operating handle	Door coupling handles		Shaft extensions for door coupling handles (the last 3 digits of GEX code indicate length in mm/in)			Auxiliary contacts 1NO/1NC	Type of fuse	Terminal covers for:	Phase barriers
	AC21A (≤500V)	AC23A (≤400V)	AC23A (≤500V)	Black	Black	Red/yellow		Exten. section	Max panel depth			Line/Load	
Order code	[A]	[A]	[A]	Order code	Order code	Order code	Order code	□	[mm/in]	Order code		Order code	Order code
Switch disconnectors IEC/EN/BS.													
GE0160T4P❷	160	160	125	**GEX65D**	**GAX66NB**	**GAX66N**	**GAX7150AN❸**	7mm/ 0.3”	214/8.42”	**GEX1011**	—	❷	—
GE0160T4	160	160	125				**GAX7200AN❸**		264/10.39”	**GEX1022**		**GEX8101**	
GE0200T4	200	160	125				**GAX7300AN❸**		364/14.33”				
GE0250T4	250	160	125				**GAX7400AN❸**		464/18.27”				
							GAX7500AN❸		564/22.20”				
GE0251T4	250	250	200	**GEX66ND**	**GEX66NB**	**GEX66N**	**GEX7227N**	10mm/ 0.4”	267/10.51”			**GEX8111**	
GE0315T4	315	315	250				**GEX7375N**		415/16.34”				
GE0400T4	400	400	315				**GEX7536N**		576/22.68”				
GE0500T4	500	500	400	**GEX67ND**	**GEX67NB**	**GEX67N**	**GEX7195N**	14mm/ 0.6”	251/9.88”			**GEX8121**	
GE0630T4	630	630	500				**GEX7345N**		401/15.79”				
GE0800T4	800	800	500				**GEX7535N**		591/23.27”				
GE1000T4	1000	1000	800	**GEX68ND**	**GEX68NB**	**GEX68N**			267/10.51”			**GEX8131**	
GE1250T4	1250	1000	800						417/16.42”				
									607/23.90”				
GE1600T4	1600	1000	900				**GEX7239N**	14mm/ 0.6”	399/15.71”			**GEX8141**	
							GEX7485N		645/25.39”				
Switch disconnectors with NFC fuse holder IEC/EN/BS.													
GEF0050FT4	50	50	50	**GEFX61DB**	**GEFX61B**	**GEFX61**	**GEFX7177**	7mm/ 0.3”	248/9.76”	**GEFX1011**	14x51	—	—
GEF0100FT4	100	100	80				**GEFX7250**		321/12.63”	❹	22x58		
							GEFX7387		458/18.03”				
GEF0125FT4	125	125	125						280/11.02”			**GEFX801**	**GEFX901**
									353/13.89”				
									490/19.29”				
Switch disconnectors with NH fuse holder IEC/EN/BS.													
GEF0063NT4	63	63	63	**GEFX61DB**	**GEFX61B**	**GEFX61**	**GEFX7177**	7mm/ 0.3”	270/10.63”	**GEFX1011**	000	—	—
GEF0100NT4	100	100	80				**GEFX7250**		343/13.5”	❹			
GEF0125NT4	125	125	125				**GEFX7387**		480/18.89”		00	**GEFX801**	**GEFX901**
GEF0160NT4	160	160	160 ❺										
GEF0250NT4	250	250	250	**GEFX62DB**	**GEFX62B**	**GEFX62**	**GEFX7227**	10mm/ 0.4”	341/32.32”		1	**GEFX803**	**GEFX903**
							GEFX7375		489/19.25”				
							GEFX7536		650/25,59”				
GE0400NT4	400	400	400	**GEX63D**	**GEX67NB**	**GEX67N**	**GEX7195N**	14mm	271/10.67”	**GEX1011**	2	**GEX8221/**	—
							GEX7345N		421/16.57”	**GEX1022**		**GEX8222**	
							GEX7535N		611/24.05”				
GE0630NT4	630	630	630	**GEX64D**	**GEX68NB**	**GEX68N**			285/11.22”		3	**GEX8231/**	
GE0800NT4	800	630	630						435/17.12”			**GEX8232**	
									625/24.61”				

❶ The motorised control unit cannot be installed.
❷ Standard supplied with IP20 terminal protection warranted by wired equipment with only maximum conductor section of 95mm². Suitable for mounting on 35mm DIN rail, GEX8900 kit is available on page 14-47.
❸ Extension length for type GAX7150AN is 186mm/7.32”, type GAX7200AN 236mm/9.29”, type GAX7300AN 336mm/13.23”, type GAX7400AN 436mm/17.16” and type GAX7500AN 536mm/21.10”.
❹ Refer to page 14-47 to select the right GEFX10S... mounting support.
❺ 160A AC23B (≤415V).

Three-pole disconnect switches with fuse holder (UL98)

GMF...030C12

GMFJ100C03

GMFJ400C03

GMFL800C03

Order code	General purpose current	UL fuse type	Command pole position	Qty per pkg	Wt
	[A]	[A]		n°	[kg]
Supplied without handle. Complete the disconnect switch by selecting shaft extension and handle for door coupling version or the handle for direct operating version (see page 12-53).					
GMFC030C12	30	CC	Central	1	0.700
GMFJ030C12	30	J	Central	1	0.700
GMFJ060C12	60	J	Central	1	1.135
GMFJ060C03	60	J	Left	1	1.135
GMFJ100C03	100	J	Left	1	1.815
GMFJ200C03	200	J	Left	1	3.000
GMFJ400C03	400	J	Left	1	6.800
GMFJ600C03	600	J	Left	1	13.00
GMFL800C03	800	L	Left	1	13.00

UL/CSA ratings

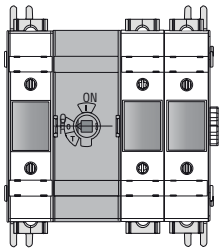
Type	1 phase [HP]		3 phase [HP]			Short-circuit rating at 600VAC	Fuse type	
	120V	240V	240V	480V	600V	[kA]	[A]	[class]
GMFC030C12	2	3	7.5	15	20	200	30	CC
GMFJ030C12	2	3	7.5	15	20	200	30	J
GMFJ060C12	-	-	15	30	50	200	60	J
GMFJ060C03	-	-	15	30	50	200	60	J
GMFJ100C03	-	-	30	60	75	200	100	J
GMFJ200C03	-	-	60	125	150	200	200	J
GMFJ400C03	-	-	125	250	350	200	400	J
GMFJ600C03	-	-	200	400	500	200	600	J
GMFL800C03	-	-	250	500	500	200	800	L

General characteristics
- General purpose current according to UL98: 30A to 800A
- Compact dimensions
- Available versions: direct operating and door coupling
- Screw or 35mm DIN rail fixing for GMF...030 types
- Possibility to adjust the position of the clips for fixing screw on plate for GMF...060 to GMF...800 types.

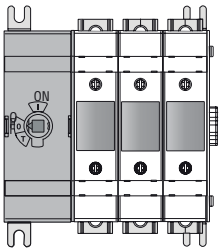
Operational characteristics
- IEC rated insulation voltage Ui: 1000V
- UL max operating voltage: 600V
- IEC rated impulse withstand Uimp: 12kV
- Mechanical life:
  - 10,000 cycles for GMF...030 and GMF...060
  - 8,000 cycles for GMFJ100C03 and GMFJ200C03
  - 5,000 cycles for GMFJ400C03 and GMFJ600C03
  - 3,000 cycles for GMFL800C03.

Certifications and compliance
Certifications obtained: cULus according to UL98 / CSA C22.2 n°4.
Compliant with standards: IEC/EN/BS 60947-3, IEC/EN/BS 60947-1.

GMF...C12 type
Central command pole



GMF...C03 type
Left command pole



Add-on blocks and accessories

GMX1010

GMX3...

GMX800
GMX801
GMX802

GMX803
GMX804

GMX5...

GMXFM...

Order	Description	Qty per pkg	Wt
		n°	[kg]
Auxiliary contacts, mounting to the switch mechanism.			
GMX1011❶	1NO/NC changeover	1	0.020
GMX1010	1NO	1	0.030
GMX1001	1NC	1	0.030
Module for auxiliary contacts mounting on the side of the switch mechanism.			
GMX33	For GMF...030 types	1	0.060
GMX34	For GMF...60 to GMF...800 types	1	0.065
Terminal covers.			
GMX800	3-piece set, each covers 1 pole for GMFJ100C03	1	0.080
GMX801	3-piece set, each covers 1 pole for GMFJ200C03	1	0.090
GMX802	1-piece set, covers 3 poles for GMFJ400C03	1	0.08
GMX803	1-piece set, covers 3 poles for GMFJ600C03	1	0.080
GMX804	1-piece set, covers 3 poles for GMFL800C03	1	0.080
Terminal clamp sets for rigid and flexible cables.			
GMX500	6-piece set for GMFJ100C03	1	0.200
GMX501	6-piece set for GMFJ200C03	1	0.200
GMX502	6-piece set for GMFJ400C03	1	0.500
GMX503	6-piece set for GMFJ400C03	1	1.000
GMX504	6-piece set for GMFJ600C03 and GMFL800C03	1	1.600
Fuse monitor modules ❷.			
GMXFM1	Rated voltage 120...240V	1	0.145
GMXFM2	Rated voltage 380...600V	1	0.140
Crimp terminals for fuse monitor GMXF... cables.			
GMX505	6-piece set. Terminal size 2.8-0.8mm/0.11-0.03"	1	0.004

❶ Only for GMF...030 types.
❷ For all GM switch disconnectors. Suitable for 1 or 3 phase circuits. Includes 1 NO and 1 NC auxiliary contacts and red/green LED lights for indication.

Operational characteristics of auxiliary contacts GMX1011
- IEC conventional free air thermal current Ith: 10A
- IEC rated insulation voltage: 400V
- Conductivity: 12V, 25mA
- Tightening torque: 0.8Nm/7.1lb.in
- Maximum 6 contacts for GMF...030 disconnect switches.

Operational characteristics of auxiliary contacts GMX1010/01
- IEC/EN/BS and UL conventional free air thermal current Ith: 16A and 10A
- IEC/EN/BS and UL rated insulation voltage: 690V/600V
- Conductivity: 24V, 10mA
- UL/CSA and IEC/EN/BS 60947-5-1 designation: A600 R300
- Tightening torque: 0.8Nm/7.1lb.in
- Maximum 8 contacts for GMF...060 to GMFL800 switch disconnectors.

Operational characteristics for terminal clamps
- Minimum and maximum conductor cross section:
  - GMX500: 2.5...70mm² / 14-2/0AWG
  - GMX501: 25...150mm² / 4-300Kcmil
  - GMX502: 35...300mm² / 2-600Kcmil
  - GMX503: 2x 35...150mm² / 2x 6-300Kcmil
  - GMX504: 2x 35...300mm² / 2x 2-600Kcmil
- Tightening torque:
  - GMX500: 13Nm / 120lb.in.
  - GMX501: 22Nm / 200lb.in
  - GMX502: 42Nm / 375lb.in
  - GMX503: 22Nm / 200lb.in
  - GMX504: 22.6Nm / 200lb.in.

Operational characteristics for terminal covers
- Snap-on mounting.

Certifications and compliance
Certifications obtained: cULus for GMX1010, GMX1001, GMXFM1 and GMXFM2.
Compliant with standards: IEC/EN/BS 60947-3, IEC/EN/BS 60947-1.

Handles and shafts

GMX62DB

GMX62

GLX00

GMX7…S06

Order code	Characteristics	Qty per pkg	Wt
		n°	[kg]
Direct operating handles.			
GMX61DB	For GMF...030. Black	1	0.050
GMX62DB	For GMFJ060...GMFJ200. Black	1	0.150
GMX63DB	For GMFJ400. Black	1	0.350
GMX64DB	For GMFJ600...GMFL800. Black	1	1.100
Door coupling handles.			
GAX66N	For GMF...030...GMFJ200. Screw fixing. 65mm/2.56" lever length pistol handle - defeatable (req. UL508A). Red/yellow. ☐ 6mm/0.24"	1	0.050
GAX66NB	For GMF...030...GMFJ200. Screw fixing. 65mm/2.56" lever length pistol handle - defeatable (req. UL508A). Black. ☐ 6mm/0.24"	1	0.050
GMX61	For GMFJ400. Screw fixing. 125mm/4.92" lever length pistol handle - defeatable (req. UL508A). Red/yellow. ☐ 12mm/0.47"	1	0.050
GMX61B	For GMFJ400. Screw fixing. 125mm/4.92" lever length pistol handle - defeatable (req. UL508A). Black. ☐ 12mm/0.47"	1	0.200
GMX62	For GMFJ600...GMFL800. Screw fixing. 175mm/6.89" lever length pistol handle - defeatable (req. UL508A). Red/yellow. ☐ 12mm/0.47"	1	0.200
GMX62B	For GMFJ600...GMFL800. Screw fixing. 175mm/6.89" lever length pistol handle - defeatable (req. UL508A). Black. ☐ 12mm/0.47"	1	0.200
Accessories for door coupling handles.			
GLX00	Shaft alignment ring	1	0.040
Shaft extensions for door coupling handles GAX66N and GAX66NB types.			
GMX7150S06	150mm/5.90", ☐ 6mm/0.24"	1	0.120
GMX7300S06	300mm/11.81", ☐ 6mm/0.24"	1	0.155
Shaft extensions for door coupling handles GMX61, GMX61B, GMX62 and GMX62B types.			
GMX7150S12	150mm/5.90", ☐ 12mm/0.47"	1	0.240
GMX7300S12	300mm/11.81", ☐ 12mm/0.47"	1	0.280
GMX7500S12	500mm/19.68", ☐ 12mm/0.47"	1	0.310

Operational characteristics for direct operating handles
- Screw fixing on disconnect switches
- 1 to 3 padlocks in the Ø5...6.2mm/0.2...0.24".

Operational characteristics for door coupling handles
- Handle fixing centres: 28x40mm/1.1x1.57"
- 1 to 3 padlocks in the Ø4...8mm/0.16...0.31" for all handles
- Tightening torque: 1.5Nm/13.3lb.in
- Degree of protection: IP66 and NEMA 4X per UL.

NOTE: the handles type GAX66N, GAX66NB, GMX61, GMX61B, GMX62, GMX62B are in accordance with UL/CSA Type 1, 2, 3R, 12, 12K, 4, 4X for external use.

Certifications and compliance
Certifications obtained: cULus for GMX62DB, GMX63DB, GMX64DB, GAX66N, GAX66NB, GMX61, GMX61B, GMX62, GMX62B, GLX00, GMX7...
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-3.

NFPA handle

GMX61NFPA

GMXCL...

GMX30

Order code	Characteristics	Qty per pkg	Wt
		n°	[kg]
Flange handle.			
GMX61NFPA	For GMF...030...GMFJ200. NEMA 4, 4X. Black	1	1.850
Flexible connection cables for GMX61NFPA.			
GMXCL36	Cable length 914mm/36"	1	0.400
GMXCL48	Cable length 1220mm/48"	1	0.500
GMXCL60	Cable length 1520mm/60"	1	0.550
GMXCL72	Cable length 1828mm/72"	1	0.650
Support and operating mechanism for GMX61NFPA.			
GMX30	For GMF...030	1	0.830
GMX31	For GMFJ060C12	1	1.180
GMX32	For GMF...060...GMFJ200	1	1.520

General characteristics for NFPA handle
The GMX61NFPA lever handle complies with the requirements of the North American NFPA79 standard. This standard requires that the switch disconnector can be operated without accessories or tools whether the door is closed or open. In case of operation with an open door, a device is integrated into the GMX61NFPA handle to prevent it from being activated unless a voluntary action is taken to unlock it.

Certifications and compliance
Certifications obtained: cURus for GMX61NFPA.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-3.

Switch disconnectors IEC/EN/BS GA series

GA040D

GAX42...D

Order code	IEC conventional free air thermal current Ith	IEC rated operational current Ie DC21B❶❷ Poles in series 3 poles 500V	4 poles 600V	800V	Qty per pkg	Wt
	[A]	[A]	[A]	[A]	n°	[kg]
Switch disconnector complete with black handle.						
GA040D	40	12	—	—	1	0.135
Fourth pole.						
GAX42040D	40	—	20	15	1	0.040

❶ Connection of 4 poles in series.
❷ For other operational voltages, refer to technical characteristics on page 12-97.

Switch disconnectors IEC/EN/BS GD series

GD040AT4

Order code	IEC conventional free air thermal current Ith	IEC rated operational current Ie DCPV1 ≤800V	1000V	1200V	1500V	Qty per pkg	Wt
	[A]	[A]	[A]	[A]	[A]	n°	[kg]
Switch disconnector complete with black handle.							
GD025AT2	25	25	16	—	—	1	0.140
GD025AT3	25	25	25	—	—	1	0.180
GD032AT3	32	32	32	—	—	1	0.180
GD032AT4	32	32	32	25	20	1	0.220
GD040AT3	40	40	32	—	—	1	0.180
GD040AT4	40	40	40	32	25	1	0.220

Plastic enclosed switch disconnectors IEC/EN/BS IP65

GAZ016DT2

GAZ040DT4

Order code	IEC conventional thermal current Ith	IEC rated operational current Ie DCPV1 ≤800V	1000V	1200V	1500V	Qty per pkg	Wt
	[A]	[A]	[A]	[A]	[A]	n°	[kg]
With red/yellow handle.							
GAZ025DT2	25	25	16	—	—	1	0.450
GAZ032DT3	32	32	32	—	—	1	1.050
GAZ040DT4	40	40	40	32	25	1	1.050
With black handle.							
GAZ025DT2B	25	25	16	—	—	1	0.450
GAZ032DT3B	32	32	32	—	—	1	1.050
GAZ040DT4B	40	40	40	32	25	1	1.050

General characteristics
- Up to 40A (1000VDC) and 32A (1200VDC)
- Modular construction
- Jumpers for connecting the poles in series supplied as standard with disconnectors GD series...
- Available versions:
  - Direct operating
  - Door coupling version. Use switch disconnector with direct actuator and separately purchase the handle and shaft extension for this version. See pages 14-18 to 14-20
- Screw or 35mm DIN rail fixing
- Padlockable in 0 position with no extra accessory.

Operational characteristics
- Rated insulation voltage for GA...D and GD... Ui: 1000V (pollution degree 3)
- Rated insulation voltage for GD... Ui: 1500V (pollution degree 2)
- Rated impulse withstand Uimp: 8kV
- Mechanical life:
  - 100,000 cycles GA040D
  - 10,000 cycles GD...
- Operating temperature: -25°C...+55°C
- Storage temperature: -40°C...+70°C
- Degree of protection: IP20 (only for GA040D).

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada (cULus - File E93602) as Manual Motor Controllers, to UL508/CSA C22.2 n° 14 for GA040D and GAX42040D; EAC for GA...D.
Compliant with standards: IEC/EN/BS 60947-3, IEC/EN/BS 60947-1.

Strokes of GA...D types (main poles and add-on pole)

Travel 0→1	0°	30°	60°	90°
GA040D Main poles			60°	
GAX42040D Simultaneous fourth-pole add on			60°	

Components

Enclosure	Switch disconnector	Handle included with GAZ...
GAZ1	GD025AT2	GAX61
GAZ2❸	GD032AT3	GAX61
GAZ2❸	GD040AT4	GAX61
GAZ1B	GD025AT2	GAX61B
GAZ2B❸	GD032AT3	GAX61B
GAZ2B❸	GD040AT4	GAX61B

❸ For further details contact our Technical support; see contact details on inside front cover.

General characteristics
- Enclosure material: ABS
- Possible accessories to mount afterwards, if any required:
  - GAX30 to provide shielded cable connection continuity (e.g. with static converters)
- Padlockable handles
- Sealable cover
- Tightening torque for cover screws:
  - GAZ025...: 1.3Nm/16lb.in
  - Other types: 1.5Nm/13lb.in.
- Degree of protection: IP65
- Cable entry:
  - GAZ025... types: PG16/M25 and PG13.5/M20 knockouts
  - GAZ032... and GAZ040... types: PG16/M25 and PG29/M32 knockouts.

Certifications and compliance
Certifications obtained: EAC
Compliant with standards: IEC/EN/BS 60947-3, IEC/EN/BS 60947-1.

Switch disconnectors IEC/EN/BS GLD series

GLD...T2C3

new

Order code	IEC conventional free air thermal current Ith	IEC rated operational current Ie DCPV1 800V	1000V	1500V	Qty per pkg	Wt
	[A]	[A]	[A]	[A]	n°	[kg]
Direct operating and door coupling versions. Separately purchase the handle and shaft extension.						
GLD0100T2C3	100	100	100	-	1	1.340
GLD0160T2C3	160	160	160	-	1	1.340
GLD0200T2C3	200	200	200	-	1	1.340
GLD0250T2C3	250	250	250	-	1	1.340
GLD0315T2C3	315	315	250	-	1	1.340
GLD0100T4C3	100	100	100	100	1	2.140
GLD0160T4C3	160	160	160	160	1	2.140
GLD0200T4C3	200	200	200	200	1	2.140
GLD0250T4C3	250	250	250	250	1	2.140
GLD0315T4C3	315	315	315	315	1	2.140

Switch disconnectors UL98B GLD series

UL

GLD...T4C3UL

new

Order code	General purpose current 1000V	1500V	Qty per pkg	Wt
	[A]	[A]	n°	[kg]
Direct operating and door coupling versions. Separately purchase the handle and shaft extension.				
GLD0100T2C3UL	100	-	1	1.340
GLD0200T2C3UL	200	-	1	1.340
GLD0100T4C3UL	100	100	1	2.140
GLD0200T4C3UL	200	200	1	2.140

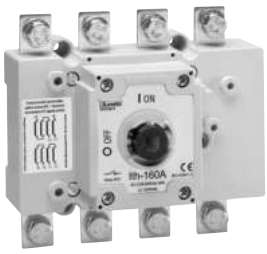
Selection of handles and accessories GLD series
Refer to the combinations given on page 14-56 and 57 for a correct choice based on the switch disconnector type used.

General characteristics
- Up to 315A 1500V DCPV1
- Up to 100A 1000V DCPV2 for GLD0315T2C3 and up to 125A 1500V DCPV2 for GLD0315T4C3
- Available versions:
  - Direct operating
  - Door coupling version. Use switch disconnector with direct actuator and separately purchase the handle and shaft extension for this version. See pages 14-56 and 57
- Screw or 35mm DIN rail fixing
- Padlockable in 0 position with no extra accessory.

Operational characteristics
- IEC rated insulation voltage Ui: 1000V for GLD...T2...; 1500V for GLD...T4...
- Mechanical life: 20,000 cycles.

Certifications and compliance
Certifications obtained: UL Listed for GLD...UL.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS IEC/EN/BS 60947-3, UL98B.

Switch disconnectors IEC/EN/BS GE series



GE...DT4

Order code	IEC conventional free air thermal current Ith	IEC rated operational current Ie DC21B ❷ 220V	800V	1000V	Qty per pkg	Wt
	[A]	[A]	[A]	[A]	n°	[kg]
Direct operating and door coupling versions. Separately purchase the handle and shaft extension.						
GE0630DT4	630	630	600	500	1	4.500
GE0800DT4	800	800	630	630	1	4.500
GE1250DT4	1250	1250	1000	850	1	8.900

❶ Connection of 4 poles in series.

Selection of handles and accessories GE series
Refer to the combinations given on page 14-56 and 57 for a correct choice based on the switch disconnector type used.

General characteristics
- Up to 850A, 1000VDC
- Available versions:
  - Direct operating
  - Door coupling version. Use switch disconnector with direct actuator and separately purchase the handle and shaft extension for this version. See page 14-48
- Screw fixing
- Padlockable in 0 position with no extra accessory.

Operational characteristics
- IEC rated insulation voltage Ui: 1000V
- Mechanical life: 10,000 cycles.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-3.

Summary table of combinations - Switch disconnectors for photovoltaic applications GL series

IEC/EN/BS

Type	IEC conventional free air thermal current Ith	IEC rated operational current Ie DCPV1			Direct operating handle	
		800V	1000V	1500V	Black	Red/Yellow
Order code	[A]	[A]	[A]	[A]	Order code	Order code
IEC/EN/BS switch disconnectors for photovoltaic applications.						
GLD0100T2C3	100	100	100	–	**GLX61DB**	**GLX61D**
GLD0160T2C3	160	160	160	–		
GLD0200T2C3	200	200	200	–		
GLD0250T2C3	250	250	250	–		
GLD0315T2C3	315	315	250	–		
GLD0100T4C3	100	100	100	160		
GLD0160T4C3	160	160	160	160		
GLD0200T4C3	200	200	200	200		
GLD0250T4C3	250	250	250	250		
GLD0315T4C3	315	315	315	315		

❶ Maximum conductor cross section: 120mm²/250kcmil.
Minimum conductor cross section: 16mm²/6AWG.

UL

Type	General purpose current		Direct operating handle	
	1000V	1500V	Black	Red/Yellow
Order code	[A]	[A]	Order code	Order code
UL98B switch disconnectors for photovoltaic applications.				
GLD0100T2C3UL	100	–	**GLX61DB**	**GLX61D**
GLD0200T2C3UL	200	–		
GLD0100T4C3UL	100	100		
GLD0200T4C3UL	200	200		

❷ Maximum conductor cross section: 152mm²/300kcmil.
Minimum conductor cross section: 16mm²/6AWG.

Summary table of combinations - Switch disconnectors for photovoltaic applications GE series

IEC/EN/BS

Type ❸	IEC conventional free air thermal current Ith	IEC rated operational current Ie DC21B with 4 poles in series			Direct operating handle
		600V	800V	1000V	Black
Order code	[A]	[A]	[A]	[A]	Order code
Switch disconnectors for photovoltaic applications.					
GE0630DT4	630	630	600	500	**GEX67ND**
GE0800DT4	800	700	630	630	
GE1250DT4	1250	1250	1000	850	**GEX68ND**

❸ The motorised control unit cannot be installed.

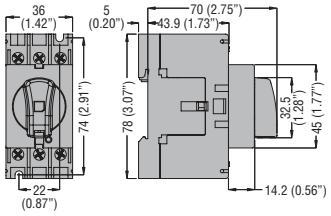
Door coupling handle		Shaft extensions for door coupling handles				Shaft alignment ring	Auxiliary contacts	Terminal covers	Phase barriers (standard supplied)	Terminal lugs	Bridging bars (standard supplied)	Captive nuts
Black	Red/Yellow		Panel depth		Shaft section							
Order code	Order code	Order code	min [mm/in]	min [mm/in]	□ [mm/in]	Order code	Order code	Order code	Order code	Order code	Order code	Order code
GLX61B	**GLX61**	**GLX7150S10** **GLX7200S10** **GLX7300S10** **GLX7400S10** **GLX7500S10**	124/ 4.88”	194/7.64” 244/9.61” 344/13.54” 444/17.48” 544/21.42”	10/0.4”	**GLX00**	**GLX1001** (1NC) **GLX1010EA** (1EB)	**GLX801** (4 pcs)	–	**GLX500** (1 pcs)❶ **GLX501** (3 pcs)❶	–	**GLDX550** (4 pcs)
								GLX801 (4 pcs) **GLDX800** (2 pcs)	**GLDX900** (2 pcs)		**GLDX201** (2 pcs)	

Door coupling handle		Shaft extensions for door coupling handles				Shaft alignment ring	Auxiliary contacts	Terminal covers	Phase barriers (standard supplied)	Terminal lugs	Bridging bars (standard supplied)	Captive nuts
Black	Red/Yellow		Panel depth		Shaft section							
Order code	Order code	Order code	min [mm/in]	min [mm/in]	□ [mm/in]	Order code	Order code	Order code	Order code	Order code	Order code	Order code
GLX61B	**GLX61**	**GLX7150S10** **GLX7200S10** **GLX7300S10** **GLX7400S10** **GLX7500S10**	124/ 4.88”	194/7.64” 244/9.61” 344/13.54” 444/17.48” 544/21.42”	10/0.4”	**GLX00**	**GLX1001** (1NC) **GLX1010EA** (1EB)	**GLX801** (4 pcs)	–	**GLDX501** (4 pcs)❷	–	**GLDX550** (4 pcs)
								GLX801 (4 pcs) **GLDX800** (2 pcs)	**GLDX901** (2 pcs)		**GLDX201** (2 pcs)	

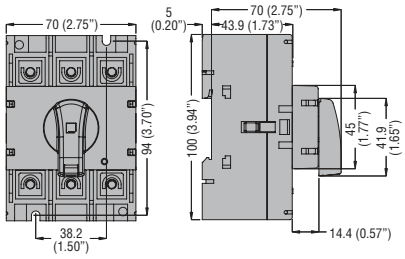
Door coupling handle		Shaft extensions for door coupling handles			Auxiliary contacts	Terminal covers
Black	Red/Yellow		Panel depth	Shaft section		
Order code	Order code	Order code	max [mm/in]	□ [mm/in]	Order code	Order code
GEX67NB	**GEX67N**	**GEX7195N** **GEX7345N** **GEX7535N**	251/9.88” 401/15.79” 591/23.27”	14mm/0.6”	**GEX1011** (1NO+1NC) **GEX1022** (2NO+2NC)	**GEX8121**
GEX68NB	**GEX68N**	**GEX7195N** **GEX7345N** **GEX7535N**	267/10.51” 417/16.42” 607/23.90”			**GEX8131**

GA SERIES - 16A TO 160A SWITCH DISCONNECTORS

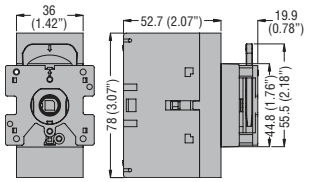
Direct operating version
GA016A...GA040A...
GA063SA...



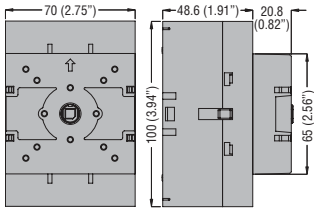
GA030A... - GA063A...GA160A...



Door mount version
GA016C...GA040C
GA063SC



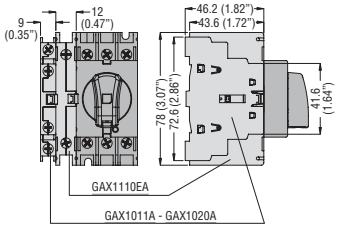
GA030C - GA063C...GA160C



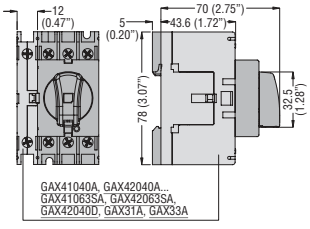
ADD-ON BLOCKS AND ACCESSORIES

For GA016A...GA040A..., GA063SA..., GA040D

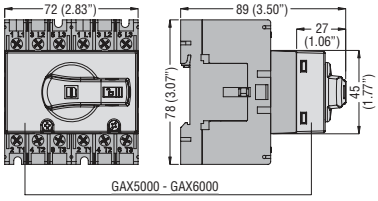
Auxiliary contacts
GAX1011A
GAX1020A
GAX1110EA



Fourth pole
GAX41040A - GAX42040A
GAX41063SA - GAX42063SA
Neutral **GAX31A** - earth/ground **GAX33A** terminals

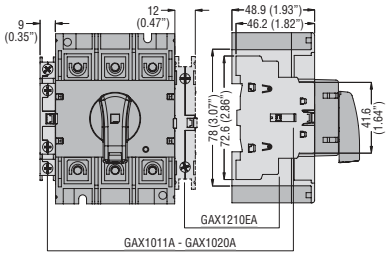


Mechanical interlock **GAX5000** and
mechanical coupling system **GAX6000**

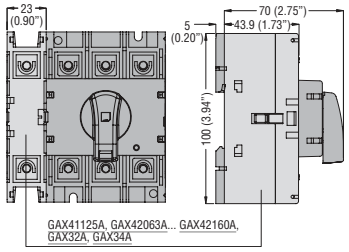


For GA063A...GA160A

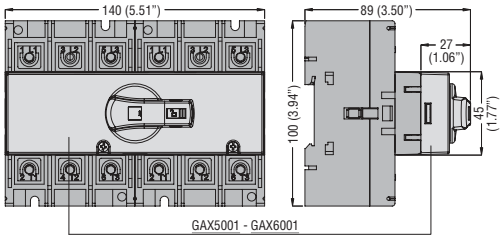
Auxiliary contacts
GAX1011A
GAX1020A
GAX1210EA



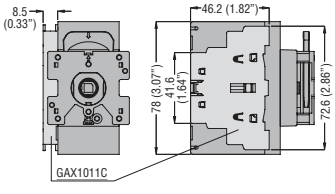
Fourth pole
GAX41125A
GAX42063A...GAX42160A
Neutral **GAX32A** - earth/ground **GAX34A** terminals



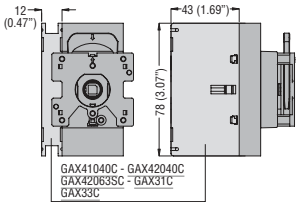
Mechanical interlock **GAX5001** and
mechanical coupling system **GAX6001**



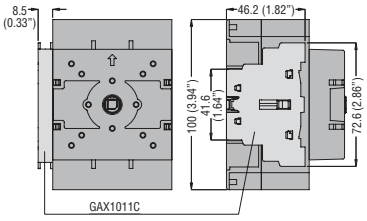
For GA016C...GA040C and GA063SC
Auxiliary contacts
GAX1011C



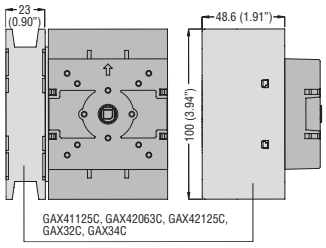
Fourth pole **GAX41040C - GAX42040C** and **GAX42063SC**
Neutral **GAX31C**
Earth/ground **GAX33C** terminals



For GA063C...GA160C
Auxiliary contacts
GAX1011C

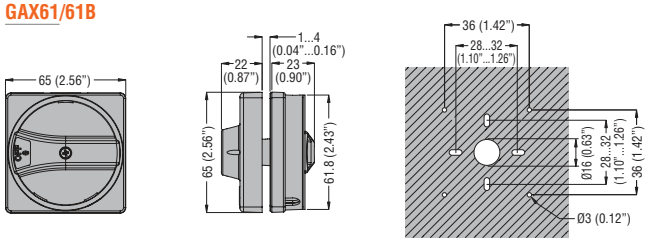


Fourth pole **GAX41125C - GAX42063C... GAX42160C**
Neutral **GAX32C**
Earth/ground **GAX34C** terminals

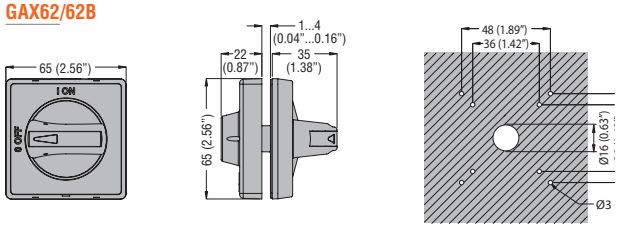


Handles

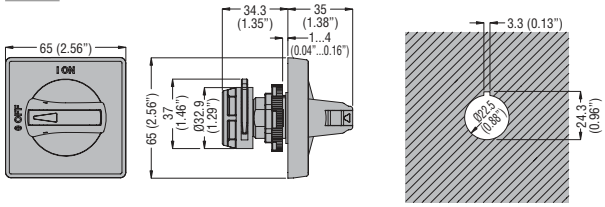
GAX61/61B



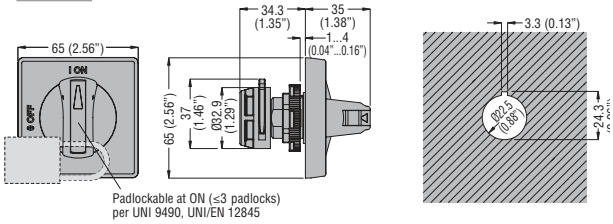
GAX62/62B



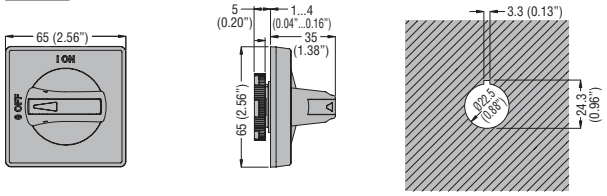
GAX63/63B/63K/63BK



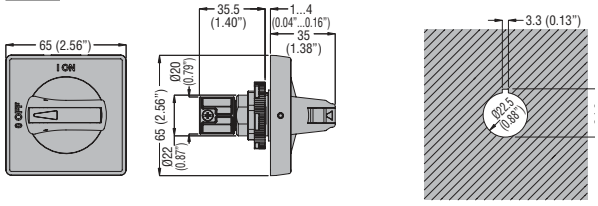
GAX631B



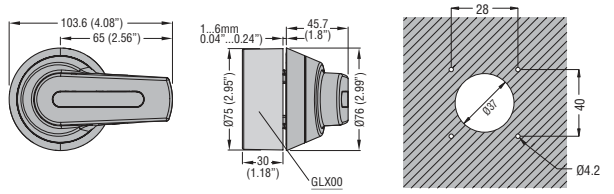
GAX632/2B



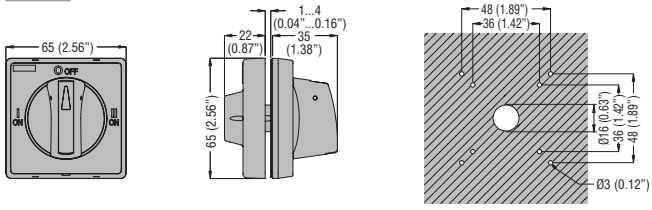
GAX64/64B



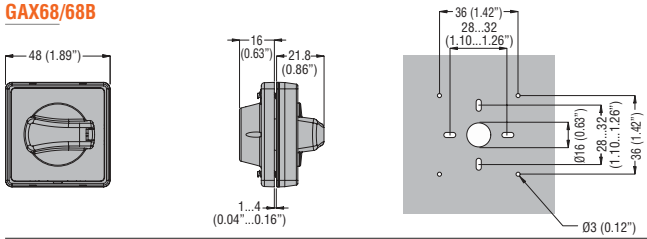
GAX66N/66NB



GAX67B

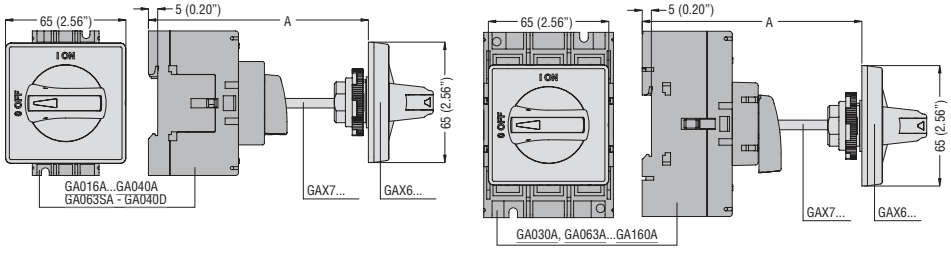


GAX68/68B



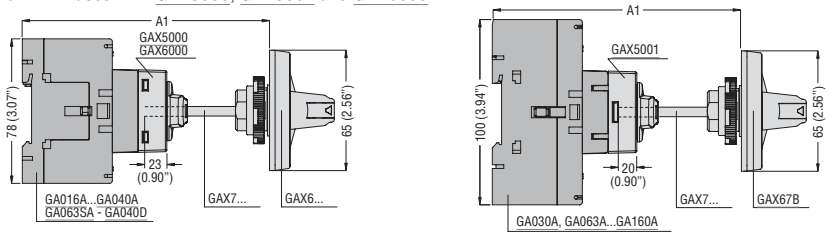
Shaft extensions for door coupling handles

GAX7...



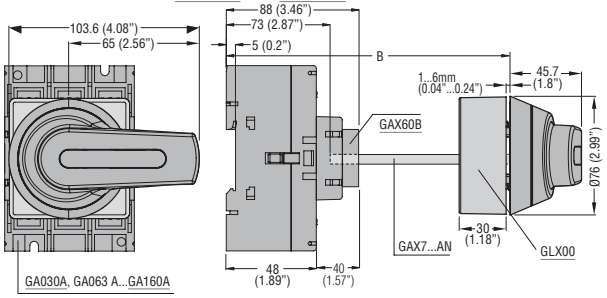
Extension	Length [mm (in)]	A [mm (in)] maximum Type of handle					
		GAX61...	GAX62...	GAX63...	GAX64...	GAX67B	GAX68...
GAX7055	55 (2.16")	99 (3.90")	97 (3.82")	102 (4.01")	116 (4.57")	97 (3.82")	98,5 (3.88")
GAX7070	70 (2.75")	114 (4.49")	112 (4.41")	117 (4.61")	131 (5.16")	112 (4.41")	113,5 (4.47")
GAX7090	90 (3.54")	134 (5.27")	132 (5.20")	137 (5.39")	151 (5.94")	132 (5.20")	133,5 (5.25")
GAX7150	150 (5.90")	194 (7.64")	192 (7.56")	197 (7.75")	211 (8.31")	192 (7.56")	193,5 (7.62")
GAX7200	200 (7.87")	244 (9.61")	242 (9.53")	247 (9.72")	261 (10.27")	242 (9.53")	243,5 (9.59")
GAX7300	300 (11.81")	344 (13.54")	342 (13.46")	347 (13.66")	361 (14.21")	342 (13.46")	343,5 (13.52")
GAX7400	400 (15.75")	444 (17.48")	442 (17.40")	447 (17.60")	461 (18.15")	442 (17.40")	443,5 (17.46")
GAX7500	500 (19.68")	544 (21.42")	542 (21.34")	547 (21.53")	561 (22.09")	542 (21.34")	543,5 (21.40")

GAX7... used with GAX5000, GAX5001 and GAX6000

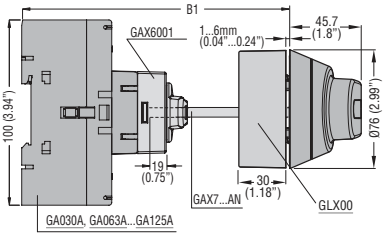


Extension	Length [mm (in)]	A1 [mm (in)] maximum Used with GAX6000 Type of handle					Used with GAX5000/GAX5001
		GAX61...	GAX62...	GAX63...	GAX64...	GAX68...	GAX67B
GAX7055	55 (2.16")	116 (4.57")	114 (4.49")	119 (4.68")	133 (5.24")	115,5 (4.55")	114 (4.49")
GAX7070	70 (2.75")	131 (5.16")	129 (5.08")	134 (5.27")	148 (5.83")	130,5 (5.14")	129 (5.08")
GAX7090	90 (3.54")	151 (5.94")	149 (5.87")	154 (6.06")	168 (6.61")	150,5 (5.92")	149 (5.87")
GAX7150	150 (5.90")	211 (8.31")	209 (8.23")	214 (8.42")	228 (8.98")	210,5 (8.29")	209 (8.23")
GAX7200	200 (7.87")	261 (10.27")	259 (10.20")	264 (10.39")	278 (10.94")	260,5 (10.25")	259 (10.20")
GAX7300	300 (11.81")	361 (14.21")	359 (14.13")	364 (14.33)	378 (14.88")	360,5 (14.20")	359 (14.13")
GAX7400	400 (15.75")	461 (18.15")	459 (18.07")	464 (14.33)	468 (18.42")	460,5 (18.13")	459 (18.07")
GAX7500	500 (19.68")	561 (22.09")	559 (22.01")	564 (22.20")	578 (22.75")	560,5 (22.07")	559 (22.01")

GAX7…AN used with GAX60B and GAX66N/66NB



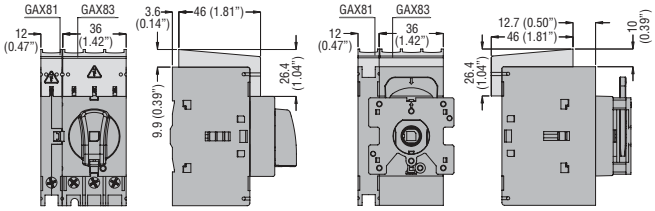
GAX7…AN used with GAX6001 and GAX66N/66NB



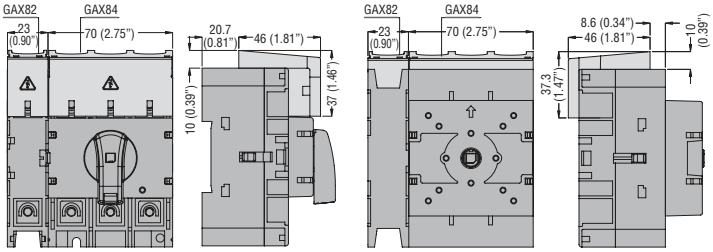
Extension	Length	B	B1
		with GAX66N/66NB handle	
	[mm(in)]	[mm(in)]	[mm(in)]
GAX7150AN	178 (7.00")	120...226 (4.72"...9.00")	120...223 (4.72"...8.80")
GAX7200AN	228 (8.98")	120...276 (4.72"...10.87")	120...273 (4.72"...10.75")
GAX7300AN	328 (12.91")	120...376 (4.72"...14.80")	120...373 (4.72"...14.68")
GAX7400AN	428 (16.85")	120...476 (4.72"...18.74")	120...473 (4.72"...18.62")
GAX7500AN	528 (20.79")	120...576 (4.72"...22.68")	120...573 (4.72"...25.56")

Terminal covers

GAX81 - GAX83

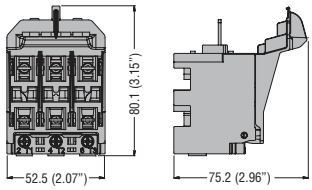


GAX82 - GAX84



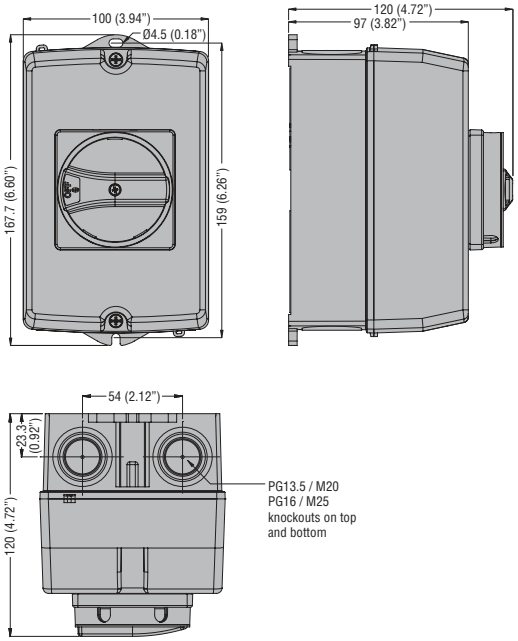
Fuse holder

GAX391 - GAX391UL

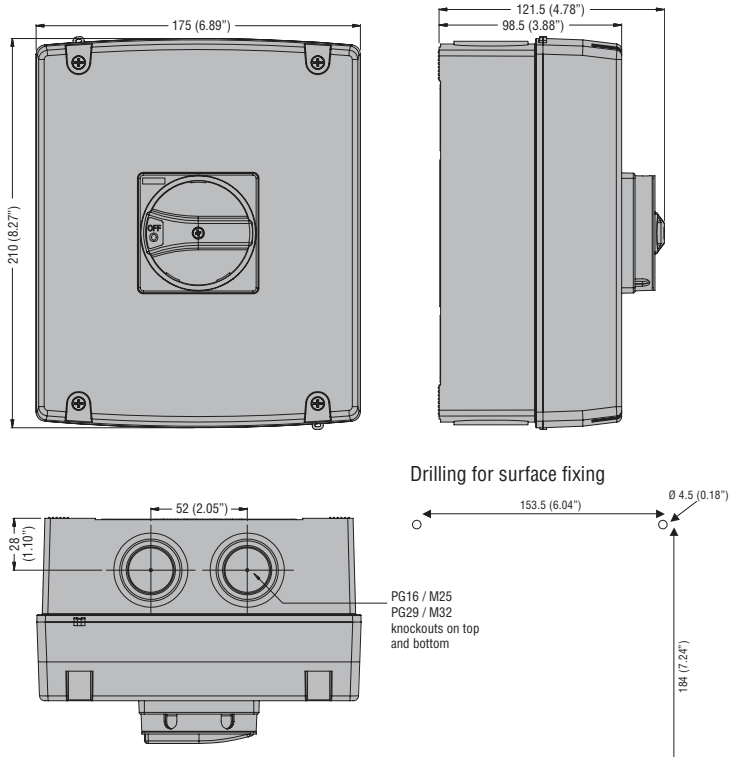


ENCLOSED SWITCH DISCONNECTORS AND EMPTY ENCLOSURES

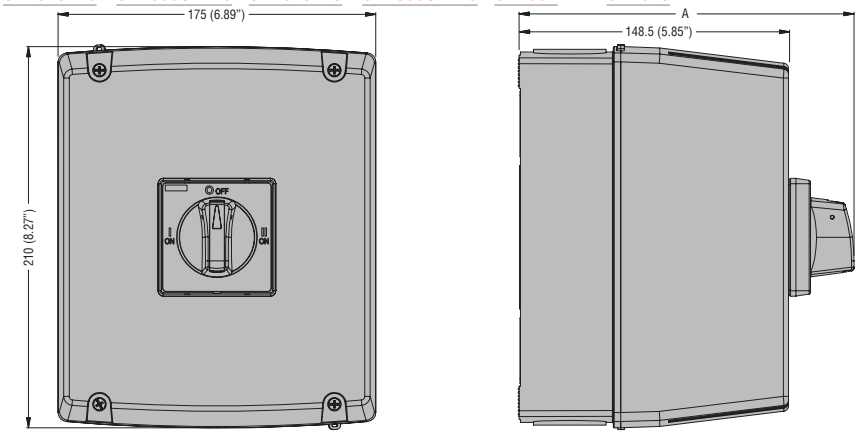
GAZ016…GAZ040…
GAZ016…GAZ040…UL
GAZ1… - GAZ1…UL
GAZ025D…

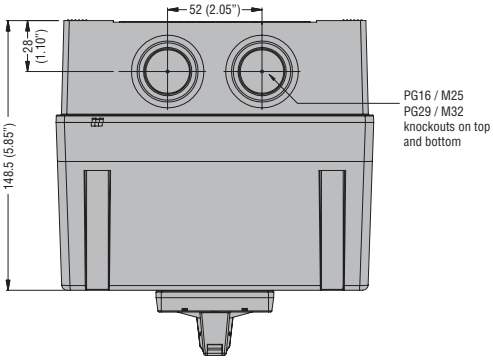


GAZ063SA…GAZ100C…
GAZ063SAUL…
GAZ2… - GAZ2…UL

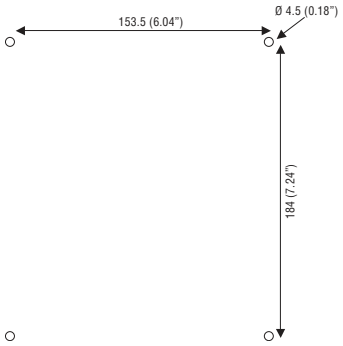


GAZ025ET6…GAZ063SAET6 - GAZ025ET8…GAZ063SAET8 - GAZ032D… - GAZ040D…



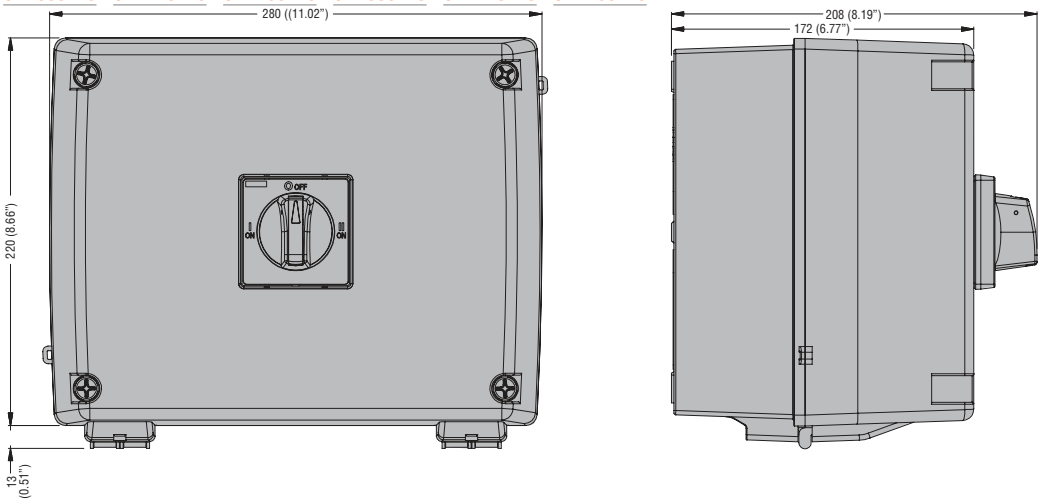


Drilling

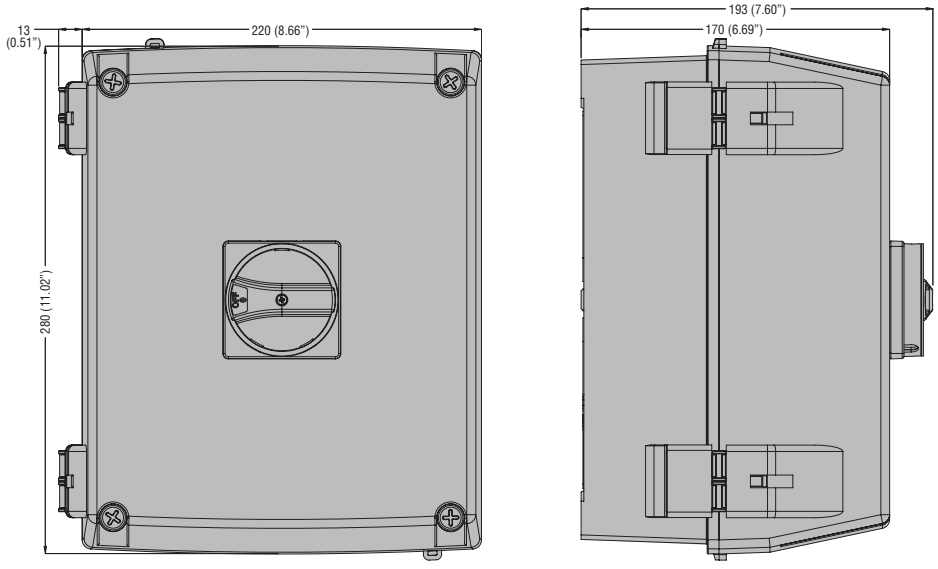


Type	A
GAZ032D...	171.5 (6.75")
GAZ040D...	171.5 (6.75")
GAZ025ET...	183.5 (7.22")
GAZ063SAET...	183.5 (7.22")

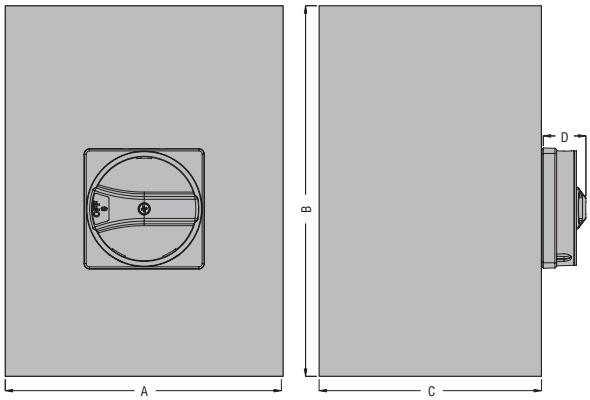
GAZ080ET6 - GAZ125ET6 - GAZ160ET6 - GAZ080ET8 - GAZ125ET8 - GAZ160ET8



GAZ125… - GAZ063…UL - GAZ125…UL - GAZ125… - GAZ160… - GAZ080UL…GAZ125…UL - GAZ3…

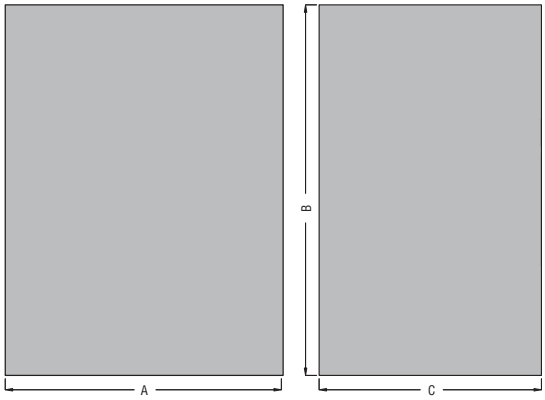


SWITCH DISCONNECTORS AND MANUAL CHANGEOVER SWITCHES IN METAL AND STAINLESS STEEL AISI 304 ENCLOSURES



Type	A	B	C	D
GAZM016...GAZM100...	150 (5.90")	200 (7.87")	120 (4.72")	23 (0.90")
GAZM125...GAZM160...	200 (7.87")	300 (11.81")	120 (4.72")	23 (0.90")
GAZM016E...GAZM063SAE...	150 (5.90")	200 (7.87")	120 (4.72")	35 (1.38")
GAZM063ET6...GAZM160ET6...	200 (7.87")	300 (11.81")	120 (4.72")	35 (1.38")
GAZM063ET8...GAZM160ET8...	300 (11.81")	400 (15.75")	120 (4.72")	35 (1.38")
GAZS016...GAZS100...	150 (5.90")	200 (7.87")	120 (4.72")	23 (0.90")
GLZM0160...GLZM0315...	300 (11.81")	400 (15.75")	250 (9.84")	45.7 (1.80")
GLZM0160E...GLZM0315E...	300 (11.81")	400 (15.75")	250 (9.84")	45.7 (1.80")

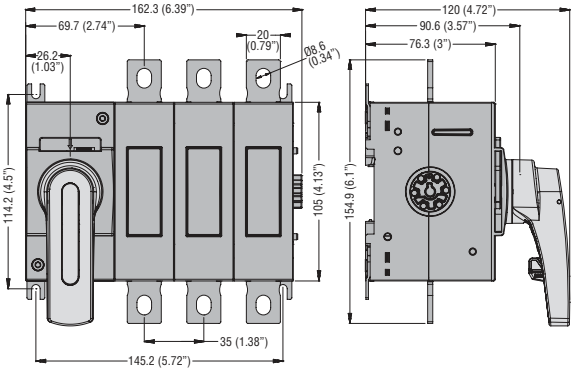
EMPTY METAL ENCLOSURES



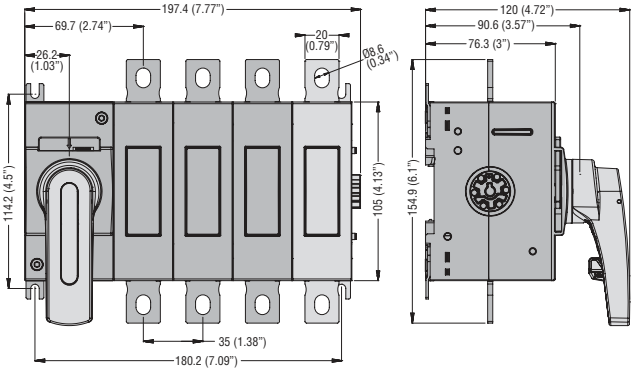
Type	A	B	C
GAZM1	150 (5.90")	200 (7.87")	120 (4.72")
GAZM2	200 (7.87")	300 (11.81")	120 (4.72")
GAZM3	300 (11.81")	400 (15.75")	120 (4.72")
GAZS1	150 (5.90")	200 (7.87")	120 (4.72")
GLZM1	300 (11.81")	400 (15.75")	250 (9.84")

GL SERIES 100A TO 1000A SWITCH DISCONNECTORS

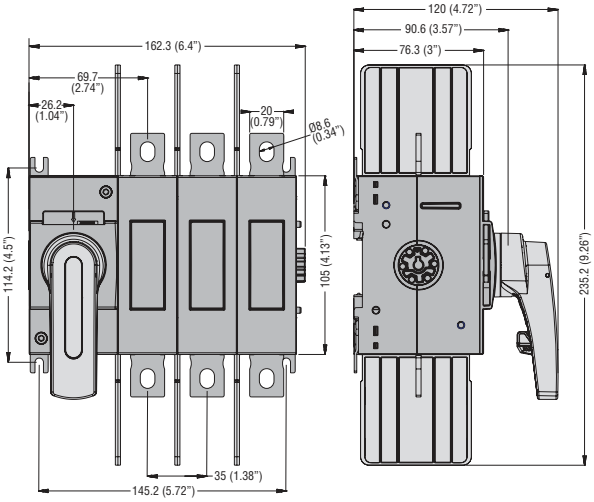
GL0160C1...GL0315C1



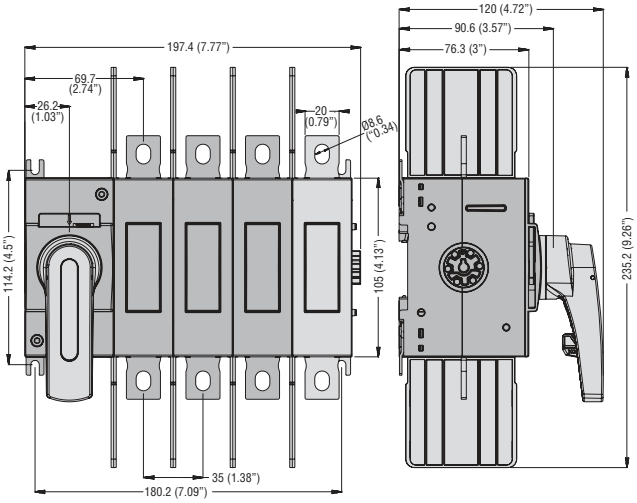
GL0160C1...GL0315C1 with add-on fourth pole GLX420315



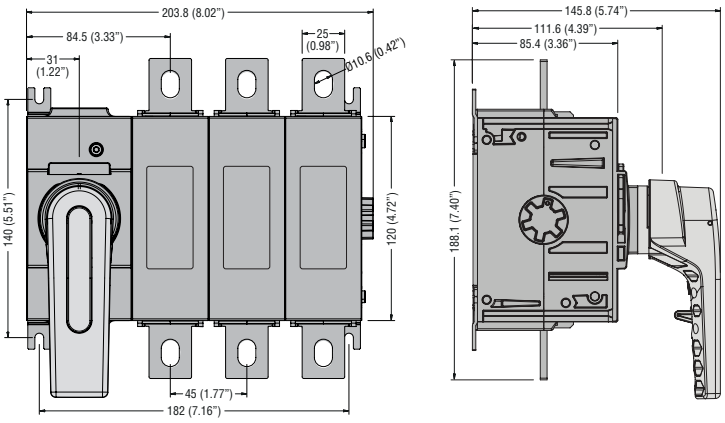
GL0100C1UL - GL0200C1UL



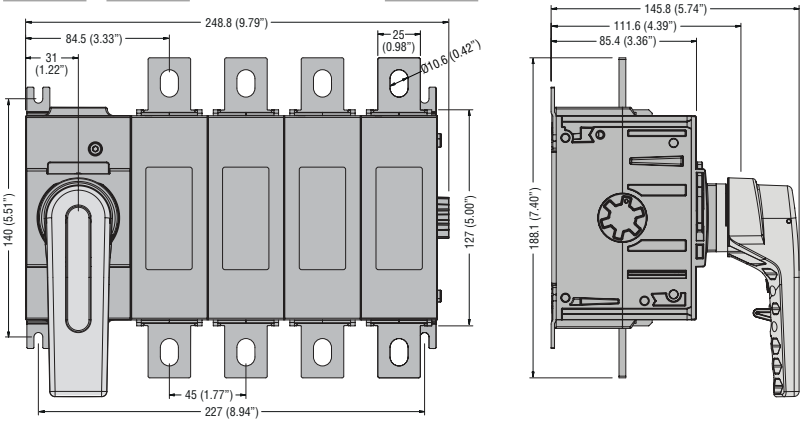
GL0100C1UL - GL0200C1UL with add-on fourth pole GLX420100UL - GLX420200UL



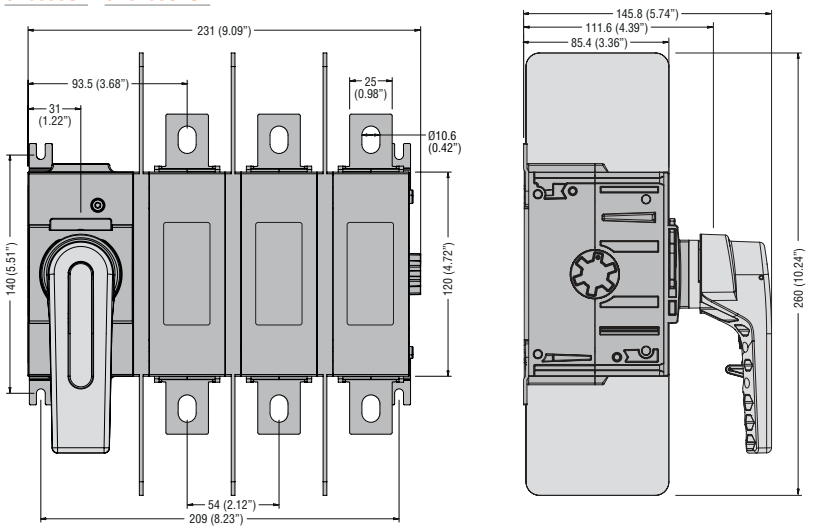
GL0320C1...GL0500C1



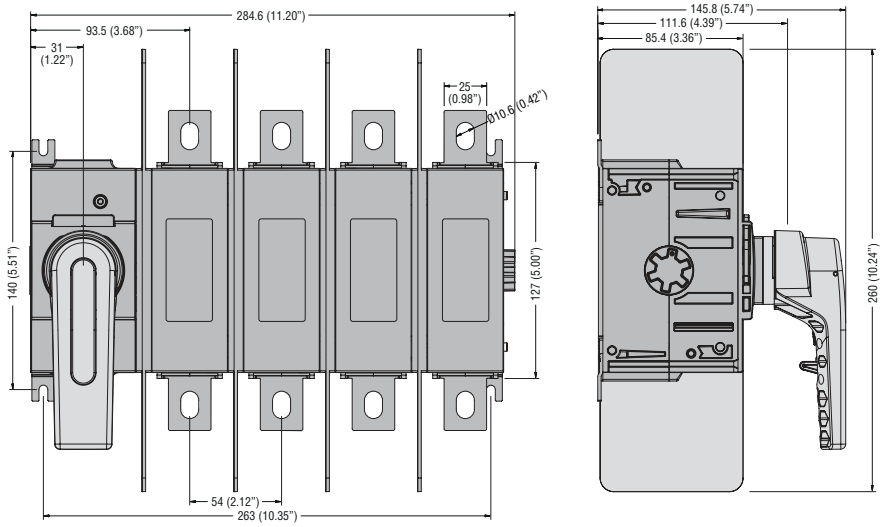
GL0320C1...GL0500C1 with add-on fourth pole GLX420320...0500



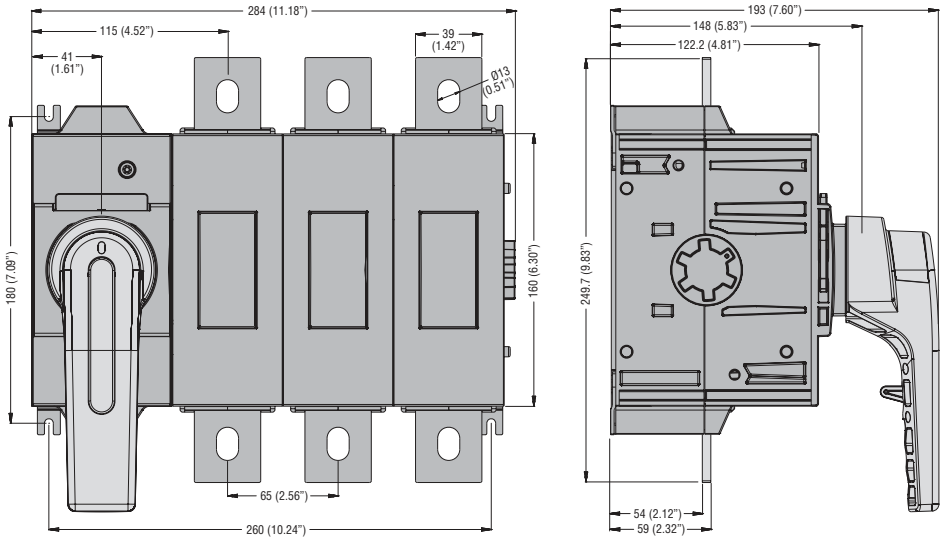
GL0630C1 - GL0400C1UL



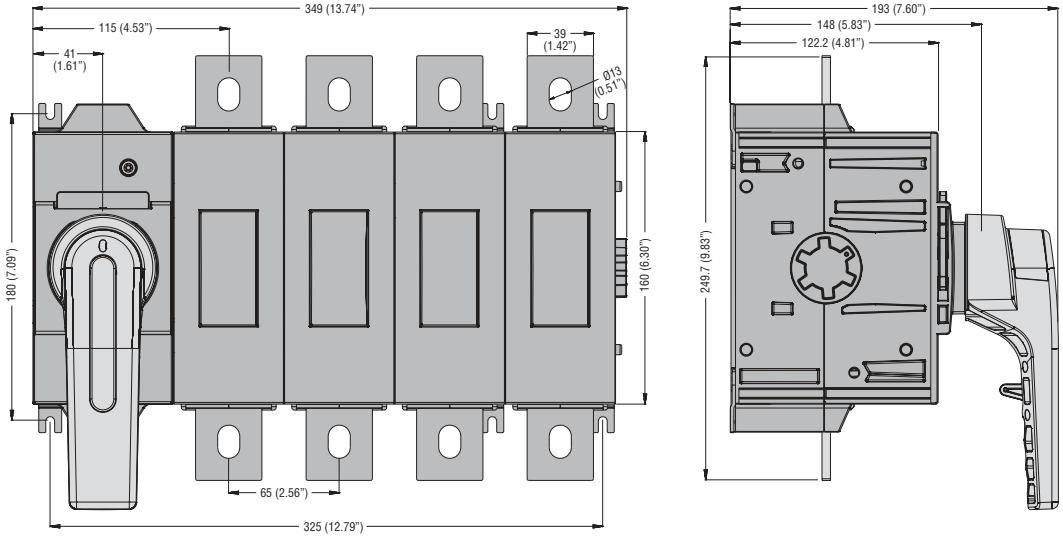
GL0630C1 - GL0400C1UL with add-on fourth pole GLX420630 - GLX420400UL



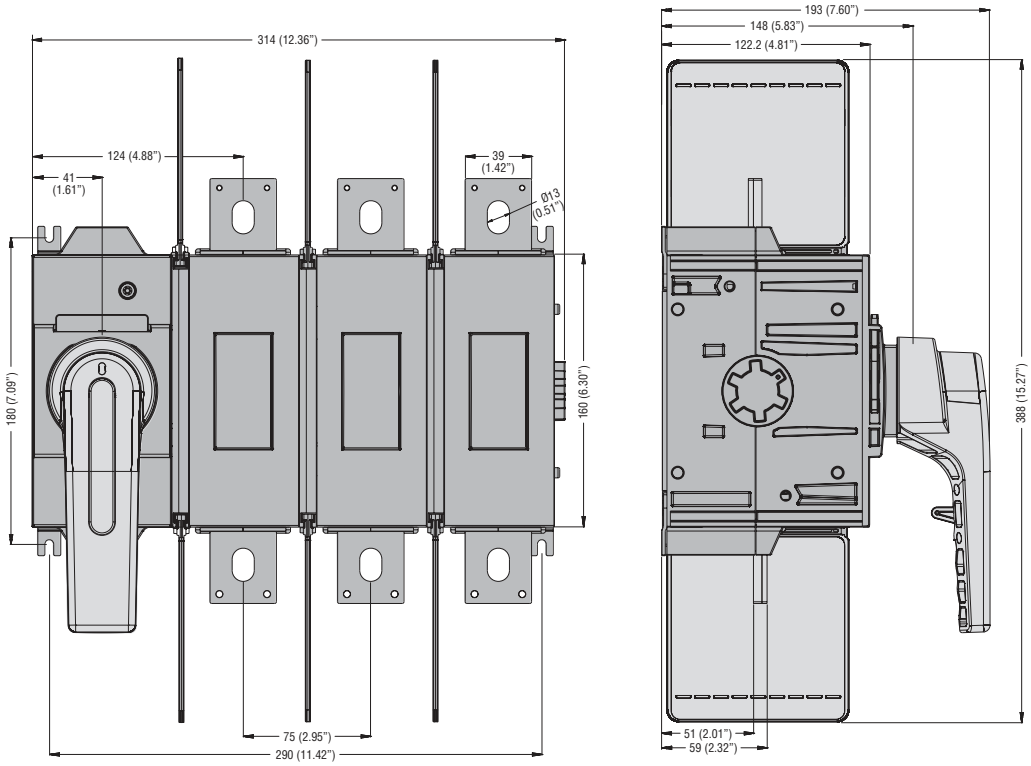
GL0631C1 - GL0800C1 - GL0600C1UL



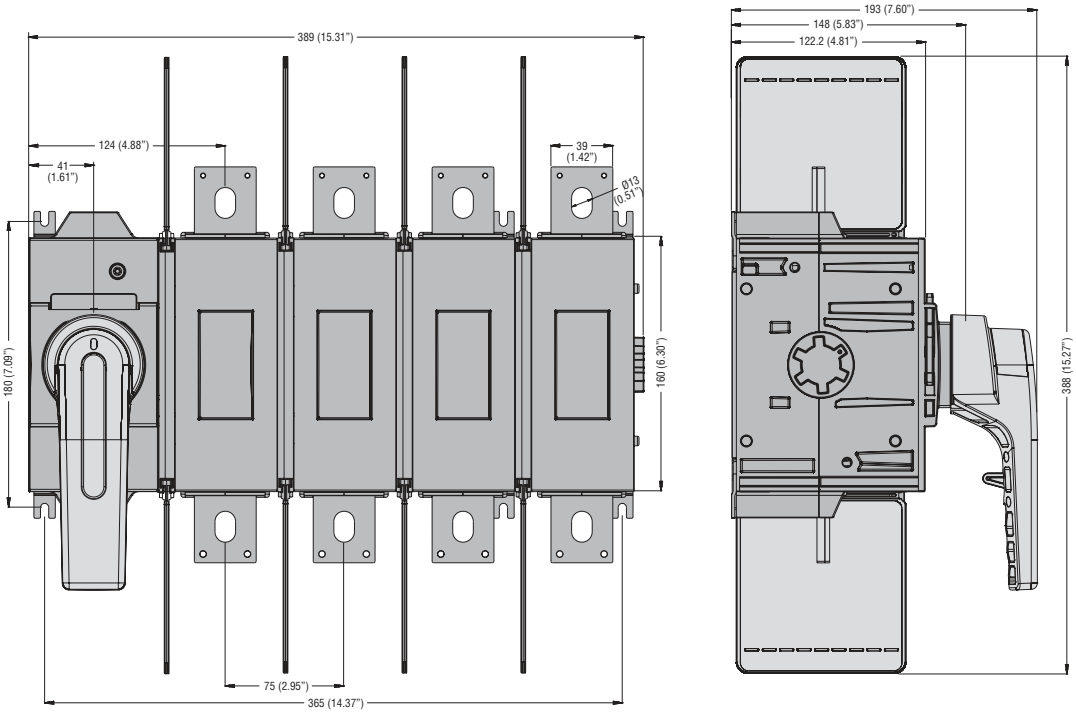
GL0631C1 - GL0800C1 with add-on fourth pole GLX420631 - GLX420800
GL0600C1UL with add-on fourth pole GLX420600UL



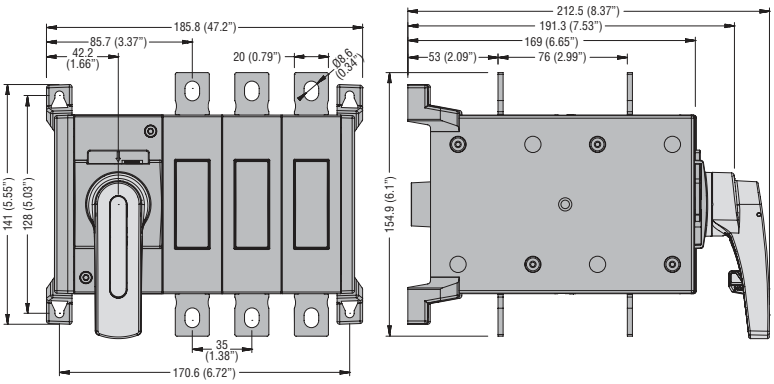
GL1000C1 - GL0800C1UL



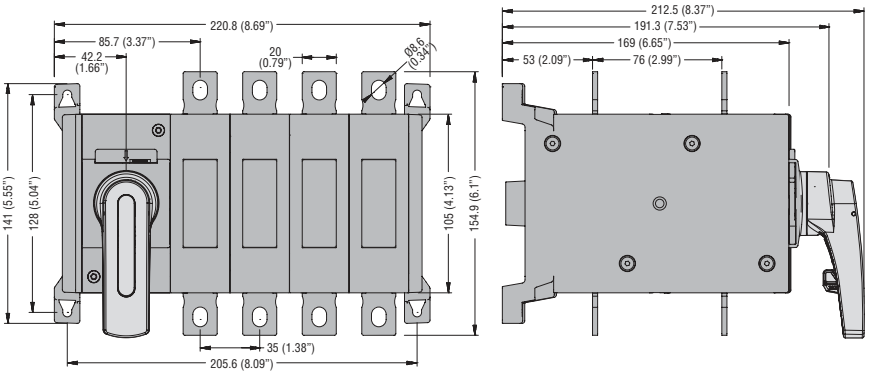
GL1000C1 with add-on fourth pole GLX421000
GL0800C1UL with add-on fourth pole GLX420800UL



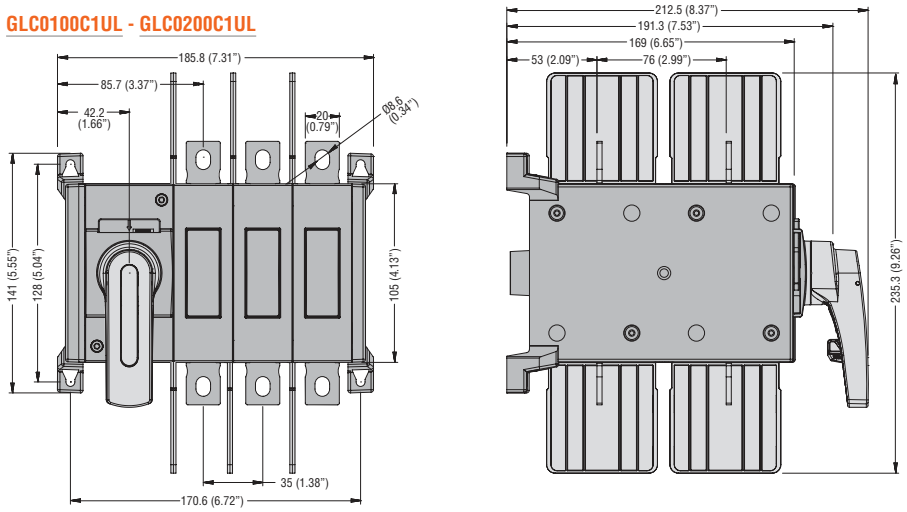
GLC0160C1...GLC0315C1



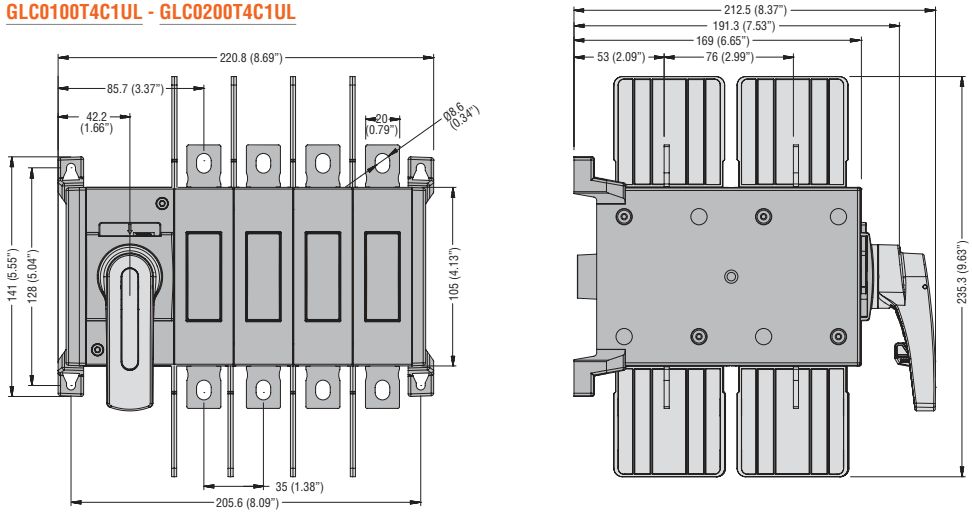
GLC0160T4C1...GLC0315T4C1



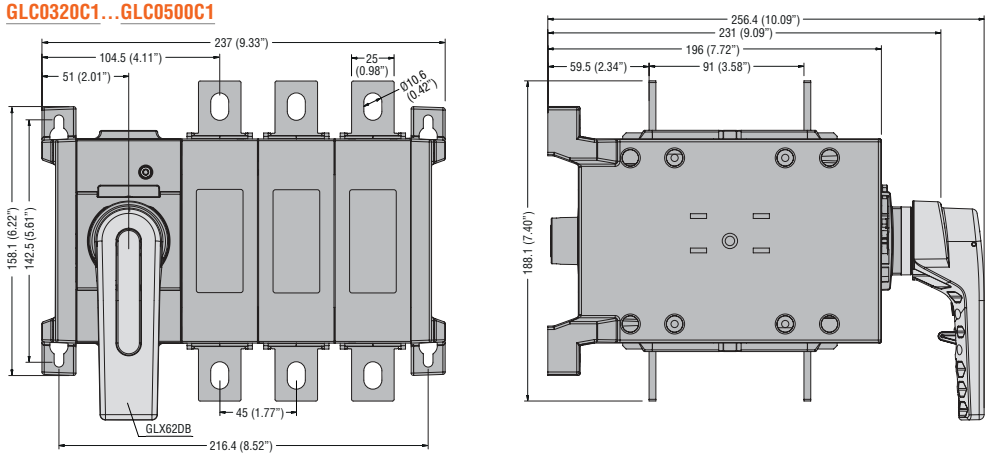
GLC0100C1UL - GLC0200C1UL



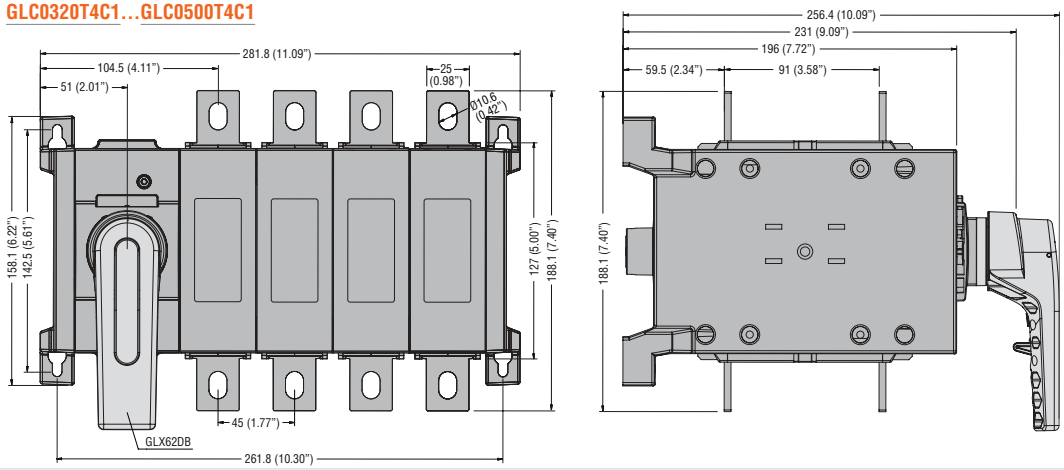
GLC0100T4C1UL - GLC0200T4C1UL



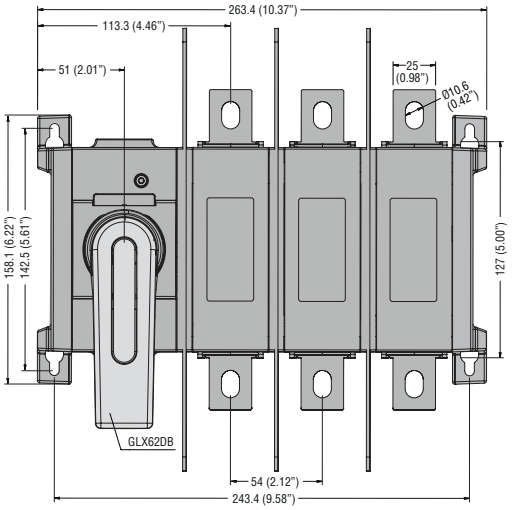
GLC0320C1...GLC0500C1

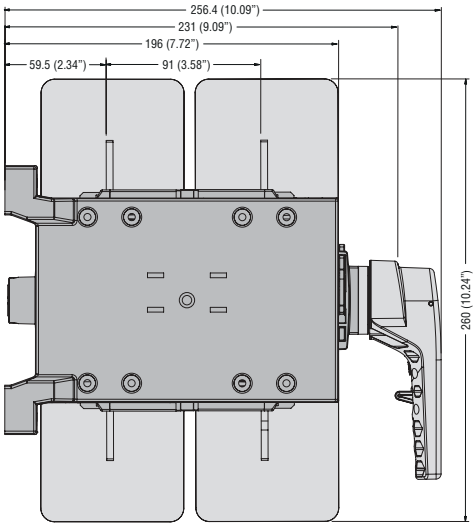


GLC0320T4C1...GLC0500T4C1

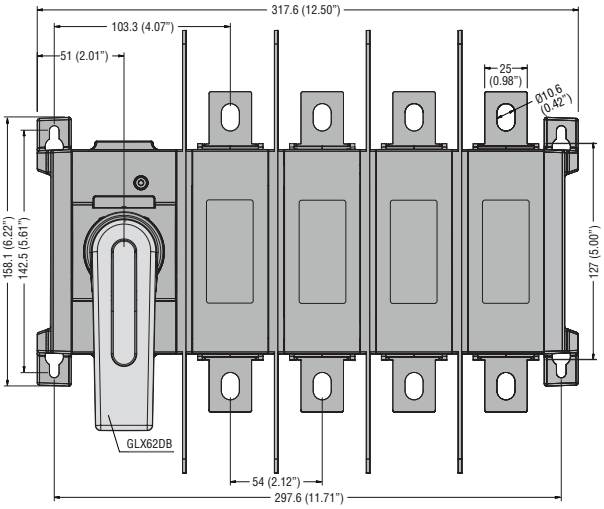


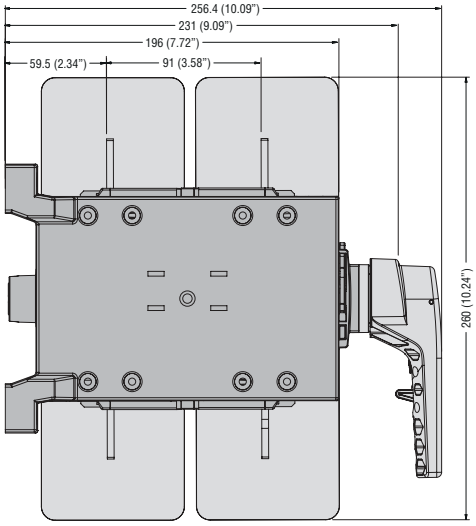
GLC0630C1 - GLC0400C1UL



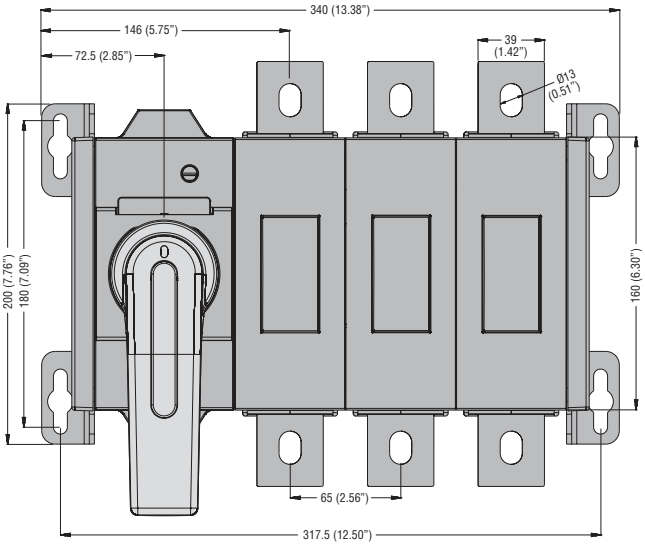


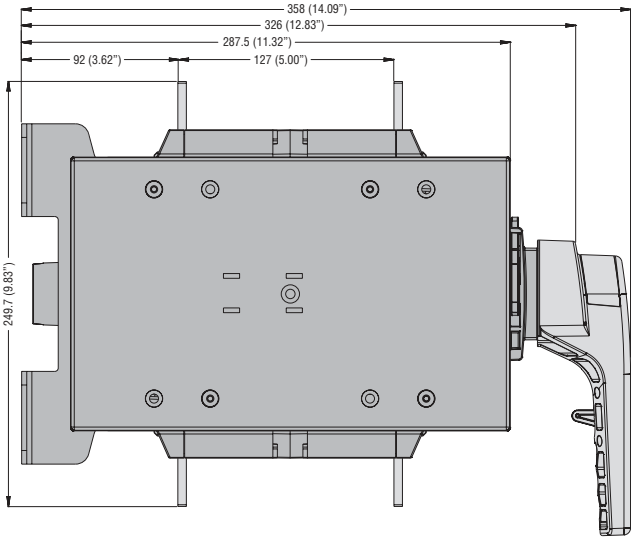
GLC0630T4C1 - GLC0400T4C1UL



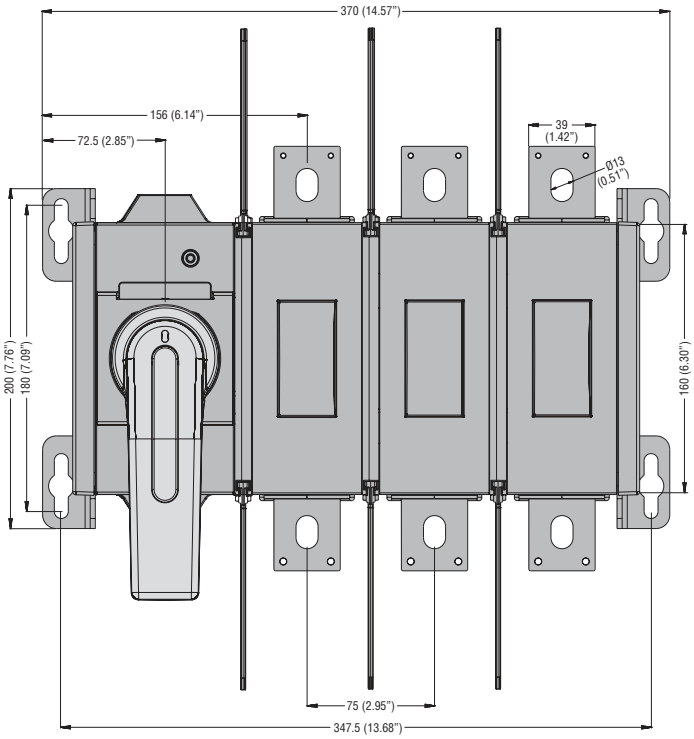


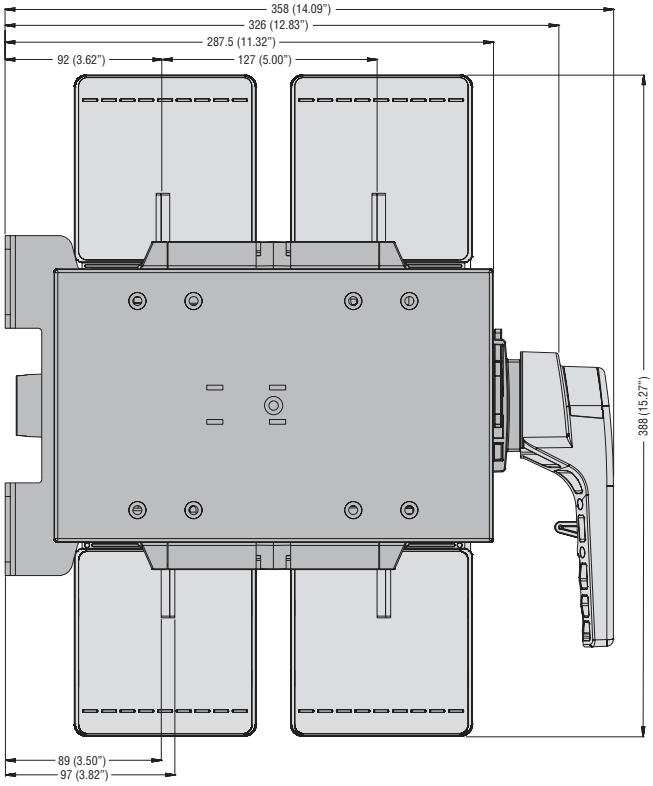
GLC0631C1 - GLC0800C1



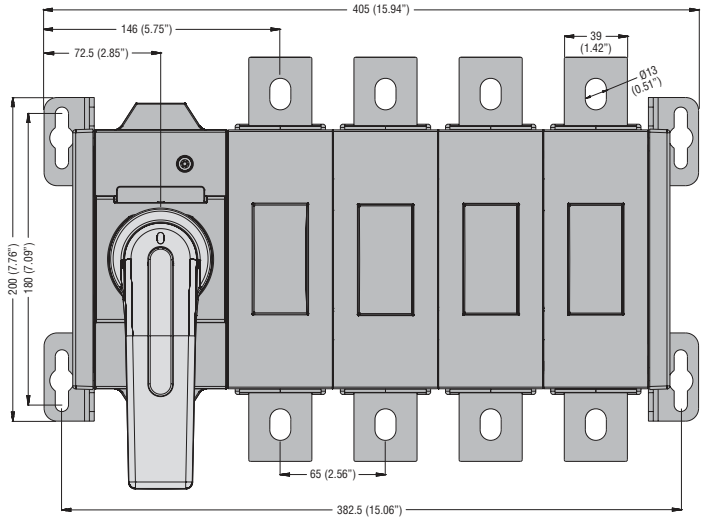


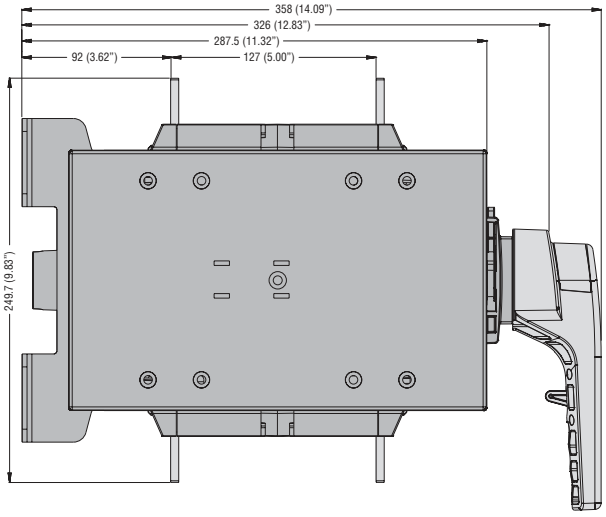
GLC1000C1



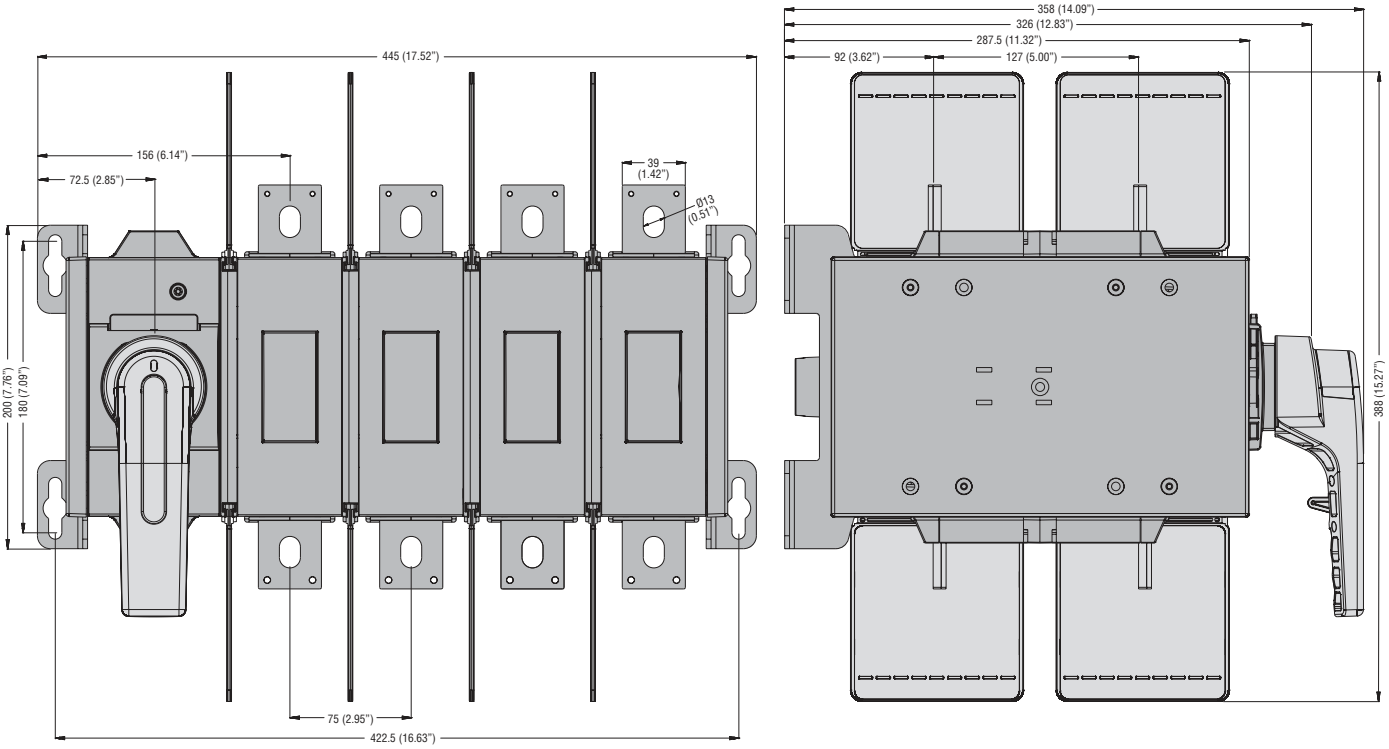


GLC0631T4C1 - GLC0800T4C1

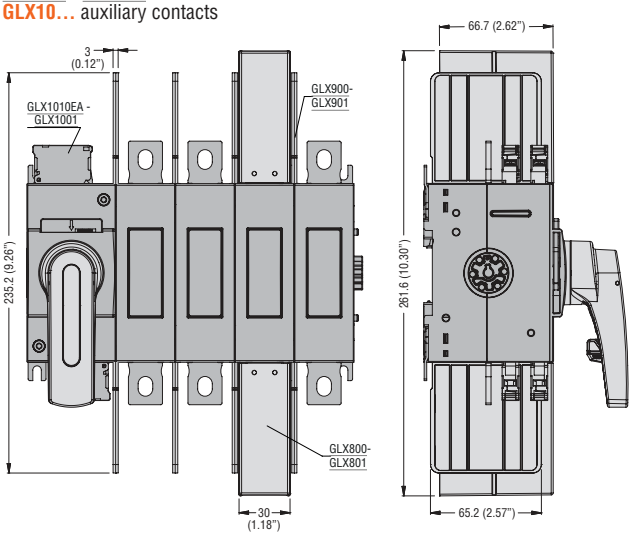




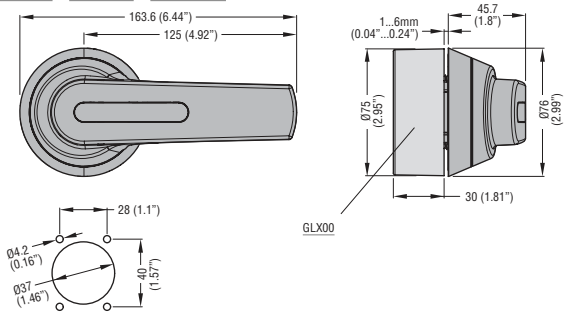
GLC1000T4C1



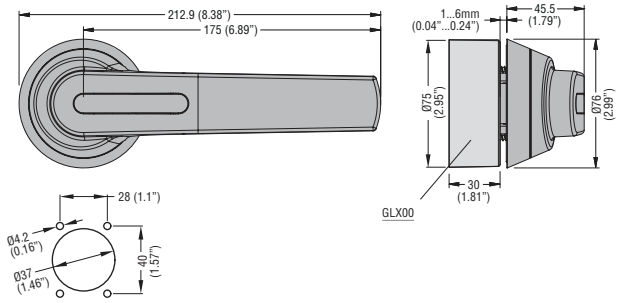
GLX800 - GLX801 terminal covers
GLX900 - GLX901 one-pole phase barrier
GLX10... auxiliary contacts



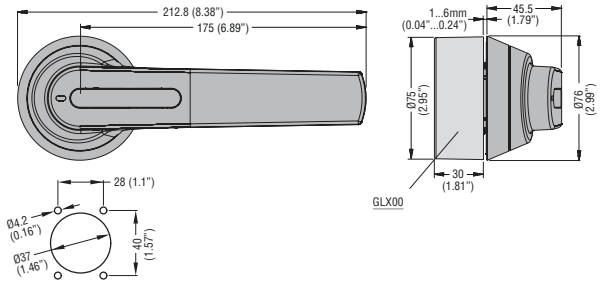
GLX61 - GLX61B - GLX61CB handles



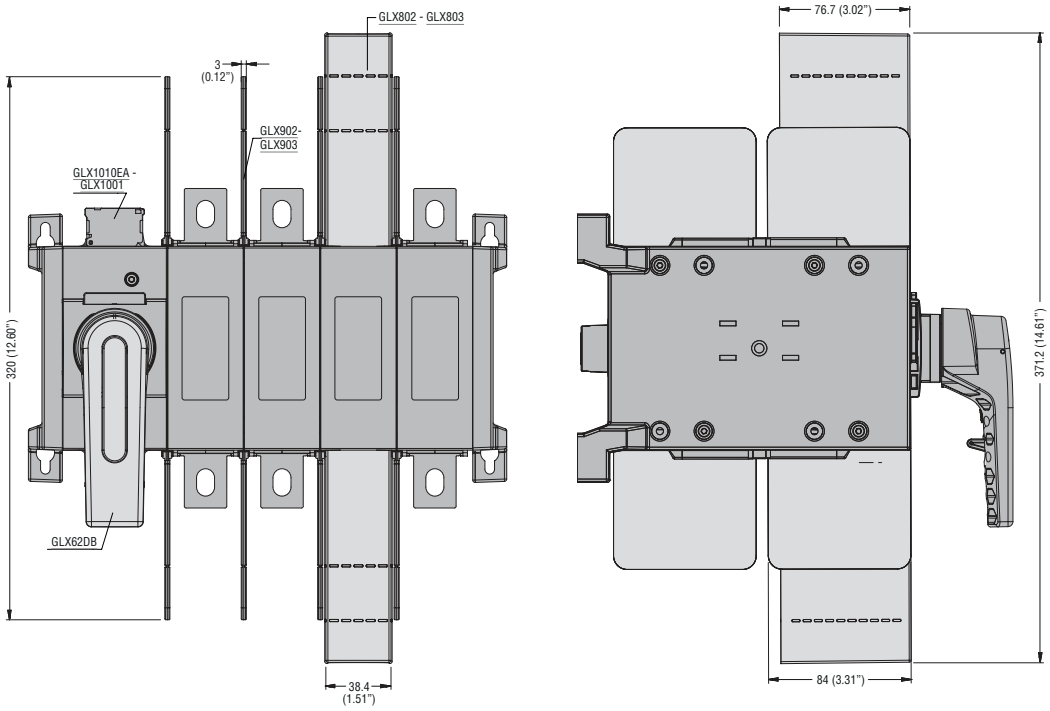
GLX62 - GLX62B - GLX62CB handles



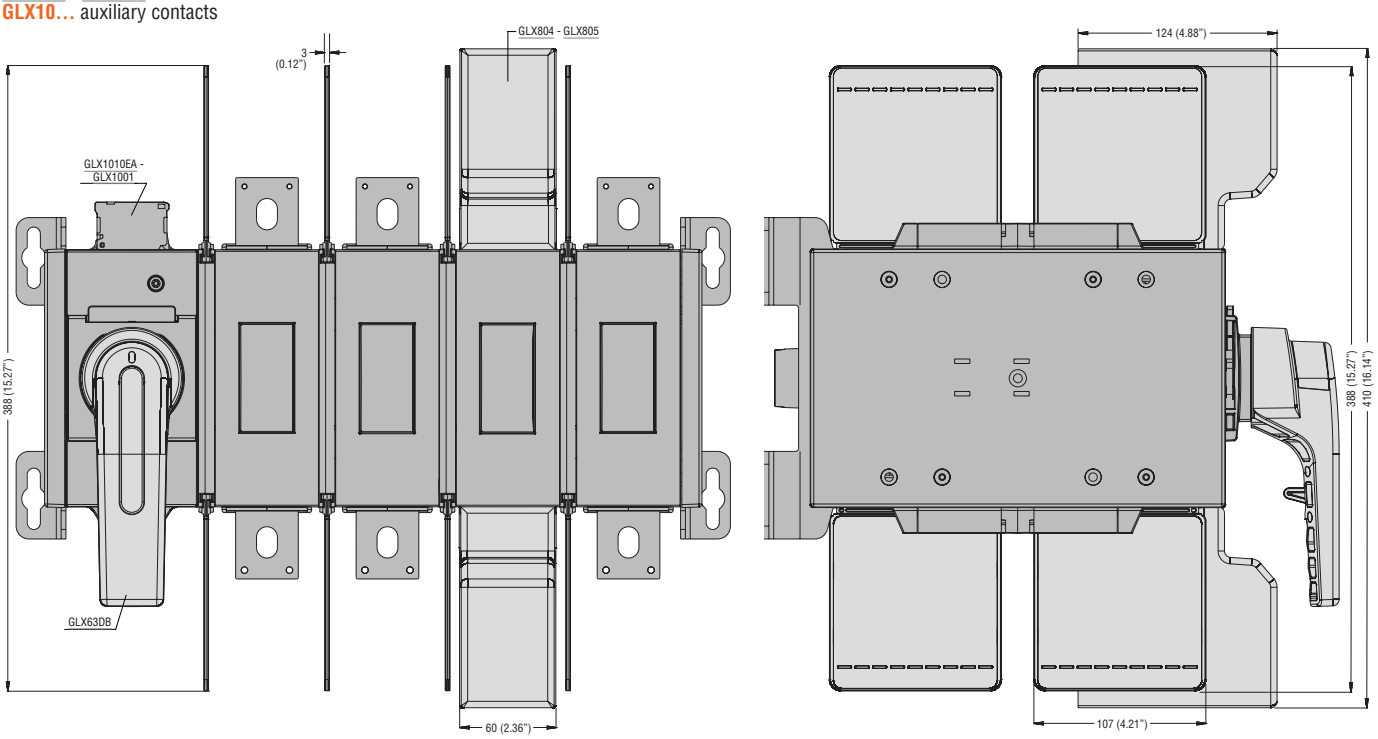
GLX63 - GLX63B - GLX63CB handles



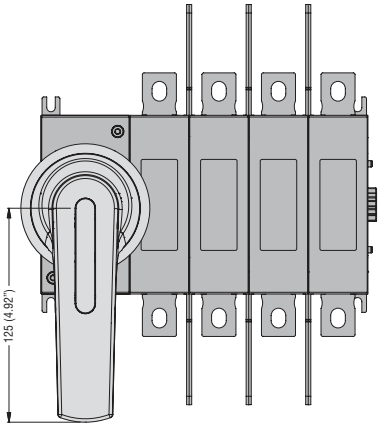
GLX802 - **GLX803** terminal covers
GLX902 - **GLX903** one-pole phase barrier
GLX10… auxiliary contacts

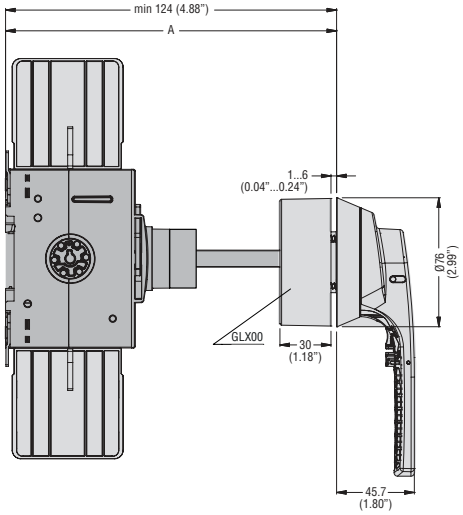


GLX804 - **GLX805** terminal covers
GLX904 - **GLX905** one-pole phase barrier
GLX10… auxiliary contacts

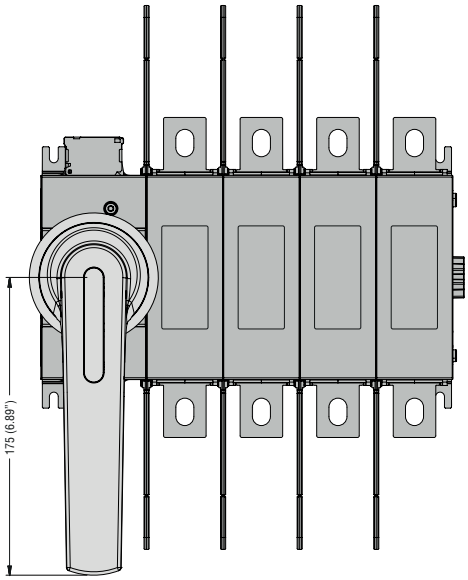


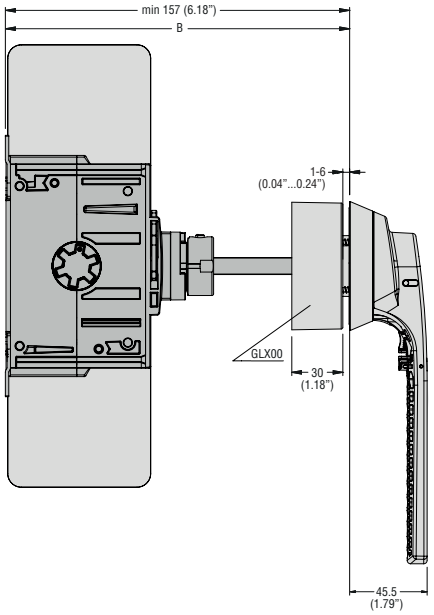
GLX7... shaft extensions for door coupling handles
GLX00 shaft alignment ring



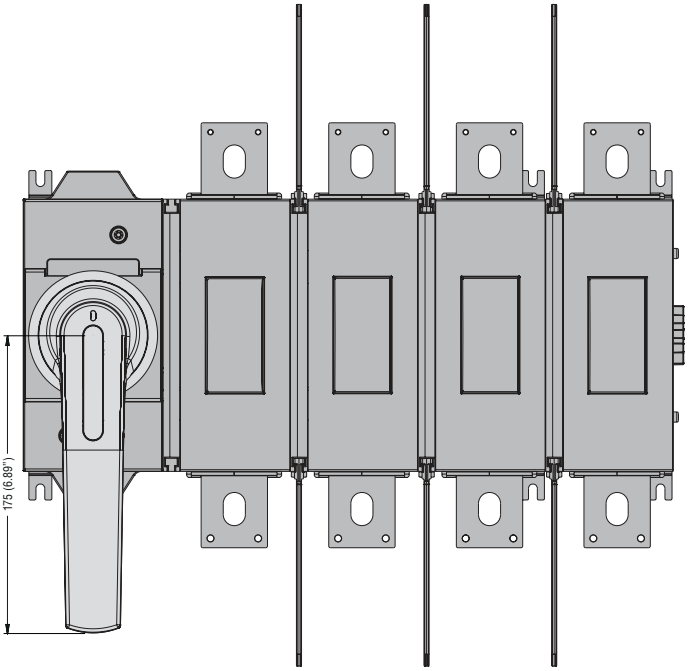


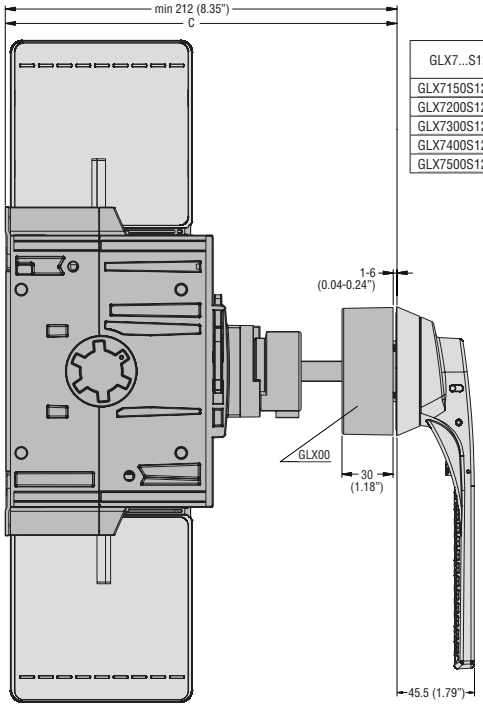
GLX7...S10	A mm (in)	
	min	max
GLX7150S10	124	194 (4.88...7.64")
GLX7200S10	124	244 (4.88...9.61")
GLX7300S10	124	344 (4.88...13.54")
GLX7400S10	124	444 (4.88...17.48")
GLX7500S10	124	544 (4.88...21.42")





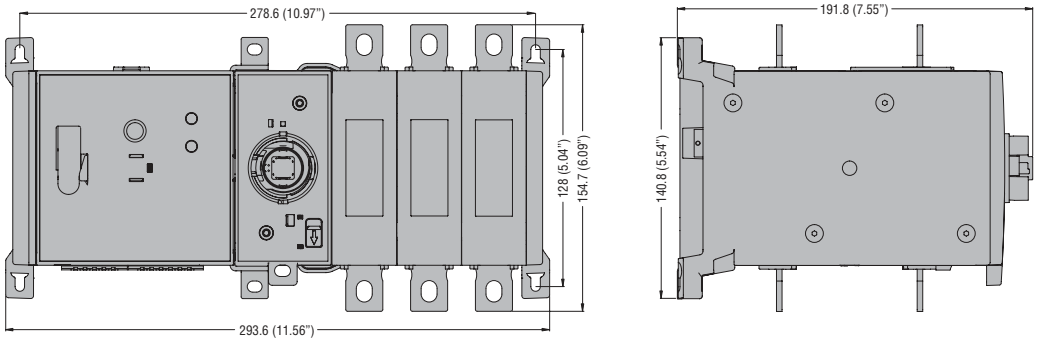
GLX7...S10	B mm (in)	
	min	max
GLX7150S10	157	227 (6.18...8.94")
GLX7200S10	157	277 (6.18...10.90")
GLX7300S10	157	377 (6.18...14.84")
GLX7400S10	157	477 (6.18...18.78")
GLX7500S10	157	577 (6.18...22.72")



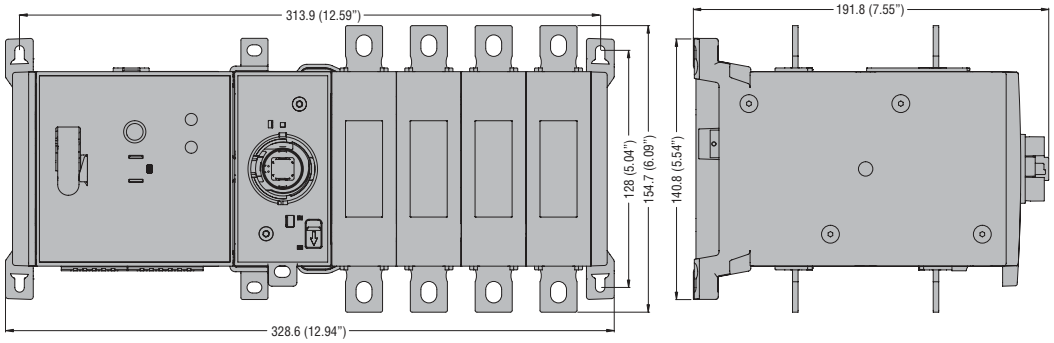


GLX7...S12	C mm (in)	
	min	max
GLX7150S12	212	232 (8.35...9.13")
GLX7200S12	212	282 (8.35...11.10")
GLX7300S12	212	382 (8.35...15.03")
GLX7400S12	212	482 (8.35...18.98")
GLX7500S12	212	582 (8.35...22.91")

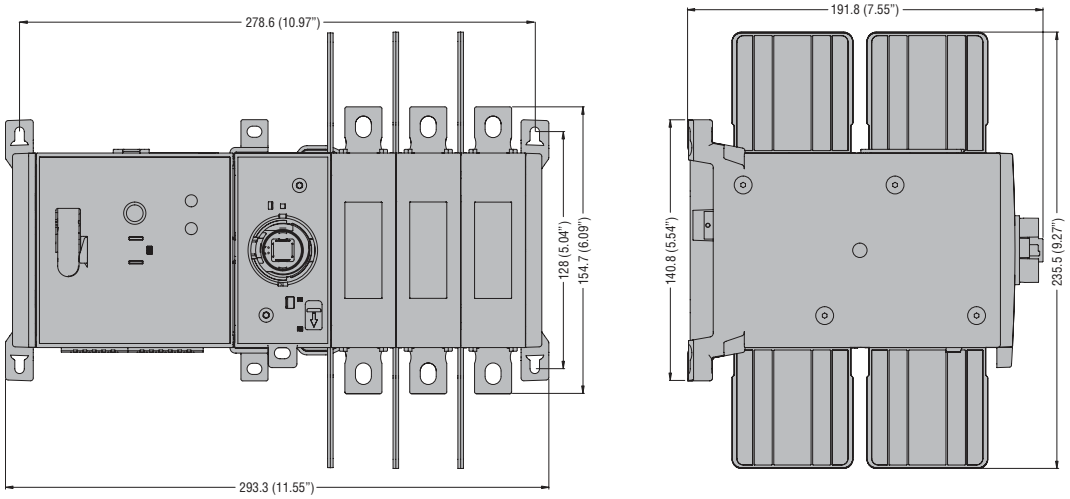
GLCMB0125...GLCMB0315...



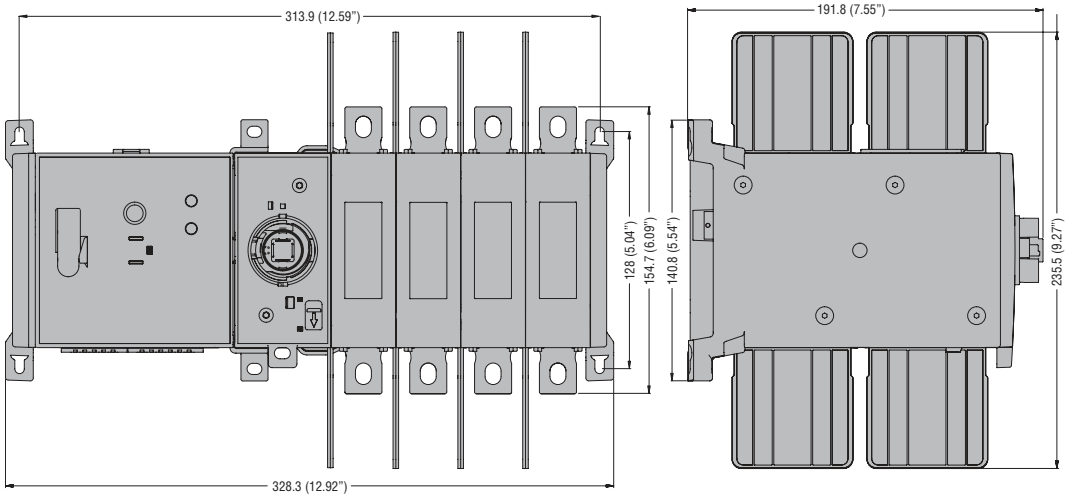
GLCMB0125T4...GLCMB0315T4...



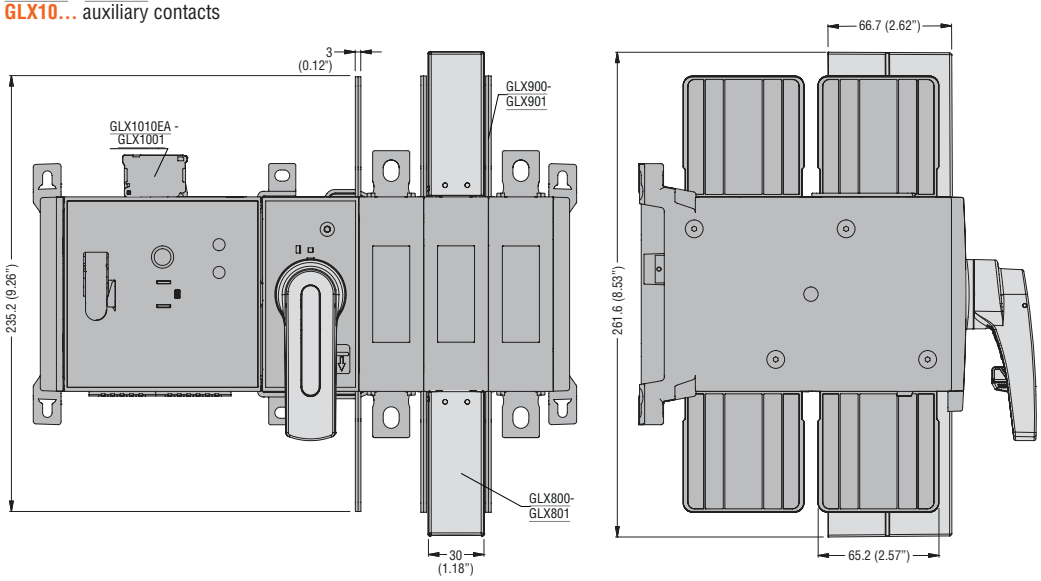
GLCMB0100...UL - GLCMB0200...UL



GLCMB0100T4...UL - GLCMB0200T4...UL

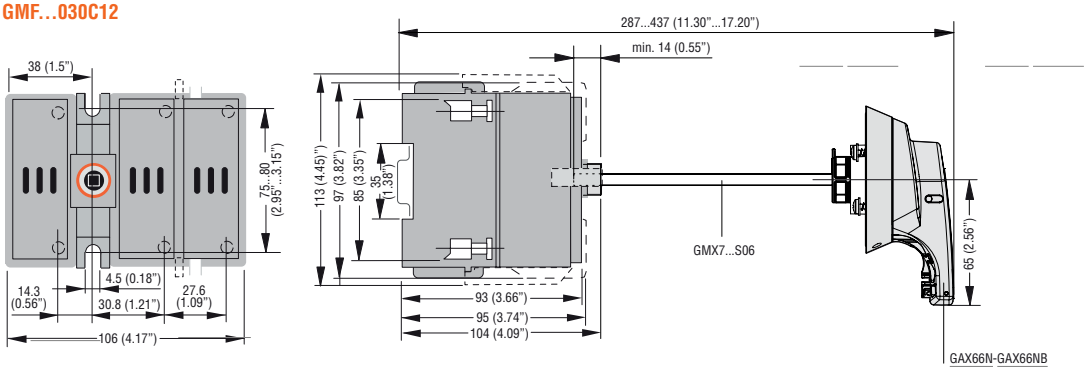


GLX800 - GLX801 terminal covers
GLX900 - GLX901 one-pole phase barrier
GLX10... auxiliary contacts

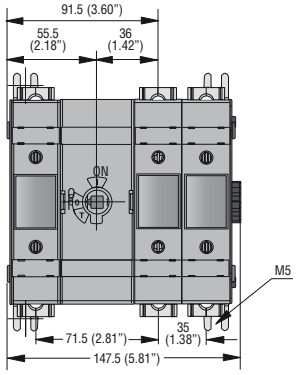


GM SERIES 30A TO 800A SWITCH DISCONNECTORS

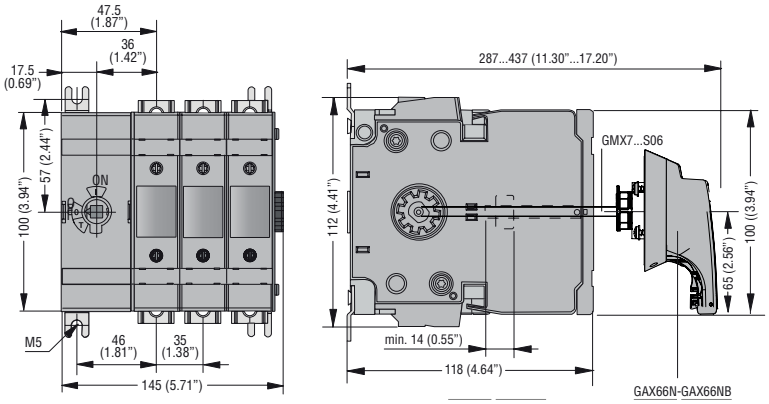
GMF...030C12



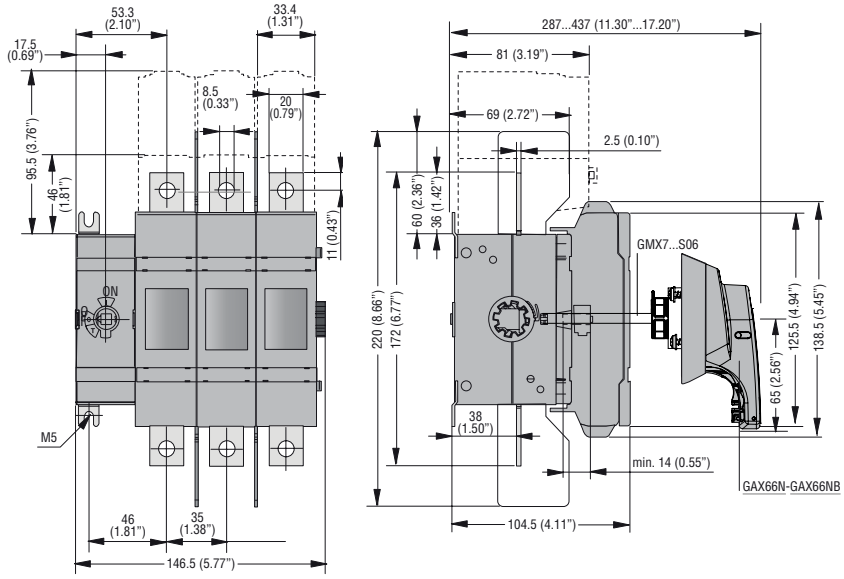
GMFJ060C12



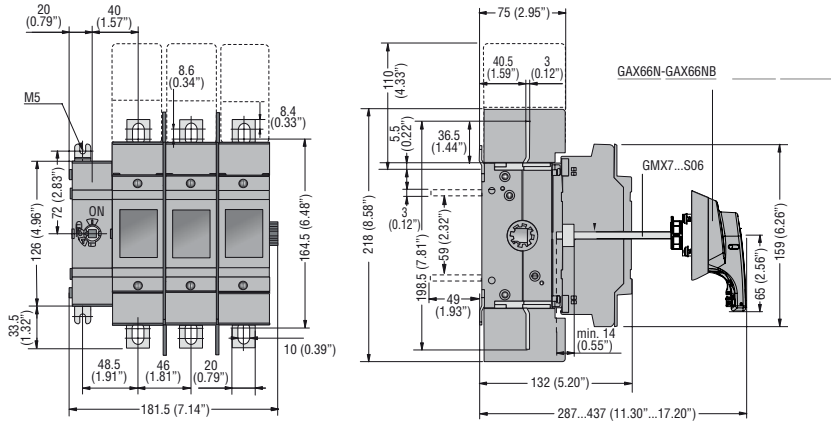
GMFJ060C03



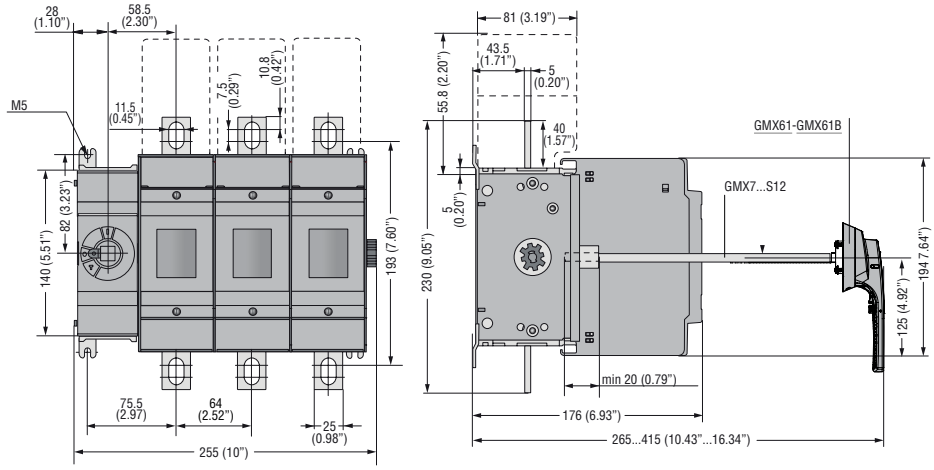
GMFJ100C03



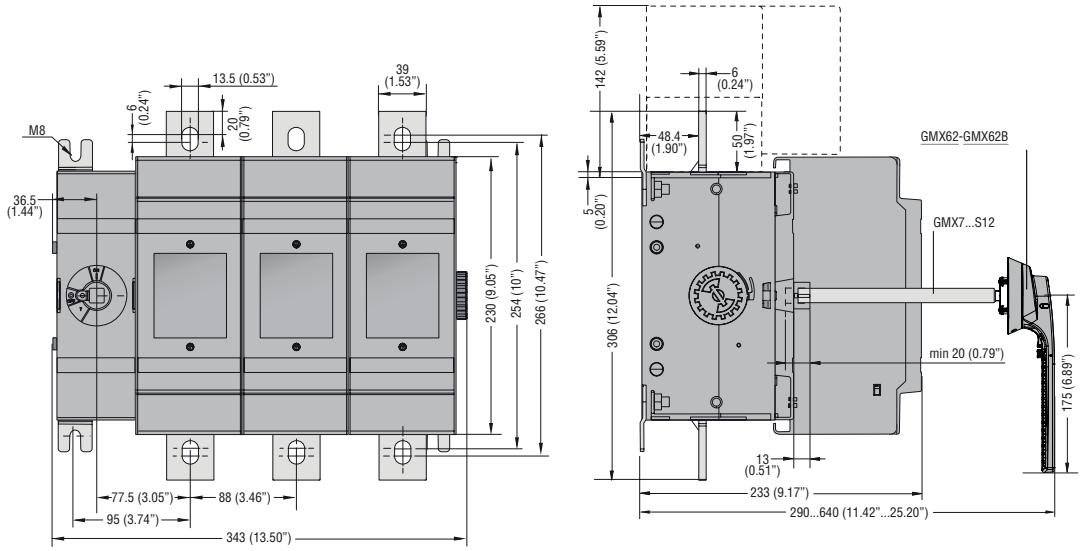
GMFJ200C03



GMFJ400C03



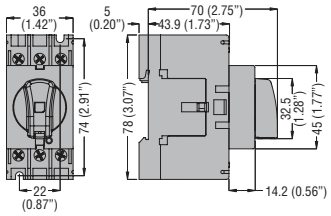
GMFJ600C03 - GMFL800C03



GA SERIES SWITCH DISCONNECTORS

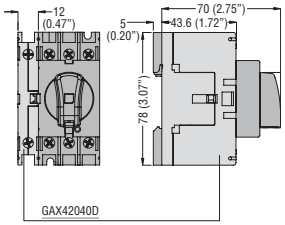
Direct operating version

GA040D



Fourth pole

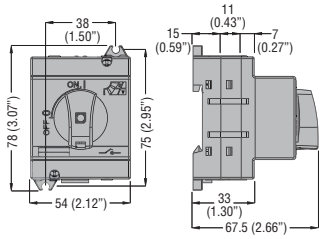
GAX42040D



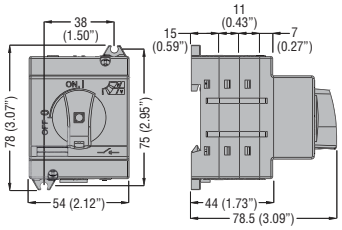
GD SERIES SWITCH DISCONNECTORS

Direct operating version

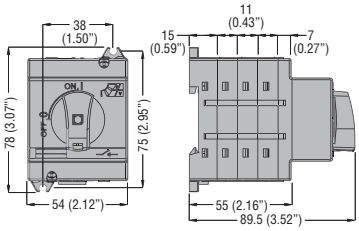
GD...AT2



GD...AT3



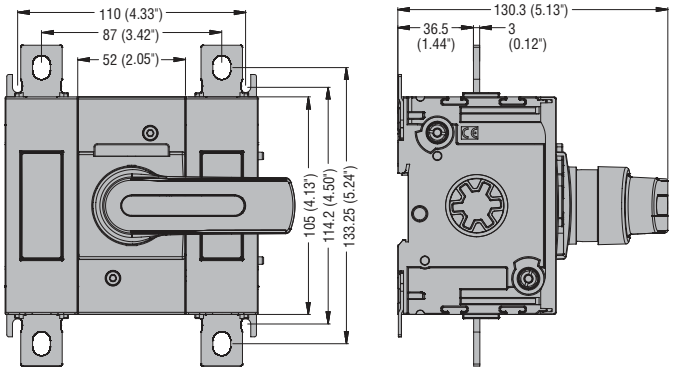
GD...AT4



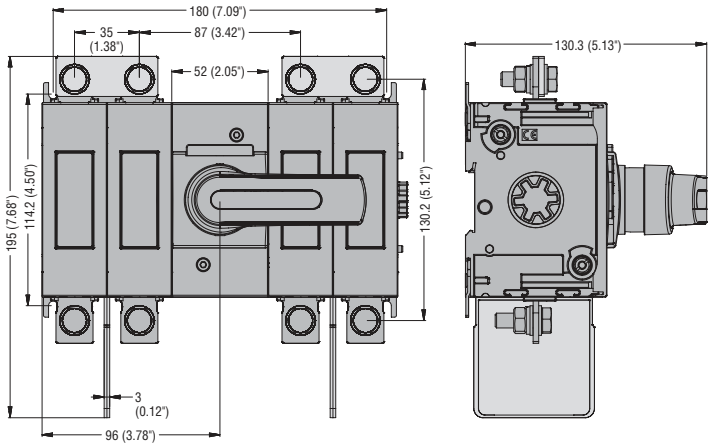
GLD SERIES SWITCH DISCONNECTORS

Direct operating version

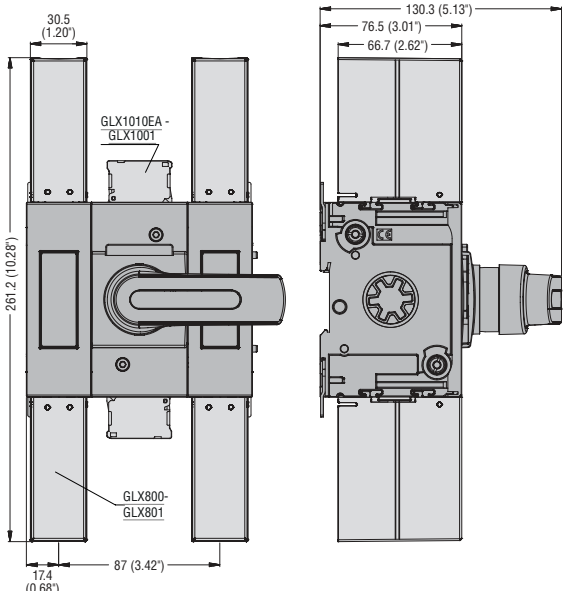
GLD...T2C3



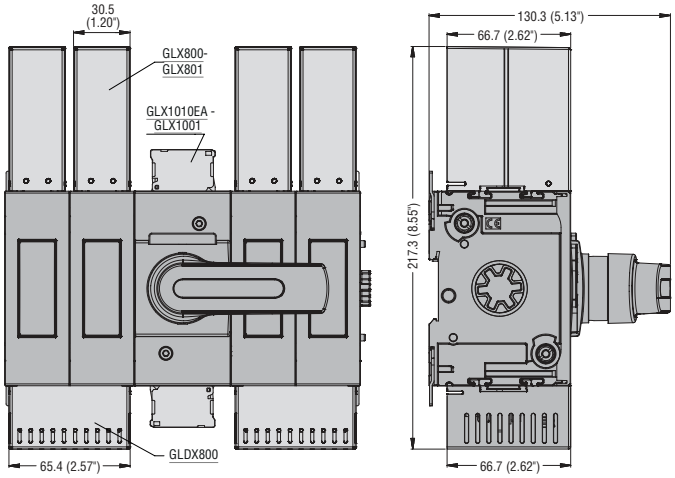
GLD...T4C3



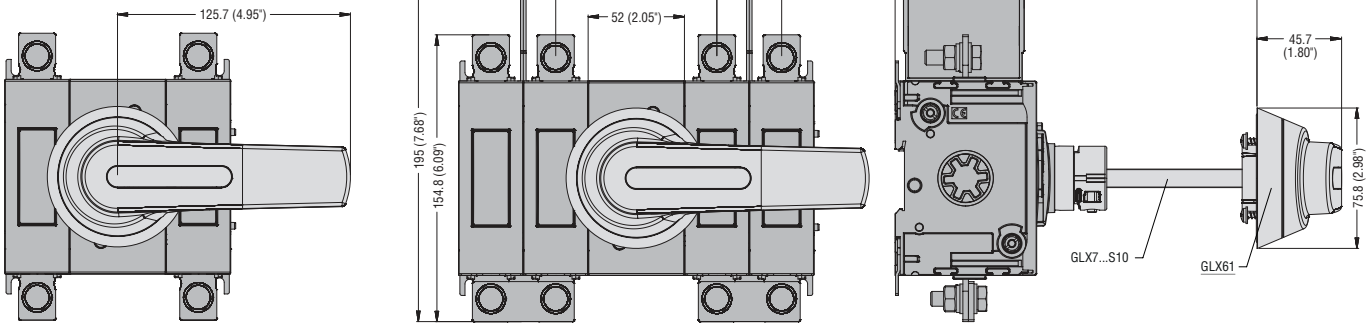
GLX10...GLX800 - GLX801



GLX10... - GLX800 - GLX801 - GLDX800

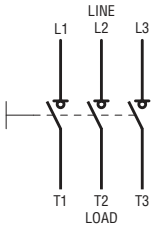


GLX7...S10 - GLX61



OPEN AND ENCLOSED GA SERIES 16A TO 160A SWITCH DISCONNECTORS

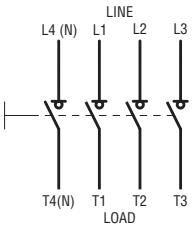
Three-pole disconnectors
GA016...GA160A.../C
GAZ016...GAZ160/B
GAZ016UL...GAZ125UL
GAZM016...GAZM160/B
GAZS016...GAZS100/B



Fourth pole
GAX42...

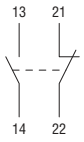
GAX41...

Four-pole disconnectors
GAZ016T4...GAZ160T4/B
GAZ016T4UL...GAZ125T4UL
GAZM016T4...GAZM160T4/B

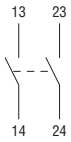


ADD-ON BLOCKS AND ACCESSORIES

Auxiliary contacts
GAX1011...



GAX1020

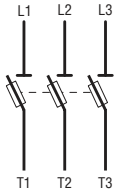


GAX11... - GAX12...

Neutral terminal
GAX31... - GAX32...

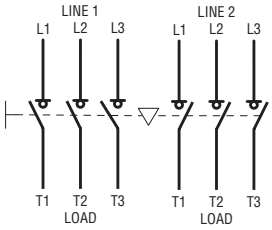
Earth/Ground terminal
GAX33... - GAX34...

Fuse holder
GAX391 - GAX391UL

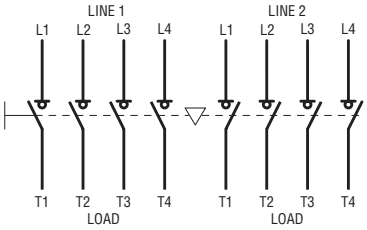


ENCLOSED AND ASSEMBLED MANUAL CHANGEOVER SWITCHES

Three-pole disconnectors GA...ET6

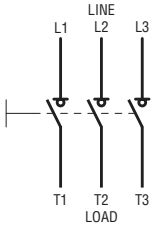


Four-pole disconnectors GA...ET8



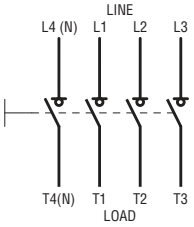
OPEN AND ENCLOSED GL SERIES 100 TO 1000A SWITCH DISCONNECTORS

Three-pole disconnectors
GL0100...GL1000...
GLZM0160...GLZM0315/B



Fourth pole
GLX42...

Four-pole disconnectors
GLZM0160T4...GLZM0315T4/B



ADD-ON BLOCKS AND ACCESSORIES

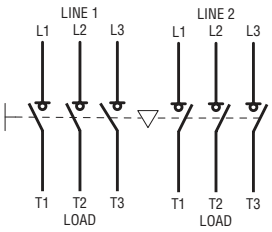
Auxiliary contacts
GLX1010EA GLX1001

Neutral terminal
GLX300 - GLX302 - GLX304 - GLX306

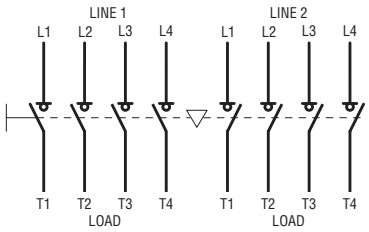
Earth/Ground terminal
GLX301 - GLX303 - GLX305 - GLX307

OPEN AND ENCLOSED GL SERIES 100 TO 1000A MANUAL CHANGEOVER SWITCHES

Three-pole
GLC...C1
GLZM...ET6

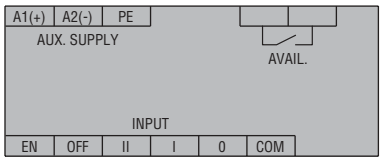


Four-pole
GLC...T4C1
GLZM...ET8



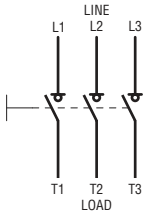
GL SERIES MOTORISED CHANGEOVER SWITCHES

Motorised control unit
GLCMB...

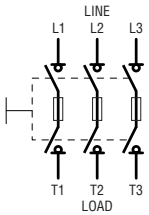


GE SERIES 50A TO 1600A SWITCH DISCONNECTORS

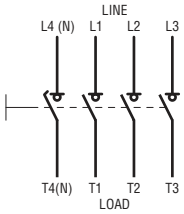
Three-pole
GE0160 - GE1600
GE0160P



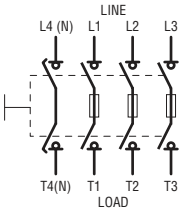
Three-pole with fuse holder
GEF0050F - GEF0125F
GEF0063N - GEF0250N
GE0400N - GE0800N



Four-pole
GE0160T4 - GE1600T4
GE0160T4P

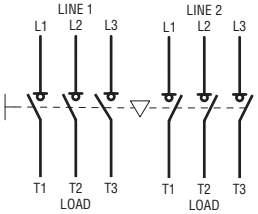


Four-pole with fuse holder
GEF0050FT4 - GEF0125FT4
GEF0063NT4 - GEF0250NT4
GE0400NT4 - GE0800NT4

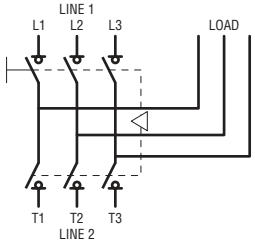


GE SERIES 160 TO 3150A CHANGEOVER SWITCHES

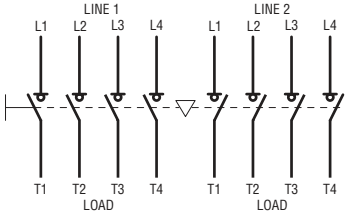
Three-pole
GE0160E - GE0200E - GE1600...3150E



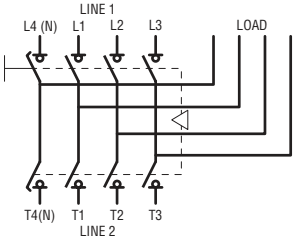
GE0201E...GE1250E



Four-pole
GE0160ET4 - GE0200ET4 - GE1600...3150ET4

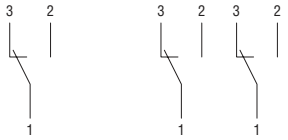


GE0201ET4...GE1250ET4

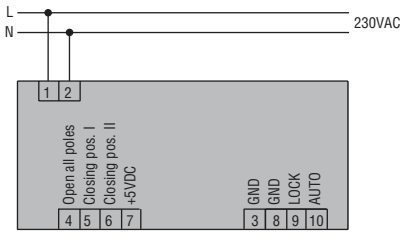


ADD-ON BLOCKS AND ACCESSORIES

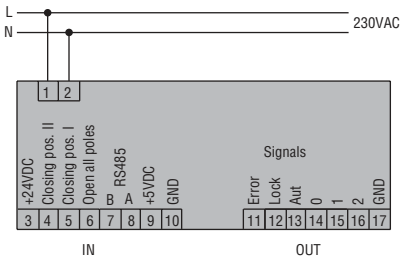
Auxiliary contacts
GEX1011... GEX1022...



Motorised control unit
GEX690C - GEX691C - GEX692C

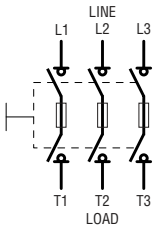


Motorised control unit
GEX693C - GEX694C - GEX695C



GM SERIES 30A TO 800A SWITCH DISCONNECTORS

GM...030...GM...800

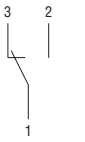


Auxiliary contacts

GMX1010

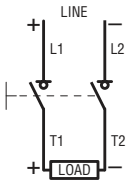
GMX1001

GMX1011

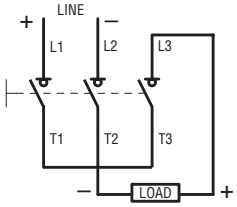


SWITCH DISCONNECTORS FOR PHOTOVOLTAIC APPLICATIONS **GA...D** (poles in series to wire)

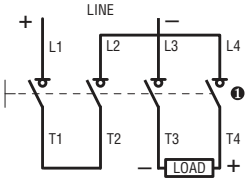
One-line control
2 poles in series



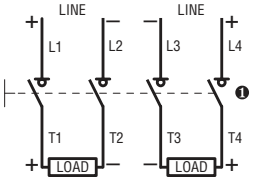
3 poles in series



4 poles in series



Two-lines control
2+2 poles in series

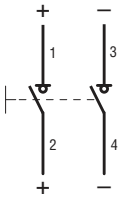


❶ The positive pole fitted on the right side of the disconnector can also be fitted on the left side; the connections must be changed in consequence.

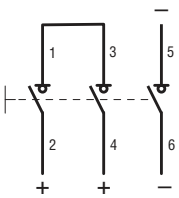
SWITCH DISCONNECTORS FOR PHOTOVOLTAIC APPLICATIONS **GD...**
(jumpers supplied as standard)

One-line control

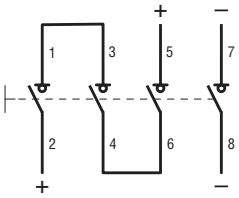
GD...AT2



GD...AT3

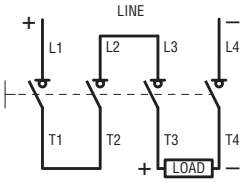


GD...AT4

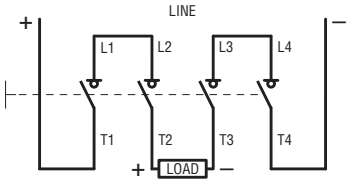


SWITCH DISCONNECTORS FOR PHOTOVOLTAIC APPLICATIONS **GE...DT4**
(poles in series to wire)

One-line control
4 poles in series

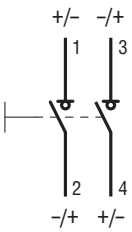


4 (2+2) poles in series

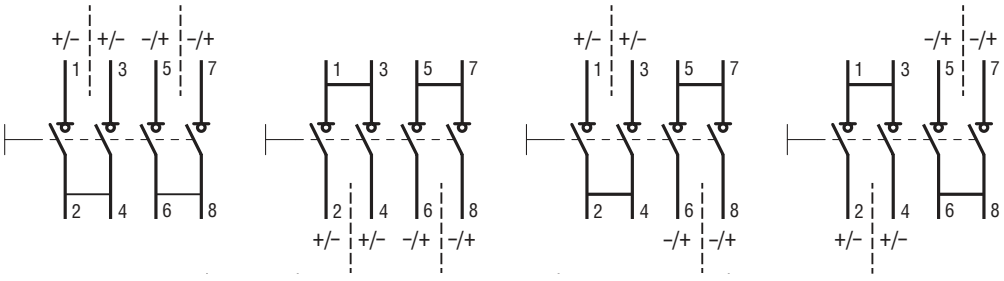


SWITCH DISCONNECTORS FOR PHOTOVOLTAIC APPLICATIONS **GLD...**

GLD...T2



GLD...T4



----- Phase barriers

——— Bridging bars

TECHNICAL DATA ACCORDING TO IEC/EN/BS 60947 RATINGS

TYPE	3-pole		GA016…	GA025…	GA032…	GA040…	GA063S…
	4-pole		GAX4…040…				GAX4…063S…
CONTACT CHARACTERISTICS							
IEC conventional free air thermal current Ith (≤40°C)		A	16	25	32	40	63
IEC rated insulation voltage Ui		V	1000				
IEC rated impulse withstand voltage Uimp		kV	8				
IEC rated operational current Ie							
AC21A	400V	A	16	25	32	40	63
	500V	A	16	25	32	40	63
	690V	A	16	25	32	40	63
AC22A	400V	A	16	25	32	40	45
	500V	A	16	25	32	40	45
	690V	A	16	25	32	40	45
AC23A	400V	A	16	25	32	40	45
	500V	A	16	25	25	25	25
	690V	A	16	25	25	25	25
Power dissipation		W/pole	0.2	0.4	0.6	1	2.9
IEC rated operational power AC23A							
	400V	kW	7.5	11	15	18.5	22
	690V	kW	11	22	22	22	22
IEC reactive power for control of capacitors 400V		kvar	7.5	10	12.5	15	15
SHORT CIRCUIT PROTECTION							
Conditional short-circuit current❶		kA rms	10				
With fuse class gG		A	16	25	32	40	63
Making capacity AC23A 400V		A	160	250	320	400	450
Breaking capacity AC23A 400V		A	128	200	256	320	360
Mechanical life		cycles	100,000				
Electrical life (AC21A)		cycles	100,000				15,000
Terminals		mm	Pillar terminal 5.6 x 6.5 - M4 Phillips 2				
Tightening torque		Nm	1.8...2				
		lb.in	16...18				
Conductor section min...max		mm^2	0.75...16				
		AWG	18...6				
AMBIENT CONDITIONS							
Temperature	Operating	°C	-25...+55				
	Storage	°C	-40...+70				
Maximum altitude		m	3000				
Mounting position	Normal		Vertical				
	Admissible		Any				
Fixing			Screw or 35mm DIN rail (IEC/EN 60715)				

❶ Ratings valid for three-pole switches. For more details contact our Technical support; see contact details on inside front cover.

TECHNICAL DATA ACCORDING TO UL/CSA RATINGS

TYPE			GA016…	GA025…	GA032…	GA040…	GA063SA
Compliance		A	UL60947-4-1; CSA C22.2 n°60947-4-1				
General purpose current ratings		A	16	25	32	40	60
Max operating voltage		V	600				
Horsepower ratings/ motor FLA current three-phase	240V	HP/A	5/15.2	7.5/22	10/28	15/42	15/42
	480V	HP/A	10/14	15/21	20/27	20/27	30/40
	600V	HP/A	10/11	20/22	20/22	25/27	32/32
Short circuit ratings		KA rms	5				
With fuse		class/A	RK5/30	RK5/30	RK5/35	RK5/45	RK5/45
Minimum enclosure dimensions at rated current		mm (in)	—				

❷ Up to 480V with protection fuses type CC, J or T (200A max).

	GA030…	GA063…	GA080…	GA100…	GA125…	GA160…
	GAX4…063…		GAX4…080…	GAX4…100…	GAX4…125…	GAX4…160…
	30	63	80	100	125	160
	1000					
	8					
	30	63	80	100	125	160
	30	63	80	100	125	160
	30	63	80	100	125	160
	30	63	80	100	125	125
	30	63	80	100	125	125
	30	63	80	100	125	125
	30	63	80	100	125	125
	30	63	63	80	100	100
	30	47	47	47	47	47
	0.4	1.6	2.6	4	6.3	12
	15	30	45	55	55	55
	30	45	45	45	45	45
	12.5	25	30	40	50	50
	50					
	63	63	80	100	125	160
	300	630	800	1000	1250	1250
	240	504	640	800	1000	1000
	30,000					
	30,000					1,500
	Pillar terminal 12.4 x 10.4 - M8 Metric Allen key 4					
	5...6					
	45...54					
	4...70					
	12...1					
	-25...+55					
	-40...+70					
	3000					
	Vertical					
	Any					
	Screw or 35mm DIN rail (IEC/EN 60715)					

	GA030…	GA063…	GA080…	GA100…	GA125…	—
	UL98; CSA C22.2 n°4					—
	30	60	100	100	100	—
	600					—
	10/28	20/54	25/68	30/80	30/80	—
	20/27	40/52	40/52	50/65	60/77	—
	30/32	40/41	40/41	50/52	60/62	—
	100❷					—
	J/60	J/60	J/100	J/100	J/100	—
	150 x 140 x 110 (5.90 x 5.51 x 4.33)					—

TECHNICAL DATA ACCORDING TO IEC/EN/BS 60947

TYPE		3-pole	GL0160...	GL0200...	GL0250...	GL0315...
		4-pole	GLX420315			
CONTACT CHARACTERISTICS						
IEC conventional free air thermal current Ith (≤40°C)		A	160	200	250	315
IEC rated insulation voltage Ui		V	1000			
IEC rated impulse withstand Uimp		kV	12			
IEC rated operational current Ie		A	160	200	250	315
AC21A	400V					
	500V	A	160	200	250	315
	690V	A	160	200	250	315
AC22A	400V	A	160	200	250	315
	500V	A	160	200	250	315
	690V	A	160	200	250	315
AC23A	400V	A	160	200	250	315
	500V	A	160	200	250	250
	690V	A	160	200	250	250
Power dissipation		W/pole	3.2	4	6.5	6.5
IEC rated operational power		kW	90	110	140	140
AC23A	400V					
	690V	kW	144	200	250	250
IEC reactive power for control of capacitors 400V		kvar	80	100	115	145
SHORT CIRCUIT PROTECTION						
Rated short-time current Icw	(1s)	A	6			
	(0.3s)	A	12			
Conditional short-circuit current		kA rms	100			
With fuse class gG		A	160	200	250	315
Making capacity AC23A 400V		A	1600	2000	2500	2500
Breaking capacity AC23A 400V		A	1280	1600	2000	2000
Mechanical life		cycles	20,000			
Terminal for busbars		mm	M8 x 20			
Tightening torque		Nm	15...22			
		lb.in	132...194			
Conductor section min...max		mm^2	70...185			
		AWG/ Kcmil	00...400			
AMBIENT CONDITIONS						
Temperature	Operating	°C	-25...+55			
	Storage	°C	-40...+70			
Maximum altitude		m	3000			
Mounting position	Normal		Vertical			
	Admissible		Any			
Fixing			By screw. For GL0160...315 also on 35mm DIN rail (IEC/EN 60715)			

❶ For more details contact our Technical support; see contact details on inside front cover.

TECHNICAL DATA ACCORDING TO UL/CSA RATINGS

TYPE		3-pole	GL0100C1UL	GL0200C1UL	—	—
		4-pole	GLX420100UL	GLX420200UL	—	—
Compliance			UL98 CSA C22.2 N°4	UL98 CSA C22.2 N°4	—	—
General purpose current ratings		A	100	200	—	—
Maximum operating voltage		V	600	600	—	—
Horsepower ratings /motor FLA current three-phase		HP/A	30/80	75/192	—	—
	240V					
	480V	HP/A	75/96	150/180	—	—
	600V	HP/A	100/99	200/192	—	—
Short circuit rating		KA rms	200	200	—	—
With fuse		class/A	J/100	J/200	—	—
Terminal kit lugs			GLX500-GLX501	GLX500-GLX501	—	—
Minimum enclosure dimensions at rated current		mm (in)	400 x 250 x 150 (15.8 x 9.9 x 5.9)	400 x 250 x 150 (15.8 x 9.9 x 5.9)	—	—

	GL0320...	GL0400...	GL0500...	GL0630...	GL0631...	GL0800...	GL1000...
	GLX420320	GLX420400	GLX420500	GLX420630	GLX420631	GLX420800	GLX421000
	320	400	500	630	630	800	1000
	1000				1000		
	12				12		
	320	400	500	630	630	800	1000
	320	400	500	630	630	800	1000
	320	400	500	630	630	800	1000
	320	400	500	630	630	800	1000
	320	400	500	50	630	800	1000
	320	400	500	500	630	800	800
	320	400	500	630	630	800	1000
	320	400	500	500	630	800	1000
	320	400	500	500	630	800	800
	20.8	26.0	32.5	41.0	25	40	63
	160	200	250	355	355	400	560
	315	400	500	50	630	800	800
	145	180	200	250	—	—	—
	12.5				20		
	20				–		
	80				80		50
	355	400	500	630	630	800	1000
	3200	4000	5000	6300	6300	8000	10000
	2560	3200	4000	5040	5040	6400	8000
	10,000				5,000		
	M10 x 25				M12 x 40		
	30...37				50...75		
	265...327				442...664		
	1 x 185...2 x 185❶				2 X 185... 4 X 300		
	1 x 400...2 x 350				2 X 350... 4 X 600		
	-25...+55						
	-40...+70						
	3000						
	Vertical						
	Any						
	By screw						
	—	GL0400C1UL	—	—	GL0600C1UL	GL0800C1UL	—
	—	GLX420400UL	—	—	GLX420600UL	GLX420800UL	—
	—	UL98 CSA C22.2 N°4	—	—	UL98 CSA C22.2 N°4		—
	—	400	—	—	600	800	—
	—	600	—	—	600		—
	—	125/312	—	—	200/480	250/604	—
	—	250/302	—	—	450/515	500/590	—
	—	350/336	—	—	500/472	500/600	—
	—	100	—	—	100		—
	—	J/400	—	—	J/600	L/800	—
	—	GLX502-GLX503	—	—	GLX506-GLX507		—
	—	950 x 350 x 200 (37.4 x 13.8 x 7.9)	—	—	750 x 600 x 250 (29.5 X 23.6 X 9.8)	1000 x 1200 x 300 (39.4 X 47.2 X 11.8)	—

TECHNICAL DATA ACCORDING TO IEC/EN/BS 60947

TYPE		3-pole	GLC0160…	GLC0200…	GLC0250…	GLC0315…	
		4-pole	GLC0160T4…	GLC0200T4…	GLC0250T4…	GLC0315T4…	
CONTACT CHARACTERISTICS							
IEC conventional free air thermal current Ith (≤40°C)		A	160	200	250	315	
IEC rated insulation voltage Ui		V	1000				
IEC rated impulse withstand Uimp		kV	12				
IEC rated operational current Ie							
AC31B	400V	A	160	200	250	315	
	500V	A	160	200	250	315	
	690V	A	160	200	250	315	
AC32B	400V	A	160	200	250	315	
	500V	A	160	200	250	315	
	690V	A	160	200	250	315	
AC33B	400V	A	160	200	250	315	
	500V	A	160	200	250	250	
	690V	A	160	200	250	250	
Power dissipation		W/pole	3.2	4	6.5	6.5	
IEC rated operational power							
AC23A	400V	kW	90	110	140	140	
	690V	kW	144	200	250	250	
SHORT CIRCUIT PROTECTION							
Rated short-time current Icw	(1s)	kA rms	6				
	(0.3s)	kA rms	12				
Conditional short-circuit current		kA rms	100				
With fuse class gG		A	160	200	250	315	
Making capacity AC23A 400V		A	1600	2000	2500	2500	
Breaking capacity AC23A 400V		A	1280	1600	2000	2000	
Mechanical life		cycles	20,000				
Terminal for busbars		mm	M8 x 20				
Tightening torque		Nm	15...22				
		lb.in	132...194				
Conductor section min...max		mm^2	70...185				
		AWG/ Kcmil	00...400				
AMBIENT CONDITIONS							
Temperature	Operating	°C	-25...+55				
	Storage	°C	-40...+70				
Maximum altitude		m	3000				
Mounting position	Normal		Vertical				
	Admissible		Any				
Fixing			By screw				

❶ For more details contact our Technical support; see contact details on inside front cover.

TECHNICAL DATA ACCORDING TO UL/CSA RATINGS

TYPE		GLC0100…UL	GLC0200…UL	—	—
Compliance	A	UL1008 CSA C22.2 N°4	UL1008 CSA C22.2 N°4	—	—
General purpose current ratings	A	100	200	—	—
Maximum operating voltage	V	600	600	—	—
Horsepower ratings /motor FLA current three-phase					
240V	HP/A	30/80	75/192	—	—
480V	HP/A	75/96	150/180	—	—
600V	HP/A	100/99	200/192	—	—
Short circuit ratings	KA rms	100	100	—	—
With fuse	class/A	J/100	J/200	—	—
Terminal kit lugs		GLX500-GLX501	GLX500-GLX501	—	—
Minimum enclosure dimensions at rated current	mm (in)	400 x 250 x 150 (15.8 x 9.9 x 5.9)	400 x 250 x 150 (15.8 x 9.9 x 5.9)	—	—

	GLC0320...	GLC0400...	GLC0500...	GLC0630...	GLC0631...	GLC0800...	GLC1000...
	GLC0320T4...	GLC0400T4...	GLC0500T4...	GLC0630T4...	GLC0631T4...	GLC0800T4...	GLC1000T4...
	320	400	500	630	630	800	1000
	1000				1000		
	12				12		
	320	400	500	630	630	800	1000
	320	400	500	630	630	800	1000
	320	400	500	630	630	800	1000
	320	400	500	630	630	800	1000
	320	400	500	500	630	800	1000
	320	400	500	500	630	800	800
	320	400	500	630	630	800	1000
	320	400	500	500	630	800	1000
	320	400	500	500	630	800	800
	20.8	26.0	32.5	41.0	25	40	63
	160	200	250	355	355	400	560
	315	400	500	500	630	800	800
	12.5				20		
	20				–		
	80				80		
	355	400	500	630	630	800	1000
	3200	4000	5000	6300	6300	8000	10000
	2560	3200	4000	5040	5040	6400	8000
	10,000				5,000		
	M10 x 25				M12 x 40		
	30...37				50...75		
	265...327				442...664		
	1 x 185...2 x 185❶				2 X 185... 4 X 300		
	1 x 400...2 x 350				2 X 350... 4 X 600		
	-25...+55						
	-40...+70						
	3000						
	Vertical						
	Any						
	By screw						
	—	**GLC0400...UL**	—	—	—	—	—
	—	UL1008 CSA C22.2 N°4	—	—	—	—	—
	—	400	—	—	—	—	—
	—	600	—	—	—	—	—
	—	125/312	—	—	—	—	—
	—	250/302	—	—	—	—	—
	—	350/336	—	—	—	—	—
	—	100	—	—	—	—	—
	—	J/400	—	—	—	—	—
	—	GLX502-GLX503	—	—	—	—	—
	—	950 x 350 x 260 (37.4 x 13.8 x 10.3)	—	—	—	—	—

TECHNICAL DATA ACCORDING TO IEC/EN/BS 60947

TYPE		3-pole	GLCMB0125...	GLCMB0160...	GLCMB0200...	GLCMB0250...	GLCMB0315...
		4-pole	GLCMB0125T4...	GLCMB0160T4...	GLCMB0200T4...	GLCMB0250T4...	GLCMB0315T4...
CONTACT CHARACTERISTICS							
IEC conventional free air thermal current Ith (≤40°C)		A	125	160	200	250	315
IEC rated insulation voltage Ui		V	1000				
IEC rated impulse voltage withstand Uimp		kV	12				
IEC rated operational current Ie							
AC31B	400V	A	125	160	200	250	315
	500V	A	125	160	200	250	315
	690V	A	125	160	200	250	315
AC32B	400V	A	125	160	200	250	315
	500V	A	125	160	200	250	315
	690V	A	125	160	200	250	315
AC33B	400V	A	125	160	200	250	315
	500V	A	125	160	200	250	250
	690V	A	125	160	200	250	250
Power dissipation		W/pole	1.8	3.2	4	6.5	6.5
IEC rated operational power							
AC23A	400V	kW	55	90	110	140	140
	690V	kW	110	144	200	250	250
SHORT CIRCUIT PROTECTION							
Rated short-time current Icw	(1s)	kA rms	6				
	(0.3s)	kA rms	12				
Conditional short-circuit current		kA rms	100				
With fuse class gG		A	125	160	200	250	315
Making capacity AC23A 400V		A	1250	1600	2000	2500	2500
Breaking capacity AC23A 400V		A	1000	1280	1600	2000	2000
Mechanical life		cycles	20,000				
Terminals		mm	M8 x 20				
Tightening torque		Nm	15...22				
		lb.in	132...194				
Conductor section min...max		mm^2	70...185				
		AWG/ Kcmil	00...400				
AMBIENT CONDITIONS							
Temperature	Operating	°C	-25...+55				
	Storage	°C	-40...+70				
Maximum altitude		m	3000				
Mounting position	Normal		Vertical				
	Admissible		Any				
Fixing			Screw				

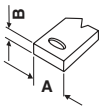
MOTOR CHARACTERISTICS ❶

TYPE		GLCMB…D024	GLCMB…E110	GLCMB…A230
Rated auxiliary supply voltage	V	24VDC	110...125VAC/DC	208...277VAC
Operating voltage range	V	19.2...31.2VDC	77...165VAC/DC	166...332VAC
Transition time I-0, 0-I	ms	720...1080		
Transition time II-0, 0-II	ms	720...1080		
Transition time I-0-II, II-0-I	s	1.2...1.8	1.6...2.4	1.2...1.8
Rated current In	A	2.7...3.3	0.72...0.88	0.36...0.44
In-rush current	A	5.4...6.6	1.8...2.2	0.9...1.1

❶ For more details contact our Technical support; see contact details on inside front cover.

TECHNICAL DATA ACCORDING TO UL/CSA RATINGS

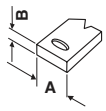
TYPE		GLCMB0100…UL	GLCMB0200…UL
Compliance	A	UL1008 CSA C22.2 N°4	UL1008 CSA C22.2 N°4
General purpose current ratings	A	100	200
Maximum operating voltage	V	600	600
Horsepower ratings /motor FLA current three-phase			
240V	HP/A	30/80	75/192
480V	HP/A	75/96	150/180
600V	HP/A	100/99	200/192
Short circuit ratings	KA rms	100	100
With fuse	class/A	J/100	J/200
Terminal kit lugs		GLX500-GLX501	GLX500-GLX501
Minimum enclosure dimensions at rated current	mm (in)	400 x 250 x 150 (15.8 x 9.9 x 5.9)	400 x 250 x 150 (15.8 x 9.9 x 5.9)

TYPE		3-pole	GE0160P GE0160	GE0200	GE0250	GE0251	GE0315	GE0400
		4-pole❺	GE0160T4P GE0160T4	GE0200T4	GE0250T4	GE0251T4	GE0315T4	GE0400T4
CONTACTS CHARACTERISTICS								
IEC conventional free air thermal current Ith (≤40°C)		A	160	200	250	250	315	400
IEC rated insulation voltage Ui		V	1000					
IEC rated impulse withstand Uimp		kV	8					
IEC rated operational current Ie								
AC21A	400V	A	160	200	250	250	315	400
	500V	A	160	200	200	250	315	400
	690V	A	160	180	180	200	250	250
AC22A	400V	A	160	200	250 (AC22B) 200 (AC22A)	250	315	400
	500V	A	160	200	200	250	315	400
	690V	A	125	160	160	160	200	200
AC23A	400V	A	160	160	160	250	315	400
	500V	A	125	125	125	200	250	315
	690V	A	80	80	80	160	160	160
Power dissipation		W/pole	4	6	9	2.5	6.5	10.5
IEC reactive power for control of capacitors 400V senφ=0.65		kvar	72	72	72	112	142	180
IEC rated operational power								
AC23A	400V	kW	90	90	90	138	174	220
	690V	kW	75	75	75	153	153	153
Short circuit protection								
Rated short-time current (1s) Icw		kA rms	7			12		
Conditional short-circuit current❶		kA rms	100					
With fuse class gG		A	160	200	250		315	400
Making capacity AC23A 400V		A	1600			2500	3150	4000
Breaking capacity AC23A 400V		A	1280			2000	2520	3200
Mechanical life		cycles	30,000			20,000		
Electrical life (AC23A 400V)		cycles	1,000					
Terminals 		type	Lug terminal ❸ or bars					
		A mm	18	26		25		
		B mm	3			4		
		screw	M8	M10				
Tightening torque		Nm	13❹	18			24	
		lb.in	88❹	150			212	
Max. conductor section		mm^2	95	120		185		
Max. bar size (thickness-width)		mm	5-25❷	5-30		7-25		
AMBIENT CONDITIONS								
Temperature	Operating	°C	-25...+55					
	Storage	°C	-40...+70					
Maximum altitude		m	3000					
Mounting position	Normal		Vertical					
	Admissible		Any					
Fixing			Screw					

❶ With protection fuse limiting peak current and specific through energy.
❷ Not suitable for types GE0160P and GE0160T4P.
❸ Types GE...P have hex terminals IP20.
❹ 4Nm/35lb.in only for types GE...P.
❺ The 4-pole types (3P+N) have early-make late-break neutral pole.

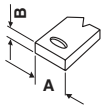
	GE0500 GE0500T4	GE0630 GE0630T4	GE0800 GE0800T4	GE1000 GE1000T4	GE1250 GE1250T4	GE1600 GE1600T4
	500	630	800	1000	1250	1600
	1000					
	12					
	500	630	800	1000	1250	1600
	500	630	800	1000	1250	1600
	500	630	800	1000	1000	1600
	500	630	800	1000	1250	1600
	500	630	800	1000	1000	1250
	400	500	500	630	630	1000
	500	630	800	1000	1000	1000
	400	500	500	800	800	900
	250	315	315	500	500	630
	22	35	56	50	78	128
	225	284	284	360	360	450
	220	349	443	443	443	554
	239	300	300	478	478	600
	16			25		50
	100			72		75
	500	630	800	1000	1250	2 x 800
	5000	6300		8000		10000
	4000	5000		6400		8000
	10,000					
	1,000		500			
	Lug terminal ❸ or bars					
	25	30		40		60
	5			8		10
	M10			M14		M14
	24			45		55
	212			292		487
	2 x 185	2 x 240	2 x 240	2 x 300		—
	6-40	2 x 5-40	2 x 5-50	2 x 10-50		2 x 10-80

	-25...+55
	-40...+70
	3000
	Vertical
	Any
	Screw

TYPE	NFC	3-pole	**GEF0050F**	—	**GEF0100F**	**GEF0125F**	—	—	
		4-pole	**GEF0050FT4**	—	**GEF0100FT4**	**GEF0125FT4**	—	—	
	NH	3-pole	—	**GEF0063N**	**GEF0100N**	**GEF0125N**	**GEF0160N**	**GEF0250N**	
		4-pole	—	**GEF0063NT4**	**GEF0100NT4**	**GEF0125N4**	**GEF0160NT4**	**GEF0250NT4**	
CONTACT CHARACTERISTICS									
IEC conventional free air thermal current Ith (≤40°C)		A	50	63	100	125	160	250	
IEC rated insulation voltage Ui			1000						
IEC rated impulse withstand Uimp			8					12	
IEC rated operational current Ie									
AC21A	400V	A	50	63	100	125	160	250	
	500V	A	50	63	100	125	160	250	
	690V	A	—						
AC22A	400V	A	50	63	100	125	160	250	
	500V	A	50	63	80	125	125	250	
	690V	A	—						
AC23A	400V	A	50	63	100	125	160 ❶	250	
	500V	A	50	50	63	125	125	200	
	690V	A	—						
Power dissipation	NFC	W/pole	4.8	—	9	11.4	—		
	NH	W/pole	—	5.8	6.6	9	11.2	17	
Conditional short circuit current		kA rms	100						
Making capacity AC23A 400V		A	500	630	800	1250	1600	2500	
Breaking capacity AC23A 400V		A	400	504	640	1000	1280	2000	
Mechanical life		cycles	10,000			8,000			
Electrical life (AC23A 400V)		cycles	—						
Terminals 		type	Hex terminals			Lug terminal or bars			
		A mm	—			25		30	
		B mm	—			3		7	
		screw	—			M8		M10	
Tightening torque		Nm	2			6		18	
		lb.in	17.7			53		159	
Max. conductor section		mm²	25		50	70		185	
Max. bar size (thickness-width)		mm	—			3-25		7-30	
AMBIENT CONDITIONS									
Temperature	Operating	°C	-25...+55						
	Storage	°C	-40...+70						
Maximum altitude		m	3000						
Mounting position									
	Normal		Vertical						
	Admissible		Any						
Fixing			Screw						

❶ Value in AC23B.

	—	—	—
	—	—	—
	GE0400N	**GE0630N**	**GE0800N**
	GE0400NT4	**GE0630NT4**	**GE0800NT4**
	400	630	800
	1000		
	12		
	400	630	800
	400	630	800
	400	630	630
	400	630	800
	400	630	800
	400	630	630
	400	630	630
	400	630	630
	315	400	400
	—		
	30	48	57
	100		
	4000	6300	
	3200	5100	
	10,000	5,000	
	1,000		500
	Lug terminal or bars		
	35	40	50
	5	6	
	M10	M12	4 x M8
	24	45	13
	212	398	115
	240	2 x 185	2 x 240
	6-40	2 x 7-50	2 x 7-50
	-25...+55		
	-40...+70		
	3000		
	Vertical		
	Any		
	Screw		

TYPE		3-pole	GE0160E	GE0200E	GE0201E	GE0250E	GE0315E	GE0400E
		4-pole❷	GE0160ET4	GE0200ET4	GE0201ET4	GE0250ET4	GE0315ET4	GE0400ET4
CONTACT CHARACTERISTICS								
IEC conventional free air thermal current Ith (≤40°C)		A	160	200		250	315	400
IEC rated insulation voltage Ui		V	1000					
IEC rated impulse withstand Uimp		kV	8					
IEC rated operational current Ie								
AC21A	400V	A	160	200	200	250	315	400
	500V	A	160	200	200	250	315	400
	690V	A	160	200	200	250	315	400
AC22A	400V	A	160	200	200	250	315	400
	500V	A	160	200	200	250	315	400
	690V	A	125	160	160	200	250	315❸
AC23A	400V	A	160	160	160	180	200	250
	500V	A	125	125	125	150	160	200
	690V	A	80	80	80	100	125	160
Power dissipation		W/pole	4	6	8	8.5	13.5	22
IEC reactive power for control of capacitors 400V		kvar	72	72	83	104	131	166
IEC rated operational power								
AC23A	400V	kW	89	89	100	100	125	125
	690V	kW	76	76	69	86	108	138
Short circuit protection								
Rated short-time current (1s) Icw		kA rms	7	7	8			
Conditional short-circuit current ❶		kA rms	100	100	100			
With fuse class gG		A	160	200	250		315	400
Making capacity AC23A 400V		A	1600	1600	3150		4000	
Breaking capacity AC23A 400V		A	1280	1280	2520		3200	
Mechanical life		cycles	30,000	30,000	10,000			
Electrical life (AC22A 400V)		cycles	1,000	1,000	1,000			
Terminals 		type	Lug terminal or bars					
		A mm	18	26	25			35
		B mm	3	3				
		screw	M8	M10				
Tightening torque		Nm	13	24				
		lb.in	115	212				
Max. conductor section		mm^2	95	120	240			
Max. bar size (thickness-width)		mm	4-13	13-18	2 x 5-30			
AMBIENTAL CONDITIONS								
Temperature	Operating	°C	-25...+55					
	Storage	°C	-40...+70					
Maximum altitude		m	3000					
Mounting position	Normal		Vertical					
	Admissible		Any					
Fixing			Screw					

❶ With protection fuse limiting peak current and specific through energy.
❷ The 4-pole types (3P+N) have early-make late-break neutral pole.
❸ Value in AC22B.

	GE0500E GE0500ET4	GE0630E GE0630ET4	GE0800E GE0800ET4	GE1000E GE1000ET4	GE1250E GE1250ET4	GE1600E GE1600ET4	GE2000E GE2000ET4	GE2500E GE2500ET4	GE3150E GE3150ET4
	500	630	800	1000	1250	1600	2000	2500	3150
	1000								
	12							8	
	500	630	800	1000	1250	1600	2000	2500	3150
	500	630	800	1000	1250	1600	2000	2500	3150
	500	630	800	1000	1250	1600	1800	2500	2500
	500	630	800	1000	1250	1600	2000	2500	2500
	500	630	800	1000	1250	1250	1800	1800	2000
	400	500	630❸	800	1000❸	1000	1600	1800	1800
	400	500	630	1000	1000	1000	1250	1800	1800
	250	315	400	800	900	900	900	1250	1400
	250	250	315	630	630	630	630	1000	1000
	28	44.5	72	76	118	128	59.60	213	338
	208	262	333	415	415	450	562	811	900
	200	200	315	500	525	550	692	997	1100
	173	216	272	544	575	600	764	956	956
	13			25		35	50		
	100			72			75	100	100
	500	630	800	1000	1250	2 x 800	–	–	–
	6300		8000	10000	10000	10000	12500	18000	20000
	5040		6400	8000	8000	8000	10000	14400	1600
	10,000		10,000				3,000	600	
	1,000		500						
	Lug terminal or bars								
	40		50		60	80			100
	5		6		10	10	2 x 15		
	M12		M14		M14	M14	M12		
	24		45		55	55	45		
	212		398		487	487	398		
	2 x 240		–	–	–	–	–	–	
	2 x 6-45		2 x 10-60		2 x 7-80	2 x 10-80	3 x 12-80		3 x 12-100

	25...+55	-30...+70
	-40...+70	-40...+75
	3000	
	Vertical	
	Any	
	Screw	

❶ With protection fuse limiting peak current and specific through energy.
❷ The 4-pole types (3P+N) have early-make late-break neutral pole.
❸ Value in AC22B.

TYPE		3-pole	GMF...030...	GMFJ060...	GMFJ100C03	GMFJ200C03	GMFJ400C03	GMFJ600C03	GMFL800C03
CONTACT CHARACTERISTICS									
IEC conventional free air thermal current Ith (≤40°C)		A	32	63	160	200	400	630	800
IEC rated insulation voltage Ui		V	1000						
IEC rated impulse voltage withstand Uimp		kV	12						
IEC rated operational current Ie									
AC21A	400V	A	32	63	160	200	400	630	800
	500V	A	32	63	160	200	400	630	800
	690V	A	32	63	160	200	400	630	800
AC22A	400V	A	32	63	160	200	400	630	80
	500V	A	32	63	160	200	400	630	800
	690V	A	32	63	160	200	400	630	800
AC23A	400V	A	32	63	160	200	400	630	800
	500V	A	32	63	160	200	400	630	800
	690V	A	32	63	160	200	400	630	800
Power dissipation (without fuse)		W/pole	2	4	9	8	30	46	75
Max fuse power dissipation	in open air	W	3.5	7.5	12	17	45	60	65
	in enclosure	W	3.5	7.5	12	15	30	50	55
IEC rated operational power									
AC23A	400V	kW	15	30	75	110	220	355	450
	690V	kW	22	55	132	200	400	630	710
IEC short circuit protection									
Rated short-time current (1s) Icw		kA rms	1	2.5	5	8	14	20	20
Conditional short circuit current		kA rms	200						
With fuse		A/class	30/J-CC	60/J	100/J	200/J	400/J	600/J	800/L
Making capacity AC23A 690V		A	320	630	1600	2000	4000	6300	8000
Breaking capacity AC23A 690V		A	256	504	1280	1600	3200	6400	6400
Mechanical life		cycles	10,000		8,000		5,000		3,000
Min. electrical endurance (pf=075...0.8)		cycles	6000				1000	1000	500
Fuse-links bolts tightening torque		Nm	-	-	4	4	20	40	40
Terminal lug kits			Built-in		GMX500	GMX501	GMX502	GMX504	GMX504
Conductor section min...max		mm^2	1...10	2.5...25	2.5...70	25...150	35...300	2 X 35...600	2 X 35...600
		AWG	18-8	14-4	14-2/0	4-300MCM	2-600MCM	(2)x2-600MCM	(2)x2-600MCM
Conductor tightening torque		Nm	2	3.5	13.5	31	42.5	56.5	56.5
		lb.in	17	30	120	275	375	500	500
Terminal lugs tightening torque		Nm	-	-	5.5	8	27	54	54
		lb.in	-	-	50	72	240	480	480
AMBIENT CONDITIONS									
Temperature	operating	°C	-25...+55						
	storage	°C	-40...+70						
Maximum altitude		m	3000						
Mounting position	normal		Vertical						
	admissible		Any						
Fixing		A	Screw or 35mm DIN rail (IEC/EN 60715)	Screw					

TECHNICAL DATA ACCORDING TO UL/CSA RATINGS

TYPE		3-pole	GMF...030...	GMFJ060...	GMFJ100C03	GMFJ200C03	GMFJ400C03	GMFJ600C03	GMFL800C03
CHARACTERISTICS									
Compliance			UL98						
General purpose rating (≤40°C)		A	30	60	100	200	400	600	800
Max operating voltage Ui		V	600						
Horsepower ratings/motor FLA current three-phase									
	240V	HP/A	7.5/22	15/42	30/80	60/154	125/312	200/480	250/602
	480V	HP/A	15/21	30/40	60/77	125/156	250/302	400/477	500/590
	600V	HP/A	20/22	50/52	75/77	150/144	350/336	500/472	600/472
Short circuit ratings		KA rms	200						
With fuse		A/class	30/J-CC	60/J	100/J	200/J	400/J	600/J	800/L
Terminal lug kits			Built-in		GMX500	GMX501	GMX502	GMX504	GMX504

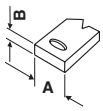
TYPE		3-pole	GA040D	GD025AT2	GD025AT3	GD032AT3	GD032AT4	GD040AT3	GD040AT4
		4th pole	GAX42040D	—	—	—	—	—	—
CONTACT CHARACTERISTICS									
IEC conventional free air thermal current Ith (≤40°C)		A	40	25	25	32	32	40	40
IEC rated insulation voltage Ui		V	1000	1000 / 1500❶					
IEC rated impulse withstand Uimp		kV	8						
IEC rated operational current Ie DC21B❷									
	≤800V	A	—	25	25	32	32	40	40
	1000V	A	—	16	25	32	32	32	40
	❶1200V	A	—	—	—	—	25	—	3
	❶1500V	A	—	—	—	—	20	—	25
2 poles in series	300V	A	16	—	—	—	—	—	—
3 poles in series	48V	A	40	—	—	—	—	—	—
	110V	A	35	—	—	—	—	—	—
	220V	A	32	—	—	—	—	—	—
	500V	A	12	—	—	—	—	—	—
4 poles in series	400V	A	35	—	—	—	—	—	—
	440V	A	32	—	—	—	—	—	—
	500V	A	32	—	—	—	—	—	—
	600V	A	20	—	—	—	—	—	—
	700V	A	15	—	—	—	—	—	—
	750V	A	15	—	—	—	—	—	—
	800V	A	15	—	—	—	—	—	—
Power dissipation		W/pole	1.0	0.8		1.2		1.9	
Mechanical life		cycles	100,000	10,000					
Terminals		type	Mantle	Screw with washer					
		A mm	5.6	—					
		B mm	6.5	—					
		Screw	M4	—					
		Tool	Phillips 2	Philips 1					
Tightening torque		Nm	1.8...2	1.2...1.6					
		lb.in	16...18	10...14					
Conductor section min.-max.		mm^2	0.75...16	1...10					
		AWG	18...6	18...8					
AMBIENT CONDITIONS									
Temperature	Operating	°C	-25...+55						
	Storage	°C	-40...+70						
Maximum altitude		m	3,000	2,000					
Mounting position	Normal		Vertical						
	Admissible		Any						
Fixing			Screw or 35mm DIN rail (IEC/EN 60715)						

❶ 1000V pollution degree 3; for higher voltages pollution degree 2.
❷ For GD series refer to wiring diagrams on page 14-81. DCPV1 utilisation category.

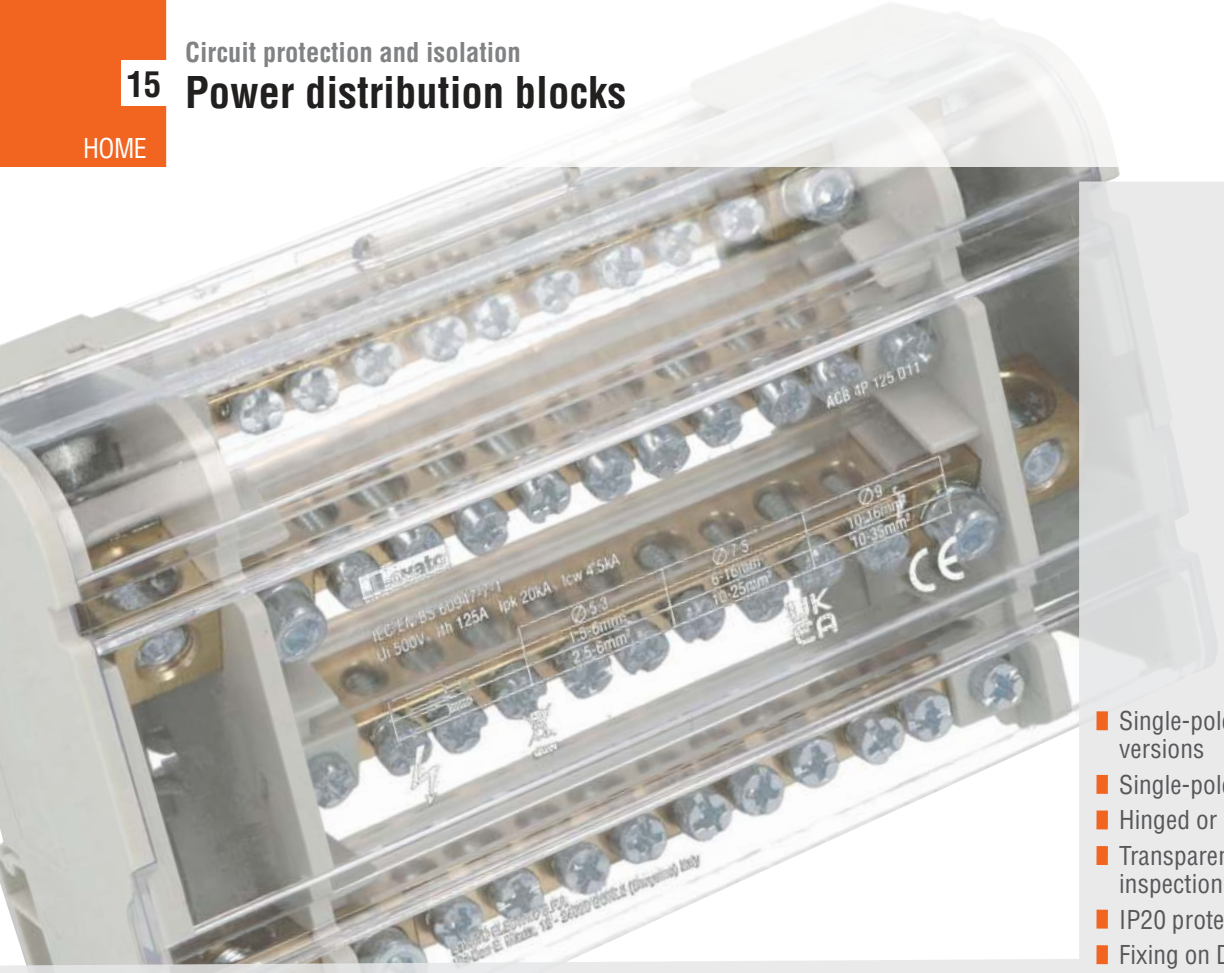
TYPE			GLD0100T2…	GLD0160T2…	GLD0200T2…	GLD0250T2…	GLD0315T2…	GLD0100T4…	GLD0160T4…	GLD0200T4…	GLD0250T4…	GLD0315T4…
CONTACT CHARACTERISTICS												
IEC conventional free air thermal current Ith (≤40°C)		A	100	160	200	250	315	100	160	200	250	315
IEC rated insulation voltage Ui		V	1000					1500				
IEC rated impulse withstand Uimp		kV	12					12				
IEC rated operational current Ie												
DC PV1	800V	A	100	160	200	250	315	100	160	200	250	315
	1000V	A	100	160	200	250	250	100	160	200	250	315
	1500V	A	–	–	–	–	–	100	160	200	250	315
Power dissipation		W/pole	1.1	3.2	4	6.5	11	1.1	3.2	4	6.5	11
Mechanical life		cycles	20,000					20,000				
Terminals		mm	M8 x 20					M8 x 20				
Tightening torque		Nm	15…22					15…22				
		lb.in	132…194					132…194				
Conductor section min...max		mm^2	70...185					70...185				
		AWG/Kcmil	00...400					00...400				
AMBIENT CONDITIONS												
Temperature	Operating	°C	-25...+55					-25...+55				
	Storage	°C	-40...+70					-40...+70				
Operating		m	3000					3000				
Mounting position	Normal		Vertical					Vertical				
	Admissible		Any					Any				
Fixing			Screw or 35mm DIN rail (IEC/EN/BS 60715)					Screw or 35mm DIN rail (IEC/EN/BS 60715)				

TECHNICAL DATA ACCORDING TO UL/CSA RATINGS

TYPE			GLD0100T2…UL	GLD0200T2…UL	GLD0100T4…UL	GLD0200T4…UL
Compliance			UL98B		UL98B	
Max operating voltage Ui		V	1000		1500	
General purpose current ratings	1000V	A	100	200	100	200
	1500V	A	–	–	100	200
Terminal kit lugs			GLDX501		GLDX501	
Minimum enclosure dimensions at rated current		mm (in)	950 x 350 x 200 (37.4 x 13.8 x 7.9)		950 x 350 x 200 (37.4 x 13.8 x 7.9)	

TYPE		4-pole	GE0630DT4	GE0800DT4	GE1250DT4
CONTACT CHARACTERISTICS					
IEC conventional free air thermal current Ith (≤40°C)		A	630	800	1250
IEC rated insulation voltage Ui		V	1000		
IEC rated impulse withstand Uimp		kV	12		
IEC rated operational current Ie DC21B	48V	A	630	800	1250
4 poles in series	110V	A	630	800	1250
	220V	A	630	800	1250
	400V	A	630	800	1250
	440V	A	630	750	1250
	500V	A	630	700	1250
	600V	A	630	700	1250
	750V	A	630	650	1050
	800V	A	600	630	1000
	850V	A	600	630	940
	900V	A	600	630	870
	1000V	A	500	630	850
Power dissipation		W/pole	15.5	24.7	36.1
Mechanical life		cycles	10,000		
Terminals 		type	Lug terminal or bars		
		A mm	30	30	40
		B mm	5	5	8
		screw	M10	M10	M14
Tightening torque		Nm	24	24	45
		lb.in	212	212	398
Max. bar size (thickness-width)		mm	2 x 5-40 (thickness-width)	2 x 5-40	2 x 10-50
Max. conductor section		mm^2	2 x 240	2 x 240	2 x 300
AMBIENT CONDITIONS					
Temperature	Operating	°C	-25...+55		
	Storage	°C	-40...+70		
Maximum altitude		m	3000		
Mounting position	Normal		Vertical		
	Admissible		Any		
Fixing			Screw		

Power distribution blocks



- Single-pole, two-pole and four pole versions
- Single-pole version cURus certified
- Hinged or removable cover
- Transparent cover for visual inspection of wires
- IP20 protection on front
- Fixing on DIN rail or by screws.

SEC. - PAGE

Power distribution blocks
Single-pole ..... 15 - 2
Two-pole ..... 15 - 2
Four-Pole ..... 15 - 2

Dimensions ..... 15 - 3
Technical characteristics ..... 15 - 2

Pag. 15-2

SINGLE-POLE
- From 85A to 520A
- IP20 protection on front
- cURus certified
- Hinged and removable cover.

Pag. 15-2

TWO-POLE
- From 100A to 125A
- IP20 protection on front
- TÜV certified
- Up to 15 terminals per pole.

Pag. 15-2

FOUR-POLE
- From 100A to 160A
- IP20 protection on front
- 100A models TÜV certified
- Up to 15 terminals per pole.

Single-pole

ACB1P...

new

Order code	Number of terminals	Rated current	Max wire section (input)	Qty per pkg	Wt
		[A]	mm²	n°	[kg]
IEC rated voltage: 1000V. cURus rated voltage: 600V.					
ACB1P085A07	7	85	16	1	0.072
ACB1P150A08	8	150	35	1	0.154
ACB1P200A08	8	200	70	1	0.154
ACB1P255A12	12	255	120	1	0.405
ACB1P335A12	12	335	185	1	0.405
ACB1P520A12	12	520	❶	1	0.393

❶ Slot 25x9.5mm for flexible busbars.

Two-pole

ACB2P...

new

Order code	Number of terminals	Rated current	Max wire section (input)	Qty per pkg	Wt
		[A]	mm²	n°	[kg]
IEC rated voltage: 500V.					
ACB2P100G07	7	100	25	1	0.130
ACB2P100G15	15	100	25	1	0.230
ACB2P125G15	15	125	35	1	0.230

Four-pole

ACB4P...

new

Order code	Number of terminals	Rated current	Max wire section (input)	Qty per pkg	Wt
		[A]	mm²	n°	[kg]
IEC rated voltage: 500V.					
ACB4P100G07	7	100	25	1	0.238
ACB4P100G11	11	100	25	1	0.345
ACB4P100G15	15	100	25	1	0.440
ACB4P125G11	11	125	35	1	0.345
ACB4P125G15	15	125	35	1	0.440
IEC rated voltage: 500V - Enlarged input terminal.					
ACB4P125D07	7	125	35	1	0.375
ACB4P125D11	11	125	35	1	0.495
ACB4P125D15	15	125	35	1	0.515
ACB4P160D12	12	160	50	1	0.615

General characteristics
LOVATO Electric ACB... series power distribution blocks are accessories that, in the context of electrical systems, provide a centralized point for efficiently routing and distributing power to multiple circuits or devices, ensuring fast-ordered and well organized wiring layout, simplifying maintenance and troubleshooting.

Operational characteristics
- IEC rated insulation voltage Ui: 690V for ACB1...; 500V for ACB2... and ACB4...
- Mounting on 35mm DIN rail (IEC/EN/BS 60715) or by screw
- Mounting position: Any
- Hinged or removable cover
- IEC degree of protection: IP20 on front.

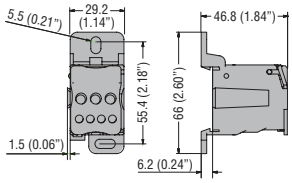
Certifications and compliance
Certifications obtained: cURus for ACB1... types; TÜV for ACB...G... types.
Compliant with standards: IEC/EN/BS 60947-7-1.

Technical characteristics

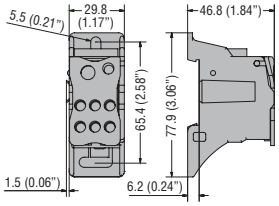
TYPE		ACB1P085A07	ACB1P150A08	ACB1P200A08	ACB1P255A12	ACB1P335A12	ACB1P520A12	ACB2P100G07	ACB2P100G15	ACB2P125G15	ACB4P100G07	ACB4P100G11	ACB4P100G15	ACB4P125G11	ACB4P125G15	ACB4P125D07	ACB4P125D11	ACB4P125D15	ACB4P160D12
ELECTRICAL CHARACTERISTICS																			
Number of poles	n°	1						2			4					4			
Rated insulation voltage Ui	V	1000 ❷						500			500					500			
Conventional free air thermal current Ith	A	85	150	200	255	335	520	100		125	100			125		125			160
Rated peak withstand current Ipk	kA	22	30		51			20			20					20			38
Rated short-time withstand current Icw	kA	3	4.2	11.8	24.5			4.5			4.5					4.5			8.2
CONDUCTOR SECTION CONNECTABLE																			
Conductor section connectable	mm²	2.5...16	10...35	10...70	35...120	95...185	❸	10...25	10...25	10...35	10...25	10...25	10...25	10...35	10...35	10...35			10...50
Terminal holes (hole n° x Ø)	mm	3x6	1x10	1x12	1x16	1x19.5		1x8.5	2x8.5	2x8.8	1x8.5	2x8.5		2x8.8		1x9			1x11.5
Conductor section connectable	mm²	2.5...16	2.5...16		6...25			2.5...6	2.5...6	10...25	2.5...6	2.5...6	2.5...6	10...25	10...25	10...25			10...25
Terminal holes (hole n° x Ø)	mm	4x4.4	1x7.5		2x9.5			3x5.5	7x5.5	2x7.5	1x5.5	2x5.5		2x7.5		1x7.5	3x7.5		3x8.5
Conductor section connectable	mm²	–	2.5...16		2.5...16			1.5...4	1.5...4	2.5...6	1.5...4	1.5...4	1.5...4	2.5...6	2.5...6	2.5...6	2.5...6	2.5...6	2.5...16
Terminal holes (hole n° x Ø)	mm	–	6x6		5x7			3x4.5	6x4.5	11x5.5	5x4.5	7x4.5	11x4.5	7x5.5	11x5.5	5x5.5	7x5.5	11x5.5	8x7
TOOL																			
Phillips		–						2			2					2			
Metric Allen Key	mm	2.5 - 3	3 - 6		3-4-5-8	3-4-5-10	3-4-5	–			–					4 ❹			
AMBIENT CONDITIONS																			
Operating position		Any						Any			Any					Any			
Fixing		Screw or on 35mm DIN rail						Screw or on 35mm DIN rail			Screw or on 35mm DIN rail					Screw or on 35mm DIN rail			

❷ 600V for UL standard. ❸ Slot 25x9.5mm for flexible busbars. ❹ Allen key 4mm just for the input wire.

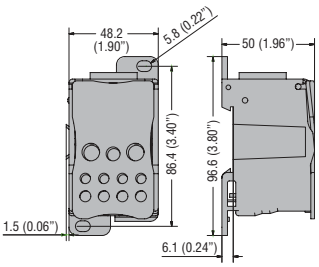
ACB1P085A07



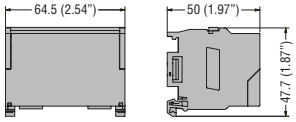
ACB1P150A08 - ACB1P200A08



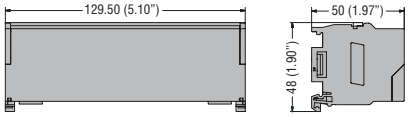
ACB1P255A12 - ACB1P335A12 - ACB1P520A12



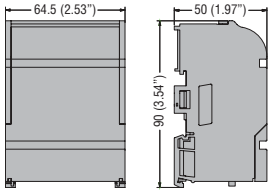
ACB2P100G07



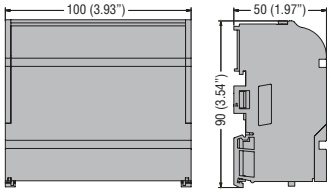
ACB2P100G15 - ACB2P125G15



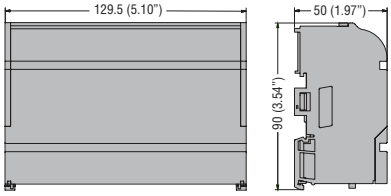
ACB4P100G07



ACB4P100G11 - ACB4P125G11



ACB4P100G15 - ACB4P125G15



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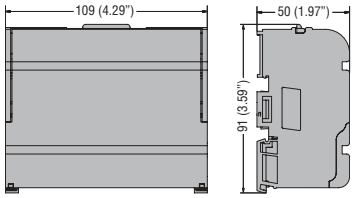

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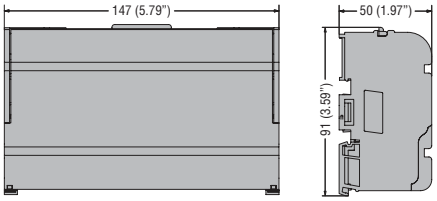
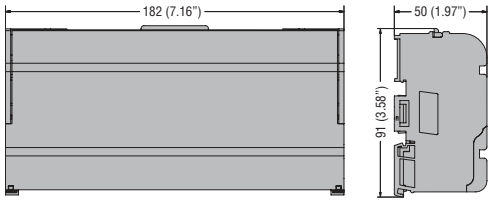
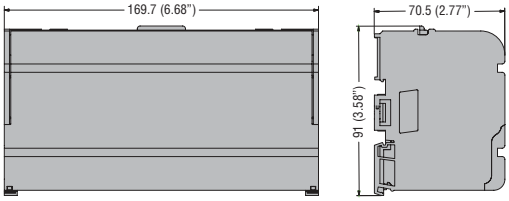


ACB4P125D15



ACB6P160D12



Circuit protection and isolation

Fuse holders and fuses

- Modular size for 10x38, 10x85, 14x51, 14x85 and 22x58mm fuses
- Finger safe - IEC IP20 degree of protection against accidental contact with live parts and with sealable cover for operator safety
- Version with status indicator to quickly determine if the fuse is still operative or needs to be replaced
- UL and CSA certified versions
- Versions for photovoltaic applications.

	SEC. - PAGE
Fuse holders	
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AC fuse holders class CC for the North American market	16 - 3
DC fuse holders for photovoltaic applications	16 - 4
Fuses for photovoltaic applications	**16 - 4**
Accessories	**16 - 5**
Dimensions	**16 - 6**
Wiring diagrams	**16 - 6**
Technical characteristics	**16 - 7**

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AC FUSE HOLDERS
- Version without indicator: 1P, 1P+N, 2P, 3P, 3P+N
- Version with indicator: 1P, 2P, 3P
- For fuses 10x38, 14x51 and 22x58mm IEC class gG or aM
- IEC rated current: 32A, 50A, 100A
- IEC rated voltage: 690VAC.

Page 16-3

AC FUSE HOLDERS CLASS CC FOR THE NORTH AMERICAN MARKET
- Version without indicator: 1P, 2P, 3P
- Version with indicator: 1P, 2P, 3P
- For 10x38mm UL/CSA class CC fuses
- IEC rated current: 30A
- IEC rated voltage: 600VAC.

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DC FUSE HOLDERS FOR PHOTOVOLTAIC APPLICATIONS
- Version without indicator: 1P, 2P
- Version with indicator: 1P, 2P
- For 10x38, 10x85 and 14x85mm IEC class gPV fuses
- IEC rated current: 32A
- IEC rated voltage: 1000VDC and 1500VDC
- IEC utilisation category: DC20B.

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DC FUSES FOR PHOTOVOLTAIC APPLICATIONS
- 10x38mm, IEC class gPV
- 10x85 and 14x85mm, IEC class gPV
- Maximum rated current: 32A
- Rated voltage: 1000VDC and 1500VDC.

Fuse holders UL Recognized

FB01F... FB01 F1PL

FB02A... FB02 A1PL

FB03A... FB03A1PL

Order code	Pole arrange-ment	Status indicator	DIN size	Qty per pkg	Wt
			n°	n°	[kg]
For 10x38mm fuses. IEC 32A rated current at 690VAC.					
FB01F1P	1P	—	1	12	0.066
FB01F1PL	1P	YES	1	12	0.065
FB01F1M❶	1P+N	—	1	12	0.062
FB01F1N	1P+N	—	2	6	0.134
FB01F2P	2P	—	2	6	0.132
new **FB01F2PL**	2P	YES	2	6	0.132
FB01F3P	3P	—	3	4	0.188
new **FB01F3PL**	3P	YES	3	4	0.188
FB01F3N	3P+N	—	4	3	0.260
For 14x51mm fuses. IEC 50A rated current at 690VAC.					
FB02A1P	1P	—	1.5	6	0.113
FB02A1PL	1P	YES	1.5	6	0.114
FB02A1N	1P+N	—	3	3	0.237
FB02A2P	2P	—	3	3	0.224
FB02A3P	3P	—	4.5	2	0.335
FB02A3N	3P+N	—	6	1	0.460
For 22x58mm fuses. IEC 100A rated current at 690VAC.					
FB03A1P	1P	—	2	6	0.167
FB03A1PL	1P	YES	2	6	0.167
FB03A1N	1P+N	—	4	3	0.354
FB03A2P	2P	—	4	3	0.334
FB03A3P	3P	—	6	2	0.500
FB03A3N	3P+N	—	8	1	0.720

❶ Not certified cURus.
❷ Use with gG/aM class 125A fuses, not dissipating more than 12W power.

NOTE:
For FB01 F type: UL Recognized as "Fuseholders - Component". Current rating: 30A. Voltage rating: 750V max. CSA certified as "Fuseholder Assemblies". Current rating: 30A. Voltage rating: 600V max.
For FB02 A type: UL Recognized as "Fuseholders - Component". Current rating: 50A. Voltage rating: 750V max.
For FB03 A type: UL Recognized as "Fuseholders - Component". Current rating: 100A. Voltage rating: 750V max.

Operational characteristics
- IEC rated voltage Un: 690VAC
- IEC rated current In:
  - FB01F: 32A
  - FB02A: 50A
  - FB03A: 100A❷
- IEC utilisation category:
  - FB01F: AC22B 500V, AC21B 690V
  - FB02A: AC22B 500V, AC21B 690V
  - FB03A: AC21B 690V
- Suitable for IEC fuse class: gG and aM
- IEC degree of protection: IP20.

Certifications and compliance

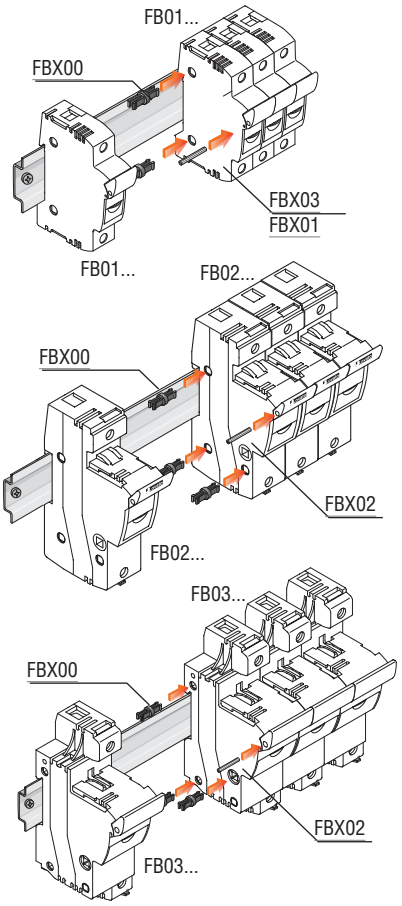
Type	CSA (File 252040 class 3211)	UL Recognized for USA and Canada (cURus - File E343395)
FB01F...	●	●
FB02A...	—	●
FB03A...	—	●

● Certification obtained.

cURus - "UL Recognized": products having this type of marking are intended for use as components of complete workshop-assembled equipment.

Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60269-1, IEC 60269-2, IEC/EN/BS 60947-1, IEC/EN/BS 60947-3, UL 4248-1, UL 4248-4, CSA C22.2 n°4248.1, CSA C22.2 n°4248.4.

Fuse holder combinations



Fuse holders

FB01B... FB01B1PL

Order code	Pole arrange-ment	Status indicator	DIN size	Qty per pkg	Wt
			n°	n°	[kg]
For 10x38mm fuses. IEC 32A rated current at 690VAC.					
FB01B1P	1P	—	1	12	0.062
FB01B1PL	1P	YES	1	12	0.064
FB01B1N	1P+N	—	2	6	0.127
FB01B2P	2P	—	2	6	0.128
FB01B3P	3P	—	3	4	0.185
FB01B3N	3P+N	—	4	3	0.247

Operational characteristics
- IEC rated voltage Un: 690VAC
- IEC rated current In: 32A
- IEC utilisation category: AC22B 500V, AC21B 690V
- Suitable for IEC fuse class: gG and aM
- IEC degree of protection IP20.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-3, IEC/EN/BS 60269-1, IEC 60269-2.

Fuse holders UL Listed and CSA Certified for class CC fuses for the North American market

FB01G... FB01G1PL

new

new

Order code	Pole arrange-ment	Status indicator	DIN size	Qty per pkg	Wt
			n°	n°	[kg]
For 10x38mm fuses. IEC 30A rated current at 600VAC.					
FB01G1P	1P	—	1	12	0.070
FB01G1PL	1P	YES	1	12	0.072
FB01G2P	2P	—	2	6	0.140
FB01G2PL	2P	YES	2	6	0.140
FB01G3P	3P	—	3	4	0.210
FB01G3PL	3P	YES	3	4	0.210

NOTE: UL Listed and CSA certified as "Fuseholders, Cartridge Fuse" for use with Class CC fuses. Interrupting rating 200,000 Amps rms symmetrical. Voltage rating 600V. Current rating 30A.

Operational characteristics
- IEC rated voltage Un: 600VAC
- IEC rated current In: 30A
- IEC utilisation category: AC22B 500V, AC21B 690V
- Suitable for UL/CSA fuse class: CC
- IEC degree of protection IP20.

Certifications and compliance
Certifications obtained: UL Listed for USA (UL - File E343395) and CSA certified for Canada only (File 252040 class 6225), EAC.
Compliant with standards: IEC/EN/BS 60269-1, IEC 60269-2, IEC/EN/BS 60947-1, IEC/EN/BS 60947-3, UL 4248-1, UL 4248-4, CSA C22.2 n°4248.1, CSA C22.2 n°4248.4.

Fuse holders for photovoltaic applications UL Listed / CSA certified up to 1000VDC

FB01D...

FB01D1PL

Order code	Pole arrange-ment	Status indicator	DIN size	Qty per pkg	Wt
			n°	n°	[kg]
For 10x38mm fuses. IEC 32A rated current at 1000VDC.					
FB01D1P	1P	—	1	12	0.064
FB01D1PL	1P	YES	1	12	0.065
FB01D2P	2P	—	2	6	0.127
FB01D2PL	2P	YES	2	6	0.130

NOTE: UL Listed and CSA certified as "Photovoltaic fuseholders" for use with Photovoltaic Fuses. Interrupting rating 30,000 DC Amps. Voltage rating 1000V. Current rating 30A.

Operational characteristics
- IEC rated voltage Un: 1000VDC
- IEC rated current In: 32A
- IEC utilisation category: DC20B 1000VDC
- Suitable for IEC fuse class: gPV
- IEC degree of protection: IP20.

Certifications and compliance
Certifications obtained: UL Listed for USA (UL - File E366062) and CSA certified for Canada (File 252040 class 3211), EAC.
Compliant with standards: IEC/EN/BS 60269-1, IEC 60269-2, IEC/EN/BS 60947-1, IEC/EN/BS 60947-3, UL 4248-1, UL4248-18, CSA C22.2 n° 4248-1, CSA C22.2 n° 4248-18.

Fuses for photovoltaic applications up to 1000VDC

FE01D...

Order code	Rated current In	Qty per pkg	Wt
	[A]	n°	[kg]
10x38mm fuses. IEC 30kA breaking capacity at 1000VDC.			
FE01D00200	2	10	0.008
FE01D00400	4	10	0.008
FE01D00600	6	10	0.008
FE01D00800	8	10	0.008
FE01D01000	10	10	0.008
FE01D01200	12	10	0.008
FE01D01600	16	10	0.008
FE01D02000	20	10	0.008

Operational characteristics
- IEC rated voltage Un: 1000VDC
- IEC rated current In: 2...20A
- IEC fuse class: gPV.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60269-6.

Fuse holders for photovoltaic applications up to 1500VDC

FB04D1P FB04D1PL

Order code	Pole arrangement	Status indicator	Qty per pkg	Wt
			n°	[kg]
10x85mm and 14x85mm fuses. IEC 32A rated current at 1500VDC.				
FB04D1P	1P	No	6	0.109
FB04D1PL	1P	Yes	6	0.110

Operational characteristics
- IEC rated voltage Un: 1500VDC
- IEC rated current In: 32A
- IEC utilisation category: DC20B 1500VDC
- Suitable for IEC fuse class: gPV
- IEC degree of protection: IP20.

Certifications and compliance
Compliant with standards: IEC/EN/BS 60947-3.

Fuses for photovoltaic applications up to 1500VDC

FE04D...

FE05D...

Order code	Rated current In	Qty per pkg	Wt
	[A]	n°	[kg]
10x85mm fuses. IEC 10kA breaking capacity at 1500VDC.			
FE04D006	6	10	0.019
FE04D010	10	10	0.019
FE04D015	15	10	0.019
FE04D020	20	10	0.019
14x85mm fuses. IEC 10kA breaking capacity at 1500VDC.			
FE05D020	20	5	0.031
FE05D025	25	5	0.031
FE05D032	32	5	0.031

Operational characteristics
- IEC rated voltage Un: 1500VDC
- IEC rated current
  - In: 6...20A for 10x85mm version
  - In: 20...32A for 14x85mm version
- Suitable for IEC fuse class: gPV.

Certifications and compliance
Compliant with standards: IEC/EN/BS 60269-6.

Accessories

FBX00

FBX01
FBX03

FBX02

P1X9033

P1X9133

P1X9201

P1X9210

P1X9202

Order code	Description	Qty per pkg	Wt
	[A]	n°	[kg]
FBX00	Coupling clip for 10x38, 14x51 and 22x58mm sizes	100	0.003
FBX01	Coupling pin for 10x38mm size type FB01B1P and FB01B1PL only	100	0.005
FBX02	Coupling pin for 14x51 and 22x58mm sizes	100	0.008
FBX03	Coupling pin for 10x38mm size types FB01F, FB01G, FB01D only	100	0.005
For FB01F, FB01B, FB01D and FB01G types❷.			
P1X9031❶	Single-pole supply busbar	10	0.160
P1X9032❶	Two-pole supply busbar	10	0.320
P1X9033❶	Three-pole supply busbar	10	0.474
P1X9034❶	Four-pole supply busbar	10	0.600
P1X9130❶	Kit of 5 isolating covers for unused busbar terminals	10	0.030
P1X9131❶	End cap for P1X9031	50	0.001
P1X9132❶	End cap for P1X9032	50	0.001
P1X9133❶	End cap for P1X9033	50	0.001
P1X9134❶	End cap for P1X9034	50	0.001
P1X9201❶	Single-pole terminal for busbar supply; conductor cross section 25mm² max.; tightening torque 2Nm	25	0.010
P1X9210❶	Single-pole terminal for supplying busbar; conductor cross section 25mm² max.; left entry; tightening torque 2Nm	25	0.010
P1X9202❶	Single-pole terminal for busbar supply; conductor cross section 50mm² max.; tightening torque 3.5Nm	25	0.022

General and operational characteristics
SINGLE-POLE SUPPLY BUSBAR
- Rated operational voltage Ue: 1000V
- Central point of power supply: 100A max.
- Side point of power supply: 63A max.
- Spacing: 17.5mm/0.69”
- Busbar section: 10mm²
- For paralleling connection
- For 57 modules, 1000mm/39.37” long (57 1P fuseholders)
- Length can be cut in shorter sections.

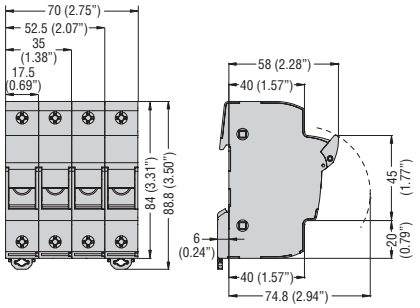
TWO-POLE, THREE-POLE AND FOUR-POLE SUPPLY BUSBARS
- Rated operational voltage Ue: 690V
- Central point of power supply: 100A max.
- Side point of power supply: 63A max.
- Spacing: 18mm/0.71”
- Busbar section: 10mm²
- For paralleling connection
- Two-pole: for 56 modules, 1000mm/39.37” long (28 2P fuseholders)
- Three-pole: for 57 modules, 1012mm/39.84” long (19 3P fuseholders)
- Four-pole: for 56 modules, 1000mm/39.37” long (14 4P fuseholders)
- Length can be cut in shorter sections.

Certification and compliance
Certifications obtained: EAC.

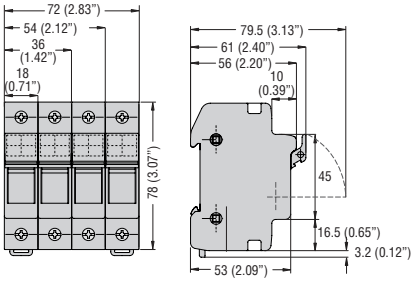
❶ See technical characteristics under derating factor of FB01... type for derating factor.
❷ When used with FB01D, rated operational voltage has to be checked.

16

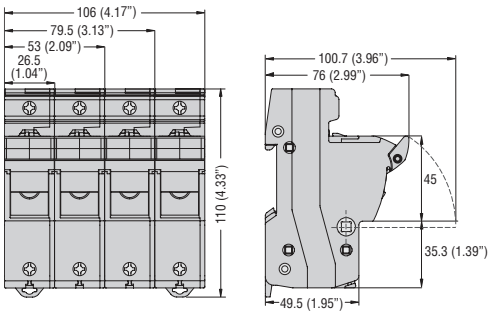
FB01F... FB01G...



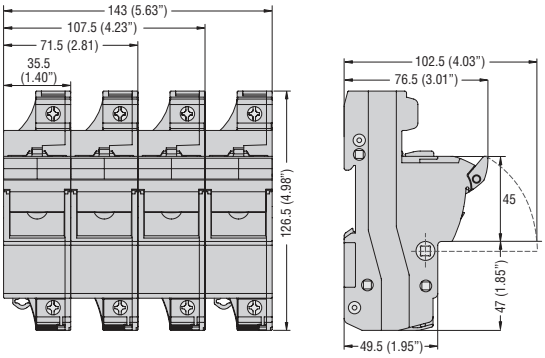
FB01B...



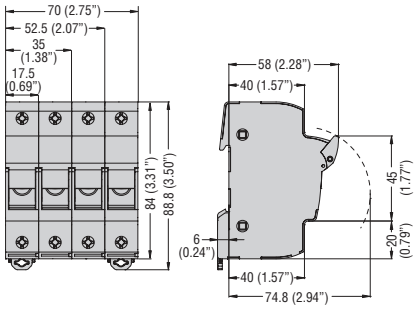
FB02A...



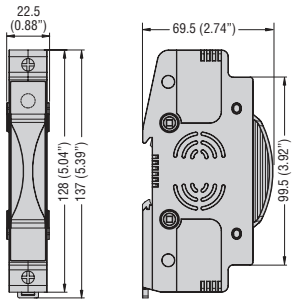
FB03A...



FB01D...

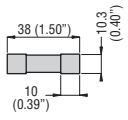


FB04D...

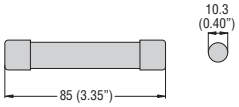


FUSES

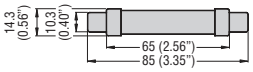
FE01D0...



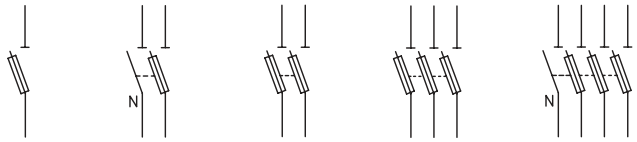
FE04D...



FE05D...



Wiring diagrams



1P 1P+N 2P 3P 3P+N

TYPE		FB01F	FB01B...	FB02A...	FB03A...	FB01G...	FB01D...	FB04D...
Range		AC				Class CC (AC)	DC	DC
IEC maximum rated current In		32A		50A	100A❶	30A	32A	32A
IEC maximum rated voltage Un		690VAC	690VAC			600VAC	1000VDC	1500VDC
IEC utilisation category		AC22B 500V; AC21B 690V			AC21B 690V	AC22B 500V; AC21B 690V	DC20B 1000VDC	DC-PV0 1500VDC
Maximum power dissipation		3W		5W	9,5W	3W	4W	8W
Derating factor of current In for different ambient temperatures	20°C	1						1
	30°C	0.95						0.98
	40°C	0.9						0.94
	50°C	0.8						0.88
	60°C	0.7						0.83
	70°C	0.5						0.75
Derating factor of current In for side-by-side fuse holders - number of poles	1-4	1						–
	5-6	0.8						–
	7-9	0.7						–
	≥10	0.6						–
Voltage for status indicator		120...690VAC		230...690VAC		120...600VAC	350...1000VDC	800...1500VDC
CONNECTIONS								
Maximum tightening torque		1.5Nm / 13.3lb.in		3Nm / 26lb.in	4Nm / 35lb.in	2.5Nm / 22lb.in		2.5Nm / 22lb.in
Maximum conductor cross section	flexible/stranded	1x16mm²; 1x6mm² / 8AWG		1x25mm² / 6AWG	1x35mm² / 2AWG	1x16mm² / 8AWG	1x16mm² / 8AWG	1x10mm² / 8AWG
	rigid/solid	1x16mm²; 1x10mm² / 8AWG		1x35mm² / 8AWG	1x50mm² / 1AWG	1x16mm² / 8AWG	1x16mm² / 8AWG	1x16mm² / 6AWG
AMBIENT CONDITIONS								
Operating temperature		-20...+70°C						
Storage temperature		-40...+80°C						
Maximum altitude		3,000m						
Operation position		Any						
Fixing		On 35mm DIN rail (IEC/EN/BS 60715)						

❶ Use with gG/aM class 125A fuses, not dissipating more than 12W power.

TECHNICAL CHARACTERISTICS FOR FE01D..., FE04D... AND FE05D... FUSES

TYPE	Rated current [A]	Power consumption at 0.7 In [W]	Power consumption at In [W]	Pre-arcing I^2t [A^2s]	Total I^2t at 1000VDC [A^2s]
FE01D00200	2	0.78	1.45	0.62	1
FE01D00400	4	0.64	1.57	6.90	11
FE01D00600	6	0.77	1.84	24	38
FE01D00800	8	0.82	2.00	7	17
FE01D01000	10	0.94	2.20	15	48
FE01D01200	12	0.98	2.40	27	68
FE01D01600	16	1.10	2.70	89	165
FE01D02000	20	1.33	3.20	158	294
FE04D006	6	1.1	2.7	68	88
FE04D010	10	1.4	3.5	45	75
FE04D015	15	1.9	2.7	171	295
FE04D020	20	2.0	5.2	240	480
FE05D020	20	2.2	5.3	68	225
FE05D025	25	2.5	6.4	140	458
FE05D032	32	3.1	8.0	270	890

Miniature and residual circuit breakers

- UL 1077 and UL 489 certified versions
- High breaking capacity
- Various trip characteristic curves: Type B, C or D
- Wide 1...125A current range
- Switch disconnectors
- Residuals with trip characteristic curves type A, AC, B and type A selective
- Accessories available.

	Sec. - Page
Miniature circuit breakers 1…63A, UL 1077	
1P - 10kA, 1 module, curve types B, C and D	17 - 2
1P+N - 6kA, 1 module, curve type B and C	17 - 3
1P+N - 6kA, 2 modules, curve type C	17 - 3
2P - 10kA, 2 modules, curve types B, C and D	17 - 4
3P - 10kA, 3 modules, curve types B, C and D	17 - 5
4P - 10kA, 4 modules, curve types B, C and D	17 - 6
Miniature circuit breakers 1…63A, UL 489	
1P - 10kA, 1 module, curve types C and D	17 - 7
2P - 10kA, 2 modules, curve types C and D	17 - 8
3P - 10kA, 3 modules, curve types C and D	17 - 9
Miniature circuit breakers 80…125A, UL 1077	
1P, 2P, 3P and 4P - 10kA, curve type C	17 - 10
3P and 4P - 10kA, curve type D	17 - 10
Add-on blocks and accessories	17 - 11
Residual blocks	17 - 11
Modular switch disconnectors	17 - 13
Residual current operated circuit breakers	17 - 14
Residual current operated circuit breakers with overcurrent protection	17 - 15
Dimensions	**17 - 16**
Wiring diagrams	**17 - 16**
Technical characteristics	**17 - 17**

Page 17-2

MINIATURE CIRCUIT BREAKERS UP TO 63A
- 1P, 1P+N, 2P, 3P and 4P versions
- IEC rated current In: 1...63A
- IEC short-circuit breaking capacity Icn: 10kA (6kA for 1P+N)
- Trip characteristic curve: Type B, C, D
- UL 1077 or UL 489 certified versions.

Page 17-10

MINIATURE CIRCUIT BREAKERS 80...125A
- 1P, 2P, 3P and 4P versions
- IEC rated current In: 80...125A
- IEC short-circuit breaking capacity Icn: 10kA
- Trip characteristic curve: Type C, D
- UL 1077 certified versions.

Page 17-11

ADD-ON BLOCKS AND ACCESSORIES

- Auxiliary and indicator contacts
- Undervoltage trip releases
- Shunt trip releases
- Connection accessories.

Page 17-13

SWITCH DISCONNECTORS
- 1P, 2P, 3P and 4P versions
- IEC rated current In: 32...125A
- Clear OFF contact status indication
- Auxiliary contact block available.

Page 17-13

RESIDUAL BLOCKS FOR CIRCUIT BREAKERS UP TO 63A
- 2P, 3P and 4P versions
- IEC rated current In: 40 and 63A
- Residual current: 30 and 300mA
- Residual current operating characteristic: Type A.

Page 17-14

RESIDUAL CURRENT OPERATED CIRCUIT BREAKERS 25...80A
- 2P and 4P versions
- IEC rated current In: 25, 40, 63 and 80A
- IEC rated residual operating current IΔn: 30mA and 300mA
- Residual current operating characteristic: Type A, AC, B and type A selective
- Auxiliary contact and signalling contact blocks available.

Page 17-15

RESIDUAL CURRENT OPERATED CIRCUIT BREAKERS WITH OVERCURRENT PROTECTION UP TO 40A
- 1P+N versions
- IEC rated current In: 6...40A
- IEC rated short-circuit capacity Icn: 10kA
- Trip characteristic curve: Type C
- Residual current: 30 and 300mA
- Residual current operating characteristic: Type AC and A
- Auxiliary contact and signalling contact blocks available.

Lovato electric

1P - 10kA (IEC/EN/BS)
1 module

P1MB1P...

Order code	Curve	IEC In	IEC Icn	N° of DIN module	Qty per pkg	Wt
		[A]	[kA]	n°	n°	[kg]
Single pole, thermal and magnetic trip type, B-curve characteristic.						
P1MB1PB01	B	1	10	1	12	0.115
P1MB1PB02	B	2	10	1	12	0.115
P1MB1PB03	B	3	10	1	12	0.115
P1MB1PB04	B	4	10	1	12	0.115
P1MB1PB06	B	6	10	1	12	0.115
P1MB1PB08	B	8	10	1	12	0.115
P1MB1PB10	B	10	10	1	12	0.115
P1MB1PB13	B	13	10	1	12	0.115
P1MB1PB16	B	16	10	1	12	0.115
P1MB1PB20	B	20	10	1	12	0.115
P1MB1PB25	B	25	10	1	12	0.115
P1MB1PB32	B	32	10	1	12	0.115
P1MB1PB40	B	40	10	1	12	0.115
P1MB1PB50	B	50	10	1	12	0.115
P1MB1PB63	B	63	10	1	12	0.115
Single pole, thermal and magnetic trip type, C-curve characteristic.						
P1MB1PC01	C	1	10	1	12	0.115
P1MB1PC01V6	C	1.6	10	1	12	0.115
P1MB1PC02	C	2	10	1	12	0.115
P1MB1PC03	C	3	10	1	12	0.115
P1MB1PC04	C	4	10	1	12	0.115
P1MB1PC06	C	6	10	1	12	0.115
P1MB1PC08	C	8	10	1	12	0.115
P1MB1PC10	C	10	10	1	12	0.115
P1MB1PC13	C	13	10	1	12	0.115
P1MB1PC16	C	16	10	1	12	0.115
P1MB1PC20	C	20	10	1	12	0.115
P1MB1PC25	C	25	10	1	12	0.115
P1MB1PC32	C	32	10	1	12	0.115
P1MB1PC40	C	40	10	1	12	0.115
P1MB1PC50	C	50	10	1	12	0.115
P1MB1PC63	C	63	10	1	12	0.115
Single pole, thermal and magnetic trip type, D-curve characteristic.						
P1MB1PD01	D	1	10	1	12	0.115
P1MB1PD01V6	D	1.6	10	1	12	0.115
P1MB1PD02	D	2	10	1	12	0.115
P1MB1PD03	D	3	10	1	12	0.115
P1MB1PD04	D	4	10	1	12	0.115
P1MB1PD06	D	6	10	1	12	0.115
P1MB1PD08	D	8	10	1	12	0.115
P1MB1PD10	D	10	10	1	12	0.115
P1MB1PD13	D	13	10	1	12	0.115
P1MB1PD16	D	16	10	1	12	0.115
P1MB1PD20	D	20	10	1	12	0.115
P1MB1PD25	D	25	10	1	12	0.115
P1MB1PD32	D	32	10	1	12	0.115
P1MB1PD40	D	40	10	1	12	0.115
P1MB1PD50	D	50	10	1	12	0.115
P1MB1PD63	D	63	10	1	12	0.115

General characteristics

These devices are used to protect against short circuits and overloads of wiring installations and loads in panel boards, office buildings, stores and similar applications.
Their purpose is circuit protection, circuit isolation and load operation controls. They have instantaneous trip characteristics defined as follows:
- B-curve: instantaneous trip 3...5 times In for non-inductive or low inductive loads (heating resistors, generators, very long wire lines)
- C-curve: instantaneous trip 5...10 times In for inductive loads (mixed and inductive resistive loads with low inrush current)
- D-curve: instantaneous trip 10...14 times In for highly inductive loads (loads with high inrush and current such as motors).

Main features include:
- IEC rated current In: 1...63A
- Pole width: 17.5mm / 0.69”
- Contact status with flag indicator
- Trip characteristic: curve type B, C and D
- Auxiliary contacts and trip releases mounted on MCB left side
- Fixing on 35mm DIN rail (IEC/EN/BS 60715).

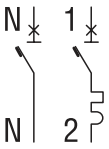
Operational characteristics
- Dissipation per pole: 3...13W
- IEC rated insulation voltage Ui: 440V
- IEC rated impulse voltage Uimp: 4kV
- IEC rated operational voltage Ue: 230/400VAC
- UL 1077 rated operational voltage: 277VAC
- Short circuit breaking capacity: IEC/EN/BS 10kA - UL 7.5kA 240V - 5kA 277V.

Certifications and compliance

Certifications obtained: cURus (E369585); EAC; TÜV-Rheinland.
Compliant with standards: IEC/EN/BS 60898-1, IEC/EN/BS 60947-2, UL 1077, CSA C22.2 n°235.

1P+N - 6kA
1 module

P1MB1M...



Order code	Curve	IEC In	IEC Icn	N° of DIN module	Qty per pkg	Wt
		[A]	[kA]	n°	n°	[kg]
Single pole + neutral, thermal and magnetic trip type, B-curve characteristic.						
P1MB1MB06	B	6	6	1	12	0.115
P1MB1MB10	B	10	6	1	12	0.115
P1MB1MB16	B	16	6	1	12	0.115
P1MB1MB20	B	20	6	1	12	0.115
P1MB1MB25	B	25	6	1	12	0.115
P1MB1MB32	B	32	6	1	12	0.115
Single pole + neutral, thermal and magnetic trip type, C-curve characteristic.						
P1MB1MC02	C	2	6	1	12	0.115
P1MB1MC04	C	4	6	1	12	0.115
P1MB1MC06	C	6	6	1	12	0.115
P1MB1MC10	C	10	6	1	12	0.115
P1MB1MC13	C	13	6	1	12	0.115
P1MB1MC16	C	16	6	1	12	0.115
P1MB1MC20	C	20	6	1	12	0.115
P1MB1MC25	C	25	6	1	12	0.115
P1MB1MC32	C	32	6	1	12	0.115
P1MB1MC40	C	40	6	1	12	0.115

General characteristics
These devices are used to protect against short circuits and overloads of wiring installations and loads in panel boards, office buildings, stores and similar applications.
Their purpose is circuit protection, circuit isolation and load operation controls. They have characteristics of instantaneous trip defined as follows:
- B-curve: instantaneous trip 3...5 times In for non-inductive or low inductive loads (heating resistors, generators, very long wire lines)
- C-curve: instantaneous trip 5...10 times In for inductive loads (mixed loads, resistive and inductive with low inrush current)
- D-curve: instantaneous trip 10...14 times In for highly inductive loads (loads with high inrush and current such as motors).

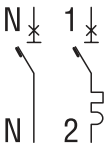
Main features include:
- IEC rated current In: 2...40A
- Pole width: 9mm/0.35" (0.5 module)
- Contact status with flag indicator
- Trip characteristic: curve type B and C
- Auxiliary contacts and trip releases mounted on left side
- Fixing on 35mm DIN rail (IEC/EN/BS 60715).

Operational characteristics
- Dissipation per pole: 3...7.5W
- IEC rated insulation voltage Ui: 440V
- IEC rated impulse voltage Uimp: 4kV
- IEC rated operational voltage Ue: 230VAC.

Certifications and compliance
Certifications obtained: EAC, TÜV-SUD.
Compliant with standards: IEC/EN/BS 60898-1, IEC/EN/BS 60947-2.

1P+N - 6kA
2 modules

P1MB1N...



Order code	Curve	IEC In	IEC Icn	N° of DIN module	Qty per pkg	Wt
		[A]	[kA]	n°	n°	[kg]
Single pole + neutral, thermal and magnetic trip type, C-curve characteristic.						
P1MB1NC01	C	1	6	2	6	0.190
P1MB1NC02	C	2	6	2	6	0.190
P1MB1NC04	C	4	6	2	6	0.190
P1MB1NC06	C	6	6	2	6	0.190
P1MB1NC10	C	10	6	2	6	0.190
P1MB1NC16	C	16	6	2	6	0.190
P1MB1NC20	C	20	6	2	6	0.190
P1MB1NC25	C	25	6	2	6	0.190
P1MB1NC32	C	32	6	2	6	0.190
P1MB1NC40	C	40	6	2	6	0.190
P1MB1NC50	C	50	6	2	6	0.190
P1MB1NC63	C	63	6	2	6	0.190

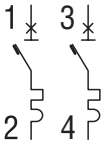
General characteristics
- IEC rated current In: 1...63A
- Pole width: 17.5mm / 0.69"
- Contact status with flag indicator
- Trip characteristic: curve type C
- Auxiliary contacts and trip releases mounted on left side
- Fixing on 35mm DIN rail (IEC/EN/BS 60715).

Operational characteristics
- Dissipation per pole: 3...13W
- IEC rated insulation voltage Ui: 440V
- IEC rated impulse voltage Uimp: 4kV
- IEC rated operational voltage Ue: 230/400VAC.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60898-1, IEC/EN/BS 60947-2.

2P - 10kA (IEC/EN/BS)
2 modules

P1MB2P...



Order code	Curve	IEC In	IEC Icn	N° of DIN module	Qty per pkg	Wt
		[A]	[kA]	n°	n°	[kg]
Two pole, thermal and magnetic trip type, B-curve characteristic.						
P1MB2PB01	B	1	10	2	6	0.230
P1MB2PB02	B	2	10	2	6	0.230
P1MB2PB04	B	4	10	2	6	0.230
P1MB2PB06	B	6	10	2	6	0.230
P1MB2PB10	B	10	10	2	6	0.230
P1MB2PB13	B	13	10	2	6	0.230
P1MB2PB16	B	16	10	2	6	0.230
P1MB2PB20	B	20	10	2	6	0.230
P1MB2PB25	B	25	10	2	6	0.230
P1MB2PB32	B	32	10	2	6	0.230
P1MB2PB40	B	40	10	2	6	0.230
P1MB2PB50	B	50	10	2	6	0.230
P1MB2PB63	B	63	10	2	6	0.230
Two pole, thermal and magnetic trip type, C-curve characteristic.						
P1MB2PC01	C	1	10	2	6	0.230
P1MB2PC01V6	C	1.6	10	2	6	0.230
P1MB2PC02	C	2	10	2	6	0.230
P1MB2PC03	C	3	10	2	6	0.230
P1MB2PC04	C	4	10	2	6	0.230
P1MB2PC06	C	6	10	2	6	0.230
P1MB2PC08	C	8	10	2	6	0.230
P1MB2PC10	C	10	10	2	6	0.230
P1MB2PC13	C	13	10	2	6	0.230
P1MB2PC16	C	16	10	2	6	0.230
P1MB2PC20	C	20	10	2	6	0.230
P1MB2PC25	C	25	10	2	6	0.230
P1MB2PC32	C	32	10	2	6	0.230
P1MB2PC40	C	40	10	2	6	0.230
P1MB2PC50	C	50	10	2	6	0.230
P1MB2PC63	C	63	10	2	6	0.230
Two pole, thermal and magnetic trip type, D-curve characteristic.						
P1MB2PD01	D	1	10	2	6	0.230
P1MB2PD01V6	D	1.6	10	2	6	0.230
P1MB2PD02	D	2	10	2	6	0.230
P1MB2PD03	D	3	10	2	6	0.230
P1MB2PD04	D	4	10	2	6	0.230
P1MB2PD06	D	6	10	2	6	0.230
P1MB2PD08	D	8	10	2	6	0.230
P1MB2PD10	D	10	10	2	6	0.230
P1MB2PD13	D	13	10	2	6	0.230
P1MB2PD16	D	16	10	2	6	0.230
P1MB2PD20	D	20	10	2	6	0.230
P1MB2PD25	D	25	10	2	6	0.230
P1MB2PD32	D	32	10	2	6	0.230
P1MB2PD40	D	40	10	2	6	0.230
P1MB2PD50	D	50	10	2	6	0.230
P1MB2PD63	D	63	10	2	6	0.230

General characteristics

These devices are used to protect against short circuits and overloads of wiring installations and loads in panel boards, office buildings, stores and similar applications.
Their purpose is circuit protection, circuit isolation and load operation controls. They have characteristics of instantaneous trip defined as follows:
- B-curve: instantaneous trip 3...5 times In for non-inductive or low inductive loads (heating resistors, generators, very long wire lines)
- C-curve: instantaneous trip 5...10 times In for inductive loads (mixed loads, resistive and inductive with low inrush current)
- D-curve: instantaneous trip 10...14 times In for highly inductive loads (loads with high inrush and current such as motors).

Main features include:
- IEC rated current In: 1...63A
- Pole width: 17.5mm / 0.69”
- Contact status with flag indicator
- Trip characteristic: curve type B, C and D
- Auxiliary contacts and trip releases mounted on left side
- Fixing on 35mm DIN rail (IEC/EN/BS 60715).

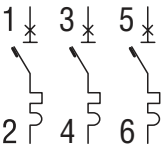
Operational characteristics
- Dissipation per pole: 3...13W
- IEC rated insulation voltage Ui: 440V
- IEC rated impulse voltage Uimp: 4kV
- IEC rated operational voltage Ue: 230/400VAC
- UL 1077 rated operational voltage: 480VAC
- Short circuit breaking capacity: IEC/EN/BS 10kA - UL 7.5kA 480V.

Certifications and compliance

Certifications obtained: cURus (E369585); EAC; TÜV-Rheinland.
Compliant with standards: IEC/EN/BS 60898-1, IEC/EN/BS 60947-2, UL 1077, CSA C22.2 n°235.

3P - 10kA (IEC/EN/BS)
3 modules

P1MB3P...



Order code	Curve	IEC In	IEC Icn	N° of DIN module	Qty per pkg	Wt
		[A]	[kA]	n°	n°	[kg]
Three pole, thermal and magnetic trip type, B-curve characteristic.						
P1MB3PB01	B	1	10	3	4	0.345
P1MB3PB02	B	2	10	3	4	0.345
P1MB3PB04	B	4	10	3	4	0.345
P1MB3PB06	B	6	10	3	4	0.345
P1MB3PB10	B	10	10	3	4	0.345
P1MB3PB13	B	13	10	3	4	0.345
P1MB3PB16	B	16	10	3	4	0.345
P1MB3PB20	B	20	10	3	4	0.345
P1MB3PB25	B	25	10	3	4	0.345
P1MB3PB32	B	32	10	3	4	0.345
P1MB3PB40	B	40	10	3	4	0.345
P1MB3PB50	B	50	10	3	4	0.345
P1MB3PB63	B	63	10	3	4	0.345
Three pole, thermal and magnetic trip type, C-curve characteristic.						
P1MB3PC01	C	1	10	3	4	0.345
P1MB3PC01V6	C	1.6	10	3	4	0.345
P1MB3PC02	C	2	10	3	4	0.345
P1MB3PC03	C	3	10	4	4	0.345
P1MB3PC04	C	4	10	3	4	0.345
P1MB3PC06	C	6	10	3	4	0.345
P1MB3PC08	C	8	10	3	4	0.345
P1MB3PC10	C	10	10	3	4	0.345
P1MB3PC13	C	13	10	3	4	0.345
P1MB3PC16	C	16	10	3	4	0.345
P1MB3PC20	C	20	10	3	4	0.345
P1MB3PC25	C	25	10	3	4	0.345
P1MB3PC32	C	32	10	3	4	0.345
P1MB3PC40	C	40	10	3	4	0.345
P1MB3PC50	C	50	10	3	4	0.345
P1MB3PC63	C	63	10	3	4	0.345
Three pole, thermal and magnetic trip type, D-curve characteristic.						
P1MB3PD01	D	1	10	3	4	0.345
P1MB3PD01V6	D	1.6	10	3	4	0.345
P1MB3PD02	D	2	10	3	4	0.345
P1MB3PD03	D	3	10	4	4	0.345
P1MB3PD04	D	4	10	3	4	0.345
P1MB3PD06	D	6	10	3	4	0.345
P1MB3PD08	D	8	10	3	4	0.345
P1MB3PD10	D	10	10	3	4	0.345
P1MB3PD13	D	13	10	3	4	0.345
P1MB3PD16	D	16	10	3	4	0.345
P1MB3PD20	D	20	10	3	4	0.345
P1MB3PD25	D	25	10	3	4	0.345
P1MB3PD32	D	32	10	3	4	0.345
P1MB3PD40	D	40	10	3	4	0.345
P1MB3PD50	D	50	10	3	4	0.345
P1MB3PD63	D	63	10	3	4	0.345

General characteristics
These devices are used to protect against short circuits and overloads of wiring installations and loads in panel boards, office buildings, stores and similar applications.
Their purpose is circuit protection, circuit isolation and load operation controls. They have characteristics of instantaneous trip defined as follows:
- B-curve: instantaneous trip 3...5 times In for non-inductive or low inductive loads (heating resistors, generators, very long wire lines)
- C-curve: instantaneous trip 5...10 times In for inductive loads (mixed loads, resistive and inductive with low inrush current)
- D-curve: instantaneous trip 10...14 times In for highly inductive loads (loads with high inrush and current such as motors).

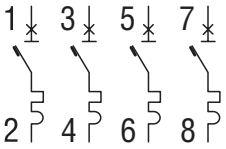
Main features include:
- IEC rated current In: 1...63A
- Pole width: 17.5mm / 0.69”
- Contact status with flag indicator
- Trip characteristic: curve type B, C and D
- Auxiliary contacts and trip releases mounted on left side
- Fixing on 35mm DIN rail (IEC/EN/BS 60715).

Operational characteristics
- Dissipation per pole: 3...13W
- IEC rated insulation voltage Ui: 440V
- IEC rated impulse voltage Uimp: 4kV
- IEC rated operational voltage Ue: 230/400VAC
- UL 1077 rated operational voltage: 480VAC
- Short circuit breaking capacity: IEC/EN/BS 10kA - UL 7.5kA 480V.

Certifications and compliance
Certifications obtained: cURus (E369585); EAC; TÜV-Rheinland.
Compliant with standards: IEC/EN/BS 60898-1, IEC/EN/BS 60947-2, UL 1077, CSA C22.2 n°235.

4P - 10kA (IEC/EN/BS)
4 modules

P1MB4P...



Order code	Curve	IEC In	IEC Icn	N° of DIN module	Qty per pkg	Wt
		[A]	[kA]	n°	n°	[kg]
Four pole, thermal and magnetic trip type, B-curve characteristic.						
P1MB4PB01	B	1	10	4	3	0.460
P1MB4PB02	B	2	10	4	3	0.460
P1MB4PB04	B	4	10	4	3	0.460
P1MB4PB06	B	6	10	4	3	0.460
P1MB4PB10	B	10	10	4	3	0.460
P1MB4PB13	B	13	10	4	3	0.460
P1MB4PB16	B	16	10	4	3	0.460
P1MB4PB20	B	20	10	4	3	0.460
P1MB4PB25	B	25	10	4	3	0.460
P1MB4PB32	B	32	10	4	3	0.460
P1MB4PB40	B	40	10	4	3	0.460
P1MB4PB50	B	50	10	4	3	0.460
P1MB4PB63	B	63	10	4	3	0.460
Four pole, thermal and magnetic trip type, C-curve characteristic.						
P1MB4PC01	C	1	10	4	3	0.460
P1MB4PC02	C	2	10	4	3	0.460
P1MB4PC04	C	4	10	4	3	0.460
P1MB4PC06	C	6	10	4	3	0.460
P1MB4PC10	C	10	10	4	3	0.460
P1MB4PC13	C	13	10	4	3	0.460
P1MB4PC16	C	16	10	4	3	0.460
P1MB4PC20	C	20	10	4	3	0.460
P1MB4PC25	C	25	10	4	3	0.460
P1MB4PC32	C	32	10	4	3	0.460
P1MB4PC40	C	40	10	4	3	0.460
P1MB4PC50	C	50	10	4	3	0.460
P1MB4PC63	C	63	10	4	3	0.460
Four pole, thermal and magnetic trip type, D-curve characteristic.						
P1MB4PD01	D	1	10	4	3	0.460
P1MB4PD02	D	2	10	4	3	0.460
P1MB4PD04	D	4	10	4	3	0.460
P1MB4PD06	D	6	10	4	3	0.460
P1MB4PD10	D	10	10	4	3	0.460
P1MB4PD13	D	13	10	4	3	0.460
P1MB4PD16	D	16	10	4	3	0.460
P1MB4PD20	D	20	10	4	3	0.460
P1MB4PD25	D	25	10	4	3	0.460
P1MB4PD32	D	32	10	4	3	0.460
P1MB4PD40	D	40	10	4	3	0.460
P1MB4PD50	D	50	10	4	3	0.460
P1MB4PD63	D	63	10	4	3	0.460

General characteristics
These devices are used to protect against short circuits and overloads of wiring installations and loads in panel boards, office buildings, stores and similar applications.
Their purpose is circuit protection, circuit isolation and load operation controls. They have characteristics of instantaneous trip defined as follows:
- B-curve: instantaneous trip 3...5 times In for non-inductive or low inductive loads (heating resistors, generators, very long wire lines)
- C-curve: instantaneous trip 5...10 times In for inductive loads (mixed loads, resistive and inductive with low inrush current)
- D-curve: instantaneous trip 10...14 times In for highly inductive loads (loads with high inrush and current such as motors).

Main features include:
- IEC rated current In: 1...63A
- Pole width: 17.5mm / 0.69”
- Contact status with flag indicator
- Trip characteristic: curve type B, C and D
- Auxiliary contacts and trip releases mounted on left side
- Fixing on 35mm DIN rail (IEC/EN/BS 60715).

Operational characteristics
- Dissipation per pole: 3...13W
- IEC rated insulation voltage Ui: 440V
- IEC rated impulse voltage Uimp: 4kV
- IEC rated operational voltage Ue: 230/400VAC
- UL 1077 rated operational voltage: 480VAC
- Short circuit breaking capacity: IEC/EN/BS 10kA - UL 7.5kA 480V.

Certifications and compliance
Certifications obtained: cURus (E369585); EAC; TÜV-Rheinland.
Compliant with standards: IEC/EN/BS 60898-1, IEC/EN/BS 60947-2, UL 1077, CSA C22.2 n°235.

1P - 10kA (IEC/EN/BS)
1 module

P1MB...1P...

Order code	Curve	IEC In	Rat. volt.	N° of DIN mod.	Qty per pkg	Wt
		[A]	[V]	n°	n°	[kg]
One pole, thermal and magnetic trip type, C-curve characteristic.						
P1MBUH1PC01	C	1	277	1	12	0.133
P1MBUH1PC01V6	C	1.6	277	1	12	0.133
P1MBUH1PC02	C	2	277	1	12	0.133
P1MBUH1PC03	C	3	277	1	12	0.133
P1MBUH1PC04	C	4	277	1	12	0.133
P1MBUH1PC05	C	5	277	1	12	0.133
P1MBUH1PC06	C	6	277	1	12	0.133
P1MBUH1PC07	C	7	277	1	12	0.133
P1MBUH1PC08	C	8	277	1	12	0.133
P1MBUH1PC10	C	10	277	1	12	0.133
P1MBUH1PC12	C	12	277	1	12	0.133
P1MBUH1PC13	C	13	277	1	12	0.133
P1MBUH1PC15	C	15	277	1	12	0.133
P1MBUH1PC16	C	16	277	1	12	0.133
P1MBUH1PC20	C	20	277	1	12	0.133
P1MBUH1PC25	C	25	277	1	12	0.133
P1MBUH1PC30	C	30	277	1	12	0.133
P1MBUH1PC32	C	32	277	1	12	0.133
P1MBUL1PC35	C	35	120	1	12	0.133
P1MBUL1PC40	C	40	120	1	12	0.133
P1MBUL1PC50	C	50	120	1	12	0.133
P1MBUL1PC60	C	60	120	1	12	0.133
P1MBUL1PC63	C	63	120	1	12	0.133
One pole, thermal and magnetic trip type, D-curve characteristic.						
P1MBUH1PD01	D	1	277	1	12	0.133
P1MBUH1PD01V6	D	1.6	277	1	12	0.133
P1MBUH1PD02	D	2	277	1	12	0.133
P1MBUH1PD03	D	3	277	1	12	0.133
P1MBUH1PD04	D	4	277	1	12	0.133
P1MBUH1PD05	D	5	277	1	12	0.133
P1MBUH1PD06	D	6	277	1	12	0.133
P1MBUH1PD07	D	7	277	1	12	0.133
P1MBUH1PD08	D	8	277	1	12	0.133
P1MBUH1PD10	D	10	277	1	12	0.133
P1MBUH1PD12	D	12	277	1	12	0.133
P1MBUH1PD13	D	13	277	1	12	0.133
P1MBUH1PD15	D	15	277	1	12	0.133
P1MBUH1PD16	D	16	277	1	12	0.133
P1MBUH1PD20	D	20	277	1	12	0.133
P1MBUH1PD25	D	25	277	1	12	0.133
P1MBUH1PD30	D	30	277	1	12	0.133
P1MBUH1PD32	D	32	277	1	12	0.133
P1MBUL1PD35	D	35	120	1	12	0.133
P1MBUL1PD40	D	40	120	1	12	0.133
P1MBUL1PD50	D	50	120	1	12	0.133
P1MBUL1PD60	D	60	120	1	12	0.133
P1MBUL1PD63	D	63	120	1	12	0.133

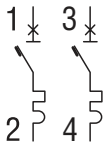
General characteristics
These devices comply with the UL 489 standard, mostly used in the North American markets. They are designed to protect feeder circuits, the part of the system from the network supply point to the protection device for a branch circuit. They can also be used on the international market thanks to compliance with the IEC/EN/BS 60947-2 standard.
They have characteristics of tripping instantaneously defined as follows:
- C-curve: instantaneous trip 5...10 times In for inductive loads (mixed loads, resistive and inductive with low inrush current)
- D-curve: instantaneous trip 10...14 times In for highly inductive loads (loads with high inrush and current such as motors).

Operational characteristics
- Dissipation per pole: 3...13W
- Rated voltage 1...32A: 277V (UL 489)
- Rated voltage 35...63A: 120V (UL 489)
- Rated insulation voltage Ui: 440V (IEC/EN/BS 60947-2)
- Rated impulse voltage Uimp: 4kV (IEC/EN/BS 60947-2)
- Rated operational voltage Ue: 230/400VAC (IEC/EN/BS 60947-2)
- Short circuit breaking capacity: IEC/EN/BS 10kA - UL 10kA.

Certifications and compliance
Certifications obtained: cULus (E481234); EAC.
Compliant with standards: UL 489, IEC/EN/BS 60947-2.

2P - 10kA (IEC/EN/BS) 2 modules

P1MB...2P...



Order code	Curve	IEC In	Rated voltage	N° of DIN mod.	Qty per pkg	Wt
		[A]	[V]	n°	n°	[kg]
Two pole, thermal and magnetic trip type, C-curve characteristic.						
P1MBUH2PC01	C	1	480Y/277	2	6	0.255
P1MBUH2PC01V6	C	1.6	480Y/277	2	6	0.255
P1MBUH2PC02	C	2	480Y/277	2	6	0.255
P1MBUH2PC03	C	3	480Y/277	2	6	0.255
P1MBUH2PC04	C	4	480Y/277	2	6	0.255
P1MBUH2PC05	C	5	480Y/277	2	6	0.255
P1MBUH2PC06	C	6	480Y/277	2	6	0.255
P1MBUH2PC07	C	7	480Y/277	2	6	0.255
P1MBUH2PC08	C	8	480Y/277	2	6	0.255
P1MBUH2PC10	C	10	480Y/277	2	6	0.255
P1MBUH2PC12	C	12	480Y/277	2	6	0.255
P1MBUH2PC13	C	13	480Y/277	2	6	0.255
P1MBUH2PC15	C	15	480Y/277	2	6	0.255
P1MBUH2PC16	C	16	480Y/277	2	6	0.255
P1MBUH2PC20	C	20	480Y/277	2	6	0.255
P1MBUH2PC25	C	25	480Y/277	2	6	0.255
P1MBUH2PC30	C	30	480Y/277	2	6	0.255
P1MBUH2PC32	C	32	480Y/277	2	6	0.255
P1MBUL2PC35	C	35	240	2	6	0.255
P1MBUL2PC40	C	40	240	2	6	0.255
P1MBUL2PC50	C	50	240	2	6	0.255
P1MBUL2PC60	C	60	240	2	6	0.255
P1MBUL2PC63	C	63	240	2	6	0.255
Two pole, thermal and magnetic trip type, D-curve characteristic.						
P1MBUH2PD01	D	1	480Y/277	2	6	0.255
P1MBUH2PD01V6	D	1.6	480Y/277	2	6	0.255
P1MBUH2PD02	D	2	480Y/277	2	6	0.255
P1MBUH2PD03	D	3	480Y/277	2	6	0.255
P1MBUH2PD04	D	4	480Y/277	2	6	0.255
P1MBUH2PD05	D	5	480Y/277	2	6	0.255
P1MBUH2PD06	D	6	480Y/277	2	6	0.255
P1MBUH2PD07	D	7	480Y/277	2	6	0.255
P1MBUH2PD08	D	8	480Y/277	2	6	0.255
P1MBUH2PD10	D	10	480Y/277	2	6	0.255
P1MBUH2PD12	D	12	480Y/277	2	6	0.255
P1MBUH2PD13	D	13	480Y/277	2	6	0.255
P1MBUH2PD15	D	15	480Y/277	2	6	0.255
P1MBUH2PD16	D	16	480Y/277	2	6	0.255
P1MBUH2PD20	D	20	480Y/277	2	6	0.255
P1MBUH2PD25	D	25	480Y/277	2	6	0.255
P1MBUH2PD30	D	30	480Y/277	2	6	0.255
P1MBUH2PD32	D	32	480Y/277	2	6	0.255
P1MBUL2PD35	D	35	240	2	6	0.255
P1MBUL2PD40	D	40	240	2	6	0.255
P1MBUL2PD50	D	50	240	2	6	0.255
P1MBUL2PD60	D	60	240	2	6	0.255
P1MBUL2PD63	D	63	240	2	6	0.255

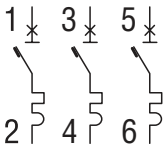
General characteristics
These devices comply with the UL 489 standard, mostly used in the North American markets. They are designed to protect feeder circuits, the part of the system from the network supply point to the protection device for a branch circuit. They can in any case be used on the international market thanks to compliance with the IEC/EN/BS 60947-2 standard as well.
They have characteristics of tripping instantaneously defined as follows:
- C-curve: instantaneous trip 5...10 times In for inductive loads (mixed loads, resistive and inductive with low inrush current)
- D-curve: instantaneous trip 10...14 times In for highly inductive loads (loads with high inrush and current such as motors).

Operational characteristics
- Rated voltage 1...32A: 480Y/277V (UL 489)
- Rated voltage 35...63A: 240V (UL 489)
- Rated insulation voltage Ui: 440V (IEC/EN/BS 60947-2)
- Rated impulse voltage Uimp: 4kV (IEC/EN/BS 60947-2)
- Rated operational voltage Ue: 230/400VAC (IEC/EN/BS 60947-2)
- Short circuit breaking capacity: IEC/EN/BS 10kA - UL 10kA.

Certifications and compliance
Certifications obtained: cULus (E481234); EAC.
Compliant with standards: UL 489, IEC/EN/BS 60947-2.

3P - 10kA (IEC/EN/BS)
3 modules

P1MB...3P...



Order code	Curve	IEC In	Rated voltage	N° of DIN mod.	Qty per pkg	Wt
		[A]	[V]	n°	n°	[kg]
Three pole, thermal and magnetic trip type, C-curve characteristic.						
P1MBUH3PC01	C	1	480Y/277	3	4	0.388
P1MBUH3PC01V6	C	1.6	480Y/277	3	4	0.388
P1MBUH3PC02	C	2	480Y/277	3	4	0.388
P1MBUH3PC03	C	3	480Y/277	3	4	0.388
P1MBUH3PC04	C	4	480Y/277	3	4	0.388
P1MBUH3PC05	C	5	480Y/277	3	4	0.388
P1MBUH3PC06	C	6	480Y/277	3	4	0.388
P1MBUH3PC07	C	7	480Y/277	3	4	0.388
P1MBUH3PC08	C	8	480Y/277	3	4	0.388
P1MBUH3PC10	C	10	480Y/277	3	4	0.388
P1MBUH3PC12	C	12	480Y/277	3	4	0.388
P1MBUH3PC13	C	13	480Y/277	3	4	0.388
P1MBUH3PC15	C	15	480Y/277	3	4	0.388
P1MBUH3PC16	C	16	480Y/277	3	4	0.388
P1MBUH3PC20	C	20	480Y/277	3	4	0.388
P1MBUH3PC25	C	25	480Y/277	3	4	0.388
P1MBUH3PC30	C	30	480Y/277	3	4	0.388
P1MBUH3PC32	C	32	480Y/277	3	4	0.388
P1MBUL3PC35	C	35	240	3	4	0.388
P1MBUL3PC40	C	40	240	3	4	0.388
P1MBUL3PC50	C	50	240	3	4	0.388
P1MBUL3PC60	C	60	240	3	4	0.388
P1MBUL3PC63	C	63	240	3	4	0.388
Three pole, thermal and magnetic trip type, D-curve characteristic.						
P1MBUH3PD01	D	1	480Y/277	3	4	0.388
P1MBUH3PD01V6	D	1.6	480Y/277	3	4	0.388
P1MBUH3PD02	D	2	480Y/277	3	4	0.388
P1MBUH3PD03	D	3	480Y/277	3	4	0.388
P1MBUH3PD04	D	4	480Y/277	3	4	0.388
P1MBUH3PD05	D	5	480Y/277	3	4	0.388
P1MBUH3PD06	D	6	480Y/277	3	4	0.388
P1MBUH3PD07	D	7	480Y/277	3	4	0.388
P1MBUH3PD08	D	8	480Y/277	3	4	0.388
P1MBUH3PD10	D	10	480Y/277	3	4	0.388
P1MBUH3PD12	D	12	480Y/277	3	4	0.388
P1MBUH3PD13	D	13	480Y/277	3	4	0.388
P1MBUH3PD15	D	15	480Y/277	3	4	0.388
P1MBUH3PD16	D	16	480Y/277	3	4	0.388
P1MBUH3PD20	D	20	480Y/277	3	4	0.388
P1MBUH3PD25	D	25	480Y/277	3	4	0.388
P1MBUH3PD30	D	30	480Y/277	3	4	0.388
P1MBUH3PD32	D	32	480Y/277	3	4	0.388
P1MBUL3PD35	D	35	240	3	4	0.388
P1MBUL3PD40	D	40	240	3	4	0.388
P1MBUL3PD50	D	50	240	3	4	0.388
P1MBUL3PD60	D	60	240	3	4	0.388
P1MBUL3PD63	D	63	240	3	4	0.388

General characteristics
These devices comply with the UL 489 standard, mostly used in the North American markets. They are designed to protect feeder circuits, the part of the system from the network supply point to the protection device for a branch circuit. They can also be used on the international market thanks to compliance with the IEC/EN/BS 60947-2 standard.
They have characteristics of tripping instantaneously defined as follows:
- C-curve: instantaneous trip 5...10 times In for inductive loads (mixed loads, resistive and inductive with low inrush current)
- D-curve: instantaneous trip 10...14 times In for highly inductive loads (loads with high inrush and current such as motors).

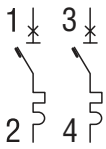
Operational characteristics
- Rated voltage 1...32A: 480Y/277V (UL 489)
- Rated voltage 35...63A: 240V (UL 489)
- Rated insulation voltage Ui: 440V (IEC/EN/BS 60947-2)
- Rated impulse voltage Uimp: 4kV (IEC/EN/BS 60947-2)
- Rated operational voltage Ue: 230/400VAC (IEC/EN/BS 60947-2)
- Short circuit breaking capacity: IEC/EN/BS 10kA - UL 10kA.

Certifications and compliance
Certifications obtained: cULus (E481234); EAC.
Compliant with standards: UL 489, IEC/EN/BS 60947-2.

1P, 2P, 3P and 4P - 10kA (IEC/EN/BS)

P2MB1P...

P2MB2P...



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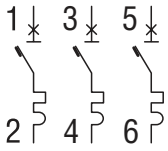

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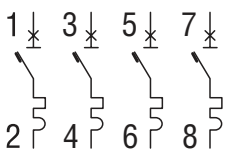


Order code	Curve	IEC In	IEC Icn	N° of DIN module	Qty per pkg	Wt
		[A]	[kA]	n°	n°	[kg]
One pole, thermal and magnetic trip type, C-curve characteristic.						
P2MB1PC080	C	80	10❶	1.5	9	0.166
P2MB1PC100	C	100	10❶	1.5	9	0.166
P2MB1PC125	C	125	10❶	1.5	9	0.166
Two pole, thermal and magnetic trip type, C-curve characteristic.						
P2MB2PC080	C	80	10	3	4	0.340
P2MB2PC100	C	100	10	3	4	0.340
P2MB2PC125	C	125	10	3	4	0.340
Three pole, thermal and magnetic trip type, C-curve characteristic.						
P2MB3PC080	C	80	10	4.5	3	0.510
P2MB3PC100	C	100	10	4.5	3	0.510
P2MB3PC125	C	125	10	4.5	3	0.510
Four pole, thermal and magnetic trip type, C-curve characteristic.						
P2MB4PC080	C	80	10	6	2	0.680
P2MB4PC100	C	100	10	6	2	0.680
P2MB4PC125	C	125	10	6	2	0.680
Two pole, thermal and magnetic trip type, D-curve characteristic.						
P2MB2PD100	D	100	10	3	4	0.510
Three pole, thermal and magnetic trip type, D-curve characteristic.						
P2MB3PD080	D	80	10	4.5	3	0.510
P2MB3PD100	D	100	10	4.5	3	0.510
P2MB3PD125	D	125	10	4.5	3	0.510
Four pole, thermal and magnetic trip type, D-curve characteristic.						
P2MB4PD080	D	80	10	6	2	0.510
P2MB4PD100	D	100	10	6	2	0.510
P2MB4PD125	D	125	10	6	2	0.510

❶ Icn at 230V.

General characteristics

These devices are used to protect against short circuits and overloads of wiring installations and loads in panel boards, office buildings, stores and similar applications.
Their purpose is circuit protection, circuit isolation and load operation controls. They have characteristics of instantaneous trip defined as follows:
- C-curve: instantaneous trip 5...10 times In for inductive loads (mixed loads, resistive and inductive with low inrush current)
- D-curve: instantaneous trip 10...14 times In for highly inductive loads (loads with high inrush and current such as motors).

Main features include:
- IEC rated current In: 80...125A
- Pole width: 27mm / 1.06”
- Contact status with flag indicator
- Trip characteristic: curve type C and D
- Fixing on 35mm DIN rail (IEC/EN/BS 60715).

Operational characteristics
- Dissipation per pole: 15...20W
- IEC rated insulation voltage Ui: 400V
- IEC rated impulse voltage Uimp: 4kV
- IEC rated operational voltage Ue: 230/400VAC (230VAC 1P version)
- Short circuit breaking capacity: IEC/EN/BS 10kA - UL 5kA 240V (1P) - 5kA 480V (2-3-4P).

Certifications and compliance

Certifications obtained: cURus (E369585); EAC; TÜV-Rheinland.
Compliant with standards: IEC/EN/BS 60898-1, IEC/EN/BS 60947-2, UL 1077, CSA C22.2 n°235.

Add-on blocks for miniature circuit breakers 1…63A

P1X1011

P1X16…

Order code	Description	Qty per MCB	Qty per pkg	Wt
		n°	n°	[kg]
Auxiliary contact.				
P1X1011❶	1 changeover contact for P1MB...	1	12	0.040
P1X1011UH	1 changeover contact for P1MBU...	1	12	0.040
Indicator contact for thermal-magnetic trip.				
P1X1311❶	1 changeover contact	1	12	0.040
Undervoltage trip release.				
P1X14230❶	230V 50/60Hz	1	8	0.070
Shunt trip release.				
P1X16230❶	110...415V 50/60Hz	1	8	0.070
P1X16024❶	12...24V 50/60Hz-DC	1	8	0.070

❶ Not suitable for P1MBU...

General characteristics
- Auxiliary and indicator contact width: 9mm/0.35” (0.5 module)
- Undervoltage and shunt trip release width: 18mm/0.71” (1 module)
- Maximum combination: 3 add-on blocks on MCB left side only of which 1 undervoltage or shunt release directly on MCB side and then 2 contacts of which 1 auxiliary and 1 indicator.

Operational characteristics
- IEC rated impulse voltage Uimp: 4kV
- IEC rated operational current in AC: 6A 230V; 3A 400V (auxiliary contacts).

Certifications and compliance
Certifications obtained: EAC, cULus (excluding P1X14230 and P1X16024), UL (only P1X14230).
Compliant with standards: IEC/EN/BS 60947-5-1, CSA C22.2 n° 5.

Residual blocks for miniature circuit breakers 1…63A

P1RA2P…

P1RA3P…

Order code	Type	IEC In	IEC IΔn	N° of DIN module	Qty per pkg	Wt
		[A]	[mA]	n°	n°	[kg]
Residual blocks – 2P – type A.						
P1RA2P40A030	A	40	30	2	1	0.160
P1RA2P40A300	A	40	300	2	1	0.160
P1RA2P63A030	A	63	30	2	1	0.160
P1RA2P63A300	A	63	300	2	1	0.160
Residual blocks – 3P – type A.						
P1RA3P40A030	A	40	30	3.5	1	0.205
P1RA3P40A300	A	40	300	3.5	1	0.205
P1RA3P63A030	A	63	30	3.5	1	0.205
P1RA3P63A300	A	63	300	3.5	1	0.205
Residual blocks – 4P – type A.						
P1RA4P40A030	A	40	30	3.5	1	0.230
P1RA4P40A300	A	40	300	3.5	1	0.230
P1RA4P63A030	A	63	30	3.5	1	0.230
P1RA4P63A300	A	63	300	3.5	1	0.230

General characteristics
These devices are intended for the protection of people against indirect contact (electric shock) and of installations against fire hazards due to a persistent earth/ground fault current.
They snap onto the P1MB... series thermal-magnetic circuit breakers; this combination forms a single device to protect people, protect against fire and protect lines.

Operational characteristics
- IEC rated insulation voltage Ui: 400V
- IEC rated impulse voltage Uimp: 4kV
- IEC rated frequency: 50/60Hz
- IEC rated operational voltage Ue: 230/400V
- IEC rated residual current for tripping IΔn: 30mA; 300mA
- Dissipation per pole: 1.6W (40A), 2.7W (63A).

Certifications and compliance
Compliance with standards: IEC/EN/BS 61009-1.
Certifications obtained: TÜV-SUD, EAC.

Add-on blocks for miniature circuit breakers 80…125A

P2X1011

P2X1311

Order code	Description	Qty per MCB	Qty per pkg	Wt
		n°	n°	[kg]
Auxiliary contact.				
P2X1011	1 changeover contact	1	10	0.040
Indicator contact for thermal-magnetic trip.				
P2X1311	1 changeover contact	1	10	0.040
Shunt trip release.				
P2X16230	110...415V 50/60Hz	1	8	0.070

General characteristics
- Auxiliary and indicator contact width: 9mm/0.35” (0.5 module)
- Shunt trip release width: 17.5mm/0.69” (1 module)
- Maximum combination: 3 add-on blocks on MCB sides of which 1 undervoltage or shunt release on MCB right side and 2 contacts on the left of which 1 auxiliary and 1 indicator.

Operational characteristics
- IEC rated insulation voltage Ui: 500V
- Rated impulse voltage Uimp: 4kV
- Rated operational current in AC: 6A 230V; 3A 400V (auxiliary contacts).

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60947-5-1.

Accessories for miniature circuit breakers

P1X9033

P1X9133

P1X9201

P1X9210

P1X9202

P1X1810

P2X1810

❶ Suitable for P1MB...
Not suitable for P1MBU...

Order code	Description	Qty per pkg	Wt
		n°	[kg]
P1X9031❶	Single-pole supply busbar	10	0.160
P1X9032❶	Two-pole supply busbar	10	0.320
P1X9033❶	Three-pole supply busbar	10	0.474
P1X9034❶	Four-pole supply busbar	10	0.600
P1X9130❶	Kit of 5 isolating covers for unused busbar terminals	10	0.030
P1X9131❶	End cap for P1X9031	50	0.001
P1X9132❶	End cap for P1X9032	50	0.001
P1X9133❶	End cap for P1X9033	50	0.001
P1X9134❶	End cap for P1X9034	50	0.001
P1X9201❶	Single-pole terminal for busbar supply; conductor cross section 25mm² max.	25	0.010
P1X9210❶	1-pole terminal for supplying busbar; conductor cross section 25mm² max.; left entry	25	0.010
P1X9202❶	Single-pole terminal for busbar supply; conductor cross section 50mm² max.	25	0.022
P1X1810	Padlockable attachment for breaker control lever P1MB...	10	0.001
P2X1810	Padlockable attachment for breaker control lever P2MB...	10	0.002

General and operational characteristics
SINGLE-POLE SUPPLY BUSBAR
- Rated operational voltage Ue: 1000V
- Central point of power supply: 100A max.
- Side point of power supply: 63A max.
- Spacing: 17.8mm/0.70”
- Busbar section: 10mm²
- For paralleling connection
- For 57 modules, 1000mm/39.37” long (57 1P breakers).

TWO-POLE, THREE-POLE AND FOUR-POLE SUPPLY BUSBARS
- Rated operational voltage Ue: 690V
- Central point of power supply: 100A max.
- Side point of power supply: 63A max.
- Spacing: 17.8mm/0.70”
- Busbar section: 10mm²
- For paralleling connection
- Two-pole: for 56 modules, 1000mm/39.37” long (28 2P breakers)
- Three-pole: for 57 modules, 1012mm/39.84” long (19 3P breakers)
- Four-pole: for 56 modules, 1000mm/39.37” long (14 4P breakers).

PADLOCKABLE ATTACHMENT
- Max. padlock diameter 5mm/0.20”
- Padlockable in ON and OFF
- One can be fitted for each pole of the breaker.

UL approved supply busbar

3P18L57S0U50

802150S

802180

ULC...

BRU3V

802307

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Power bars for UL 1077 thermal-magnetic circuit breakers, type P1MB...			
1P18K57S0U50	Single-pole supply busbar	10	0.160
2P18L56S0U50	Two-pole supply busbar	10	0.320
3P18L57S0U50	Three-pole supply busbar	10	0.474
BRB5W	Kit of 5 insulating caps for unused bar terminals	10	0.030
A69	End cap for 1P18K57S0U50	50	0.001
A7	End cap for 2P18L56S0U50 and 3P18L57S0U50	50	0.001
802150S	Single-pole terminal block to supply busbar 1P18K57S0U50; conductor section 10 to 1 AWG	25	0.030
802180	Single-pole terminal block to supply busbar 2P18L56S0U50 and 3P18L57S0U50; conductor section 10 to 1 AWG	10	0.030
Power bars for UL 489 thermal-magnetic circuit breakers, type P1MBU...			
ULC157A18A	Single pole power bar	10	0.160
ULC256A18A	Two pole power bar	10	0.320
ULC357A18A	Three pole power bar	10	0.474
BRU3V	Kit of 3 insulating caps for unused bar terminals	10	0.022
A68	End cap for all ULC... type bars	50	0.001
802307	Single-pole terminal block to power bars; conductor section 14 to 2 AWG	10	0.030

Main features
UL approved power bars are divided into two groups:
- Bars for UL 1077 approved thermal-magnetic circuit breakers;
- Bars for UL 489 approved thermal-magnetic circuit breaker bars.

Both models are supplied 1000mm/39.37” long and can be cut to the desired length. This feature makes it easy to adapt to any combination of installed thermal-magnetic circuit breakers. Special end caps must be applied at the points where the bars are cut, to ensure IP20 protection and to comply with UL standards.

Operational characteristics
POWER BARS FOR UL APPROVED THERMAL-MAGNETIC CIRCUIT BREAKERS
- Maximum rated AC voltage: 600V
- Central power point: 160A max
- Side point for power supply: 80A max
- Spacing: 17.8mm/0.70”
- Bar section: 18mm²
- For parallel connection
- Single pole: for 57 modules, 1000mm/39.37” long (57 1P switches)
- Two pole: for 56 modules, 1000mm/39.37” long (28 2P switches)
- Three pole: for 57 modules, 1012mm/39.84” long (19 3P switches).

Certifications
UL 508 for P18K57... bars (for use with UL 1077 approved thermal-magnetic circuit breakers).
UL 489 for UL... bars (for use with UL 489 approved thermal-magnetic circuit breakers).

Switch disconnectors

P1MS1P...

P1MS2P...

P1MS3P...

P1MS4P...

Order code	Ie	N° of DIN module	Qty per pkg	Wt
	[A]	n°	n°	[kg]
Modular switch disconnectors - 1P.				
P1MS1P032	32	1	12	0.083
P1MS1P040	40	1	12	0.083
P1MS1P063	63	1	12	0.083
P1MS1P100	100	1	12	0.083
P1MS1P125	125	1	12	0.083
Modular switch disconnectors - 2P.				
P1MS2P032	32	2	6	0.170
P1MS2P040	40	2	6	0.170
P1MS2P063	63	2	6	0.170
P1MS2P100	100	2	6	0.170
P1MS2P125	125	2	6	0.170
Modular switch disconnectors - 3P.				
P1MS3P032	32	3	4	0.250
P1MS3P040	40	3	4	0.250
P1MS3P063	63	3	4	0.250
P1MS3P100	100	3	4	0.250
P1MS3P125	125	3	4	0.250
Modular switch disconnectors - 4P.				
P1MS4P032	32	4	3	0.330
P1MS4P040	40	4	3	0.330
P1MS4P063	63	4	3	0.330
P1MS4P100	100	4	3	0.330
P1MS4P125	125	4	3	0.330

General characteristics
These devices are mainly used for disconnection and insulation of power lines and systems. They can also be used to switch various types of resistive and inductive loads.
Main features include:
- IEC rated current In: 32...125A
- Pole width: 17.5mm / 0.69”
- Clear contact status indication
- Wide terminals for easy wiring
- Auxiliary contacts can be mounted on left side and padlockable attachment
- Fixing on 35mm DIN rail (IEC/EN/BS 60715).

Operational characteristics
- Utilisation category: AC-22A
- IEC rated insulation voltage Ui: 1000V
- IEC rated impulse voltage Uimp: 4kV
- IEC rated operational voltage Ue: 1P 230...240V; 2P, 3P, 4P 400...440V
- IEC rated short-time withstand current Icw: 12xIe (for 1 second)
- rated conditional short-circuit current:
- 25kA with gG fuses rated 63A
- 15kA with gG fuses rated 125A.

Certifications and compliance
Certifications obtained: TÜV-Rheinland, EAC.
Compliant with standards: IEC/EN/BS 60947-3.

Add-on blocks for switch disconnectors P1MS...

P1X1011S

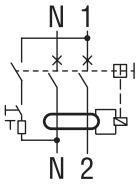
P1X1810

Order code	Description	Qty per breaker	Qty per pkg	Wt
		n°	n°	[kg]
P1X1011S	Auxiliary contact, 1 changeover contact	1	1	0.040
P1X1810	Padlockable attachment for switch control lever P1MS...	1	10	0.001

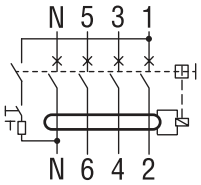
Operational characteristics (auxiliary contact)
- Utilisation category AC-12: 6A 230V; 3A 400V
- Utilisation category DC-12: 0.4A 250V; 6A 24V.

2P - 2 modules
4P - 4 modules

P1RD2P...



P1RD4P...



P1RC4PB...

Order code	Type	IEC In	IEC IΔn	N° of DIN module	Qty per pkg	Wt
		[A]	[mA]	n°	n°	[kg]
Two pole RCCB type AC.						
P1RD2P25AC030	AC	25	30	2	1	0.185
P1RD2P25AC300	AC	25	300	2	1	0.185
P1RD2P40AC030	AC	40	30	2	1	0.185
P1RD2P40AC300	AC	40	300	2	1	0.185
P1RD2P63AC030	AC	63	30	2	1	0.185
P1RD2P63AC300	AC	63	300	2	1	0.185
Two pole RCCB type A.						
P1RD2P25A030	A	25	30	2	1	0.185
P1RD2P25A300	A	25	300	2	1	0.185
P1RD2P40A030	A	40	30	2	1	0.185
P1RD2P40A300	A	40	300	2	1	0.185
P1RD2P63A030	A	63	30	2	1	0.185
P1RD2P63A300	A	63	300	2	1	0.185
Two pole RCCB type A - selective.						
new **P1RD2P40A300S**	A	40	300	2	1	0.185
new **P1RD2P63A300S**	A	63	300	2	1	0.185
Four pole RCCB type AC.						
P1RD4P25AC030	AC	25	30	4	1	0.326
P1RD4P25AC300	AC	25	300	4	1	0.326
P1RD4P40AC030	AC	40	30	4	1	0.326
P1RD4P40AC300	AC	40	300	4	1	0.326
P1RD4P63AC030	AC	63	30	4	1	0.326
P1RD4P63AC300	AC	63	300	4	1	0.326
Four pole RCCB type A.						
P1RD4P25A030	A	25	30	4	1	0.326
P1RD4P25A300	A	25	300	4	1	0.326
P1RD4P40A030	A	40	30	4	1	0.326
P1RD4P40A300	A	40	300	4	1	0.326
P1RD4P63A030	A	63	30	4	1	0.326
P1RD4P63A300	A	63	300	4	1	0.326
Four pole RCCB type A - selective.						
new **P1RD4P40A300S**	A	40	300	4	1	0.326
new **P1RD4P63A300S**	A	63	300	4	1	0.326
Four pole RCCB type B.						
P1RC4P40B030	B	40	30	4	1	0.335
P1RC4P40B300	B	40	300	4	1	0.335
P1RC4P63B030	B	63	30	4	1	0.335
P1RC4P63B300	B	63	300	4	1	0.335
P1RC4P80B030	B	80	30	4	1	0.335
P1RC4P80B300	B	80	300	4	1	0.335

General characteristics
These RCCBs are intended for the protection of people against indirect contact (electric shock) and of installations against fire hazards due to a persistent earth/ground fault current. Specifically to prevent electric shock, RCCBs must be rated with a rated residual current (IΔn) not exceeding 30mA so that these devices trip in the case of earth/ground fault only. They usually are connected in series with thermal-magnetic breakers which assure short circuit and overcurrent protection too. P1RC types have a IΔn of either 30mA or 300mA and are available with three different versions of residual current tripping, as follows:

Type AC – Tripping for earth/ground fault is ensured "for residual sinusoidal alternating currents, suddenly applied or slowly rising". The symbol identifying Type AC is the following:

Type A – Tripping for earth/ground fault is ensured "for residual sinusoidal alternating currents and pulsating direct currents, suddenly applied or slowly rising". In addition to the protection given by Type AC, this version protects against residual current with pulsating waveform. This can be caused by circuits connected with electronic equipment. The symbol identifying Type A is the following:

Type A selective – in addition to the characteristics of type A, they have a delayed tripping. Installed upstream of a series of lines protected by residual current breakers, it allows the tripping of the downstream ground fault device protection avoiding the tripping of upstream line. The symbol identifying the selective type is: **S**

Type B – tripping is ensured for all conditions already covered by types AC and A. They also ensure tripping for high-frequency leakage currents up to 1000Hz and direct currents. They are particularly suitable for applications with inverters, UPSs and electric vehicle charging stations.
The symbol identifying Type B is the following:

Main features include:
- IEC rated current In: 25A, 40A and 63A
- Versions: 2P and 4P
- Type of operation: AC, A, B and A selective
- Pole width: 17.5mm / 0.69"
- Contact status with flag indicator
- Fixing on 35mm DIN rail (IEC/EN/BS 60715).

Operational characteristics
- Dissipation per pole:
  - 1.1W for P1RC2/4P25... type AC or A
  - 2.9W for P1RC2/4P40... type AC, A or B
  - 7.2W for P1RC2/4P63... type AC, A or B
  - 9.7W for P1RC/4P80... type B
- IEC rated insulation voltage Ui: 400V
- IEC rated impulse voltage Uimp: 4kV
- IEC rated frequency: 50/60Hz
- IEC rated operational voltage Uc: 230VAC for 2P; 230/400VAC for 4P
- IEC rated residual operating voltage Ue: IΔn: 30mA; 300mA
- IEC short-circuit breaking capacity Icn: 10kA
- Tripping delay for type A selective: 150...500ms.

Certifications and compliance
Certifications obtained: TÜV-Rheinland (types AC and A), EAC.
Compliant with standards: IEC/EN/BS 61008-1, IEC/EN/BS 61008-2-1 (all types); IEC/EN/BS 62423 (type B).

Add-on blocks for P1RD...

P1X1011

P1X16...

Order code	Description	Qty per MCB	Qty per pkg	Wt
		n°	n°	[kg]
Auxiliary contact.				
P1X1011	1 changeover contact	1	12	0.040
Indicator contact for trip.				
P1X1311	1 changeover contact	1	12	0.040
Undervoltage trip release.				
P1X14230	230V 50/60Hz	1	8	0.070
Shunt trip release.				
P1X16230	110...415V 50/60Hz	1	8	0.070
P1X16024	12...24V 50/60Hz-DC	1	8	0.070
Padlockable attachment.				
P1X1810	Padlockable attachment for breaker control lever	1	10	0.001

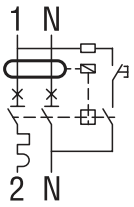
General characteristics
- Auxiliary and indicator contact width: 9mm/0.35" (0.5 module)
- Undervoltage and shunt trip release width: 18mm/0.71" (1 module)
- Maximum combination: 3 add-on blocks on MCB left side only of which 1 undervoltage or shunt release directly on MCB side and then 2 contacts of which 1 auxiliary and 1 indicator.

Operational characteristics
- IEC rated impulse voltage Uimp: 4kV
- IEC rated operational current in AC: 6A 230V; 3A 400V (auxiliary contacts).

Certifications and compliance
Certifications obtained: EAC, cULus (excluding P1X14230 and P1X16024), UL (only P1X14230).
Compliant with standards: IEC/EN/BS 60947-5-1, CSA C22.2 n° 5.

1P+N - 10kA
2 modules

P1RE1N...



Order code	Curve	IEC In	IEC Icn	IEC IΔn	Mod. DIN	Qty per pkg	Wt
		[A]	[kA]	[mA]	n°	n°	[kg]
Single pole + neutral RCBO type AC.							
P1RE1NC06AC030	C	6	10	30	2	1	0.205
P1RE1NC06AC300	C	6	10	300	2	1	0.205
P1RE1NC10AC030	C	10	10	30	2	1	0.205
P1RE1NC10AC300	C	10	10	300	2	1	0.205
P1RE1NC16AC030	C	16	10	30	2	1	0.205
P1RE1NC16AC300	C	16	10	300	2	1	0.205
P1RE1NC20AC030	C	20	10	30	2	1	0.205
P1RE1NC20AC300	C	20	10	300	2	1	0.205
P1RE1NC25AC030	C	25	10	30	2	1	0.205
P1RE1NC25AC300	C	25	10	300	2	1	0.205
P1RE1NC32AC030	C	32	10	30	2	1	0.205
P1RE1NC32AC300	C	32	10	300	2	1	0.205
P1RE1NC40AC030	C	40	10	30	2	1	0.205
P1RE1NC40AC300	C	40	10	300	2	1	0.205
Single pole + neutral RCBO type A.							
P1RE1NC06A030	C	6	10	30	2	1	0.205
P1RE1NC06A300	C	6	10	300	2	1	0.205
P1RE1NC10A030	C	10	10	30	2	1	0.205
P1RE1NC10A300	C	10	10	300	2	1	0.205
P1RE1NC13A030	C	13	10	30	2	1	0.205
P1RE1NC16A030	C	16	10	30	2	1	0.205
P1RE1NC16A300	C	16	10	300	2	1	0.205
P1RE1NC20A030	C	20	10	30	2	1	0.205
P1RE1NC20A300	C	20	10	300	2	1	0.205
P1RE1NC25A030	C	25	10	30	2	1	0.205
P1RE1NC25A300	C	25	10	300	2	1	0.205
P1RE1NC32A030	C	32	10	30	2	1	0.205
P1RE1NC32A300	C	32	10	300	2	1	0.205
P1RE1NC40A030	C	40	10	30	2	1	0.205
P1RE1NC40A300	C	40	10	300	2	1	0.205

General characteristics
These devices both detect and trip in the event of residual current and protect circuits in the case of short circuits and overcurrent. From a practical point of view, they integrate both functions of MCB and RCCB.
They have a C-type trip characteristic (instantaneous trip 5-10 times In) and are used for inductive loads (mixed loads, resistive and inductive with low inrush current).
In addition, they have a rated residual current (IΔn) of either 30mA or 300mA and are available with two different versions of residual current tripping type AC or A as described on page 17-14.
Its main features are:
- IEC rated current In: 6...40A
- Version: 1P+N
- Contact status with flag indicator
- Double control lever to distinguish the residual current tripping from short circuit or overcurrent tripping
- Trip characteristic: curve type C
- Fixing on 35mm DIN rail (IEC/EN/BS 60715).

Operational characteristics
- Dissipation per pole: 3...13W
- Rated insulation voltage Ui: 400V
- Rated impulse voltage Uimp: 4kV
- Operating frequency: 50/60Hz
- Rated operational voltage Ue: 230VAC
- Rated residual operating voltage IΔn: 30mA; 300mA
- IEC short-circuit breaking capacity Icn: 10kA

Certifications and compliance
Certifications obtained: TÜV Rheinland, EAC.
Compliant with standards: IEC/EN/BS 61009-1, IEC/EN/BS 61009-2-1.

Add-on blocks for P1RE...

P1X1011

P1X16...

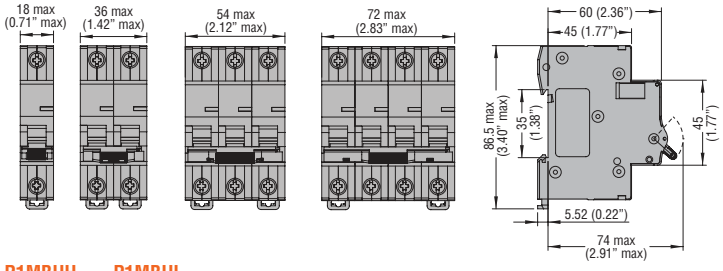
Order code	Description	Qty per MCB	Qty per pkg	Wt
		n°	n°	[kg]
Auxiliary contact.				
P1X1011	1 changeover contact	1	12	0.040
Indicator contact for trip.				
P1X1311	1 changeover contact	1	12	0.040
Undervoltage trip release.				
P1X14230	230V 50/60Hz	1	8	0.070
Shunt trip release.				
P1X16230	110...415V 50/60Hz	1	8	0.070
P1X16024	12...24V 50/60Hz-DC	1	8	0.070
Padlockable attachment.				
P1X1810	Padlockable attachment for breaker control lever	1	10	0.001

General characteristics
- Auxiliary and indicator contact width: 9mm/0.35" (0.5 module)
- Undervoltage and shunt trip release width: 18mm/0.71" (1 module)
- Maximum combination: 3 add-on blocks on MCB left side only of which 1 undervoltage or shunt release directly on MCB side and then 2 contacts of which 1 auxiliary and 1 indicator.

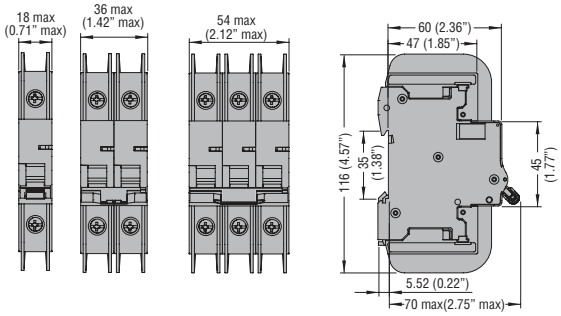
Operational characteristics
- IEC rated impulse voltage Uimp: 4kV
- IEC rated operational current in AC: 6A 230V; 3A 400V (auxiliary contacts).

Certifications and compliance
Certifications obtained: EAC, cULus (excluding P1X14230 and P1X16024), UL (only P1X14230).
Compliant with standards: IEC/EN/BS 60947-5-1, CSA C22.2 n° 5.

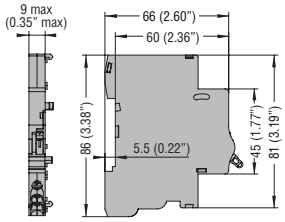
MINIATURE CIRCUIT BREAKERS
P1MB...



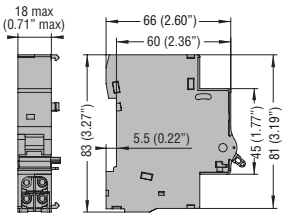
P1MBUH... - P1MBUL....



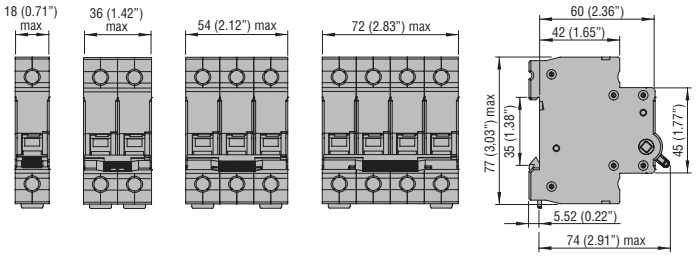
ACCESSORIES
Add-on contacts
P1X1011 - P1X0111S - P1X1011UH - P1X1311



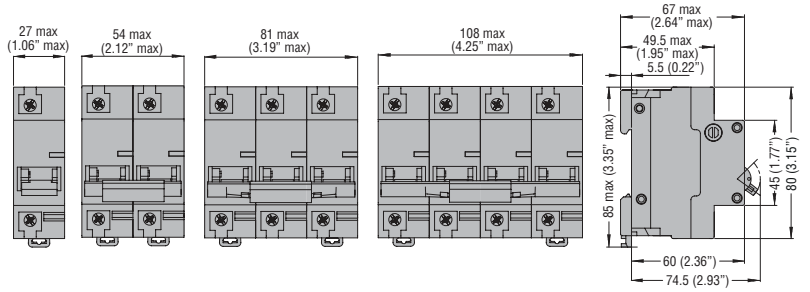
Undervoltage and shunt releases
P1X14230 - P1X16...



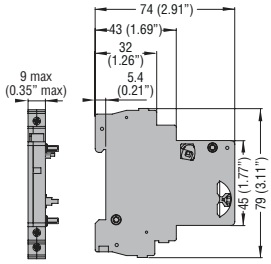
SWITCH DISCONNECTORS
P1MS....



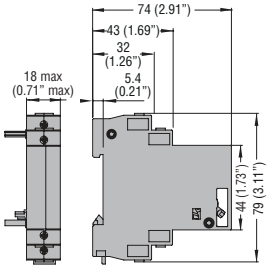
MINIATURE CIRCUIT BREAKERS
P2MB...



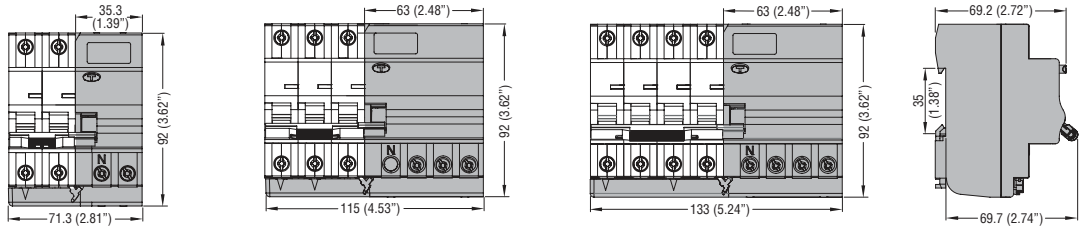
ACCESSORIES
Add-on contacts
P2X1011 - P2X1311



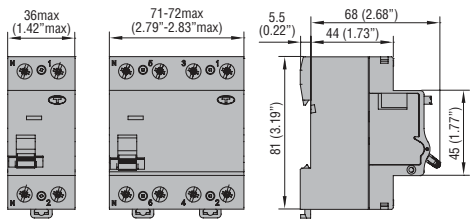
Shunt release
P2X16230



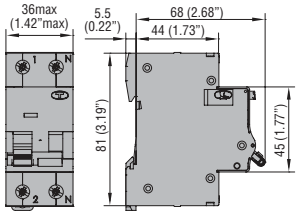
RESIDUAL BLOCKS
P1RA



RESIDUAL CURRENT OPERATED CIRCUIT BREAKERS
P1RD...

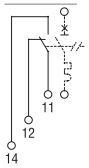


RESIDUAL CURRENT OPERATED CIRCUIT BREAKERS WITH OVERCURRENT PROTECTION
P1RE...

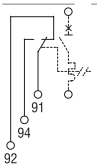


Wiring diagrams

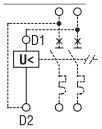
P1X1011 - P1X1011S - P1X1011UH - P2X1011



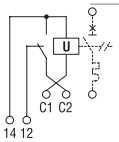
P1X1311 - P2X1311



P1X14230



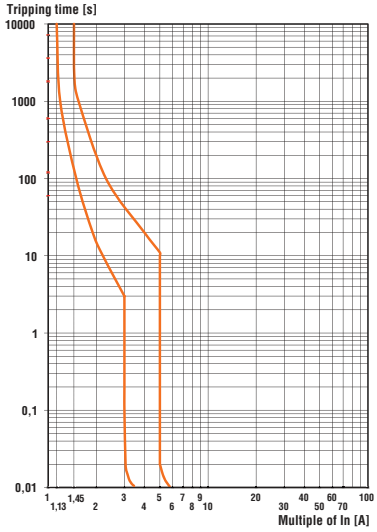
P1X16... - P2X16230



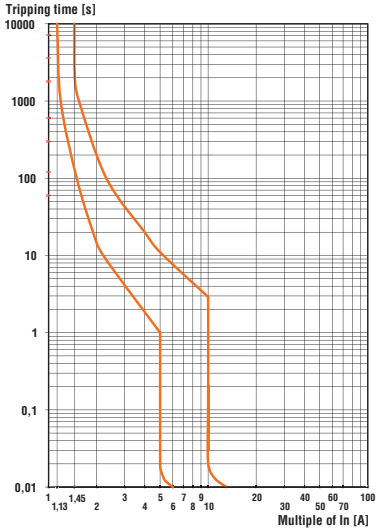
TYPE			P1MB1M...	P1MB1N...	P1MB...P...	P2MB	P1MS...	P1RA	P1RD...	P1RE...
Description			Miniature circuit breakers	Miniature circuit breakers	Miniature circuit breakers	Miniature circuit breakers	Switch disconnectors	Residual blocks	Residual current operated circuit breakers	Residual current operated circuit breakers w/ overcurrent prot.
Standards			IEC/EN/BS 60898, IEC/EN/BS 60947-2	IEC/EN/BS 60898, IEC/EN/BS 60947-2	IEC/EN/BS 60898, IEC/EN/BS 60947-2 UL 1077 - UL 489❶	IEC/EN/BS 60947-2 UL 1077	IEC/EN/BS 60947-3	IEC/EN/BS 61008-1 IEC/EN/BS 61008-2-1	IEC/EN/BS 61008-1 IEC/EN/BS 61008-2-1	IEC/EN/BS 61009-2-1
IEC rated insulation voltage Ui		V	500	230	440	400	1000	400	400	400
IEC rated impulse withstand voltage Uimp		kV	4	4	4	6	4	4	4	4
IEC rated operational voltage Ue	in AC	V	230	230	230 (1P, 1P+N) 230/400 (2P, 3P, 4P)❸	230 (1P) 230/400 (2P, 3P, 4P)	230...240 (1P) 400...440V (2P, 3P, 4P)	230 (2P) 230/400 (3P, 4P)	230 (2P) 230/400(4P)	230
	in DC	V	—	—	80 (1P, 2P)❹	80 (1P) / 125 (2P)❺	—	—	—	—
Rated frequency		Hz	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60
Maximum rated current		A	40	63	63	125	125	63	63	40
Available rated current for types		A	2, 4, 6, 10, 13, 16, 20, 25, 32, 40	1, 2, 4, 6, 10, 16, 20, 25, 32, 40, 50, 63	1, 1,6, 3, 4, 6, 8, 10, 13, 16, 20, 25, 32, 40, 50, 63❷	80, 100, 125	32, 40, 63, 100, 125	40, 63	25, 40, 63 (80A solo tipo B)	6, 10, 16, 20, 25, 32, 40
Versions			1P+N	1P+N	1P, 2P, 3P, 4P	1P, 2P, 3P, 4P	1P, 2P, 3P, 4P	2P, 3P, 4P	2P, 4P	1P+N
Tripping characteristic		curve	B-C	C	B-C-D	C-D	—	—	—	C
Instantaneous tripping			Curve B: 3...5In Curve C: 5...10In	Curve B: 3...5In Curve C: 5...10In	Curve B: 3...5In Curve C: 5...10In Curve D: 10...14In	Curve C: 5...10In Curve D: 10...14In	—	—	—	Curve C: 5...10In
Residual operation characteristic		type	—	—	—	—	—	A	AC, A, B❼	AC, A
Rated residual current IΔn		mA	—	—	—	—	—	30, 300	30, 300	30, 300
Short circuit capacity (IEC/EN/BS)		kA	6 (Icn/Icu)	6 (Icn/Icu)	10 (Icn/Icu)	10 (Icu)	—	—	10 (Inc)	10 (Icn)
Short circuit capacity (UL 1077) ❻		kA	—	—	7.5 (1P 240V) 5 (1P 277V) 7.5 (2,3,4P 480V)	5	—	—	—	—
Mechanical life		cycle	20,000	20,000	20,000	10,000	7,000	20,000	20,000	20,000
Electrical life		cycle	10,000	10,000	10,000	10,000	1,000	10,000	10,000	10,000
Tightening torque of terminals		Nm	1.1...1.2	1.8...2	1.8...2	3.2...3.5	3.2...3.5	1.8...2	1.8...2	1.8...2
		lb.in	9.7...10.6	16...17.7	16...17.7	28.8...31	28.8...31	16...17.7	16...17.7	16...17.7
		Tool	PZ2	PZ2	PZ2	PZ2	PZ2	PZ2	PZ2	PZ2
Conductor section min...max.		mm^2	1...16	1...35	1...35	2.5...50	1...50	1...25	2.5...35	1...16
		AWG	14...6	14...2	14...2	14...1/0	16...1	14...6	14...2	16...3
AMBIENT CONDITIONS										
Temperature	Operating	°C	-40...+70	-40...+70	-40...+70	-40...+70	-25...+70	-25...+60	-25...+60	-25...+60
	Storage	°C	-40...+80	-40...+80	-40...+80	-40...+80	-25...+70	-40...+80	-40...+80	-40...+80
Max. altitude		m	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Pollution degree			2	2	2	3	3	2	2	2
Mounting			35mm DIN rail (IEC/EN/BS 60715)							

TRIP CHARACTERISTICS

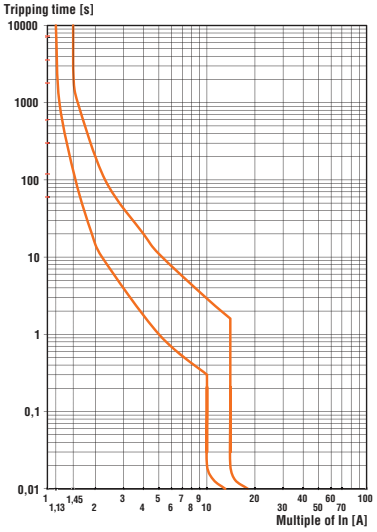
Curve B



Curve C



Curve D



❶ UL489 only P1MBU... version; for the operational voltages for these devices refer to the pages for the chosen product.
❷ For the UL 489, P1MBU... versions, the following rated current currents are also available: 5, 7, 12, 15, 30, 35, 60 A.
❸ For the UL 489, P1MBU... versions to 32A: 1P 277V; 2P and 3P 480Y/277V. From 35 to 63A: 1P 120V; 2P and 3P 240V.
❹ UL 1077 standard: 60VDC (1P) / 125VDC (2P), short circuit capacity 7.5kA. For the UL 489, P1MBU... versions: 60VDC (1P, 2P) / 125VDC (2P), short circuit capacity 10kA
❺ UL 1077 standard: 60VDC (1P, 2P), short circuit capacity 10kA.
❻ For the UL 489, P1MBU..., short circuit capacity 10kA.
❼ Type A selective is alslo available. Tripping delay: 150...500ms.

Surge protection devices

- Protection against overvoltage and high surge conditions caused by direct or indirect lightning strikes
- Version with integrated fuse and “no leakage current” available
- Types with plug-in cartridge provide fast servicing capability
- Visual failure status signalling of single modules
- Versions with or without output for remote SPD status indication
- Versions for data and signal lines
- Versions for photovoltaic applications
- UL-certified versions.

SEC. - PAGE

Surge protection devices for AC system
Type 1 and 2 monoblock Iimp=25kA ..... 18 - 4
Type 1 and 2 with plug-in cartridge Iimp=25kA with integrated fuse ..... 18 - 4
Type 1 and 2 with plug-in cartridge Iimp=12.5kA ..... 18 - 5
Type 1 and 2 monoblock Iimp=12.5kA ..... 18 - 5
Type 1 and 2 with plug-in cartridge Type 1CA/Open-Type 1 UL-certified ..... 18 - 5
Type 2 with plug-in cartridge In=20kA ..... 18 - 6
Type 2 with plug-in cartridge In=5kA ..... 18 - 6
Type 3 with plug-in cartridge Uoc/Icw=10kV/5kA ..... 18 - 6
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Surge protection devices for data and signal lines
Type C2-D1 ..... 18 - 7

Surge protection devices for photovoltaic applications
Type 1 and 2 with plug-in cartridge Ucpv=1100VDC and 1500VDC ..... 18 - 7
Type 2 with plug-in cartridge Ucpv=600VDC, 1100VDC and 1500VDC ..... 18 - 7

Dimensions ..... 18 - 8
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Technical characteristics ..... 18 - 13

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TYPE 1 AND 2 MONOBLOCK Iimp=25kA
- 1P, 1P+N, 2P, 3P, 3P+N, 4P
- IEC impulse current Iimp (10/350µs): 25kA
- IEC maximum discharge current Imax (8/20µs): 100kA
- SPD status indicator
- Versions with output for remote status indication
- Version with integrated fuse and “no leakage current” available.

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TYPE 1 AND 2 Iimp=12.5kA
- 1P, 1P+N, 2P, 3P, 3P+N, 4P
- IEC impulse current Iimp (10/350µs): 12.5kA
- IEC maximum discharge current Imax (8/20µs):
  - 40kA for versions with plug-in cartridge
  - 50kA for monoblock versions
- Single module status indicator
- Versions with output for remote status indication.

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TYPE 1CA/OPEN-TYPE 1 UL-CERTIFIED WITH PLUG-IN CARTRIDGE
- 3P
- IEC impulse current Iimp (10/350µs): 5...12.5kA
- IEC rated discharge current In (8/20µs): 20kA
- IEC maximum discharge current Imax (8/20µs): 50kA
- Maximum continuous voltage Uc: 300...750VAC
- Versions with output for remote status indication.

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TYPE 2 WITH PLUG-IN CARTRIDGE In=20kA
- 1P, 1P+N, 2P, 3P, 3P+N, 4P
- IEC maximum discharge current Imax (8/20µs): 50kA
- IEC rated discharge current In (8/20µs): 20kA
- Single module status indicator
- Versions with or without output for remote status indication.

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TYPE 2 WITH PLUG-IN CARTRIDGE In=5kA
- 1P, 1P+N, 2P, 3P, 3P+N, 4P
- IEC maximum discharge current Imax (8/20µs): 15kA
- IEC rated discharge current In (8/20µs): 5kA
- Single module status indicator
- Versions with or without output for remote status indication.

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TYPE 3 WITH PLUG-IN CARTRIDGE Uoc/Icw=10kV/5kA
- 1P+N
- Version with plug-in cartridge:
  - IEC rated current In (8/20µs): 5kA
  - SPD status indicator
  - output for remote status indication
- Acoustic or optical intervention indicator.

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TYPE 3 COMPACT VERSIONS Uoc/Icw=6kV/3kA
- 1P+N
- Compact versions:
  - IEC rated current In (8/20µs): 3kA
  - Combined impulse Uoc: 6kV
- Acoustic or optical intervention indicator.

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TYPE C2-D1 FOR DATA AND SIGNAL LINES In=10kA
- Versions for RS485 and BUS 24VDC lines:
  - C2 rated current In (8/20µs): 10kA
  - D1 impulse current Iimp (10/350µs): 2.5kA
  - Output for remote status indication
- Version for Cat.6 Ethernet line - POE
  - C2 rated current In (8/20µs): 10kA
  - D1 impulse current Iimp (10/350µs): 1kA.
- Versions for telephone line:
  - C2 rated current In (8/20µs): up to 20kA
  - D1 impulse current Iimp (10/350µs): up to 7.5kA
  - Output for remote status indication.

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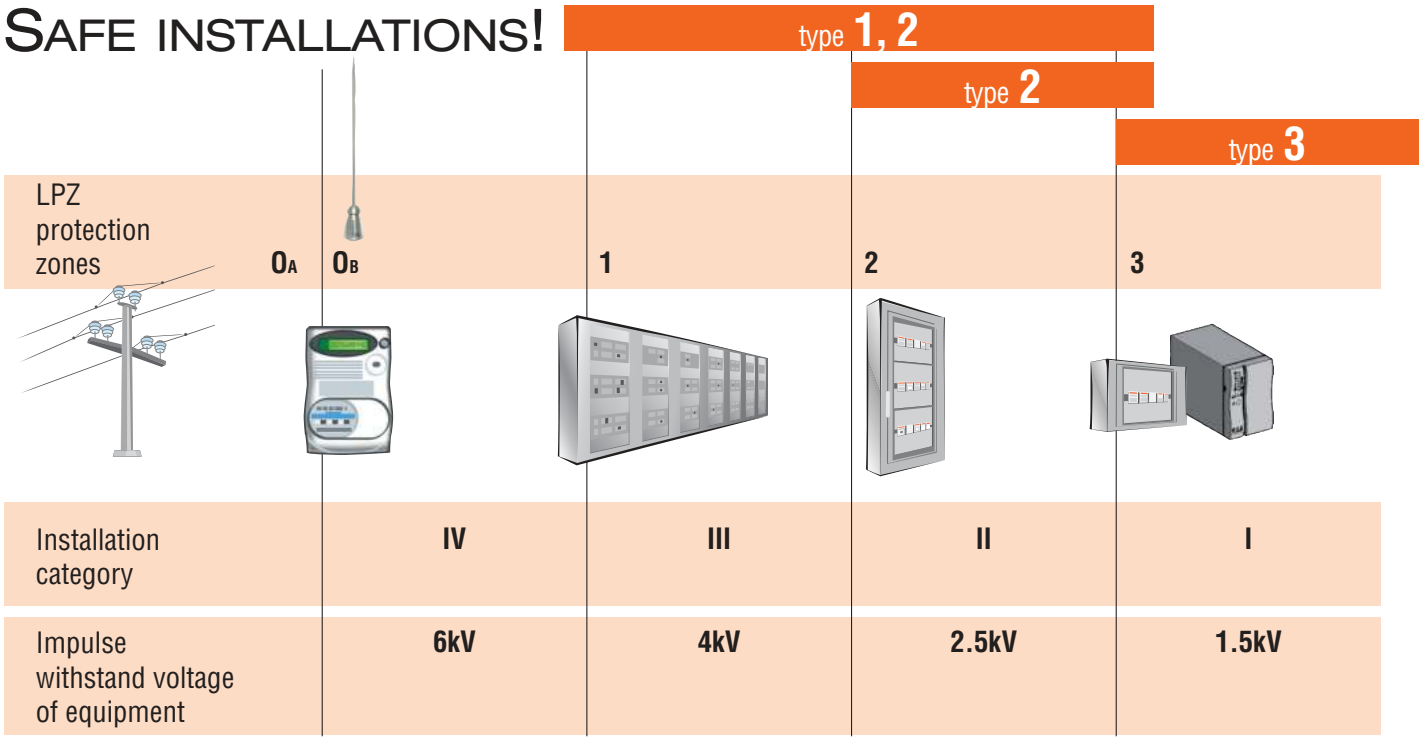
TYPE 1 AND 2 AND TYPE 2 WITH PLUG-IN CARTRIDGE FOR PHOTOVOLTAIC APPLICATIONS
- Versions with plug-in cartridge: +, -, PE
- IEC maximum operational voltage: 1500VDC
- IEC maximum discharge current Imax (8/20µs): 40kA
- IEC rated discharge current In (8/20µs): 20kA
- Single module status indicator
- Versions with or without output for remote status indication
- Tested according to EN/BS 50539-11.

Lovato electric

SAFE INSTALLATIONS!



SURGE PROTECTION DEVICES

The surge arresters commonly defined as SPD (Surge Protection Devices), are devices designed to protect electric systems and equipment against transient and impulse overvoltage such as those caused by lightning strikes and by electric switching.
Their function is to divert the discharge or impulse current generated by an overvoltage to earth/ground, thereby protecting the equipment downstream.
SPD are installed in parallel with the electric line to be protected. At the mains rated voltage, they are comparable to an open circuit and have a high impedance at their ends.
In the presence of an overvoltage, this impedance falls to very low values, closing the circuit to earth/ground.
Once the overvoltage has ended, their impedance rises again rapidly to the initial value (very high), returning to open loop conditions.
The SA1B and SA0B (monoblock) and SA0 (with plug-in cartridge) type protects against direct and indirect lightning strikes as well as induced overvoltage conditions. It can be installed in areas with a high risk of direct lightning strikes, inside main distribution boards or nearby sub-distribution boards.

PROTECTION ZONES

Standards define the LPZs (Lightning Protection Zone), which indicate the different zones at risk. These are distinguished among:

LPZ 0A: Area outside a building not protected by LPS (e.g. lightning rods) where a direct lightning strikes is possible. In this zone, there is total exposure to induced electromagnetic fields.

LPZ 0B: Area outside a building not protected by LPS; therefore, a direct lighting strike is not possible. In this zone zone, there is total exposure to induced electromagnetic fields.

LPZ 1: Area inside a building so protected against direct lightning strikes. In this zone, there is the possibility of very high overvoltages and of induced electromagnetic fields which may be attenuated depending on the degree of screening. This zone must be protected by an SPD type 1 at the boundary with zone LPZ 0A or 0B.

LPZ 2: Area inside a building (e.g. in a room) in which there is the possibility of low overvoltages since they are limited by SPDs installed upstream. This zone must be protected by an SPD type 2 at the boundary with zone LPZ 1.

LPZ 3: Area inside a building (e.g. the system connected to a socket in a room) characterised by very sensitive equipment, in which there is the possibility of very low overvoltages as they are limited by SPDs installed upstream.
This zone must be protected by an SPD type 3 at the boundary with zone LPZ 2.

INSTALLATION CATEGORY

For the correct choice of the SPD, the dielectric strength of the equipment to protect needs to be considered. This level is established by IEC 60664-1 standard.
For a 230/400V installation, it specifies:

Installation category IV: 6kV for devices installed upstream of the distribution board (for example, delivery point with the distribution system)

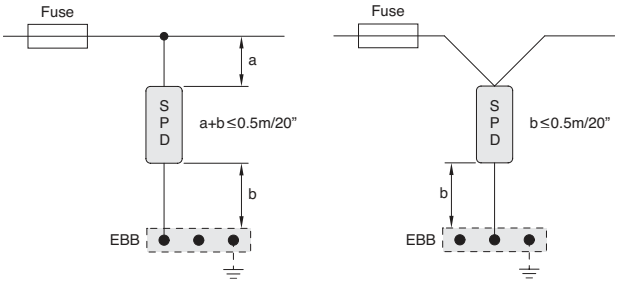
Installation category III: 4kV for devices being part of the fixed system (for example, distribution boards, switching devices, isolators, ducting and their accessories)

Installation category II: 2.5kV for non electric devices (for example, household appliances or electric tools)

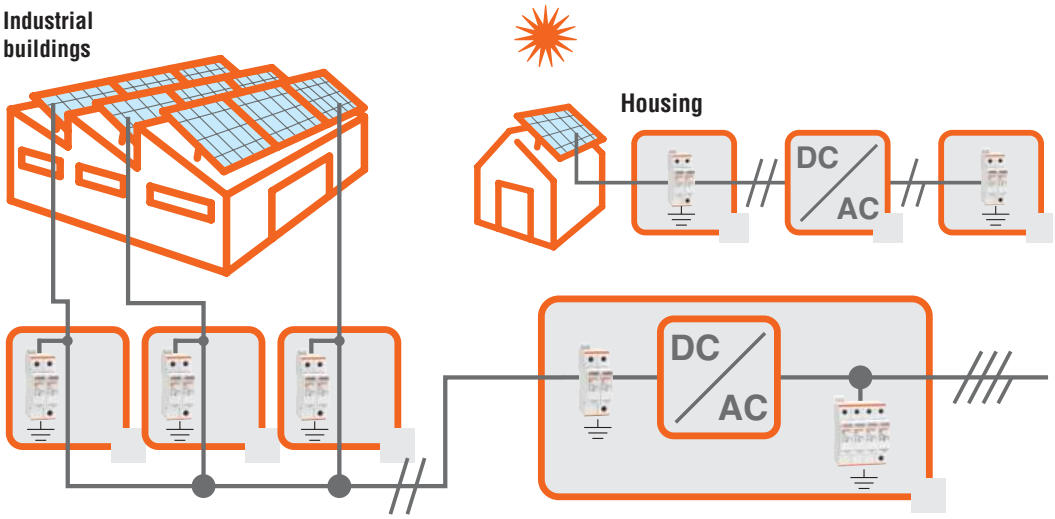
Installation category I: 1.5kV for equipment containing “particularly sensitive” electronic circuits (for example, electronic devices like PCs or TVs).

RECOMMENDATIONS FOR INSTALLATION

For correct installation, it is advisable to make connections between the line and SPD input (phase or neutral terminals) as well as between the SPD output (earth/ground terminal) and the equipotential bonding connection with a maximum 0.5m/20” length of the leads. To reduce the distance, use of the so-called “V connection” is admissible.



For more details, CEI/EN/BS 62305 standards can be consulted.



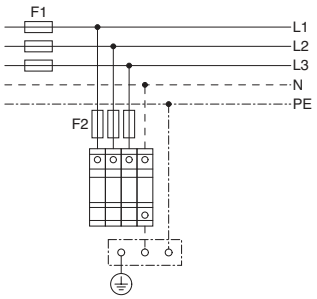
type 2 DC

SURGE PROTECTION DEVICES FOR PHOTOVOLTAIC APPLICATIONS

In photovoltaic applications in a domestic environment or industrial facility or other similar circumstances, equipped with lightning rod systems having a safety distance (S), SPD type 2, suitable for DC duty, can be used to protect the installation. It is advisable to install these devices as close as possible to the photovoltaic panels, consequently in the so-called string boards. If the AC/DC inverter is far away the string boards (indicatively more than 10/33' apart), another SPD type 2 DC needs to be installed next to the inverter on the DC side. Installation of SPD type 2 suitable of AC duty is also required downstream of the inverter on the AC side. For more details, consult specific national standards and/or application guides issued by local authorities for solar systems concerning protection against. The SG2DG... types with plug-in cartridge are suitable for connection in the DC side of a solar installation and offer protection against induced overvoltage conditions. The SG2...A300 type is suitable for installation downstream of the inverter on the AC side and in intermediate panels.

BACKUP PROTECTION

Protection against short circuits of SPDs is provided by overcurrent devices (gL/gG fuses), which should be chosen according to the SPD manufacturer's recommendations.



Fuse size depends on SPD

FOR SA1F34A275R THERE IS NO NEED TO USE ANY BACKUP PROTECTION

SPD COORDINATION

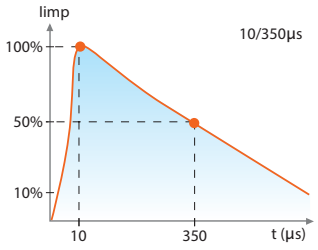
In order to obtain an effective protection against overvoltage, it is advisable to install several SPDs coordinated with one another in cascade connection.
For instance, it is advisable to have a type 1 SPD in the main distribution board, a type 2 in the sub-distribution board and a type 3 SPD near the terminal equipment to be protected.
In this way, the energy originating from an overvoltage gradually decreases as it reaches the equipment to protect

DEFINITIONS AND RATING ACCORDING IEC/EN/BS

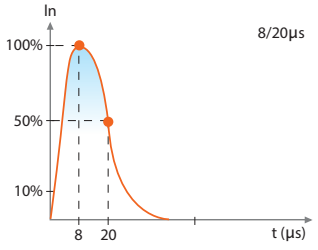
Maximum continuous voltage Uc:
Maximum value of AC or DC voltage that the SPD is capable of permanently withstanding without activating or getting damaged; this is its rated voltage.

Protection level voltage Up:
Maximum value of the voltage between the terminals of the SPD in presence of an impulsive overvoltage. It is a fundamental parameter to correctly choose the SPD; it must be taken into account with regards to the impulse voltage of the equipment to protect.

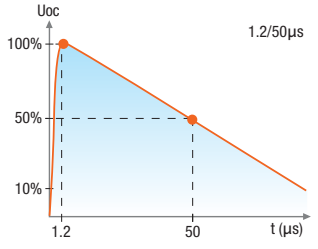
Impulse current Iimp:
Crest value of the current that circulates in the SPD with a 10/350µs waveform (activation must be guaranteed for 20 times without damage). It is used to classify SPDs in test class I.



Rated discharge current In:
Crest value of the current that circulates in the SPD with an (8/20µs waveform (activation must be guaranteed for 20 times without damage). It is used to classify SPDs in test class II.



Open circuit discharge voltage Uoc:
Crest value of the no-load discharge voltage delivered by the test generation with a 1.2/50µs waveform simultaneously with a short circuit current of an 8/20µs waveform, applied at the SPD terminals. It is used to classify SPDs in test class III.



Monoblock limp=25kA

SA1B1PA320R

SA1B3NA320R

Order code	Pole arrange-ment	Relay output	Number of DIN modules	Qty per pkg	Wt
		(SPDT)		n°	[kg]
MONOBLOCK VERSION. IEC impulse current limp (10/350µs) 25kA per pole.					
SA1B1PA320R	1P	YES	2	1	0.275
SA1B1NA320R	1P+N	YES	4	1	0.390
SA1B2PA320R	2P	YES	4	1	0.395
SA1B3PA320R	3P	YES	6	1	0.595
SA1B3NA320R	3P+N	YES	8	1	0.760
SA1B4PA320R	4P	YES	8	1	0.780

General characteristics
The surge protection device type SA1B combines the performance of SPD type 1 and 2 into a single product.It protects against direct and indirect lightning strikes as well as induced overvoltage conditions. It can be installed in areas with a high risk of direct lightning strikes, inside main distribution boards or nearby sub-distribution boards.

Operational characteristics
- IEC maximum continuous operating voltage Uc: 320VAC
- IEC maximum discharge current Imax (8/20µs): 100kA per pole
- IEC rated discharge current In (8/20µs): 25kA per pole
- Version with relay output having changeover contact for remote status indication
- IEC degree of protection: IP20.

Certifications and compliance
Certification obtained: EAC.
Compliant with standards: IEC/EN/BS 61643-11.

Characteristics

Type	IEC rated voltage Un	IEC voltage protection level Up	Power installation system
	[V]	[kV] L-N	
SA1B1PA320R	230	<1.4	TN-C, TN-S, TT❶
SA1B1NA320R	230	<1.4/1.3	TT, TN-S
SA1B2PA320R	230	<1.4	TN-S
SA1B3PA320R	230/400	<1.4	TN-C
SA1B3NA320R	230/400	<1.4/1.5	TT, TN-S
SA1B4PA320R	230/400	<1.4	TN-S

❶ Between L-N only.

With plug-in cartridge limp=25kA with integrated fuse and "no leakage current"

new

SA1F34A275R

SAX1FA275

Order code	Pole arrange-ment	Relay output	Number of DIN modules	Qty per pkg	Wt
				n°	[kg]
VERSION WITH PLUG-IN CARTRIDGE WITH INTEGRATED FUSE AND "NO LEAKAGE CURRENT". Impulse current limp (10/350µs) 25kA per pole.					
SA1F34A275R	3P+N/4P	YES	8	1	1.065

PLUG-IN CARTRIDGE.

Order code	Description	Q.y per pkg	Wt
		n°	[kg]
SAX1FA275	For SA1F... type	1	0.194

General characteristics
The surge protection device SA1F34A275R combines the performance of SPD type 1 and 2 into a single product.
It protects against direct and indirect lightning strikes as well as induced overvoltage conditions. It can be installed in areas with a high risk of direct lightning strikes, inside main distribution boards or nearby sub-distribution boards.
This surge protection device is immune to temporary overvoltage (TOV) and stop the flow of current after the trip.
The presence of the integrated fuse does not require any backup protection (see page 18-3).
The "no leakage current" technology allows it to be installed upstream of energy meters as it does not influence the measurement of consumed energy.

Operational characteristics
- IEC maximum continuous operating voltage Uc: 275VAC
- IEC maximum discharge current Imax (8/20µs): 65kA per pole
- IEC rated discharge current In (8/20µs): 25kA per pole
- Versions with or without relay output having changeover contact for remote status indication
- IEC degree protection: IP20.

Compliance
Compliant with standards: IEC/EN/BS 61643-11.

Characteristics

Type	IEC rated voltage Un	IEC voltage protection level Up	Power installation system
	[V]	[kV] L-N	
SA1F34A275R	240	<1.5	TN-C, TN-S, TT

With plug-in cartridge Iimp=12.5kA

SA01PA320R

SA03PA320R

SAX00PA320

Order code	Pole arrange-ment	Relay output	Number of DIN modules	Qty per pkg	Wt
		(SPDT)		n°	[kg]
VERSION WITH PLUG-IN CARTRIDGES. IEC impulse current Iimp (10/350µs) 12.5kA per pole.					
SA01PA320R	1P	YES	1	1	0.195
SA01NA320R	1P+N	YES	2	1	0.365
SA02PA320R	2P	YES	2	1	0.370
SA03PA320R	3P	YES	3	1	0.540
SA03NA320R	3P+N	YES	4	1	0.670
SA04PA320R	4P	YES	4	1	0.670

PLUG-IN CARTRIDGE.

Order code	Description	Qty per pkg	Wt
		n°	[kg]
SAX00PA320	For SA0... type	1	0.100

Monoblock Iimp=12.5kA

SA0B1PA320R

Order code	Pole arrange-ment	Relay output	Number of DIN modules	Qty per pkg	Wt
		(SPDT)		n°	[kg]
MONOBLOCK VERSION. IEC impulse current Iimp (10/350µs) 12.5kA per pole.					
SA0B1PA320R	1P	YES	2	1	0.205
SA0B1NA320R	1P+N	YES	2	1	0.155
SA0B2PA320R	2P	YES	2	1	0.230
SA0B3PA320R	3P	YES	3	1	0.330
SA0B3NA320R	3P+N	YES	4	1	0.600
SA0B4PA320R	4P	YES	4	1	0.600

General characteristics
SURGE PROTECTION DEVICES SA0
It has a plug-in cartridge and combines the performance of SPD type 1 and 2 into a single product. It is ideal in all those systems of reduced extent to protect the load side downstream of main circuit breaker to terminal equipment. It protects against direct and indirect lightning strikes as well as induced overvoltage conditions. It can be installed inside main distribution boards and nearby terminal equipment. The protection cartridges are plug-in and can be easily replaced for quick servicing.

SURGE PROTECTION DEVICES TYPE SA0B
Monoblock version SPD, it combines the performance of SPD type 1 and 2 into a single product. It is ideal in all those systems of reduced extent to protect the load side downstream of main circuit breaker to terminal equipment. It protects against direct and indirect lightning strikes as well as induced overvoltage conditions. It can be installed inside main distribution boards and nearby terminal equipment.

Operational characteristics
- IEC maximum continuous operating voltage Uc: 300VAC (SA0...); 320VAC (SA0B...)
- IEC maximum discharge current Imax (8/20µs): 40kA per pole (SA0...); 50kA (SA0B...)
- IEC rated discharge current In (8/20µs): 20kA per pole
- Version with relay output having changeover contact for remote status indication
- IEC degree of protection IP20.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 61643-11.

Characteristics

Type	IEC rated voltage Un	IEC voltage protection level Up	Power installation system
	[V]	[kV] L-N	
SA0...1PA...	230	<1.5	TN-C, TN-S, TT❶
SA0...1NA...	230	<1.5	TT, TN-S
SA0...2PA...	230	<1.5	TN-S
SA0...3PA...	230/400	<1.5	TN-C
SA0...3NA...	230/400	<1.5	TT, TN-S
SA0...4PA...	230/400	<1,5	TN-S

❶ Between L-N only.

With plug-in cartridge Type 1CA/Open-Type 1, In=20kA UL-certified

new

SG13PA...RUL

Order code	Pole arrange-ment	Relay output	Number of DIN modules	Qty per pkg	Wt
				n°	[kg]
VERSION WITH PLUG-IN CARTRIDGE. TYPE 1CA/OPEN-TYPE 1. Rated discharge current In (8/20µs) 20kA per pole.					
SG13PA300RUL	3P	YES	3	1	0.508
SG13PA350RUL	3P	YES	3	1	0.565
SG13PA480RUL	3P	YES	3	1	0.574
SG13PA750RUL	3P	YES	3	1	0.583

General characteristics
SURGE PROTECTION DEVICES TYPES SG13PA...RUL
It has a plug-in cartridge and combines the performance of SPD type 1 and 2 into a single product. It is ideal in all those systems of reduced extent to protect the load side downstream of main circuit breaker to terminal equipment. It protects against direct and indirect lightning strikes as well as induced overvoltage conditions. It can be installed inside main distribution boards and nearby terminal equipment.

Operational characteristics
- IEC maximum continuous operating voltage Uc: 300...750VAC
- IEC maximum discharge current Imax (8/20µs): 50kA per pole
- IEC rated discharge current In (8/20µs): 20kA per pole
- IEC impulse discharge current Iimp (10/350µs):
  - 12.5kA per pole (SG13PA300RUL and SG13PA350RUL)
  - 10kA per pole (SG13PA480RUL)
  - 5kA per pole (SG13PA750RUL)
- Versions with or without relay output having changeover contact for remote status indication
- IEC degree of protection: IP20.

Certifications and compliance
Certifications: cULus.
Compliant with standards: IEC/EN/BS 61643-11, UL1449 4TH edition.

Type 2 with plug-in cartridge In=20kA

SG2...

Order code	Pole arrange-ment	Relay output	Number of DIN modules	Qty per pkg	Wt
				n°	[kg]
VERSIONS WITH PLUG-IN CARTRIDGE. Rated discharge current In (8/20µs) 20kA per pole.					
SG21PA300	1P	NO	1	1	0.128
SG21PA300R	1P	YES	1	1	0.135
SG21NA300	1P+N	NO	2	1	0.234
SG21NA300R	1P+N	YES	2	1	0.240
SG22PA300	2P	NO	2	1	0.252
SG22PA300R	2P	YES	2	1	0.266
SG23PA300	3P	NO	3	1	0.366
SG23PA300R	3P	YES	3	1	0.376
SG23NA300	3P+N	NO	4	1	0.477
SG23NA300R	3P+N	YES	4	1	0.486
SG24PA300	4P	NO	4	1	0.496
SG24PA300R	4P	YES	4	1	0.505

PLUG-IN CARTRIDGE.

Order code	Description	Qty per pkg	Wt
		n°	[kg]
SGX02PA300	For SG2...A300/300R types	1	0.100

Type 2 with plug-in cartridge In=5kA

SG2C...

Order code	Pole arrange-ment	Relay output	Number of DIN modules	Qty per pkg	Wt
		(SPDT)		n°	[kg]
VERSIONS WITH PLUG-IN CARTRIDGE. Rated discharge current In (8/20µs) 5kA per pole.					
SG2C1NA320	1P+N	NO	1	1	0.126
SG2C2PA320	2P	NO	1	1	0.144

Type 3 with plug-in cartridge Uoc/Icw = 10kV/5kA

SA31NA320R

Order code	Pole arrange-ment	Relay output	Number of DIN modules	Qty per pkg	Wt
		(SPDT)		n°	[kg]
VERSIONS WITH PLUG-IN CARTRIDGE. Combined impulse Uoc/Icw (1.2/50µs, 8/20µs) 10kV/5kA.					
SA31NA320R	1P+N	YES	1	1	0.140

Type 3 compact version Uoc/Icw = 6kV/3kA

SA31NA275MS

SA31NA275ML

Order code	Pole arrange-ment	Intervention signaling	Qty per pkg	Wt
			n°	[kg]
COMPACT VERSION. Combined impulse Uoc/Icw (1.2/50µs, 8/20µs) 6kV/3kA.				
SA31NA275MS	1P+N	Acoustic	1	0.050
SA31NA275ML	1P+N	Optical	1	0.050

General characteristics
SURGE PROTECTION DEVICES TYPE SG2
They are available in plug-in cartridge version and they are suitable for installation in secondary boards and in terminal equipment.
They ensure protection against overvoltages conditions.
The protection cartridges are plug-in and can be easily replaced for quick servicing.
SG2 surge arresters are immune to temporary overvoltages (TOV) and block the circulation of the subsequent network current after the intervention.

SURGE PROTECTION DEVICES TYPE SG2C
They are available in plug-in cartridge version and suitable for installation in residential boards where a 5kA per pole indirect discharge protection is sufficient. They have compact size, 1 module width for two poles.

Operational characteristics
- IEC maximum continuous operating voltage Uc: 300VAC (SG2...); 320VAC (SG2C...)
- IEC maximum discharge current Imax (8/20µs): 50kA per pole (SG2...); 15kA (SG2C...)
- IEC rated discharge current In (8/20µs): 20kA per pole (SG2...); 5kA (SG2C...)
- Versions with or without relay output having changeover contact for remote status indication (SG2...)
- IEC degree of protection IP20.

Certifications and compliance
Certification obtained: EAC.
Compliant with standards: IEC/EN/BS 61643-11.

Characteristics

Type	IEC rated voltage Un	IEC voltage protection level Up	Power installation system
	[V]	[kV] L-N	
SG21PA...	230	<1.5	TN-C, TN-S, TT❶
SG2/SG2C1NA...	230	<1.5	TT, TN-S
SG2/SG2C2PA...	230	<1.5	TN-S
SG23PA...	230/400	<1.5	TN-C
SG23NA...	230/400	<1.5	TT, TN-S
SG24PA...	230/400	<1,5	TN-S

❶ Between L-N only.

General characteristics
SURGE PROTECTION DEVICE TYPE SA3
They are available in plug-in cartridge version for installation on DIN rail or compact version for installation in terminal block or electrical conduct. They are used for protection of end users (electronic devices).
The DIN rail version includes a relay output with exchange contact for status reporting. The compact versions are available with acoustic or light signaling and are provided with pre-wired connectors, length 11cm.

Operational characteristics
- IEC rated voltage Un: 230VAC
- IEC rated current In (8/20µs): 5kA (SA3...A320R), 3kA (SA3...MS, SA3...ML)
- IEC combined impulse Uoc: 10kV (SA3...A320R), 6kV (SA3...MS, SA3...ML)
- IEC protection level Up<1.5kV
- IEC degree of protection IP20.

Certifications and compliance
Certification obtained: EAC.
Compliant with standards: IEC/EN/BS 61643-11.

Type C2-D1 for data and signal lines In = 10kA

SASD...VR SASDET6

new

SASDTELIP

Order code	Application	Relay output	Qty per pkg	Wt
			n°	[kg]
Rated current C2 In (8/20µs): 10kA.				
SASD5VR	RS485 - 5VDC	YES	1	0.058
SASDET6	Ethernet Cat.6 - POE	–	1	0.120
SASD024VR	Data lines - BUS 24VDC	YES	1	0.058
SASDTELDIN	Telephone line - 110VDC, for DIN rail installation	YES	1	0.052
SASDTELIP	Telephone - 110VDC, for outdoor installation (IP66)	–	1	0.150

General characteristics
Surge protection device for data lines type RS485 (5VDC), BUS (24VDC e.g. intercom), Ethernet Cat. 6 Power Over Ethernet (POE) and telephone lines (110VDC).
Typically used for protection of televisions, data lines, PCs, video cameras, electronic control units, measuring devices, switches and routers.

Operational characteristics
Types SASD...VR
- IEC rated voltage Un: 5VDC (SASD5VR); 30VDC (SASD024VR)
- C2 rated current In (8/20µs): 10kA
- D1 impulse current limp (10/350µs): 2.5kA
- Bandwidth: 30MHz
- IEC degree of protection: IP20.

TYPE SASDET6
- IEC rated voltage Un: 48VDC (POE)
- C2 rated current In (8/20µs): 10kA
- D1 impulse current limp (10/350µs): 1kA
- Bandwidth: 250MHz
- IEC degree of protection: IP20.

TYPE SASDTELDIN
- IEC rated voltage Un: 110VDC
- C2 rated current In (8/20µs): 10kA
- D1 impulse current limp (10/350µs): 2.5kA
- Bandwidth: 30MHz
- IEC degree of protection: IP20.

TYPE SASDTELIP
- IEC rated voltage Un: 110VDC
- C2 rated current In (8/20µs): 20kA
- D1 impulse current limp (10/350µs): 7.5kA
- Bandwidth: 250MHz
- IEC degree of protection: IP66, suitable for outdoor applications.

Certifications and compliance
Certification obtained: EAC.
Compliant with standards: IEC/EN/BS 61643-21.

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Type 1 and 2 for photovoltaic application with plug-in cartridge

SG2EDGK10M3R

new

Order code	Pole arrange-ment	Relay output	Number of DIN modules	Qty per pkg	Wt
		(SPDT)		n°	[kg]
EN rated voltage Un 1100VDC.					
SG2EDGK10M3R	+, -, PE	YES	3	1	0.406
EN rated voltage Un 1500VDC.					
SG2EDGK50M3R	+, -, PE	YES	3	1	0.475

Type 2 for photovoltaic application with plug-in cartridge

SG2DG600M2... SG2DGK10M3R

Order code	Pole arrange-ment	Relay output	Number of DIN modules	Qty per pkg	Wt
		(SPDT)		n°	[kg]
EN rated voltage Un 600VDC.					
SG2DG600M2	+, -, PE	NO	2	1	0.320
SG2DG600M2R	+, -, PE	YES	2	1	0.325
EN rated voltage Un 1100VDC.					
SG2DGK10M3	+, -, PE	NO	3	1	0.396
SG2DGK10M3R	+, -, PE	YES	3	1	0.406
SA2EDGK10M3	+, -, PE	NO	3	1	0.329
EN rated voltage Un 1500VDC.					
SG2DGK50M3	+, -, PE	NO	3	1	0.444
SG2DGK50M3R	+, -, PE	YES	3	1	0.454

Plug-in cartridge

SGX02DG600M2

Order code	Description	Qty per pkg	Wt
		n°	[kg]
SGX02DG600M2	For SG2DG600M2/M2R type	1	0.100
SGX02DK10M3	For SG2DGK10M3/M3R type	1	0.100
SGX02DGK50M3	For SG2DGK50M3R type	1	0.100

General characteristics
The surge protection device type SG2EDG..., SG2DG... and SA2EDG... with plug-in cartridge for photovoltaic applications is suitable for installation on the direct-current end of a photovoltaic installation and protects against induced overvoltage conditions.
The protection cartridges are plug-in and can be easily replaced for quick servicing.

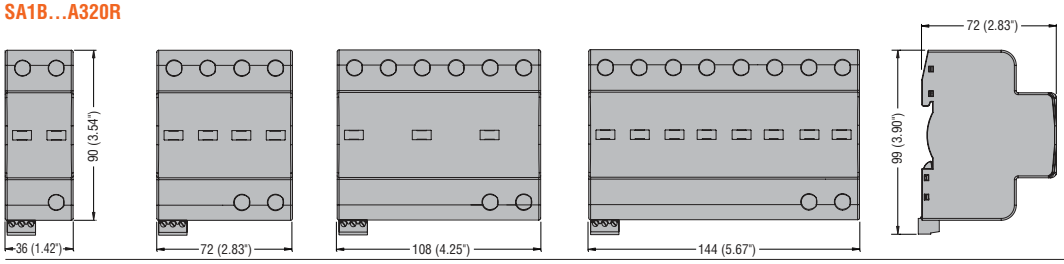
Operational characteristics
- EN maximum continuous voltage Ucpv: 600VDC, 1100VDC, 1500VDC
- EN short circuit current rating Iscpv: 30kA for SG2EDGK50..., 11kA for SG2DGK10... and SG2DG..., 9kA for SA2EDG...
- Versions with or without relay output having changeover contact for remote status indication
- IEC degree of protection: IP20.

Characteristics

Type	EN rated voltage Un	EN continuous voltage Ucpv	EN voltage protection level Up
	[VDC]	[VDC]	[kV]
SG2DG600M2	600	600	<1.9
SG2DG600M2R	600	600	<1.9
SG2DGK10M3	1100	1100	<3.8
SG2DGK10M3R	1100	1100	<3.8
SG2EDGK10M3R	1100	1100	<3.8
SA2EDGK10M3	1100	1100	<4.0
SG2EDGK50M3R	1500	1500	<4.5
SG2DGK50M3	1500	1500	<5.0
SG2DGK50M3R	1500	1500	<5.0

Certifications and compliance
Certification obtained: EAC.
Compliant with standards: EN/BS 50539-11.

SA1B...A320R



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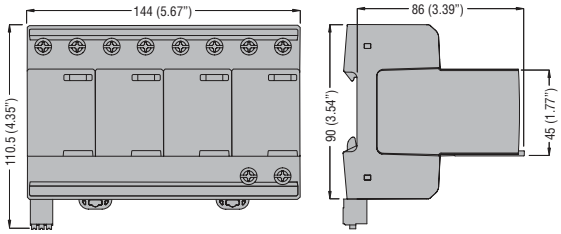
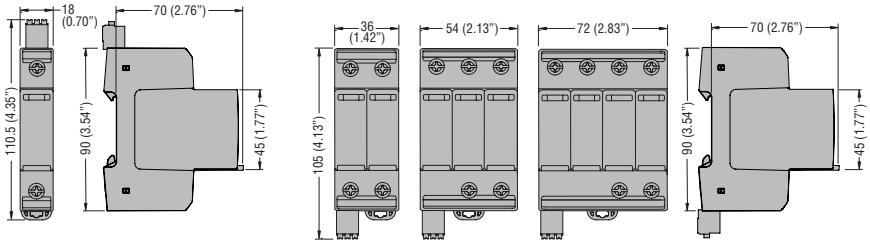


SA0...A320R



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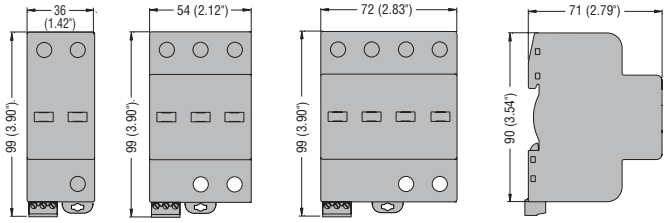

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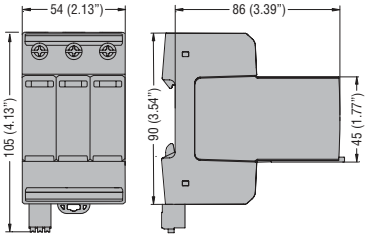
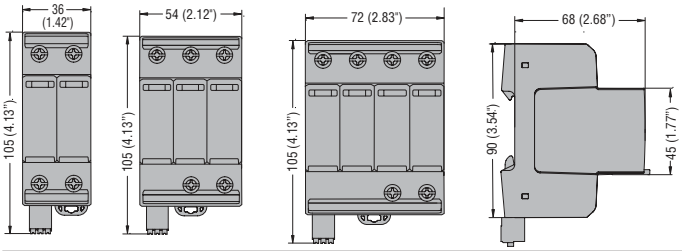


SG2...A300



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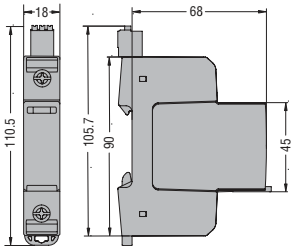
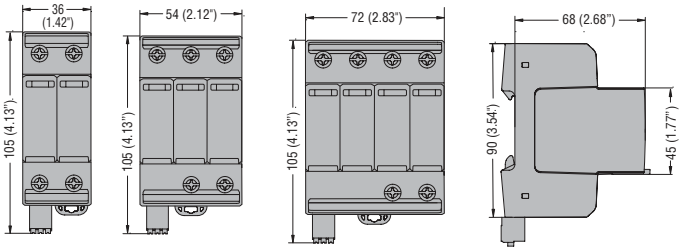
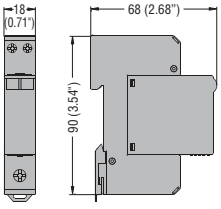


SG2...A300R



SG2C...A320



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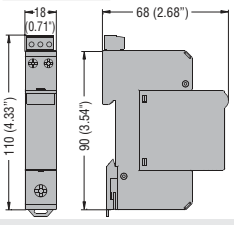

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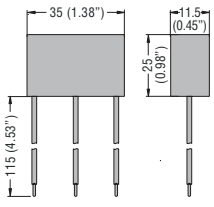
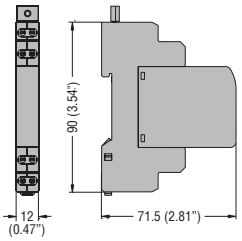


SASD...VR - SASDTELDIN



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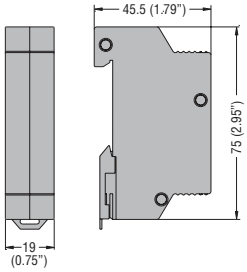

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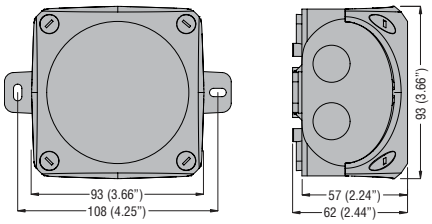
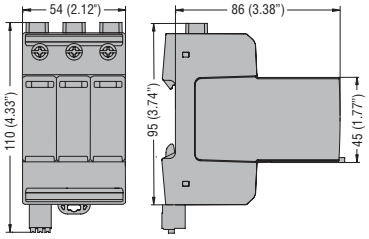
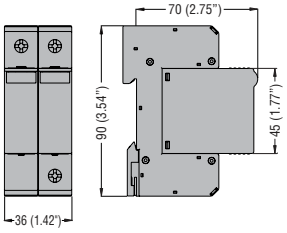


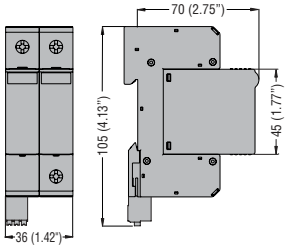
SG2EDGK...M3R



SG2DG600M2



SG2DG600M2R



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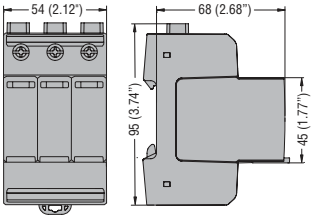

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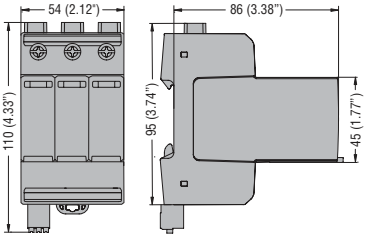

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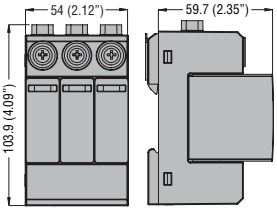

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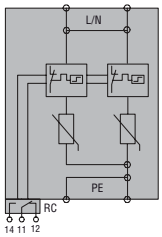

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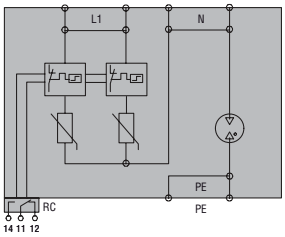

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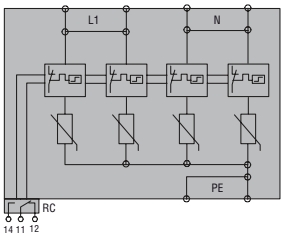

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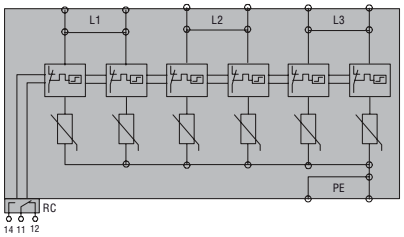

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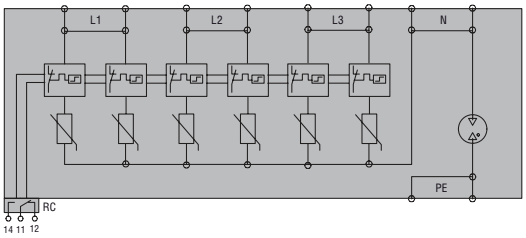

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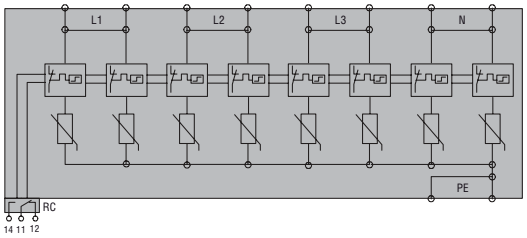

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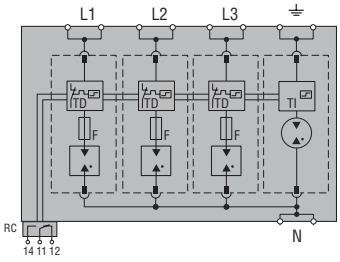
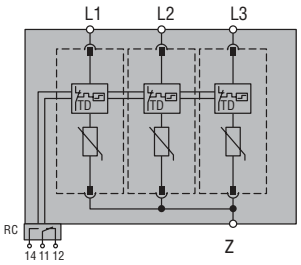


SG13PA...RUL



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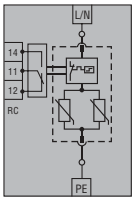

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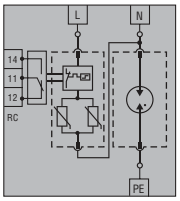

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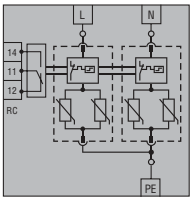

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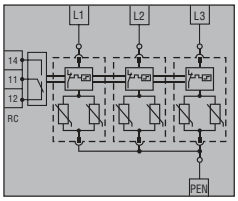

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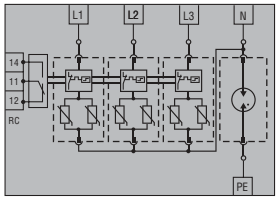

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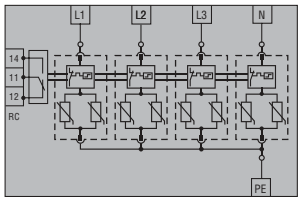

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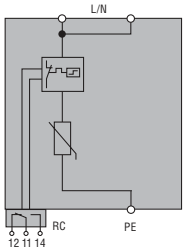

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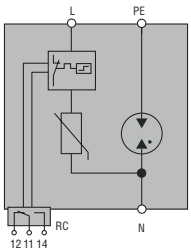

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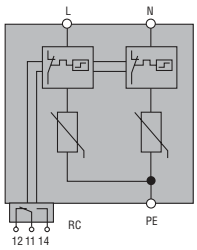

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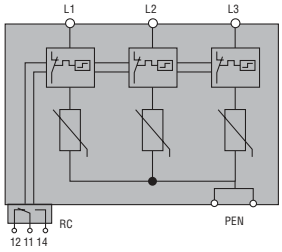

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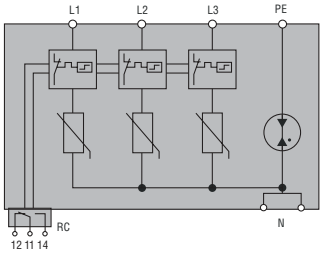

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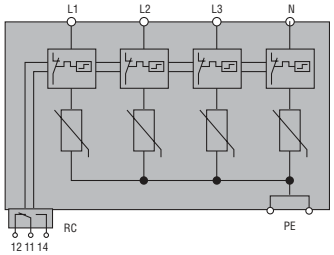
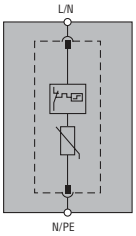


SG21PA300



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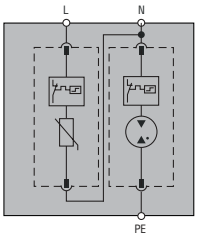

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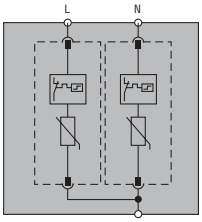
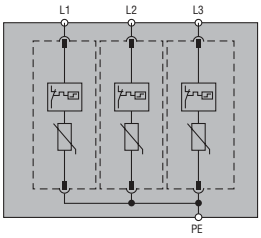


SG23PA300



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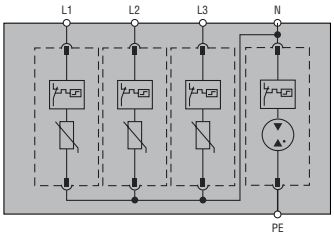
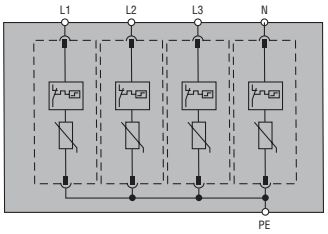
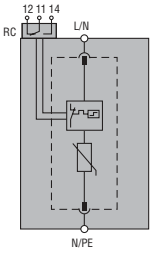


SG24PA300



SG21PA300R



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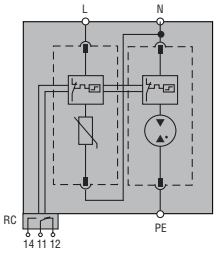

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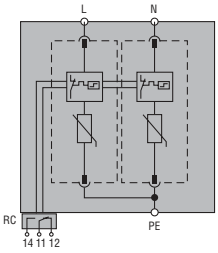

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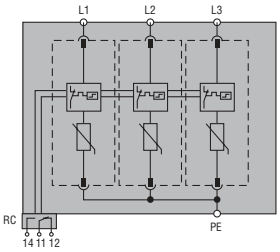

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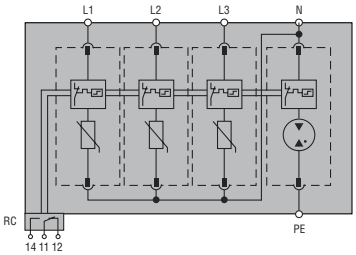

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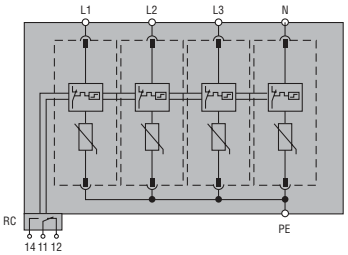

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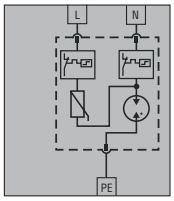

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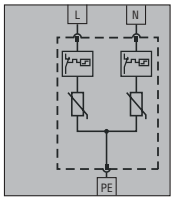

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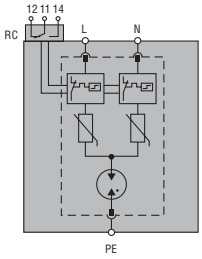

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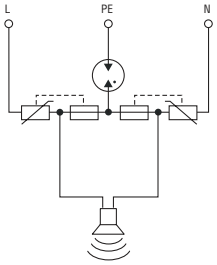

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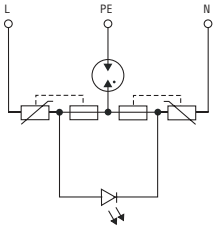
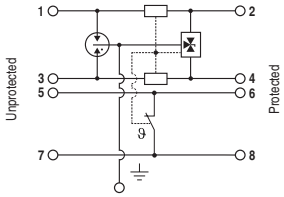


SASD...VR



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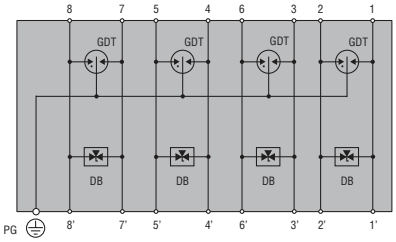

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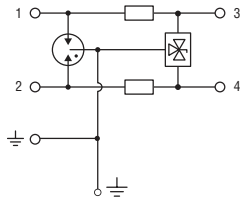

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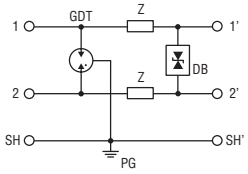

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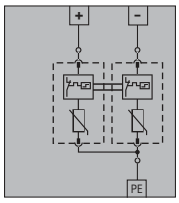
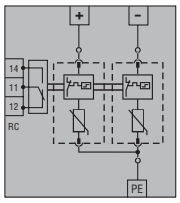
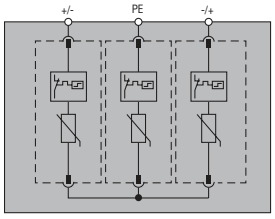


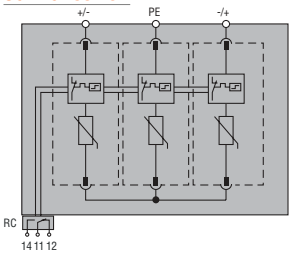
SG2DG600M2R



SG2DGK10M3
SG2DGK50M3
SA2EDGK10M3



SG2DGK10M3R
SG2EDGK10M3R
SG2DGK50M3R



TYPE with relay output		SA1B1PA320R	SA1B1NA320R	SA1B2PA320R	SA1B3PA320R	SA1B3NA320R	SA1B4PA320R	SA1F34A275R
ELECTRICAL PROPERTIES								
SPD per IEC/EN/BS 61643-11		Type 1, 2 (test class I, II)						
IEC rated voltage Un	VAC	230	230	230	230 / 400	230 / 400	230 / 400	230 / 400
IEC maximum continuous voltage Uc	VAC	320						275
IEC impulse current Iimp (10/350) (L-N/N-PE)	kA	25	25 / 50	25 per pole	25 per pole	25 / 100	25 per pole	25 / 100
IEC max impulse current Imax (8/20) (L-N/N-PE)	kA	100	100 / 100	100 per pole	100 per pole	100 / 100	100 per pole	65 / 130
IEC rated discharge current In (8/20) (L-N/N-PE)	kA	25	25 / 50	25 per pole	25 per pole	25 / 100	25 per pole	25 / 100
IEC voltage protection level Up (L-N/N-PE)	kV	<1.4	<1.4 / <1.3	<1.4	<1.4	<1.4 / <1.5	<1.4	<2.1 / <1.5
IEC temporary overvoltage (TOV) withstand Ut (L-N for 5s)	VAC	334						–
IEC temporary overvoltage (TOV) safe fail (L-N for 120min)	VAC	438						442
IEC temporary overvoltage (TOV) withstand (N-PE for 200ms)	VAC	–	1200V / 300A	–	–	–	1200V / 300A	1200V
IEC residual voltage Ures (L-N/N-PE) at 5kA (8/20)	kV	1	1	1	1.1	1.1	1.1	1.2 / 0.3
IEC follow current If (N-PE)	Arms	No	>100	No	No	>100	No	100,000
Tripping time t_a (L-N/N-PE)	ns	<25	<25 / 100	<25	<25	<25 / 100	<25	<100
Thermal isolation protection		Yes						–
Backup protection fuse (gL/gG) in case of main fuse >250A	A min	125 (Iimp=10kA)						**Not needed**
	A max	250						
IEC maximum short circuit current 50Hz	kA	50						100
Status indicator - operating / failure	colour	Green / Red						
CONNECTIONS								
IEC degree of protection		IP20						
Terminal tightening torque	Nm	3						4.5
Maximum conductor section	mm^2	25 (flexible) / 35 (rigid)						
RELAY OUTPUT FOR REMOTE STATUS INDICATION								
Type of contact		Changeover (NO/NC)						
Contact capacity	A	0.5A 250VAC; 3A 125VAC; 0.1A 250VDC; 0.2A 125VDC						1A 250VAC; 0.5A 48VDC
Contact terminal tightening torque	Nm	0.25						
Maximum contact conductor section	mm^2	1.5						
AMBIENT CONDITIONS								
Operating temperature		-40...+85°C						
Fixing		On 35mm DIN rail (IEC/EN/BS 60715)						
Material		Thermoplastic, RAL 7035, UL 94 V-0						

TYPE with relay output		SA01PA320R	SA01NA320R	SA02PA320R	SA03PA320R	SA03NA320R	SA04PA320R
ELECTRICAL PROPERTIES							
SPD per IEC/EN/BS 61643-11		Type 1, 2 (test class I, II)					
IEC rated voltage Un	VAC	230	230	230	230 / 400	230 / 400	230 / 400
IEC maximum continuous voltage Uc	VAC	300					
IEC impulse current Iimp (10/350) (L-N/N-PE)	kA	12.5	12.5 / 50	12.5 per pole	12.5 per pole	12.5 / 50	12.5 per pole
IEC max discharge current Imax (8/20) (L-N/N-PE)	kA	40	40 / 100	40 per pole	40 per pole	40 / 100	40 per pole
IEC rated discharge current In (8/20) (L-N/N-PE)	kA	20	20 / 50	20 per pole	20 per pole	20 / 50	20 per pole
IEC combined surge Uoc/Isc (1,2/50, 8/20)	kV/kA	10 / 5					
IEC voltage level protection Up (L-N/N-PE)	kV	<1.5					
IEC temporary overvoltage (TOV) withstand Ut (L-N for 5s)	VAC	335					
IEC temporary overvoltage (TOV) withstand (N-PE for 200ms)	VAC	–	–	1200V / 300A	–	1200V / 300A	–
IEC residual voltage Ures (L-N/N-PE) at 5kA (8/20)	kV	0.8	0.8 / 0.2	0.8	0.8	0.8 / 0.2	0.8
IEC follow current If (N-PE)	Arms	No	>100	No	No	>100	No
Tripping time t_a (L-N/N-PE)	ns	<25	<25 / 100	<25	<25	<25 / 100	<25
Thermal isolation protection		Yes					
Backup protection fuse (gG) in case of main fuse >160A	A min	125 (Iimp=10kA)					
	A max	160					
IEC maximum short circuit current (50Hz)	kA	25					
Status indicator - operating / failure	colour	– / Red					
CONNECTIONS							
IEC degree of protection		IP20					
Terminal tightening torque	Nm	3					
Maximum conductor section	mm^2	25 (flexible) / 35 (rigid)					
RELAY OUTPUT FOR REMOTE STATUS INDICATION							
Type of contact		Changeover (NO/NC)					
Contact capacity	A	0.5A 250VAC; 3A 125VAC; 0.1A 250VDC; 0.2A 125VDC					
Contact terminal tightening torque	Nm	0.25					
Maximum contact conductor section	mm^2	1.5					
AMBIENT CONDITIONS							
Operating temperature		-40...+80°C					
Fixing		On 35mm DIN rail (IEC/EN/BS 60715)					
Material		Thermoplastic, RAL 7035, UL 94 V-0					

TYPE with relay output		SA0B1PA320R	SA0B1NA320R	SA0B2PA320R	SA0B3PA320R	SA0B3NA320R	SA0B4PA320R
ELECTRICAL PROPERTIES							
SPD per IEC/EN/BS 61643-11		Type 1, 2 (test class I, II)					
IEC rated voltage Un	VAC	230	230	230	230 / 400	230 / 400	230 / 400
IEC maximum continuous voltage Uc	VAC	320					
IEC impulse current Iimp (10/350) (L-N/N-PE)	kA	12.5	12.5 / 50	12.5	12.5	12.5 / 50	12.5
IEC max discharge current Imax (8/20) (L-N/N-PE)	kA	50	50 / 100	50	50	50 / 100	50
IEC rated discharge current In (8/20) (L-N/N-PE)	kA	20	20 / 50	20	20	20 / 50	20
IEC voltage level protection Up (L-N/N-PE)	kV	<1.5	<1.5 / <1.5	<1.5	<1.5	<1.5 / <1.5	<1.5
IEC temporary overvoltage (TOV) withstand Ut (L-N for 5s)	VAC	334					
IEC temporary overvoltage (TOV) safe fail (L-N for 120min)	VAC	438					
IEC temporary overvoltage (TOV) withstand (N-PE fos 200ms)	VAC	–	–	1200V / 300A	–	1200V / 300A	–
IEC follow current If (N-PE)	Arms	No	>100	No	No	>100	No
Tripping time t_a (L-N/N-PE)	ns	<25	<25 / 100	<25	<25	<25 / 100	<25
Thermal isolation protection		Yes					
Backup protection fuse (gL/gG) in case of main fuse >250A	A min	125 (Iimp=10kA)					
	A max	250					
IEC maximum short circuit current (50Hz)	kA	50					
Status indicator - operating / failure	colour	Green / Red					
CONNECTIONS							
IEC degree of protection		IP20					
Terminal tightening torque	Nm	3					
Maximum conductor section	mm^2	25 (flexible) / 35 (rigid)					
RELAY OUTPUT FOR REMOTE STATUS INDICATION							
Type of contact		Changeover (NO/NC)					
Contact capacity	A	0.5A 250VAC; 3A 125VAC					
Contact terminal tightening torque	Nm	0.25					
Maximum contact conductor section	mm^2	1.5					
AMBIENT CONDITIONS							
Operating temperature		-40...+85°C					
Fixing		On 35mm DIN rail (IEC/EN/BS 60715)					
Material		Thermoplastic, RAL 7035, UL 94 V-0					

TYPE with relay output		SG13PA300RUL	SG13PA350RUL	SG13PA480RUL	SG13PA750RUL
ELECTRIC PROPERTIES					
SPD per IEC/EN/BS 61643-11		Type 1, 2 (test class I, II)			
SPD per UL1449 5th edition		Type 1CA, Open-Type 1 SPD Listed			
IEC rated voltage Un	VAC	240	277	400	600
IEC maximum continuous voltage Uc/MCOV	VAC	300	350	480	750
IEC max discharge current Imax (8/20) (L-N/N-PE)	kA	50			35
IEC rated discharge current In (8/20) (L-N/N-PE)	kA	20			
IEC impulse current Iimp (10/350) (L-N/N-PE)	kA	12.5	12.5	10	5
IEC voltage level protection Up (L-N/N-PE)	kV	<1.5	<1.75	<2.1	<3.2
Voltage Protection Rating VPR	V	900	1200	1500	2500
IEC temporary overvoltage (TOV) withstand Ut (L-N for 5s)	VAC	337	403	581	871
IEC temporary overvoltage (TOV) safe fail (L-N for 120min)	VAC	442	529	762	1143
IEC residual voltage Ures at 5kA (8/20)	kV	1.1	1.3	1.5	2.5
IEC follow current t_a	ns	<25			
Thermal isolation protection		Yes	Yes	Yes	Yes
Backup protection fuse (gG) in case of main fuse >315A and Ik<25kA or >250A and Ik<50kA	A max	315A with Isccr=25kA, 250A with Isccr=50kA			250A
	A min	160A			80A
IEC maximum short circuit current 50Hz	kA	25 / 50			50
IEC maximum short circuit current SCCR	kA	150	150	200	150
Status indicator - operating / failure	colour	Green / Red			
CONNECTIONS					
IEC degree of protection		IP20			
Terminal tightening torque	Nm/lbf.in	4.5 / 35			
Maximum conductor section	mm²/AWG	25 (flexible) / 6 - 35 (rigid) / 6			
RELAY OUTPUT FOR REMOTE STATUS INDICATION					
Type of contact		Changeover (NO/NC)			
Contact capacity	A	1A 250VAC; 0.5A 48VDC			
Maximum contact conductor section	mm²/AWG	1.5 / 10			
AMBIENT CONDITIONS					
Operating temperature		-40...+85°C			
Fixing		On 35mm DIN rail (IEC/EN/BS 60715)			
Material		Thermoplastic, RAL 7035, UL 94 V-0			

TYPE without relay output		SG21PA300	SG21NA300	SG22PA300	SG23PA300	SG23NA300	SG24PA300
with relay output		SG21PA300R	SG21NA300R	SG22PA300R	SG23PA300R	SG23NA300R	SG24PA300R
ELECTRICAL PROPERTIES							
SPD per IEC/EN/BS 61643-11		Type 2 (test class II)					
IEC rated voltage Un	VAC	240	240	240	240 / 400	240 / 400	240 / 400
IEC maximum continuous voltage Uc	VAC	300					
IEC max discharge current Imax (8/20) (L-N/N-PE)	kA	50	50 / 65	50	50	50 / 65	50
IEC rated discharge current In (8/20) (L-N/N-PE)	kA	20	20 / 40	20	20	20 / 40	20
IEC level protection Up (L-N/N-PE)	kV	<1.5	<1.5 / <1,5	<1.5	<1.5	<1.5 / <1.5	<1.5
IEC temporary overvoltage (TOV) Ut (L-N for 5s)	VAC	337					
IEC follow current If (N-PE)	Arms	No	100	No	No	100	No
Tripping time t_a (L-N/N-PE)	ns	<25	<25 / 100	<25	<25	<25 / 100	<25
Thermal isolation protection		Yes					
Backup protection fuse (gG) in case of main fuse >315A and Ik<25kA or >250A e Ik<50kA	A min	125					
	A max	315A with Isccr=25kA, 250A with Isccr=50kA					
IEC maximum short circuit current (50Hz)	kA	25 / 50					
Status indicator - operating / failure	colour	Green / Red					
CONNECTIONS							
IEC degree of protection		IP20					
Terminal tightening torque	Nm	4.5					
Maximum conductor section	mm²	25 (flexible) / 35 (rigid)					
RELAY OUTPUT FOR REMOTE STATUS INDICATION							
Type of contact		Changeover (NO/NC)					
Contact capacity	A	1A 250VAC; 1A 125VAC; 0.5A 48VDC; 0.5A 24VDC; 0.5A 12VDC					
Maximum contact conductor section	mm²	1.5					
AMBIENT CONDITIONS							
Operating temperature		-40...+85°C					
Fixing		On 35mm DIN rail (IEC/EN/BS 60715)					
Material		Thermoplastic, RAL 7035, UL 94 V-0					

TYPE with relay output		SG2C1NA320	SG2C2PA320
ELECTRICAL PROPERTIES			
SPD per IEC/EN/BS 61643-11		Type 2 (test class II)	
IEC rated voltage Un	VAC	230	
IEC maximum continuous voltage Uc	VAC	320	
IEC max discharge current Imax (8/20) (L-N/N-PE)	kA	15/35	15
IEC rated discharge current In (8/20) (L-N/N-PE)	kA	5/20	5
IEC voltage level protection Up	kV	<1.5	
IEC temporary overvoltage (TOV) Ut (L-N for 5s)	VAC	335	
IEC follow current If (N-PE)	Arms	>100	No
Tripping time t_a (L-N/N-PE)	ns	<25 / 100	<25
Thermal isolation protection		Yes	
Backup protection fuse (gG) in case of main fuse >63A	Fusible A	63 gG	
IEC maximum short circuit current (50Hz)	kA	6	
Status indicator - operating / failure	colour	- / Red	
CONNECTIONS			
IEC degree of protection		IP20	
Terminal tightening torque	Nm	0.5 (L,N); 3 (PE)	
Maximum conductor section	mm^2	L,N: 4 (flexible) / 6 (rigid) PE: 25 (flexible) / 35 (rigid)	
AMBIENT CONDITIONS			
Operating temperature		-40...+85°C	
Fixing		On 35mm DIN rail (IEC/EN/BS 60715)	
Material		Thermoplastic, RAL 7035, UL 94 V-0	

TYPE		SA31NA320R	SA31NA275MS	SA31NA275ML
ELECTRICAL PROPERTIES				
SPD per IEC/EN/BS 61643-11		Type 3 (test class III)		
IEC rated voltage Un	VAC	230	230	
IEC maximum continuous voltage Uc	VAC	320	275	
Combined impulse (1.2/50; 8/20) Uoc/Icw	kV/kA	10/5	6/3	
IEC max discharge current Imax (8/20)	kA	10	–	
IEC level protection Up (L-N/N-PE)	kV	<1.5	<1.5 / <1.7	
IEC temporary overvoltage TOV Ut (L-N per 5s)	VAC	337		
Tripping time t_a (L-N/N-PE)	ns	<100ns		
IEC backup protection	A	63A fuse gG (line fuse >63 A)	MCB/B 16A (if >16 A)	
IEC maximum short circuit current (50Hz)	kA	10	1	
Status indicator - operating / failure		Red replace + relay output	Acoustic (buzzer)	Optical (LED)
CONNECTIONS				
IEC degree of protection		IP20		
Terminal tightening torque (L-N / PE)	Nm	0.5 / 3	–	
Maximum conductor section	mm^2	L-N: 4 (flexible) / 6 (rigid); PE: 25 (flexible) / 35 (rigid)	1 (rigid)	
RELAY OUTPUT FOR REMOTE STATUS INDICATION				
Type of contact		Changeover (NO/NC)	–	
Contact capacity	A	0.5A 250VAC; 3A 125VAC	–	
Contact terminal tightening torque	Nm	0.25	–	
Maximum contact conductor section	mm^2	1.5	–	
AMBIENT CONDITIONS				
Operating temperature		-40...+85°C		
Fixing		On 35mm DIN rail (IEC/EN/BS 60715)	Socket circuit, terminal block, electrical conduct	
Material		Thermoplastic, RAL 7035, UL 94 V-0		

TYPE for data and signal lines		SASD5VR	SASD024VR	SASDTELDIN	SASDTELIP	SASDET6
ELECTRICAL PROPERTIES						
SPD per IEC/EN/BS 61643-11		Type D1/C1/C2/C3				
Application		RS485	BUS 24VDC	Telephone line	Telephone line	Ethernet Cat.6, POE
IEC rated voltage Un	VDC	5	30	110	110	48
IEC maximum discharge current Uc	VDC	6	33	170	180	50
C2 rated current In (8/20)	kA	10	10	10	10	10
Maximum discharge current Imax (8/20)	kA	20	20	20	20	10
D1 impulse current limp (10/350)	kA	2.5	2.5	2.5	7.5	1
EN residual voltage Ures at 5kA (8/20)	V	<22	<42	<450	–	–
Protection level Up (L-L)	V	<10	<43	<264	<250	<150
Load current I_L a 25°C	A	1	1	1	0.6	1
Tripping time t_a	ns	<1	<1	<1	–	<1
Line resistance	Ω	1.6...2.0	1.6...2.0	1.6...2.0	1.6...2.0	–
Capacity	pF	50	50	50	20	–
Bandwidth	MHz	30	30	30	250	250, Cat.6
CONNECTIONS						
IEC degree of protection		IP20	IP20	IP20	IP66	IP20
Terminal tightening torque	Nm	0.5	0.5	0.5	(Terminals PCB)	(RJ45 sockets)
Conductor section (L / PE)	mm^2	4 (max) / 6 (min)	4 (max) / 6 (min)	4 (max) / 6 (min)	2.5 (max) / 0.13 (min)	–
RELAY OUTPUT FOR REMOTE STATUS INDICATION						
Type of contact		NC	NC	–	–	–
Contact capacity	A	0.5A 250VAC; 1A 50VDC		–	–	–
Maximum contact conductor section	mm^2	0.3...4	0.3...4	–	–	–
AMBIENT CONDITIONS						
Operating temperature		-40...+80°C	-40...+80°C	-40...+80°C	-25...+40°C	-40...+80°C
Fixing		On 35mm DIN rail (IEC/EN/BS 60715)			Screw	On 35mm DIN rail (IEC/EN/BS 60715)
Material		Thermoplastic, V-0	Thermoplastic, V-0	Thermoplastic, V-0	Polypropylene	Metal

TYPE without relay output		–	–	SG2DG600M2	SG2DGK10M3	SG2DGK50M3	SA2EDGK10M3
with relay output		SG2EDGK10M3R	SG2EDGK50M3R	SG2DG600M2R	SG2DGK10M3R	SG2DGK50M3R	–
ELECTRICAL PROPERTIES							
SPD per IEC/EN/BS 61643-11		Type 1,2 (test class I, II)	Type 1,2 (test class I, II)	Type 2 (test class II)			
IEC rated voltage Un	VDC	1100	1500	600	1100	1500	1100
Maximum continuous voltage Ucpv	VDC	1100	1500	600	1100	1500	1100
IEC impulse current limp (10/350)	kA	6.25	6.25	–	–	–	–
Maximum discharge current Imax (8/20)	kA	40	60	40	40	30	40
Rated discharge current In (8/20)	kA	20	20	20	20	20	20
Protection level Up	kV	<3.8	<4.5	<1.9	<3.8	<5.0	<4.0
EN residual voltage Ures at 5kA (8/20)	kV	–	3.4	1.5	–	–	–
Tripping time t_a	ns	<25					
Thermal isolation protection		Yes					
EN maximum short circuit current Iscpv	kA	11	30	11			9
Status indicator - operating / failure	colour	Green / Red					
CONNECTIONS							
EN degree of protection		IP20					
Terminal tightening torque	Nm	4.5		4.5			2.5
Maximum conductor section	mm^2	25 (flexible) / 35 (rigid)					
RELAY OUTPUT FOR REMOTE STATUS INDICATION							
Type of contact		Changeover (NO/NC)					
Contact capacity	A	1A 250VAC; 1A 125VAC; 0.5A 48VDC; 0.5A 24VDC; 0.5A 12VDC					
Maximum contact conductor section	mm^2	1.5					
AMBIENT CONDITIONS							
Operating temperature		-40...+85°C					
Fixing		On 35mm DIN rail (IEC/EN/BS 60715)					
Material		Thermoplastic, RAL 7035, UL 94 V-0					

Circuit protection and isolation

Modular contactors and other modular devices

- Two, three and four-pole contactors, 20A to 63A
- Silent during operation or control stage
- Contactors with manual control
- Latching relays
- Add-on auxiliary contacts
- 12VAC or 230VAC bells and buzzers
- 12 to 63VA modular safety transformers
- Modular sockets.

Modular contactors — SEC. - PAGE

Contactors ..... 19 - 2
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Latching relays ..... 19 - 4
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Modular safety transformers ..... 19 - 5
Modular socket ..... 19 - 5

Dimensions ..... 19 - 6
Wiring diagrams ..... 19 - 7
Technical characteristics ..... 19 - 8

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ONE AND TWO-POLE CONTACTORS
- IEC rated current Ith AC1 (400V): 20A and 32A
- IEC rated current AC3 (400V): 9A
- Ideal for domestic and service applications.

Page 19-2

THREE AND FOUR-POLE CONTACTORS
- IEC rated current Ith AC1 (400V): 25A, 32A, 40A and 63A
- IEC rated current AC3 (400V): 8.5A, 22A and 30A
- Ideal for industrial and service applications, such as office buildings, stores, hospitals, hotels, etc.

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ONE AND TWO-POLE CONTACTORS WITH MANUAL CONTROL
- IEC rated current Ith AC1 (400V): 20A and 32A
- IEC rated current AC3 (400V): 9A
- Ideal for functional tests and dual tariff systems in domestic and service applications.

Page 19-3

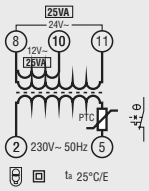
THREE AND FOUR-POLE CONTACTORS WITH MANUAL CONTROL
- IEC rated current Ith AC1 (400V): 32A
- IEC rated current AC3 (400V): 8.5A
- Ideal for functional tests and dual tariff systems in domestic and service applications.

Page 19-4

LATCHING RELAYS
- IEC rated current Ith AC1 (400V): 20A and 32A
- IEC rated current AC3 (400V): 9A and 8.5A
- 2 position hand toggle actuator
- Coil cut-off selector
- Ideal for lights control.

Page 19-5

BELLS AND BUZZERS
- 12VAC or 230VAC power supply
- Ideal for audible signalling in domestic and service applications.



Page 19-5

MODULAR SAFETY TRANSFORMERS
- Power supply primary: 230VAC
- 12VAC or 24VAC output voltages
- Available powers: 15, 25, 40 and 63VA.

Page 19-5

MODULAR SOCKET
- 16A modular socket Italian and German (Schuko) standard.

Lovato electric

Contactors

CN20…
CN3211… - CN3220…

CN25…
CN3210… - CN3201…

CN40…

CN63…

Order code	Rated auxiliary supply voltage	Configuration and number of contacts		Qty per pkg	Wt
	[V]❶	⅂NO	⅃NC	n°	[kg]
One-pole or two-pole. 1 module. Ith 20A.					
CN2011024❼	24VAC/DC	1	1❸	10	0.135
CN2011220❼	220...230VAC❻	1	1❸	10	0.135
CN2020012❼	12VAC/DC	2	—	10	0.135
CN2020024❼	24VAC/DC	2	—	10	0.135
CN2020220❼	220...230VAC❻	2	—	10	0.135
CN2002024❼	24VAC/DC	—	2	10	0.135
CN2002220❼	220...230VAC❻	—	2	10	0.135
One-pole or two-pole. 1 module. Ith 32A.					
CN3211024❷❼	24VAC/DC	1	1❸	10	0.135
CN3211220❷❼	220...230VAC❻	1	1❸	10	0.135
CN3220012❷❼	12VAC/DC	2	—	10	0.135
CN3220024❷❼	24VAC/DC	2	—	10	0.135
CN3220220❷❼	220...230VAC❻	2	—	10	0.135
Three-pole or four-pole. 2 modules. Ith 25A.					
CN2510024❺	24VAC/DC	4❹	—	5	0.260
CN2510220❺	220...230VAC❻	4❹	—	5	0.260
CN2501024❺	24VAC/DC	3	1❹	5	0.260
CN2501220❺	220...230VAC❻	3	1❹	5	0.260
CN2522220❷	220...230VAC❻	2	2	5	0.260
Three-pole or four-pole. 2 modules. Ith 32A.					
CN3210024❺	24VAC/DC	4	—	5	0,260
CN3210220❺	220...230VAC❻	4	—	5	0,260
CN3201024❺	24VAC/DC	3	1❸	5	0,260
CN3201220❺	220...230VAC❻	3	1❸	5	0,260
Three-pole or four-pole. 3 modules. Ith 40A.					
CN4010024❺	24VAC/DC	4❹	—	5	0.425
CN4010220❺	220...230VAC❻	4❹	—	5	0.425
CN4001024❺	24VAC/DC	3	1❹	5	0.425
CN4001220❺	220...230VAC❻	3	1❹	5	0.425
CN4022220❺	220...230VAC❻	2	2❹	5	0.425
Three-pole or four-pole. 3 modules. Ith 63A.					
CN6310024	24VAC/DC	4❹	—	5	0.425
CN6310220	220...230VAC❻	4❹	—	5	0.425
CN6301024	24VAC/DC	3	1❹	5	0.425
CN6301220	220...230VAC❻	3	1❹	5	0.425
CN6322220	220...230VAC❻	2	2❹	5	0.425

❶ Other voltages on request. Consult Technical support; see contact details on front cover.
❷ 2NC version supplied on request.
❸ The last (NC) pole has the same characteristics as the power pole. It can therefore be used indifferently as an auxiliary or as a NC power contact.
❹ The fourth NO or NC pole has the same characteristics as the power poles; therefore it can be used indifferently as auxiliary or as power contact.
❺ On request can be supplied: 4NC power poles. Consult Technical support; see contact details on front cover.
❻ Can also operate at 220VDC.
❼ No auxiliary contacts can be mounted.

Maximum number of contactors side-by-side
When contactors are mounted side by side and operate in continuous service (1 hour), spacing is needed between equipment to allow appropriate cooling.
9mm spacing is required; there is an accessory, called half-module spacer, order code CNX80, for this specific type of mounting. The following table indicates details of the space needed between each.

Maximum number of contactors to be mounted side-by-side without spacing; the CNX80 spacer is required when the number of pieces is more than the indicated below:

	CN20	CN32	CN25	CN40	CN63
Ambient temperature ≤40°C	3	3	3	3	3
Ambient temperature >40°...55°C	2	2	2	3	2

General characteristics
- DC powered magnetic core system assuring silent operation and noise damping during the control phase
- Overvoltage protection circuit and voltage peak limitation of the magnetic core
- Equipped with 2 or 4 closing contacts of equal capacity permitting use in power or auxiliary circuits
- Operation flag indicator.

Operational characteristics

Type	IEC conventional free-air thermal current Ith, AC1 and AC-7a ≤400V [A]	Operational current AC3 and AC-7b ≤400V [A]	Protection fuse gG (IEC) [A]
One-pole or two-pole.			
CN20...	20	9	20
CN32...	32	9	32
Three-pole or four-pole.			
CN25...	25	8.5	25
CN32...	32	8.5	32
CN40...	40	22	63
CN63...	63	30	80

- Noise level:
  - Closed contactor <20dB
  - Making/breaking operation ≤50dB
- IEC degree of protection: IP20
- Mounting on 35mm DIN rail (IEC/EN/BS 60175).

Operational characteristics of contactor-incorporated auxiliary contacts

Type	IEC insulation voltage Ui	IEC rating (AC15 category)	
		230V	400V
	[V]	[A]	[A]
CN20...	440	6	6
CN25...	440	6	4
CN32...	440	6	4
CN40...	500	6	4
CN63...	500	6	4

Utilisation
- Lighting systems
- Electric home heating
- Heat pumps
- Conditioning
- Ventilation
- Civil installations.

Lighting circuit switching
See pages 19-10 and 11.

Special versions
Contactors with Mirror Contact function, as per IEC/EN/BS 60947-4-1 Standard, Annex F, are available on request. Consult Technical support; see contact details on front cover.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 61095.

Contactors with manual control

CNM20... - CNM3220...

CNM3210...

Order code	Rated auxiliary supply voltage	Configuration and number of contacts		Qty per pkg	Wt
	[V]❶	⅂NO	⅂NC	n°	[kg]
One-pole or two-pole. 1 module. Ith 20A.					
CNM2011024❷❻	24VAC/DC	1	1❸	10	0.135
CNM2011220❷❻	220...230VAC❺	1	1❸	10	0.135
CNM2020012❷❻	12VAC/DC	2	—	10	0,135
CNM2020024❷❻	24VAC/DC	2	—	10	0.135
CNM2020220❷❻	220...230VAC❺	2	—	10	0.135
One-pole or two-pole. 1 module. Ith 32A.					
CNM3220012❷❻	12VAC/DC	2	—	10	0.135
CNM3220024❷❻	24VAC/DC	2	—	10	0.135
CNM3220220❷❻	220...230VAC❺	2	—	10	0.135
Three-pole or four-pole. 2 module. Ith 32A.					
CNM3210024❷❻	24VAC/DC	4❹	—	5	0.260
CNM3210220❷❻	220...230VAC❺	4❹	—	5	0.260

❶ Other voltages on request. Consult Technical support; see contact details on front cover.
❷ 2NC version supplied on request.
❸ The last (NC) pole has the same characteristics as the power pole. It can therefore be used indifferently as an auxiliary or as a NC power contact.
❹ The fourth NO or NC pole has the same characteristics as the power poles; therefore it can be used indifferently as auxiliary or as power contact.
❺ Can also operate at 220VDC.
❻ No auxiliary contacts can be mounted.

Maximum number of contactors side-by-side
When contactors are mounted side by side and operate in continuous service (1 hour), spacing is needed between equipment to allow appropriate cooling.
9mm spacing is required; there is an accessory, called half-module spacer, order code CNX80, for this specific type of mounting. The following table indicates details of the space needed between each.

Maximum number of contactors to be mounted side-by-side without spacing; the CNX80 spacer is required when the number of pieces is more than the indicated below:

	CNM20	CNM32
Ambient temperature ≤40°C	3	3
Ambient temperature >40°...55°C	2	2

General characteristics
- DC powered magnetic core system assuring silent operation and noise damping during the control phase
- Overvoltage protection circuit and voltage peak limitation of the magnetic core
- Equipped with 2 or 4 closing contacts of equal capacity permitting use in power or auxiliary circuits
- Operation flag indicator
- Handle functions
  Position A: contactor function.
  Position O: contactor permanently switched off, even in case of coil control voltage is present.
  Position I: contactor closed manually; when the coil is supplied the handle automatically moves to A position.

Operational characteristics

Type	IEC conventional free-air thermal current Ith AC1 and AC-7a ≤400V [A]	Operational current AC3 and AC-7b ≤400V [A]	Protection fuse gG (IEC) [A]
One-pole or two-pole.			
CN20...	20	9	20
CN32...	32	9	32
Three-pole or four-pole.			
CN32...	32	8,5	32

- Noise level:
  • Closed contactor <20dB
  • Making/breaking operation ≤50dB
- IEC degree of protection: IP20
- Mounting on 35mm DIN rail (IEC/EN/BS 60175).

Operational characteristics of contactor-incorporated auxiliary contacts

Type	IEC insulation voltage Ui	IEC rating (AC15 category)	
		230V	400V
	[V]	[A]	[A]
CN20...	440	6	6
CN32...	440	6	4

Utilisation
- Lighting systems
- Electric home heating
- Heat pumps
- Conditioning
- Ventilation
- Civil installations.

Lighting circuit switching
See pages 19-10 and 11.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 61095.

Add-on blocks and accessories for contactors and contactors with manual control

CNH...

CNP2

Order code	Characteristics	Max qty per contactor	Qty per pkg	Wt
		n°	n°	[kg]
Auxiliary contacts❼.				
CNH11❼	1NO + 1NC	1	1	0.044
CNH20❼	2NO	1	1	0.044
Set for terminal protection (also sealable).				
CNP0	For CN20..., CNM20... and CNM32...	2	1❽	0.001
CNP1	For CN25... and CNM32...	2	1❽	0.002
CNP2	For CN40... and CN63...	2	1❽	0.003
Spacer.				
CNX80	1/2 mod. wide	1	10	0.013

Operational characteristics for auxiliary contacts
- IEC rated insulation voltage: 440VAC
- IEC conventional free air thermal current Ith: 6A
- Minimum switching capacity: 5mA 12V
- Conductor section: 1...2.5mm²
- Maximum tightening torque: 1Nm.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 61095.

❼ Not suitable for CN20..., CN32 11..., CN32 20..., CNM20... and CNM32... modular contactors.
❽ Set of 2 pieces.

Latching relays

CNB20... - CNB3220...

CNB3210...

Order code	Rated auxiliary supply voltage	Configuration and number of contacts		Qty per pkg	Wt
	[V]❶	⅂NO	⊦NC	n°	[kg]
One-pole or two-pole. 1 module. Ith 20A.					
CNB2010230	230VAC	1	—	8	0.135
CNB2011012	12VAC	1	1❷	8	0.135
CNB2011024	24VAC	1	1❷	8	0.135
CNB2011230	230VAC	1	1❷	8	0.135
CNB2020012	12VAC	2	—	8	0.135
CNB2020024	24VAC	2	—	8	0.135
CNB2020230	230VAC	2	—	8	0.135
One-pole or two-pole. 1 module. Ith 32A.					
CNB3220012	12VAC	2	—	8	0.135
CNB3220024	24VAC	2	—	8	0.135
CNB3220230	230VAC	2	—	8	0.135
Three-pole or four-pole. 2 module. Ith 32A.					
CNB3210012	12VAC	4❸	—	4	0.195
CNB3210024	24VAC	4❸	—	4	0.195
CNB3210230	230VAC	4❸	—	4	0.195

❶ Other voltages on request. Consult Technical support; see contact details on front cover.
❷ The last (NC) pole has the same characteristics as the power pole. It can therefore be used indifferently as an auxiliary or as a NC power contact.
❸ The fourth NO or NC pole has the same characteristics as the power poles; therefore it can be used indifferently as auxiliary or as power contact.

General characteristics
- Mechanical system that keeps the contactor in position without the coil being powered
- Includes a manual control system and a switch to lock the coil command
- Equipped with 2 or 4 closing contacts of equal capacity permitting use in power or auxiliary circuits
- Operation flag indicator
- No consumption of the closed electromagnet contactor with considerable advantages in reducing the dissipated heat.

Operational characteristics

Type	IEC conventional free-air thermal current Ith, AC1 and AC-7a ≤400V [A]	Operational current AC3 and AC-7b ≤400V [A]	Protection fuse gG (IEC) [A]
One-pole or two-pole.			
CNB20...	20	9	20
CNB32...	32	9	32
Three-pole or four-pole.			
CNB32...	32	8,5	32

- Noise level:
  - Closed contactor 0dB (mechanically closed)
  - Making/breaking operation ≤50dB
- IEC degree of protection: IP20
- Mounting on 35mm DIN rail (IEC/EN/BS 60175).

Operational characteristics of contactor-incorporated auxiliary contacts

Type	IEC insulation voltage Ui	IEC rating (AC15 category)	
		230V	400V
	[V]	[A]	[A]
CNB20...	440	6	6
CNB32...	440	6	4

Utilisation
- Lighting systems
- Electric home heating
- Heat pumps
- Conditioning
- Ventilation
- Civil installations.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 61095, IEC/EN/BS 60669-1, IEC/EN/BS 60669-2-2.

Add-on blocks and accessories

CNBX...

CNP3

Order code	Characteristics	Max qty per contactor	Qty per pkg	Wt
		n°	n°	[kg]
Auxiliary contacts.				
CNBX11	1NO + 1NC	1	1	0.032
CNBX20	2NO	1	1	0.032
Set for terminal protection (also sealable).				
CNP3	For CNB...	❹	1❺	0.002

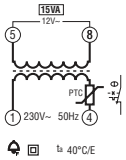
❹ To cover all the terminals, mount: 2 pieces for one module latching relay; 2 set of 2 pieces for two module latching relay.
❺ Set of 2 pieces.

Operational characteristics for auxiliary contacts
- IEC rated insulation voltage: 440VAC
- IEC conventional free air thermal current Ith: 6A
- Minimum switching capacity: 5mA 12V
- Conductor section: 1...2.5mm^2
- Maximum tightening torque: 1Nm.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 61095.

Bells and buzzers

CBE... CBZ230A



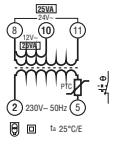
CTRB15VA

Order code	Description	Supply voltage	Output voltage	Qty per pkg	Wt
				n°	[kg]
CBE012A	Modular bell	12	–	1	0.077
CBE230A	Modular bell	230	–	1	0.073
CBZ230A	Modular buzzer	230	–	1	0.063
CTRB15VA	Modular transformer for 15VA bell	230	12	1	0.339

General and operational characteristics
- Sound intensity, distance 1m: buzzer 80dB, bells 84dB
- Power consumption: 10VA (5VA for CBE012A)
- Operating temperature: -10...+55°C (-10...+40°C for CTRB15VA)
- Storage temperature: -40...+80°C
- Conductor section (min...max): 0.5...1.5mm²
- Tightening torque: 0.5Nm
- Screw terminals: M3
- DIN modules: CBE... 1 module; CBZ... 1 module; CTRB15VA 2 modules
- CTRB15VA can only be used for bell power supply (intermittent operation)
- CTRB15VA overload and short circuit protection integrated (PTC).

Certifications and compliance
Certifications obtained: EAC (except CTRB15VA).
Compliant with standards: IEC/EN/BS 62080.

Modular safety transformers



CTRS...

Order code	Power	Supply voltage	Output voltage	Qty per pkg	Wt
				n°	[kg]
CTRS15VA	15	230	12-24	1	0.477
CTRS25VA	25	230	12-24	1	0.582
CTRS40VA	40	230	12-24	1	0.846
CTRS63VA	63	230	12-24	1	1.319

General and operational characteristics
- Safety transformers suitable for continuous operation
- Overload and short circuit protection integrated (PTC)
- Operating temperature: -10...+25°C
- Storage temperature: -40...+70°C
- Conductor section (min...max): 0.5...10mm²
- Tightening torque: 1Nm
- Screw terminals: M4
- DIN modules: CTRS15VA 3 modules; CTRS25VA 3 modules; CTRS40VA 4 modules; CTRS63VA 6 modules.

Reference standards
Compliant with standards: IEC/EN/BS 61558-2-8.

Modular socket

P1X7

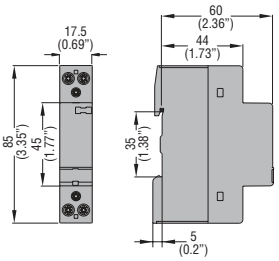
Order code	Description	Qty per pkg	Wt
		n°	[kg]
P1X7	Modular socket Italian and German (Schuko) standard;16A	5	0.123

General and operational characteristics
- Operating temperature: -25...+45°C
- Storage temperature: -40...+75°C
- Max. current: 16A
- Connectable section 1.5...10mm²
- Tightening torque: 1.8Nm
- Fixing on 35mm DIN rail (IEC/EN/BS 60715)
- DIN modules: 2.5.

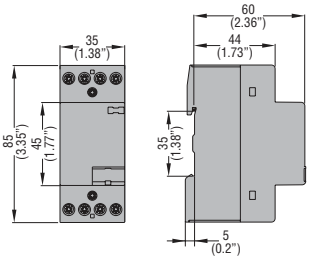
Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/BS 60884-1.

MODULAR CONTACTORS

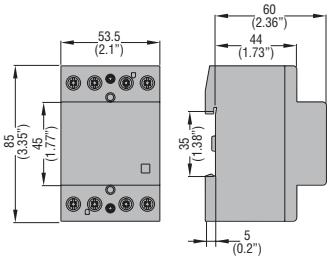
CN20... - CN32... (one-pole - two-pole)



CN25... - CN32... (three-pole - four-pole)

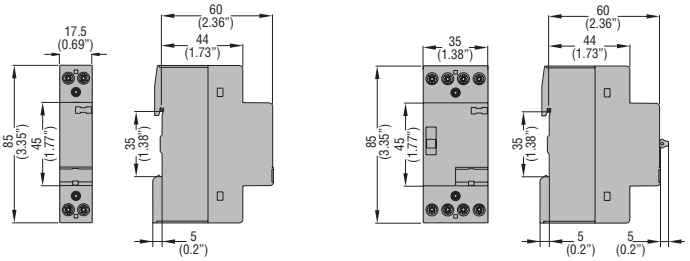


CN40... - CN63... (three-pole - four-pole)



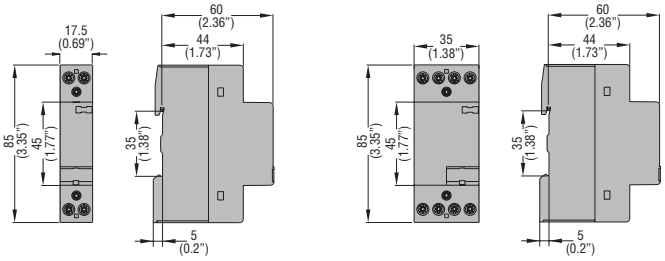
MODULAR CONTACTORS WITH MANUAL CONTROL

CNM20... - CNM32... (one-pole - two-pole) **CNM32...** (three-pole - four-pole)



LATCHING RELAYS

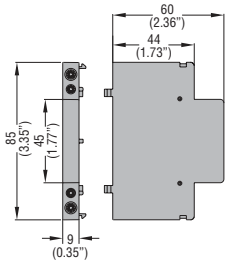
CNB20... - CNB32... (one-pole - two-pole) **CNB32...** (three-pole - four-pole)



ADD-ON BLOCKS AND ACCESSORIES

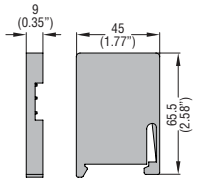
Auxiliary contacts

CNH... - CNBX...



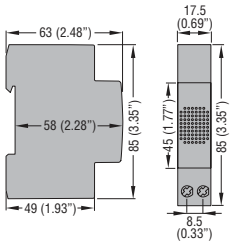
Spacer

CNX80



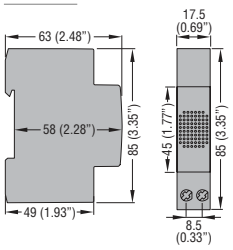
BELLS

CBE...



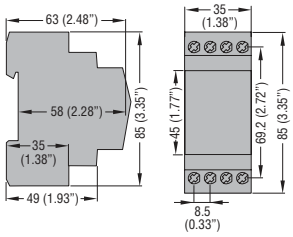
BUZZER

CBZ230A



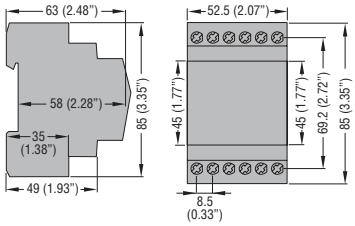
TRANSFORMER FOR BELLS

CTRB15VA

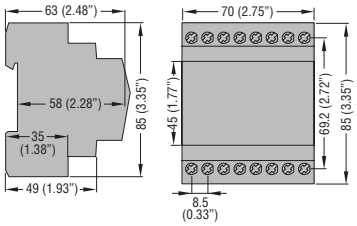


MODULAR SAFETY TRANSFORMERS

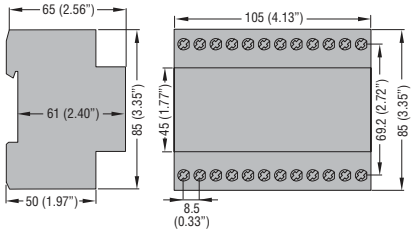
CTRS15VA - CTRS25VA



CTRS40VA

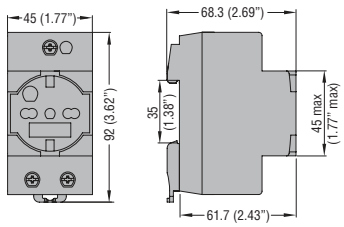


CTRS63VA



MODULAR SOCKET

P1X7

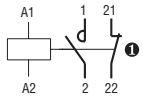


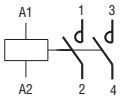
ONE-POLE AND TWO-POLE MODULAR CONTACTORS

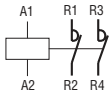
CN2011
CN3211
CNM2011

CN2020
CN3220
CNM2020
CNM3220

CN2002





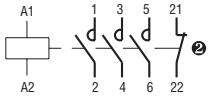


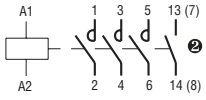
THREE-POLE AND FOUR-POLE MODULAR CONTACTORS

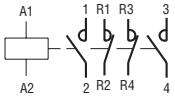
CN2501
CN3201
CN4001
CN6301

CN2510
CN3210
CN4010
CN6310
CNM3210

CN2522
CN4022
CN6322





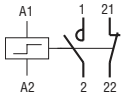


❶ The NC contact has the same characteristics as the power pole contact. Therefore, it can be used indifferently as an auxiliary or as a NC power pole contact.
❷ The fourth pole NO or NC has the same characteristics as the power poles. Therefore, it can be used indifferently as auxiliary or as power pole contact.

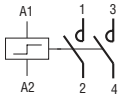
LATCHING RELAYS

CNB2010

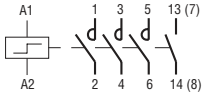
CNB2011



CNB2020
CNB3220



CNB3210



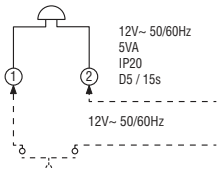
ADD-ON AUXILIARY CONTACTS

CNH11
CNBX11

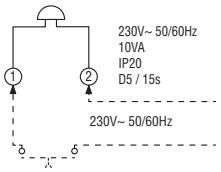
CNH20
CNBX20

BELLS

CBE012A

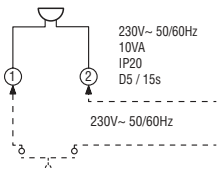


CBE230A



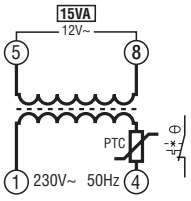
BUZZER

CBZ230A



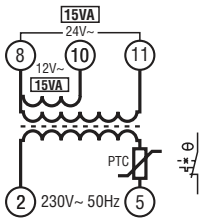
TRANSFORMER FOR BELLS

CTRB15VA

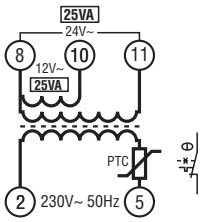


MODULAR SAFETY TRANSFORMERS

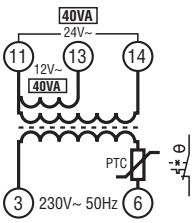
CTRS15VA



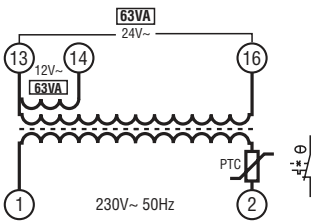
CTRS25VA



CTRS40VA



CTRS63VA



TYPE			CN20... - CNM20...	CN25...	CN32... - CNM32... (one-pole and two-pole)	CN32... - CNM32... (three-pole and four-pole)	CN40...	CN63...
CONTACT CHARACTERISTICS								
IEC conventional free-air thermal current Ith (≤40°C)		A	20	25	32	32	40	63
IEC rated insulation voltage Ui		V	440					
IEC rated impulse withstand voltage Uimp		kV	4					
Minimum switching capacity			17V ≥50mA					
Max fuse size, gG type, for Type 1 coordination, 400V - 3kA		A	25	25	32	32	63	80
Power dissipation for Ith pole		W	1.7	2	2.5	2.5	4	8
Maximum tightening torque for coil terminals		Nm	0.6	0.6	0.6	0.6	0.6	0.6
		lb.in	5.3	5.3	5.3	5.3	5.3	5.3
		Pozidr.	PZ1	PZ1	PZ1	PZ1	PZ1	PZ1
Coil conductor section	min.	mm^2	1					
	max.	mm^2	2.5					
Maximum tightening torque for power terminals		Nm	1.2	1.2	1.2	1,.2	2	2
		lb.in	10.6	10.6	10.6	10.6	18	18
		Tool	PZ2	PZ2	PZ2	PZ2	PZ2	PZ2
Power conductor section	min.	mm^2	1	1	1	1	1.5	1.5
	max.	mm^2	10	10	10	10	16	16
AC/DC CONTROL CIRCUIT								
Average coil consumption in-rush and holding		W	2.5	3	2.5	3	5	5
Operating voltage limits	pick-up	% Us	85...110					
	drop-out	% Us	20...75					
OPERATING TIMES								
Average time	closing NO	ms	15...45	15...45	15...45	15...45	15...20	15...20
	opening NO	ms	25...50	20...70	20...50	20...70	35...45	35...45
LIFE								
Mechanical		cycles	3,000.000	3,000.000	3,000.000	3,000.000	3,000.000	3,000.000
Electrical (in AC3 duty)		cycles	300,000	500,000	500,000	500,000	150,000	150,000
Electrical (in AC1 duty)		cycles	200,000	200,000	150,000	150,000	100,000	100,000
AMBIENT CONDITIONS								
Operating temperature		°C	-5...+55❶					
Storage temperature		°C	-30...+80					

❶ -25...+70°C (2NO or 4NO configuration). When the operating temperature is between +55°C and +70°C, it is compulsory to have a free space of at least 9mm on the side faces of the contactor.

TYPE			CNB20	CNB32... (one-pole and two-pole)	CNB32... (three-pole and four-pole)
CONTACT CHARACTERISTICS					
IEC conventional free-air thermal current Ith (≤40°C)		A	20	32	32
IEC rated insulation voltage Ui		V	440		
IEC rated impulse withstand voltage Uimp		kV	4		
Minimum switching capacity			≥10V ≥100mA		
Max fuse size, gG type, for Type 1 coordination, 400V - 3kA		A	20	32	32
Power dissipation for Ith pole		W	1.5	3	3
Maximum tightening torque for coil terminals		Nm	0.6	0.6	0.6
		lb.in	5.3	5.3	5.3
		Pozidr.	PZ1	PZ1	PZ1
Coil conductor section	min.	mm^2	1		
	max.	mm^2	4		
Maximum tightening torque for power terminals		Nm	1.2	1.2	1.2
		lb.in	10.6	10.6	10.6
		Pozidr.	PZ2	PZ2	PZ2
Power conductor section	min.	mm^2	1	1	1
	max.	mm^2	10	10	10
CONTROL CIRCUIT					
Coil consumption - In-rush		VA/W	18/13	18/13	7
Max. recommended impulse duration		m/s	50/100		
Min. time between two impulses		m/s	150		
Maximum supply time		h	1		
Operating voltage limits	closing	% Us	85...110		
OPERATING TIMES					
Average time	closing NO	ms	5...20		
	opening NO	ms	25...50		
LIFE					
Mechanical		cycles	1,000,000		
Electrical (in AC3 duty)		cycles	100,000		
Electrical (in AC1 duty)		cycles	100,000		
AMBIENT CONDITIONS					
Operating temperature		°C	-25...+55		
Storage temperature		°C	-30...+80		

LIGHTING CIRCUIT SWITCHING

Lamp features	Lamp power	Rated current	Capacitor power	Maximum number [n] of lamps each contactor pole 230V 50Hz				
	[W]	[A]	[µF]	**CN20... - CNM20... CNB20...**	**CN25...**	**CN32... - CNM32... CNB32...**	**CN40**	**CN63**
LED LIGHTING BALLAST	N = number of controlled ballasts❶ In = ballast rated current in mA			N = 2400 / In	N = 3800 / In	N = 4000 / In	N = 11000 / In	N = 18000 / In
INCANDESCENT AND TUNGSTEN HALOGEN	60	0.26	-	33	37	42	67	83
	100	0.44	-	20	22	25	40	50
	500	2.17	-	4	4	5	8	10
	1000	4.35	-	2	2	3	4	5
COMPACT FLUORESCENT (ENERGY SAVING)	3	0.04	-	150	200	250	550	700
	5	0.06	-	90	120	150	330	420
	6	0.07	-	75	100	125	275	350
	7	0.08	-	64	86	107	236	300
	8	0.09	-	56	75	94	206	263
	9	0.1	-	50	67	83	183	233
	10	0.11	-	45	60	75	165	210
	11	0.12	-	41	55	68	150	191
	12	0.13	-	38	50	63	138	175
	13	0.14	-	35	46	58	127	162
	14	0.15	-	32	43	54	118	150
	15	0.16	-	30	40	50	110	140
	16	0.18	-	28	38	47	103	131
	17	0.19	-	26	35	44	97	124
	18	0.2	-	25	33	42	92	117
	20	0.21	-	23	30	38	83	105
	21	0.22	-	21	29	36	79	100
	22	0.23	-	20	27	34	75	95
	23	0.24	-	20	26	33	72	91
	24	0.25	-	19	25	31	69	88
	25	0.26	-	18	24	30	66	84
	26	0.27	-	17	23	29	63	81
	27	0.124	-	17	22	28	61	78
	30	0.15	-	15	20	25	55	70
	50	0.24	-	9	12	15	33	42
	70	0.312	-	6	9	11	24	30
FLUORESCENT not corrected	18	0.37	-	24	30	35	54	86
	25	0.29	-	30	39	45	69	110
	36	0.43	-	20	26	30	47	74
	58	0.67	-	13	17	19	30	48
FLUORESCENT corrected	18	0.19	4.5	7	8	9	49	73
	25	0.15	3.5	9	10	11	63	94
	36	0.29	4.5	7	8	9	49	73
	58	0.46	7	4	5	6	31	47
ELECTRONIC FLUORESCENT BALLAST	14	0.08	-	44	59	64	156	225
	2x14	0.15	-	23	32	34	83	120
	18	0.09	-	39	53	57	139	200
	2x18	0.17	-	21	28	30	74	106
	21	0.11	-	32	43	46	114	164
	2x21	0.22	-	16	22	23	57	82
	28	0.14	-	25	34	36	89	129
	2x28	0.27	-	13	18	19	46	67
	36	0.16	-	22	30	32	78	113
	2x36	0.31	-	11	15	16	40	58
	40	0.21	-	17	23	24	60	86
	2x40	0.42	-	8	11	12	30	43
	58	0.25	-	14	19	20	50	72
	2x58	0.48	-	7	10	11	26	38
	70	0.3	-	12	16	17	42	60
	2x70	0.57	-	6	8	9	22	32
HIGH-PRESSURE MERCURY VAPOUR not corrected	50	0.6	-	14	18	20	38	55
	80	0.8	-	10	13	15	29	42
	125	1.2	-	7	9	10	20	29
	250	2.2	-	4	5	6	10	15
	400	3.3	-	2	3	4	7	10
	700	5.4	-	1	2	3	4	6
	1000	7.5	-	1	1	2	3	4

❶ Usually each LED lamp has one ballast.
In event of one ballast supplies several lamps, the calculation has to consider the number of supplied ballasts.
E.G. If the LED lamp ballast input current is 500mA, (consider CN40=11,000/500=22), the maximum number of ballasts admitted per each pole of CN40 contactor is 22.

LIGHTING CIRCUIT SWITCHING

Lamp features	Lamp power	Rated current	Capacitor power	Maximum number [n] of lamps each contactor pole 230V 50Hz				
	[W]	[A]	[µF]	**CN20... - CNM20... CNB20...**	**CN25...**	**CN32... - CNM32... CNB32...**	**CN40**	**CN63**
HIGH-PRESSURE MERCURY	50	0.3	7	4	5	6	31	47
VAPOUR	80	0.4	8	4	5	5	27	41
corrected	125	0.6	10	3	4	4	22	33
	250	1.2	18	1	2	2	12	18
	400	1.8	25	1	1	1	9	13
	700	3.4	40	0	0	1	5	7
	1000	4.8	60	0	0	0	4	5
METAL HALIDE	35	0.5	-	18	22	28	43	60
not corrected	70	1	-	10	12	14	23	32
	100	1.2	-	8	10	11	19	26
	150	1.8	-	5	7	7	12	18
	250	3	-	3	4	4	7	10
	400	4.6	-	3	3	3	6	9
	600	6.2	-	1	2	2	3	4
	1000	9.7	-	1	1	1	2	3
	2000	12.2	-	0	0	1	1	2
METAL HALIDE	35	0.23	6	5	6	6	36	50
corrected	70	0.42	12	2	3	3	18	25
	100	0.55	12	2	3	3	18	25
	150	0.77	20	1	1	1	11	15
	250	1.26	32	0	1	1	6	9
	400	2	45	0	0	0	5	7
	600	3	65	0	0	0	3	5
	1000	5	85	0	0	0	2	3
	2000	10.5	125	0	0	0	1	2
HIGH-PRESSURE SODIUM	100	1.2	-	7	8	9	25	30
VAPOUR	150	1.8	-	5	6	6	17	22
not corrected	250	3	-	3	4	4	10	13
	400	4.4	-	2	2	2	6	8
	600	6.2	-	1	1	1	4	5
	1000	10.3	-	0	1	1	3	3
HIGH-PRESSURE SODIUM	100	0.55	12	2	3	3	18	2
VAPOUR	150	0.77	20	1	1	2	11	16
corrected	250	1.26	32	0	1	1	6	10
	400	2	45	0	0	0	4	6
	600	2.9	65	0	0	0	3	5
	1000	5.1	100	0	0	0	2	3
LOW-PRESSURE SODIUM	18	0.4	-	22	27	30	71	90
VAPOUR	35	0.6	-	7	9	10	23	30
not corrected	55	0.6	-	7	9	10	23	30
	90	0.9	-	4	5	6	14	19
	135	0.9	-	3	4	5	10	13
	180	0.9	-	3	4	5	10	13
LOW-PRESSURE SODIUM	18	0.35	5	6	7	8	44	66
VAPOUR	35	0.28	20	1	1	2	11	16
corrected	55	0.35	20	1	1	2	11	16
	90	0.55	26	1	1	1	8	12
	135	0.8	40	0	0	1	4	7
	180	1	40	0	0	1	5	8
LOW-PRESSURE SODIUM	35	0.16	-	13	18	21	35	44
VAPOUR	55	0.25	-	8	11	13	22	28
with electronic ballast								

Earth leakage relays

- Versions with type A and type B operating characteristics
- Modular, flush and internal panel mount version, with or without flag indicator, configurable pre-alarm indication and fail safe operation
- Versions with or without display
- Wide range of supply voltages
- Versions with automatic toroid connection control
- Type A and type B toroids
- Adjustable fault current IΔn
- Adjustment and choice of tripping range for both fault current and delay time.

	Sec. - Page
Type A	
Modular version with display, with 1 operation threshold	20 - 2
Modular version with display, with 2 operation thresholds	20 - 2
Modular version, with 1 operation threshold	20 - 2
Flush-mount version with 1 operation threshold	20 - 3
Flush-mount version with 2 operation thresholds	20 - 3
Panel mount version with 1 operation threshold	20 - 3
Type B	
Modular version with display, with 2 operation thresholds	20 - 4
Toroidal current transformers	**20 - 5**
External multiplier	**20 - 5**
Accessories	**20 - 5**
Dimensions	**20 - 6**
Wiring diagrams	**20 - 8**
Technical characteristics	**20 - 10**

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MODULAR VERSION WITH DISPLAY TYPE A
RM1DA, RM2DA type
- Backlit LCD display
- Fault current measurement
- Version with 1 or 2 operation thresholds
- External toroidal transformer
- Adjustable tripping IΔn and delay time
- Version with adjustable third harmonic filter.

Page 20-2

MODULAR VERSION TYPE A
RM1 type
- 1 operation threshold
- External toroidal transformer
- Fixed tripping IΔn and delay time.

RM type
- 1 operation threshold
- External toroidal transformer
- Adjustable tripping IΔn and delay time.

Page 20-3

FLUSH-MOUNT VERSION TYPE A
R1D, R2D, R3D and R4D type
- Version with 1 or 2 operation thresholds.
- External toroidal transformer
- Adjustable tripping IΔn and delay time
- Positive fail safe
- Version with fault current measurement
- Version with digital display
- Version with flag indicator
- Version with shunt tripping circuit.

Page 20-3

COMPACT PANEL MOUNT VERSION TYPE A
RC type
- 1 operation threshold
- Incorporated toroidal transformer
- Adjustable tripping IΔn and delay time
- 35mm to 110mm diameter.

Page 20-4

MODULAR VERSION WITH DISPLAY TYPE B
RM2DB type
- Backlit LCD display
- Measure fault current in AC and DC components
- 2 operation thresholds
- External toroidal transformer
- Adjustable tripping IΔn and delay time
- Harmonics analysis.

Page 20-5

TOROIDAL CURRENT TRANSFORMERS
RT type
- Type A
- Solid core
- 35mm to 210mm diameter.

RTA type
- Type A
- Split core
- 110mm and 210mm diameter.

RTB type
- Type B
- Solid core
- 35mm to 210mm diameter.

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EXTERNAL MULTIPLIER
RX10 type
- 10-fold multiplier.

Modular version with display type A

RM1DA...

RM2DA...

new

Order code	Rated auxiliary supply voltage	Output contacts	Qty per pkg	Wt
	[V]	SPDT	n°	[kg]
1 OPERATION THRESHOLD. Modular, 35mm DIN (IEC/EN/BS 60715) rail mounting. External CT.				
RM1DA230	230VAC	1	1	0.300
2 OPERATION THRESHOLDS. Modular, 35mm DIN (IEC/EN/BS 60715) rail mounting. External CT.				
RM2DA230	230VAC	2	1	0.200

General characteristics
- Earth leakage relay type A
- True RMS measurements (TRMS)
- Adjustable third or twenty-first harmonic filter (only for RM2DA230)
- Modular DIN 43880 housing, 2 modules (RM1DA230) or 3 modules (RM2DA230), suitable for fixing on 35mm DIN rail (IEC/EN/BS 60715) execution
- 31RT... series external toroid
- Display of the differential current values
- Backlit LCD display with indication of the relay status via display color (green, yellow, red)
- Green power LED indicator (ON)
- Yellow pre-alarm LED indicator (only for RM2DA230)
- Red LED indicator for trip intervention (only for RM2DA230)
- TEST and RESET buttons on the front or remote contact closure (only for RM2DA230)
- 1 (RM1DA230) or 2 (RM2DA230) independent relay outputs, the second output can be set as a pre-alarm threshold
- Operation with positive safety for each relay (settable)
- Digital inputs for test function and remote reset (only for RM2DA230)
- Instantaneous trend graph of the current measurement (only for RM2DA230)
- Fault current intervention event log
- Possibility to protect settings via password
- IEC degree of protection: IP20 terminals, IP40 on front.

ADJUSTMENTS
- Configurable tripping set-point (IΔn): 0.030...30A
- Configurable tripping delay time (t): 0.2...10s.

Certification and compliance
Compliant with standards: RM1DA230: IEC/EN 61010, IEC/EN 61000-6-2 IEC/EN 61000- 6-3, IEC/TR 60755, EN 60947-2 (Annex M). RM2DA230: EN 61326-1:2013-01 EN 61326-2-1:2013-01 EN 61326-2-2:2013-01 EN 61326-2-3:2013-01 EN 61326-2-4:2013-01 EN 61326-2-5:2013-01 EN 60947-2:2017-10 (Annex M) EN 61543/A2:2006-02, EN 61543/A11, EN 61543/A12.

Modular version type A

RM1...

31RM...

31RMT...

Order code	Rated auxiliary supply voltage	Output contacts	Qty per pkg	Wt
	[V]	SPDT	n°	[kg]
1 OPERATION THRESHOLD. Modular, 35mm DIN (IEC/EN/BS 60715) rail mounting. External CT. Fixed tripping set point and time.				
RM1415	110-240-415V ❶	1	1	0.175
1 OPERATION THRESHOLD. Modular, 35mm DIN (IEC/EN/BS 60715) rail mounting. External CT.				
31RM48	24-48VAC/DC	1	1	0.190
31RM415	110-240-415V ❶	1	1	0.190
1 OPERATION THRESHOLD. Modular, 35mm DIN (IEC/EN/BS 60715) rail mounting. Ø28mm/Ø1.1" incorporated CT. Configurable fail safe.				
31RMT415	110-240-415V ❶	2	1	0.375

❶ Supply voltage:
- 110...125VAC (50/60Hz)/DC
- 220...240VAC (50/60Hz)
- 380...415VAC (50/60Hz).

General characteristics
- Earth leakage relay type A
- Configurable fail safe operation for RMT type only
- Green power LED indicator (ON)
- Red relay tripped LED indicator (TRIP)
- Front TEST and RESET buttons
- Configurable automatic or manual resetting
- Modular DIN 43880 housing, 2 modules, with transparent cover, suitable for fixing on 35mm DIN rail (IEC/EN/BS 60715)
- IEC degree of protection: IP20 terminals, IP40 on front with cover.

SETTINGS FOR RM1
- Selectable tripping set-point (IΔn): fixed 0.3A or 0.5A
- Selectable tripping time (t): fixed 0.02s or 0.5s.

ADJUSTMENTS FOR 31RM AND 31RMT
- Configurable tripping set-point (IΔn): 0.025...0.25A, 0.25...2.5A, 2.5...25A, 25...250A (with external multiplier 31RX10 for RM only)
- Configurable tripping delay time (t): 0.02...0.5s, 0.2...5s.

Certification and compliance
Certification obtained: EAC.
Compliant with standards: IEC/EN/BS 60947-2.

Flush-mount version type A

R1D...

R2D...

R3D...

R4D...

Order code	Rated auxiliary supply voltage	Output contacts	Qty per pkg	Wt
	[V]	SPDT	n°	[kg]
1 OPERATION THRESHOLD. Flush mount. External CT.				
R1D415	110-240-415V ❶	1	1	0.280
2 OPERATION THRESHOLDS. Flush mount. External CT. Fail safe.				
R2D415	110-240-415V❶	2	1	0.395
2 OPERATION THRESHOLDS. Flush mount. External CT. Fail safe. Flag Indicator.				
R3D415	110-240-415V❶	2	1	0.405
2 OPERATION THRESHOLDS. Flush mount. External CT. Fault current measurement. Digital display. Fail safe. Flag indicator.				
R4D415	110-240-415V❶	2	1	0.570

❶ Supply voltage:
– 110...125VAC (50/60Hz)/DC
– 220...240VAC (50/60Hz)
– 380...415VAC (50/60Hz).

General characteristics
R1D415
– Earth leakage relay type A
– Green power LED indicator (ON)
– Red relay tripped LED indicator (TRIP)
– Front TEST and RESET buttons
– Configurable automatic or manual resetting
– Flush mount 96x96mm/3.78”x3.78” housing with transparent cover
– IEC degree of protection: IP20 terminals, IP40 on front with cover.

ADJUSTMENTS FOR R1D
– Configurable tripping set-point (IΔn): 0.025...0.25A, 0.25...2.5A, 2.5...25A, 25...250A (with external multiplier 31RX10)
– Configurable tripping delay time (t): 0.02...0.5s, 0.2...5s.

R2D415 - R3D415 - R4D415
– Earth leakage relay type A
– 2 output relays each with changeover contact, configurable as 2 tripping or 1 tripping and 1 alarm
– Configurable fail safe pre-alarm and operation
– Automatic toroid connection control
– Green power LED indicator (ON)
– Red relay tripped LED indicator (TRIP)
– Red tripping pre-alarm LED indicator (ALARM)
– Front TEST button
– Manual resetting by front RESET button or remote contact closing
– Automatic resetting by remote contact closing or rear jumper connection
– Flag indicator (TRIP MEMORY) (R3D-R4D only)
– Digital fault current measurement and display with configurable tripping value memory (R4D only)
– Shunt tripping circuit operating test (TCS) (R4D only)
– Flush mount 96x96mm/3.78”x3.78” housing with transparent cover
– IEC degree of protection: IP20 terminals, IP40 on front with cover.

ADJUSTMENTS FOR R2D and R3D
– Configurable tripping set-point (IΔn): 0.025...0.25A, 0.25...2.5A, 2.5...25A, 25...250A (with external multiplier 31RX10)
– Pre-alarm set-point: fixed 70%
– Configurable tripping delay time (t): 0.02...0.5s, 0.2...5s.

ADJUSTMENTS FOR R4D
– Configurable tripping set-point (IΔn): 0.03...0.3A, 0.3...3A, 3...30A, 30...300A (with external multiplier 31RX10)
– Pre-alarm set-point: fixed 70%
– Configurable tripping delay time (t): 0.03...0.5s, 0.3...5s.

Certification and compliance
Certification obtained: EAC.
Compliant with standards: IEC/EN/BS 60947-2.

Panel mount version type A

31RC60...

31RC110...

Order code	Rated auxiliary supply voltage	Output contacts	Qty per pkg	Wt
	[V]	SPDT	n°	[kg]
1 OPERATION THRESHOLD. Compact panel mount. CT incorporated.				
31RC❷48	24-48VAC/DC	1	1	0.485
31RC❷415	110-240-415V ❶	1	1	0.485

❶ Supply voltage:
– 110...125VAC (50/60Hz)/DC
– 220...240VAC (50/60Hz)
– 380...415VAC (50/60Hz).
❷ Replace with the digit of the required diameter (35-60-80-110mm/ 1.38-2.36-3.15-4.33”).

General characteristics
– Earth leakage relay type A
– Green power LED indicator (ON)
– Red relay tripped LED indicator (TRIP)
– Front TEST and RESET buttons
– Configurable automatic or manual resetting
– Compact housing for fixing on panel mounting plate
– IEC degree of protection: IP20 terminals.

ADJUSTMENTS FOR RC
– Configurable tripping set-point (IΔn): 0.025...0.25A, 0.25...2.5A, 2.5...25A
– Configurable tripping delay time (t): 0.02...0.5s, 0.2...5s.

Certification and compliance
Certification obtained: EAC.
Compliant with standards: IEC/EN/BS 60947-2.

Modular version with display type B

RM2DB...

new

Order code	Rated auxiliary supply voltage	Output contacts	Qty per pkg	Wt
	[V]	SPDT	n°	[kg]
2 OPERATION THRESHOLDS. Modular, 35mm DIN (IEC/EN/BS 60715) rail mounting. External CT.				
RM2DB230	230VAC	2	1	0.200

General characteristics
- Earth leakage relay type B
- True RMS measurements (TRMS)
- Adjustable third or twenty-first harmonic filter (only for RM2DA230)
- Modular DIN 43880 housing, 3 modules, suitable for fixing on 35mm DIN rail (IEC/EN/BS 60715) execution
- It can be used with just a single external toroid from the RTB series...
- Display of differential current values, both AC and DC components
- Backlit LCD display with indication of the relay status via display color (green, yellow, red)
- Green power LED indicator (ON)
- Yellow pre-alarm LED indicator
- Red LED indicator for trip intervention
- TEST and RESET buttons on the front or remote contact closure
- 2 independent relay outputs, the second output can be set as a pre-alarm threshold
- Operation with positive safety for each relay (settable)
- Digital inputs for test function and remote reset
- Self-test function to verify the correct connection of the toroidal current transformer
- Possibility to protect settings via password
- IEC degree of protection: IP20 terminals, IP40 on front.

ADJUSTMENTS
- Configurable tripping set-point (IΔn): 0.030...30A
- Configurable tripping delay time (t): 0.2...10s.

Certification and compliance
Compliant with standards: RM2DB230: EN 61326-1:2013-01, EN 61326-2-1:2013-01, EN 61326-2-2:2013-01, EN 61326-2-3:2013-01, EN 61326-2-4:2013-01, EN 61326-2-5:2013-01, EN 60947-2:2017-10 (Annex M), EN 61543/A2:2006-02, EN 61543/A11, EN 61543/A12.

Toroidal current transformers

31RT... 31RT...

RTB...

new

Order code	Diameter	Openable	Qty per pkg	Wt
	[mm/in]		n°	[kg]
Type A.				
31RT35	35/1.38”	No	1	0.200
31RT60	60/2.36”	No	1	0.245
31RT80	80/3.15”	No	1	0.410
31RT110	110/4.33”	No	1	0.400
31RT210	210/8.27”	No	1	1.200
31RTA110	110/4.33”	Yes	1	0.540
31RTA210	210/8.27”	Yes	1	1.820
Type B.				
RTB35	35/1.38”	No	1	0.322
RTB60	60/2.36”	No	1	0.392
RTB80	80/3.15”	No	1	0.602
RTB110	110/4.33”	No	1	0.680
RTB210	210/8.27”	No	1	0.955

Certification and compliance
Certification obtained: EAC (only for 31RT...).
Compliant with standards: IEC/EN/BS 60947-2.

External multiplier

31RX10

Order code	Description	Qty per pkg	Wt
		n°	[kg]
31RX10	10-fold multiplier suitable for R1D, RM, R2D, R3D and R4D types only	1	0.300

General characteristics
– To connect between toroid and relay.

Certification and compliance
Certification obtained: EAC.
Compliant with standards: IEC/EN/BS 60947-2.

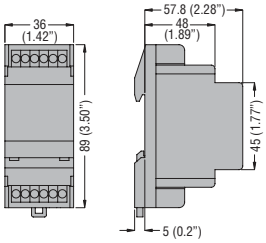
Accessories

DMXP03

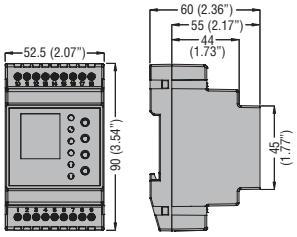
Order code	Description	Qty per pkg	Wt
		n°	[kg]
DMXP03	Panel mounting for 3 modules devices	1	0.052

MODULAR VERSION EARTH LEAKAGE RELAYS

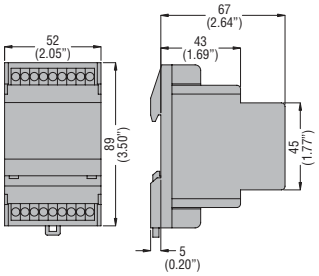
RM1DA230



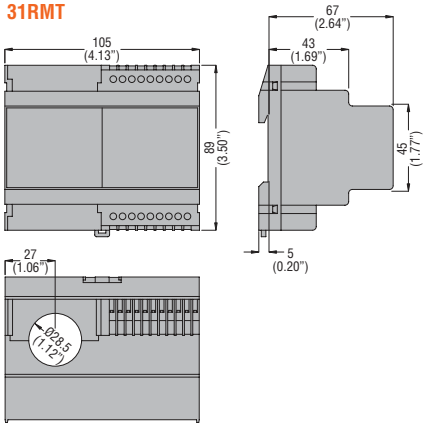
RM2DA230 - RM2DB230



RM1 - 31RM

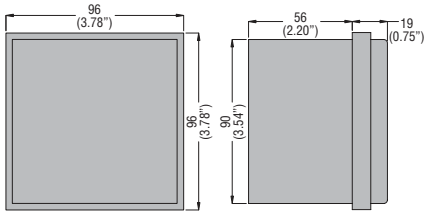


31RMT

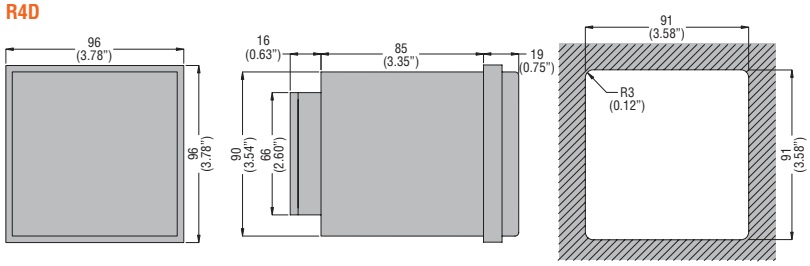


FLUSH-MOUNT VERSION EARTH LEAKAGE RELAYS

R1D - R2D - R3D

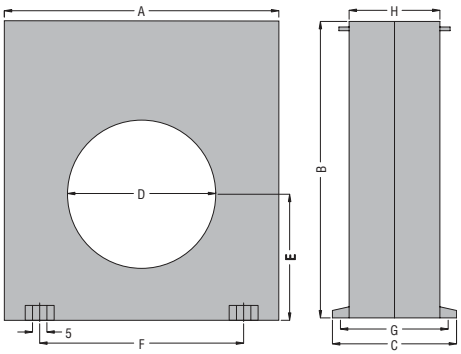


R4D



PANEL MOUNT VERSION EARTH LEAKAGE RELAYS

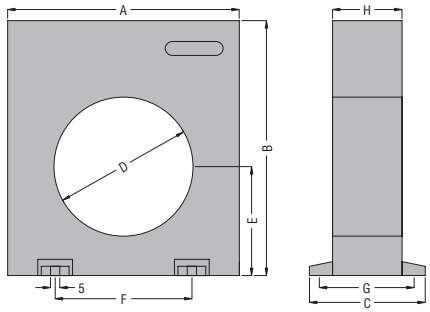
31RC...



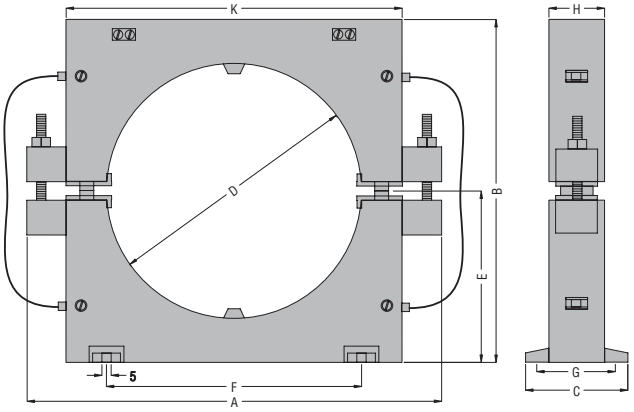
TYPE	A	B	C	D	E	F	G	H
31RC35	100 (3.94")	110 (4.33")	70 (2.75")	35 (1.38")	47 (1.85")	60 (2.36")	60 (2.36")	50 (1.97")
31RC60	100 (3.94")	110 (4.33")	70 (2.75")	60 (2.36")	47 (1.85")	60 (2.36")	60 (2.36")	50 (1.97")
31RC80	150 (5.90")	160 (6.30")	70 (2.75")	80 (3.15")	70 (2.75")	110 (4.33")	60 (2.36")	50 (1.97")
31RC110	150 (5.90")	160 (6.30")	70 (2.75")	110 (4.33")	70 (2.75")	110 (4.33")	60 (2.36")	50 (1.97")

TOROIDAL CURRENT TRANSFORMERS AND EXTERNAL MULTIPLIER

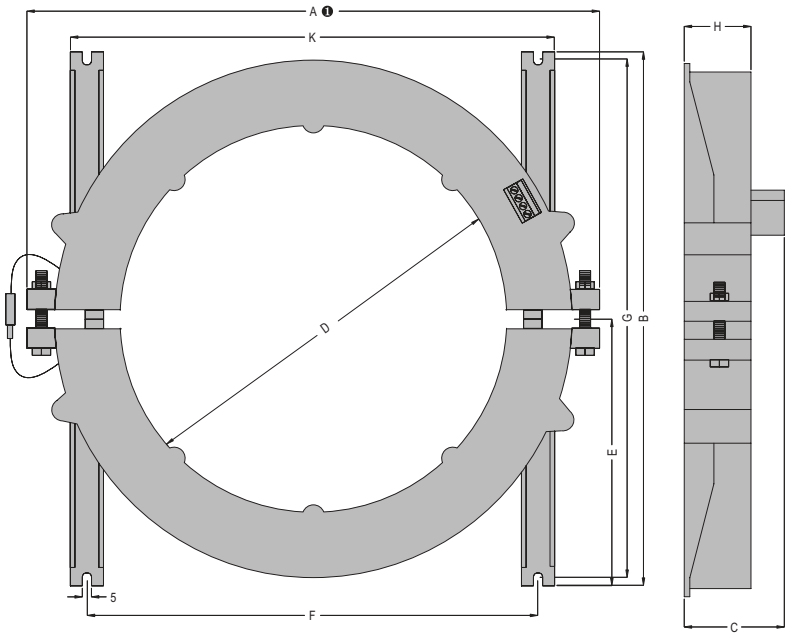
31RT35 - 31RT60 - 31RT80 - 31RT110 - 31RX10
RTB035 - RTB060 - RTB080 - RTB110



31RTA110



31RT210 - 31RTA210 - RTB110

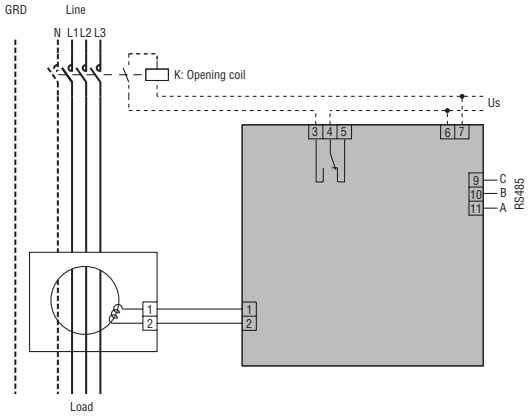


❶ With screws, for 31RTA210 split-core type; fixed structure, without screws, for 31RT210 type.

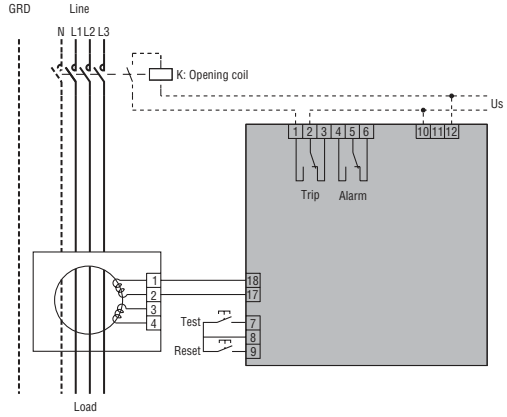
TYPE	A	B	C	D	E	F	G	H	K
31RT35 - RTB035	100 (3.94")	110 (4.33")	50 (1.97")	35 (1.38")	47 (1.85")	60 (2.36")	43 (1.69")	30 (1.18")	—
31RT60 - RTB60	100 (3.94")	110 (4.33")	50 (1.97")	60 (2.36")	47 (1.85")	60 (2.36")	43 (1.69")	30 (1.18")	—
31RT80 - RTB80	150 (5.90")	160 (6.30")	50 (1.97")	80 (3.15")	70 (2.75")	110 (4.33")	43 (1.69")	30 (1.18")	—
31RT110	150 (5.90")	160 (6.30")	50 (1.97")	110 (4.33")	70 (2.75")	110 (4.33")	43 (1.69")	30 (1.18")	—
31RT210 - RTB110	310 (12.20")	290 (11.41")	54 (2.12")	210 (8.27")	145 (5.71")	240 (9.45")	280 (11.02")	36 (1.42")	258 (10.16")
31RTA110	180 (7.09")	150 (5.90")	45 (1.77")	110 (4.33")	75 (2.95")	110 (4.33")	38 (1.50")	25 (0.98")	145 (5.71")
31RTA210	310 (12.20")	290 (11.41")	54 (2.12")	210 (8.27")	145 (5.71")	240 (9.45")	280 (11.02")	36 (1.42")	258 (10.16")
31RX10	100 (3.94")	110 (4.33")	50 (1.97")	—	—	60 (2.36")	43 (1.69")	30 (1.18")	—

EARTH LEAKAGE RELAYS

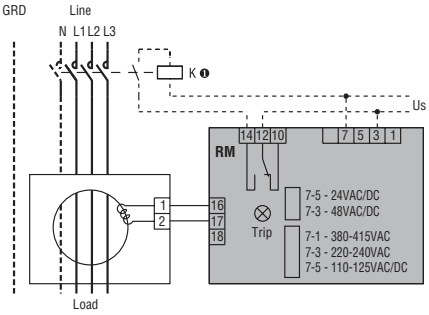
RM1DA230



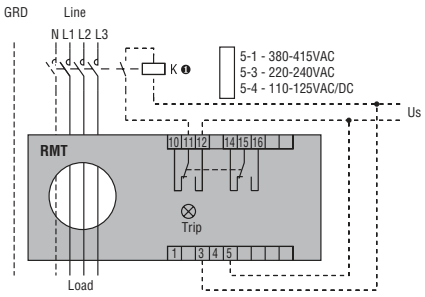
RM2DA230



RM1415 - 31RM...

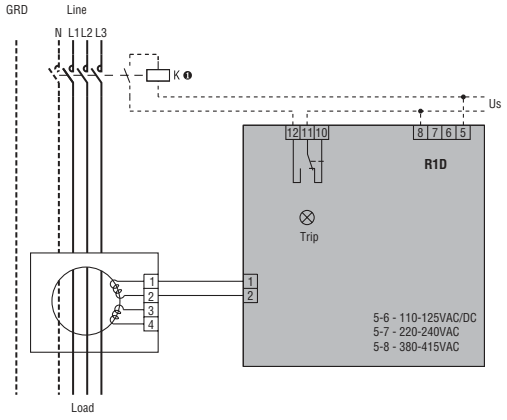


31RMT415

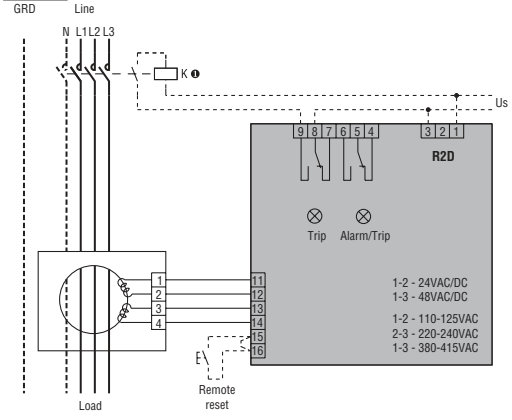


❶ The coil connection can vary depending on the connected type of device (contactor, breaker with shunt trip release or breaker with undervoltage trip release).

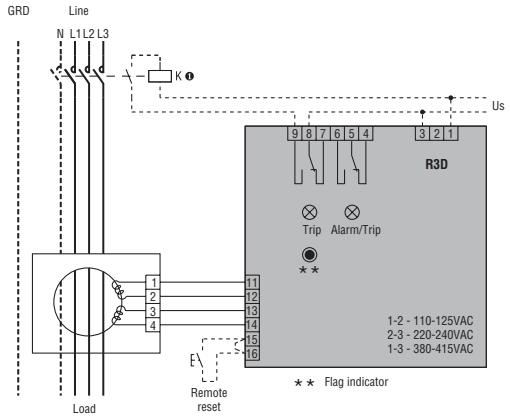
R1D415



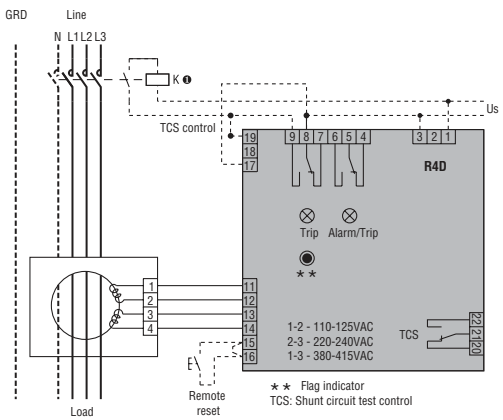
R2D415



R3D415



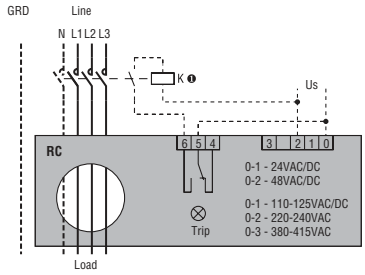
R4D415



❶ The coil connection can vary depending on the connected type of device (contactor, breaker with shunt trip release or breaker with undervoltage trip release).

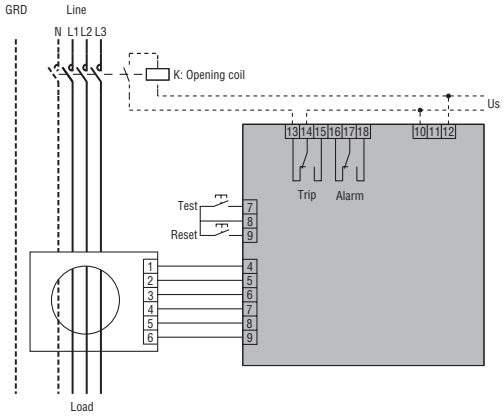
Type	Us	Us wiring	TCS wiring
R4D415	110-125VAC	1-2	17-18
	220-240VAC	2-3	17-18
	380-415VAC	1-3	17-19

31RC...



❶ The coil connection can vary depending on the connected type of device (contactor, breaker with shunt trip release or breaker with undervoltage trip release).

RM2DB230



Earth leakage relays
Technical characteristics

TYPE	RM1DA230	RM2DA230	R1D❶	R2D❶	R3D❶
DESCRIPTION					
	Modular, 1 operating threshold	Modular, 2 operating thresholds	Flush mount with transparent cover, 1 operating threshold	Flush mount with transparent cover, 2 operating thresholds constant toroid-relay circuit control	Flush mount with transparent cover, 2 operating thresholds constant toroid-relay circuit control
CONTROL CIRCUIT					
Toroidal transformer	External (see types given on page 20-5)				
Adjustments					
Tripping set-point (IΔn)	0.030...30A		0.025...0.25A (x0.1) 0.25...2.5A (x1) 2.5...25A (x10) 25...250A(external multiplier)		
Pre-alarm set-point	Programmable		—	70% IΔn (fixed)	70% IΔn (fixed)
Tripping delay time (t)	0.02...10s		0.02...0.5s (tx1) 0.2...5s (tx10)		
Selection of multiplier for IΔn and t	—	—	By dip-switches		
Resetting	Configurable automatic or manual by button on front	Automatic by remote contact closing or rear jumper connection Manual by button on front or remote contact closing	Configurable automatic or manual by button on front❷	Automatic by remote contact closing or rear jumper connection Manual by button on front or remote contact closing	
Shunt circuit control	—	—	—	—	—
AUXILIARY SUPPLY					
Auxiliary voltage Us (0.85 - 1.1 Us limit)	—	—	—	—	—
	220...240VAC	90...250VAC 120...350VDC	110...125VAC/DC 220...240/380...415VAC	110...125/220...240/380...415VAC	
Rated frequency	50...60Hz				
Power consumption (maximum)	2VA	6VA	4VA		
RELAY OUTPUTS					
State	Configurable normally de-energised or energised	Configurable normally de-energised or energised	Normally de-energised	Configurable normally de-energised or energised	Configurable normally de-energised or energised
Contact arrangement	1 changeover SPDT (trip)	2 changeover SPDT each (configurable: 1 trip and 1 alarm)	1 changeover SPDT (trip)	2 changeover SPDT each (configurable: 2 trip or 1 trip and 1 alarm)	
Rated contact capacity IEC Ith	5A 250VAC				
Mechanical life	$20x10^6$ cycles	$10x10^6$ cycles	$50x10^6$ cycles		
Electrical life	$3x10^5$ cycles				
INSULATION					
Power frequency withstand voltage	2.5kV for 60s				
INDICATIONS					
Auxiliary voltage available (ON)	Green LED	Green LED and green backlight	Green LED		
Relay tripping (TRIP)	Red backlight	Red LED and red backlight	Red LED		
Trip prealarm (ALARM)	Yellow backlight	Yellow LED and yellow backlight	—	Red LED	Red LED
Mechanical (TRIP MEMORY)	—	—	—	—	Flag indicator
Shunt circuit tripping (TCS)	—	—	—	—	—
CONNECTIONS					
Type of terminals	Fixed				
Tightening torque maximum	0.5Nm (4.5lb.in)				
Conductor section min...max	0.2...2.5mm^2 (24...12AWG)				
AMBIENT CONDITIONS					
Operating temperature	-10...+60°C				
Storage temperature	-20...+80°C				
Relative humidity	≤90%	≤95%	≤90%		
HOUSING					
Material	Self-extinguishing polycarbonate				

❶ Type A, sensitive to residual sinusoidal AC and pulsating DC currents.
❷ Remote resetting by removing power for more than 1 second.
❸ Digital display of fault current measurement and tripping value memory.

	R4D❶❸	RM1…❶	31RM…❶	31RMT…❶	31RC…❶	RM2DB…
	Flush mount with display and cover, 2 operating thresholds - constant toroid-relay circuit control	Modular with transparent cover, 1 operating threshold	Modular with transparent cover, 1 operating threshold	Modular with transparent cover, 1 operating threshold	Compact, 1 operating threshold	Modular, 1 operating thresholds
	External (see types given on page 20-5)			Incorporated Ø28mm/1.1”	Incorporated 35-60-80-110mm/ 1.38-2.36-3.15-4.33” standard diameter	External (see types given on page 20-5)
	0.03...0.3A (x0.1) 0.3...3A (x1) 3...30A (x10) 30...300A (external multiplier)	0.3A or 0.5A	0.025...0.25A (x0.1) 0.25...2.5A (x1) 2.5...25A (x10) 25...250A (external multiplier)	0.025...0.25A (x0.1) 0.25...2.5A (x1) 2.5...25A (x10)	0.025...0.25A (x0.1) 0.25...2.5A (x1) 2.5...25A (x10)	0.030...30A
	70% IΔn (fixed)	—	—	—	—	Programmable
	0.03...0.5s (tx1) 0.3...5s (tx10)	0.02s or 0.5s	0.02...0.5s (tx1) 0.2...5s (tx10)	0.02...0.5s (tx1) 0.2...5s (tx10)	0.02...0.5s (tx1) 0.2...5s (tx10)	0.02...10s
		By dip-switches				—
	Automatic by remote contact closing or rear jumper connection Manual by button on front or remote contact closing	Configurable A: Automatic or M: Manual by button on front				Automatic by remote contact closing or rear jumper connection Manual by button on front or remote contact closing
	Yes	—				—
	—	—	24-48VAC/DC	—	24-48VAC/DC	—
	110...125/220...240/ 380...415VAC	110...125VAC/DC 220...240/380...415VAC				90...250VAC 120...350VDC
	50...60Hz					
	4VA	3VA				4VA
	Configurable normally de-energised or energised	Normally de-energised	Normally de-energised	Configurable normally de-energised or energised	Normally de-energised	Configurable normally de-energised or energised
	2 changeover SPDT each (configurable: 2 trip or 1 trip and 1 alarm)	1 changeover SPDT (trip)	1 changeover SPDT (trip)	2 changeover SPDT each (both trip)	1 changeover SPDT (trip)	2 changeover SPDT each (configurable: 1 trip and 1 alarm)
	5A 250VAC					
	$50x10^6$ cycles	$50x10^6$ cycles				$10x10^6$ cycles
	$3x10^5$ cycles					
	2.5kV for 60s					
	Green LED	Green LED				Green LED and green backlight
	Red LED	Red LED				Red LED and red backlight
	Red LED	—				Yellow LED and yellow backlight
	Flag indicator	—				—
	Red LED	—				—
	Removable, plug-in	Fixed				
	0.5Nm (4.5lb.in)					
	0.2...2.5mm² (24...12AWG)					
	-10...+60°C					
	-20...+80°C					
	≤90%					≤95%
	Self-extinguishing polycarbonate					

Time relays

- Modular versions for modular-slot switchboards, mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing via pull out tabs
- Plug-in or flush-mount version
- Version programmable with NFC and APP
- Wide range of functions and time scales
- High accuracy and repeatability of the time settings.

SEC. - PAGE

Modular versions
On delay. Multiscale. Multivoltage ..... 21 - 2
Multifunction. Multiscale. Multivoltage. 1 relay output ..... 21 - 2
Multifunction. Multiscale. Multivoltage. 1 relay output, with NFC and APP ..... 21 - 2
Multifunction. Multiscale. Multivoltage. 2 relay outputs ..... 21 - 3
Recycle, independent timings. Multiscale. Multivoltage ..... 21 - 3
Off delay. Multiscale. Multivoltage ..... 21 - 3
For starting. Multiscale. Multivoltage ..... 21 - 4
For staircase with “zero crossing” load switching ..... 21 - 4

Plug-in and flush-mount version, 48x48mm/1.9x1.9”
On delay. Multiscale. Multivoltage ..... 21 - 5
On delay. Multiscale. Single voltage ..... 21 - 5
Multifunction. Multivoltage. Multiscale ..... 21 - 5
Accessories ..... 21 - 5

Dimensions ..... 21 - 6
Wiring diagrams ..... 21 - 6
Technical characteristics ..... 21 - 10

Page 21-2

MODULAR TIME RELAYS

- Suitable for modular-slot switchboards
- Selectable time ranges and functions with potentiometers on front or via NFC and APP
- LED indication
- Mounting on 35mm DIN rail or screw fixing
- Screw terminals.

Page 21-5

PLUG-IN AND FLUSH-MOUNT TIME RELAYS, 48X48MM

- Flush and internal panel mounting
- Time ranges: 0.05s...10h
- LED indication
- 8 and 11-pin sockets for panel mounting.

On delay time relay. Multiscale. Multivoltage

TMP

Order code	Time of scale range	Rated auxiliary supply voltage	Qty per pkg	Wt
		[V]	n°	[kg]
TMP	0.1...1s 1...10s 6...60s 1...10min 6min...1h 1...10h 0.1...1 day 1...10 days ON only OFF only	24...48VDC 24...240VAC	1	0.078
TMPA440	0.1...1s 1...10s 6...60s 1...10min	380...440VAC	1	0.078

General characteristics
- Electronic time relay, multiscale, multivoltage. On delay, delay on make, with 1 relay output with 1 changeover contact (SPDT) start at relay energising for TMP
- Electronic time relay, multiscale with 2 normally open (N/O-SPST) contacts with common pole for TMPA440
- Delay time adjustable on front by rotary switch: 10...100%
- Green LED indicator for power on
- Red LED indicator for relay state; flashing for delay and steady when relay energised
- Modular DIN 43880 housing, 1 module suitable for fixing on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing
- IEC degree of protection: IP40 on front (only when mounted in housing or electric board with IP40); IP20 on terminals.

Certifications and compliance
Certifications obtained: EAC; UL Listed, for USA and Canada (cULus - File E93601), CCC.
Compliant with standards: IEC/EN/BS 61812-1, UL508, CSA C22.2 n° 14.

Multifunction time relay. Multiscale. Multivoltage. 1 relay output

TMM1

Order code	Time of scale range	Rated auxiliary supply voltage	Qty per pkg	Wt
		[V]	n°	[kg]
TMM1	0.1...1s 1...10s 6...60s 1...10min 6min...1h 1...10h 0.1...1 day 1...10 days ON only OFF only	12...240V AC/DC	5	0.086

General characteristics
- Electronic time relay, multifunction, multiscale, multivoltage, with 1 relay output with 1 changeover contact (SPDT)
- Enabling input
- Selectable functions: (a) On delay. (b) Pulse on relay energising with start when energised. (c) Symmetrical flasher starting with OFF. (d) Symmetrical flasher starting with ON. (e) Off delay; relay energising at external contact closing with start on break. (f) Pulse on relay energising with start on external contact closing. (g) Pulse on relay energising with start on external contact opening. (h) On-off delay. Delay on make, with start at external contact closing, and delay at break, with start at external contact opening. (i) Internal ON/OFF trigger with relay contact closing or operating at each closing of an external contact. (j) Pulse generator.
- Delay time adjustable on front by rotary switch: 10...100%
- Green LED indicator for power on
- Red LED indicator for relay state; flashing for delay and steady when relay energised
- Modular DIN 43880 housing, 1 module suitable for fixing on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing
- IEC degree of protection: IP40 on front (only when mounted in housing or electric board with IP40); IP20 on terminals.

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601); EAC.
Compliant with standards: IEC/EN/BS 61812-1, UL508, CSA C22.2 n° 14.

Multifunction time relay. Multiscale. Multivoltage. 1 relay output. Programmable with NFC and APP

NFC

TMM1NFC

The app can be downloaded from Google Play Store and App Store.

Order code	Time of scale range	Rated auxiliary supply voltage	Qty per pkg	Wt
		[V]	n°	[kg]
TMM1NFC	0.1s... 999days ON only OFF only	12...240V AC/DC	1	0.086

Simple and intuitive programming with LOVATO NFC App thanks to the graphic interface that displays the selected function and parameters directly on the screen of the smartphone, eliminating the need to consult the manual.

General characteristics
- Electronic time relay, multifunction, multiscale, multivoltage, with 1 relay output with changeover contact (SPDT), with NFC technology and LOVATO NFC App
- Command input for the enabling of the function or to pause the timing
- 40 selectable functions. For details consult the technical manual on the website www.LovatoElectric.com
- NFC connectivity for the programming of the parameters with the LOVATO NFC App freely downloadable from Google Play Store and App Store
- Simple, fast and intuitive programming
- Very high accuracy and repeatability of the settings
- Internal counter which stops the function when the relay output reaches a programmable number of closures
- Possibility to save the program on smartphone or tablet to be copied on others TMM1NFC, even with device powered off
- Possibility to protect the settings with a password
- QR code for the direct connection to the LOVATO Electric website for the download of the technical manual
- Green LED indicator for power on
- Red LED indicator for relay state; flashing for delay and steady when relay energised
- Modular DIN 43880 housing (1 module), suitable for fixing on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing
- IEC degree of protection: IP40 on front (only when mounted in housing or electric board with IP40), IP20 on terminals.

Certifications and compliance
Certifications: cULus, EAC, CCC.
Compliant with standards: IEC/EN/BS 61812-1, UL508, CSA C22.2 n°14.

Multifunction time relay. Multiscale. Multivoltage. 2 relay outputs

TMM2

Order code	Time of scale range	Rated auxiliary supply voltage	Qty per pkg	Wt
		[V]	n°	[kg]
TMM2	0.1...1s 1...10s 6...60s 1...10min 6min...1h 1...10h 0.1...1 day 1...10 days ON only OFF only	12...240V AC/DC	1	0.094

General characteristics
- Electronic time relay, multifunction, multiscale, multivoltage
- 2 relay outputs, one with 1 delayed changeover (C/O-SPDT) contact and the other with 1 normally open (N/O-SPST) contact, programmable as instantaneous or delayed
- Enabling input
- Selectable functions: (a) On delay; delay on make with start at relay energising. (b) Pulse on relay energising with start when energised. (c) Flasher starting with OFF interval. Equal timing recycle. (d) Flasher starting with ON interval. Equal timing recycle. (e) Off delay; relay energising at external contact closing with start on break. (f) Pulse on relay energising with start on external contact closing. (g) Pulse on relay energising with start on external contact opening. (h) On-off delay. Delay on make, with start at external contact closing, and delay at break, with start at external contact opening. (i) Internal ON/OFF trigger with relay contact closing or operating at each closing of an external contact. (j) Pulse generator, unequal timing recycle; starting with OFF pulse time and 0.5s ON pulse.
- Delay time adjustable on front by rotary switch: 10...100%
- Green LED indicator for power on
- Red LED indicator for relay state; flashing for delay and steady when relay energised
- Modular DIN 43880 housing, 1 module suitable for fixing on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing
- IEC degree of protection: IP40 on front (only when mounted in housing or electric board with IP40); IP20 on terminals.

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601) as Auxiliary Devices - Timers; EAC.
Compliant with standards: IEC/EN/BS 61812-1, UL508, CSA C22.2 n° 14.

Recycle time relay, independent timings. Multiscale. Multivoltage

TMPL

Order code	Time of scale range	Rated auxiliary supply voltage	Qty per pkg	Wt
		[V]	n°	[kg]
TMPL	0.1...1s 1...10s 6...60s 1...10min 6min...1h 1...10h 0.1...1 day 1...10 days 3...30 days 10...100 days	12...240V AC/DC	1	0.082

General characteristics
- Recycle time relay with asymmetrical timings, multiscale, multivoltage
- 1 relay output with 1 changeover contact (SPDT)
- Enabling input of ON (work) or OFF (pause) interval
- Delay time for OFF (pause) interval, adjustable on front by rotary switch: 10...100%
- Delay time for ON (work) interval, adjustable on front by rotary switch: 10...100%
- Green LED indicator for power on
- Red LED indicator for relay state; flashing for delay
- Modular DIN 43880 housing, 1 module; suitable for fixing on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing
- IEC degree of protection: IP40 on front (only when mounted in housing or electric board with IP40); IP20 on terminals.

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601) as Auxiliary Devices - Timers; EAC.
Compliant with standards: IEC/EN/BS 61812-1, UL508, CSA C22.2 n° 14.

Off delay time relay. Multiscale. Multivoltage

TMD

Order code	Time of scale range	Rated auxiliary supply voltage	Qty per pkg	Wt
		[V]	n°	[kg]
TMD	0.06...0.6s 0.6...6s 6...60s 18...180s	24...240V AC/DC	1	0.080

General characteristics
- Electronic time relay, multiscale, multivoltage. True off delay; delay on break with start at relay de-energising
- 1 relay output with 1 changeover contact (SPDT)
- Delay time adjustable on front by rotary switch: 10...100%
- Green LED indicator for power on
- Modular DIN 43880 housing, 1 module; suitable for fixing on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing
- IEC degree of protection: IP40 on front (only when mounted in housing or electric board with IP40); IP20 on terminals.

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601) as Auxiliary Devices - Timers; EAC, CCC.
Compliant with standards: IEC/EN/BS 61812-1, UL508, CSA C22.2 n° 14.

Time relay for starting. Multiscale. Multivoltage

TMST

Order code	Time of scale range	Rated auxiliary supply voltage	Qty per pkg	Wt
		[V]	n°	[kg]
TMST	0.1...1s 1...10s 6...60s 1...10min	24...48VDC 24...240VAC	1	0.090
TMSTA440	0.1...1s 1...10s 6...60s 1...10min	380...440VAC	1	0.090

General characteristics
- Electronic time relay, multiscale, multivoltage for starting (star-delta, impedance, autotransformer, etc) of induction motors (squirrel cage), 2 separate timings
- 1 relay output with 2 normally open (N/O-SPST) contacts with common pole
- Delay time adjustable on front by rotary switch: 10-100% for star connection
- Starting and transition (20...300ms time scale - from star to delta), time adjustable on front by rotary switch
- Green LED indicator for power on
- Red LED indicator for relay state; flashing during delay and steady at delay lapsing
- Modular DIN 43880 housing, 1 module; suitable for fixing on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing
- IEC degree of protection: IP40 on front (only when mounted in housing or electric board with IP40); IP20 on terminals.

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601) as Auxiliary Devices - Timers; EAC.
Compliant with standards: IEC/EN/BS 61812-1, UL508, CSA C22.2 n° 14.

Time relay for staircase lighting with "zero crossing" load switching

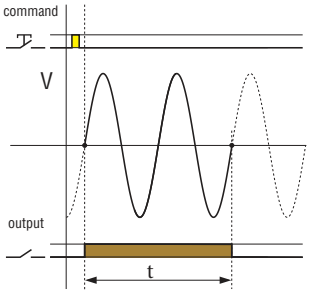
TMLSL

Order code	Time of scale range	Rated auxiliary supply voltage	Qty per pkg	Wt
		[V]	n°	[kg]
TMLSL	0.5...20min	220...240VAC	1	0.090

General characteristics
- Electronic time relay for staircase lighting single scale and single voltage
- 1 relay output with 1 powered normally open (N/O-SPST) contact
- Possible connections for 3- or 4-wire systems
- Zero crossing load switching
- Adjustable delay time on the front: 0.5...20min
- Selectable functions:
  - timed lighting + staircase cleaning
  - timed lighting with notice of shutdown + staircase cleaning
  - constant lighting
- Green LED for power presence signalling
- 1 control input can be connected to up to 150 light buttons (<1mA each)
- 1 relay output with normally open contact NO,16A 250VAC
- LED lamp management up to 600W
- QR code included for the direct connection to the LOVATO Electric website for the download of the technical manual
- Modular housing DIN 43880 (1 module), suitable for fixing on 35mm omega profile or screw fixing
- Degree of protection: IP40 on front (if mounted in container and/or electrical panel having IP40), IP20 on terminals.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 61812-1, UL508, CSA C22.2 n°14.

"ZERO CROSSING" LOAD SWITCHING - IDEAL FOR LED LAMPS



The time relay for staircase TMLSL uses "zero crossing" technology for load switching, which consists of monitoring the sinusoidal mains voltage and inserting the load at the exact instant in which the voltage passes through zero.
This has several advantages:
- reduction of the inrush current generated when the lamp is activated, which can reach very high values, especially in the increasingly popular LED lamps
- protection of the lamp and extension of the electrical life
- protection of the time relay contact from the risk of sticking
- reduction of consumption.

Time relay

31L48TP...

31L48TPB...

31L48M...

Order code	Time of scale range	Rated auxiliary supply voltage	Qty per pkg	Wt
		[V]	n°	[kg]
Time relay on delay. Multiscale and multivoltage.				
31L48TPS240	0.3...780s	24VAC/DC 110VAC 220...240VAC	1	0.124
31L48TPM240	18s...780min		1	0.124
Time relay on delay. Multiscale and single voltage.				
31L48TPBM24	0.05s...10min	24VAC/DC	1	0.124
31L48TPBM240		220...240VAC	1	0.124
Time relay, multifunction, multivoltage and multiscale.				
31L48MM240	0.05s...10min	24...240V AC/DC	1	0.135
31L48MH240	0.05min...10h		1	0.135

Accessories for 48x48mm/1.9x1.9” time relay

HR7XS1

31L48P8

HR7XS2

31L48P11

31L48AP

Order code	Description	Qty per pkg	Wt
		n°	[kg]
HR7XS1	8-pin socket for screw fixing or on 35mm DIN rail (IEC/EN/BS 60715) of time relay type L48T....	10	0.061
31L48P8	8-pin socket for the door-mounting of time relay type 31L48T... with accessory 31L48AP. Screw terminals.	10	0.040
HR7XS2	11-pin socket for screw fixing or on 35mm DIN rail (IEC/EN/BS 60715) of time relay type 31L48M....	10	0.064
31L48P11	11-pin socket for the door-mounting of time relay type L48M... with accessory 31L48AP. Screw terminals.	10	0.048
31L48AP	Flush door mounting bracket	10	0.012

NOTE: max. conductor section for sockets: 2x2.5mm²/2x14AWG.
Tightening torque: 0.8Nm/7.1lb.in.

General characteristics

TIME RELAY 31L48TP...
- Electronic time relay, multiscale, multivoltage. On delay, delay on make with start at relay energising
- 1 relay output with 1 changeover contact (SPDT)
- Delay time adjustable on front by rotary knob
- Time range selected by dip switches:
  31L48TPS: 0.3...3s; 1.2...12s; 10...100s; 7.8...780s.
  31L48TPM: 18s...3min; 72s...12min; 10...100min; 78...780min
- LED indicators for power on and relay state
- Plug-in housing with 8-pin socket, HR7XS1 or 31L48P8 with accessory 31L48AP
- Flush door-mounting bracket 31L48AP available
- IEC protection degree: IP40 on front and IP20 at terminals.

Time range setting

	A B	A B	A B	A B
31L48TPS	0.3...3s	1.2...12s	10...100s	7.8...780s
31L48TPM	18s...3min	72s...12min	10...100min	78...780min

TIME RELAY 31L48TPB...
- Electronic time relay, multiscale, single voltage, on delay function
- 2 relay outputs, each with 1 changeover contact (SPDT), configurable either delay on make or instantaneous
- Delay time adjustable on front by rotary knob
- Time range selected by dip switches: 0.05...1s; 0.1...10s; 0.6s...1min; 6s...10min
- LED indicators for power on and relay state
- Plug-in housing with 8-pin socket, HR7XS1 or 31L48P8 with accessory 31L48AP
- Flush door-mounting bracket 31L48AP available
- IEC protection degree: IP40 on front and IP20 at terminals.

Time range setting

	A B	A B	A B	A B
31L48TPB	0.05...1s	0.1...10s	0.6s...1min	6s...10min

TIME RELAY 31L48M...
- Electronic time relay, multiscale, multivoltage, multifunction
- Selectable functions: On delay, delay on make with start at relay energising. Pulse on relay energising with start on energising. Flasher, starting with OFF interval. Flasher, starting with ON interval. Time relay resetting is possible on closing of external contact (R) connected to terminals 7-6. Possible time relay stopping storing elapsed time on closing of external contact (M) connected to terminals 7-5 and then restarting time on its opening. See diagrams on page 21-9
- 2 relay outputs, each with 1 changeover contact; both delayed (SPDT)
- Delay time adjustable on front by rotary knob
- Time range selected by dip switches:
  31L48MM: 0.05...1s; 0.1...10s; 0.6s...1min; 6s...10min
  31L48MH: 0.05...1min; 0.1...10min; 0.6min...1h; 1min...10h
- LED indicators for power on and relay state
- Plug-in housing with 11-pin socket, HR7XS2 or 31L48P11 with accessory 31L48AP
- Flush door-mounting bracket 31L48AP available
- IEC protection degree: IP40 on front and IP20 at terminals.

Time range setting

	A B	A B	A B	A B
31L48MM	0.05...1s	0.1...10s	0.6s...1min	6s...10min
31L48MH	0.05...1min	0.1...10min	0.6min...1h	1min...10h

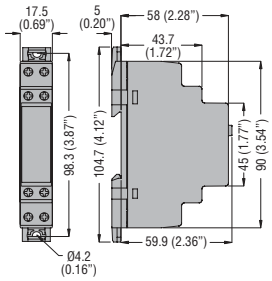
SOCKETS HR7X... AND 31L48...
- 8-pin and 11-pin version
- Screw fixing or on DIN rail for HR7X..., flush mount for 31L48... with accessory 31L48AP
- Screw terminals
- Ratings: 10A - 250VAC.

Certifications and compliance

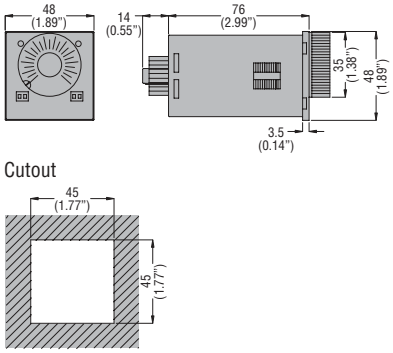
Certifications obtained: cURus (for 31L48... and HR7X... type), CSA (for HR7X... type), EAC.
Compliant with standards: IEC/EN/BS 61810-1 (for HR7X... type), IEC/EN/BS 61812-1, UL508, CSA C22.2 n° 14.

TIME RELAYS

TM…



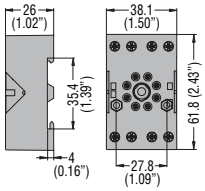
31L48…



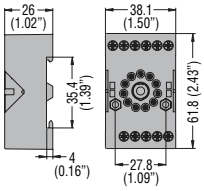
Cutout

ACCESSORIES - SOCKETS

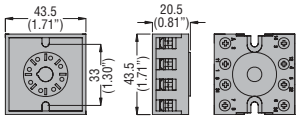
HR7XS1



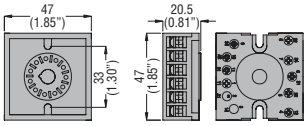
HR7XS2



31L48P8

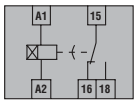


31L48P11

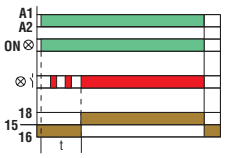


Wiring diagrams

TMP

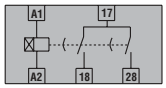


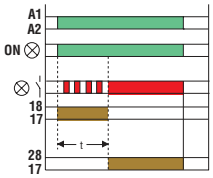
On delay. Delay on make, with start at relay energising



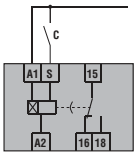
TMPA440

On delay. Delay on make, with start at relay energising

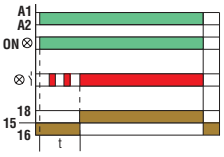




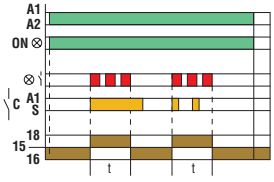
TMM1



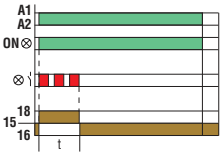
On delay. Delay on make, with start at relay energising



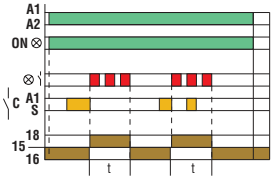
Pulse on relay energising with start at external contact closing



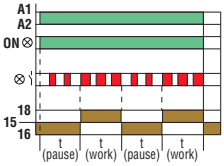
Pulse on relay energising with start on energising



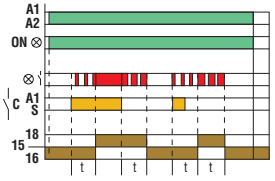
Pulse on relay energising with start at external contact opening



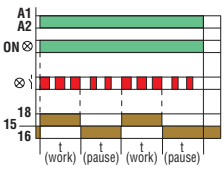
Flasher, starting with OFF (pause) interval. Equal timing recycle



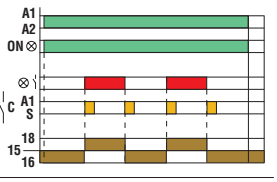
On-Off delay. Delay on make, with start at external contact closing, and delay at break, with start at external contact opening



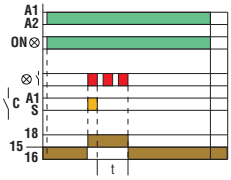
Flasher, starting with ON (work) interval. Equal timing recycle



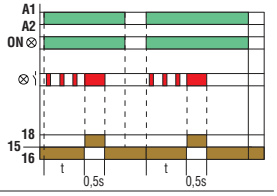
Internal ON/OFF trigger. Relay contact either closes or opens at each external contact closing



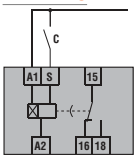
Off delay. Relay energising at external contact closing with start on break



Pulse generator. Unequal timing recycle, starting with OFF pulse time and 0.5sec ON time

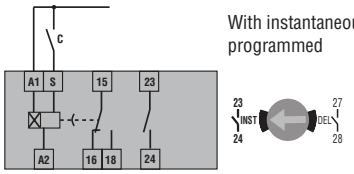


TMM1NFC

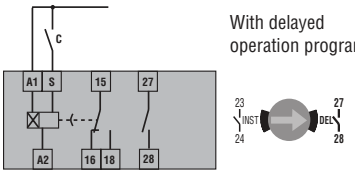


For operational diagrams see instruction manual I562 on the website www.LovatoElectric.com, section download/technical instruction.

TMM2

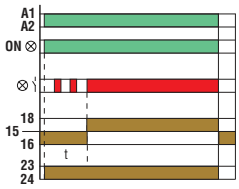


With instantaneous operation programmed

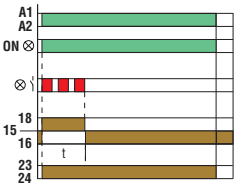


With delayed operation programmed

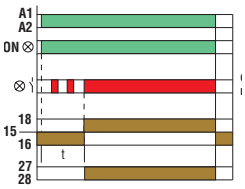
On delay. Delay on make, with start at relay energising



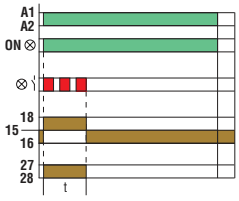
Pulse on relay energising with start on energising



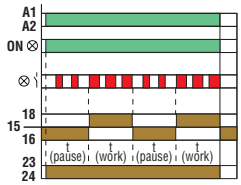
On delay. Delay on make, with start at relay energising



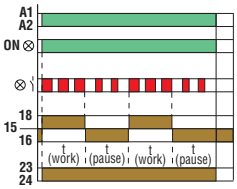
Pulse on relay energising with start on energising



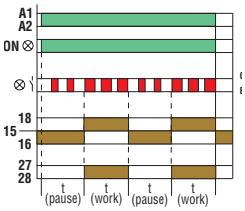
Flasher, starting with OFF (pause) interval. Equal timing recycle



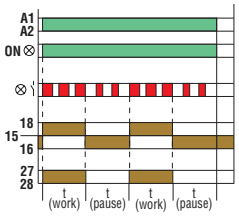
Flasher, starting with ON (work) interval. Equal timing recycle



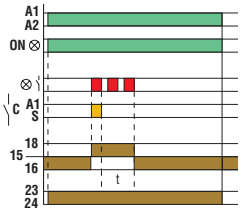
Flasher, starting with OFF (pause) interval. Equal timing recycle



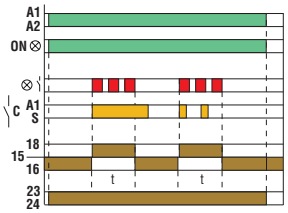
Flasher, starting with ON (work) interval. Equal timing recycle



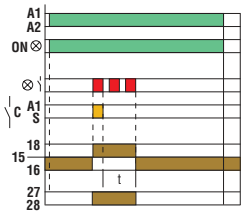
Off delay. Relay energising at external contact closing with start on break



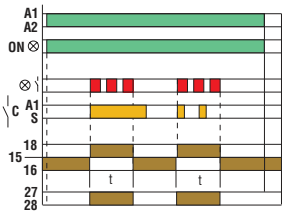
Pulse on relay energising with start on external contact closing



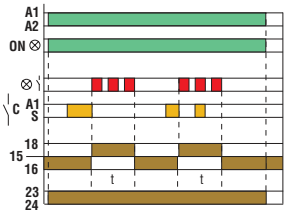
Off delay. Relay energising at external contact closing with start on break



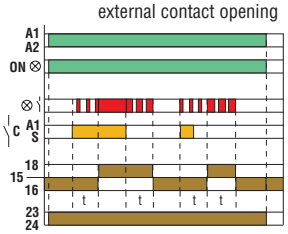
Pulse on relay energising with start on external contact closing



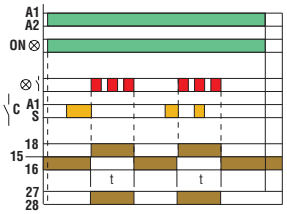
Pulse on relay energising with start on external contact opening



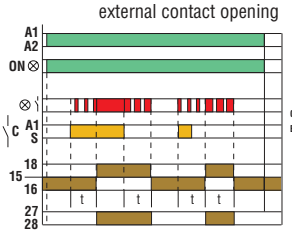
On-off delay. Delay make, with start at external contact closing and delay at break, with start at external contact opening



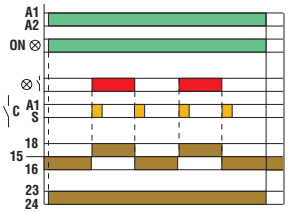
Pulse on relay energising with start on external contact opening



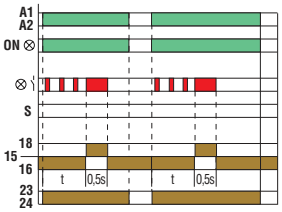
On-off delay. Delay make, with start at external contact closing and delay at break, with start at external contact opening



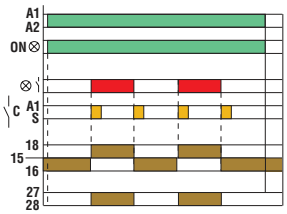
Internal trigger ON/OFF. Relay contact either closes or opens at each external contact closing



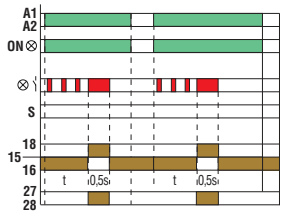
Pulse generator. Unequal timing recycle, starting with ON pulse time



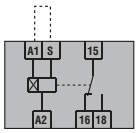
Internal trigger ON/OFF. Relay contact either closes or opens at each external contact closing



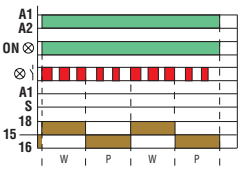
Pulse generator. Unequal timing recycle, starting with ON pulse time



TMPL

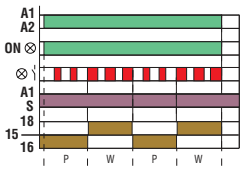


Flasher, starting with ON interval.
Equal timing recycle, ON first



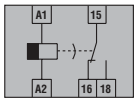
W = Work (ON)
P = Pause (OFF)

Flasher, starting with OFF interval.
Equal timing recycle, OFF first

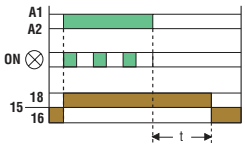


W = Work (ON)
P = Pause (OFF)

TMD

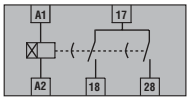


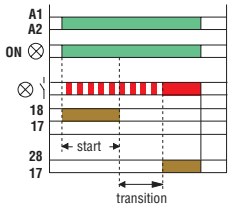
True off delay. Delay on break, starting at relay de-energising



TMST

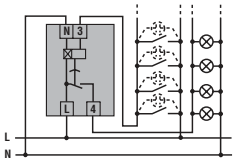
For starting



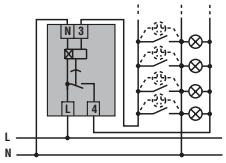


TMLSL

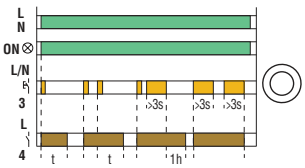
4-wire connection



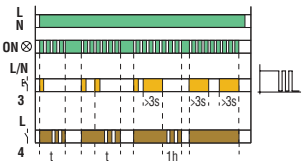
3-wire connection



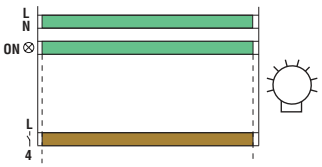
Timed lighting + staircase cleaning



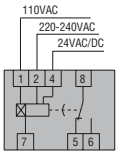
Timed lighting with shutdown notice + staircase cleaning



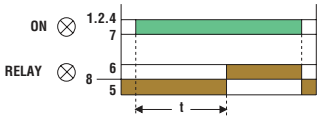
Constant lighting



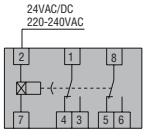
31L48TP...



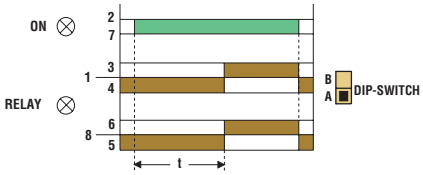
On delay

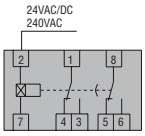


31L48TPB...

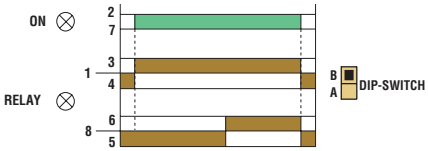


On delay with both instantaneous c/o contacts

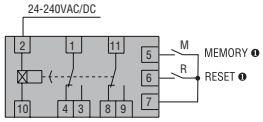




On delay with one instantaneous c/o contact and one late-break c/o contact

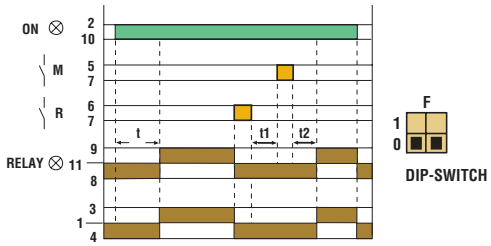


31L48M...

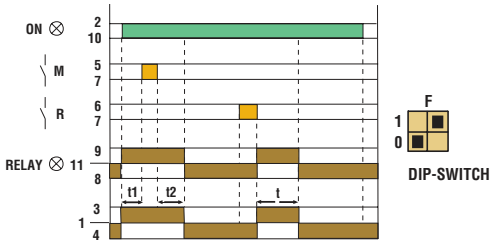


T (preset time) = T1+T2
❶ Contacts "M" and "R" are to be voltage free (dry).

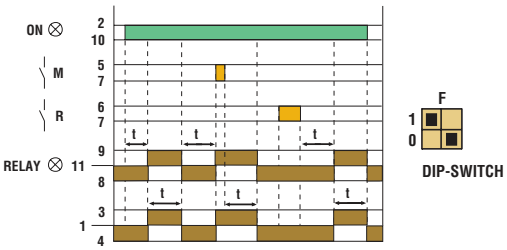
On delay



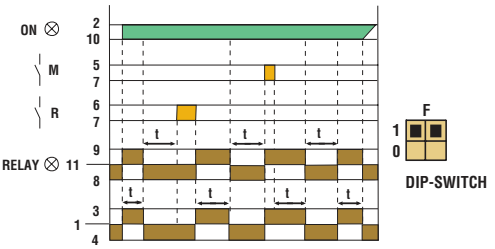
Pulse on relay energising with start on energising



Flasher starting with OFF



Flasher starting with ON



TYPE	TMP	TMPA440	TMM1 - TMM2	TMM1NFC	TMPL	TMD	TMST	TMLSL
DESCRIPTION								
	On delay	On delay	Programmable multifunction	Programmable multifunction with NFC	Asymmetrical recycle	True off delay	For starting	Staircase illumination
	Multiscale	Multiscale	Multiscale	Multiscale	Multiscale	Multiscale	Multiscale	Single scale
	Multivoltage	Single voltage	Multivoltage	Multivoltage	Multivoltage	Multivoltage	Multivoltage	Single voltage
CONTROL CIRCUIT								
Rated auxiliary supply voltage Us	24...48VDC 24...240VAC	380...440VAC	12...240VAC/DC			24...240VAC/DC	24...48VDC 24...240VAC 380...440VAC	220...240VAC
Rated frequency	50/60Hz							
Operating voltage range	0.85...1.1Us							
Power consumption (maximum)	1.2VA/0.8W max (24...48VAC/DC) 16VA/0.9W max (110...240VAC)	19VA/1.7W max	TM M1: 0.6VA/0.3W max (12...48VAC/DC) 1.6VA/1.2W max (110...240VAC/DC) TM M2: 1.1VA/0.8W max (12...48VAC/DC) 1.8VA/1.2W max (110...240VAC/DC)	0.6VA/0.3W max (12...48VAC/DC) 1.6VA/1.2W max (110...240VAC/DC)	0.6VA/0.3W max (12...48VAC/DC) 1.6VA/1.2W max (110...240VAC/DC)	0.1VA/0.1W (24...48VAC/DC) 1.1VA/0.8W (110...240VAC/DC)	1.2VA/0.8W max (24...48VAC/DC) 1.6VA/0.9W max (110...240VAC)❶	❸
TIMING CIRCUIT								
Time setting range	Multiscale 0,1...1s 1...10s 6s...60s 1...10min 6min...1h 1...10h 0.1...1day 1...10days ON only OFF only	Multiscale 0,1...1s 1...10s 6s...60s 1...10min	Multiscale 0,1...1s 1...10s 6s...60s 1...10min 6min...1h 1...10h 0.1...1day 1...10days ON only OFF only	Multiscale 0,1s...999h programmabile con tecnologia NFC e APP	Multiscale 0.1...1s 1...10s 6s...60s 1...10min 6min...1h 1h...10h 0.1...1day 1...10days 3...30days 10...100days	Multiscale 0.06...0.6s 0.6...6s 6s...60s 18s...180s	Multiscale 0.1...1s 1...10s 6s...60s 1...10min	Single scale 0.5...20min
Setting accuracy	< ±9%			0	< ±19%			❸
Repeat accuracy	< ±0.1%	< ±0.5%	< ±0.5% - < ±0.2%	< ±0.1%	< ±0.2%	< ±0.5%		❸
Influence of voltage variation	< ±0.01%							❸
Average variation of set delays related to +20°C condition at –20°C	< ±0.2%							❸
Minimum power time	—	—	—	—	—	≥ 200ms	—	—
Minimum ON time	—	—	25ms (no maximum limit)			—	—	≥ 60ms (no max lim.)
Resetting time during timing	≥ 100ms	≥ 100ms	≥ 100ms	≥ 100ms	≥ 100ms	—	≥ 100ms	❸
Resetting time elapsed time	≥ 50ms	≥ 50ms	≥ 50ms	≥ 50ms	≥ 50ms	—	≥ 50ms	—
Immunity time for microbreakings	≤ 50ms	—	≤ 25ms - ≤ 15ms	≤ 25ms	≤ 25ms	—	≤ 40ms❷	❸
RELAY OUTPUTS								
Contact arrangement	1 delayed changeover	2 delayed changeover	TMM1: 1 delayed changeover TM M2: 1 inst./delayed N/O + 1 delayed c/o	1 delayed changeover	1 delayed changeover	1 delayed changeover	2 delayed N/O	1 delayed N/O
Maximum switching voltage	250VAC							
IEC conventional free air thermal current (Ith)	8A	8A	8A	8A	8A	5A	8A	16A
UL/CSA designation	B300							—
Electrical life (with rated load)	10^5 cycles							
Mechanical life	$30x10^6$ cycles							
Tightening torque maximum	max. 0.8Nm (7lb.in; 7...9lb.in per UL)							
Conductor section min-max	0.2...4mm² (24...12AWG; 12...18AWG per UL)							
INSULATION (input-output)								
IEC rated insulation voltage	250V							
IEC rated impulse withstand voltage	4kV							
IEC power frequency withstand voltage	2kV							
AMBIENT CONDITIONS								
Operating temperature	–20...+60°C							
Storage temperature	–30...+80°C							
Housing material	Self-extinguishing polyamide							

❶ For 380...440VAC types: 19VA/1.7W max. ❷ Used at 24...48VDC or 24...240VAC; ≤30ms at 380...440VAC. ❸ Consult Technical support for information; see contact details on front cover.
NOTE: N/O = normally open / SPST c/o = changeover / SPDT; inst. = instantaneous.

TYPE		31L48TP…	31L48TPB…	31L48M…
DESCRIPTION				
		On delay	On delay	Programmable multifunction
		Multiscale	Multiscale	Multiscale
		Multivoltage	Single voltage	Multivoltage
CONTROL CIRCUIT				
Rated supply voltage Us		24VAC/DC❶	24VAC/DC❶	24...240VAC/DC❶
		110VAC❶	220...240VAC❶	
		220...240VAC❶		
Rated frequency		50...60Hz		
Operating voltage range		0.85...1.1 Us		
Power consumption (maximum)		6VA		
TIMING CIRCUIT				
Time setting range		31L48TPS... Multiscale 0.3...3s 1.2...12s 10...100s 7.8...780s	Multiscale 0.05...1s 0.10...10s 0.6s...1min 6s...10min	31L48MM... Multiscale 0.05...1s 0.1...10s 0.6s...1min 6s...10min
		31L48TPM... Multiscale 18s...3min 72s...12min 10...100min 78...780min		31L48MH... Multiscale 0.05...1min 0.1...10min 0.6min...1h 1min...10h
Setting accuracy		±5%		
Repeat accuracy		±0.5%		
Influence of voltage variation		±0.5%		
Average variation of set delays in related to 20°C condition	at –10°C	+2%		
	at +60°C	–3%		
Minimum ON time		—		
Resetting time	during operation	≥ 0.1s	≥ 0.1s	≥ 0.1s
	elasped time	≥ 65ms	≥ 65ms	≥ 65ms
Immunity time for microbreakings		≤ 40ms	≤ 40ms	≤ 40ms
RELAY OUTPUTS				
Number of relays		1	2	2
Contact arrangement		1 delayed c/o	2 del. or 1 inst. + 1 del. c/o	2 delayed c/o
Maximum switching voltage		250V		
IEC conventional free air thermal current (Ith)		5A		
UL/CSA designation		B300		
Electrical life (with rated load)		10^5 cycles		
Mechanical life		$30x10^6$ cycles		
CONNECTIONS				
Tightening torque maximum		—		
Conductor section (min-max)		—		
INSULATION (input-output)				
IEC rated insulation voltage Ui		250V		
IEC power frequency withstand voltage Uimp		—		
IEC power frequency withstand voltage		2kV		
AMBIENT CONDITIONS				
Operating temperature		–10...+60°C		
Storage temperature		–30...+80°C		
Housing material		Self-extinguishing polyamide		

❶ Other voltages on request.
NOTE: del. = delayed inst. = instantaneous c/o = changeover/SPDT

- Modular versions suitable for different types of installations, DIN rail, screw fixing or switchboard, also suitable for rear mounting plate fixing
- Minimum and maximum voltage monitoring relays for single and three-phase systems, with or without neutral
- Voltage asymmetry, phase sequence and phase loss control relays
- Multifunction voltage and frequency monitoring relays with NFC technology and APP
- Frequency monitoring relays
- Minimum and maximum current monitoring relays
- Insulation monitoring relays
- Interface protection system units compliant with standards CEI 0-21, CEI 0-16, DEWA DRRG, ENA G98/G99, VDE-AR-N 4105, VDE-AR-N 4110, VDE-AR-N 4120, VDE V 0126-1-1, SEC (Saudi Electricity Company).

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For single-phase systems ..... 22 - 7
Multifunction voltage and frequency monitoring relays, programmable via NFC technology and APP . 22 - 8
Frequency monitoring relays ..... 22 - 9
Current monitoring relays
For single-phase systems ..... 22 - 9
For single and three-phase systems ..... 22 - 10
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Insulation monitoring relays ..... 22 - 11
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VOLTAGE MONITORING RELAYS
- For three-phase systems with or without neutral and single-phase systems
- Minimum and maximum AC voltage
- Phase loss and incorrect phase sequence
- Asymmetry
- Minimum and maximum frequency.

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MULTIFUNCTION VOLTAGE AND FREQUENCY MONITORING RELAYS
- Voltage and frequency monitoring relays for three-phase systems with or without neutral
- Programmable via NFC technology and APP
- Minimum and maximum AC voltage
- Phase loss, neutral loss and incorrect phase sequence
- Asymmetry
- Minimum and maximum frequency.

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FREQUENCY MONITORING RELAYS
- For single and three-phase systems
- Minimum frequency
- Maximum frequency.

Pages 22-9 and 10

CURRENT MONITORING RELAYS
- For single and three-phase systems
- Maximum AC/DC current
- Minimum or maximum AC/DC current
- Minimum and maximum AC/DC current.

Page 22-11

PUMP PROTECTION RELAYS
- For single and three-phase systems
- Minimum cosφ for dry running protection
- Maximum AC current
- Phase loss and incorrect phase sequence.

Page 22-11

INSULATION MONITORING RELAYS
- Insulation monitoring for IT network up to 230VAC
- Front LEDs for trip and status indication operation
- Test pushbutton
- Adjustable intervention threshold.

Page 22-12

INTERFACE PROTECTION SYSTEM UNITS
- Compliant with Italian standard CEI 0-21, for low voltage
- Compliant with Italian standard CEI 0-16, for medium voltage
- Compliant with standard SHAMS DUBAI - DRRG (DEWA)
- Compliant with technical guide SEC (Saudi Electricity Company)
- Compliant with technical guide ENA G98/G99
- Compliant with technical guide VDE-AR-N 4105, VDE-AR-N 4110, VDE-AR-N 4120 and VDE V 0126-1-1.

Voltage monitoring relays for three-phase systems without neutral

	PMV10	PMV20	PMV30	PMV40	PMV50	PMV70
Modular version	●(1U)	●(2U)	●(2U)	●(2U)	●(2U)	●(2U)
Minimum AC voltage			●		●	●
Maximum AC voltage					●	●
Phase loss	●	●	●	●	●	●
Incorrect phase sequence	●	●	●	●	●	●
Asymmetry				●		●
Page	22-4				22-5	22-5

Voltage monitoring relays for three-phase systems with or without neutral

	PMV50N	PMV70N	PMV80N	PMV95N
Modular version	●(3U)	●(3U)	●(3U)	●(2U)
Minimum AC voltage	●	●	●	●
Maximum AC voltage	●	●	●	●
Phase loss	●	●	●	●
Neutral loss	●	●	●	●
Incorrect phase sequence	●	●	●	●
Asymmetry		●		●
Minimum frequency			●	●
Maximum frequency			●	●
Programmable via NFC technology and APP				●
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Voltage monitoring relay for single-phase systems

	PMV55
Modular version	●(2U)
Minimum AC voltage	●
Maximum AC voltage	●
Page	22-7

Frequency monitoring relays for single-phase and three-phase systems

	PMF20
Modular version	●(2U)
Minimum frequency	●
Maximum frequency	●
Page	22-9

Current monitoring relays for single and three-phase systems

	PMA20	PMA30	PMA40
Modular version	●(2U)	●(2U)	●(3U)
Maximum AC/DC current	●		
Minimum or maximum AC/DC current		●	
Minimum and maximum AC/DC current			●
Page	22-9	22-10	22-10

Pump protection relay for single and three-phase systems

	PMA50
Modular version	●(3U)
Minimum cosφ for dry running pump protection	●
Maximum AC current	●
Phase loss	●
Incorrect phase sequence	●
Page	22-11

Insulation monitoring relay

	PMIB1A230
Modular version	●(3U)
Adjustable low insulation intervention threshold	●
Page	22-11

Interface protection system units

	PMVF3000	PMVF52	PMVF61	PMVF71	PMVF81	PMVF90
CEI 0-21		●				
CEI 0-16	●					
DEWA DRRG			●			
SEC (Saudi Electricity Company)			●			
ENA G98/G99				●		
VDE-AR-N 4105					●	
VDE V 0126-1-1					●	
For systems requiring 3 maximum voltage thresholds						●
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For three-phase systems, without neutral

PMV10A440

PMV20…

Order code	Rated voltage to control Ue (phase-to-phase)	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]
Three-phase system, without neutral. Phase loss and incorrect phase sequence. Instantaneous trip. 1 module housing.			
PMV10A440	208...480VAC	1	0.050
2 modules housing.			
PMV20A240	100...240VAC	1	0.120
PMV20A575	208...575VAC	1	0.120
PMV20A600	380...600VAC	1	0.120

General characteristics
- Voltage monitoring relay, self powered, for phase loss and incorrect phase sequence
- Phase loss detection if one of the voltages is <70% rated value
- Phase loss tripping time: 60ms
- 1 relay output with 1 changeover contact (SPDT)
- Modular DIN 43880 housing: 1 module for PMV10; 2 modules for PMV20
- Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing via pull out tabs
- IEC degree of protection: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601) as Auxiliary Devices; EAC.
Compliant with standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 508, CSA C22.2 n° 14.

PMV30…

Order code	Rated voltage to control Ue (phase-to-phase)	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]
Three-phase system, without neutral. Minimum AC voltage. Delayed trip. Phase loss and incorrect phase sequence. Instantaneous trip.			
PMV30A240	208...240VAC	1	0.130
PMV30A575	380...575VAC	1	0.130
PMV30A600	600VAC	1	0.130

General characteristics
- Voltage monitoring relay, self powered, for minimum voltage, phase loss and incorrect phase sequence
- Configurable rated voltage (Ue):
  - PMV30A240: 208-220-230-240VAC
  - PMV30A575: 380-400-415-440-460-480-525-575VAC
- Excellent tripping accuracy
- TRMS measurements (True Root Mean Square)
- Control of phase-to-phase voltages
- Phase loss detection if one of the voltages is <70% rated value
- Phase loss tripping time: 60ms
- 1 relay output with 1 changeover contact (SPDT)
- Modular DIN 43880 housing, 2 modules
- Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing via pull out tabs
- IEC degree of protection: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

ADJUSTMENTS

"V min"	Minimum voltage tripping threshold 80...95% Ue
"Delay"	Tripping time 0.1...20s
"Reset delay"	Resetting time 0.1...20s.

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices; EAC.
Compliant with standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 508, CSA C22.2 n° 14.

PMV40…

Order code	Rated voltage to control Ue (phase-to-phase)	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]
Three-phase system, without neutral. Asymmetry. Delayed trip. Phase loss and incorrect phase sequence. Instantaneous trip.			
PMV40A240	208...240VAC	1	0.130
PMV40A575	380...575VAC	1	0.130
PMV40A600	600VAC	1	0.130

General characteristics
- Voltage monitoring relay, self powered, for asymmetry, phase loss and incorrect phase sequence
- Excellent tripping accuracy
- TRMS measurements (True Root Mean Square)
- Control of phase-to-phase voltages
- Phase loss detection if one of the voltages is <70% rated value
- Phase loss tripping time: 60ms
- 1 relay output with 1 changeover contact (SPDT)
- Modular DIN 43880 housing, 2 modules
- Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing via pull out tabs
- IEC degree of protection: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

ADJUSTMENTS

"Asymmetry"	High voltage asymmetry tripping threshold 5...15% Ue
"Delay"	Tripping time 0.1...20s
"Reset delay"	Resetting time 0.1...20s.

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices; EAC.
Compliant with standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 508, CSA C22.2 n° 14.

For three-phase systems, without neutral

PMV50...

Order code	Rated voltage to control Ue (phase-to-phase)	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]
Three-phase system, without neutral. Minimum and maximum AC voltage. Delayed trip. Phase loss and incorrect phase sequence. Instantaneous trip.			
PMV50A240	208...240VAC	1	0.130
PMV50A575	380...575VAC	1	0.130
PMV50A600	600VAC	1	0.130

General characteristics
- Voltage monitoring relay, self powered, for minimum and maximum voltage, phase loss and incorrect phase sequence
- Configurable rated voltage (Ue):
  - PMV50A240: 208-220-230-240VAC
  - PMV50A575: 380-400-415-440-460-480-525-575VAC
- High tripping accuracy
- TRMS measurements (True Root Mean Square)
- Control of phase-to-phase voltages
- Phase loss detection if one of the voltages is <70% rated value
- Phase loss tripping time: 60ms
- 1 relay output with 1 changeover contact (SPDT)
- Modular DIN 43880 housing, 2 modules
- Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing via pull out tabs
- IEC degree of protection: IP40 on front (only when placed in IP40 enclosure or control board); IP20 on terminals.

ADJUSTMENTS

"V max"	Maximum voltage tripping threshold 105...115% Ue
"V min"	Minimum voltage tripping threshold 80...95% Ue
"Delay" for each	Tripping time 0.1...20s
"Reset delay"	Resetting time 0.1...20s.

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601) as Auxiliary Devices; EAC.
Compliant to standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 508, CSA C22.2 n° 14.

PMV70...

Order code	Rated voltage to control Ue (phase-to-phase)	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]
Three-phase system, without neutral. Minimum and maximum AC voltage and asymmetry. Delayed trip. Phase loss and incorrect phase sequence. Instantaneous trip.			
PMV70A240	208...240VAC	1	0.130
PMV70A575	380...575VAC	1	0.130
PMV70A600	600VAC	1	0.130

General characteristics
- Voltage monitoring relay, self powered, for minimum and maximum voltage, phase loss, incorrect phase sequence and asymmetry
- Configurable rated voltage (Ue):
  - PMV70A240: 208-220-230-240VAC
  - PMV70A575: 380-400-415-440-460-480-525-575VAC
- Excellent tripping accuracy
- TRMS measurements (True Root Mean Square)
- Control of phase-to-phase voltages
- Phase loss detection if one of the voltages is <70% rated value
- Phase loss tripping time: 60ms
- 1 relay output with 1 changeover contact (SPDT)
- Modular DIN 43880 housing, 2 modules
- Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing via pull out tabs
- IEC degree of protection: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

ADJUSTMENTS

"V max"	Maximum voltage tripping threshold 105...115% Ue
"V min"	Minimum voltage tripping threshold 80...95% Ue
"Delay" for each	Tripping delay 0.1...20s
"Asymmetry"	High voltage asymmetry tripping threshold 5...15% Ue.

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices; EAC.
Compliant with standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 508, CSA C22.2 n° 14.

For three-phase systems with or without neutral

PMV50N...

Order code	Rated voltage to control Ue (phase-to-phase)	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]
Three-phase system, with or without neutral. Minimum and maximum AC voltage. Delayed trip. Phase loss, neutral loss and incorrect phase sequence. Instantaneous trip.			
PMV50NA240	208...240VAC	1	0.200
PMV50NA440	380...440VAC	1	0.200
PMV50NA600	480...600VAC	1	0.200

General characteristics
- Voltage monitoring relay, self powered, for minimum and maximum voltage, phase loss, neutral loss and incorrect phase sequence
- 4 configurable rated voltages (Ue):
  - PMV50NA240: 208-220-230-240VAC (phase-to-phase) 120-127-132-138VAC (phase-to-neutral)
  - PMV50NA440: 380-400-415-440VAC (phase-to-phase) 220-230-240-254VAC (phase-to-neutral)
  - PMV50NA600: 480-525-575-600VAC (phase-to-phase) 277-303-332-347VAC (phase-to-neutral)
- Excellent tripping accuracy
- TRMS measurements (True Root Mean Square)
- Phase loss detection when one of the voltages is <70% rated voltage
- Phase or neutral loss tripping time: 60ms
- 2 relay outputs, each with 1 changeover contact (SPDT)
- Modular DIN 43880 housing, 3 modules
- Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing via pull out tabs
- IEC degree of protection: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

ADJUSTMENTS

"V max"	Maximum voltage tripping threshold 105...115% Ue
"V min"	Minimum voltage tripping threshold 80...95% Ue
"Delay" for each	Tripping time 0.1...20s
"Reset delay"	Resetting time 0.1...20s.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3.

PMV70N...

Order code	Rated voltage to control Ue (phase-to-phase)	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]
Three-phase system, with or without neutral. Minimum and maximum AC voltage and asymmetry. Delayed trip. Phase loss, neutral loss and incorrect phase sequence. Instantaneous trip.			
PMV70NA240	208...240VAC	1	0.200
PMV70NA440	380...440VAC	1	0.200
PMV70NA600	480...600VAC	1	0.200

General characteristics
- Voltage monitoring relay, self powered, for minimum and maximum voltage, phase loss, neutral loss, incorrect phase sequence and asymmetry
- 4 configurable rated voltages (Ue):
  - PMV70NA240: 208-220-230-240VAC (phase-to-phase) 120-127-132-138VAC (phase-to-neutral)
  - PMV70NA440: 380-400-415-440VAC (phase-to-phase) 220-230-240-254VAC (phase-to-neutral)
  - PMV70NA600: 480-525-575-600VAC (phase-to-phase) 277-303-332-347VAC (phase-to-neutral)
- Excellent tripping accuracy
- TRMS measurements (True Root Mean Square)
- Phase loss detection when one of the voltages is <70% rated value
- Phase or neutral loss tripping time: 60ms
- 2 relay outputs, each with 1 changeover contact (SPDT)
- Modular DIN 43880 housing, 3 modules
- Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing via pull out tabs
- IEC degree of protection: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

ADJUSTMENTS

"V max"	Maximum voltage tripping threshold 105...115% Ue
"V min"	Minimum voltage tripping threshold 80...95% Ue
"Delay" for each	Tripping time 0.1...20s
"Asymmetry"	High voltage asymmetry tripping threshold 5...15% Ue.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3.

For three-phase systems, with or without neutral

PMV80N...

Order code	Rated voltage to control Ue (phase-to-phase)	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]
Three-phase system, with or without neutral. Minimum and maximum AC voltage, minimum and maximum frequency. Delayed trip. Phase loss, neutral loss and incorrect phase sequence. Instantaneous trip.			
PMV80NA240	208...240VAC	1	0.200
PMV80NA440	380...440VAC	1	0.200
PMV80NA600	480...600VAC	1	0.200

General characteristics
- Voltage monitoring relay, self powered, for minimum and maximum voltage, minimum and maximum frequency, phase loss, neutral loss and incorrect phase sequence
- 4 configurable rated voltages (Ue):
  - PMV80NA240: 208-220-230-240VAC (phase-to-phase) 120-127-132-138VAC (phase-to-neutral)
  - PMV80NA440: 380-400-415-440VAC (phase-to-phase) 220-230-240-254VAC (phase-to-neutral)
  - PMV80NA600: 480-525-575-600VAC (phase-to-phase) 277-303-332-347VAC (phase-to-neutral)
- Excellent tripping accuracy
- TRMS measurements (True Root Mean Square)
- Phase loss detection if one of the voltages is <70% rated value
- Phase or neutral loss tripping time: 60ms
- 2 relay outputs, each with 1 changeover contact (SPDT)
- Modular DIN 43880, 3 modules
- Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing via pull out tabs
- IEC degree of protection: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

ADJUSTMENTS

"V max"	Maximum voltage tripping threshold 105...115% Ue
"V min"	Minimum voltage tripping threshold 80...95% Ue
"Hz min/max"	Minimum/maximum frequency tripping threshold ±1...10% rated frequency
"V delay"	Tripping time 0.1...20s
"Hz delay"	Tripping time 0.1...5s.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3.

For single-phase systems

PMV55...

Order code	Rated voltage to control Ue	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]
Single-phase system. Minimum and maximum AC voltage. Delayed trip.			
PMV55A127	110...127VAC	1	0.125
PMV55A240	208...240VAC	1	0.125
PMV55A440	380...440VAC	1	0.125

General characteristics
- Voltage monitoring relay, self powered, for minimum and maximum voltage
- 4 configurable rated voltages (Ue):
  - PMV55A127: 110-115-120-127VAC
  - PMV55A240: 208-220-230-240VAC
  - PMV55A440: 380-400-415-440VAC
- Excellent tripping accuracy
- TRMS measurements (True Root Mean Square)
- 1 relay output with 1 changeover contact (SPDT)
- Modular DIN 43880 housing, 2 modules
- Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing via pull out tabs
- IEC degree of protection: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

ADJUSTMENTS

"V max"	Maximum voltage tripping threshold 105...115% Ue
"V min"	Minimum voltage tripping threshold 80...95% Ue
"Delay" for each	Tripping time 0.1...20s
"Reset delay"	Resetting time 0.1...20s.

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices; EAC.
Compliant with standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 508, CSA C22.2 n° 14.

Multifunction voltage and frequency monitoring relays for three-phase systems with or without neutral, with NFC technology and APP

Order code	Rated voltage to control Ue (phase-to-phase)	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]
Three-phase system, with or without neutral. Minimum and maximum AC voltage, minimum and maximum frequency and asymmetry. Delayed trip. Phase loss, neutral loss and phase sequence. Instantaneous trip. Programmable via smartphone or tablet with NFC technology and App.			
PMV95NA240NFC	208...240VAC	1	0.130
PMV95NA575NFC	380...575VAC	1	0.130

PMV95N...

The App can be downloaded from Google Play Store and App Store.

ANDROID APP ON Google play

Available on the App Store

General characteristics
- Multifunction voltage and frequency monitoring relay, self powered, for minimum and maximum voltage, minimum and maximum frequency, phase loss, neutral loss, incorrect phase sequence and asymmetry.
- NFC connectivity for parameter setting with LOVATO NFC App, freely downloadable from Google Play Store and App Store
- Simple, fast and intuitive programming
- Very high accuracy and repeatability of the settings
- Possibility to save the program on smartphone or tablet to be copied on other PMV95N, even with device powered off
- Possibility to enable or disable individually the functions of interest
- Possibility to protect the settings with a password
- QR code for the direct connection to the website www.LovatoElectric.com for the download of the technical manual
- Excellent tripping accuracy
- TRMS measurements (True Root Mean Square)
- Phase loss detection if one of the voltages is <70% rated value
- 1 relay output with changeover contact (SPDT)
- Modular DIN 43880 housing, 2 modules
- Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing via pull out tabs
- IEC degree of protection: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals
- Adjustments: consult the technical manual on the website www.LovatoElectric.com.

Certifications and compliance
Certifications obtained: cULus, EAC.
Compliant with standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 508, CSA C22.2 n° 14.

8 protection functions in a single product, with possibility to enable or disable individually the functions of interest.
- maximum voltage
- minimum voltage
- maximum frequency
- minimum frequency
- asymmetry
- phase loss
- neutral loss
- incorrect phase sequence

Compact dimensions
Suitable for three-phase systems with or without neutral. It comes in a 2 DIN module modular housing

Excellent accuracy of settings with digital setting of time and tripping thresholds.

Repeatability of settings, with possibility to save the programming on the smartphone to be copied in fast way on other relays without risk of error.

Simple and intuitive programming thanks to the graphic interface of the LOVATO NFC App that shows on the display of the smartphone the functions and parameters without need to consult the technical manual.

Protection of settings with a password.

Frequency monitoring relays for single and three-phase systems

PMF20...

Order code	Rated voltage Ue	Qty per pkg	Wt
	[V] 50/60Hz	n°	[kg]
Single and three-phase systems. Minimum and maximum frequency. Delayed trip. Automatic reset.			
PMF20A240	220...240VAC	1	0.125
PMF20A415	380...415VAC	1	0.125

General characteristics
- Frequency monitoring relay, self powered, for minimum and maximum control
- Rated frequency selection: 50 or 60Hz
- Tripping threshold for minimum and maximum frequency
- Excellent tripping accuracy
- 1 relay output, configurable, with 1 changeover contact (SPDT)
- Modular DIN 43880 housing, 2 modules
- Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing via pull out tabs
- IEC degree of protection: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

ADJUSTMENTS

"Hz max"	Maximum frequency tripping threshold 101...110% rated frequency
"Delay"	Tripping time 0.1...20s
"Hz min"	Minimum frequency tripping threshold 90...99% rated frequency
"Delay"	Tripping time 0.1...20s
"Reset delay"	Resetting time 0.1...20s
"Mode"	• Minimum and maximum frequency with output relay normally energised • Maximum frequency with output relay normally energised • Minimum frequency with output relay normally energised • Maximum frequency with output relay normally de-energised.

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices; EAC.
Compliant with standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 508, CSA C22.2 n° 14.

Current monitoring relay for single-phase systems

PMA20240

Order code	Rated current Ie	Auxiliary supply voltage	Qty per pkg	Wt
	[A]	[V]	n°	[kg]
Single-phase system. AC/DC maximum current control. Auxiliary AC/DC power supply. Automatic or manual reset.				
PMA20240	5 or 16A	24...240V AC/DC	1	0.121

General characteristics
- Current monitoring relay for AC/DC maximum current control
- AC/DC multivoltage auxiliary power supply
- Direct connection up to 16A max or by current transformer (CT)
- Excellent tripping accuracy
- TRMS current measurements (True Root Mean Square)
- Resetting and inhibition input
- 1 relay output with 1 changeover contact (SPDT)
- Modular DIN 43880 housing, 2 modules
- Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing via pull out tabs
- IEC degree of protection: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

ADJUSTMENTS

"Imax"	Maximum current tripping threshold 5...100% Ie
"Hysteresis"	Maximum hysteresis threshold 1...50%
"Trip delay"	Tripping time 0.1...30s
"Inhibition time"	Inhibition delay for external input or at power up 1...60s
"Aut. reset delay"	Automatic resetting time 0.1...30s
"Mode"	• Rated current 5A or 16A • Relay output normally energised or de-energised • Tripping memory (latch) ON or OFF.

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices - Modular ampere monitoring relays; EAC.
Compliant with standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 508, CSA C22.2 n° 14.

Current monitoring relays for single and three-phase systems

PMA30240

Order code	Rated current Ie	Auxiliary supply voltage	Qty per pkg	Wt
	[A]	[V]	n°	[kg]
Single and three-phase system. AC/DC minimum or maximum current control. Delayed trip. Auxiliary AC/DC power supply. Automatic or manual reset.				
PMA30240	5 or 16A	24...240V AC/DC	1	0.121

General characteristics
- Current monitoring relay for AC/DC minimum or maximum current control
- AC/DC multivoltage auxiliary power supply
- Automatic or manual reset.
- Direct connection up to 16A max or by current transformer (CT)
- Excellent tripping accuracy
- TRMS current measurements (True Root Mean Square)
- Resetting and inhibition input
- 1 relay output with 1 changeover contact (SPDT)
- Modular DIN 43880 housing, 2 modules
- Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing via pull out tabs
- IEC degree of protection: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

ADJUSTMENTS

"Set point"	Minimum or maximum current tripping threshold 5...100% Ie
"Hysteresis"	Minimum or maximum hysteresis threshold 1...50%
"Trip delay"	Tripping time 0.1...30s
"Inhibition time"	Inhibition delay for external input or at power up 1...60s
"Ie"	Current scale selection: 5A or 16A
"Mode"	• Min or max function • Relay output normally energised or de-energised • Tripping memory (latch) ON or OFF.

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices - Modular ampere monitoring relays; EAC.
Compliant with standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 508, CSA C22.2 n° 14.

PMA40240

Order code	Rated current Ie	Auxiliary supply voltage	Qty per pkg	Wt
	[A]	[V]	n°	[kg]
Single and three-phase system. AC/DC minimum and maximum current control. Delayed trip. Auxiliary AC/DC power supply. Automatic or manual reset.				
PMA40240	0.02-0.05-0.25-1-5-16A	24...240V AC/DC	1	0.166

General characteristics
- Current monitoring relay for AC/DC minimum and maximum current control
- AC/DC multivoltage auxiliary power supply
- Direct connection up to 16A max or by current transformer (CT)
- Excellent tripping accuracy
- TRMS current measurements (True Root Mean Square)
- Automatic or manual resetting (manual resetting by power removal)
- 2 relay outputs (Min and Max), configurable, each with 1 changeover contact (SPDT)
- Modular DIN 43880 housing, 3 modules
- Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing via pull out tabs
- IEC degree of protection: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

ADJUSTMENTS

"Imax"	Maximum current tripping threshold 5...100% Ie
"Imin"	Minimum current tripping threshold 5...100% Ie
"Trip delay"	Minimum and maximum current tripping time 0.1...30s
"Inhibition time"	Inhibition time at power up 1...60s
"Ie"	Current scale selection: 20mA, 50mA, 250mA, 1A, 5A or 16A
"Mode"	• Separate or common relay outputs • Relay output normally energised or de-energised • Tripping memory (latch) ON or OFF.

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices - Modular ampere monitoring relays; EAC.
Compliant with standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 508, CSA C22.2 n° 14.

For single and three-phase systems

PMA50...

Order code	Rated current Ie	Auxiliary supply voltage	Qty per pkg	Wt
	[A]	[V]	n°	[kg]
Single and three-phase systems. Maximum AC current and minimum cosφ. Delayed trip. Phase loss and incorrect phase sequence. Instantaneous trip. Auxiliary AC power supply. Automatic or manual reset.				
PMA50A240	5 or 16A	220...240VAC	1	0.251
PMA50A415		380...415VAC	1	0.251
PMA50A480		440...480VAC	1	0.251

General characteristics
- Pump protection relay against dry running
- Auxiliary AC power supply
- Motor under-load and over-current control
- Direct connection up to 16A max or by current transformer (CT)
- Excellent tripping accuracy
- Voltage control range 80...660VAC
- Current control range 0.1...16A
- Resetting and enabling consent input
- 1 relay output relay with 1 changeover contact (SPDT)
- Modular DIN 43880 housing, 3 modules
- Mounting on 35mm DIN rail (IEC/EN/BS 60715) or screw fixing via pull out tabs
- IEC degree of protection: IP40 on front (only when placed in IP40 enclosure or control board); IP20 at terminals.

ADJUSTMENTS

"Cosφ min"	Minimum cosφ threshold 0.1...0.99 (under-load/dry running)
"Imax"	Maximum current threshold 10...100%Ie
"Trip delay"	Tripping time for minimum cosφ and maximum current 0.1...10s
"Inhibition time"	Inhibition delay for external input or at power up 1...60s
"Aut. reset delay"	Automatic reset time OFF...100min
"Mode"	• Rated current 5A or 16A • Single or three phase • External reset ON or OFF.

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices - Modular ampere monitoring relays; EAC.
Compliant with standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 508, CSA C22.2 n° 14.

Insulation monitoring relay for AC IT systems

new

PMIB1A230

Order code	Rated voltage	Limit threshold	Qty per pkg	Wt
	[V]		n°	[kg]
For IT networks up to 230VAC. 1 adjustable intervention threshold.				
PMIB1A230	230VAC	1	1	0.200

General characteristics
The PMIB1A230 insulation monitoring relay is a device that allows the monitoring of the insulation towards earth of alternating current networks up to 230VAC isolated from earth (IT systems).
The insulation resistance is checked by applying a continuous component measurement signal between the insulated line and earth. By detecting the leakage current generated towards earth it is possible to measure the level of insulation.
On the front there are the TEST and RESET buttons, as well as the device powered (ON) and low insulation trip (TRIP) signals.
The intervention threshold is adjustable via a frontal potentiometer.
- Auxiliary power supply: 230VAC
- Insulation control of IT networks up to 230VAC
- Intervention threshold settable via front potentiometer
- LED signaling of ON and TRIP
- Dedicated buttons for the RESET and TEST function
- Dedicated inputs for the remote RESET and TEST function
- 250VAC 5A AC1 changeover relay output for signaling the intervention
- Modular DIN 43880 housing, 3 modules
- Mounting on 35mm DIN rail (IEC/EN/BS 60715)
- Degree of protection: IP40 on the front; IP20 on the terminals.

ADJUSTMENTS:
Intervention threshold: 25...100kOhm.

To indicate the low insulation signal, a dry changeover output is available.

Certifications and compliance
Compliant with standards: IEC/EN/BS 61010-1, IEC/EN/BS 61557-8, IEC/EN/BS 61326-1.

For low voltage

PMVF52

Order code	Rated voltage Control	Auxiliary	Qty per pkg	Wt
	[V]	[V]	n°	[kg]
For single-phase and three-phase systems with and without low voltage neutral. Dual threshold minimum and maximum voltage and frequency protection. Modular (4U).				
PMVF52	230VAC 400VAC	24...240VAC/ 24...240VDC	1	0.326

new

Voltage threshold for CEI 0-21.

Type of protection	Tripping threshold	Tripping time
Maximum voltage 59.S2	1.15Un	0.2s
Maximum voltage 59.S1 (moving mean over 10min)	1.10Un	≤ 3s
Minimum voltage 27.S1	0.85Un	1.5s
Minimum voltage 27.S2	0.15Un	0.2s

Frequency threshold for CEI 0-21.

Type of protection	Tripping threshold	Tripping time
High external signal and low local control conditions.		
Maximum frequency 81>.S2	51.5Hz	0.1s
Minimum frequency 81<.S2	47.5Hz	0.1s
Low external signal and high local control conditions.		
Maximum frequency 81>.S2	51.5Hz	1s
Minimum frequency 81<.S2	47.5Hz	4s
High conditions for both external signal and local control.		
Maximum frequency 81>.S1	50.2Hz	0.1s
Minimum frequency 81<.S1	49.8Hz	0.1s

NOTE: Low conditions for both external signal and local control are not taken into consideration by the standard.

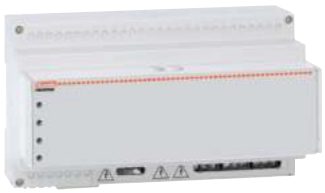
Expansion modules

EXM10...

Order code	Description
Communication ports.	
EXM1010	Opto-isolated USB interface
EXM1011	Opto-isolated RS232 interface
EXM1012	Opto-isolated RS485 interface
EXM1013	Opto-isolated Ethernet interface
EXM1018❶	IEC/EN/BS 61850 interface
Inputs and outputs.	
EXM1001	2 digital opto-isolated inputs and 2 relay outputs 5A 250VAC

❶ **IEC 61850 protocol**
The EXM1018 module will be made available only when the competent authorities have established the exact terms of the supervision and control of the specific commands (currently under study as specified in the Italian CEI 0-21 standard).

Backup power supply



PMVFUPS02

new

Order code	Description	Qty per pkg	Wt
		n°	[kg]
PMVFUPS02	Input 230VAC Output 230VAC with stored energy 800Ws and power 650VA	1	0.450

- **Compatible with contactors (IS or backup function) with standard AC or electronic coils.**
- **Compatible with undervoltage trip releases (IS or backup function) of moulded case circuit breakers.**

General characteristics
PMVF52 interface protection system (IP) unit has been developed according to the Italian CEI 0-21 standard prescriptions. Each is used when a local solar generating system is connected in parallel with the low-voltage electric utility. The controls refer to limits of voltage and frequency monitoring.
In the case when either the voltage or the frequency are out of admissible limits, PMVF52 must step in by de-energising a relay output so that the interface device (IS) trips.
PMVF52 is certified for use in single and three phase systems, where it is required in presence of storage systems connected in parallel to the distribution network and to the photovoltaic inverter on the AC side (presence of multiple energy generators simultaneously or exceeding the threshold of 11.08kW overall).
PMVF52 is equipped with 5 inputs having the following functions:
- IS status feedback
- External signal for frequency selection (communication network malfunction)
- local control for frequency selection
- remote tripping (forced IS opening, independent of voltage and frequency values)
- 5th programmable input.

Also, there are 3 relay outputs for:
- IS opening and closing
- standby device opening (programmable: retentive normally energised, retentive normally de-energised or adjustable pulse)
- 3rd programmable input.

The standby device control is compulsory in installations with more than 20kW and consists of a signal, with a 0.5s delay respect to the IS opening command, transmitted only if the IS failed and did not complete the disconnection.

Operational characteristics
- Auxiliary voltage: 24...240VAC/24...240VDC
- Voltage inputs:
  - 400VAC (three-phase connection)
  - 230VAC (single-phase connection)
- Relays output:
  OUT1: 8A 250VAC, 8A 30VDC
  OUT2: 5A 250VAC, 5A 30VDC
  OUT3: 2A 250VAC, 2A 30VDC
- Predisposed for IEC/EN/BS 61850 signal supervision using expansion EXM1018 or external module
- Expandable with up to 2 module EXM... by optical interface
- Event log (128 events with time reference):
  - interface protection interventions
  - action on password
  - command execution
  - system events
- Parameter configuration and remote control (only with communication expansion module) with software Synergy and Xpress
- Housing: modular (4 modules)
- Mounting on 35mm DIN rail or screw fixing
- Degree of protection for both: IP40 on front; IP20 on terminals.

Reference standards
Compliant standard: Italian CEI 0-21, IEC/EN/BS 60255-27, IEC/EN/BS 60255-26.

General characteristics for PMVFUPS02
CEI 0-21 and CEI 0-16 standards require an auxiliary power supply to feed the interface protection (IP), the interface switch (IS) and the backup switch for at least 5 seconds in the event of a power failure. PMVFUPS02 guarantees the necessary energy by accumulating it in capacitors, thus avoiding the use of batteries that require maintenance.
- power supply: 230VAC, 50Hz
- output voltage: 230VAC, 50Hz
- output power: 650VA
- accumulated energy: 800Ws
- accumulation time: 60s
- Housing: modular (9 modules)
- Mounting on 35mm DIN rail or screw fixing
- operating temperature: -5...+50°C
- degree of protection IP20 on front and terminals.

Reference standards
Compliant with standards: IEC/EN/BS 61010-1.

For medium voltage

PMVF3000

Order code	Rated voltage Control	Auxiliary	Qty per pkg	Wt
	[V]	[V]	n°	[kg]
Medium-voltage system. Dual threshold minimum and maximum voltage and frequency protection. Flush mount type with standard cutout dimensions 92x92mm/3.62x3.62”				
PMVF3000	Measure-ments via VTs in MV or direct in LV	100...240VAC/ 110...250VDC	1	0.389

new

Voltage threshold for CEI 0-16

Type of protection	Tripping threshold	Tripping time
Maximum voltage 59.S2	1.2Un	0.6s
Maximum voltage 59.S1 (moving mean over 10min)	1.1Un	≤ 3s
Minimum voltage 27.S1	0.85Un	0.4s
Minimum voltage 27.S2	0.15Un	0.2s
Maximum residual voltage 59.V0 (59N)	5% Urn	25s

Frequency threshold for CEI 0-16
Frequency protection at voltage choice

Type of protection	Tripping threshold	Tripping time
Configuration in standard conditions.		
Maximum frequency 81>.S2	51.5Hz	1s
Minimum frequency 81<.S2	47.5Hz	4s
Limited configuration in case of local control or voltage choice condition.		
Maximum frequency 81>.S1	50.2Hz	0.15s
Minimum frequency 81<.S1	49.8Hz	0.15s
– Voltage choice functions		
Maximum residual voltage 59.V0 (59N)	5% Urn	-
Minimum direct sequence voltage 27.Vd	70% Un	-
Maximum inverse sequence voltage 59.Vi	15% Un	-

EXP10...

Order code	Description
EXPANSION MODULES FOR PMVF3000. For auto reclosing management of automatic circuit breaker (IS).	
EXP1003	2 relay outputs 5A 250VAC
Communication ports.	
EXP1010	Opto-isolated USB interface
EXP1011	Opto-isolated RS232 interface
EXP1012	Opto-isolated RS485 interface
EXP1013	Opto-isolated Ethernet interface
EXP1018❶	IEC/EN/BS 61850 interface

❶ IEC/EN/BS 61850 protocol
The EXP1018 module will be made available only when the competent authorities have established the exact terms of the supervision and control of the specific commands (currently under study as specified in the Italian CEI 0-16 standard).

Backup power supply

PMVFUPS02

Order code	Description	Qty per pkg	Wt
		n°	[kg]
PMVFUPS02	Input 230VAC Output 230VAC with stored energy 800Ws and power 650VA	1	0.450

new

– **Compatible with contactors (IS or backup function) with standard AC or electronic coils.**
– **Compatible with undervoltage trip releases (IS or backup function) of moulded case circuit breakers.**

General characteristics
PMVF3000 interface protection system (IP) unit has been developed according to the Italian CEI 0-16 standard prescriptions. It is used when a local generating system is connected in parallel with the medium-voltage utility distribution grid. The controls refer to limits of voltage and frequency monitoring.
In the case when either the voltage or the frequency are out of admissible limits, PMVF... must step in by de-energising a relay output so that the interface device (IS) trips.
PMVF3000 is equipped with inputs having the following functions:
– IS status feedback
– Interface protection system exclusion
– Local control
– Remote tripping (forced IS opening, independent of voltage and frequency values).
In addition, there are two relay outputs to configure as:
– IS opening
– Programmable (either as factory default for standby device opening or to set up as auto reclosing if the IS is an automatic circuit breaker).

Standby device opening
In installations with more than 400kW, the standard specifies there must be a command signal, that releases another standby device, given within 1 second whenever the IS opening fails or malfunctions.

Automatic IS reclosing
Whenever an automatic circuit breaker is used as the IS, the PMVF3000 is capable of controlling both the opening (according to the installation conditions indicated in the Italian CEI 0-16 standard) and the auto reclosing. The auto reclosing function includes defining the number of attempts and the time interval between an attempt and the following one as well as generating an alarm if the closing operation does not take place.
This function can be carried out through a programmable output of the PMVF3000 (unless it is already used for the standby device operation) or by installing an EXP1003 expansion module.

Operational characteristics
– Auxiliary voltage: 100-240VAC/110-250VDC
– Voltage inputs (connection via VTs in MV or directly in LV end):
  • Primary: until 150,000V
  • Secondary: 50...500V (for voltage/frequency); 50...150V (for residual voltage measurement)
– Relay outputs 5A 250VAC AC1 / 5A 30VDC
– 4 digital inputs
– 3 current inputs (for optional measuring): Use via CTs with selectable /5A or /1A secondary
– Built-in Ethernet communication port
– Expandable with up to 2 module EXP...
– Parameter configuration and remote control with software Synergy and Xpress
– Housing: Flush mount 118x96mm/4.64x3.78”, cutout 92x92mm/3.62x3.62”.
– Degree of protection: IP65 on front; IP20 on terminals
– **Predisposed for IEC/EN/BS 61850 signal supervision using expansion or external module❶.**

Reference standards
Compliant with standards: Italian CEI 0-16; IEC/EN/BS 60255-27, IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3.

Synergy: supervision and Energy management software with remote and configuration capabilities.

Xpress: free software for Energy management controlling one device only.
See section 36.

General characteristics for PMVFUPS02
See page 22-12.

For low, medium and high voltage

PMVF81

Order code	Rated voltage Control	Auxiliary	Qty per pkg	Wt
	[V]	[V]	n°	[kg]
For single-phase and three-phase systems with and without low voltage neutral. Dual threshold minimum and maximum voltage and frequency protection. R.O.C.O.F and Vector shift. Modular type (4U).				
PMVF81	Programmable	24...240VAC/ 24...240VDC	1	0.326

new

Voltage threshold (default for VDE-AR-N 4105).

Type of protection	
Maximum voltage threshold 2	●
Maximum voltage threshold 1	● (10 min. avg)
Minimum voltage threshold 1	●
Minimum voltage threshold 2	Optional set to OFF

Frequency threshold (default for VDE-AR-N 4105).

Type of protection	
Maximum frequency threshold 2	●
Maximum frequency threshold 1	Optional set to OFF
Minimum frequency threshold 1	Optional set to OFF
Minimum frequency threshold 2	●

Expansion modules

EXM10...

Order code	Description
Communication ports.	
EXM1010	Opto-isolated USB interface
EXM1011	Opto-isolated RS232 interface
EXM1012	Opto-isolated RS485 interface
EXM1013	Opto-isolated Ethernet interface
EXM1018❶	IEC/EN/BS 61850 interface
Inputs and outputs.	
EXM1001	2 digital opto-isolated inputs and 2 relay outputs 5A 250VAC

❶ **IEC 61850 protocol**
The EXM1018 module will be made available only when the competent authorities have established the exact terms of the supervision and control of the specific commands (currently under study as specified in the Italian CEI 0-21 standard).

Backup power supply

PMVFUPS02

new

Order code	Description	Qty per pkg	Wt
		n°	[kg]
PMVFUPS02	Input 230VAC Output 230VAC with stored energy 800Ws and power 650VA	1	0.450

– **Compatible with contactors (IS or backup function) with standard AC or electronic coils.**
– **Compatible with undervoltage trip releases (IS or backup function) of moulded case circuit breakers.**

General characteristics
PMVF81 interface protection system (IP) unit has been developed according to VDE-AR-N 4105, VDE-AR-N 4110, VDE-AR-N 4120 and VDE V 0126-1-1 standards.
The controls refer to limits of voltage and frequency monitoring.
In the case when either the voltage or the frequency are out of admissible limits, PMVF81 must step in by de-energising a relay output so that the interface device (IS) trips.
PMVF81 is equipped with 5 inputs having the following functions:
– IS status feedback
– R.O.C.O.F./Vector shift delay
– disabling tripping
– remote tripping (forced IS opening independent of voltage and frequency values).
– programmable.
Also, there are 3 relay outputs for:
– IS opening and closing
– standby device opening (programmable: retentive normally energised, retentive normally de-energised or adjustable pulse)
– programmable (default: global alarm).
The backup device consists of a signal contemporary or delayed respect to the IS opening command, transmitted only if the IS failed and did not complete the disconnection.

Operational characteristics
– Auxiliary voltage: 24...240VAC/24...240VDC
– Voltage inputs: 100-500000VAC (with VT)
– Relays output:
OUT1: 8A 250VAC, 8A 30VDC
OUT2: 5A 250VAC, 5A 30VDC
OUT3: 2A 250VAC, 2A 30VDC
– The device can be password protected to prevent parameters from being altered
– 5 digital input
– Programmable voltage rating, voltage thresholds, frequency and delays
– Support of EXM series communication port (USB, RS232, RS485, Ethernet)
– Predisposed for IEC/EN/BS 61850 signal supervision using expansion EXM1018 or external module
– Expandable with up to 2 module EXM... by optical interface
– Event log (128 events with time reference):
• interface protection interventions
• action on password
• command execution
• system events
– Parameter configuration and remote control (only with communication expansion module) with software Synergy and Xpress
– Housing: modular (4 modules)
– Mounting on 35mm DIN rail or screw fixing
– Degree of protection: IP40 on front; IP20 on terminals.

Reference standards
Compliant standard VDE-AR-N 4105, VDE-AR-N 4110, VDE-AR-N 4120, IEC/EN 61010-1, IEC/EN 61000-6-2 and IEC/EN 61000-6-4.

Synergy: supervision and Energy management software with remote and configuration capabilities.

Xpress: free software for Energy management controlling one device only.
See section 36.

General characteristics for PMVFUPS02
See page 22-12.

PMVF...

new

Order code	Rated voltage Control	Auxiliary	Qty per pkg	Wt
	[V]	[V]	n°	[kg]
Dual threshold minimum and maximum voltage and frequency protection, R.O.C.O.F. and Vector shift. Modular type.				
Compliant with standards DEWA DRRG and SEC (Saudi Electricity Company).				
PMVF61	Programmable	24...240VAC/ 24...240VDC	1	0.326
Compliant with standards G98/G99.				
PMVF71	Programmable	24...240VAC/ 24...240VDC	1	0.326
For systems requiring 3 maximum voltage thresholds (E.g.: Czech Republic and Slovakia).				
PMVF90	Programmable	24...240VAC/ 24...240VDC	1	0.326

Voltage threshold

Protection type	PMVF61	PMVF71	PMVF90
Maximum voltage threshold 3			●
Maximum voltage threshold 2	●	●	●
Maximum voltage threshold 1	● (10 min. average)	●	●
Minimum voltage threshold 1	●	●	●
Minimum voltage threshold 2	●	●	●

Frequency threshold

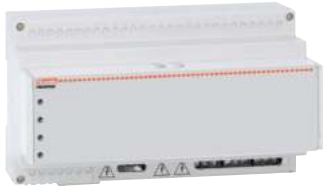
Protection type	PMVF61	PMVF71	PMVF90
Maximum frequency threshold 2	Optional set to OFF	●	●
Maximum frequency threshold 1	●	●	Optional set to OFF
Minimum frequency threshold 1	●	●	Optional set to OFF
Minimum frequency threshold 2	Optional set to OFF	●	●

EXM10...

Order code	Description
Communication ports.	
EXM1010	Opto-isolated USB interface
EXM1011	Opto-isolated RS232 interface
EXM1012	Opto-isolated RS485 interface
EXM1013	Opto-isolated Ethernet interface
EXM1018❶	IEC/EN/BS 61850 interface
Inputs and outputs.	
EXM1001	2 digital inputs, opto-isolated and 2 relay outputs, rated 5A 250VAC

❶ **IEC/EN/BS 61850 protocol**
The EXP1018 module will be made available only when the competent authorities have established the exact terms of the supervision and control of the specific commands (currently under study as specified in the Italian CEI 0-16 standard).

Backup power supply



PMVFUPS02

new

Order code	Description	Qty per pkg	Wt
		n°	[kg]
PMVFUPS02	Input 230VAC Output 230VAC with stored energy 800Ws and power 650VA	1	0.450

– **Compatible with contactors (IS or backup function) with standard AC or electronic coils.**
– **Compatible with undervoltage trip releases (IS or backup function) of moulded case circuit breakers.**

General characteristics
PMVF... interface protection system (IPS) units have been developed in order to be used when a local generating system is connected in parallel with the utility distribution grid. The controls refer to limits of voltage and frequency monitoring.
In the case when either the voltage or the frequency are out of admissible limits, the IPS must step in by de-energising a relay output so that the interface device (IS) trips.
PMVF... is equipped with 5 inputs having the following functions:
– IS status feedback
– R.O.C.O.F/Vector shift delay or external signal for frequency selection (communication network malfunction)
– Disabling signal
– Remote tripping (forced IS opening, independent of voltage and frequency values).
Also, there are 3 relay outputs for:
– IS opening and closing
– standby device opening (programmable: retentive normally energised, retentive normally de-energised or adjustable pulse)
– 3rd programmable input.
The backup device consists of a signal contemporary or delayed respect to the IS opening command, transmitted only if the IS failed and did not complete the disconnection.

Operational characteristics
– Auxiliary voltage: 24...240VAC/24...240VDC
– Voltage inputs: 100-500000VAC (with VT)
– Relays output:
OUT1: 8A 250VAC, 8A 30VDC
OUT2: 5A 250VAC, 5A 30VDC
OUT3: 2A 250VAC, 2A 30VDC
– The device can be password protected to prevent parameters from being altered
– 5 digital input
– Programmable voltage rating, voltage thresholds, frequency and delays
– Support of EXM series communication port (USB, RS232, RS485, Ethernet)
– Predisposed for IEC/EN/BS 61850 signal supervision using expansion EXM1018 or external module
– Expandable with up to 2 module EXM... by optical interface
– Event log (128 events with time reference):
• interface protection interventions
• action on password
• command execution
• system events
– Parameter configuration and remote control (only with communication expansion module) with software Synergy and Xpress
– Housing: modular (4 modules)
– Mounting on 35mm DIN rail or screw fixing
– Degree of protection: IP40 on front; IP20 on terminals.

Reference standards
Compliant with standards: DEWA DRRG (PMVF61); SEC (PMVF61); ENA G98/G99 (PMVF71); IEC/EN/BS 60255-27; IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-4.

Synergy: supervision and Energy management software with remote and configuration capabilities.

Xpress: free software for Energy management controlling one device only.
See section 36.

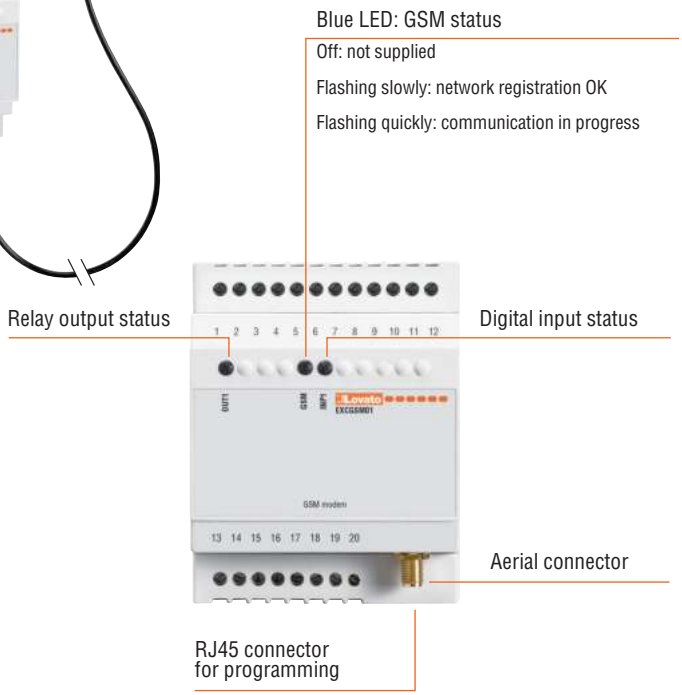
General characteristics for PMVFUPS02
See page 22-12.

Remote control and monitoring GSM modem via SMS

Compliant with Italian CEI 0-16 Standard, paragraph 8.8.6.5 and annex M, resolution 421/2014 of the ARERA

Order code	Description
GSM Modem (modular - 4U). IP69K outside aerial with 2.5m cable. RJ45-USB programming cable (included).	
EXCGSM01	100...240VAC, 1 digital input, 1 analogic input (0...10V, 0...20mA, NTC), 1 relay output

EXCGSM01



General characteristics
With EXCGSM01 it is possible to remotely operate a relay output and obtain information on the system by sending programmable SMS.
Using the configuration software (downloaded for free from www.LovatoElectric.com) the user can control the relay output and both the digital and analog inputs.
The logic is based on events (for example, the activation of the digital input or the arrival of an SMS with specific text), to which the user can decide specific actions (reply either by SMS or voice message, or by switching the relay output).

Use with CEI 0-16
The CEI 0-16 standard in paragraph 8.8.6.5 and in attachment M prescribes that the electricity production plants powered by wind or solar photovoltaic sources with power greater than or equal to 100kW, connected or to be connected to medium voltage grids, are equipped with GSM modem.
Thanks to this modem it is possible to manage the disconnection of the generation through the messages sent by the energy distributor.

Functional characteristics
- Connection to the GSM network for sending and receiving SMS messages
- Programmable message texts
- Command output piloted by SMS or internal logic, for example to send the remote disconnection command to the interface device CEI 0-16
- Programmable digital input, for example to detect the status of the Interface Switch (IS) and sending of successful IS opening and closing SMSs
- POD management (active user code)
- Management of the list of caller IDs (CLI) up to 5000 callers enabled
- Detection of mobile network coverage
- Full compatibility with medium-voltage PI LOVATO Electric PMVF30: no software/hardware updates or programming required
- **Compatibility with third-party PIs where the remote disconnection signal is transmitted via digital input (dry contact)**
  For additional information contact our Technical support Tel. + 39 035 4282422; E-mail: service@LovatoElectric.com.

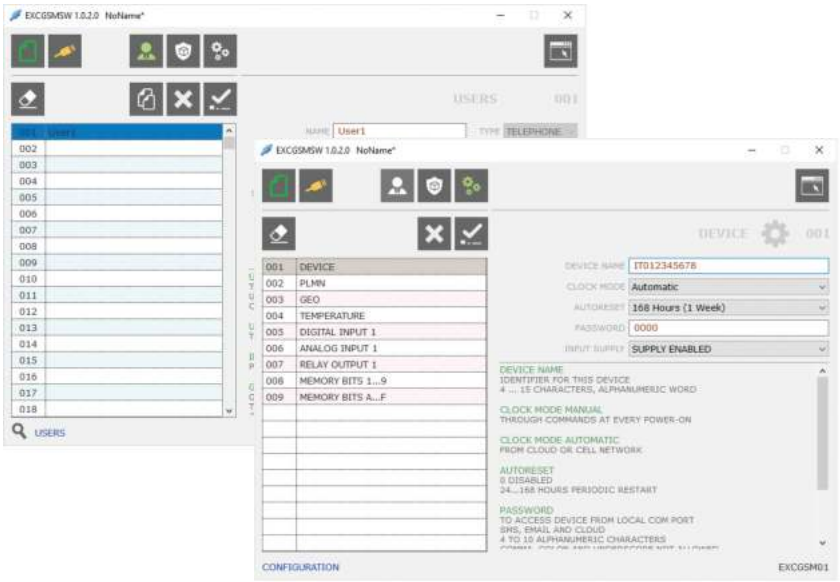
Operational characteristics
MODEM
- Supply: 100...240VAC
- Consumption: 5VAC
- 1 digital output 3A 250VAC
- 1 self-supplied digital input
- 1 analog input 0...10V, 0...20mA, NTC
- Housing for 3V and 1.8V SIM card
- SIM PIN management
- Temperature sensor
- Update time, sunrise and sunset via GSM network
- Position update via GSM
- Certified according to FCC rules, part 15B
- Housing: modular (4 modules)
- Mounting on 35mm DIN rail
- Operating temperature: -20...+60°C
- Protection rating: IP40 on front; IP20 on terminals.

AERIAL
- Quad band 850/900/1800/1900MHz
- Degree of protection: outside IP69K
- 2.5m cable
- Fixing via M10 hole:
  • with adhesive seal
  • with threaded pin and nut.

Compliance
Compliant with electrical safety standards: EN/BS 62368, EN/BS 62311.

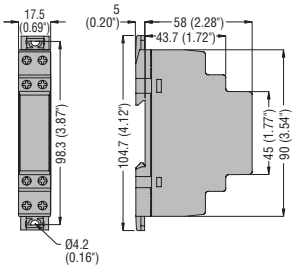
Software

To configure the EXCGSM01 modem (using the RJ45-USB programming cable included), the EXCGSMSW software must be used. This can be downloaded for free from the www.LovatoElectric.com website.
The software allows you to set:
– the users enabled to exchange messages with the modem
– the identifier of the modem, for example the active customer code (POD) in CEI 0-16 applications;
– the functions assigned to the digital output and input and to analog input;
– the texts of the SMS associated with the commands
– the logic of the actions taken following the SMS arrival, change of input status, alarm situations.
Configuration is also possible off-line, creating a file to transfer to the modem at another time.

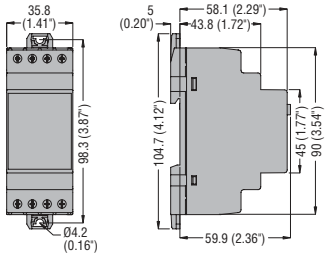


MONITORING RELAYS

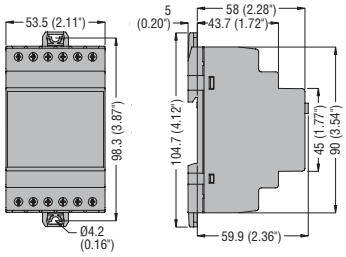
PMV10...



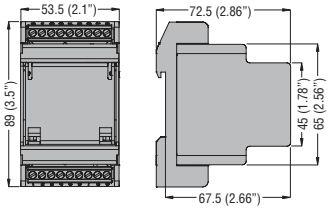
PMV20... - PMV95N... - PMF20
PMA20... - PMA30...



PMV50N... - PMV70N... - PMV80N... - PMA40...
PMA50...

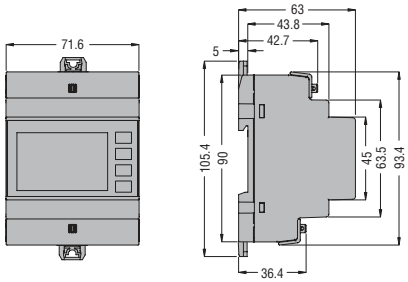


PMIB1A230



INTERFACE PROTECTION SYSTEM UNITS

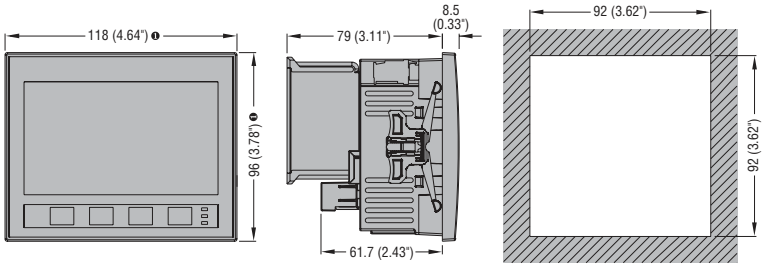
PMVF52 - PMVF61 - PMVF71 - PMVF81 - PMVF90



INTERFACE PROTECTION SYSTEM UNIT

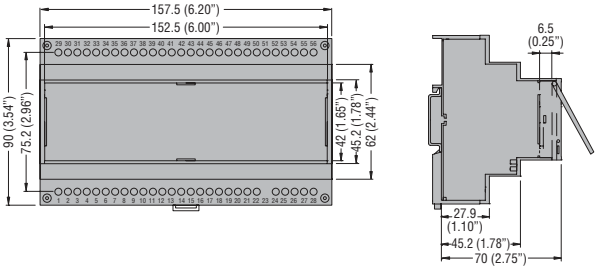
PMVF3000

Cutout



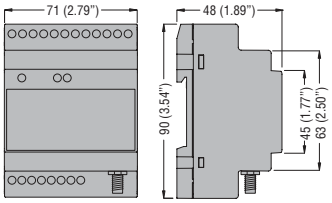
BACKUP POWER SUPPLY

PMVFUPS02

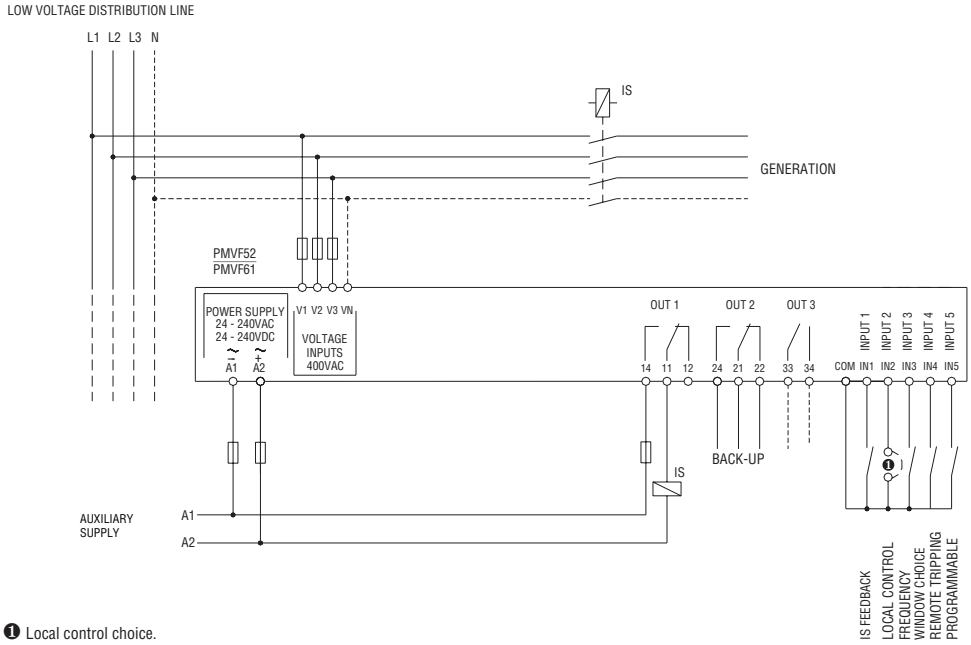


GSM MODEM FOR REMOTE DISCONNECTION SIGNAL

EXCGSM01

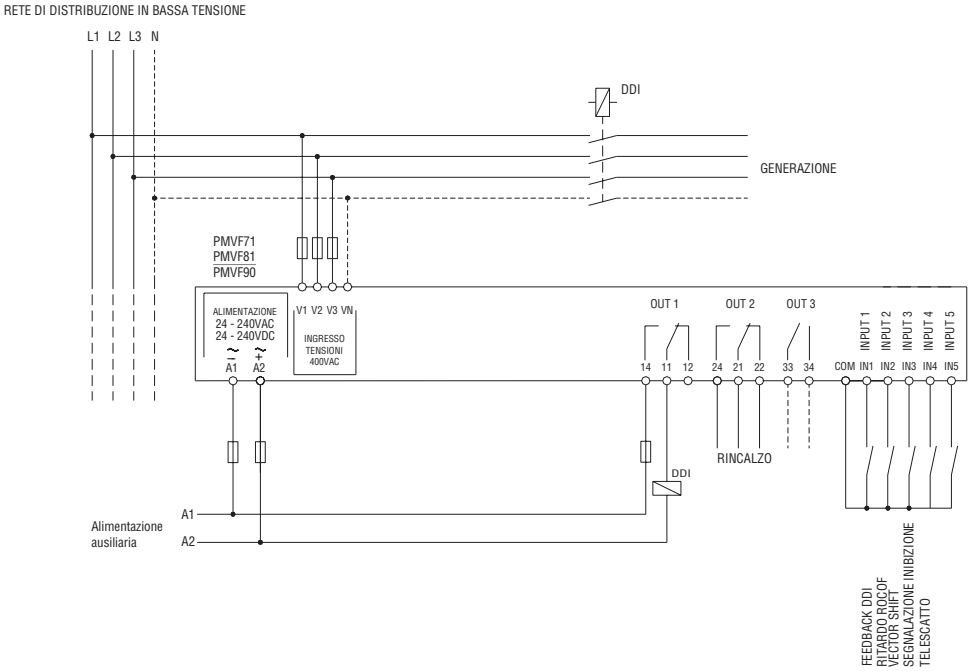


PMVF52 - PMVF61
Three-phase connection



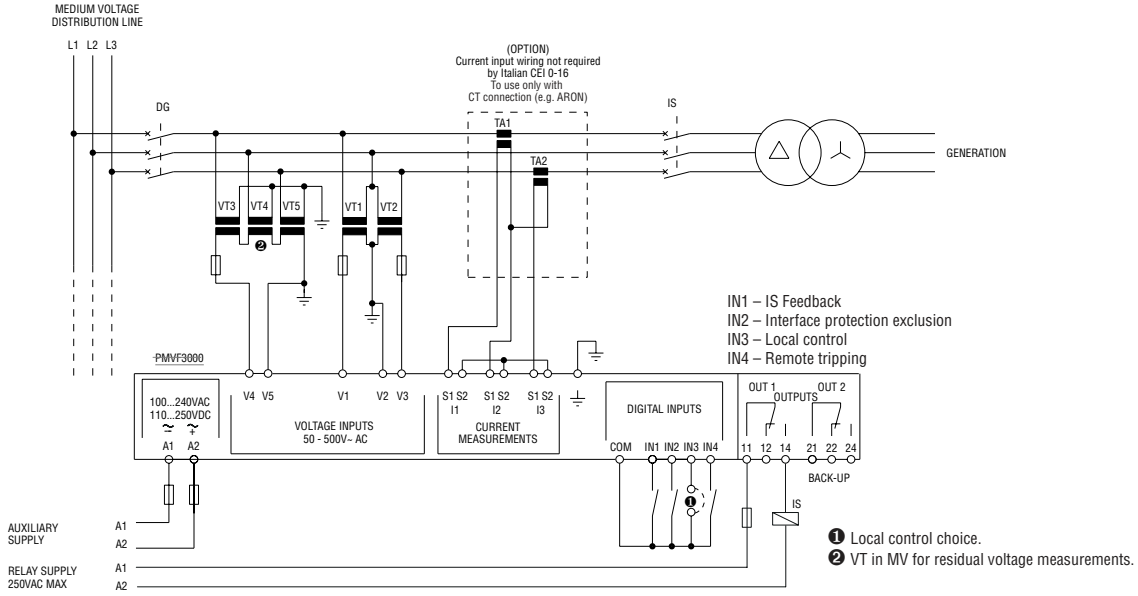
❶ Local control choice.

PMVF71 - PMVF81 - PMVF90
Three-phase connection



PMVF3000

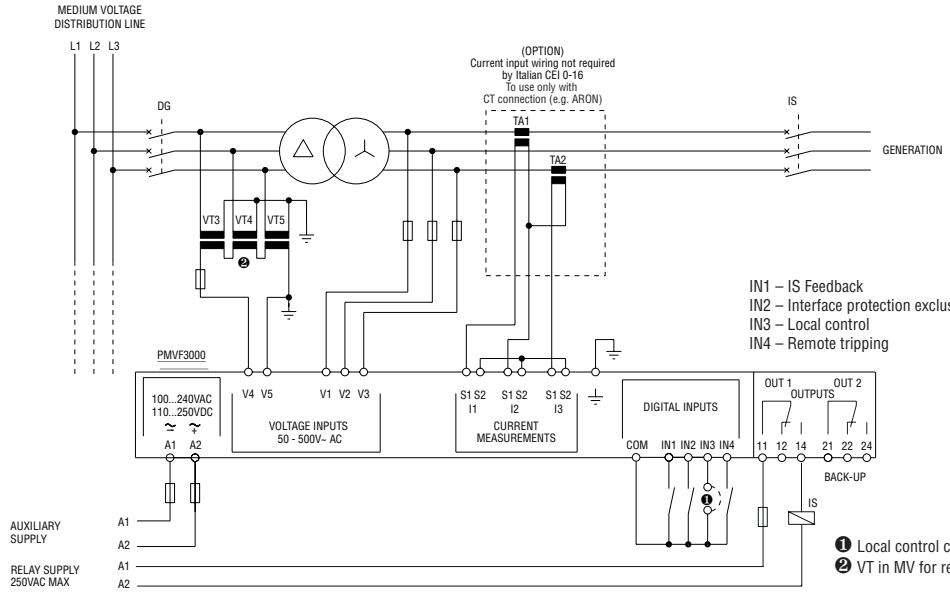
Connection through VTs in Medium Voltage
Three-phase connection



IN1 – IS Feedback
IN2 – Interface protection exclusion
IN3 – Local control
IN4 – Remote tripping

❶ Local control choice.
❷ VT in MV for residual voltage measurements.

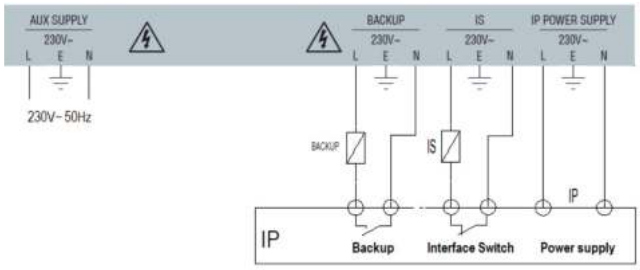
Direct connection in Low Voltage
Three-phase connection



IN1 – IS Feedback
IN2 – Interface protection exclusion
IN3 – Local control
IN4 – Remote tripping

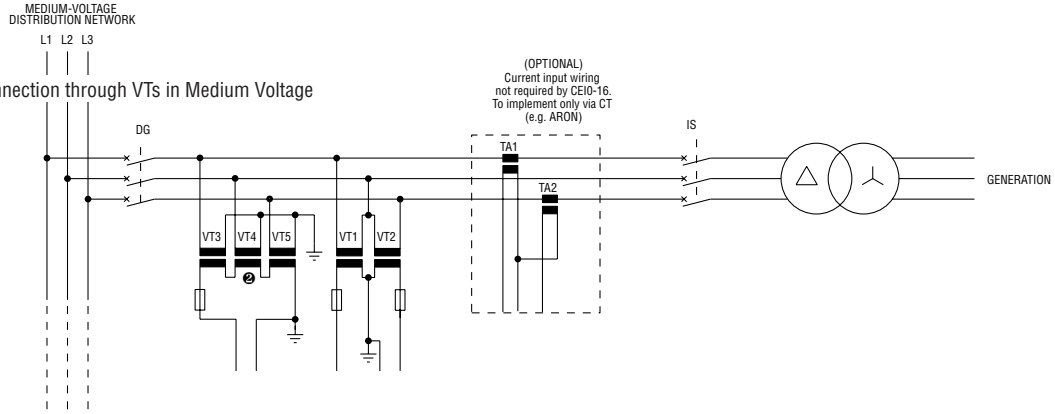
❶ Local control choice.
❷ VT in MV for residual voltage measurements.

PMVFUPS02

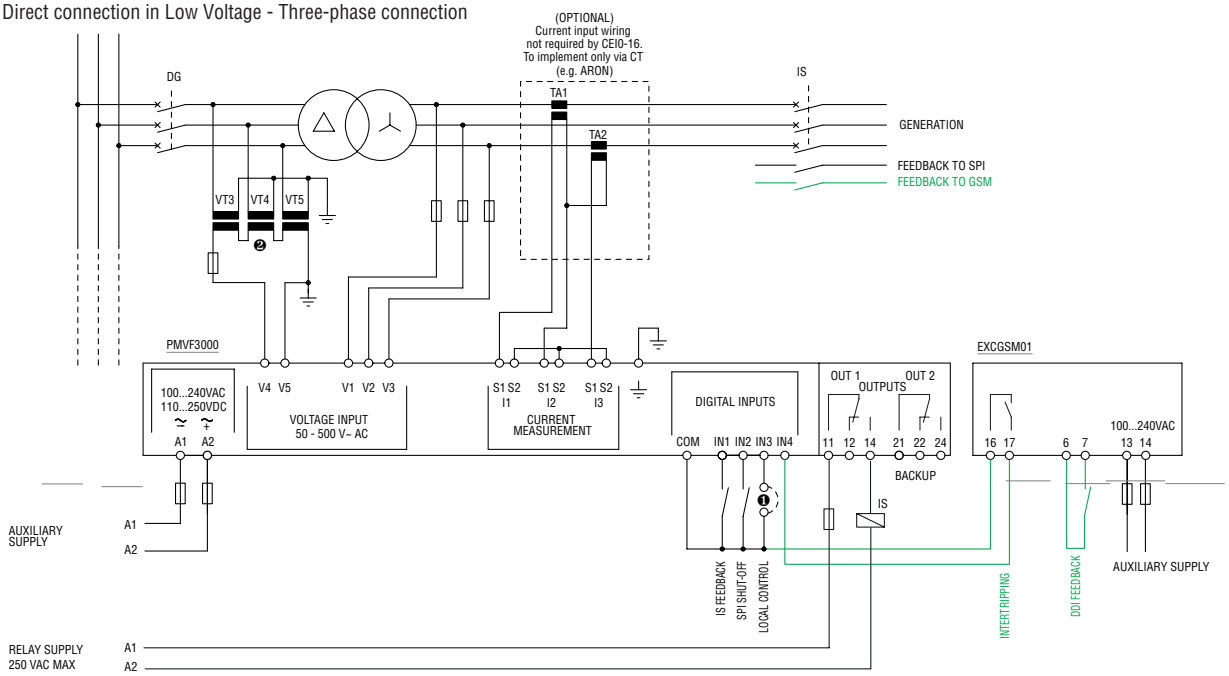


PMVF3000 with EXCGSM01

Connection through VTs in Medium Voltage



Direct connection in Low Voltage - Three-phase connection

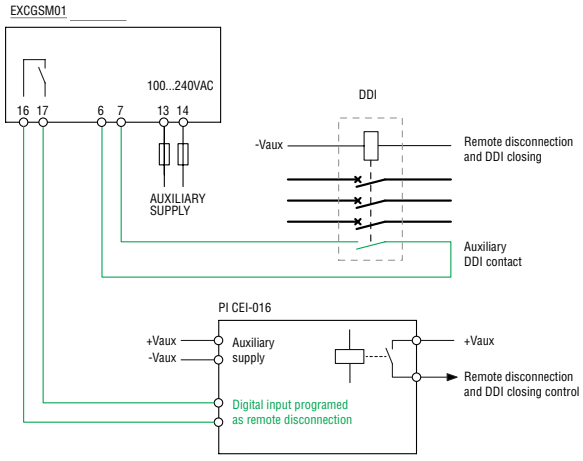


❶ Local control choice.
❷ VT in MV for residual voltage measurements.

The connections coloured in GREEN, in addition to the GSM Modem, represent the only wiring necessary for the adaptation.

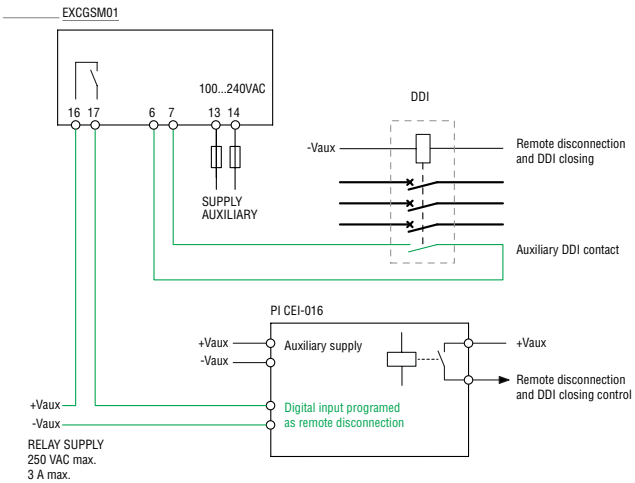
22

EXCGSM01 modem wiring diagram with other interface protections (PI) with self-supplied remote disconnection input



The connections coloured in GREEN, in addition to the GSM Modem, represent the only wiring necessary for the adaptation.

EXCGSM01 modem wiring diagram with other interface protections (PI) with remote disconnection input to be supplied



TYPE	Single phase	**PMV55**	—	—	—	—	
	Three phase	—	**PMV10**	**PMV20**	**PMV30**	**PMV40**	
	Three phase with/without neutral	—	—	—	—	—	
DESCRIPTION							
		Minimum and maximum AC voltage	Phase loss and incorrect phase sequence		Minimum AC voltage, phase loss and incorrect phase sequence	Asymmetry, phase loss and incorrect phase sequence	
CONTROL CIRCUIT							
Rated voltage to control (Ue)		110...127VAC	208...480VAC	100...240VAC	208...240VAC		
		208...240VAC		208...575VAC	380...575VAC		
		380...440VAC		380...600VAC	600VAC		
Maximum voltage set-point		105...115% Ue	—	—	—	—	
Minimum voltage set-point		80...95% Ue	—	—	80...95% Ue	—	
Asymmetry set-point		—	—	—	—	5...15% Ue	
Minimum and maximum frequency set-point		—	—	—	—	—	
Tripping time		0.1...20s	60ms		0.1...20s		
Resetting time		0.1...20s (0.5s at power up)	0.5s		0.1...20s (0.5s at power up)		
Resetting hysteresis		3%	5%		3%		
Instantaneous tripping for Ue		<70% Ue configured	Umin<70% Ue		<70% Ue configured	<70% Ue configured	
Repeat accuracy		< ±0.1%	< ±1%		< ±0.1%	< ±0.1%	
POWER SUPPLY							
Auxiliary voltage (Us)		Self powered					
Operating range		105...115% Ue	—	—	—	—	
Frequency		0.7...1.2Ue	0.85...1.1Ue		0.7...1.2Ue		
Power consumption (maximum)		10VA (208...240VAC)❶ 17VA (380...440VAC)❶	20VA❶	28VA❶	11VA (208...240VAC)❶ 30VA (380...575VAC)❶ 19VA (600VAC)❶		
Power dissipation (maximum)		1.5W	2.2W	2.5W			
RELAY OUTPUTS							
Number of relays		1					
Relay state		Normally energised De-energises at tripping					
Contact arrangement		1 changeover SPDT					
Rated operational voltage		250VAC					
Maximum switching voltage		400VAC					
Conventional free-air thermal current (Ith)		8A					
UL/CSA and IEC/EN/BS 60947-5-1 designation		B300					
Electrical life (with rated load)		10^5 cycles					
Mechanical life		$30x10^6$ cycles					
Indications		1 green LED for power on and tripping 2 red LEDs for tripping	1 green LED for power on and tripping		1 green LED for power on and tripping 1 red LED for tripping		
CONNECTIONS							
Terminal tightening torque (maximum)		0.8Nm (7lb.in; 7...9lb.in for UL/CSA)					
Conductor section min...max		0.2...4.0mm² (24...12AWG; 18...12AWG for UL/CSA)					
INSULATION (input-output)							
IEC rated insulation voltage Ui		440VAC	480VAC	600VAC			
IEC rated impulse withstand voltage Uimp		6kV					
IEC power frequency withstand voltage		4kV					
AMBIENT CONDITIONS							
Operating temperature		–20...+60°C					
Storage temperature		–30...+80°C					
HOUSING							
Material		Self-extinguishing polyamide					

❶ Power consumption (maximum) at 50Hz.

	—	—	—	—	—	—
	PMV50	**PMV70**	—	—	—	—
	—	—	**PMV50N**	**PMV70N**	**PMV80N**	**PMV95N**
	Minimum and maximum AC voltage, phase loss and incorrect phase sequence	Minimum and maximum AC voltage, phase loss incorrect phase sequence and asymmetry	Minimum and maximum AC voltage, phase loss neutral loss and incorrect phase sequence	Minimum and maximum AC voltage, phase loss neutral loss, incorrect phase sequence and asymmetry	Minimum and maximum AC voltage and frequency, phase loss, neutral loss and incorrect phase sequence	Minimum and maximum AC voltage and frequency, phase loss, neutral loss, incorrect phase sequence and asymmetry
	208...240VAC	208...240VAC	208...240VAC	208...240VAC	208...240VAC	208...240VAC
	380...575VAC	380...575VAC	380...440VAC	380...440VAC	380...440VAC	380...575VAC
	600VAC	600VAC	480...600VAC	480...600VAC	480...600VAC	—
	105...115% Ue	105...115% Ue	105...115% Ue	105...115% Ue	105...115% Ue	105...115% Ue
	80...95% Ue	80...95% Ue	80...95% Ue	80...95% Ue	80...95% Ue	80...95% Ue
	—	5...15% Ue	—	5...15% Ue	—	5...15% Ue
	—	—	—	—	±1...10% rated frequency	±1...10% rated frequency
	0.1...20s				0.1...20s / 0.1...5s freq.	0.1...30s
	0.1...20s (0.5s at power up)	0.5s	0.1...20s (0.5s at power up)	0.5s	0.5s	0.1...30s (0.5s at power up)
	3%	3%	3%	3%	3% / 0.5% freq.	1...5%
	<70% Ue configured					
	< ±0.1%					
	Self powered					
	0.7...1.2Ue					
	50/60Hz ±5%		50/60Hz ±10%			
	11VA (208...240VAC)❶ 30VA (380...575VAC)❶ 19VA (600VAC)❶		27VA			30VA
	2.5W		1.9W			2.5W
	1		2			1
	Normally energised De-energises at tripping					
	1 changeover SPDT		2 changeover SPDT			1 changeover SPDT
	250VAC					
	400VAC					
	8A					
	B300					
	10^5 cycles					
	$30x10^6$ cycles					
	1 green LED for power on and tripping 2 red LEDs for tripping	1 green LED for power on and tripping 3 red LEDs for tripping	1 green LED for power on and tripping 2 red LEDs for tripping	1 green LED for power on and tripping 3 red LEDs for tripping		1 green LED for power 5 red LEDs for tripping
	0.8Nm (7lb.in; 7...9lb.in for UL/CSA - PMV50N/70N/80N excluded)					
	0.2...4.0mm² (24...12AWG; 18...12AWG for UL/CSA - PMV50N/70N/80N excluded)					
	600VAC					
	6kV					
	4kV					
	–20...+60°C					
	–30...+80°C					
	Self-extinguishing polyamide					

TYPE		PMF20
DESCRIPTION		Single-phase minimum and maximum frequency control
FREQUENCY CONTROL CIRCUIT		
Rated frequency		50 or 60Hz selectable
Operating frequency range		40...70Hz
Adjustment	MAX tripping	101...110% operating frequency
	MIN tripping	90...99% operating frequency
	Resetting hysteresis	0.5%
	Inhibition time	0.1...20s
	Reset delay	0.1...20s
Resetting		Automatic
Repeat accuracy		< ±0.1%
AUXILIARY POWER SUPPLY		
Rated supply voltage Ue		220...240VAC
		380...415VAC
Operating range		0.85...1.1Ue
Rated frequency		50/60Hz
Power consumption (maximum)		10VA (220...240VAC); 17VA (380...415VAC)
Power dissipation (maximum)		1.5W
RELAY OUTPUTS		
Number of relays		1
Relay state		Normally energised, de-energises at tripping❶
Contact arrangement		1 changeover contact SPDT
Rated operational voltage		250VAC
Maximum switching voltage		400VAC
IEC conventional free air thermal current Ith		8A
UL/CSA and IEC/EN/BS 60947-5-1 designation		B300
Electrical life (with rated load)		10^5 cycles
Mechanical life		$30x10^6$ cycles
Indications		1 green LED for power on/tripping 2 red LEDs for min-max tripping
CONNECTIONS		
Tightening torque maximum		0.8Nm (7lb.in)
Conductor section min-max		0.2...4.0mm² (24...12AWG)
INSULATION (input - output)		
IEC rated insulation voltage Ui		575VAC
IEC rated impulse withstand voltage Uimp		6kV
IEC power frequency withstand voltage		4kV
AMBIENT CONDITIONS		
Operating temperature		–20...+60°C
Storage temperature		–30...+80°C
HOUSING		
Material		Self-extinguishing polyamide

❶ Normally de-energised, energises at tripping with $\overline{\text{MAX}}$ function configured.

TYPE		PMA20	PMA30	PMA40	PMA50
DESCRIPTION					
		Single-phase maximum current monitoring AC/DC multiscale	Single-phase minimum or maximum current monitoring AC/DC multiscale	Single-phase minimum or maximum current monitoring AC/DC multiscale	Single and three-phase pump protection (motor under-load and over-current control) monitoring for max AC current, min cosφ, phase loss and incorrect phase sequence
CONTROL CIRCUIT					
Rated current		5 or 16A		0.02 - 0.05 - 0.25 - 1 - 5 - 16A	5 or 16A
Rated frequency		50/60Hz ±5%			
Overload capacity		5 Ie for 1s 160A for 10ms Constant 16A		50mA - 1A inputs: 5 Ie for 1s 10Ie for 10ms Constant 2Ie	16A input: 5 Ie for 1s 160A for 10ms Constant 16A	5Ie for 1s 160A for 10ms Constant 16A
Connection		Direct or by current transformer			
Current monitoring relays adjustments	Tripping values	5...100% f.s.			—
	Tripping time	0.1...30s			—
	Inhibition time	1...60s			—
	Resetting hysteresis	1...50%		3% fixed	—
Pump protection relays adjustments	End-scale value	—			5 or 16A
	Tripping for MAX current	—			10...100Ie
	Tripping for cosφ	—			0.1...0.99 cosφ (Min)
	Tripping delay	—			0.1...10s
	Inhibition time	—			1...60s
	Automatic resetting delay	—			OFF...100min
Resetting		Automatic or manual			—
External input		Resetting or inhibition		—	Consent for running/resetting
Repeat accuracy		±1% with constant parameters			
VOLTAGE CONTROL CIRCUIT					
Voltage measuring range (Ue)		—			80...660VAC
Tripping time for phase loss		—			60ms
AUXILIARY SUPPLY					
Auxiliary supply voltage Us		24...240VAC/DC			220...240VAC
					380...415VAC
					440...480VAC
Operating range		0.85...1.1Us			
Rated frequency		50/60Hz ±5%			
Power consumption (maximum)		3.2VA		7VA	4.5VA
Power dissipation (maximum)		1.6W		1.7W	2.3W
RELAY OUTPUTS					
Number of relays		1		2	1
Relay state		Normally energised / de-energised (selectable)			Normally energised, de-energises at tripping
Contact arrangement		1 changeover contact SPDT each			
Rated operational voltage		250VAC			
Maximum switching voltage		400VAC			
IEC conventional free air thermal current Ith		8A			
UL/CSA and IEC/EN/BS 60947-5-1 designation		B300			
Electrical life (with rated load)		10^5 cycles			
Mechanical life		30x10^6 cycles			
Indications		1 green LED for power on/inhibition 1 red LED for tripping		1 green LED for power on/inhibition 2 red LEDs for max/min tripping	
CONNECTIONS					
Tightening torque maximum		0.8Nm (7lb.in; 7...9lb.in per UL/CSA)			
Conductor section min...max		0.2...4.0mm² (24...12AWG; 18...12AWG per UL/CSA)			
INSULATION (input-output)					
IEC rated insulation voltage Ui		415VAC			600VAC
IEC rated impulse withstand voltage Uimp		4kV			6kV
IEC power frequency withstand voltage		2.5kV			
AMBIENT CONDITIONS					
Operating temperature		–20...+60°C			
Storage temperature		–30...+80°C			
HOUSING					
Material		Self-extinguishing polyamide			

TYPE	**PMIB1A230**
DESCRIPTION	
	Insulation monitoring relay
VOLTAGE CONTROL CIRCUIT	
Voltage measuring range	207...253VAC
Adjustable intervention threshold	25...100kOhm
AUXILIARY SUPPLY	
Auxiliary supply voltage Us	220...240VAC
Operating range	0.85...1.1Us
Rated frequency	50/60Hz ±5%
Power consumption (maximum)	3VA
Power dissipation (maximum)	1.5W
RELAY OUTPUTS	
Number of relays	1
Relay state	Normally energised, de-energises at tripping
Contact arrangement	1 changeover contact SPDT each
Rated operational voltage	250VAC
Maximum switching voltage	250VAC
IEC conventional free air thermal current Ith	5A
Electrical life (with rated load)	$3x10^5$ cycles
Mechanical life	$50x10^6$ cycles
Indications	1 green LED for power on/inhibition 1 red LED for tripping
CONNECTIONS	
Tightening torque maximum	0.5Nm (4.5lb.in)
Conductor section min...max	0.2...2.5mm^2 (24...12AWG)
INSULATION (input-output)	
IEC rated insulation voltage Ui	600VAC
IEC rated impulse withstand voltage Uimp	4kV
IEC power frequency withstand voltage	2.5kV
AMBIENT CONDITIONS	
Operating temperature	–10...+60°C
Storage temperature	–20...+70°C
HOUSING	
Material	Self-extinguishing polycarbonate

TYPE	PMVF52	PMVF61 - PMVF71 - PMVF81 - PMVF90	PMVF3000
AUXILIARY POWER SUPPLY			
Rated control supply voltage Us	24...240VAC / 24...240VDC	24...240VAC / 24...240VDC	100...240VAC / 110...250VDC
Operating limits	22...264VAC / 22...264VDC	22...264VAC / 22...264VDC	90...264VAC / 93.5...300VDC
Frequency	45...55Hz	45...55Hz	45...55Hz
Power consumption max	6.2VA	6.2VA	15VA
Power dissipation max	2W	2W	6W
Micro-breaking immunity	240VAC 50Hz ≤2000ms 240VDC ≤1000ms 24VAC 50Hz ≤30ms 24VDC ≤15ms	240VAC 50Hz ≤2000ms 240VDC ≤1000ms 24VAC 50Hz ≤30ms 24VDC ≤15ms	≤50ms
Overload category	III	III	III
VOLTAGE INPUTS			
Rated operating voltage	400VAC L-L; 230VAC L-N 50Hz	400VAC L-L; 230VAC L-N 50Hz	50...500VAC (for voltages/frequency) / 50...150V (for residual voltage measurement)
Measuring range	40...480VAC L-L; 23...277VAC L-N	without VT: 10...520VAC L-L; 5...300VAC L-N with VT: 100...500000VAC L-L; 57...290000VAC L-N	400-150,000V (VT primary)
Frequency range	45...55Hz	45...55Hz - 45...66 (for PMVF61)	45...55Hz
Overload category	IV	IV	IV
CURRENT INPUTS (OPTIONAL)			
Rated operational current Ie	–	–	1A or 5A in AC programmable
Measuring range	–	–	For 1A scale: 0.01...1.2A; for 5A scale: 0.01...6A
Type of input	–	–	Shunts powered by external current transformer (low voltage) 5A max.
Type of measurement	–	–	RMS
Overload capacity	–	–	±100% Ie
Overload peak	–	–	50A for 1 second
RELAY OUTPUTS			
Number of outputs	3❶	3❶	2
Type of output	2 changeover contact and 1 output NO	2 changeover contact and 1 output NO	1 changeover contact/SPDT each
Rated operating voltage	250VAC	250VAC	250VAC
IEC/EN/BS 60947-5-1 designation	OUT1: 8A 250VAC, 8A 30VDC OUT2: 5A 250VAC, 5A 30VDC OUT3: 2A 250VAC, 2A 30VDC	OUT1: 8A 250VAC, 8A 30VDC OUT2: 5A 250VAC, 5A 30VDC OUT3: 2A 250VAC, 2A 30VDC	5A 250VAC AC1 / B300, 5A 30VDC
Overload category	III	III	III
DIGITAL INPUTS			
Number and type of inputs	4 positive (PNP)	4 positive (PNP)	4 negative (NPN)
Input voltage	5VDC output from the common	5VDC output from the common	24VDC isolated
Input current	6mA	6mA	7mA
SUPPLY/VOLTAGE MEASURING CIRCUIT CONNECTIONS			
Type of terminal	Screw - fixed	Screw - fixed	Screw - fixed
Number of terminals	–	–	2 for power supply; 5 for voltage control
Conductor section (min...max)	0.2...4mm² (24...12AWG)	0.2...4mm² (24...12AWG)	0.2...4.0mm² (24...12AWG)
Tightening torque	0.8Nm (7lb.in)	0.8Nm (7lb.in)	0.8Nm (7lb.in)
CURRENT MEASURING CIRCUIT CONNECTIONS			
Type of terminal	–	–	Screw - fixed
Number of terminals	–	–	6 for external CT connections
Conductor section (min...max)	–	–	0.2...4mm² (24...12AWG)
Tightening torque	–	–	0.44Nm (4lb.in)
RELAY OUTPUT CONNECTIONS			
Type of terminals	Screw - fixed	Screw - fixed	Screw - removable
Conductor section (min...max)	0.2...2.5mm² (24...12AWG)	0.2...2.5mm² (24...12AWG)	0.2...2.5mm² (24...12AWG)
Tightening torque	0.44Nm (4lb.in)	0.44Nm (4lb.in)	0.5Nm (4.5lb.in)
INPUT CONNECTIONS – Input terminals			
Type of terminals	Screw - fixed	Screw - fixed	Screw - removable
Conductor section (min...max)	0.2...2.5mm² (24...12AWG)	0.2...2.5mm² (24...12AWG)	0.2...1.5mm² (28...14AWG)
Tightening torque	0.44Nm (4lb.in)	0.44Nm (4lb.in)	0.18Nm (1.7lb.in)
INPUT CONNECTIONS – COM and auxiliary voltage terminals			
Type and (number) of terminals	Screw - fixed	Screw - fixed	Screw - removable
Conductor section (min...max)	0.2...2.5mm² (24...12AWG)	0.2...2.5mm² (24...12AWG)	0.2...2.5mm² (24...12AWG)
Tightening torque	0.44Nm (4lb.in)	0.44Nm (4lb.in)	0.5Nm (4.5lb.in)
HOUSING			
Material	Polyamide	Polyamide	Polyamide
Version	Modular 4U	Modular 4U	Flush

❶ Single insulation between the two outputs. Both outputs must use the same voltage group.

Level controls and float switches

- Level monitoring relays for electrically conductive liquids
- Modular and plug-in versions
- Adjustable 2.5...200kΩ sensitivity
- Single and three-pole probes
- Float switches
- Start-up priority change relays.

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Level monitoring relays	
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LEVEL CONTROL RELAYS
- For conductive liquids
- Single, dual or multivoltage
- Emptying or filling functions
- Multifunctions
- Automatic reset
- Modular and plug-in versions.

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PROBES, ELECTRODES AND ELECTRODE HOLDERS
- Single pole
- Three pole.

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FLOAT SWITCHES
- Versions for grey water, drinking water and dirty water
- Versions with PVC and Neoprene cable
- Emptying or filling functions.

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START-UP PRIORITY CHANGE RELAYS
- Versions for 2, 3 or 4 motors
- Single or multivoltage
- Modular and plug-in versions.

Lovato electric

Description	LEVEL CONTROL RELAYS						START-UP PRIORITY CHANGE RELAYS			
	LVM20	LVM25	LVM30	LVM40	LV1E	LV2E	LVMP05	LVMP10	CSP2E	LVMP30
Modular version	●(2U)	●(1U)	●(3U)	●(3U)			●(1U)	●(3U)		●(4U)
Plug-in version					● (8 pin)	● (11 pin)			● (11 pin)	
3 detecting electrodes (MIN, MAX and COM)	●	●	●		●	●				
5 detecting electrodes (MIN1, MAX1, MIN2, MAX2 and COM)				●						
Sensitivity adjustment 2.5...50kΩ	●		●							
Sensitivity adjustment 2.5...100kΩ		●								
Sensitivity adjustment 2.5...200kΩ				●						
Fixed sensitivity: 7...8kΩ					●	●				
Adjustable sensitivity full-scale value 25-50-100-200 kΩ				●						
Separate sensitivity adjustment for MAX probe (foam detection)				●						
Emptying function	●	●	●	●	●	●				
Filling function		●	●	●						
Emptying function with MIN and/or MAX alarm				●						
Filling function with MIN and/or MAX alarm				●						
Emptying function with pump priority change				●						
Filling function with pump priority change				●						
Tank filling, well drawing functions and alarm				●						
Filling-emptying adjustment selector		●	●							
Programming selector for 5 different functions				●						
Start-up priority change for 2 motors							●			
Start-up priority change for 2 motors. Possible starting of stand-by motor								●	●	
Start-up priority change for 3 or 4 motors										●
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Some permitted liquid substances				Liquid substances not permitted
Type of liquid	**Resistivity kΩcm**	**Type of liquid**	**Resistivity kΩcm**	
Drinking water	5...10	Milk	~1	• Purified water • Deionised water • Petrol • Oil • Liquid gases • Paraffin • Ethylene glycol • Paints • Liquids with a high percentage of alcohol
Well water	2...5	Whey	~1	
River water	2...15	Fruit juices	~1	
Rainwater	15...25	Vegetable juices	~1	
Sludge	0.5...2	Soups	~1	
Seawater	~0.03	Wine	~2.2	
Salt water	~2.2	Beer	~2.2	
Natural/hard water	~5	Coffee	~2.2	
Chlorinated water	~5	Suds	~18	
Condensed water	~18			

N.B. The resistivity values in the table are purely indicative.

Single-voltage relay

LVM20...

LVMKIT20A...

Order code	Auxiliary supply voltage	Type of output contact	Qty per pack	Wt
	[V] 50/60Hz	⅂'	n°	[kg]
Emptying function. Automatic reset.				
LVM20A024	24VAC	1 C/O (SPDT)	1	0.215
LVM20A127	110...127VAC	1 C/O (SPDT)	1	0.215
LVM20A240	220...240VAC	1 C/O (SPDT)	1	0.215
LVM20A415	380...415VAC	1 C/O (SPDT)	1	0.215

Order code	Description	Qty per pack	Wt
		n°	[kg]
Level control relay LVM20 and 11SN1 electrodes kit.			
new **LVMKIT20A024**	Level control relay LVM20A024 and two 11SN1 probes	1	0.340
LVMKIT20A240	Level control relay LVM20A240 and two 11SN1 probes	1	0.340

Operational characteristics
- Used with 3 sensing electrodes, MIN, MAX and COM
- 2.5...50kΩ adjustable sensitivity
- Double insulation between each supply, electrodes and output relay circuits
- Fixed probe signal delay: <1s
- Green LED indicator for power on
- Red LED indicator for output relay state
- Modular DIN 43880 housing (2 modules)
- IEC degree of protection: IP40 on front (only when mounted in housing or electric board with IP40); IP20 on terminals.

Certifications and compliance
Certifications obtained: UL Listed, EAC, for USA and Canada (cULus-File E93601), as Auxiliary Devices - Level control relays.
Compliant with standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL508, CSA C22.2 no. 14.

Probes and electrode holders
Use probes and electrode holders type: 11SN1/31PS31/31PS3S/31SCM/31CGL or similar (see page 23-6).

Multi-voltage relay

LVM25240

LVMKIT25

Order code	Auxiliary supply voltage	Type of output contact	Qty per pack	Wt
	[V] 50/60Hz	⅂'	n°	[kg]
Emptying or filling functions. Automatic reset.				
LVM25240	24...240VAC/DC	1 C/O (SPDT)	1	0.095

Order code	Description	Qty per pack	Wt
		n°	[kg]
Level control relay LVM25240 and 11SN1 electrodes kit.			
LVMKIT25	Level control relay LVM25240 and two 11SN1 probes	1	0.192

Operational characteristics
- Used with 3 sensing electrodes, MIN, MAX and COM
- 2.5...100kΩ adjustable sensitivity
- Insensitivity to stray electrode-cable capacitance
- Programming selector for emptying or filling function with fail-safe operation
- Double insulation between each supply, electrodes and output relay circuits
- Fixed probe signal delay: <1s
- Green LED indicator for power on
- Red LED indicator for output relay state
- Modular DIN 43880 housing (1 module)
- IEC degree of protection: IP40 on front (only when mounted in housing or electric board with IP40); IP20 on terminals.

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus-File E93601), as Auxiliary Devices - Level control relays, EAC.
Compliant with standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-4, UL508, CSA C22.2 n° 14.

Probes and electrode holders
Use probes and electrode holders type: 11SN1/31PS31/31PS3S/31SCM/31CGL or similar (see page 23-6).

Dual-voltage relay

LVM30...

Order code	Auxiliary supply voltage	Type of output contact	Qty per pack	Wt
	[V] 50/60Hz	⅂'	n°	[kg]
Emptying or filling functions. Automatic reset.				
LVM30A240	24/220...240VAC	2 C/O (SPDT)	1	0.315
LVM30A415	110...127VAC 380...415VAC	2 C/O (SPDT)	1	0.315

Operational characteristics
- Used with 3 sensing electrodes, MIN, MAX and COM
- 2.5...50kΩ adjustable sensitivity
- Programming selector for emptying or filling function with fail-safe operation
- Double insulation between each supply, electrodes and output relay circuits
- Adjustable probe signal delay: 1...10s or pump start delay: 0...300s
- Green LED indicator for power on
- Red LED indicator for output relay state
- Modular DIN 43880 housing (3 modules)
- IEC degree of protection: IP40 on front (only when mounted in housing or electric board with IP40); IP20 on terminals.

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus-File E93601), as Auxiliary Devices - Level control relays, EAC.
Compliant with standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL508, CSA C22.2 n° 14.

Probes and electrode holders
Use probes and electrode holders type: 11SN1/31PS31/31PS3S/31SCM/31CGL or similar (see page 23-6).

Single-voltage multifunction relay

LVM40...

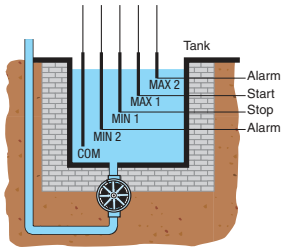
Order code	Auxiliary supply voltage	Type of output contact	Qty per pack	Wt
	[V] 50/60Hz	❶	n°	[kg]
Multifunction. Automatic reset.				
LVM40A024	24VAC	1+1NO	1	0.278
LVM40A127	110...127VAC	1+1NO	1	0.278
LVM40A240	220...240VAC	1+1NO	1	0.278
LVM40A415	380...415VAC	1+1NO	1	0.278

❶ Two relay outputs; one with C/O (SPDT) and one with N/O (SPST).

FUNCTIONS

A- Emptying with MIN and/or MAX alarms.

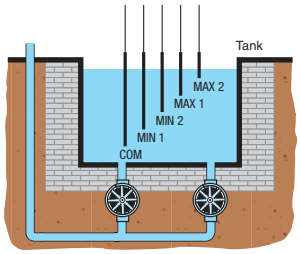
B- Filling with MIN and/or MAX alarms.



EXAMPLE OF EMPTYING OPERATION
To achieve this type of operation, two electrodes are used to control the liquid between the fixed limits using MIN1 and MAX1 and two alarm levels using MIN2 and MAX2. When one of the alarm electrodes is wet, the alarm relay is de-energised.
The alarm can be caused by pump malfunction, insufficient pump delivery capacity, MAX control level failure or MIN level electrode shorted.
With a proper connection, only the MIN alarm or MAX alarm can be activated or neither of the two can be activated so the relative output contacts can be used for pump control.

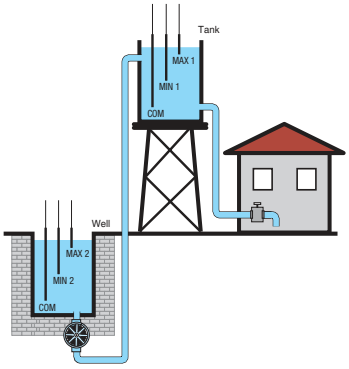
C- Emptying with pump priority change.

D- Filling with pump priority change.



EXAMPLE OF EMPTYING OPERATION
This operation is obtained by using four electrodes positioned at four different levels and two relay outputs to control two pumps. For example, one can place the four electrodes, MIN1, MIN2, MAX1 and MAX2, in increasing order from the lowest to the highest levels and must control the tank emptying. Usually the level is controlled between the MIN1 and MAX1 levels by starting one of the two pumps. This case is different so the pumps can be maintained at the best efficiency and optimise their wear.
When the liquid wets the MAX2 level and because the first pump is faulty or else a higher delivery capacity is needed, the second stand-by pump is activated to back up the first pump. When the liquid lowers and no longer wets the MIN2 level, the second pump is stopped and then when the MIN1 level is no longer wet, the first pump is stopped too.

E- Tank filling and well drawing with alarm.



EXAMPLE
Two electrodes are used in this operation to control the tank level and another two for the well. One relay is used to activate the pump while the other for dry running / no water alarm.
When the well liquid wets the MAX2 level and the liquid wets the MIN1 tank level, the tank-filling pump is activated.
When the tank MAX1 level is wet, the pump is stopped.
During the tank filling, the pump could stop before the MAX1 level is wet because the well MIN2 level is no longer wet.
Should the tank MIN1 level no longer be wet at which the pump should restart but the well MIN2 level is also no longer wet, then the alarm relay is de-energised.

Operational characteristics
- Use with 5 sensing electrodes, MIN1, MAX1, MIN2, MAX2 and COM
- 2.5...200kΩ adjustable sensitivity
- Adjustable sensitivity full-scale value: 25-50-100-200kΩ
- Separate sensitivity adjustment of MAX electrodes for foam detection
- Insensitivity to stray electrode-cable capacitance
- Programming selector for 5 different functions:
  - Emptying function and alarms (pos. A)
  - Filling function and alarms (pos. B)
  - Emptying function with pump priority start-up change (pos. C)
  - Filling function with pump priority start-up change (pos. D)
  - Well draining and tank filling and alarms (pos. E)
- Double insulation between each supply, electrodes and output relay circuits
- Adjustable probe signal delay: 1...10s
- Adjustable pump start delay: 0...30min
- Green LED indicator for power on
- Red LED indicators for output relay and electrode state
- Modular DIN 43880 housing (3 modules)
- IEC degree of protection: IP40 on front (only when mounted in housing or electric board with IP40); IP20 on terminals.

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus-File E93601), as Auxiliary Devices - Level control relays, EAC.
Compliant with standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL508, CSA C22.2 n° 14.

Probes and electrode holders
Use probes and electrode holders type: 11SN1/31PS31/31PS3S/31SCM/31CGL or similar (see page 23-6).

Single-voltage relay

31LV1E...

Order code	Auxiliary supply voltage	Type of output contact	Qty per pack	Wt
	[V] 50/60Hz		n°	[kg]
Emptying function. Automatic reset.				
31LV1E24	24VAC	1 C/O (SPDT)	1	0.263
31LV1E110	110...120VAC	1 C/O (SPDT)	1	0.263
31LV1E230	220...240VAC	1 C/O (SPDT)	1	0.263
31LV1E400	380...415VAC	1 C/O (SPDT)	1	0.263

Operational characteristics
- Used with 3 sensing electrodes, MIN, MAX and COM
- 7...8kΩ fixed sensitivity
- Red LED indicator for output relay state
- Max. relay-electrode cable length: 500m/547yd single-core, double insulated cables
- Mounting on 35mm/1.38" (IEC/EN/BS 60715) DIN rail or 8-pin plug-in housing
- 8-pin plug-in housing (socket 31S8, see page 23-6)
- IEC degree of protection: IP30.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60255-27.

Probes and electrode holders
Use probes and electrode holders type:
11SN1/31PS31/31PS3S/31SCM/31CGL or similar (see page 23-6).

Dual-voltage relay

31LV2E...

Order code	Auxiliary supply voltage	Type of output contact	Qty per pack	Wt
	[V] 50/60Hz		n°	[kg]
Emptying function. Automatic reset.				
31LV2E48	24/48VAC	1 C/O (SPDT)	1	0.266
31LV2E220	110...120VAC/ 220...240VAC	1 C/O (SPDT)	1	0.266
31LV2E400	220...240VAC/ 380...415VAC	1 C/O (SPDT)	1	0.266

Operational characteristics
- Used with 3 sensing electrodes, MIN, MAX and COM
- 7...8kΩ fixed sensitivity
- Red LED indicator for output relay state
- Max. relay-electrode cable length: 500m/547yd single-core, double insulated cables
- Mounting on 35mm/1.38" (IEC/EN/BS 60715) DIN rail or 11-pin plug-in housing
- 11-pin plug-in housing (socket 31S11, see page 23-6)
- IEC degree of protection: IP30.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60255-27.

Probes and electrode holders
Use probes and electrode holders type:
11SN1/31PS31/31PS3S/31SCM/31CGL or similar (see page 23-6).

Probes and electrode holders

11SN1

31SCM...

31CGL125...

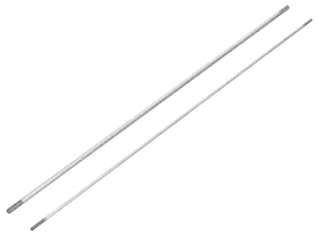
31PS31

31PS3S

Order code	Probe included	Probe length	Qty per pack	Weight
		[mm/in]	n°	[kg]
Single pole electrodes.				
11SN1	Yes	100❶/3.9”	10	0.050
31SCM04	Yes	43/1.7”	1	0.060
31SCM50	Yes	500/19.7”	1	0.115
31SCM100	Yes	1000/39.4”	1	0.162
31CGL1253	Yes	327/12.9”	1	0.126
31CGL1255	Yes	500/19.7”	1	0.158
31CGL1257	Yes	700/27.6”	1	0.208
31CGL12510	Yes	1000/39.4”	1	0.281
Three pole electrode.				
31PS31	Yes	300/11.8”	1	0.120
Electrode holder (for 3 rod probes).				
31PS3S	No	—	1	0.184

❶ Total electrode length.

Electrodes



31ASTA...

Order code	Rod probe length	Qty per pack	Weight
	[mm/in]	n.	[kg]
For 31SCM... probes.			
31ASTA460MM4	460/18.11”	1	0.053
31ASTA960MM4	960/37.8”	1	0.103
For 31PS3S electrode holder.			
31ASTA460MM6	460/18.11”	1	0.100
31ASTA960MM6	960/37.8”	1	0.210

General characteristics
11SN1 SINGLE POLE PROBES
A single pole probe used for level control in wells or storage tanks. It comprises of an AISI 303 stainless steel electrode, a plastic (PPOX) holder and a cable gland.
A seal ring and the tightening of the cable gland PG7 prevent water from entering the cable terminal connector and causing its oxidation.
Cable connection: screw.
The external cable diameter must be 2.5 to 6mm/Ø0.1 to 0.24” to warrant perfect sealing.
Maximum connection cable section: 2.5mm^2.
Maximum operating temperature: +60°C.
Application: tanks and deep wells.

31SCM... PROBES
A single pole probe used for level control on boilers, autoclaves and in general where pressure (10bar maximum) and high temperature (+100°C maximum) are present. It comprises of an AISI 303 stainless steel electrode embedded in an aluminium oxide body and a 3/8” GAS threaded metal support holder.
Cable connection: threaded rod with nut.
Application: tanks, pressurised tanks and boilers.

31CGL125... PROBES
A single pole probe with AISI 302 electrode, used for level control on boilers and autoclaves and in general wherever pressure is maximum up to 10bar.
Maximum operating temperature: +180°C.
Threaded coupling: 3/8” GAS.
Cable connection: threaded rod with nut.
Application: tanks, pressurised tanks and boilers.

31PS31 PROBE
A small electrode holder, complete with three AISI 304 stainless steel probes.
Particularly suited to small containers whenever pressure is maximum up to 2bar.
Maximum operating temperature: +70°C.
Threaded coupling: 1/2” GAS.
Faston termination; related lugs supplied.
Application: tanks and automatic dispensers.

31PS3S ELECTRODE HOLDER
A thermoset resin electrode holder to be used with three probes (rod probes to be ordered separately) and complete with terminal cover.
Maximum operating temperature: +100°C.
2” GAS threaded coupling.
Cable connection: screw.
Application: tanks.

ELECTRODES
Stainless steel AISI 304 electrodes with 4M or 6M threaded extremity suitable as extensions for 31SCM... probe or as rod probe for 31PS3S electrode holder.

Certification and compliance
Certification obtained: EAC.
Compliant with standards: IEC/EN/BS 60255-27.

Accessories

31RE213

31S8

31S11

31RE014

Order code	Description	Qty per pack	Weight
		n°	[kg]
31RE213	Coupler unit for 31SCM... with electrode extension ASTA...MM4	1	0.008
31S8	8-pin socket for screw fixing or mounting on 35mm/1.38” DIN rail (IEC/EN/BS 60715), used with LV1E... relay. Screw terminals	10	0.061
31S11	11-pin socket for screw fixing or mounting on 35mm/1.38” DIN rail (IEC/EN/BS 60715), used with LV2E... and CSP2E... relays. Screw terminals	10	0.064
31RE014	Relay-socket retention bracket; 31S8 or 31S11 types only	10	0.001

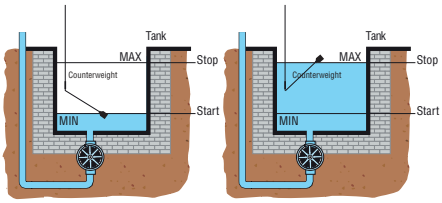
Operational characteristics
SOCKETS FOR INSTALLING PLUG-IN LEVEL CONTROL RELAYS.
– Max. wire section for sockets: 2x2.5mm^2/2x14AWG
– Tightening torque: 0.8Nm/7.1lb.in
– Ratings: 10A - 400VAC.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 61984, IEC/EN/BS 61210, IEC/EN/BS 60999-1.

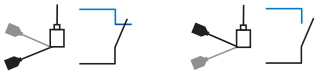
For grey water

Order code	Cable material	Cable length	Counter-weight included	Qty per pack	Wt
		[m]		n.	[kg]
LVFSP1W03	PVC	3	Yes	1	0.610
LVFSP1W05	PVC	5	Yes	1	0.830
LVFSP1W10	PVC	10	Yes	1	1.410
LVFSP1W15	PVC	15	Yes	1	1.930
LVFSP1W20	PVC	20	Yes	1	2.380
LVFSN1W03	Neoprene	3	Yes	1	0.640
LVFSN1W05	Neoprene	5	Yes	1	0.880
LVFSN1W10	Neoprene	10	Yes	1	1.510
LVFSN1W15	Neoprene	15	Yes	1	2.080
LVFSN1W20	Neoprene	20	Yes	1	2.480

Filling function

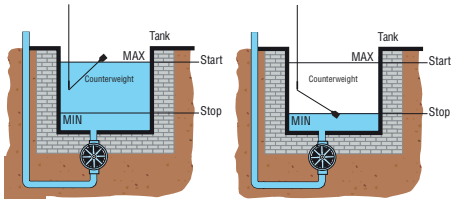


This function is achieved by connecting the black and blue float terminals. The level regulator contact closes the lower circuit at minimum level and opens the circuit when the float switch reaches the upper maximum level. The MIN and MAX levels can be adjusted by varying the distance between counterweight and float switch.



Start Stop

Emptying function



This function is achieved by connecting the black and brown float switch terminals. The level regulator contact closes the upper circuit at maximum level and opens the circuit when the float switch reaches the lower minimum level. The MIN and MAX levels can be adjusted by varying the distance between counterweight and float switch.

Start Stop

General characteristics
Float switches are used in the automation of electrical equipment, such as: pumps, solenoid valves, alarms, motorised sluice gates, etc. All versions feature an internal changeover contact operated in accordance with the level of liquid where the float is located. The cables used are high-quality and offer excellent mechanical or chemical resistance over time.
The cables are 3x1 type, that is 3 wires with section 1mm^2. This allows the user to choose the filling and emptying function during regulator wiring.
They are used for the civil and industrial control of levels of grey water, e.g. rainwater, groundwater or cooling water from industry. They are available with PVC and neoprene cables of various lengths.

Operational characteristics
- Upper switching angle: 30° ±5°
- Lower switching angle: 30° ±5°
- 130g external counterweight included
- Float casing material: polypropylene
- Cable A05 VV-F3X1 (PVC) available in lengths of 3, 5, 10, 15 and 20m/3.28, 5.47, 10.94, 16.40 and 21.87yd and cable H07 RN-F3X1 (Neoprene) available in lengths of 3, 5, 10, 15 and 20m/3.28, 5.47, 10.94, 16.40 and 21.87yd
- Rated cable diameter: 9mm/0.35” (PVC and Neoprene)
- Relay with changeover contact 10(8)A 250VAC 50/60Hz
- Maximum installation depth: 20m/21.26yd
- Maximum pressure: 2bar
- Operating temperature: 0...+50°C
- Storage temperature: -20...+80°C
- IEC degree of protection: IP68
- Insulation class: II.

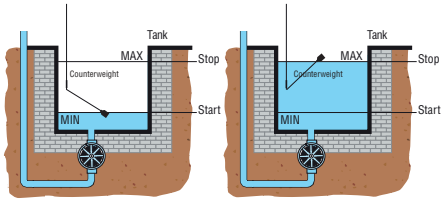
Certifications and compliance
Certifications: TÜV-SUD.
Compliant with standards: IEC/EN/BS 60730-1, IEC/EN/BS 60730-2-15.

For drinking water

LVFSA1D...

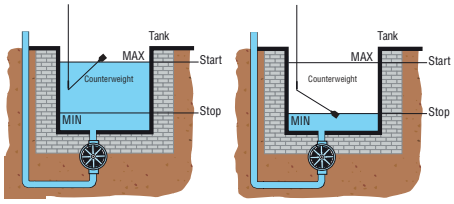
Order code	Cable material	Cable length	Counter-weight included	Qty per pkg	Wt
		[m]		n.	[kg]
LVFSA1D03	PVC ACS+AD8	3	Yes	1	0.630
LVFSA1D05	PVC ACS+AD8	5	Yes	1	0.850
LVFSA1D10	PVC ACS+AD8	10	Yes	1	1.430
LVFSA1D15	PVC ACS+AD8	15	Yes	1	1.950
LVFSA1D20	PVC ACS+AD8	20	Yes	1	2.400

Filling function



This function is achieved by connecting the black and blue float switch terminals. The level regulator contact closes the lower circuit at minimum level and opens the circuit when the float switch reaches the upper maximum level. The MIN and MAX levels can be adjusted by varying the distance between counterweight and float switch.

Emptying function



This function is achieved by connecting the black and brown float switch terminals. The level regulator contact closes the upper circuit at maximum level and opens the circuit when the float switch reaches the lower minimum level. The MIN and MAX levels can be adjusted by varying the distance between counterweight and float switch.

General characteristics
Float switches LVFSA1D type are suitable for drinking water and foodstuffs applications such as aqueducts, fountains, aquariums, drinks, fish hatcheries, swimming pools, etc.
They are realised with a non-toxic polypropylene outer shell, a stainless steel untreated sphere, and an AD8 cable with health certification ACS (Attestation de Conformité Sanitaire) with outer sheath with PVC suitable for drinkable water immersion and use with food products.
They are provided with stainless steel counterweight AISI 316.
All versions, which differ in the length of the cable, feature an internal changeover contact operated in accordance with the level of liquid where the float is located.
The cables are 3x1 type, that is 3 wires with section 1mm^2. This allows the user to choose the filling and emptying function during regulator wiring.

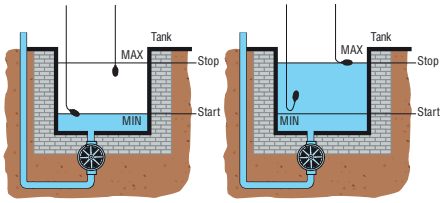
Operational characteristics
- Upper switching angle: 30° ±5°
- Lower switching angle: 30° ±5°
- Stainless steel counterweight AISI 316 included
- Float casing material: polypropylene
- PVC cable ACS + AD8 certified
- Microswitch with changeover contact: 10(8)A 250VAC 50/60Hz
- Maximum installation depth: 20m/21.87yd
- Maximum pressure: 2bar
- Operating temperature: 0...+50°C
- Storage temperature: -20...+80°C
- Degree of protection: IP68
- Insulation class: II.

Certifications and compliance
Certifications: Health certification ACS (Attestation de Conformité Sanitaire) for the cable.
Compliant with standards: IEC/EN/BS 60730-1, IEC/EN/BS 60730-2-15.

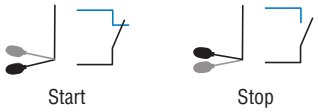
For dirty water

Order code	Cable material	Cable length	Counter-weight	Qty per pkg	Wt
		[m]		n.	[kg]
LVFSN1B05	Neoprene	5	Internal	1	1.250
LVFSN1B10	Neoprene	10	Internal	1	1.860
LVFSN1B15	Neoprene	15	Internal	1	2.460
LVFSN1B20	Neoprene	20	Internal	1	3.060

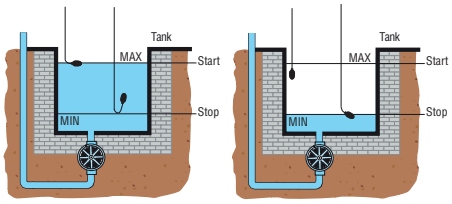
Filling function❶



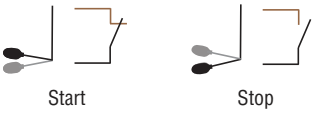
This function uses two float switches and is achieved by connecting the black and blue float switch terminals. The MIN and MAX levels can be adjusted by varying the position of the float switches.



Emptying function❶



This function uses two float switches and is achieved by connecting the black and brown float switch terminals. The MIN and MAX levels can be adjusted by varying the position of the float switches.



❶ It is possible to use even a single float for black water, adjusting the level in a fixed range of 10cm max, a solution which is not advisable for turbulent waters.

General characteristics
These float switches are used for the civil and industrial control of levels of dirty water, e.g. sewage or waste water from industry. The float switches comprises of a one-piece external blow-moulded polypropylene casing, with fixed internal counterweight located in the cable exit area.
The regulator contact is positioned centrally in its own watertight chamber. This is insulated from the external casing by injecting closed-cell foam. This solution further increases protection against moisture leakage and heat insulates the watertight chamber housing the contact, eliminating the creation of condensation.

Operational characteristics
- Upper switching angle: 30° ±5°
- Lower switching angle: 20° ±5°
- Internal counterweight
- Float casing material: polypropylene
- Cable H07 RN-F3X1 (Neoprene) available in lengths of 5, 10, 15 and 20m/5.47, 10.94, 16.40 and 21.87yd
- Rated cable diameter: 9mm/0.35”
- Relay with changeover contact 10(4)A 250VAC 50/60Hz
- Maximum installation depth: 100m/109.36yd
- Maximum pressure: 10bar
- Operating temperature: 0...+50°C
- Storage temperature: -20...+80°C
- IEC degree of protection: IP68
- Insulation class: II.

Certifications and compliance
Certifications: TÜV-SUD.
Compliant with standards: IEC/EN/BS 60730-1. IEC/EN/BS 60730-2-15.

Priority change relays for 2 motors Modular version

LVMP05

LVMP10...

Order code	Auxiliary supply voltage	Type of output contacts	Qty per pack	Weight
	[V]	⌇	n°	[kg]
2 outputs. AC and DC supply voltage.				
LVMP05	24/48VDC 24...240VAC	2NO with same common	1	0.090
2 outputs. AC supply voltage. Possible starting of stand-by motor.				
LVMP10A024	24VAC	2 NO (SPST)	1	0.250
LVMP10A127	110...127VAC	2 NO (SPST)	1	0.250
LVMP10A240	220...240VAC	2 NO (SPST)	1	0.250
LVMP10A415	380...415VAC	2 NO (SPST)	1	0.250

General characteristics
Priority change relays are designed to balance the operating time and hence the wear of pumps, compressors, generators, when two units, primary and stand-by, are installed.

Operational characteristics
- Operating limits: 0.85...1.1 Ue
- Connection: permanent
- Green LED indicator for power on
- Red LED indicators for output relay state 1 for LVMP05, 2 for LVMP10
- Modular DIN 43880 housing (1 module LVMP05, 3 modules LVMP10)
- IEC degree of protection: IP40 on front (only when mounted in housing or electric board with IP40); IP20 on terminals.

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus-File E93601), as Auxiliary Devices - Automatic starting control, EAC.
Compliant with standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL508, CSA C22.2 n° 14.

Priority change relays for 2 motors Plug-in version

31CSP2E...

Order code	Auxiliary supply voltage	Type of output contacts	Qty per pack	Weight
	[V]	⌇	n°	[kg]
2 outputs. AC supply voltage. Possible starting of stand-by motor.				
31CSP2E24	24VAC	2 NO (SPST)	1	0.150
31CSP2E110	110VAC	2 NO (SPST)	1	0.150
31CSP2E220	220VAC	2 NO (SPST)	1	0.150
31CSP2E230	230...240VAC	2 NO (SPST)	1	0.150

General characteristics
Priority change relays are designed to balance the operating time, and hence the wear of pumps, compressors, generators, when two units, primary and stand-by, are installed.

Operational characteristics
- Operating limits: 0.85...1.1 Ue
- Connection: permanent
- Voltage applied to input contacts: 15VDC not insulated at power supply
- Input contacts current consumption: about 1mA.
- 11-pin plug-in housing (see socket 31S11)
- IEC degree of protection: IP30.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60255-27, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-4.

Priority change relays for 3 or 4 motors Modular version

LVMP30...

new

Order code	Auxiliary supply voltage	Type of output contacts	Qty per pack	Weight
	[V]		n°	[kg]
4 outputs. AC supply voltage.				
LVMP30A024	24VAC	4	1	0.250
LVMP30A240	100...240VAC	4	1	0.242

General characteristic
The LVMP30... priority change relays manage the alternation between 3 or 4 motors, with the purpose of making homogeneous operating time and wear. They are typically used in pumping systems where there may be 3 or 4 pumps to be controlled alternately. The presence of the keyboard with display allows to set up the system configuration quickly and easily, by selecting the number of motors to control, the setting of motor switch-on and switch-off delays, and to monitor the number of starting and the operating hours for each motor.

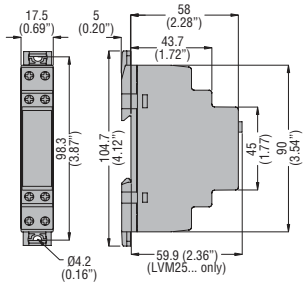
FUNCTIONS
- Management of alternation between 3 or 4 motors
- 5 digital inputs for liquid level signaling (enable + 4 levels)
- 1 digital input to enable the operation with latch (every time a motor is activated, it remains active until the liquid drops below the minimum level probe)
- 4 relay outputs with NO contact for motor control
- Possibility to set motor switch-on and switch-off delays
- Monitoring of the number of starts and the operating hours of each motor.

Operational characteristics
- Operating limits:
  - LVMP30A024: 20.4...28.8VAC (47...63Hz)
  - LVMP30A240: 85...265VAC (47...63Hz)
- Connection: permanent
- Modular DIN 43880 housing (4 modules)
- IEC degree of protection: IP20.

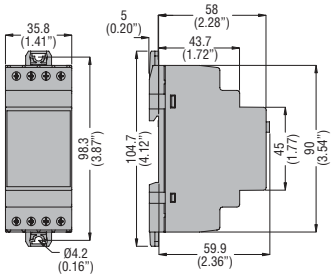
Certifications and compliance
Certifications obtained: cULus, EAC.
Compliant with standards: IEC/EN/BS 61131-2, UL508, CSA C22.2 n°142.

LEVEL CONTROL AND START-UP PRIORITY CHANGE RELAYS

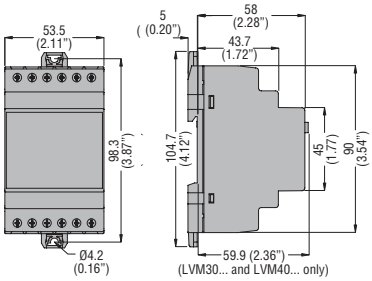
LVM25... - LVMP05



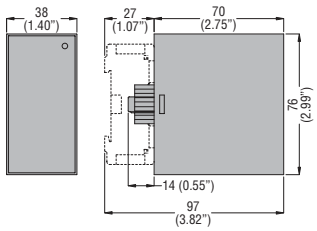
LVM20...



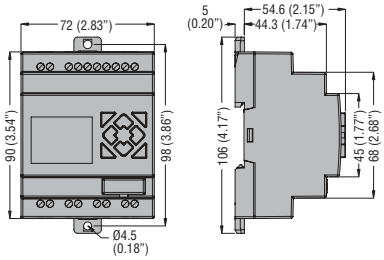
LVM30... - LVM40... - LVMP10



31LV1E... - 31LV2E... - 31CSP2E...

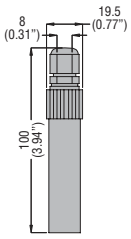


LVMP30...

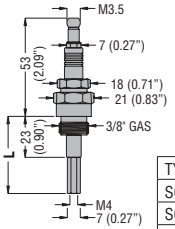


PROBES AND ELECTRODE HOLDERS FOR CONDUCTIVE LIQUIDS

11SN1

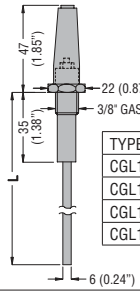


31SCM...



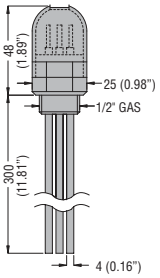
TYPE	L
SCM04	43 (1.69")
SCM50	500 (19.68")
SCM100	1000 (39.37")

31CGL125...

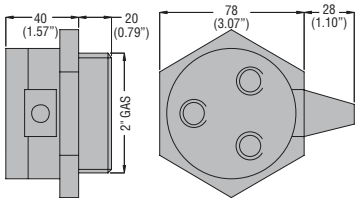


TYPE	L
CGL1253	327 (12.87")
CGL1255	500 (19.68")
CGL1257	700 (27.55")
CGL12510	1000 (39.37")

31PS31

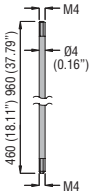


31PS3S

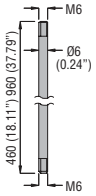


ELECTRODES

31ASTA460MM4
31ASTA960MM4

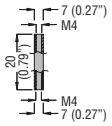


31ASTA460MM6
31ASTA960MM6



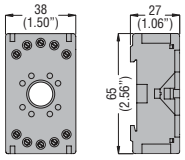
Coupler unit

31RE213

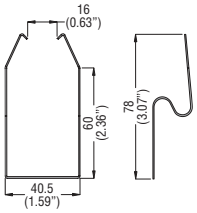


ACCESSORIES

31S8 - 31S11

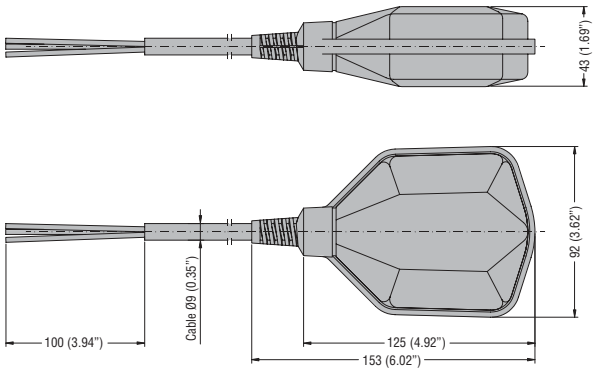


31RE014

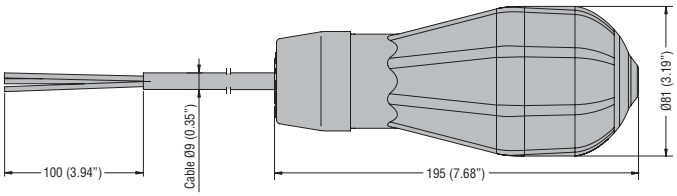


FLOAT SWITCHES

LVFS...W...
LVFS...D...

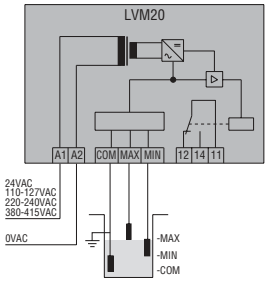


LVFSN1B...

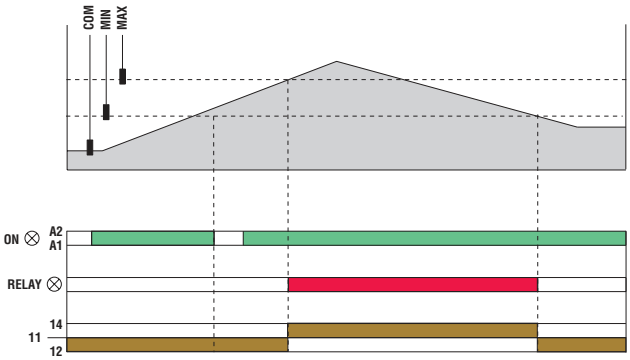


Emptying function

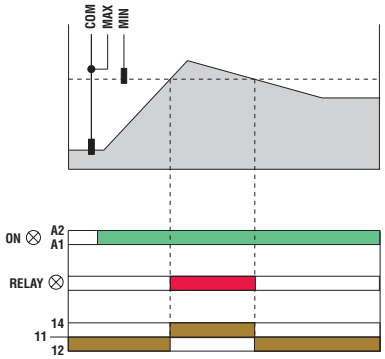
LVM20



Emptying function with 3 electrodes

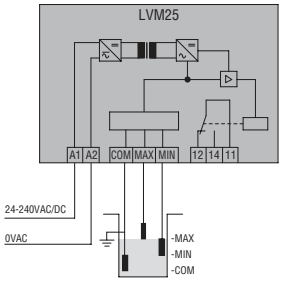


Emptying function with 2 electrodes

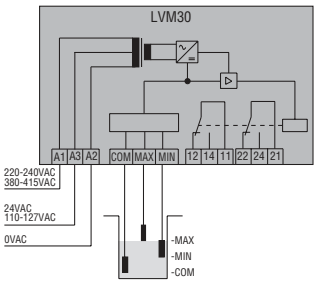


Emptying or filling functions

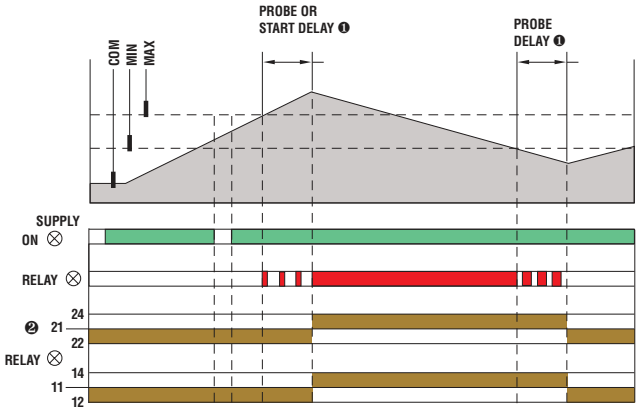
LVM25



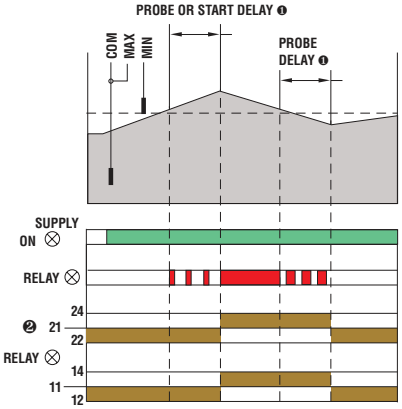
LVM30



Emptying function (DOWN)
Connection with 3 electrodes

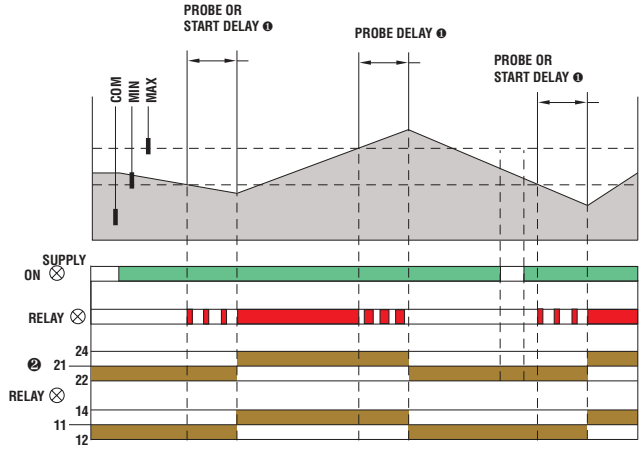


Connection with 2 electrodes

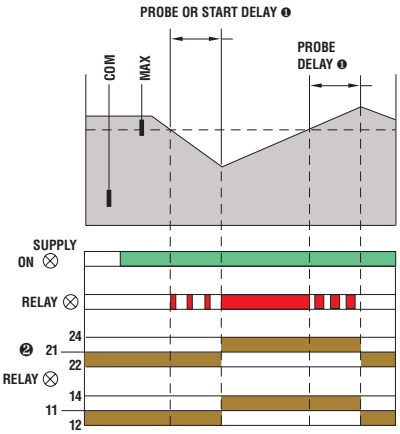


❶ Delay for LVM30 only.
❷ Changeover contact (SPDT) for LVM30 only.

Filling function (UP)
Connection with 3 electrodes



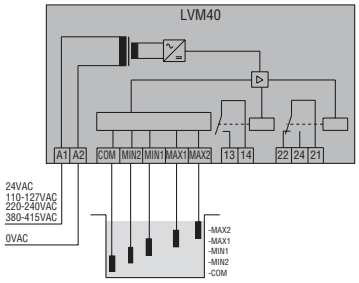
Connection with 2 electrodes



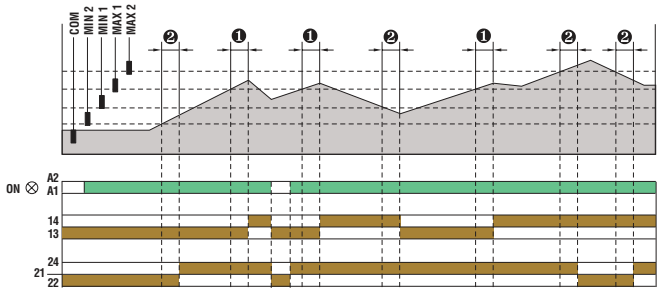
❶ Delay for LVM30 only.
❷ Changeover contact (SPDT) for LVM30 only.

Multifunctions.

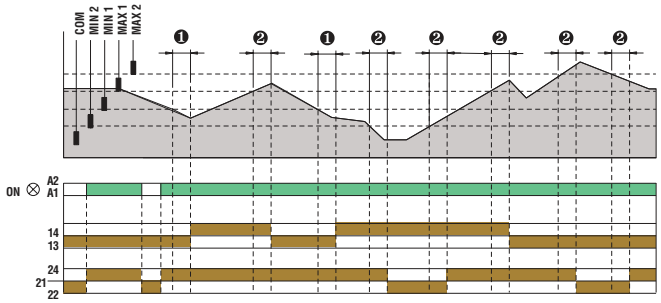
LVM40



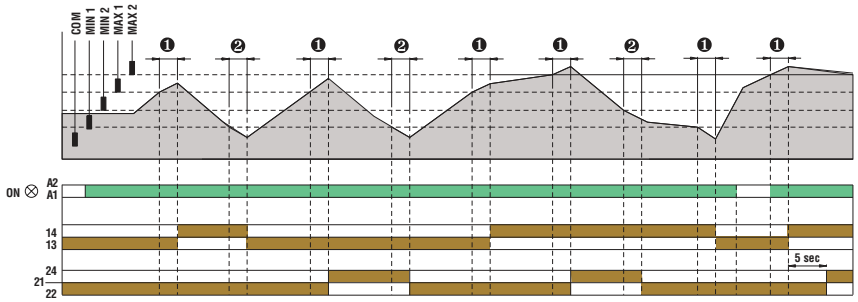
Emptying function + alarms



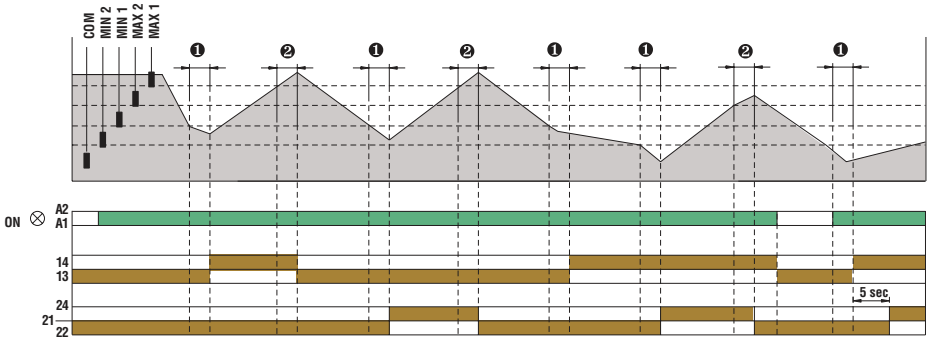
Filling function + alarms



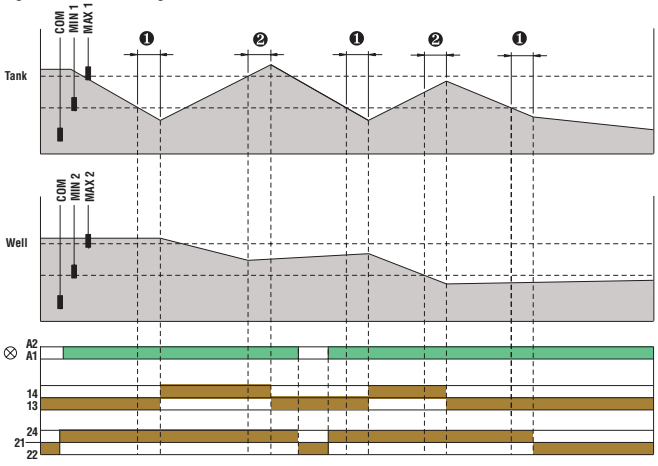
Emptying function + pump change



Filling function + pump change



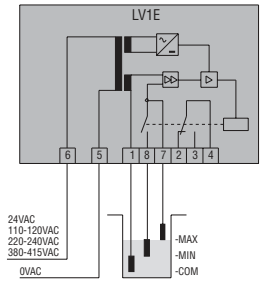
Filling tank and draining well function + alarm



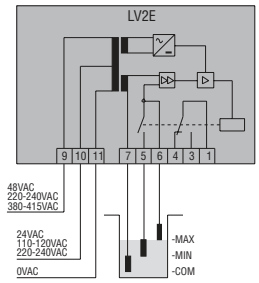
❶ Probe delay + start delay.
❷ Probe delay.

Emptying function

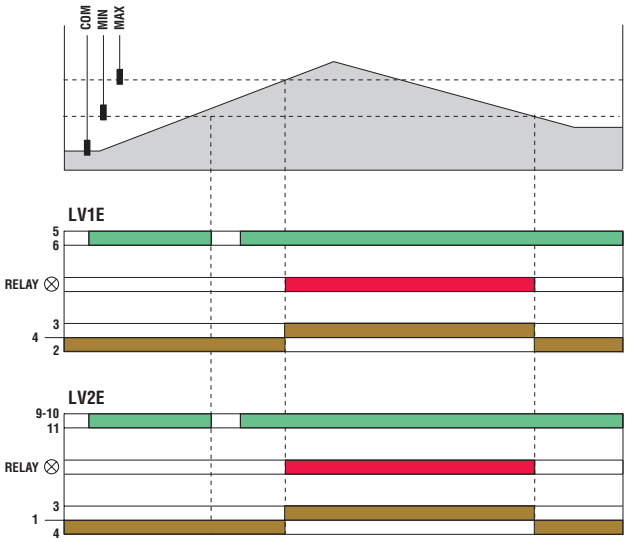
31LV1E



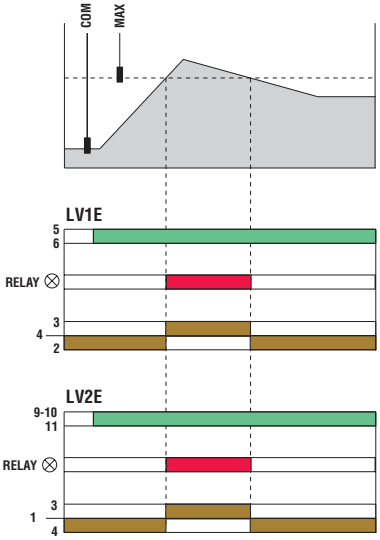
31LV2E



Emptying function with 3 electrodes

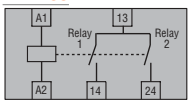


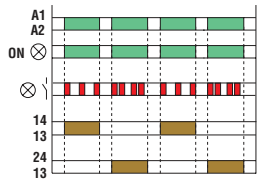
Emptying function with 2 electrodes



Priority change relays

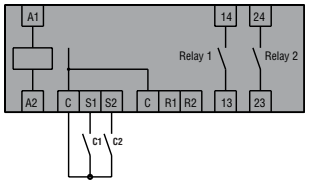
LVMP05



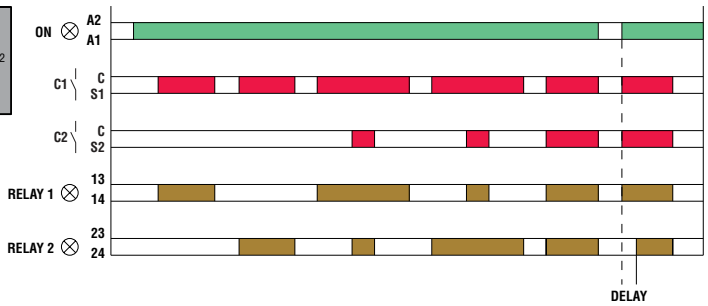


LVMP10

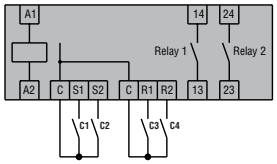
2-wire connection



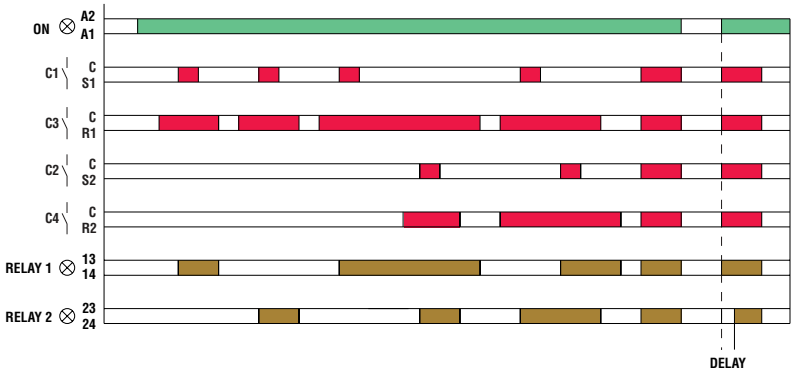
C1 = Primary
C2 = Secondary / Standby



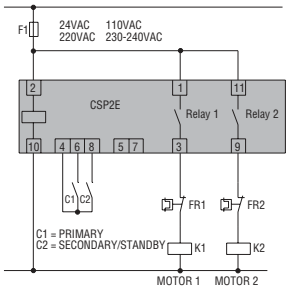
3-wire connection



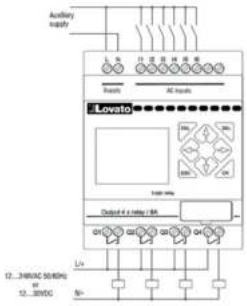
C1 = Start Primary
C2 = Start Standby
C3 = Stop Primary
C4 = Stop Standby



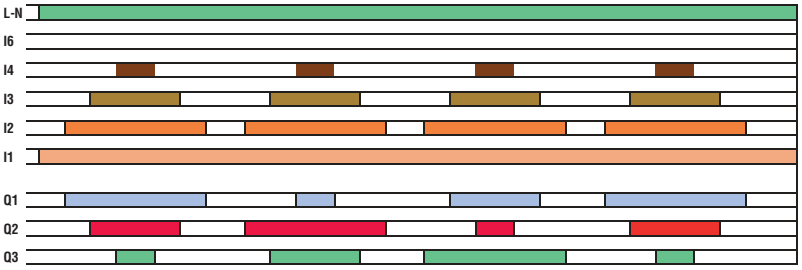
31CSP2E



LVMP30...



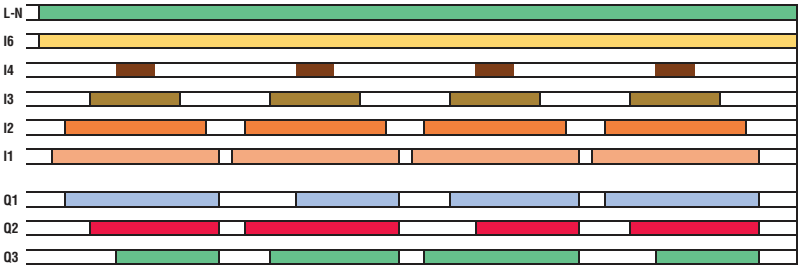
3-motor operation, without latch



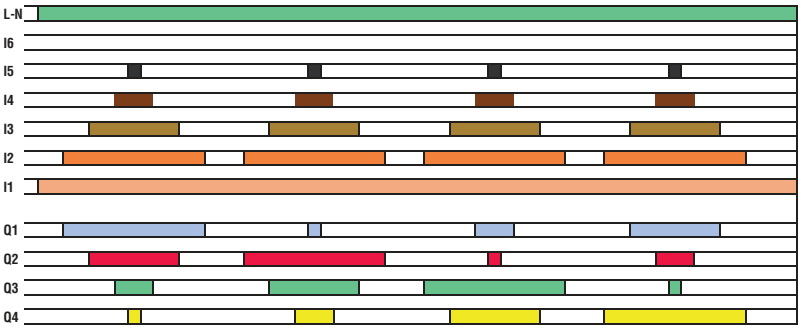
I1 = Minimum level (enable)
I2 = Start motor 1
I3 = Start motor 2
I4 = Start motor 3
I6 = Latch enable

Q1 = Motor 1
Q2 = Motor 2
Q3 = Motor 3

3-motor operation, with latch



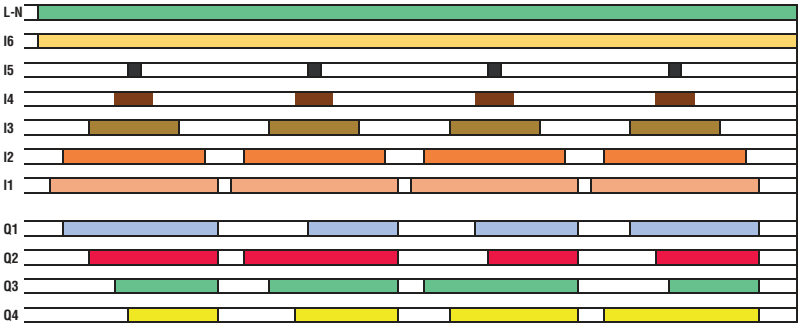
4-motor operation, without latch



I1 = Minimum level (enable)
I2 = Start motor 1
I3 = Start motor 2
I4 = Start motor 3
I5 = Start motor 4
I6 = Latch enable

Q1 = Motor 1
Q2 = Motor 2
Q3 = Motor 3
Q4 = Motor 4

3-motor operation, with latch



TYPE	LVM20...	LVM25...	LVM30...	LVM40...
DESCRIPTION				
	Modular			
	Automatic reset			
	Single voltage	Multi voltage	Dual voltage	Single voltage
Function	Emptying function	Emptying or filling function	Emptying or filling function	Multifunctions
Operating principle	Electrical conductivity of liquids			
AUXILIARY SUPPLY				
Rated supply voltage Us	24VAC	24...240VAC/DC	24/220...240VAC	24VAC
	110...127VAC		110...127/380...415VAC	110...127VAC
	220...240VAC			220...240VAC
	380...415VAC			380...415VAC
Operating voltage range	0.85...1.1 Us; 50/60Hz ±5%			
Power consumption (maximum)	3.5VA	3VA	5.5VA	4.5VA
Power dissipation (maximum)	1.8W	1.2W	2.8W	2.8W
LEVEL ELECTRODES				
Number of connectable electrodes	3	3	3	5
Type of electrode	Electrode and electrode holders: SN1 / SCM / CGL / PS31 / PS3S or similar			
Electrode voltage	7.5VAC	10Vpp	7.5VAC	10Vpp
Sensitivity	2.5...50kOhm	2.5...100kOhm	2.5...50kOhm	2.5...200kOhm
TIME DELAYS				
Tripping time (minimum)	≤ 600ms	≤ 1s	1s	1s
Resetting time (minimum)	≤ 750ms	≤ 1s	1s	1s
Probe tripping delay	—	—	OFF...10s	1...10s
Relay energising delay	—	—	OFF...300s	0...30min
RELAY OUTPUTS				
Number of relays	1	1	2	2
Relay state	Normally de-energised, energises at tripping			
Contact arrangement	1 changeover / SPDT	1 changeover / SPDT	2 changeover / SPDT each	1 changeover / SPDT and 1 with 1 N/O - SPST
Rated utilisation voltage	250VAC			
Maximum switching voltage	400VAC			
IEC conventional free air thermal current Ith	8A			
UL/CSA and IEC/EN/BS 60947-5-1 designation	B300			
Electrical life (with rated load)	10^5 cycles			
Mechanical life	$30x10^6$ cycles			
Indications	1 green LED for power on 1 red LED for relay state	1 green LED for power on 1 red LED for relay state	1 green LED indicator for power on 1 red LED for relay state	1 green LED indicator for power on 2 red LEDs for relay state 2 red LEDs for probe state
INSULATION				
IEC rated insulation voltage Ui	415VAC	250VAC	415VAC	415VAC
IEC rated impulse withstand voltage Uimp	6kV	6kV	6kV	6kV
IEC power frequency withstand voltage	4kV	4kV	4kV	4kV
Double insulation Supply/relay/electrode	≤ 250VAC	≤ 250VAC❶	≤ 250VAC	≤ 250VAC
CONNECTIONS				
Tightening torque maximum	0.8Nm (7lb.in; 7-9lb.in for UL/CSA)			
Conductor section min-max	0.2...4mm² (24...12AWG; 18...12AWG for UL/CSA)			
AMBIENT CONDITIONS				
Operating temperature	–20...+60°C			
Storage temperature	–30...+80°C			
HOUSING				
Material	Self-extinguishing polyamide			
Typical configuration (examples)	LVM20 + n° 3 SN1 electrodes LVM30 + n° 3 SN1 electrodes		LVM25 + n° 3 SN1 electrodes LVM40 + n° 5 SN1 electrodes	
Maximum cable length	❸			

❶ Double insulation between supply, electrodes and output relay circuit.
❷ Voltage applied to input contacts, not insulated at power supply.
❸ Consult Technical support for more information; see contact Tel. +39 035-4282422 - E-mail: service@LovatoElectric.com.

	31LV1E...	31LV2E...	LVMP05	LVMP10	31CSP2E	LVMP30
	Plug-in		Modular	Modular	Plug-in	Modular with display
	Automatic resetting		—	—	—	—
	Single voltage	Dual voltage	Multistage	Single voltage	Single voltage	Multi voltage
	Emptying function		Priority change for two motors			Priority change for 3-4 motors
	Electrical conductivity of liquids		—			—
	24VAC	24/48VAC	24/48VDC 24....240VAC	24VAC	24VAC❷	24VAC
	110...120VAC	110...120VAC/220...240VAC		110...127VAC	110VAC❷	100...240VAC
	220...240VAC	220...240VAC/380...415VAC		220...240VAC	220VAC❷	
	380...415VAC			380...415VAC	230/240VAC❷	
	0.8...1.1 Us; 50/60Hz					20.4...28.8VAC (LVMP30A024) 50/60Hz ±5% 85...265VAC (LVMP30A240) 50/60Hz ±5%
	5.5VA		1.6VA	4.8VA	5VA	—
	2.8W		0.9W	3W	3W	7.5W
	3		—	—	—	—
	Electrode and electrode holders: SN1 / SCM / CGL / PS31 / PS3S / or similar		—	—	—	—
	9VAC (voltage between probes)		—	—	—	—
	7...8 kΩ fixed		—	—	—	—
	≤ 50ms		—	—	—	—
	≤ 100ms		—	—	—	—
	—		—	—	—	—
	—		—	—	—	—
	1		2	2	2	4
	Normally de-energised, energises at tripping					
	1 changeover contact / SPDT		2 N/O with same common	2 N/O - SPST	2 N/O - SPST	4 N/O
	220VAC		250VAC	250VAC	250VAC	250VAC
	380VAC		—	—	—	265VAC
	5A		8A	8A	5A	8A
	B300		B300	B300	B300	—
	2.5x10^5 cycles		10^5 cycles	10^5 cycles	10^5 cycles	10^5 cycles
	50x10^6 cycles		30x10^6 cycles	30x10^6 cycles	30x10^6 cycles	—
	1 red LED for relay state		1 green LED for power on 1 red LED for relay state	1 green LED for power on 2 red LED for relays state	1 green/red LED for relay state	Display for monitoring motor status, number of starts and working hours
	415VAC		250VAC	415VAC	250VAC	❸
	5kV		4kV	4kV	4kV	❸
	2kV		2kV	2.5kV	2.5kV	❸
	—		—			—
	—		0.8Nm (7lb.in; 7-9lb.in for UL/CSA)		—	0.6Nm (5.3lb.in)
	—		0.2...4.0mm^2 (24...12AWG; 18...12AWG for UL/CSA)		—	0.14...2.5mm^2 (26...14AWG)
	-20...+60°C					-20...+55°C
	-30...+80°C					-40...+70°C
	Self-extinguishing polycarbonate		Self-extinguishing polyamide	Self-extinguishing polyamide	Self-extinguishing polycarbonate	Polyamide
	LV1E + n° 3 SN1 electrode LV2E + n° 2 SN1 electrodes + reset button		—	—	—	—
	500m/547yd single-core, double insulated cables		—	—	—	—

General purpose relays

- Electromechanical and SSR (solid state relay) versions
- AC or DC coils
- Sockets with screw, Push-in or PIN for Printed Circuit Board terminals
- Relays with LED state indicator and mechanical actuator
- Parallel busbars and surge suppressor filters
- Power relays with Atex certificate.

	Sec. - Page
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Miniature relays clear enclosure	24 - 7
Miniature relays with LED state indicator and mechanical actuator	24 - 7
Industrial relays with LED state indicator and mechanical actuator	24 - 8
8-pin and 11-pin industrial relays with LED state indicator and mechanical actuator	24 - 9
Power relays with Atex certificate	24 - 9
Dimensions	**24 - 10**
Wiring diagrams	**24 - 11**
Technical characteristics	**24 - 12**

Page 24-5

HR10
- Slim electromechanical relay
- Socket width 6.2mm
- 1 changeover contact
- Ith rated current 6A
- Sockets with built-in LED
- Sockets with screw or Push-in terminals
- Control voltage from 12 to 230VAC/DC
- 20 poles parallel busbars
- Available version with relay and base ready assembled.

Page 24-5

HR20
- Slim solid state relay (SSR)
- Socket width 6.2mm
- 1 solid-state (SSR) output
- Output current 2A in AC and 4A in DC
- Sockets with built-in LED
- Sockets with screw or Push-in terminals
- Control voltage 24VDC
- 20 poles parallel busbars
- High switching speed
- Theoretically infinite electrical life
- Zero crossing.

Page 24-6

HR30
- Miniature relay
- Socket width 15.8mm
- 1 or 2 changeover contacts
- Ith rated current:
  – 1 contact: 10A (16A on PCB)
  – 2 contacts: 8A
- AC or DC control voltage
- Sockets with screw, Push-in or pins for PCB terminals
- 8 poles parallel busbars
- Small dimensions
- Can be used for direct mounting on PCB
- Snap-on surge suppressor filters
- Available version with relay and base ready assembled.

Page 24-7

HR40
- Miniature relay in clear enclosure
- Socket width 15.8mm
- 1 or 2 changeover contacts
- Ith rated current:
  – 1 contact: 10A (16A on PCB)
  – 2 contacts: 10A
- AC or DC control voltage
- Sockets with screw, Push-in or pins for PCB terminals
- 8 poles parallel busbars
- Clear enclosure for contacts visibility
- Can be used for direct mounting on PCB
- Snap-on surge suppressor filters.

Page 24-7

HR50
- Miniature relay with LED status indicator and mechanical and status indication
- Socket width 15.8mm
- 1 or 2 changeover contacts
- Ith rated current:
  – 1 contact: 10A (16A on PCB)
  – 2 contacts: 8A
- Mechanical test actuator with latch option
- AC or DC control voltage
- Sockets with screw, Push-in or pins for PCB terminals
- 8 poles parallel busbars
- Can be used for direct mounting on PCB
- Snap-on surge suppressor filters
- Available version with relay and base ready assembled.

Page 24-8

HR60
- Industrial relay with LED status indicator and mechanical actuator
- Socket width 27mm
- 2 or 4 changeover contacts
- Ith rated current:
  – 2 contacts: 7A
  – 4 contacts: 5A
- LED and mechanical status indicator
- Mechanical test actuator with latch option
- AC or DC control voltage
- Sockets with screw or Push-in terminals
- Snap-on surge suppressor filters
- Available version with relay and base ready assembled.

Page 24-9

HR70
- Industrial relay with LED status indicator and mechanical actuator
- Socket width 38mm
- 8-pin and 11-pin industrial relay
- 2 or 3 changeover contacts
- Ith rated current: 10A
- LED and mechanical state indicator
- Mechanical test actuator with latch option
- Versions with AC or DC control.

Page 24-9

HR80
- Power relays with Atex certificate
- In rated current 30A
- 2 normally open or 2 changeover contacts
- Faston terminals
- Screw fixing.

Lovato electric

Relays		Code	Contacts	Rated current	Control voltage	Sockets
SLIM RELAYS		**HR101CE012**	1 C/O	6A	12VAC/DC	**HR1XS024** - **HR1XS024S**❶
		HR101CE024	1 C/O	6A	24VAC/DC	
		HR101CE060	1 C/O	6A	110...125VAC/DC❷	**HR1XS110** - **HR1XS110S**❶
					220...240VAC/DC❷	**HR1XS230** - **HR1XS230S**❶
		HR201AS024	1 SSR	2A (AC)	24VDC	**HR1XS024** - **HR1XS024S**❶
		HR201DS024	1 SSR	4A (DC)	24VDC	
MINIATURE RELAYS		**HR301CD012**	1 C/O	16A❸	12VDC	Max 10A
		HR301CD024	1 C/O	16A❸	24VDC	
		HR301CD048	1 C/O	16A❸	48VDC	
		HR301CA024	1 C/O	16A❸	24VAC	
		HR301CA110	1 C/O	16A❸	110...120VAC	
		HR301CA230	1 C/O	16A❸	230VAC	**HR5XS21** Screw terminals. Contact terminals all on upper side.
		HR302CD012	2 C/O	8A	12VDC	
		HR302CD024	2 C/O	8A	24VDC	
		HR302CD048	2 C/O	8A	48VDC	
		HR302CA024	2 C/O	8A	24VAC	
		HR302CA110	2 C/O	8A	110...120VAC	
		HR302CA230	2 C/O	8A	230VAC	**HR5XS22** Screw terminals.
MINIATURE RELAYS CLEAR ENCLOSURE		**HR401CD012**	1 C/O	16A❸	12VDC	
		HR401CD024	1 C/O	16A❸	24VDC	
		HR401CA024	1 C/O	10A	24VDC	
		HR401CA110	1 C/O	10A	110VAC	
		HR401CA230	1 C/O	10A	230VAC	**HR5XS21S** Push-in terminals.
		HR402CD012	2 C/O	10A	12VDC	
		HR402CD024	2 C/O	10A	24VDC	
		HR402CA024	2 C/O	5A	24VDC	
		HR402CA110	2 C/O	5A	110VAC	
		HR402CA230	2 C/O	5A	230VAC	
MINIATURE RELAYS WITH LED STATE INDICATOR AND MECHANICAL ACTUATOR		**HR501CD012**	1 C/O	16A❸	12VDC	
		HR501CD024	1 C/O	16A❸	24VDC	
		HR501CD048	1 C/O	16A❸	48VDC	
		HR501CD110	1 C/O	16A❸	110VDC	
		HR501CA024	1 C/O	16A❸	24VAC	
		HR501CA110	1 C/O	16A❸	110...120VAC	
		HR501CA230	1 C/O	16A❸	230VAC	**HR5XS21P** PIN terminals. For Printed Circuit Board.
		HR502CD012	2 C/O	8A	12VDC	
		HR502CD024	2 C/O	8A	24VDC	
		HR502CD048	2 C/O	8A	48VDC	
		HR502CD110	2 C/O	8A	110VDC	
		HR502CA012	2 C/O	8A	12VAC	
		HR502CA024	2 C/O	8A	24VAC	
		HR502CA110	2 C/O	8A	110...120VAC	
		HR502CA230	2 C/O	8A	230VAC	
INDUSTRIAL RELAYS WITH LED STATE INDICATOR AND MECHANICAL ACTUATOR		**HR602CD012**	2 C/O	7A	12VDC	**HR6XS21** Screw terminals. Contact terminals on upper side. **HR6XS22** Screw terminals. **HR6XS41S** Push-in terminals.
		HR602CD024	2 C/O	7A	24VDC	
		HR602CD048	2 C/O	7A	48VDC	
		HR602CA012	2 C/O	7A	12VAC	
		HR602CA024	2 C/O	7A	24VAC	
		HR602CA110	2 C/O	7A	110...120VAC	
		HR602CA230	2 C/O	7A	230VAC	
		HR604CD012	4 C/O	5A	12VDC	**HR6XS41** Screw terminals. Contact terminals on upper side. **HR6XS42** Screw terminals. **HR6XS41S** Push-in terminals.
		HR604CD024	4 C/O	5A	24VDC	
		HR604CD048	4 C/O	5A	48VDC	
		HR604CA012	4 C/O	5A	12VAC	
		HR604CA024	4 C/O	5A	24VAC	
		HR604CA110	4 C/O	5A	110...120VAC	
		HR604CA230	4 C/O	5A	230VAC	
8-PIN AND 11-PIN INDUSTRIAL RELAYS WITH LED STATE INDICATOR AND MECHANICAL ACTUATOR		**HR702CD024**	2 C/O	10A	24VDC	8-pin
		HR702CD048	2 C/O	10A	48VDC	
		HR702CD110	2 C/O	10A	110VDC	
		HR702CA024	2 C/O	10A	24VAC	
		HR702CA110	2 C/O	10A	110...120VAC	
		HR702CA230	2 C/O	10A	230VAC	**HR7XS1** Screw terminals.
		HR703CD024	3 C/O	10A	24VDC	11-pin
		HR703CD048	3 C/O	10A	48VDC	
		HR703CD110	3 C/O	10A	110VDC	
		HR703CA024	3 C/O	10A	24VAC	
		HR703CA110	3 C/O	10A	110...120VAC	
		HR703CA230	3 C/O	10A	230VAC	**HR7XS2** Screw terminals.

Code	Retaining clips	Code	Marker tags	Code	Parallel busbars	Code	Surge suppressor filters
	Included in the socket	**HR1X30** **HR1X3016** (strip with 16 tags)		20 poles **HR1X9020** (black) **HR1X9120** (red)			
HR3X88❻ **HR3X86**❺		**HR5X30**❻		8 poles **HR5X9008** (black) ❹ 2 poles **HR5X9002**❼		Resistor - Capacitor **HR6X77024** 6...24VAC/DC **HR6X77230** 110...230VAC/DC Diode + LED **HR6X78024** 6...24VDC	
HR5X88❻ **HR5X86**❺ **HR5X87**❻							
HR6X88❽ **HR6X87**		**HR6X30**		2 poles **HR5X9002**❼			
HR7X87							

❶ Final S in code indicates Push-in terminals.
❷ Voltage dependent on selected relay socket; rated insulation voltage only for relay 60VDC.
❸ Rated current if the relay is soldered directly onto the board; with socket the maximum current is 10A.
❹ For sockets with screw terminals.
❺ Only mounting on socket HR5XS21P.
❻ Not suitable for HR5XS21P socket.
❼ Bus jumper for A2 terminal; for Push-in terminals sockets only.
❽ Not suitable for Push-in terminals sockets.
❾ Other voltages available on request: 24, 120, 208, 220, 277VAC - 5, 6, 12, 24, 48, 110VDC.

Relay and base ready assembled		Code	Contacts	Rated current	Control voltage	Code	Marker tags	Code	Parallel busbars	Code	Surge suppressor filters
ASSEMBLED SLIM RELAYS		**HRA101CE024**	1 C/O	6A	24VAC/DC	**HR1X30** **HR1X3016** (strip with 16 tags)		20 poles **HR1X9020** (black) **HR1X9120** (red)			
		HRA101CE024S❶	1 C/O	6A	24VAC/DC						
ASSEMBLED MINIATURE RELAYS		**HRA302CD024K4**	2 C/O	8A	24VDC	**HR5X30**		8 poles **HR5X9008** (black)❷ **HR5X9002❼** 2 poles		Resistor - Capacitor **HR6X77024** 6...24VAC/DC **HR6X77230** 110...230VAC/DC Diode + LED **HR6X78024** 6...24VDC	
		HRA302CD024K5❸	2 C/O	8A	24VDC						
ASSEMBLED MINIATURE RELAYS WITH LED STATE INDICATOR AND MECHANICAL ACTUATOR		**HRA502CD024K5❸**	2 C/O	8A	24VDC						
		HRA502CD024K4	2 C/O	8A	24VDC						
		HRA502CA024K4	2 C/O	8A	24VAC						
		HRA502CA230K4	2 C/O	8A	230VAC						
ASSEMBLED INDUSTRIAL RELAYS WITH LED STATE INDICATOR AND MECHANICAL ACTUATOR		**HRA604CD024K4**	4 C/O	5A	24VDC	**HR6X30**					
		HRA604CA024K4	4 C/O	5A	24VAC						
		HRA604CA230K4	4 C/O	5A	230VAC						
ASSEMBLED POWER RELAYS WITH ATEX CERTIFICATE		**HR8020D012**	2NO	30A	12VDC						
		HR8020A024	2NO	30A	24VAC						
		HR8020A120	2NO	30A	110/120VAC						
		HR8020A230	2NO	30A	230VAC						
		HR802CD012	2 C/O	30A	12VDC						
		HR802CA024	2 C/O	30A	24VAC						
		HR802CA120	2 C/O	30A	110/120VAC						
		HR802CA230	2 C/O	30A	230VAC						

❶ Final S in code indicates Push-in terminals.
❷ For sockets with screw terminals.
❸ Kit complete with diode filter + LED HR6X78024.

Slim relays

HRA10...

HR10...

HR20...

Order code	Control voltage	Contacts	Rated current	Description	Qty per pkg
			[A]		no.
Slim electromechanical relay and base ready assembled.					
HRA101CE024	24VAC/DC	1 C/O	6	Screw terminals	10
HRA101CE024S	24VAC/DC	1 C/O	6	Push-in terminals	10
Slim electromechanical relays.					
HR101CE012	12VDC	1 C/O	6	12VAC/DC control when on HR1XS024 or HR1XS024S socket	20
HR101CE024	24VDC	1 C/O	6	24VAC/DC control when on HR1XS024 or HR1XS024S socket	20
HR101CE060	60VDC	1 C/O	6	110...125VAC/DC control when on HR1XS110 or HR1XS110S socket. 220...240VAC/DC control when on HR1XS230 or HR1XS230S socket	20
Slim SSR (solid state relay) relays.					
HR201AS024	24VDC	1 SSR	2	Output 24...280VAC	20
HR201DS024	24VDC	1 SSR	4	Output 3...28VDC	20

General characteristics
Slim-type relays have a reduced width that permits considerable optimisation of space. All sockets are equipped with supply indicator LED and retain/release clips. The availability of electromechanical and solid-state (SSR) versions permits the installation of the most technically suitable solution in accordance with system requirements. The socket terminals can be screw or Push-in type.
The parallel busbars make for quick wiring.

Operational characteristics
- Rated insulation voltage: 250V
- Rated impulse withstand voltage: 4kV
- Relay control voltage: 12, 24, 60VDC
- Relay control voltage + socket: 12, 24, 110...125, 220...240VAC/DC
- Max controllable power in AC-1: 1500W
- Max controllable power in AC-15: 360VA.

Certifications and compliance
Certifications obtained: cURus, CSA, EAC, VDE for electromechanical relays HR10..., cURus, TÜV for SSR relay HR20....
Compliant with standards: IEC/EN/BS 61810-1 for electromechanical relays, IEC/EN/BS 62314 for SSR.

Sockets

HR1XS... HR1XS...S

Order code	Control voltage	Terminals	Description	Qty per pkg
	AC/DC			no.
Sockets for relays.				
HR1XS024	12...24V	Screw	Use with relay HR101CE012, HR101CE024 and HR20...	10
HR1XS110	110...125V	Screw	Use with relay HR101CE060	10
HR1XS230	220...240V	Screw	Use with relay HR101CE060	10
HR1XS024S	12...24V	Push-in	Use with relay HR101CE012, HR101CE024 and HR20...	10
HR1XS110S	110...125V	Push-in	Use with relay HR101CE060	10
HR1XS230S	220...240V	Push-in	Use with relay HR101CE060	10

General characteristics
HR1X... sockets are equipped with supply indicator LED and retain/release clips. The socket terminals can be screw or Push-in type. Parallel busbars can be fitted to the sockets, for quick wiring. These busbars plug-in, on both the screw and Push-in sockets, leaving the cable entry terminals free.

Operational characteristics
- Rated insulation voltage: 250V
- Rated impulse withstand voltage: 4kV
- Relay control voltage: 12, 24, 60VDC
- Relay control voltage + socket: 12, 24, 110...125, 220...240VAC/DC
- Green indication LED
- Fitting on DIN rail
- Operating temperature: HR1XS024 -40...+70°C, HR1XS110 and HR1XS230 -40...+55°C.

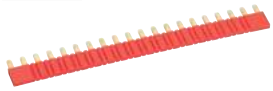
Certifications and compliance
Certifications obtained: cURus, CSA, EAC, VDE for electromechanical relay HR10..., cURus, TÜV for SSR relay HR20....
Compliant with standards: IEC/EN/BS 61810-1 for electromechanical relays, IEC/EN/BS 62314 for SSR.

Accessories

HR1X30...

Order code	Description	Qty per pkg
		no.
HR1X30	Marker tags	100
HR1X3016	Marker tags - strip with 16 tags	20
HR1X9020	20-pole parallel busbar - black	10
HR1X9120	20-pole parallel busbar - red	10

HR1X9020



HR1X9120

Miniature relays

HRA30...

HR30...

Order code	Control voltage	Contacts	Rated current	Description	Qty per pkg
			[A]		no.
Miniature relay and base ready assembled.					
HRA302CD024K4	24VDC	2 C/O	8	Screw terminals with retain/release clip	5
HRA302CD024K5	24VDC	2 C/O	8	Push-in terminals with retain/ release clip and suppressor filter	5
Miniature relays.					
HR301CD012	12VDC	1 C/O	16	Fitting on socket HR5XS2... (max 10A)	20
HR301CD024	24VDC	1 C/O	16		20
HR301CD048	48VDC	1 C/O	16		20
HR301CA024	24VAC	1 C/O	16		20
HR301CA110	110/120VAC	1 C/O	16		20
HR301CA230	230VAC	1 C/O	16		20
HR302CD012	12VDC	2 C/O	8	Fitting on socket HR5XS2...	20
HR302CD024	24VDC	2 C/O	8		20
HR302CD048	48VDC	2 C/O	8		20
HR302CA024	24VAC	2 C/O	8		20
HR302CA110	110/120VAC	2 C/O	8		20
HR302CA230	230VAC	2 C/O	8		20

General characteristics
Miniature relays have compact dimensions but high functional performance. It's the ideal device for those looking for a cost-effective solution without compromising performance.

Operational characteristics
- Rated insulation voltage: 250V
- Rated impulse withstand voltage: 4kV
- Relay control voltage: 12, 24 and 48VDC - 24, 110/120 and 230VAC, 50/60Hz
- Max controllable power in AC-1 (1C/2C): 4000/2000W
- Max controllable power in AC-15 (1C/2C): 300/150VA
- Maximum current (1C/2C): 16A/8A.

Certifications and compliance
Certifications obtained: cURus, CSA, EAC, VDE (VDE except for HR301CA...).
Compliant with standards: IEC/EN/BS 61810-1.

Sockets

HR5XS21

HR5XS22

HR5XS21S

HR5XS21P

Order code	Description	Qty per pkg
		no.
Sockets for relays (supplied without retain/release clip). Terminal layout see page 24-11.		
HR5XS21	Screw terminals, contact terminals all on upper side. Fitting on DIN rail or with screws	10
HR5XS22	Screw terminals. Fitting on DIN rail or with screws	10
HR5XS21S	Terminals with **Push-in technology**. Fitting on DIN rail or with screws	10
HR5XS21P	PIN terminals for Printed Circuit Board	40

General characteristics
HR5X... series sockets can have screw or Push-in terminals for quick wiring. A socket with pins for PCB is also available. Screw terminals are available in 2 versions: with contact terminals separated from the coil terminals or with NC contact terminals near the coil terminals.
Surge suppressor filters, parallel busbars and tags for writing can be snap-fitted to the sockets.

Operational characteristics
- Rated insulation voltage: 250V
- Rated impulse withstand voltage: 4kV
- Maximum current: 10A
- Terminal layout see page 24-10
- Operating temperature: -40...+70°C.

Certifications and compliance
Certifications obtained:
- Screw terminal sockets: cURus, CSA, EAC
- Push-in terminal sockets: cURus, EAC
- PIN terminal sockets: cURus

Compliant with standards: IEC/EN/BS 61810-1.

Accessories

HR3X88

HR3X86

HR6X78024

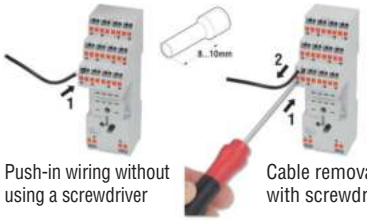
HR5X30

HR5X9002

HR5X9008

Order code	Description	Qty per pkg
		no.
HR3X88	Retain/release clip. Not suitable for HR5XS21P socket	20
HR3X86	Retaining clip. Only mounting on socket HR5XS21P	10
HR5X30	Marker tags	100
HR6X78024	Plug-in surge suppressor filters. 6...24VDC with LED	10
HR6X77024	Plug-in surge suppressor filters. 6...24VAC/DC (RC)	10
HR6X77230	Plug-in surge suppressor filters. 110...230VAC/DC (RC)	10
HR5X9008	8-pole parallel busbar - black - for sockets with screw terminals	10
HR5X9002	Bus jumper for A2 terminals; for Push-in terminal sockets only	10

HR5XS21S socket with Push-in technology
Push-in wiring without using a screwdriver for cables with end lugs. They guarantee fast wiring and clamping force maintained over time even in the presence of vibrations and/or shocks. To connect cables without end lug and for cables removal, a screwdriver needs to push the handy buttons.



Push-in wiring without using a screwdriver

Cable removal with screwdriver

Miniature relays clear enclosure

HR40...

Order code	Control voltage	Contacts	Rated current	Description	Qty per pkg
			[A]		no.
Miniature relays clear enclosure.					
HR401CD012	12VDC	1 C/O	16	Mounting on HR5XS2... socket (max 10A)	50
HR401CD024	24VDC	1 C/O	16		50
HR401CA024	24VAC	1 C/O	10	Mounting on HR5XS2... socket	50
HR401CA110	110VAC	1 C/O	10		50
HR401CA230	230VAC	1 C/O	10		50
HR402CD012	12VDC	2 C/O	10	Mounting on HR5XS2... socket	50
HR402CD024	24VDC	2 C/O	10		50
HR402CA024	24VAC	2 C/O	5	Mounting on HR5XS2... socket	50
HR402CA110	110VAC	2 C/O	5		50
HR402CA230	230VAC	2 C/O	5		50

Miniature relays with LED state indicator and mechanical actuator

new

HRA50...

HR50...

Order code	Control voltage	Contacts	Rated current	Description	Qty per pkg
			[A]		no.
Miniature relay and base ready assembled with LED state indicator and mechanical actuator.					
HRA502CD024K5	24VDC	2 C/O	8	Push-in terminals with retain/ release clip and suppressor filter	5
HRA502CD024K4	24VDC	2 C/O	8	Screw terminals with retain/release clip	5
HRA502CA024K4	24VAC	2 C/O	8		5
HRA502CA230K4	230VAC	2 C/O	8		5
Miniature relays with LED state indicator and mechanical actuator.					
HR501CD012	12VDC	1 C/O	16	Mounting on HR5XS2... socket (max 10A)	10
HR501CD024	24VDC	1 C/O	16		10
HR501CD048	48VDC	1 C/O	16		10
HR501CD110	110VDC	1 C/O	16		10
HR501CA024	24VAC	1 C/O	16		10
HR501CA110	110/120VAC	1 C/O	16		10
HR501CA230	230VAC	1 C/O	16		10
HR502CD012	12VDC	2 C/O	8	Mounting on HR5XS2... socket	10
HR502CD024	24VDC	2 C/O	8		10
HR502CD048	48VDC	2 C/O	8		10
HR502CD110	110VDC	2 C/O	8		10
HR502CA012	12VAC	2 C/O	8		10
HR502CA024	24VAC	2 C/O	8		10
HR502CA110	110/120VAC	2 C/O	8		10
HR502CA230	230VAC	2 C/O	8		10

Sockets

HR5XS21

HR5XS22

HR5XS21S

HR5XS21P

Order code	Description	Qty per pkg
		no.
Sockets for relays (supplied without retain/release clip). Terminal layout see page 24-11.		
HR5XS21	Screw terminals, contact terminals all on upper side. Fitting on DIN rail or with screws	10
HR5XS22	Screw terminals. Fitting on DIN rail or with screws	10
HR5XS21S	Terminals with **Push-in technology**. Fitting on DIN rail or with screws	10
HR5XS21P	PIN terminals for Printed Circuit Board	40

Accessories

HR5X86

HR5X87

HR5X88

HR5X30

HR5X9008

HR6X78024

HR5X9002

Order code	Description	Qty per pkg
		no.
HR5X86	Metal retaining clip. Only mounting on HR5XS21P socket	10
HR5X87	Metal retaining clip. Not suitable for HR5XS21P socket	20
HR5X88	Plastic retaining clip. Not suitable for HR5XS21P socket	10
HR5X30	Marker tags	100
HR6X78024	Plug-in surge suppressor filters. 6...24VDC with LED	10
HR6X77024	Plug-in surge suppressor filters. 6...24VAC/DC (RC)	10
HR6X77230	Plug-in surge suppressor filters. 110...230VAC/DC (RC)	10
HR5X9008	8-pole parallel busbar - black	10
HR5X9002	Bus jumper for A2 terminals; for Push-in terminal sockets only	10

General characteristics
HR40... and HR50... miniature relays have reduced dimensions and, in addition to the high electrical performance. HR40... has a clear enclosure that allow contacts visibility for wear and tear check. HR50... is equipped with the following functions: LED to indicate voltage on the coil, mechanical contact state indicator and mechanical test actuator. The mechanical actuator is particularly useful for performing functional tests; it can also keep the relay closed continuously.

Operational characteristics
- Rated insulation voltage: 250V (400V with pollution degree 2)
- Relay control voltage:
  - HR40...: 12 and 24VDC
  - HR40...: 24, 110 and 230VAC 50/60Hz
  - HR50...: 12, 24 and 48VDC
  - HR50...: 12, 24, 110/120 and 230VAC 50/60Hz
- Max AC-1 controllable power (1C/2C):
  - HR40...3840/2500W (version with DC coil)
  - HR40...2500W/1250W (version with AC coil)
  - HR50...: 4000/2000W
- Max AC-15controllable power: 150VA
- Maximum current (1C/2C):
  - HR40...: 16A/10A (version with DC coil)
  - HR40...: 10A/5A (version with AC coil)
  - HR50...: 16A/8A.

Certifications and compliance
Certifications obtained: HR401CD... cURus; HR402CD... cURus, TüV; HR40...CA... cURus, TüV; HR501C... and HR502C... cURus, CSA, EAC, VDE.
Note: HR502CA012 no certification.
Compliant with standards: IEC/EN/BS 61810-1.

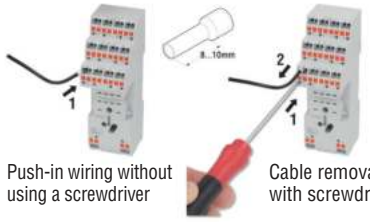
General characteristics
HR5X... series sockets can have screw or Push-in terminals for quick wiring. A socket with pins for PCB is also available. Screw terminals are available in 2 versions: with contact terminals separated from the coil terminals or with NC contact terminals near the coil terminals.
Surge suppressor filters, parallel busbars and tags for writing can be snap-fitted to the sockets intended for DIN rail mounting.

Operational characteristics
- Rated insulation voltage: 250V
- Rated impulse withstand voltage: 4kV
- Maximum current: 10A
- Terminal layout see page 24-10
- Operating temperature: -40...+70°C.

Certifications and compliance
Certifications obtained:
- Screw terminal sockets: cURus, CSA, EAC
- Push-in terminal sockets: cURus, EAC
- PIN terminal sockets: cURus

Compliant with standards: IEC/EN/BS 61810-1.

HR5XS21S socket with Push-in technology
Push-in wiring without using a screwdriver for cables with end lugs. They guarantee fast wiring and clamping force maintained over time even in the presence of vibrations and/or shocks. To connect cables without end lug and for cables removal, a screwdriver needs to push the handy buttons.



Push-in wiring without using a screwdriver

Cable removal with screwdriver

Industrial relays with LED state indicator and mechanical actuator

HRA60...

HR60...

new

Order code	Control voltage	Contacts	Rated current	Description	Qty per pkg
			[A]		no.
Industrial relay and base ready assembled with LED state indicator and mechanical actuator.					
HRA604CD024K4	24VDC	4 C/O	5	Screw terminals with retain/release clip	5
HRA604CA024K4	24VAC	4 C/O	5		5
HRA604CA230K4	230VAC	4 C/O	5		5
Industrial relays with LED state indicator and mechanical actuator.					
HR602CD012	12VDC	2 C/O	7	Fitting on socket HR6XS2...	10
HR602CD024	24VDC	2 C/O	7		10
HR602CD048	48VDC	2 C/O	7		10
HR602CA012	12VAC	2 C/O	7		10
HR602CA024	24VAC	2 C/O	7		10
HR602CA110	110/120VAC	2 C/O	7		10
HR602CA230	230VAC	2 C/O	7		10
HR604CD012	12VDC	4 C/O	5	Fitting on socket HR6XS4...	10
HR604CD024	24VDC	4 C/O	5		10
HR604CD048	48VDC	4 C/O	5		10
HR604CA012	12VAC	4 C/O	5		10
HR604CA024	24VAC	4 C/O	5		10
HR604CA110	110/120VAC	4 C/O	5		10
HR604CA230	230VAC	4 C/O	5		10

General characteristics
HR60... type industrial relays are available in 2/4-changeover-contact versions. They are equipped with LEDs that indicate control voltage, a mechanical contact state indicator and a mechanical actuator. The actuator is particularly useful for performing functional tests; it can also keep the relay closed continuously.

Operational characteristics
- Rated insulation voltage: 250V
- Rated impulse withstand voltage: 4kV
- Relay control voltage: 12, 24 or 48VDC - 12, 24, 110/120 and 230VAC, 50/60Hz
- Max controllable current in AC-1 (2C/4C): 7/5A
- Maximum current (2C/4C): 7A/5A.

Certifications and compliance
Certifications obtained: cURus, CSA, EAC, VDE.
Compliant with standards: IEC/EN/BS 61810-1.

Sockets

HR6XS21

HR6XS41

HR6XS42

HR6XS41S

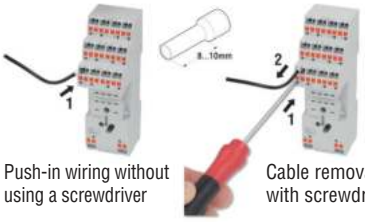
Order	Description	Qty per pkg
		no.
Sockets for relays (supplied without retain/release clip) for fitting on DIN rail or with screws. Terminal layout see page 24-11.		
For relays with 2 changeover contacts.		
HR6XS21	Screw terminals, contact terminals all on upper side	10
HR6XS22	Screw terminals	10
HR6XS41S	Terminals with **Push-in technology**	10
For relays with 4 changeover contacts.		
HR6XS41	Screw terminals, contact terminals all on upper side	10
HR6XS42	Screw terminals	10
HR6XS41S	Terminals with **Push-in technology**	10

General characteristics
HR6X... series sockets have screw terminals and are supplied in two versions for relays with 2 or 4 contacts. Surge suppressor filters and tags for writing can be plugged in to the sockets.
They can be fixed on DIN rail or with screws.

Operational characteristics
- Rated insulation voltage: 250V
- Rated impulse withstand voltage: 4kV
- Maximum current: 10A
- Terminal layout see page 24-10 and 11
- Operating temperature: -40...+70°C

Certifications and compliance
Certifications obtained: cURus, CSA, EAC (CSA only for screw terminal sockets).
Compliant with standards: IEC/EN/BS 61810-1.

HR6XS41S socket with Push-in technology
Push-in wiring without using a screwdriver for cables with end lugs. They guarantee fast wiring and clamping force maintained over time even in the presence of vibrations and/or shocks. To connect cables without end lug and for cables removal, a screwdriver needs to push the handy buttons.



Push-in wiring without using a screwdriver

Cable removal with screwdriver

Accessories

HR6X88

HR6X87

HR5X30

HR6X78024

HR5X9002

Order	Description	Qty per pkg
		no.
HR6X87	Metal retaining clip	20
HR6X88❶	Plasic retain/release clip	20
HR6X30	Marker tag for sockets with screw terminals	100
HR5X30	Marker tag for sockets with Push-in terminals	100
HR6X78024	Plug-in surge suppressor filters. 6...24VDC with LED	10
HR6X77024	Plug-in surge suppressor filters. 6...24VAC/DC (RC)	10
HR6X77230	Plug-in surge suppressor filters. 110...230VAC/DC (RC)	10
HR5X9002	Bus jumper for A2 terminals; for Push-in terminal sockets only	10

❶ Not suitable for sockets with Push-in terminals.

8-pin and 11-pin industrial relays with LED state indicator and mechanical actuator

HR70...

Order code	Control voltage	Contacts	Rated current	Description	Qty per pkg
			[A]		no.
Industrial relays with LED state indicator and mechanical actuator. 8-pin type.					
HR702CD024	24VDC	2 C/O	10	Fitting on socket HR7XS1	10
HR702CD048	48VDC	2 C/O	10	Fitting on socket HR7XS1	10
HR702CD110	110VDC	2 C/O	10	Fitting on socket HR7XS1	10
HR702CA024	24VAC	2 C/O	10	Fitting on socket HR7XS1	10
HR702CA110	110/120VAC	2 C/O	10	Fitting on socket HR7XS1	10
HR702CA230	230VAC	2 C/O	10	Fitting on socket HR7XS1	10
Industrial relays with LED state indicator and mechanical actuator. 11-pin type.					
HR703CD024	24VDC	3 C/O	10	Fitting on socket HR7XS2	10
HR703CD048	48VDC	3 C/O	10	Fitting on socket HR7XS2	10
HR703CD110	110VDC	3 C/O	10	Fitting on socket HR7XS2	10
HR703CA024	24VAC	3 C/O	10	Fitting on socket HR7XS2	10
HR703CA110	110/120VAC	3 C/O	10	Fitting on socket HR7XS2	10
HR703CA230	230VAC	3 C/O	10	Fitting on socket HR7XS2	10

General characteristics
HR70... type industrial relays are available in 2 or 3 changeover versions. They are equipped with LEDs that indicate control voltage, mechanical contact state indicator and mechanical actuator. The actuator is particularly useful for performing functional tests; it can also keep the relay closed continuously.
HR70... has high electrical endurance performance and lends itself to the most heavy-duty applications.

Operational characteristics
- Rated insulation voltage: 250V
- Rated impulse withstand voltage: 4kV
- Relay control voltage: 24 and 48VDC- 24, 110/120 and 230VAC, 50/60Hz
- Maximum current: 10A.

Certifications and compliance
Certifications obtained: cURus, CSA, EAC.
Compliant with standards: IEC/EN/BS 61810-1.

Sockets

HR7XS1

HR7XS2

Order code	Description	Qty per pkg
		no.
Sockets for relays (supplied without retaining clip), for fitting on DIN rail or with screws. Terminal layout see page 24-11.		
HR7XS1	8-pin for HR702C... Screw terminals	10
HR7XS2	11-pin for HR703C... Screw terminals	10

General characteristics
HR7X... series sockets have screw terminals and are supplied in two versions for relays with 2 or 3 contacts (8-pin – 11-pin).
They can be fixed on DIN rail or with screws.

Operational characteristics
- Rated insulation voltage: 250V
- Rated impulse withstand voltage: 4kV
- Maximum current: 10A
- Operating temperature: -40...+70°C.

Certifications and compliance
Certifications obtained: cURus, CSA, EAC.
Compliant with standards: IEC/EN/BS 61810-1.

Accessories

HR7X87

Order code	Description	Qty per pkg
		no.
HR7X87	Metal retaining clip	20

Power relays with Atex certificate

HR80...

	Order code	Control voltage	Contacts	Rated current	Characteristics	Qty per pkg
				[A]		no.
new	**HR8020D012**	12VDC	2 NO	30	Faston terminals. Screw fixing	20
	HR8020A024	24VAC	2 NO	30	Faston terminals. Screw fixing	20
new	**HR8020A120**	110/120VAC	2 NO	30	Faston terminals. Screw fixing	20
	HR8020A230	230VAC	2 NO	30	Faston terminals. Screw fixing	20
new	**HR802CD012**	12VDC	2 C/O	30❶	Faston terminals. Screw fixing	20
	HR802CA024	24VAC	2 C/O	30❶	Faston terminals. Screw fixing	20
new	**HR802CA120**	110/120VAC	2 C/O	30❶	Faston terminals. Screw fixing	20
	HR802CA230	230VAC	2 C/O	30❶	Faston terminals. Screw fixing	20

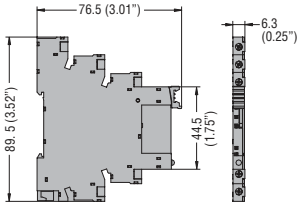
❶ 3A for NC contact.

General characteristics
The HR80... power relays, thanks to the Atex certification, are particularly suitable for refrigeration systems that use propane gas.
The compact structure and the front Faston terminals make them easy to install even in small spaces and speed up wiring.

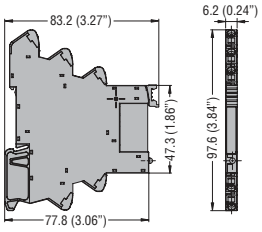
Operational characteristics
- Rated insulation voltage: 250V (277V for UL)
- Rated impulse withstand voltage:
  - 4kV between contacts and coil
  - 1.5kV between open contacts
  - 2kV between poles
- Max current 30A for NO contacts; 3A for NC contacts
- Faston terminals 6.3x0.8mm.

Certifications and compliance
Certifications obtained: cURus, Atex.
Compliant with standards: IEC/EN/BS 61810-1.

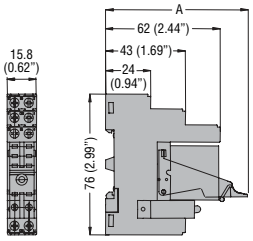
HRA10... - HR10... - HR20 with socket HR1XS...



HRA101CE024S with socket HR1XS...S

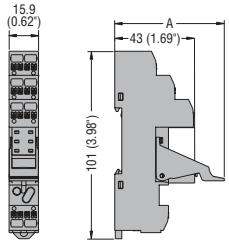


HR30... - HRA30... - HR40... - HR50... HRA50... with socket HR5XS21



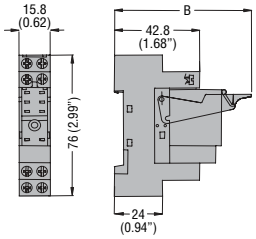
A: 64mm (2.52") with HR3X88
75mm (2.95") with XR5X88

HR30... - HRA30... - HR40... - HR50... HRA50... with socket HR5XS21S



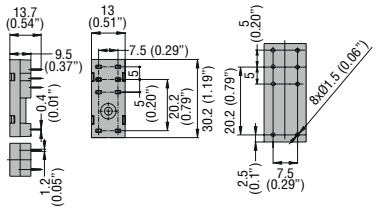
A: 60mm (2.36") with HR3X88
70mm (2.75") with XR5X88

HR30... - HR40... - HR50... with socket HR5XS22

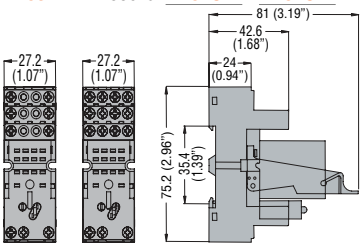


B: 57.5mm (2.26") with HR3X88
68mm (2.68) with XR5X88

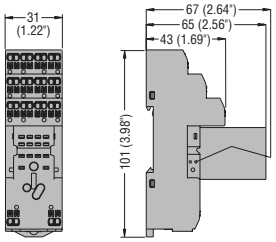
HR5XS21P



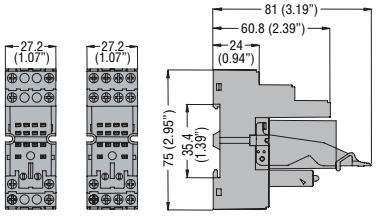
HR60... with socket HR6XS21 - HR6XS41



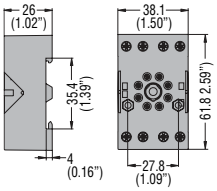
HR602C... - HR604C... with socket HR6XS41S



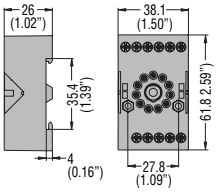
HR60... - HRA60... with socket HR6XS22 - HR6XS42



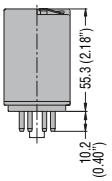
HR7XS1



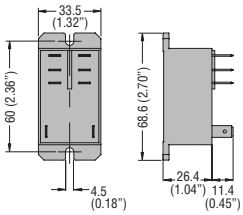
HR7XS2



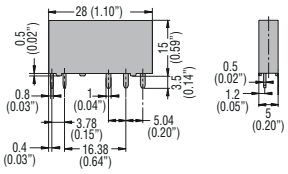
HR702C... - HX703C...



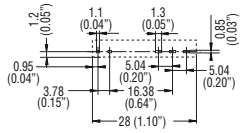
HR8020... - HX802C...



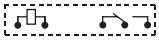
HR10 - HR20



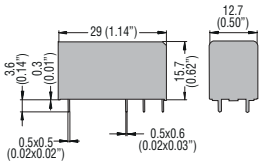
PCB layout



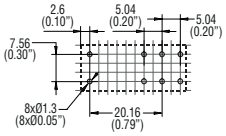
Connections
1 changeover contact



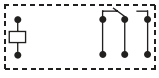
HR30



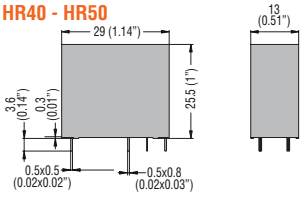
PCB layout



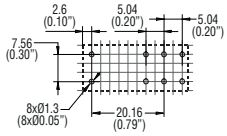
Connections
1 changeover contact



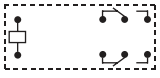
HR40 - HR50



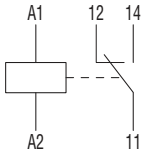
PCB layout



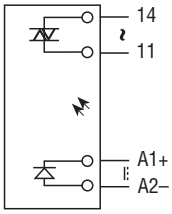
Connections
2 changeover contacts



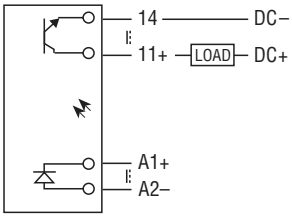
HR101C..., HRA101C...



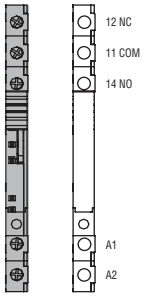
HR201A...



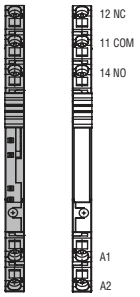
HR201D...



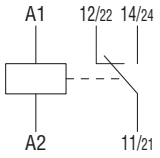
HR1XS...



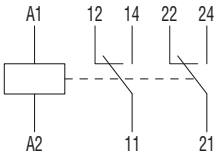
HR1XS...S



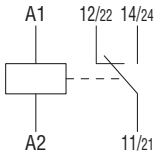
HR301C...



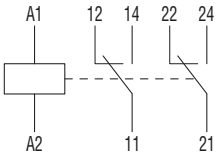
HR302C... - HRA302C...



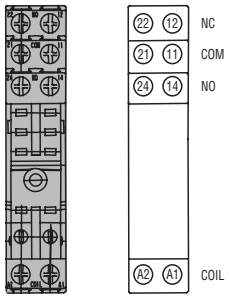
HR401C... - HR501C...



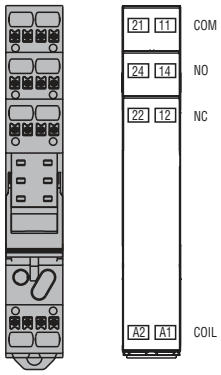
HR402C... - HR502C... - HRA502C...



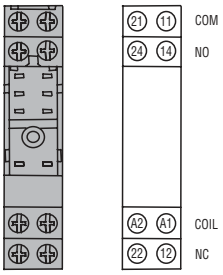
HR5XS21



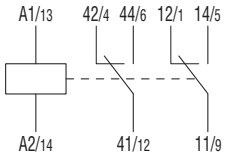
HR5XS21S



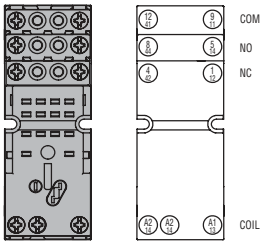
HR5XS22



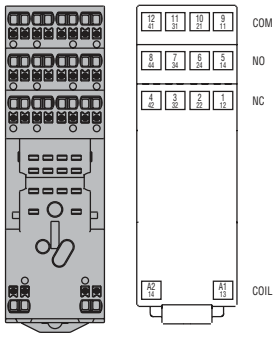
HR602C... - HRA602C...



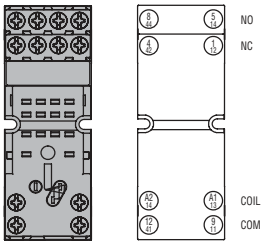
HR6XS21



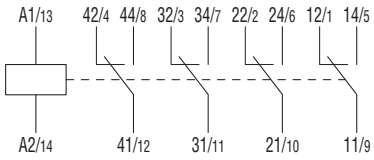
HR6XS41S



HR6XS22



HR604C...



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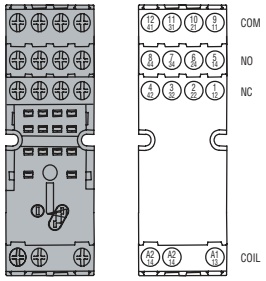

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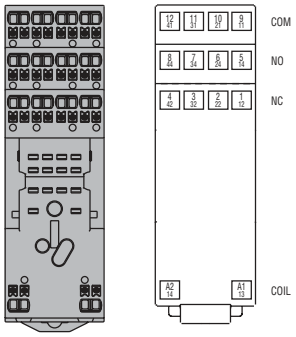

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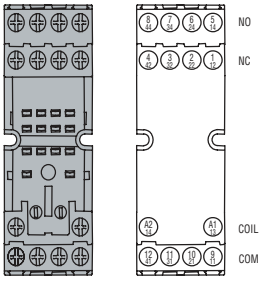
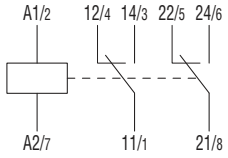
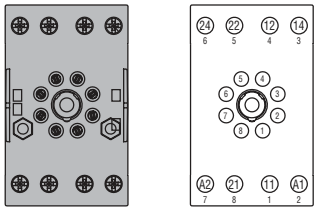


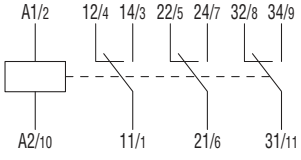
HR702C...



HR7XS1



HR703C...



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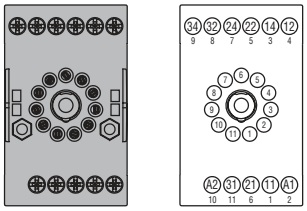
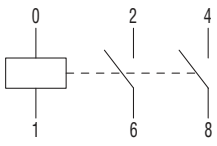
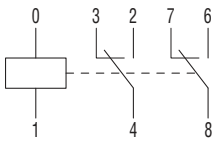


HR8020...



HR802C...

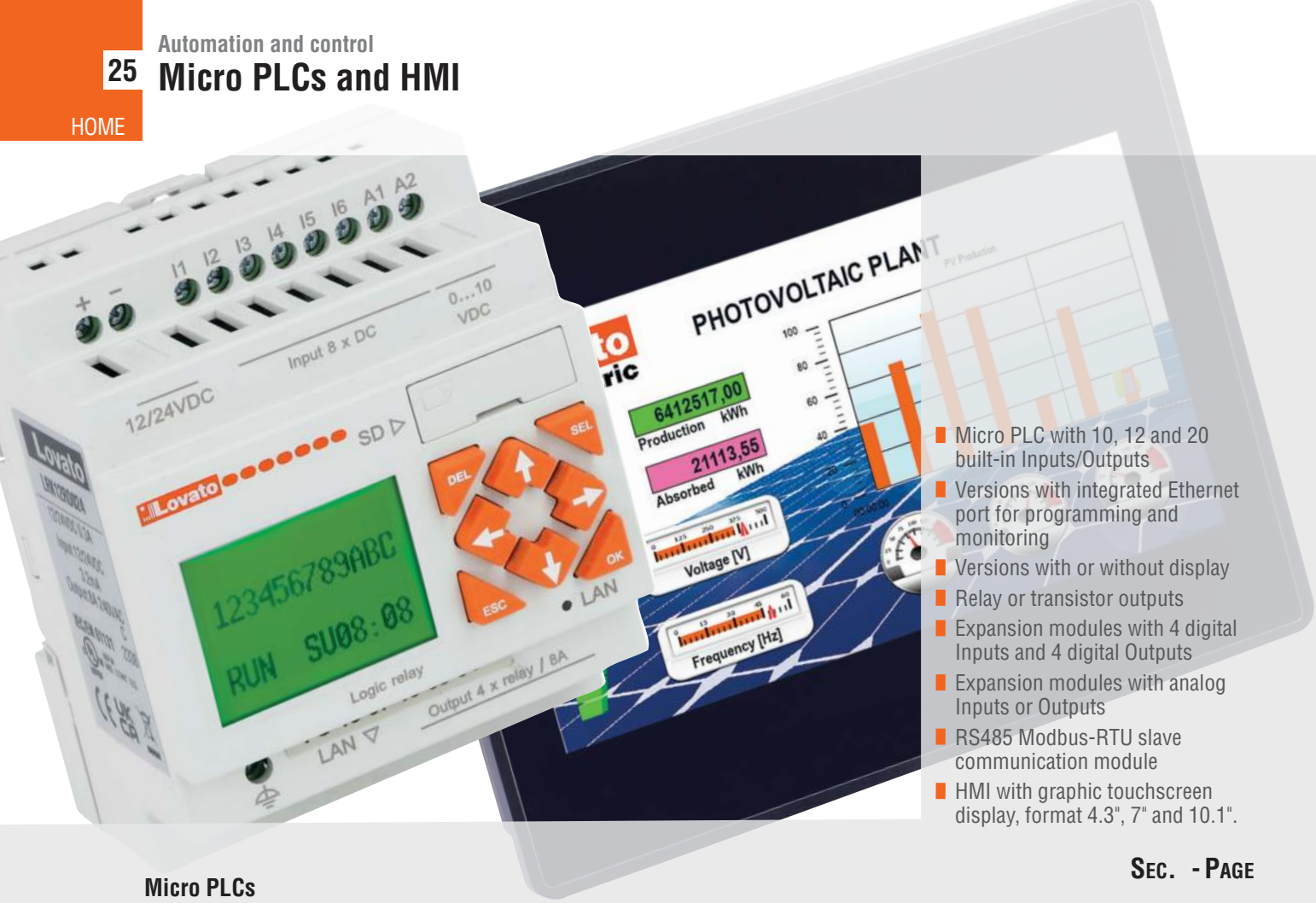


Type		HRA10.. HR10...	HR201AS024	HR201DS024	HR301C...	HR302C...	HR401CD...	HR402CD...
CHARACTERISTICS OF THE CONTACTS								
Contact configuration		1 C/O	1 static	1 static	1 C/O	2 C/O	1 C/O	2 C/O
Rated insulation voltage Ui	V	250	2500 (in/out)	2500 (in/out)	250	250	250	250
Rated impulse withstand voltage Uimp	kV	4	4	1.5	6	6	4	5
Conventional free air thermal current Ith	A	6	2	4	16❷	8	16❷	10
Maximum instantaneous current	A	20 (500ms)	40 (10ms)	48 (10ms)	60❶	20❶	60	26
Rated operating voltage AC1	VA	1500	❹	–	4000	2000	4000	2500
Rated operating voltage AC15 (230VAC)	VA	360	❹	–	300❶	150❶	500	400
Single-phase motor control (230VAC)	kW	0.186	❹	–	0.4	0.2	0.37	0.3
Rated operating voltage DC1: 30/110/220V	A	6 / 0.2 / 0.12	–	❺	12 / 0.3 / 0.1	8 / 0.3 / 0.1	10 / 0.3 / 0.12	8 / 0.3 / 0.12
Minimum switching load	V / mA	5 / 100	24 / 0.1	3 / 0.02	5 / 100		5 / 100	
Contact impedance	mΩ	100	–	–	100		100	
Contact material		Ag/Ni	–	–	Ag/SnO_2		Ag/SnO_2	
Max socket terminal tightening torque	Nm	0.5			0.6		0.6	
Socket screw tightening tool (cross / flat blade)		Phillips 0 / 3.5mm			Phillips 1 / 4.5mm❸		Phillips 1 / 4.5mm❸	
Wire section on sockets with screw or Push-in terminals (min...max)	mm^2	0.5...1.5			0.5...2.5		0.5...2.5	
	AWG	20...16			20...14		20...14	
OPERATING TIMES								
Closing	ms	≤8	10	0.3	< 10		< 15	
Opening	ms	≤4	10	0.3	< 5		< 5	
ENDURANCE								
Mechanical	Cycles	10,000,000	Theoretically infinite		10,000,000		10,000,000	
Electrical with load AC1	Cycles	30,000❶	Theoretically infinite		50,000❶		100,000❶	
COIL CHARACTERISTICS								
Average coil consumption AC (50/60Hz) at 20°C	VA	0.2	–	–	0.9		–	–
Average coil consumption DC at 20°C	W	0.2	–	–	0.45		0.7	0.5
Operating range closing	(% Un)	≥75	80...120	80...120	70...110AC / 75...110DC		75...110	75...110
opening	(% Un)	≥5			20...55AC / 10...30DC		10...30	10...30
Maximum cycle frequency	cycles/h	10,000	>100,000	>100,000	3,600		3,600	3,600
AMBIENT CONDITIONS								
Operating temperature	°C	-40...+70	-30...+80		-40...+85		-40...+85	
Storage temperature	°C	-40...+80	-30...+100		-40...+85		-40...+85	
Fitting position		Any						
OTHER CHARACTERISTICS								
Indicator LED		Yes (on the socket)			No		No	
Mechanical contact position indicator		No			No		No	
Mechanical test actuator		No			No		No	
Socket fixing		On 35mm DIN rail			On 35mm DIN rail and with screws			

❶ NO contact.
❷ Maximum socket current of 10A.
❸ 2.5mm flat blade for versions with Push-in terminals.
❹ 2A output 24...280VAC.
❺ 4A output 3...28VDC.

	HR401CA...	HR402CA...	HR501C...	HR502C...	HR602C...	HR604C...	HR702C...	HR703C...	HR8020...	HR802C...
	1 C/O	2 C/O	1 C/O	2 C/O	2 C/O	4 C/O	2 C/O	3 C/O	2 NO	2 C/O
	250	250	250		500		250		250	
	4	4	6		4		6		4	
	10	5	16❷	8	7	5	10	10	30	30 NO (3 NC)
	–	–	20❶	10❶	–	–	–	–	–	–
	2500	1250	4000	2000	1750	1250	2500	2500	–	–
	–	–	150❶	150❶	150❶	150❶	500	500	–	–
	0.25	0.12	0.1	-	0.37	0.37	1.2	1.2	2.2	2.2
	–	–	12 / 0.3 / 0.1	8 / 0.3 / 0.1	12 / 0.3 / 0.1	8 / 0.3 / 0.1	10 / - / -	10 / - / -	–	–
	5 / 100		5 / 100		5 / 100		5 / 100		–	
	50		100		100		100		50	
	Ag/SnO_2		Ag/Ni		Ag/Ni		Ag/Ni		Ag/SnO_2	
	0.6		0.6		0.6		0.6		–	
	Phillips 1 / 4.5mm❸		Phillips 1 / 4.5mm❸		Phillips 1 / 4.5mm		Phillips 1 / 4.5mm		–	
	0.5...2.5		0.5...2.5		0.5...2.5		0.5...2.5		–	
	20...14		20...14		20...14		20...14		–	
	< 20		< 15		< 25		< 30		25	
	< 10		< 15		< 25		< 30		25	
	10,000,000		10,000,000		20,000,000		5,000,000		5,000,000	
	100,000❶		30,000❶		50,000❶	100,000	100,000		100,000	
	1		1		1.7		3		4	
	–		0.4		1.1		1.5		1.7	
	80...110		70...110AC / 75...110DC		70...110AC / 75...110DC		70...110AC / 75...110DC		80...110	
	> 10		20...55AC / 10...30DC		20...55AC / 10...30DC		20...55AC / 10...30DC		20...55	
	1,800		3,600		3,600		3,600		360	
	-40...+85		-40...+70		-40...+70		-40...+55		-40...+85	
	-40...+85		-40...+85		-40...+80		-40...+70		-40...+85	
	Any									
	No		Yes		Yes		Yes		No	
	No		Yes		Yes		Yes		No	
	No		Yes		Yes		Yes		No	
	On 35mm DIN rail and with screws		On 35mm DIN rail and with screws		On 35mm DIN rail and with screws		On 35mm DIN rail and with screws		Screw fixing	

Micro PLCs and HMI



- Micro PLC with 10, 12 and 20 built-in Inputs/Outputs
- Versions with integrated Ethernet port for programming and monitoring
- Versions with or without display
- Relay or transistor outputs
- Expansion modules with 4 digital Inputs and 4 digital Outputs
- Expansion modules with analog Inputs or Outputs
- RS485 Modbus-RTU slave communication module
- HMI with graphic touchscreen display, format 4.3", 7" and 10.1".

	SEC. - PAGE
Micro PLCs	
Micro PLCs LRK series	25 - 6
Micro PLCs LRD series	25 - 7
Expansion and communication modules	25 - 8
Accessories	25 - 9
Kit	25 - 9
HMI	**25 - 11**
Dimensions	**25 - 12**
Wiring diagrams	**25 - 13**
Technical characteristics	**25 - 14**

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MICRO PLCs LRK SERIES

- Compact with great performance
- Base modules with 10, 12 or 20 Inputs/Outputs
- Integrated Ethernet port for programming, monitoring and web server
- Wide program memory
- Versions with or without display
- 12/24VDC or 100...240VAC power supply
- Relay outputs
- Expandable with expansion modules LRE type.

Pag. 25-7

MICRO PLCs LRD SERIES

- Simple and functional.
- Base modules with 10, 12 or 20 Inputs/Outputs
- 12VDC, 24VDC, 24VAC or 100...240VAC power supply
- Relay or transistor outputs
- Expandable with expansion modules LRE type.

Pag. 25-8

EXPANSION AND COMMUNICATION MODULES

- Digital Inputs/Outputs
- Analog inputs (0...10V, 0/4...20mA)
- Analog outputs (0...10V, 0/4...20mA)
- Relay or transistor outputs
- PT100 temperature sensor inputs
- Modbus-RTU communication module
- 24VDC, 24VAC or 100...240VAC power supply.

Pag. 25-9

ACCESSORIES

- Program backup memory
- Power supply unit
- HMI operator panel with graphic LCD.

Pag. 25-9

KIT

- Micro PLCs LRD series complete with software and USB programming cable
- Training kits complete with micro PLC and Inputs/Outputs simulation board.

Pag. 25-11

HMI

- Graphic display with touchscreen
- Available in formats 4.3", 7" and 10.1"
- Programming software
- IP66, Type 2 and 4X.

		LRK series	LRD series
Built-in Ethernet port		●	–
LCD display		● (not present on LRK12RD024B)	●
Auxiliary power supply		versions: 12/24VDC,100-240VAC	versions: 24VDC,12VDC, 24VAC, 100-240VAC
Integrated Inputs/Outputs in the base module		10, 12 or 20	10, 12 or 20
Maximum number of Inputs/Outputs (I/O) ❶		56 I/Os with expansion modules (44 digital I/Os + 12 analog I/Os) + 172 I/Os with network connection (126 digital Network I/Os + 46 analog Network I/Os)	56 I/Os with expansion modules (44 digital I/Os + 12 analog I/Os)
Program memory		600 rows (ladder), 500 blocks (FBD)	300 rows (ladder), 260 blocks (FBD)
RS485 port		optional, integrated on type LRK20RD024RS	optional, integrated on type LRD20RD024P1
Programming		standard Ethernet cable	dedicated USB cable type LRXC03
Web server		●	–
Program backup memory		micro-SD card (32GB max)	dedicated module type LRXM00
Slot for battery for the retention of the clock time		● (optional CR1220 battery)	–
Basic functions	Arithmetic operations (addition, subtraction, multiplication, division)	●	●
	Timers	● (31)	● (31)
	Counters	● (31)	● (31)
	Analog comparators	● (31)	● (31)
	Real Time Clock	● (31)	● (31)
	HMI display pages	● (31)	● (31)
	Auxiliary memories (merkers M+N)	● (127 + 127)	● (63 + 63)
	Data registers	● (240)	● (240)
	Multiplexers	● (15)	● (15)
Advanced functions	Data-logging	●	–
	Astronomical clock	●	–
	Analog filter	●	–
	Max, min and average value	●	–
	PID	●	●
	Network I/O (control or remote I/Os between micro PLC connected in Ethernet)	●	–
	RS485 functions: remote I/O (master-slave), I/O link, Modbus RTU commands	LRK20RD024RS only	LRD20RD024P1 only

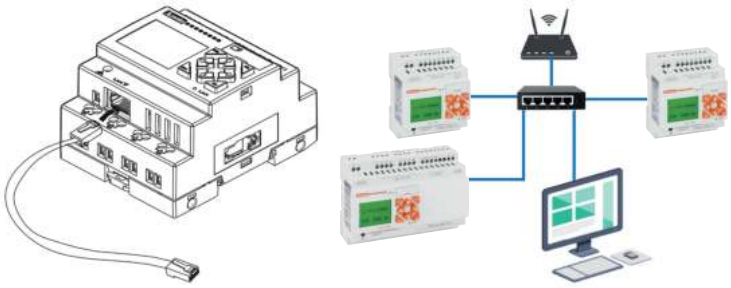
❶ Considering the base module with the highest number of built-in I/Os (type LR...20...).

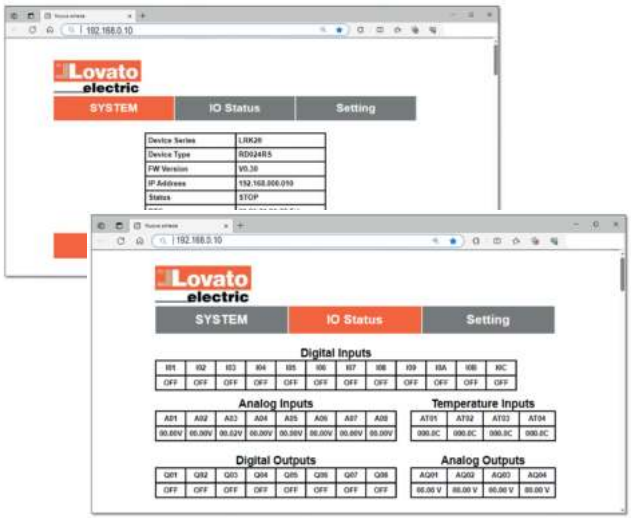
Lovato electric

MICRO PLCs LRK SERIES
COMPACT WITH GREAT PERFORMANCE

BUILT-IN ETHERNET PORT

- local or remote programming with connection through IP address
- connection with standard Ethernet cable, without the need for special cables for programming
- support of Modbus-TCP communication port for the integration in supervision systems or interfacing with master intelligent devices such as HMI, PC or PLC
- built-in web server for the monitoring of the status and the main variables of the micro PLC from remote through a web browser.

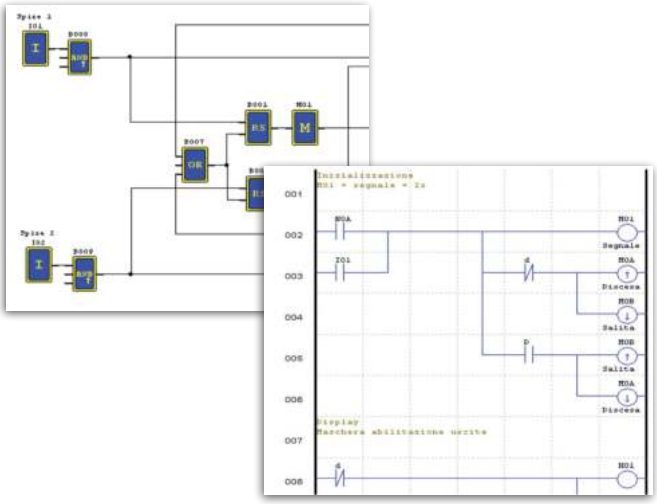




WIDE PROGRAM MEMORY

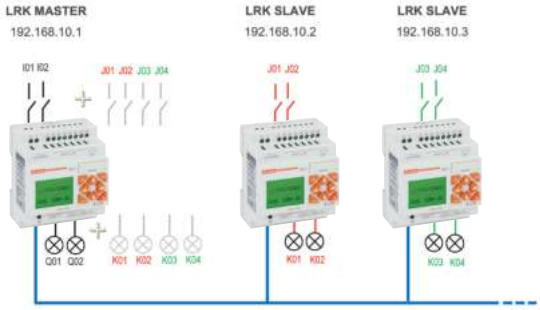
Double memory compared to micro PLC LRD series, for programs with medium-high complexity:

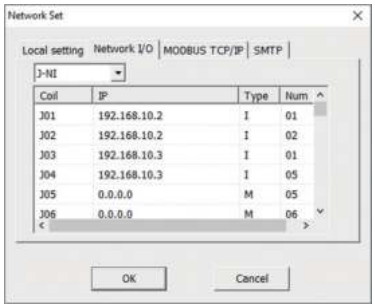
- **600 rows** for LADDER programming (contact scheme)
- **500 blocks** for FBD (function blocks).

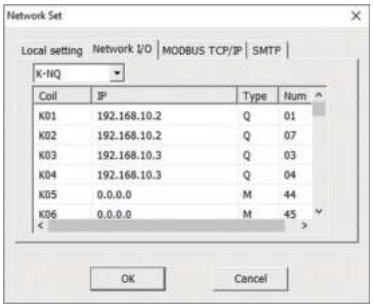


LARGE NUMBER OF MANAGEABLE INPUTS AND OUTPUTS

- up to 56 I/Os with the connection of expansion modules type LRE (44 digital I/O + 12 analog I/O)
- plus additional 172 I/Os controlled through network connection between more LRK base modules (126 digital Network I/Os + 46 analog Network I/Os): one LRK base module configured as master can control the I/Os of other LRK base modules configured as slaves connected on the same network.



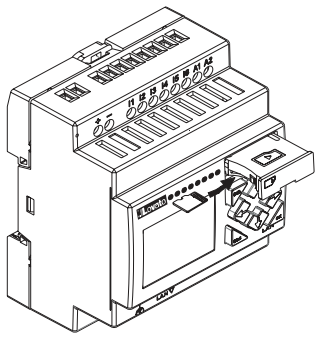




SUPPORT OF MICRO-SD CARD

- for program backup or data-logging
- support of standard micro-SD card (32GB max).

The micro-SD card allows the saving of the project to be transferred on other micro PLC LRK series, without the need of dedicated memory modules.
It can also be used for the data-logging function, to store up to 15 variables of the micro PLC, sampled at configurable time intervals, which are saved to a daily xls file on the micro-SD card.



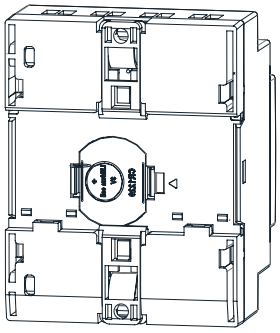
	A	B	C
1	Time	Coil_Name	Current_Value
2	24/01/10 10:30:00	A01	252
3	24/01/10 10:30:00	C01	8
4	24/01/10 10:30:00	DR07	12
5	24/01/10 10:35:00	A01	345
6	24/01/10 10:35:00	C01	20
7	24/01/10 10:35:00	DR07	39

POWER SUPPLY 12/24VDC

The base modules with DC auxiliary power supply (type LRK...D024...) can be powered either at 12VDC or 24VDC, ensuring maximum flexibility for any application.
It is also available a version with auxiliary power supply 100...240VAC (type LRK10RA240).

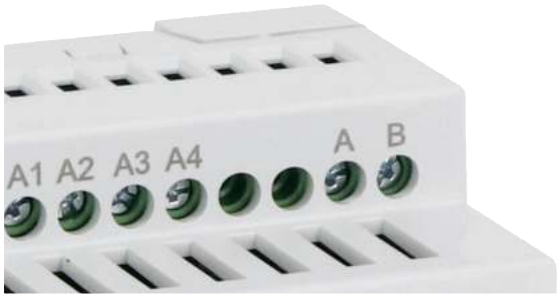
SLOT FOR BATTERY FOR THE RETENTION OF THE RTC

On the back of the micro PLC, there is a slot for an optional CR1220-type battery to maintain the integrated date and time even in the absence of power supply.



RS485 PORT

The micro PLC type LRK20RD024RS, in addition to the Ethernet port, also integrates a second communication port RS485 type, which operates independently of the Ethernet port.



ASTRONOMICAL CLOCK

Functionality that automatically calculates the sunrise and sunset times of a specific location based on set geographical coordinates (latitude and longitude). It is used to control the activation of the outputs of the micro PLC between sunrise and sunset, for applications such as public lighting control or the management of lights in parking lots, fountains, shop windows, neon signs, and many others.

MICRO PLCs LRD SERIES
SIMPLE AND FUNCTIONAL

SYSTEM CONTROL AND SUPERVISION
- Contacts status viewing in simple pages on display
- Possibility to add the micro PLC to data networks. With Synergy supervision and energy management software, a server-multiclient structure can also be managed through web interface.

QUICK INSTALLATION OF CONTROL PANELS
- Fewer number of components
- Less wiring and number of connections.

REPEATABILITY
- Less errors during panel assembly
- Considerable time saving.

FLEXIBILITY
- Quick correction of abnormal conditions during the panel test
- Fast changes on control boards.

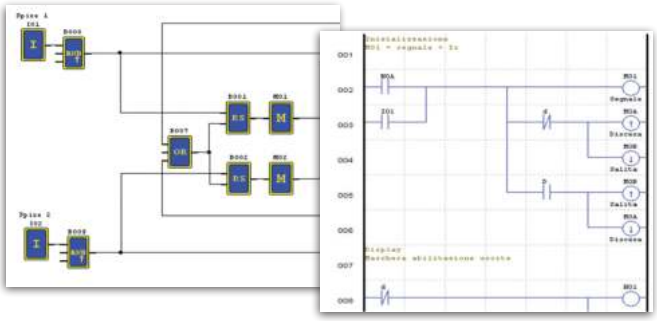
FUNCTION BLOCKS AND MEMORY

Timers (T) (delay on/off, recycle, pulsing...)	31
Real Time Clock (RTC) (daily, weekly, monthly and yearly mode)	31
Counters (C)	31
Analog comparators (G)	31
User's pages (H) - 16 characters - 4 lines	31
Auxiliary relays - Markers (M + N memory types)	63 + 63
Arithmetic operation: addition/subtraction and multiplication/division	31 + 31
Data registers (DR)	240

Possibility to save in the internal memory:
- Auxiliary memories
- Counter values
- Numerical variables.

PROGRAM MEMORY SIZE

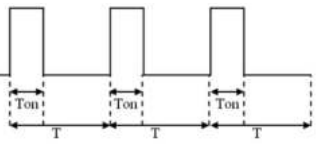
Language	
LADDER (contact scheme)	300 rows
FBD (function blocks)	260 blocks



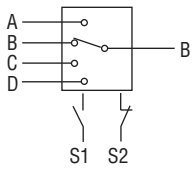
FUNCTIONS

PWM OUTPUT
Pulse train generation with programmable pulse time and frequency (only for base module with transistor outputs type LRD12TD024)

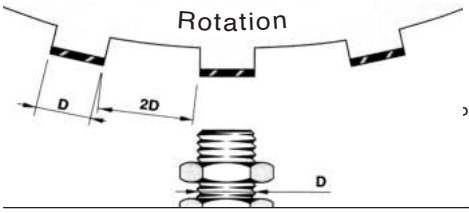
$$V_{out} = 24VDC \times \frac{T_{on}}{T}$$



MULTIPLEXER
Selection of 1 of 4 values according to the combination of two digital signals

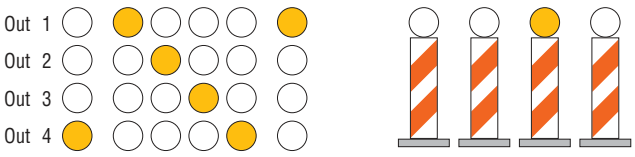


HIGH SPEED INPUT
Integrated on base modules with DC power supply

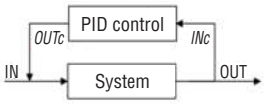


Position and speed detection

SHIFT FUNCTION - activation of pulsed outputs in sequence

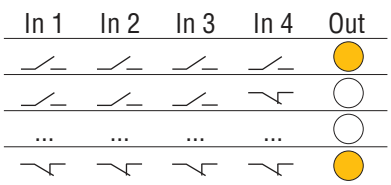


PID CONTROL

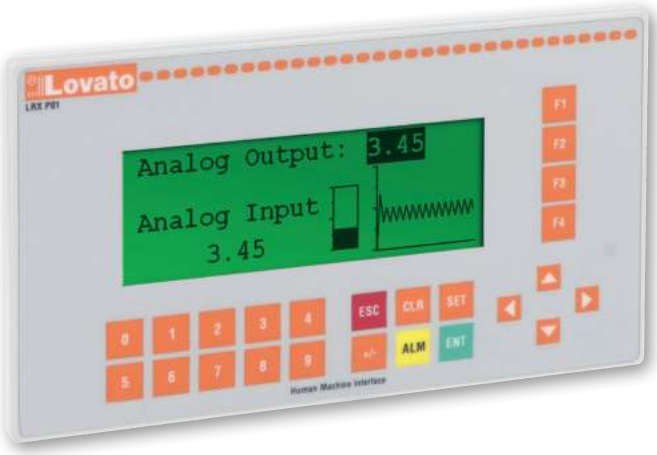


Example:
- IN: heating switch on and required temperature setting
- OUT: current room temperature
- INc: measured room temperature in an exact spot
- OUTc: temperature adjusting and controlling.

BOOLEAN LOGIC BLOCKS
Output activation based on a series of digital signals



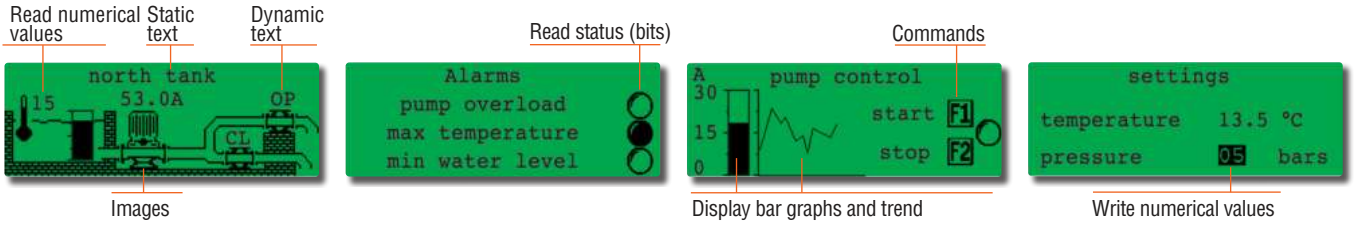
HMI Operator panel LRXP01



HMI INTERFACE

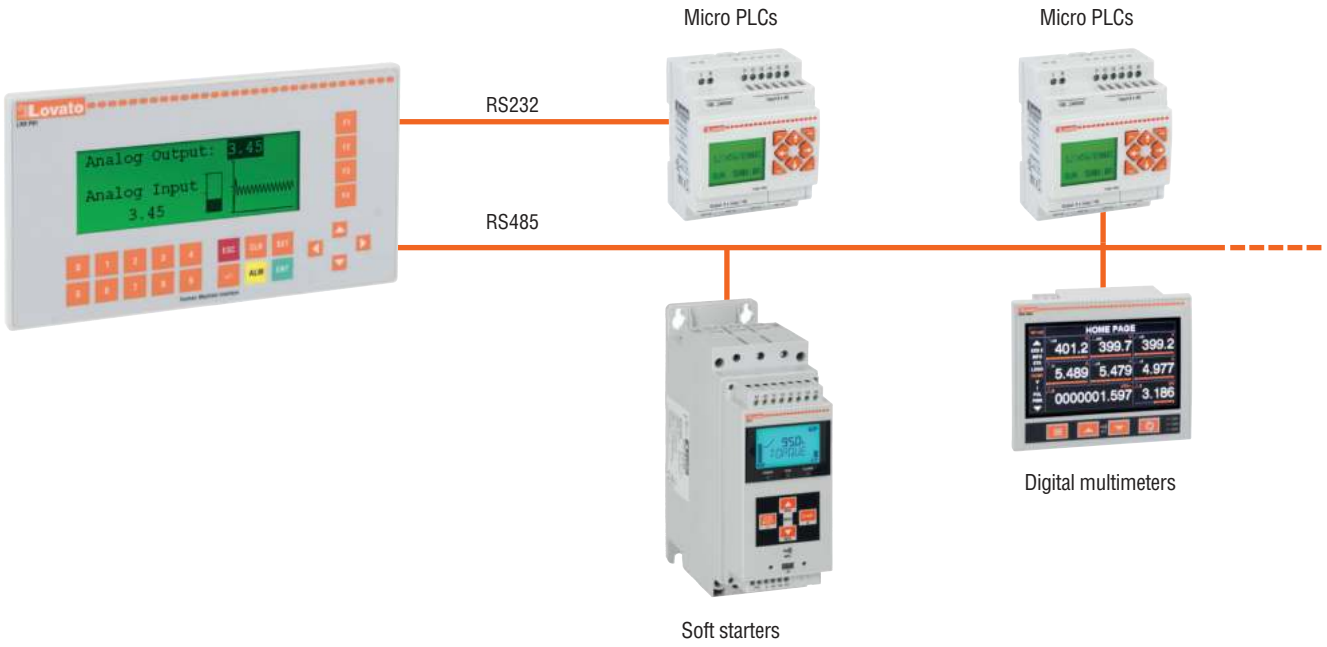
LRXP01 is an HMI operator panel, used with many types of PLCs or other intelligent controllers equipped with communication port with Modbus-RTU protocol.
With the HMI, the values of the PLC registers and the status of the relays can be controlled with the keys of the frontal keyboard, offering a simple and intuitive functioning of the machinery.
The LRXSWP01 editor software permits to create dedicated screens by taking advantage of the graphic display to show bitmaps, bar graphs and trends.

GRAPHIC BACKLIT LCD DISPLAY 192x64 PIXEL



COMMUNICATION MODES

LRXP01 supports Modbus-RTU protocol and can be connected to devices via the integrated RS232 and RS485 communication ports.



Micro PLCs
LRK series

LRK12RD024

new

LRK12RD024B

LRK20RD024RS

Order code	Auxiliary power supply	Inputs/ Outputs	Display	Built-in communic. port	Qty per pkg	Wt
					n°	[kg]
Base modules.						
LRK10RA240	100... 240VAC	6/4 relay	Yes	Ethernet	1	0.240
LRK12RD024	12/24 VDC	8/4 relay	Yes	Ethernet	1	0.240
LRK12RD024B	12/24 VDC	8/4 relay	No	Ethernet	1	0.240
LRK20RD024RS	12/24 VDC	12/8 relay	Yes	Ethernet + RS485	1	0.340
Expansion modules.						

See page 25-8.

General characteristics
- Base modules with 10, 12 or 20 built-in Inputs/Outputs
- Auxiliary power supply 12/24VDC or 100...240VAC
- Backlit LCD display, 4 rows x 16 characters, 10 languages (not present on type LRK12RD024B)
- Relay outputs
- Built-in Ethernet port for programming and monitoring
- Integrated web server
- Support of protocols Modbus-TCP and Modbus-RTU over TCP
- Programming from PC with Ethernet connection and software LRXSW, freely downloadable from the website www.LovatoElectric.com, or from the front keyboard (except for type LRK12RD024B)
- Ladder (contact scheme) or FBD (function blocks) programming language
- Program memory: 600 rows (ladder), 500 blocks (FBD)
- Expandability:
  - up to 56 I/Os with expansion modules type LRE (44 digital I/Os + 12 analog I/Os)
  - plus additional 172 remote I/Os via Ethernet connection with other base modules type LRK (126 digital Network I/Os + 46 analog Network I/Os)
- Slot for micro-SD card (32GB max) for program backup and data-logging
- Integrated Real Time Clock with optional battery type CR1220
- Base module type LRK20RD024RS with two built-in communication ports, Ethernet and RS485 types.

FUNCTIONS
- Arithmethic operations: addition, subtraction, multiplication and division between variables
- Analog comparators between variables
- Timers
- Counters
- Auxiliary relays (markers)
- Data registers
- Real Time Clock (RTC) blocks
- HMI display pages with texts
- High speed input (1kHz), only on base modules with DC power supply
- PID control
- Multiplexers
- Analog ramps
- Shift function
- Boolean logic blocks
- Password protection, 4 digits
- Astronomical clock
- Filter instructions (analog filter, calculation of maximum, minimum and average value)
- I/O networking (possibility to read and write variables of other base modules type LRK connected on the same Ethernet network in master-slave configuration)
- Data-logging with micro-SD card.

Operational characteristics
- Auxiliary power supply: 12/24VDC (LRK...RD024...) or 100...240VAC 50/60Hz (LRK10RA240)
- Relay outputs Ith 8A 240VAC
- Analog inputs 0...10VDC (on versions with DC power supply only)
- Operating temperature: -20…+50°C
- Storage temperature: -40…+70°C
- Relative humidity <90% non-condensing
- Modular housing
- 35mm DIN rail mounting (IEC/EN/BS 60715) or screw fixing (M4x20mm)
- Screw terminals
- Protection degree: IP20.

Certifications and compliance
Certifications obtained: cULus (except LRK10RA240).
Compliant with standards: IEC/EN/BS 61131-2, UL 61010-1, UL 61010-2-201, CSA C22.2 No. 61010-1, CSA C22.2 No. 61010-2-201:18.

Micro PLCs
LRD series

LRD10...
LRD12...

LRD20RD024P1

Order code	Auxiliary power supply	Inputs/ Outputs	Qty per pkg	Wt
			n°	[kg]
Base modules.				
LRD12RD024	24VDC	8/4 relay	1	0.241
LRD12TD024	24VDC	8/4 transistor	1	0.220
LRD20RD024	24VDC	12/8 relay	1	0.360
LRD12RA024	24VAC	8/4 relay	1	0.250
LRD20RA024	24VAC	12/8 relay	1	0.368
LRD10RA240	100...240VAC	6/4 relay	1	0.242
LRD20RA240	100...240VAC	12/8 relay	1	0.367
LRD20RD012	12VDC	12/8 relay	1	0.360
Base module with built-in RS485 communication port				
LRD20RD024P1	24VDC	12/8 relay	1	0.360
Expansion modules.				

See page 25-8.

General Characteristics
- Base modules with 10, 12 or 20 built-in Inputs/Outputs
- Auxiliary power supply 12VDC, 24VDC, 24VAC or 100…240VAC
- Backlit LCD display, 4 rows x 16 characters, 10 languages
- Relay or transistor outputs
- Programming from PC with USB cable type LRXC03 and software LRXSW, freely downloadable from the website www.LovatoElectric.com, or from the front keyboard
- Ladder (contact scheme) or FBD (function blocks) programming language
- Program memory: 300 rows (ladder), 260 blocks (FBD)
- Expandability up to 56 I/Os with expansion modules type LRE (44 digital I/Os + 12 analog I/Os)
- Optional memory module for program backup
- Base module type LRD20RD024P1 with built-in RS485 communication port.

FUNCTIONS
- Arithmethic operations: addition, subtraction, multiplication and division between variables
- Analog comparators between variables
- Timers
- Counters
- Auxiliary relays (markers)
- Data registers
- Real Time Clock (RTC) blocks
- HMI display pages with texts
- High speed input (1kHz), only on base modules with DC power supply
- PID control
- PWM outputs, only on base module type LRD12TD024
- Multiplexers
- Analog ramps
- Shift function
- Boolean logic blocks
- Password protection, 4 digits.

Operational characteristics
- Auxiliary power supply: 12VDC (LRD...D012), 24VDC (LRD...D024) or 100...240VAC 50/60Hz (LRD...A240)
- Relay outputs Ith 8A 240VAC
- Analog inputs 0...10VDC (on versions with DC power supply only)
- Operating temperature: -20…+55°C
- Storage temperature: -40…+70°C
- Relative humidity <90% non-condensing
- Modular housing
- 35mm DIN rail mounting (IEC/EN/BS 60715) or screw fixing (M4x20mm)
- Screw terminals
- Protection degree: IP20.

Certifications and compliance
Certifications obtained: cULus, EAC.
Compliant with standards: IEC/EN/BS 61131-2, UL508, CSA C22.2 n° 142.

Expansion and communication modules

LRE...

Order code	Auxiliary supply voltage	Inputs/ Outputs	Qty per pkg	Wt
			n°	[kg]
Expansion and communication modules for micro PLCs LRK and LRD series ❶.				
LRE02AD024	24VDC	2 analog outputs 0...10V/0...20mA	1	0.160
LRE04AD024	24VDC	4 analog inputs 0...10V/0...20mA	1	0.160
LRE04PD024	24VDC	4 PT100 temp. sensor inputs	1	0.160
LRE08RD024	24VDC	4/4 relay	1	0.171
LRE08TD024	24VDC	4/4 transistor	1	0.151
LRE08RA024	24VAC	4/4 relay	1	0.180
LRE08RA240	100...240VAC	4/4 relay	1	0.180
LREP00	24VDC	Communication module RS485, protocol Modbus-RTU	1	0.134

❶ The expansion modules are supplied with connector for the connection to the base module.

General characteristics
The expansion modules type LRE allow to expand the number of inputs and outputs of the LRK and LRD series micro PLCs. Several models are available, including:
– Digital inputs and digital outputs type relay or transistor
– Analog inputs configurable as type 0...10VDC or 0/4...20mA
– Analog outputs configurable as type 0...10VDC or 0/4...20mA
– Inputs for PT100 temperature sensors

Additionally, it is available an RS485 module to equip the micro PLCs without built-in communication with a serial port for interfacing with Modbus-RTU masters such as HMI, PLC, gateways or other intelligent devices for control and monitoring.
The LRE expansion modules are connected to the base module via a connector, provided as standard, and have independent auxiliary power supply terminals.
On each base module type LRK or LRD it is possible to install up to 8 expansion modules, according to the configuration shown in the section “Maximum configuration”.

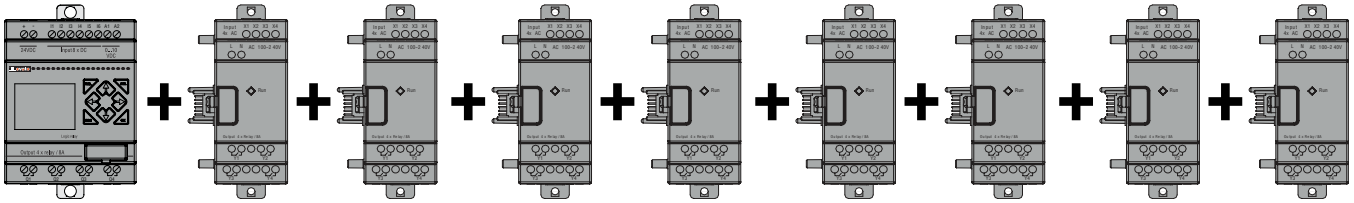
Certifications and compliance
Certifications obtained: cULus, EAC.
Compliant with standards: IEC/EN/BS 61131-2, UL508, CSA C22.2 n° 142.

INPUTS/OUTPUTS REFERENCE TABLE

BASE MODULES				TOT DIGITAL I/OS BASE MODULE + EXPANSIONS
Type	Power supply	Inputs	Outputs	Max I/Os
LRK12RD024 LRK12RD024B	12/24VDC	6 digital + 2 digital/analog	4 relay	12 + 24
LRK10RA240	100...240VAC	6 digital	4 relay	10 + 24
LRK20RD024RS	12/24VDC	8 digital + 4 digital/analog	8 relay	20 + 24
LRD12RD024	24VDC	6 digital + 2 digital/analog	4 relay	12 + 24
LRD12TD024	24VDC	6 digital + 2 digital/analog	4 transistor	12 + 24
LRD20RD012	12VDC	8 digital + 4 digital/analog	8 relay	20 + 24❷
LRD20RD024	24VDC	8 digital + 4 digital/analog	8 relay	20 + 24
LRD20RD024P1	24VDC	8 digital + 4 digital/analog	8 relay	20 + 24
LRD10RA240	100...240VAC	6 digital	4 relay	10 + 24
LRD20RA240	100...240VAC	12 digital	8 relay	20 + 24
LRD12RA024	24VAC	8 digital	4 relay	12 + 24
LRD20RA024	24VAC	12 digital	8 relay	20 + 24
EXPANSION AND COMMUNICATION MODULES				
LRE02AD024	24VDC	—	2 analog	—
LRE04AD024	24VDC	4 analog	—	—
LRE04PD024	24VDC	4 PT100	—	—
LRE08RD024	24VDC	4 digital	4 relay	—
LRE08TD024	24VDC	4 digital	4 transistor	—
LRE08RA240	100...240VAC	4 digital	4 relay	—
LRE08RA024	24VAC	4 digital	4 relay	—
LREP00	24VDC	RS485 communication module, Modbus-RTU slave		

❷ Expansion modules supplied at 24VDC.

Maximum configuration



Base module LRK or LRD 12 inputs + 8 outputs (max)
4 digital inputs + 4 digital outputs
4 digital inputs + 4 digital outputs
4 digital inputs + 4 digital outputs
4 PT100 temperature sensor inputs
2 analog outputs 0...10V or 0...20mA
2 analog outputs 0...10V or 0...20mA
4 analog inputs 0...10V or 0...20mA
RS485 Modbus-RTU (slave)

• 24 digital inputs (4 configurable as analog 0...10V input)
• 20 digital outputs (relay, transistor or mixed)
• 4 inputs for PT100 temperature sensor
• 4 analog inputs 0...10V, 0/4...20mA
• 4 analog outputs 0...10V, 0/4...20mA
• 1 RS485 communication module.

Note. The sequence and the maximum number of the product given above must be respected for correct operation.

Accessories

LRX1V3D024

LRXM00

LRXC03

LRXP01

LRXC02

Order code	Descriprion	Qty per pkg	Wt
		n°	[kg]
For base modules LRD series.			
LRXM00	Program backup memory	1	0.011
LRXC00	PC (RS232)-LRD (1.5m) programming cable or LRXP01 (RS232)-LRD direct connection	1	0.083
LRXC03	PC (USB)-LRD (1.5m) programming cable	1	0.080
For base modules LRK and LRD series.			
LRX1V3D024	Power supply unit 100...240VAC/24VDC 1.3A	1	0.220
LRXP01	HMI operator panel, 24VDC, RS232, RS485 (Modbus-RTU Master)	1	0.200
LRXC02	PC (RS232)-LRXP01 programming cable	1	0.180

Kits

LRDKIT...

LRDDEM...

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Kits.			
LRDKIT12RD024	Starter kit with LRD12RD024 base module, LRXSW software and LRXC03 cable	1	0.424
LRDKIT12RA024	Starter kit with LRD12RA024 base module, LRXSW software and LRXC03 cable	1	0.424
LRDKIT10RA240	Starter kit with LRD10RA240 base module, LRXSW software and LRXC03 cable	1	0.424
Training kits.			
LRDDEM12RD024	Training kit with LRD12RD024 mounted on inputs/outputs simulation board	1	0.920
LRDDEM20RD024	Training kit with LRD20RD024 mounted on inputs/outputs simulation board	1	1.060

Backup memory and power supply unit general characteristics
- The LRXM00 backup memory allows the saving of the user's program as backup copy or to be quickly transferred to other base module LRD series.
- The LRX1V3D024 power supply produces a DC voltage to supply the base and expansion modules when 24VDC is not available in the panel. The power supply can also be used to supply any 24VDC auxiliary circuits.

HMI operator panel LRXP01 general characteristics
- Auxiliary supply voltage 24VDC
- RS232 communication port for direct connection to micro PLC LRD series using cable type LRXC00
- RS485 port for communication with slave devices via Modbus-RTU protocol
- Programming via software LRXSWP01, freely downloadable from the website www.LovatoElectric.com
- Degree of protection: IP65.

FUNCTIONS
- Send commands
- Read status
- Static and dynamic texts
- Write variables
- Read variables with representation in numerical format, bar graphs or trends.

Programming software LRXSW
At any time and with extreme simplicity, micro PLCs LRK and LRD series can be set and reprogrammed to satisfy new requirements and improve the operation of a system.
Programming is simple and intuitive and can be done directly from the keyboard on front (except for type LRK12RD024B) or from PC with LRXSW software, freely downloadable from the website www.LovatoElectric.com.
The connection between the base module and the PC is done via Ethernet connection for the base modules LRK series and with USB cable type LRXC03 for base modules LRD series.
Two programming languages can be used: LADDER (contact scheme) or FBD (Function Block Diagram).
In addition to the project configuration, with LRXSW software it is possible to:
- Simulate the program "off-line" from PC, to test if it runs correctly even without a micro PLC connected
- Use the supervision mode to check the project "on-line" while running in real time on a micro PLC.

As an alternative to the LRXSW software, with the front keyboard it is possible to program the micro PLC "on-board", monitor the status of the Inputs/Outputs and all the variables of the micro PLC, and configure settings such as the date and time, operating mode, password and communication parameters (e.g. setting network parameters on base modules LRK series).

Certifications and compliance
Certifications obtained: cULus for power supply and HMI units and base module of kits, EAC.
Compliant with standards: IEC/EN/BS 61131-2, UL508, CSA C22.2 n° 142.

25

HMI LRH SERIES

HMI WITH COLOUR TOUCHSCREEN DISPLAY

The HMI LRH series have a graphic TFT display with 64k colours, touchscreen, easy to program and extremely flexible.
They can be interfaced with different type of devices, from PLC to any kind of intellingent controller provided with communication port, like multimeters, drives, process controllers.
The LRHSW programming software allows the configuration of the HMI in a simple and intuitive way, thanks to the graphical interface with which you can create customized screens to show images, trends, bar graphs, analog indicators, dynamic objects and other functionalities.
The HMI LRH series are the ideal solution for the supervision and control of small and large automation scenarios that are more and more required in the world of Industry 4.0.

WIDESCREEN DISPLAY WITH HIGH VISIBILITY

- TFT diplay with resistive touchscreen
- High brightness thanks to the LED backlighting
- 64k colours
- Available in formats 4.3", 7" and 10.1".

SIMPLICITY AND EFFICIENCY

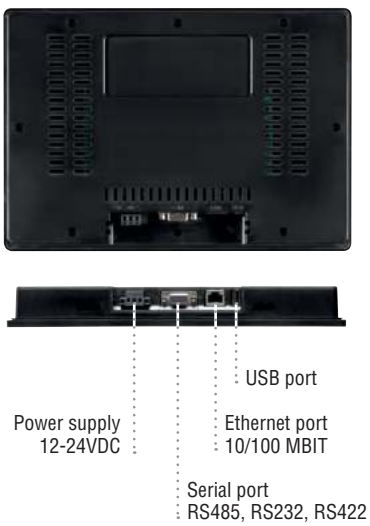
- Simple and elegant design with low energy consumption
- High robustness, thanks to the use of higly reliable industrial components
- Plastic enclosure, degree of the protection IP66, Type 2 and 4X.

CONNECTIVITY FOR EASY INTEGRATION

- 3 built-in communication ports: Ethernet, USB and serial (type RS232-RS485-RS422, configurable via software LRHSW)
- Support of communication protocols Modbus-RTU Master/Slave, Modbus TCP Client/Server, OPC UA Client/Server, Simatic S7 Ethernet and MQTT.

POWERFUL AND INTUITIVE PROGRAMMATION

- High performance CPU
- Extensive gallery of widgets, objects and pre-configured scenarios for typical applications
- Data acquisition and display on numeric indicators, trends or graphical gauges
- Support of vector graphics, images, analog indicators, bar graphs
- Advanced functionalities: dynamic objects, alarms and events management, support of multilingual applications, recipes, tags editor, user and password management, script language
- Advanced properties of the objects: e-mail, events scheduler, etc
- Support HTML5 and JavaScript
- Possibility to simulate the program by working off-line.



PRE-CONFIGURED SCENARIOS

Preconfigured and ready to use scenarios for typical applications managed with LOVATO Electric products (remote control of a micro PLC, supervision of a pumping station with variable speed drive, monitoring of a photovoltaic system with energy meter, soft starter monitoring, control and supervision of a power factor correction plant, monitoring of an automatic transfer switch ATS panel, command and monitoring of a mains-generator application, etc.) freely downloadable from the website www.LovatoElectric.com.

HMI

LRHA04

LRHA07

LRHA10

EXCCAB02

Order code	Description	Q.ty per pkg	Wt
		n°	[kg]
HMI.			
LRHA04	4.3" TFT LCD display	1	0.400
LRHA07	7" TFT LCD display	1	0.600
LRHA10	10.1" TFT LCD display	1	1.000
Programming software for HMI.			
LRHSW01	User license for LRHSW software (downloadable from www.LovatoElectric.com), valid for 1 station	1	—
RS485 connection cable.			
EXCCAB02	RS485 connection cable for LRH, length 3m	1	0.150
Kits HMI and micro PLC.			
LRDKITHMIA04	Kit with micro PLC type LRD20RD024P1, HMI type LRHA04 and EXCCAB02 cable	1	1.000
LRDKITHMIA07	Kit with micro PLC type LRD20RD024P1, HMI type LRHA07 and EXCCAB02 cable	1	1.200

Model	LRHA04	LRHA07	LRHA10
SYSTEM RESOURCES			
Display	4.3" TFT 16:9	7" TFT 16:9	10.1" TFT 16:9
Colours	64K		
Resolution	480x272 pixel	800x480 pixel	1024x600 pixel
Brightness	200Cd/m²		
Dimming	Yes		
Touchscreen	Resistive		
CPU	ARM Cortex A8 300MHz	ARM Cortex A8 1GHz	ARM Cortex A8 1GHz
Operative system	Linux 3.12		
Flash	2GB	4GB	4GB
RAM	256MB	512MB	512MB
Application memory	60MB		
Real Time Clock, RTC backup, Buzzer	Yes		
INTERFACES			
Ethernet	1 (10/100 Mbit)		
USB	1 (Host v2.0, max 500mA)		
Serial	1 (RS232, RS485, RS422, software configurable)		
FUNCTIONALITIES			
Vector graphics	●		
Dynamic objects	●		
Font True Type	●		
Alarms	●		
Event list	●		
Recipes	●		
User management	●		
Trends	●		
Multi-language management	●		

General characteristics
- Widescreen display with resistive touchscreen
- Available in formats 4.3", 7" and 10.1"
- LED backlight
- Ethernet, USB and serial port (type RS232-RS485-RS422, configurable via software LRHSW)
- Lightweight and low-power design
- Highly reliable industrial components
- Powerful and intuitive programming with software LRHSW (downloadable from www.LovatoElectric.com), with 30-days trial license included
- Support of protocols Modbus-RTU Master/Slave, Modbus-TCP Client/Server, OPC UA Client/Server, Simatic S7 Ethernet and MQTT
- Support of vector graphics
- Rich library of preconfigured and ready to use graphical objects (widgets): static or dynamic images, buttons, sliders, lights, bar graphs, gauges, meters, media widgets, etc.
- Possibility to create custom widgets
- Tags editor to create, import or export tags
- Alarm handling with management of events and actions (e.g. alerts with pop-up messages, send email, write tags, etc.)
- Data-logging with presentation of the collected data in graphical trends and tables, with possibility to save the data in .CSV file
- Recipes data handling
- Scheduler to execute specific actions at set intervals, or on a time basis
- Automatic generation of customizable reports
- Multilingual projects management with texts in True Type font
- Data transfer function to exchange data between the devices connected to the HMI
- Powerful script language with JavaScript editor
- Web access: support of HTML5 technology to allow users to access HMI projects from a remote web browser running on a PC or on a mobile device (smartphone or tablet)
- Advanced user management with possibility to configure different levels of authorizations and permissions on the projects, with dedicated credentials
- Monitoring and remote control of the project running on the HMI from a PC with the software LRHSW Client, installed together with the programming software LRHSW
- On-line and off-line simulation of the applications.

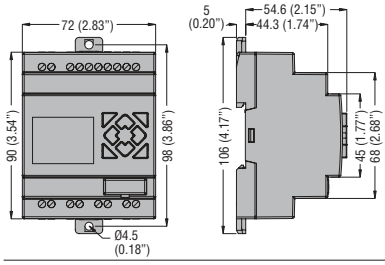
Operational characteristics
- Rated auxiliary power supply: 12/24VDC
- Operating range: 10...32VDC
- Operating temperature: 0...+50°C
- Storage temperature: -20...+70°C
- Humidity: 5-85% RH, non condensing
- Protection degree: IP66, Type 2 and 4X (front); IP20 (rear).

Preconfigured scenarios
Preconfigured and ready to use scenarios for typical applications managed with LOVATO Electric products (remote control of a micro PLC, supervision of a pumping station with variable speed drive, monitoring of a photovoltaic system with energy meter, soft starter monitoring, control and supervision of a power factor correction plant, monitoring of a mains-generator application, etc.) freely downloadable from the website www.LovatoElectric.com.

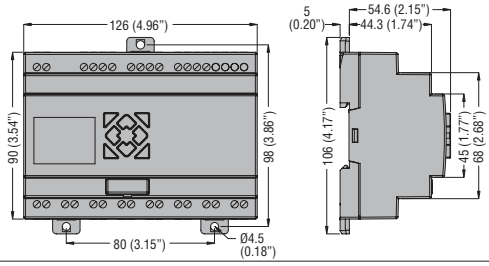
Certifications and compliance
Certifications obtained: cULus, EAC, RCM.
Compliant with standards: emissions EN/BS 61000-6-4, immunity EN/BS 61000-6-2 for installation in industrial environments; emissions EN/BS 61000-6-3, immunity EN/BS 61000-6-1 for installation in residential environments; UL508.

BASE MODULES

LRK10... - LRK12...
LRD10... - LRD12...

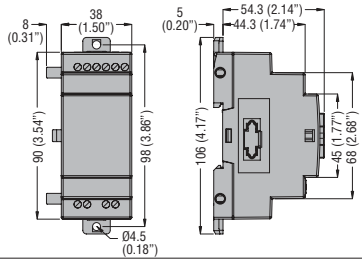


LRK20...
LRD20...



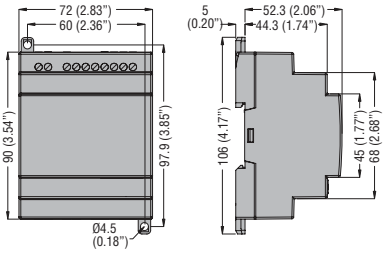
EXPANSION AND COMMUNICATION MODULES

LRE...

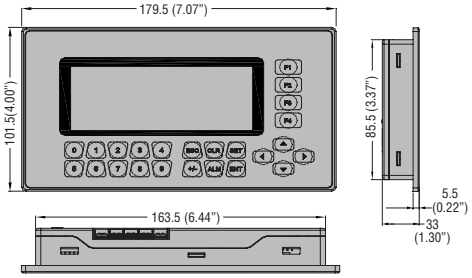


ACCESSORIES

LRX1V3D024 power supply unit



LRXP01 HMI operator panel



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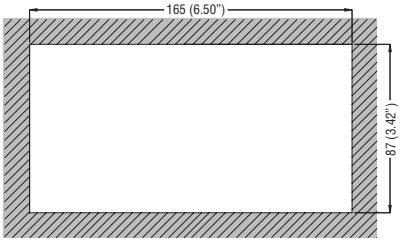
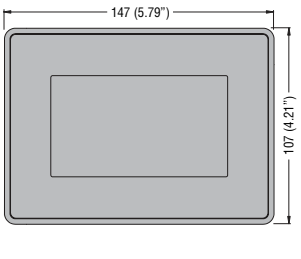


HMI

LRHA04



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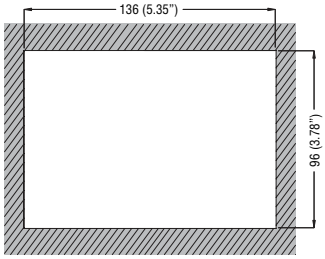
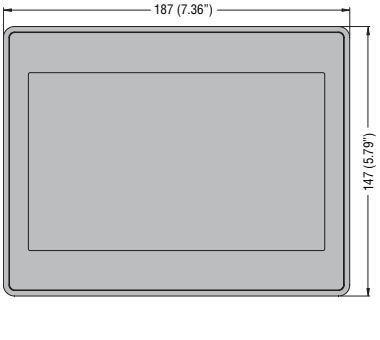


LRHA07



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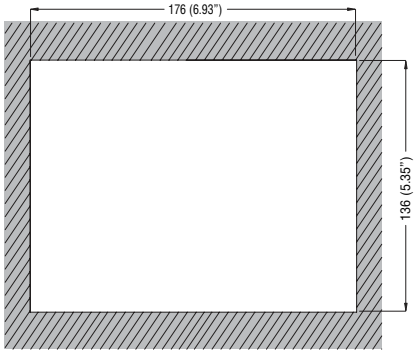
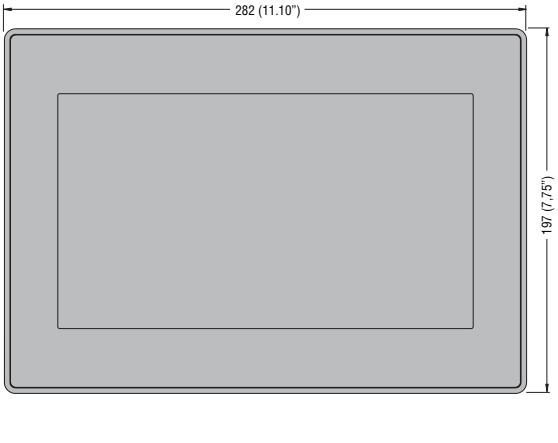


LRHA10



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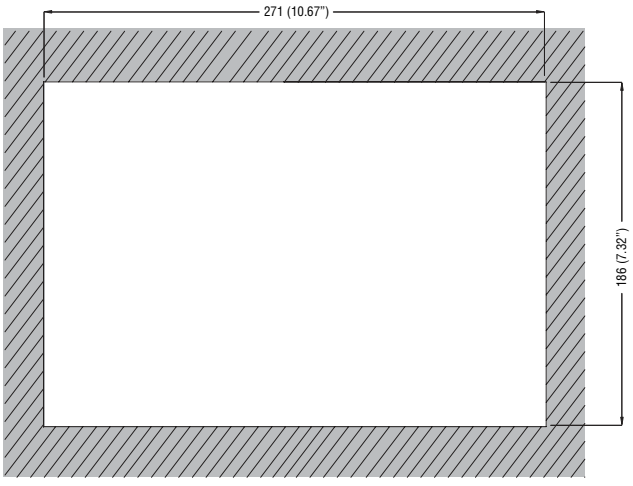
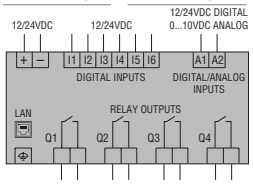
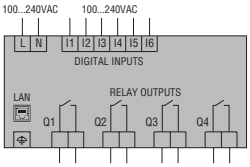


BASE MODULES

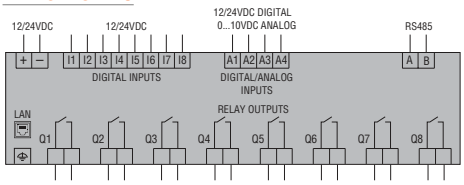
LRK12RD024 - LRK12RD024B



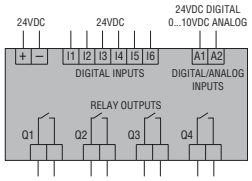
LRK10RA240



LRK20RD024RS



LRD12RD024



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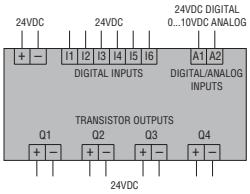

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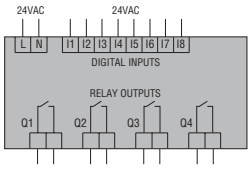

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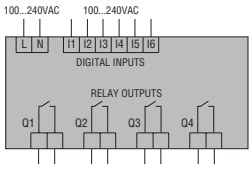
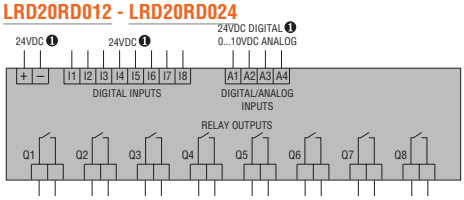
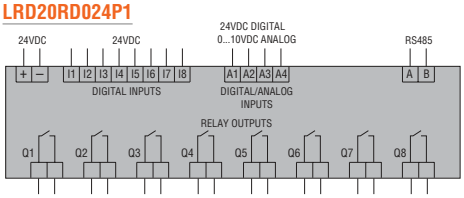


LRD20RD012 - LRD20RD024

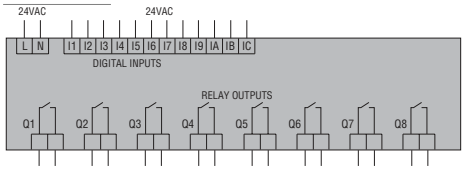


❶ 12VDC for LRD20RD012.

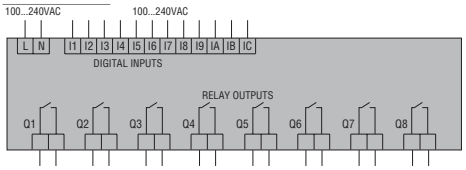
LRD20RD024P1



LRD20RA024

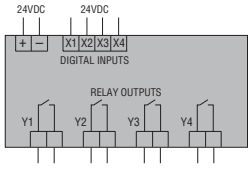


LRD20RA240



EXPANSION AND COMMUNICATION MODULES

LRE08RD024



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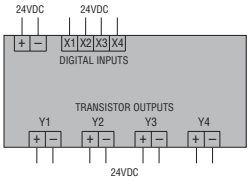

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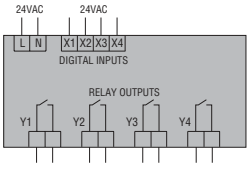

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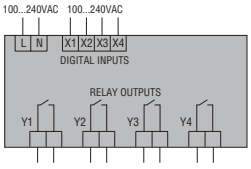
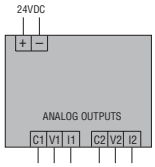


LRE02AD024



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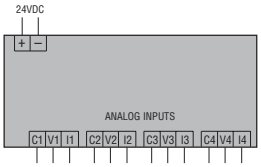

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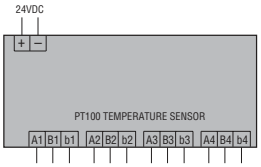
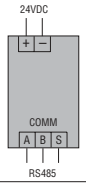


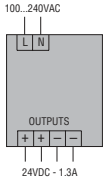
LREP00



ACCESSORIES

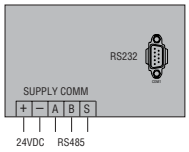
Power supply unit

LRX1V3D024



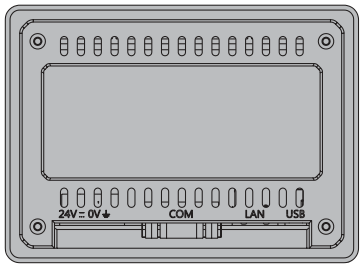
HMI operator panel

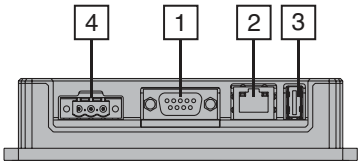
LRXP01



HMI

LRHA...





1 Serial port (RS232, RS485, RS422 configurable via software)
2 Ethernet port
3 USB port
4 Auxiliary power supply 12/24VDC

BASE MODULES		LRK…D024…	LRK…A240	LRD…D012	LRD…D024	LRD…A024	LRD…A240
AUXILIARY POWER SUPPLY							
Rated voltage		12/24VDC	100…240VAC 50/60Hz	12VDC	24VDC	24VAC 50/60Hz	100...240VAC 50/60Hz
Operating limits		10.0...28.8VDC	85...265VAC (47...63Hz)	10.4...14.4VDC	20.4...28.8VDC	20.4...28.8VAC (47...63Hz)	85...265VAC (47...63Hz)
Average current consumption		300mA (LRK12...) 400mA (LRK20...)	90mA	265mA	125mA (LRD12...) 185mA (LRD20...)	290mA	100mA
DIGITAL INPUTS							
Rated voltage		12/24VDC	100...240VAC 50/60Hz	12VDC	24VDC	24VAC 50/60Hz	100...240VAC 50/60Hz
Input voltage	State 0	<5VDC	<40VAC	<2.5VDC	<5VDC	<6VAC	<40VAC
	State 1	>10VDC (12V) >15VDC (24V)	>79VAC	>7.5VDC	>15VDC	>14VAC	>79VAC
Delay time	0 to 1	5ms	50/45ms (Ue=120VAC) 22/18ms (Ue=240VAC)	4ms (0.5ms for high speed inputs)	4ms (0.5ms for high speed inputs)	90ms	50/45ms (Ue=120VAC) - 22/18ms (Ue=240VAC)
	1 to 0	3ms	50/45ms (Ue=120VAC) 90/85ms (Ue=240VAC)	4ms (0.3ms for high speed inputs)	4ms (0.3ms for high speed inputs)	90ms	50/45ms (Ue=120VAC) - 90/85ms (Ue=240VAC)
ANALOG INPUTS (for base modules with DC power supply only)							
Input signal range		0…10VDC	—	0...10VDC		—	—
Display resolution		0.01VDC	—	0.01VDC		—	—
Current consumption at 10VDC		<0.17mA	—	<0.17mA		—	—
Bit conversion		12	—	10 (LRD12...) 8 (LRD20...)	8	—	—
Maximum cable length		≤30m shielded	—	≤30m shielded		—	—
DIGITAL OUTPUTS							
Type of output / IEC rated current Ith		Relay / 8A		Relay / 8A (LRD...R... / LRE08R... only) Transistor / 0.3A 24VDC (LRD...T... / LRE08T... only)			
Operative voltage		Max 250VAC /30VDC		Max 265VAC / 30VDC (LRD...R... / LRE08R... only) 10...28.8VDC (LRD...T... / LRE08T... only)			
AMBIENT CONDITIONS							
Operating temperature		-20...+50°C		-20...+55°C			
Storage temperature		-40...+70°C					
Relative humidity		20...90% non-condensing					
HOUSING							
Version		Modular for mounting on 35mm DIN rail (IEC/EN/BS 60715) or M4x20mm screw fixing					
Connections	Type of terminals	Screw					
	Conductors section	0.14...2.5mm² (26...14AWG)					
	Tightening torque	0.8Nm / 7.1lb.in		0.6Nm / 5.3lb.in			
	Maximum cable length	≤100m					
IEC degree of protection		IP20					

EXPANSION MODULES	LRE02AD024		LRE04AD024		LRE04PD024
AUXILIARY POWER SUPPLY					
Rated voltage	12VDC		24VDC		24VAC 50/60Hz
Operating limits	20.4...28.8VDC		20.4...28.8VDC		20.4...28.8VDC
ANALOGIC INPUTS/OUTPUTS					
Type of channels	2 outputs configurable for voltage or current		4 inputs configurable for voltage or current		4 inputs for PT100 temperature sensor
Operating limits	0...10V	0...20mA	0...10V	0...20mA	-100...+600°C
Display resolution	0.00...10.00V	0.00...20.00mA	0.00...10.00V	0.00...20.00mA	-100.0...+600.0°C
Resolution	10mV	40µA	10mV	40µA	0.1°C
Accuracy	±2.5%		±2.5%		±1%
Power consumption	70mA		70mA		70mA

COMMUNICATION MODULE	LREP00
Auxiliary power supply	24VDC
Baud-rate	4800...57600bps
Terminator resistor	Integrated 120 Ohm
Cable length	0.14...1.5mm² (26...16AWG)
Tightening torque	0.6Nm (5.4lb.in)

HMI OPERATOR PANEL	**LRXP01**
AUXILIARY POWER SUPPLY	
Rated voltage	24VDC
Operating limits	20.4...26.4VDC (-15%...+10%)
Power consumption	1.9W
AMBIENT CONDITIONS	
Operating temperature	0...+55°C
Storage temperature	-40...+70°C
Altitude	≤2000m
Relative humidity	10...95% non-condensing
Maximum pollution degree	2 (IEC/EN/BS 61131-3)
Vibration resistance	15g
Shock resistance	0.5g
Conductor section	0.4...3.3 mm² (22-12 AWG)
Tightening torque	1.8Nm / 10.4lb.in
IEC degree of protection	IP65

HMI	**LRHA04**	**LRHA07**	**LRHA10**
AUXILIARY POWER SUPPLY			
Rated voltage	12/24VDC		
Operating range	10...32VDC		
Max current consumption at 24VDC	0.25A	0.3A	0.38A
AMBIENT CONDITIONS			
Operating temperature	0...+50°C		
Storage temperature	-20...+70°C		
Relative humidity	5...85% non-condensing		
IEC degree of protection	IP66, Type 2, 4X (front); IP20 (rear)		

Switching power supplies

- Versions: modular and 35mm DIN rail mount
- Output voltage adjustment by front potentiometer
- Output short-circuit protection
- Built-in input voltage surge suppressor
- Used as power supply for DC electromechanical and electronic equipment
- Redundancy modules

	Sec. - Page
Modular DIN rail mount switching power supplies	
Single-phase modular compact power supplies with standard functionality 24...100W, PSN series	26 - 2
Single-phase modular power supplies with maximum functionality and cULus 10...100W, PSL series	26 - 2
Compact DIN rail mount switching power supplies with cULus	
Single-phase compact power supplies with standard functionality 120...480W, PSN series	26 - 3
Single-phase compact power supplies with basic functionality 30...120W, PSE series	26 - 3
DIN rail mount switching power supplies with maximum functionality with cULus	
Single-phase 5...480W	26 - 4
Two-phase 100W	26 - 4
Three-phase 120...960W	26 - 4
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Dimensions	**26 - 5**
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Technical characteristics	**26 - 8**

Page 26-2

MODULAR DIN RAIL MOUNT SWITCHING POWER SUPPLIES
- Single-phase
- Output voltage: 12 or 24VDC
- Output power: 10...100W.

Page 26-3

COMPACT DIN RAIL MOUNT SWITCHING POWER SUPPLIES
- Single-phase
- Output voltage: 24VDC
- Output power: 30...480W.

Page 26-4

DIN RAIL MOUNT SWITCHING POWER SUPPLIES
- Single, two and three-phase
- Output voltage: 24 or 48VDC
- Output power: 5...960W.

Page 26-4

REDUNDANCY MODULES
- Modular and 35mm DIN rail mount
- Output voltage: 12 or 24VDC
- Output current: 10 or 20A.

MODULAR DIN RAIL MOUNT SWITCHING POWER SUPPLIES

	PSN	PSL
Input type	Single-phase 100...240VAC	Single-phase 100...240VAC
Output type	12VDC or 24VDC	12VDC or 24VDC
Output power	12VDC: 24, 54, 90W 24VDC: 36, 60, 100W	12VDC: 10, 24, 33, 54, 72W 24VDC: 10, 24, 36, 60, 100W
Dimensions	Ultra compact	Standard
Operating temperature	-40...+70°C	-40...+71°C
Derating (typical)	Over 45°C	Over 60°C
Power on LED	●	●
Low voltage LED	–	●
Type of short circuit protection	Hiccup	Hiccup up to size 24W Fold forward for bigger sizes
cULus	–	●

DIN RAIL MOUNT SWITCHING POWER SUPPLIES

	PSN	PSE	PSL
Input type	Single-phase 100...240VAC	Single-phase 100...240VAC	Single-phase 100...240VAC (PSL1...) Two-phase 400...500VAC (PSL2...) Three-phase 400...500VAC (PSL3...)
Output type	24VDC	24VDC	24VDC o 48VDC (single-phase only)
Output power	120, 240, 480W	30, 50, 72, 100, 120W	Single-phase: 5...480W (24VDC), 30...480W (48VDC) Two-phase: 100W Three-phase: 120...690W
Dimensions	Ultra compact	Compact	Standard
Operating temperature (typical)	-40...+70°C (-20...+60°C for PSN112024L)	-25...+71°C	-35...+71°C
Derating (typical)	Over +50°C and under -25°C	Over 50°C	Over 60°C
Power on LED	●	●	●
Low voltage LED	–	–	●
DC OK output for available voltage	● (PSN112024 and PSN148024)	–	● (sizes ≥30W)
PFC	● (excluded PSN112024L)	–	● (sizes ≥120W)
Type of short circuit protection	Hiccup	Hiccup	Single-phase: fold forward (hiccup for sizes ≤18W) Two and three-phase: hiccup (fold forward for 480W)
cULus	●	●	●

Lovato electric

Modular compact power supplies with standard functionality PSN series

PSN1M03624

new

Order code	Rated output voltage	Rated output current	Output power	Qty per pkg	Wt
	[V]	[A]	[W]	n°	[kg]
Single-phase.					
PSN1M02412	12VDC	2	24	1	0.115
PSN1M05412		4.5	54	1	0.175
PSN1M09012		7.5	90	1	0.235
PSN1M03624	24VDC	1.5	36	1	0.115
PSN1M06024		2.5	60	1	0.175
PSN1M10024		4.2	100	1	0.235

General characteristics
The switching power supplies PSN series are suitable for installation in modular switchboards, used in both civil and industrial applications. The main selling point of this series is the extremely compact dimensions.

Protections:
– Output short circuit
– Output overvoltage
– Overload
– Input voltage peaks.

Indications:
– LED indicator for power on.

Operational characteristics
– Rated supply voltage: 100...240VAC
– Mains frequency: 50/60Hz
– Rated output voltage: 12VDC (PSN1M...12) / 24VDC (PSN1M...24)
– Output voltage adjustment by front potentiometer
– High efficiency up to 90%
– 35mm DIN rail (IEC/EN/BS 60715) mounting
– Screw terminals
– Modular DIN 43880 housing; number of modules:
  2 for PSN1M02412 and PSN1M03624
  3 for PSN1M05412 and PSN1M06024
  4 for PSN1M09012 and PSN1M10024
– IEC degree of protection: IP20 on terminals.

Compliance
Compliant with standards: IEC/EN/BS 62368-1, EN/BS 61558-1, EN/BS 55032, IEC/EN/BS 61000-4-2, IEC/EN/BS 61000-4-3, IEC/EN/BS 61000-4-4, IEC/EN/BS 61000-4-5, IEC/EN/BS 61000-4-6, IEC/EN/BS 61000-4-11.

Modular power supplies with maximum functionality and cULus PSL series

PSL1M010...

PSL1M03312
PSL1M03624

Order code	Rated output voltage	Rated output current	Output power	Qty per pkg	Wt
	[V]	[A]	[W]	n°	[kg]
Single-phase.					
PSL1M01012	12VDC	0.83	10	1	0.065
PSL1M02412		2	24	1	0.130
PSL1M03312		2.75	33	1	0.190
PSL1M05412		4.5	54	1	0.250
PSL1M07212		6	72	1	0.380
PSL1M01024	24VDC	0.42	10	1	0.065
PSL1M02424		1	24	1	0.130
PSL1M03624		1.5	36	1	0.190
PSL1M06024		2.5	60	1	0.250
PSL1M10024		4.2	100	1	0.380

General characteristics
Switching power supplies transform an AC input voltage into a DC output one. This type of equipment is used in industrial and domestic automation fields. The power supplies are equipped with switching technology offering very high efficiency in an extremely compact size. Dimensions are compatible with modular consumer panels and its plastic housing is suitable for building automation installations as well as industrial automation applications.
The wide range of power supply voltages and the choice of current outputs provide for the best adaptability to supply voltage needs of the most common electronic and electromechanical devices.

Protections:
– Output short circuit
– Output overvoltage
– Overload
– Input voltage peaks.

Indications:
– LED indicator for power on
– LED indicator for low voltage.

Operational characteristics
– Rated supply voltage: 100...240VAC
– Mains frequency: 50/60Hz
– Rated output voltage: 12VDC for PSL1M...12 types; 24VDC for PSL1M...24 types
– Output voltage adjustment by front potentiometer (except for PSL1M010...)
– High efficiency up to 89%
– 35mm DIN rail (IEC/EN/BS 60715) mounting
– Screw terminals
– Modular DIN 43880 housing; number of modules:
  • 1 for PSL1M010...
  • 2 for PSL1M024...
  • 3 for PSL1M03312 and PSL1M03624
  • 4 for PSL1M05412 and PSL1M06024
  • 5 for PSL1M07212 and PSL1M10024
– IEC degree of protection: IP20 on terminals.

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada (cULus-File E318016) as Power Supplies in power circuit and motor-mounted apparatus category; EAC, RCM.
Compliant with standards: IEC/EN/BS 62368-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL508, CSA C22.2 n° 107-1.

Compact DIN rail mount power supplies with standard functionality PSN series

PSN112024

new

Order code	Rated output voltage	Rated output current	Output power	Qty per pkg	Wt
	[V]	[A]	[W]	n°	[kg]
Single-phase.					
PSN112024L❶	24VDC	5	120	1	0.410
PSN112024		5	120	1	0.490
PSN124024		10	240	1	0.600
PSN148024		20	480	1	0.980

❶ Version without active PFC.

General characteristics
PSN are switching power supplies for DIN rail mounting characterized by extremely compact dimensions. Available in versions with output power from 120W to 480W.

Protections:
– Output short circuit
– Output overvoltage
– Overload
– Input voltage peaks
– Overheating.

Indications:
– LED indicator for power on.

Operational characteristics
– Rated supply voltage: 100...240VAC
– Mains frequency: 50/60Hz
– Rated output voltage: 24VDC
– Output voltage adjustment by front potentiometer
– High efficiency up to 94%
– Active PFC function (except PSN112024L)
– Relay output for available voltage signaling (Rdy) on types PSN112024 and PSN148024
– 35mm DIN rail (IEC/EN/BS 60715) mounting
– Screw terminals
– IEC degree of protection: IP20 on terminals.

Certifications and compliance
Certifications obtained: cULus
Compliant with standards: IEC/EN/BS 62368-1, EN/BS 55032, IEC/EN/BS 61000-3-2, IEC/EN/BS 61000-4-2, IEC/EN/BS 61000-4-3, IEC/EN/BS 61000-4-4, IEC/EN/BS 61000-4-5, IEC/EN/BS 61000-4-6, IEC/EN/BS 61000-4-11, UL61010-1, UL61010-2-201.

Compact DIN rail mount power supplies with basic functionality PSE series

PSE105024

Order code	Rated output voltage	Rated output current	Output power	Qty per pkg	Wt
	[V]	[A]	[W]	n°	[kg]
Single-phase.					
PSE103024	24VDC	1.25	30	1	0.140
PSE105024		2.1	50	1	0.200
PSE107224		3	72	1	0.250
PSE110024		4.2	100	1	0.350
PSE112024		5	120	1	0.610

General characteristics
The PSE power supplies have compact dimensions and are DIN rail mountable. They are used to supply electromechanical and electronic devices with DC control, such as contactors, time relays, sensors, PLCs, DC motors, displays, SSRs and other equipment normally found in automation systems.
Versions with output power from 30W to 120W available.

Protections:
– Output short circuit
– Output overvoltage
– Overload
– Input voltage peaks.

Indications:
– LED indicator for power on.

Operational characteristics
– Rated supply voltage: 100...240VAC
– Mains frequency: 50/60Hz
– Rated output voltage: 24VDC
– Output voltage adjustment by front potentiometer
– High efficiency up to 89%
– 35mm DIN rail (IEC/EN/BS 60715) mounting
– Screw terminals
– IEC degree of protection: IP20 on terminals.

Certifications and compliance
Certifications obtained: cULus, EAC, RCM.
Compliant with standards: IEC/EN/BS 62368-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL508, CSA C22.2 No. 107.1.

DIN Rail mount power supplies with maximum functionality PSL series

PSL100524
PSL101024
PSL101824

PSL1030...
PSL1060...

PSL1100...

PSL1240...
PSL130024

PSL148024
PSL148048

PSL396024

Order code	Rated output voltage	Rated output current	Output power	Qty per pkg	Wt
	[V]	[A]	[W]	n°	[kg]
Single-phase.					
PSL100524	24VDC	0.21	5	1	0.120
PSL101024		0.42	10	1	0.120
PSL101824		0.75	18	1	0.150
PSL103024		1.25	30	1	0.270
PSL106024		2.5	60	1	0.340
PSL110024		4.2	100	1	0.430
PSL112024		5	120	1	0.920
PSL124024		10	240	1	1.380
PSL130024		12.5	300	1	1.400
PSL148024		20	480	1	1.920
PSL103048	48VDC	0.625	30	1	0.270
PSL106048		1.25	60	1	0.340
PSL110048		2.1	100	1	0.430
PSL112048		2.5	120	1	0.920
PSL124048		5	240	1	1.380
PSL148048		10	480	1	1.920
Two-phase.					
PSL210024	24VDC	4.2	100	1	0.500
Three-phase❶.					
PSL312024	24VDC	5	120	1	0.800
PSL324024		10	240❶	1	1.100
PSL348024		20	480❶	1	1.720
PSL396024		40	960❶	1	3.400

❶ Two-phase connection is admissible with a 25% output power derating.

General characteristics
Power supplies PSL... series are used to supply electromechanical and electronic devices with DC control, such as contactors, time relays, sensors, PLCs, DC motors, displays, SSRs and other equipment normally found in automation systems and networks.

Protections:
- Output short circuit
- Output overvoltage
- Overload
- Input voltage peaks.

Indications:
- LED indicator for power on
- LED indicator for low voltage.

Operational characteristics
- Rated supply voltage:
  100...240VAC (PSL1005...PSL1100...)
  115/230VAC self-configurable (PSL1120...PSL1480...)
  400...500VAC (PSL2... and PSL3...❶)
- Mains frequency: 50/60Hz
- Rated output voltage: 24VDC (PSL...24) / 48VDC (PSL...48)
- Output voltage adjustment by front potentiometer
- PFC function for types: PSL112024...PSL396024 PSL112048...PSL148048
- Parallel connection for types: PSL1100...PSL396024 (except for PSL312024)
- High efficiency up to 92%
- 35mm DIN rail (IEC/EN/BS 60715) mounting
- Screw terminals
- Plastic or metal housing depending on type
- IEC degree of protection: IP20 on terminals.

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada (cULus-File E318016) as Power Supplies in power circuit and motor-mounted apparatus category; EAC, RCM.
Compliant with standards: IEC/EN/BS 62368-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL508, CSA C22.2 n° 107.1.

Redundancy modules

PSLRM1024

PSLR2024

Order code	Rated voltage	Rated output current	Qty per pkg	Wt
	[V]	[A]	n°	[kg]
Modular version DIN rail mount version.				
PSLRM1024	12...24VDC	10	1	0.075
DIN rail mount version.				
PSLR2024	24VDC	20	1	0.210

Indications (PSLR2024)

Input voltage A	Input voltage B	LED A	LED B	Relay A	Relay B
Within limits	Within limits	ON	ON	Energ.	Energ.
Within limits	<MIN or >MAX	ON	OFF	Energ.	De-energ.
<MIN or >MAX	Within limits	OFF	ON	De-energ.	Energ.
<MIN or >MAX	<MIN or >MAX	OFF	OFF	De-energ.	De-energ.

General characteristics
They are used for the redundancy connection of two or more power supplies to enhance the reliability of the DC supply. The redundancy modules ensure a perfect insulation between the power supplies connected.

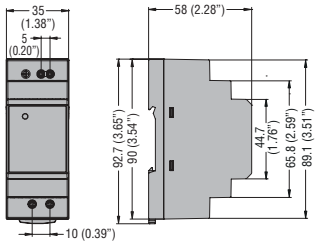
Indications (only for PSLR2024):
- LED indicator for DC voltage within limit
- Alarm relay.

Operational characteristics
- Rated input voltage:
  12...24VDC (PSLRM1024)
  24VDC (PSLR2024)
- Rated input current:
  10A (PSLRM1024)
  20A (PSLR2024)
- Rated output current :
  10A (PSLRM1024)
  20A (PSLR2024)
- Maximum output current:
  16A for 300s (PSLRM1024)
  30A for 300s (PSLR2024)
- Modular housing DIN 43880 2 modules (PSLRM1024)
- 35mm DIN rail (IEC/EN/BS 60715) mounting
- Screw terminals
- Plastic housing
- IEC degree of protection: IP20 on terminals.

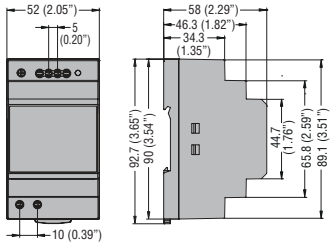
Certifications and compliance
Certifications obtained: cULus (only for PSLR2024), EAC, RCM.
Compliant with standards: IEC/EN/BS 60950-1 (only for PSLRM1024), IEC/EN/BS 62368-1 (only for PSLR2024), IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL508 (only for PSLR2024), CSA C22.2 n°107.1 (only for PSLR2024).

MODULAR COMPACT DIN RAIL MOUNT SWITCHING POWER SUPPLIES WITH STANDARD FUNCTIONALITY PSN SERIES

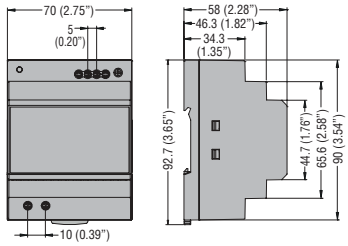
PSN1M02412 - PSN1M03624



PSN1M05412 -PSN1M06024

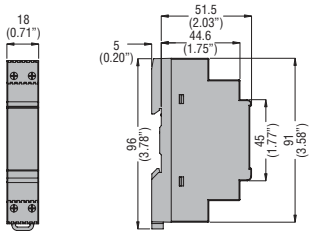


PSN1M09012 - PSN1M10024



MODULAR DIN RAIL MOUNT SWITCHING POWER SUPPLIES WITH MAXIMUM FUNCTIONALITY PSL SERIES

PSL1M010...



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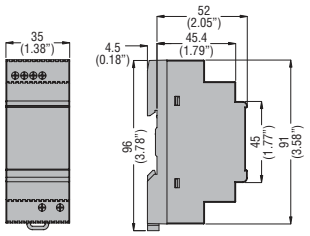
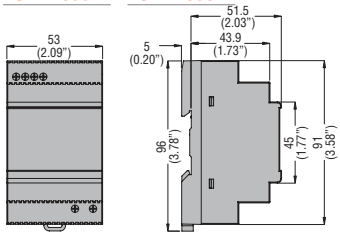
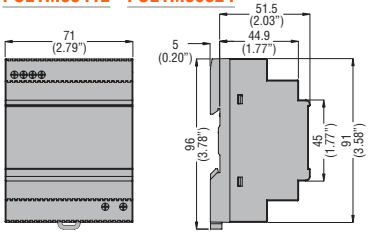


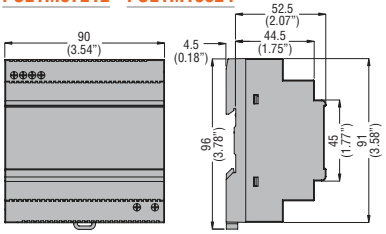
PSL1M03312 - PSL1M03624



PSL1M05412 - PSL1M06024

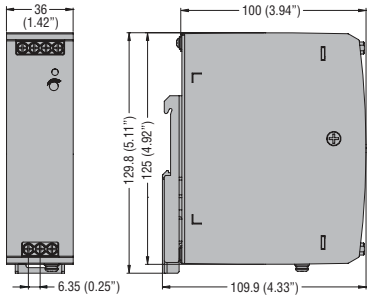


PSL1M07212 - PSL1M10024

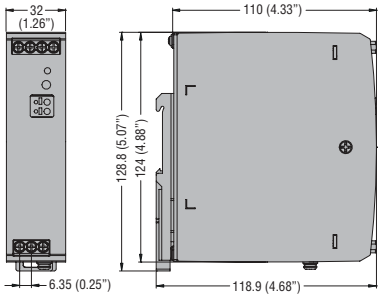


COMPACT DIN RAIL MOUNT SWITCHING POWER SUPPLIES WITH STANDARD FUNCTIONALITY PSN SERIES

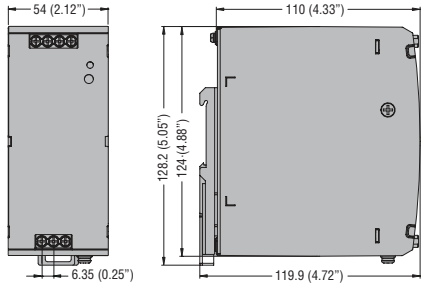
PSN112024L



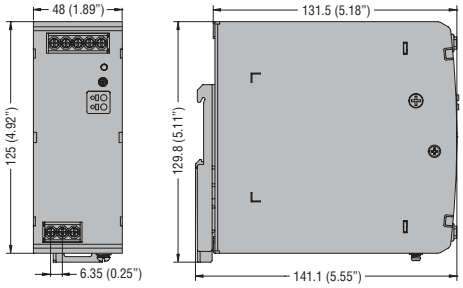
PSN112024



PSN124024

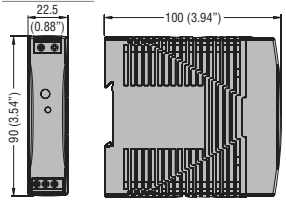


PSN148024

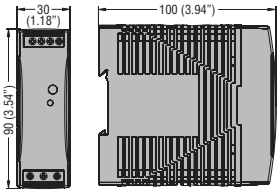


COMPACT DIN RAIL MOUNT SWITCHING POWER SUPPLIES WITH BASIC FUNCTIONALITY PSE SERIES

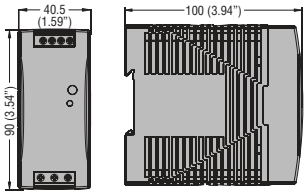
PSE103024



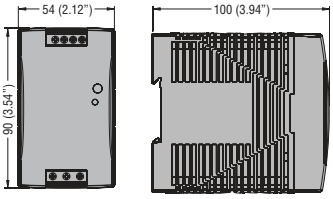
PSE105024



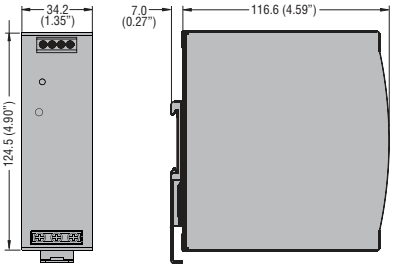
PSE107224



PSE110024

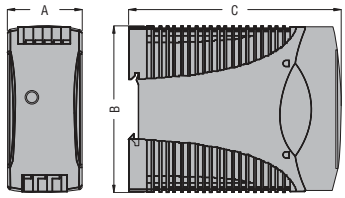


PSE112024



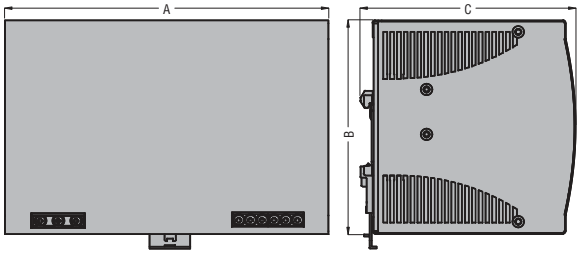
DIN RAIL MOUNT SWITCHING POWER SUPPLIES WITH MAXIMUM FUNCTIONALITY PSL SERIES

PSL100524...PSL110048
PSL210024



TYPE	A	B	C
PSL100524	22.5 (0.88")	90 (3.54")	115 (4.53")
PSL101024	22.5 (0.88")	90 (3.54")	115 (4.53")
PSL101824	22.5 (0.88")	90 (3.54")	115 (4.53")
PSL1030...	40.5 (1.59")	90 (3.54")	115 (4.53")
PSL1060...	40.5 (1.59")	90 (3.54")	115 (4.53")
PSL1100...	54 (2.12")	90 (3.54")	115 (4.53")
PSL210024	54 (2.12")	90 (3.54")	115 (4.53")

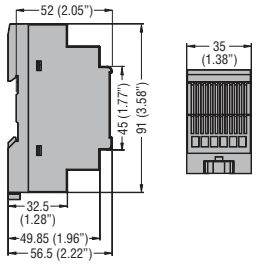
PSL112024...PSL148024
PSL312024...PSL396024



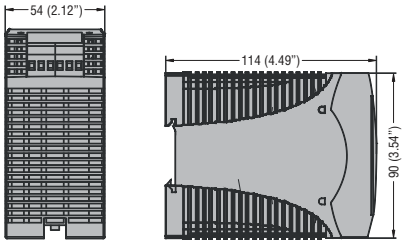
TYPE	A	B	C
PSL1120...	64 (2.52")	124.5 (4.90")	123.6 (4.87")
PSL1240...	83.5 (3.29")	124.5 (4.90")	123.6 (4.87")
PSL130024	83.5 (3.29")	124.5 (4.90")	123.6 (4.87")
PSL1480...	175.5 (6.91")	124.5 (4.90")	125 (4.92")
PSL312024	74.3 (2.92")	124 (4.88")	118.8 (4.68")
PSL324024	89 (3.50")	124 (4.88")	118.8 (4.68")
PSL348024	150 (5.90")	124 (4.88")	118.8 (4.68")
PSL396024	275.8 (10.86")	125.9 (4.96")	120.9 (4.76")

REDUNDANCY MODULES

PSLRM1024

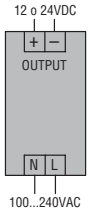


PSLR2024

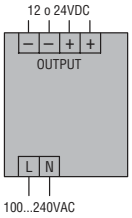


MODULAR COMPACT DIN RAIL MOUNT SWITCHING POWER SUPPLIES WITH STANDARD FUNCTIONALITY PSN SERIES

PSN1M02412
PSN1M03624

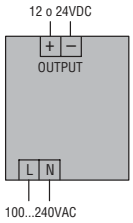


PSN1M05412 - PSN1M06024
PSN1M09012 - PSN1M10024

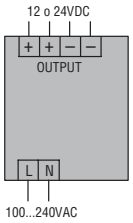


MODULAR DIN RAIL MOUNT SWITCHING POWER SUPPLIES WITH MAXIMUM FUNCTIONALITY PSL SERIES

PSL1M01012
PSL1M01024

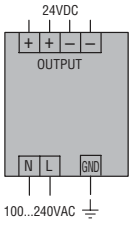


PSL1M02412 - PSL1M02424
PSL1M03312 - PSL1M03624
PSL1M05412 - PSL1M06024
PSL1M07212 - PSL1M10024

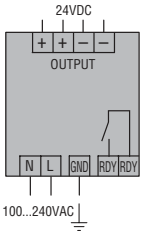


COMPACT DIN RAIL MOUNT SWITCHING POWER SUPPLIES WITH STANDARD FUNCTIONALITY PSN SERIES

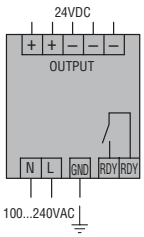
PSN112024L
PSN124024



PSN112024

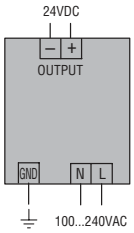


PSN148024

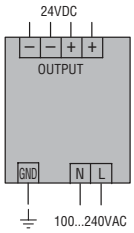


COMPACT DIN RAIL MOUNT SWITCHING POWER SUPPLIES WITH BASIC FUNCTIONALITY PSE SERIES

PSE103024

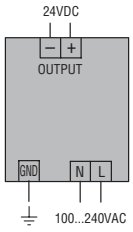


PSE105024 - PSE107224
PSE110024 - PSE112024

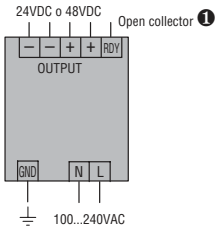


DIN RAIL MOUNT SWITCHING POWER SUPPLIES WITH MAXIMUM FUNCTIONALITY PSL SERIES

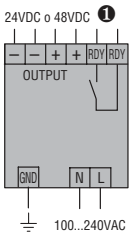
PSL100524
PSL101024
PSL101824



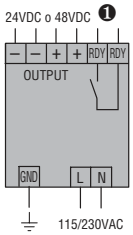
PSL1030...
PSL1060...



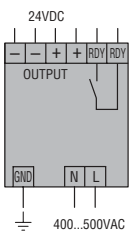
PSL1100...



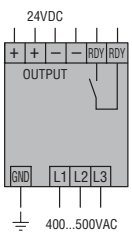
PSL1120...
PSL1240... - PSL130024
PSL1480...



PSL210024



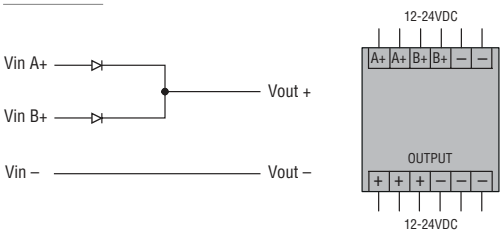
PSL312024 - PSL324024❷
PSL348024❷- PSL396024❷



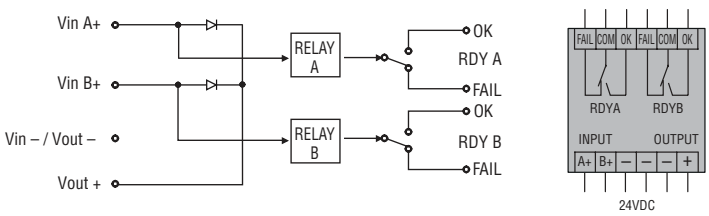
❶ Only for PSL1...24.
❷ Two-phase connection is permissible with a 25% output power derating.

REDUNDANCY MODULES

PSLRM1024



PSLR2024



MODULAR COMPACT DIN RAIL MOUNT SWITCHING POWER SUPPLIES WITH STANDARD FUNCTIONALITY **PSN** SERIES

TYPE Single-phase	**PSN1M02412 PSN1M03624**	**PSN1M05412 PSN1M06024**	**PSN1M09012 PSN1M10024**	
INPUT CHARACTERITICS				
Rated supply voltage	Multivoltage 100...240VAC			
Operating range	85...264VAC / 120...370VDC			
Consumption (max)	900mA (115VAC) 500mA (230VAC)	1.2A (115VAC) 800mA (230VAC)	3A (115VAC) 1.6A (230VAC)	
Frequency range	47...63Hz			
PFC	–			
Insulation voltage Input/output	4000VAC			
Internal fuse ❶	T3.15A 250VAC	T3.15A 250VAC	T6.3A 250VAC	
OUTPUT CHARACTERISTICS				
Voltage	12VDC (PSN1M...12); 24VDC (PSN1M...24)			
Voltage trimming (potentiometer)	10.8...13.8VDC (PSN1M02412) 21.6...29.0VDC (PSN1M03624)	10.8...13.8VDC (PSN1M05412) 21.6...29.0VDC (PSN1M06024)	12...13.8VDC (PSN1M09012) 21.6...29.0VDC (PSN1M10024)	
Rated current	2A (PSN1M02412) 1.5A (PSN1M03624)	4.5A (PSN1M05412) 2.5A (PSN1M06024)	7.5A (PSN1M09012) 4.2A (PSN1M10024)	
Temperature coefficient	±0.02%/°C	±0.02%/°C	±0.03%/°C	
Line adjustment	±0,5%			
Load adjustment	±1,5%			
Efficiency	88% (PSN1M02412) 88% (PSN1M03624)	88% (PSN1M05412) 90% (PSN1M06024)	88% (PSN1M09012) 90% (PSN1M10024)	
Overload protection	120%	120%	110...200%	
Output short-circuit protection	Hiccup			
Output overvoltage protection	≤ 16.5VDC (PSN1M...12) ≤ 36VDC (PSN1M...24)		≤ 20VDC (PSN1M...12) ≤ 35VDC (PSN1M...24)	
Ripple and noise	120mV (PSN1M...12); 150mV (PSN1M...24)			
Parallel connection (n° of units)❷	–			
INDICATIONS				
LED for power on	Yes			
LED for low voltage	No			
Output for available voltage signaling (Rdy)	No			
AMBIENT CONDITIONS				
Operating temperature ❸	-40...+70°C			
Derating of the output power	❹			
Storage temperature	-40...+85°C			
HOUSING				
Material	Plastic			

❶ No replacement by user.
❷ Minimum load of 150mA.
❸ Maximum surrounding temperature of 50°C for use according to UL508.
❹ See the derating tables in the technical manual.

MODULAR DIN RAIL MOUNT SWITCHING POWER SUPPLIES WITH MAXIMUM FUNCTIONALITY **PSL** SERIES

	PSL1M01012 - PSL1M01024	**PSL1M02412 - PSL1M02424**	**PSL1M03312 - PSL1M03624**	**PSL1M05412 - PSL1M06024**	**PSL1M07212 - PSL1M10024**
	Multivoltage 100...240VAC				
	90...264VAC / 120...375VDC				
	300mA	600mA	900mA	1.5A	1.7/2.2A
	47...63Hz				
	—				
	3000VAC (4242VDC)				
	T1A 250VAC	T2A 250VAC			T3.15A 250VAC
	12VDC (PSL1M...12); 24VDC (PSL1M...24)				
	—	12...14VDC (PSL1M...12) 24...28VDC (PSL1M...24)			
	0.83A (PSL1M...12) 0.42A (PSL1M...24)	2A (PSL1M...12) 1A (PSL1M...24)	2.75A (PSL1M...12) 1.5A (PSL1M...24)	4.5A (PSL1M...12) 2.5A (PSL1M...24)	6A (PSL1M...12) 4.2A (PSL1M...24)
	±0.03%/°C				
	±1%				
	±1%				
	79% (PSL1M...12) 80% (PSL1M...24)	84% (PSL1M...12) 85% (PSL1M...24)	83% (PSL1M...12) 84% (PSL1M...24)	84% (PSL1M...12) 86% (PSL1M...24)	86% (PSL1M...12) 89% (PSL1M...24)
	125...185%	120...160%	110...150%		
	Hiccup		Fold forward		
	15...16.5VDC (PSL1M...12) 30...33VDC (PSL1M...24)				
	50mV				
	—				
	Yes				
	Yes				
	No				
	-40...+71°C				
	from +61°C to +71°C by 2.5%/°C	from +56°C to +71°C by 2.5%/°C			from +61°C to +71°C by 2.5%/°C
	-40...+85°C				
	Plastic				

COMPACT DIN RAIL MOUNT SWITCHING POWER SUPPLIES WITH STANDARD FUNCTIONALITY **PSN** SERIES

TYPE Single-phase	**PSN112024L**	**PSN112024**	**PSN124024**	**PSN148024**
INPUT CHARACTERITICS				
Rated supply voltage	Multivoltage 100...240VAC			
Operating range	90...264VAC / 120...370VDC	85...264VAC / 120...370VDC		
Consumption (max)	3A (115VAC) 1.6A (230VAC)	1.5A (115VAC) 750mA (230VAC)	3A (115VAC) 1.5A (230VAC)	5.5A (115VAC) 2.5A (230VAC)
Frequency range	47...63Hz			
PFC	No	0.98 (115VAC), 0.94 (230VAC)	0.98 (115VAC), 0.95 (230VAC)	0.99 (115VAC), 0.99 (230VAC)
Insulation voltage Input/output	4000VAC	3000VAC		
Internal fuse ❶	T3.15A 250VAC	T4A 250VAC	T8A 250VAC	T8A 250VAC
OUTPUT CHARACTERISTICS				
Voltage	24VDC			
Voltage trimming (potentiometer)	24...28VDC			
Rated current	5A	5A	10A	20A
Temperature coefficient	±0.03%°C			
Line adjustment	±0.5%			
Load adjustment	±1%			
Efficiency	88%	94%	94%	94.5%
Overload protection	105...150%	105...200%	110...200%	150%
Output short-circuit protection	Hiccup			
Output overvoltage protection	≤ 33VDC	≤ 35VDC		29...35VDC
Ripple and noise	120mV	100mV	150mV	50mV
Parallel connection (n° of units)❷	–			
INDICATIONS				
LED for power on	Yes			
LED for low voltage	No			
Output for available voltage signaling (Rdy)	No	Yes	No	Yes
AMBIENT CONDITIONS				
Operating temperature ❸	-20...+60°C	-40...+70°C		
Derating of the output power	❹			
Storage temperature	-40...+85°C			
HOUSING				
Material	Metallic			

❶ No replacement by user.
❷ Minimum load of 150mA.
❸ Maximum surrounding temperature of 50°C for use according to UL508.
❹ See the derating tables in the technical manual.

COMPACT DIN RAIL MOUNT SWITCHING POWER SUPPLIES WITH BASIC FUNCTIONALITY **PSE** SERIES

	PSE103024	PSE105024	PSE107224	PSE110024	PSE112024
	Multivoltage 100...240VAC				
	85...264VAC / 120...375VDC				
	750mA	1.3A	1.7A	2.3A	2.9A
	47...63Hz				
	–				
	3000VAC (4242VDC)				
	T2A 250VAC		T3.15A 250VAC		
	24VDC				
	22.5...28.5VDC				
	1.25A	2.1A	3A	4.2A	5A
	±0.03%°C				
	±1%				
	±1%				
	Up to 86%	Up to 87%	Up to 89%	Up to 88%	Up to 89%
	140%			130%	140%
	Hiccup				
	28.8...32.4VDC				
	100mV				
	—				
	Yes				
	No				
	No				
	-25...+71°C				
	from +51°C (+46°C for PSE110024) to +71°C by 2.5%/°C				
	-40...+85°C				
	Plastic				Metallic

DIN RAIL MOUNT SWITCHING POWER SUPPLIES WITH MAXIMUM FUNCTIONALITY **PSL** SERIES

TYPE	Single-phase	**PSL100524**	**PSL101024**	**PSL101824**	**PSL103024 PSL103048**	**PSL106024 PSL106048**	**PSL110024 PSL110048**
	Two-phase	—	—	—	—	—	—
	Three-phase	—	—	—	—	—	—
INPUT CHARACTERITICS							
Rated supply voltage		Multivoltage 100...240VAC					
Operating range		90...264VAC / 120...375VDC			85...264VAC / 90..375VDC		90...264VAC 120...375VDC
Consumption (max)		200mA	300mA	500mA	800mA	1.5A	2.4A
Frequency range		47...63Hz					
PFC		—					
Insulation voltage Input/output		3000VAC (4242VDC)					
Internal fuse ❶		T2A 250VAC					T3.15A 250VAC
OUTPUT CHARACTERISTICS							
Voltage		24VDC (PSL...24); 48VDC (PSL...48)					
Voltage trimming (potentiometer)		21.6...28.8VDC			24...28VDC 48...55VDC		22.5...28.5VDC 47...56VDC
Rated current		0.21A	0.42A	0.75A	1.25A 0.625A	2.5A 1.25A	4.2A 2.1A
Temperature coefficient		±0.03%/°C					
Line adjustment		±1%			±0.5%		±1%
Load adjustment		±2%			±0.5%		±1%
Efficiency		72%	76%	77%	86%	89%	86% 88%
Overload protection		110...165%			110...150%		110...140%
Output short-circuit protection		Hiccup			Fold forward		
Output overvoltage protection		30...34.8VDC			30...33VDC		
Ripple & noise		50mV					
Parallel connection (n° of units)❸		—					3
INDICATIONS							
LED for power on		Yes					
LED for low voltage		Yes			No		Yes
Output for available voltage signaling (Rdy)		No			only on types PSL1...24		
AMBIENT CONDITIONS							
Operating temperature ❹		-20...+71°C			-40...+71°C		-35...+71°C
Storage temperature		-25...+85°C			-40...+85°C		
Derating of the output power		from +61°C to +71°C by 2.5%/°C					
HOUSING							
Material		Plastic					

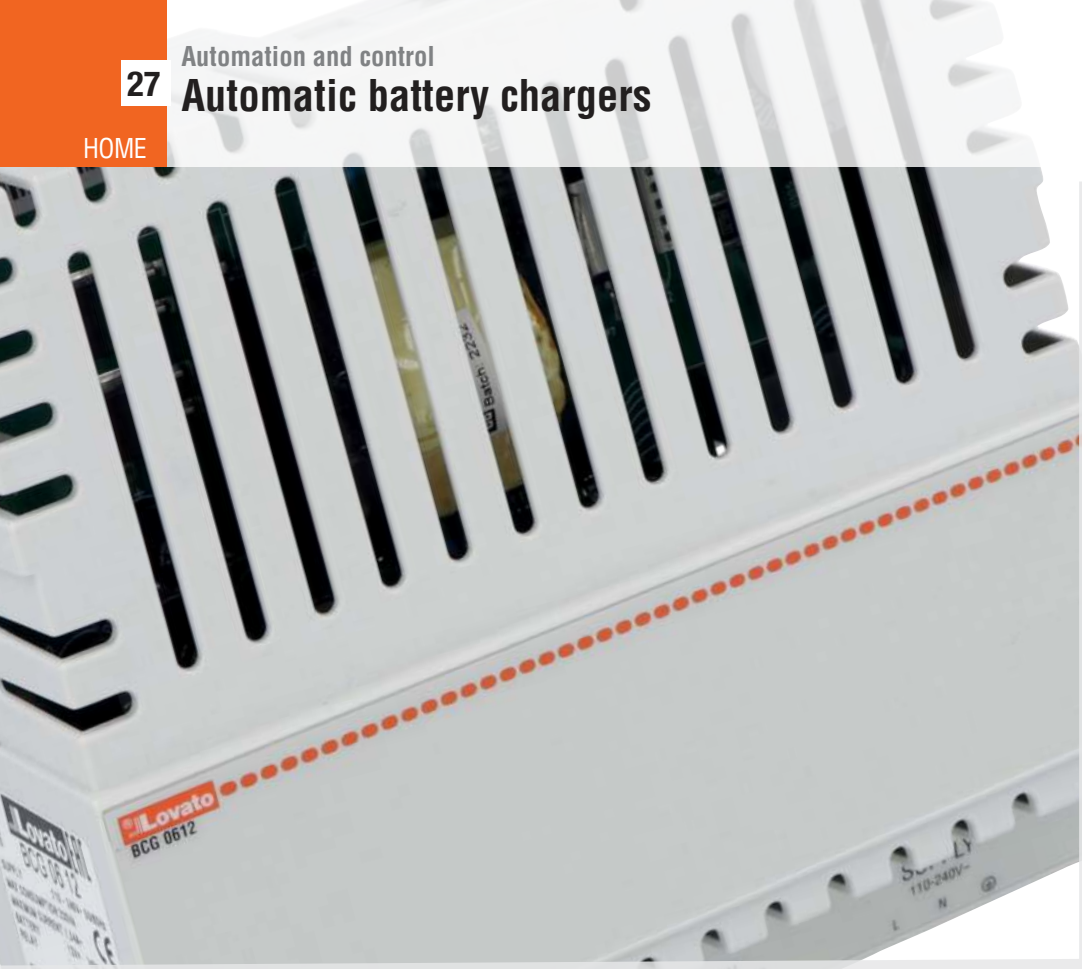
❶ No replacement by user.
❷ Two-phase connection is possible with 25% power derating, except types PSL2100... and PSL312024.
❸ Minimum load of 150mA.
❹ Maximum surrounding temperature of 50°C for use according to UL508.

	PSL112024 **PSL112048**	**PSL124024** **PSL124048**	**PSL130024**	**PSL148024** **PSL148048**	—	—	—	—	—
	—	—	—	—	**PSL210024**	—	—	—	—
	—	—	—	—	—	**PSL312024**	**PSL324024**	**PSL348024**	**PSL396024**
	Self-configurable 115/230VAC				400...500VAC ❷				
	90...132VAC / 180...264VAC 210...375VDC			90...264VAC 120...375VDC	340...575VAC 480...820VDC				
	2.8A	5.4A	6A	7A	750mA	500mA	850mA	1.4A	2.4A
	47...63Hz								
	0.7	0.75		0.97	0.55			0.65	0.8
	3000VAC (4242VDC)								
	T3.15A 250VAC	T6.3A 250VAC	T8A 250VAC	T10A 250VAC	T2A 600VAC			T3.15A 500VAC	T5A 500VAC
	24VDC (PSL...24); 48VDC (PSL...48)				24VDC				
	22.5...28.5VDC 47...56VDC		22.5...28.5VDC	22.5...28.5VDC 47...56VDC	22.5...28.5VDC				
	5A 2.5A	10A 5A	12.5A	20A 10A	4.2A	5A	10A	20A	40A
	0.03%/°C								
	±0.5%				±1%				
	±1%								
	86% 87%	89% 90%	89%	89% 90%	87%	89%	90%	90%	92%
	110...145%	120...145%		110...140%	115...135%		120...140%	110...135%	
	Fold forward				Hiccup			Fold forward	Hiccup
	30...33VDC (PSL...24) 60...66VDC (PSL...48)		30...33VDC	30...33VDC (PSL...24) 60...66VDC (PSL...48)	30...33VDC				
	50mV	100mV			50mV	100mV			80mV
	3				2	—	2	2	3
	Yes								
	Yes								
	only on types PSL1...24				Yes				
	-35...+71°C	-40...+71°C	-30...+71°C	-40...+71°				-30...+71°C	-40...+71°C
	-40...+85°C								
	from +61°C to +71°C by 2.5%/°C		from +56°C to +71°C by 2.5%/°C		from +61°C to +71°C by 2.5%/°C				3.5%/°C (>60°C)
	Metal				Plastic	Metal			

REDUNDANCY MODULES **PSLR...**

TYPE	**PSLRM1024**	**PSLR2024**
INPUTS CHARACTERISTICS		
Rated input voltage	12-24VDC	24VDC
Operating range	9...35VDC	21...28VDC
Number of input	2	2
Rated input current	10A	20A
OUTPUTS CHARACTERISTICS		
Output voltage drop	0.5V	0.5V
Corrente di uscita nominale	10A	20A
Rated output current	35V	30V
Maximum output current	16A for 300s	30A for 300s
INDICATIONS		
DC ON indicator for input A	No	Yes
DC ON indicator for input B	No	Yes
Power Rdy (Ready) output	No	Ok if input >20V (±5%) or <30V(±5%) Fail if input <20V (±5%) or >30V(±5%) Rating 1A 30VDC
AMBIENT CONDITIONS		
Operating temperature / Storage temperature	-40...+71°C / -40...+85°C	
HOUSING		
Material	Plastic	

Automatic battery chargers



- Switching and linear technology
- 1 charging level
- Versions for non-sealed and sealed lead-acid batteries, 1.25 to 12A ratings
- Charging current limitation selectable.

	Sec. - Page
Automatic battery chargers for lead-acid batteries	
Switching BCF series, modular version	27 - 2
Switching BCG series	27 - 3
Linear BCE series	27 - 4
Dimensions	**27 - 5**
Wiring diagrams	**27 - 6**
Technical characteristics	**27 - 7**

Page 27-2

SWITCHING BATTERY CHARGERS MODULAR VERSION

- For lead-acid batteries up to 50Ah rating
- Rated output current:
  – 2.5 and 4.5A at 12VDC
  – 1.25 and 2.5A at 24VDC
- Electronic lock for shorted battery, reverse polarity and output overload
- Automatic reset at end of alarm conditions
- Output for alarm remote indication.

Page 27-3

SWITCHING BATTERY CHARGERS

- For lead-acid batteries up to 150Ah rating
- Rated output current:
  – 6A and 12A at 12VDC
  – 5A and 10A at 24VDC
- Electronic lock for shorted battery, reverse polarity and output overload
- Automatic reset at end of alarm conditions
- Output for alarm remote indication.

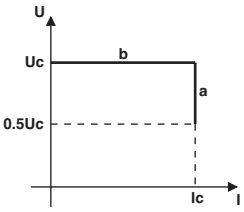
Page 27-4

LINEAR BATTERY CHARGERS

- For lead-acid batteries up to 150Ah rating
- Rated output current:
  – 3A, 6A, 12A at 12VDC
  – 2.5A, 5A, 10A at 24VDC
- Electronic lock for shorted battery, reverse polarity, output overload and disconnected battery
- Output for alarm remote indication.

For lead-acid batteries

BCF...



a - constant current charge
b - constant voltage charge

Order code	Rated output current	Rated output voltage in DC	Qty per pkg	Wt
	[A]	[V]	n°	[kg]
1 charging level.				
BCF025012	2.5	12	1	0.332
BCF045012	4.5		1	0.336
BCF012524	1.25	24	1	0.332
BCF025024	2.5		1	0.332

Alarms	VDC ON GREEN LED	BAT LOW RED LED	RELAY
Correct output voltage	ON	OFF	Energised
Reverse polarity	ON	ON	Energised
Short circuit/ Overload	OFF	OFF	De-energised

Type	Maximum power consumption		dissipation	Internal fuse mains side (Type T)
	[VA]	[W]	[W]	[A]
BCF025012	80	40	6	2❶
BCF045012	150	70	9	2❶
BCF012524	80	39	6	2❶
BCF025024	150	77	9	2❶

❶ Not replaceable.

General characteristics
- Switching technology
- Wide range of auxiliary supply
- Screw fixing or 35mm DIN rail mount (IEC/EN/BS 60715).

Protection:
- Mains input fuse
- Battery output fuse
- Electronic lock in case of short circuit on battery terminals, reverse battery polarity and output overload
- Automatic reset at end of alarm conditions.

LED indications:
- Correct output voltage
- Reverse battery polarity.

Operational characteristics
- Auxiliary supply voltage: 100...240VAC ±10% 50/60Hz ±5%
- Fixed charging current
- Current limitation
- Charging current according to DIN 41773 standards
- Fixed clamping screw terminal block with captive screws
- IEC degree of protection: IP20.

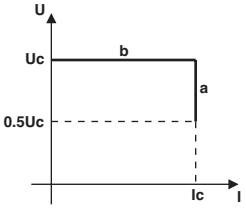
Alarm output circuit
- Type of output: 3A 250VAC AC1 duty relay, normally energised.

Certifications and compliance
Certifications obtained: EAC; UL Recognized for USA and Canada (cURus - File E360865), as Power Supplies - Component. Products having this type of marking are intended for use as components of complete workshop-assembled equipment. Compliant with standards: IEC/EN/BS 62368-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 60950-1, CSA C22.2 n°60950-1.

For lead-acid batteries

BCG...

BCGX00



a - constant current charge
b - constant voltage charge

Order code	Rated output current	Rated output voltage in DC	Qty per pkg	Wt
	[A]	[V]	n°	[kg]
1 charging level.				
BCG0612	6	12	1	0.532
BCG1212	12		1	0.710
BCG0524	5	24	1	0.532
BCG1024	10		1	0.710
Accessories.				
BCGX00	Adapter for 35mm DIN rail vertical mount of BCG0612 and BCG0524		1	0.022

Alarms	ON GRN LED	REV RED LED	ALA RED LED	CHG YEL RED	RELAY
Correct output voltage	ON	OFF	OFF	OFF	Energ.
Charging	ON	OFF	OFF	ON❶	Energ.
Low battery voltage	ON	OFF	ON	ON❷	De-energ.
Reverse polarity	OFF	ON	OFF	OFF	De-energ.
Short circuit / Overload	ON	OFF	ON	OFF	De-energ.

❶ Steady light if the charging current is more than approx. 30% of programmed current value.
❷ Flashing during Hiccup operating conditions.

Type	Maximum power consumption	dissipation	Internal fuse Mains side (type T)
	[VA]	[W]	[W]	[A]
BCG0612	230	97	14	4❸
BCG1212	284	190	29	6,3
BCG0524	364	158	20	6,3❸
BCG1024	630	311	41	8

❸ Not replaceable.

General characteristics
- Switching technology
- Wide auxiliary supply range
- High efficiency
- Two charging voltages selectable by DIP-switch
- Boost external control for full battery charging
- Hiccup function for battery recharging when its voltage is lower than 50% rated value
- Charging current limiting trimmer resistor
- Screw fixing or 35mm DIN rail mount (IEC/EN/BS 60715).

Protection:
- Input fuse on AC side
- Electronic lock in case of short circuit on battery terminals, reverse battery polarity and output overload
- Automatic reset at end of alarm conditions.

LED indications:
- Power on
- Charging operation (I>30% Ic)
- Overload or short circuit conditions
- Reverse battery polarity.

Operational characteristics
- Auxiliary supply voltage: 110...240VAC ±10% 50/60Hz ±10%
- Charging voltage selectable by DIP-switch
- Maximum charging current can be set with a trimmer on the front: 20...100% of the rated current value
- Current limitation
- Charging cycle according to DIN 41773 standards
- IEC degree of protection: IP20.

Alarm output circuit
- Type of output: 5A 30VDC duty relay, normally energised.

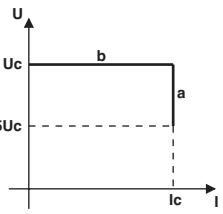
Certifications and compliance
Certifications obtained: EAC; UL Recognized for USA and Canada (cURus - File E360865), as Power Supplies - Component.
Products having this type of marking are intended for use as components of complete workshop-assembled equipment.
Compliant with standards: IEC/EN/BS 62368-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-4, UL 60950-1, CSA C22.2 n°60950-1.

For lead-acid batteries

31BCE0312
31BCE2V524

31BCE0612
31BCE0524

31BCE1212
31BCE1024



a - constant current charge
b - constant voltage charge

Order code	Rated output current	Rated output voltage in DC	Qty per pkg	Wt
	[A]	[V]	n°	[kg]
1 charging level.				
31BCE0312	3	12	1	1.984
31BCE0612	6		1	4.832
31BCE1212	12		1	8.690
31BCE2V524	2.5	24	1	1.992
31BCE0524	5		1	4.960
31BCE1024	10		1	9.560

Alarms	ON GREEN LED	ALARM RED LED	CHARGE GREEN LED	RELAY
Correct output voltage	ON	OFF	OFF	Energ.
Charging	ON	OFF	ON	Energ.
Low battery voltage	ON	ON	OFF	De-energ.
Reverse polarity	ON	ON	OFF	De-energ.
Short circuit / Overload	ON	ON	OFF	De-energ.
Battery disconnected	ON	ON	OFF	De-energ.

Type	Maximum power consumption	dissipation	Mains fuse (type)
	[VA]	[W]	[A]
BCE0312	117	24	1 (T) ext ❶
BCE0612	222	46	4 (F) int
BCE1212	400	73	6.3 (F) int
BCE2V524	166	26	1 (T) ext ❶
BCE0524	317	40	4 (F) int
BCE1024	610	66	6.3 (F) int

❶ Not supplied; installed by customer.

General characteristics
- Linear technology
- Housing for internal panel mounting by screws.

Protection:
- Mains input fuse (except for BCE2V5 and BCE03)
- Battery output fuse
- Electronic lock in case of short circuit on battery terminals, reverse battery polarity, output overload (<0.5 Ue) and disconnected battery.

LED Indications:
- Power on
- Charge (I > 0.2 Ic)
- Alarm for protection tripping.

Operational characteristics
- Auxiliary supply voltage: 220...240VAC ±10%, 50/60Hz ±5%
- Charging current: 30...100% Ie adjustable
- Charging cycle according to DIN 41773 standards
- Current limitation
- Clamping screw terminal block with captive screws:
  - Removable for BCE03 and BCE2V5
  - Fixed for BCE05, BCE06, BCE10 and BCE12
- IEC degree of protection: IP00.

Alarms
Possible causes of alarm include:
- Low battery voltage
- Battery fuse blown
- Battery not connected
- Battery polarity inverted (reverse polarity).

BCE2V524 - BCE0312
These types have a static alarm output for the control of a relay or indicator, maximum 300mA duty.
If it is connected to a relay, this must be normally energised in absence of alarm. In alarm conditions with ALARM LED switched on or in absence of supply, the relay de-energises.

BCE0524 - BCE0612 - BCE1024 - BCE1212
These types have a normally energised relay alarm output. In alarm conditions with ALARM LED switched on or in absence of supply, the relay de-energises.

Alarm output circuit
BCE2V524 - BCE0312
- Type of output:
  - Negative static; NPN transistor❷
  - Maximum voltage applicable to load: +V battery terminal
  - Maximum output current: 300mA
  - Maximum overload current for 1 second: 2A
  - Dynamic over-voltage protection with inductive load.

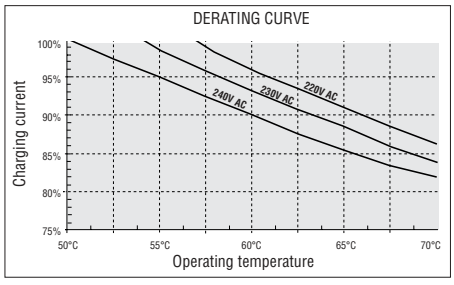
BCE0524 - BCE0612 - BCE1024 - BCE1212
- Type of output
  - Relay: 1 changeover contact (SPDT)
  - Rated voltage: 250VAC
  - IEC rated capacity in AC1 duty: 5A 250VAC Ith
  - IEC rated capacity in DC13 or DC14 duty: 5A 30VDC
  - Electrical life: >10^5 cycles
  - Mechanical life: >30x10^5 cycles.

❷ The output is not overload or short-circuit protected. It is however capable of switching on a 3W filament bulb.

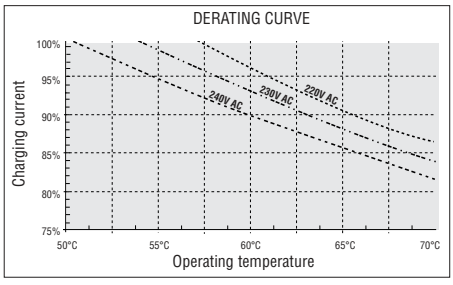
Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60950-1.

DERATING CURVES

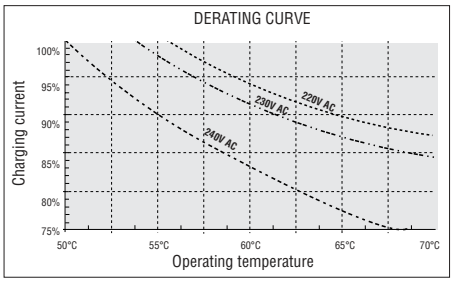
BCE2V524 - BCE0312



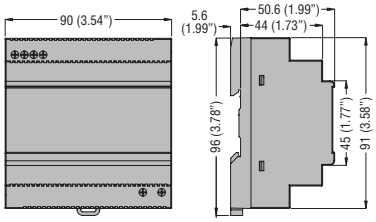
BCE0524 - BCE0612



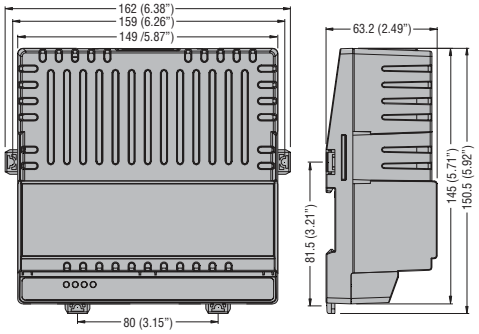
BCE1024 - BCE1224



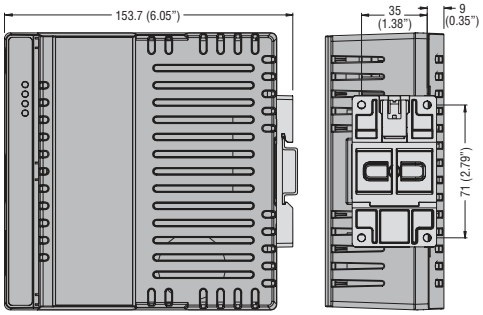
BCF...



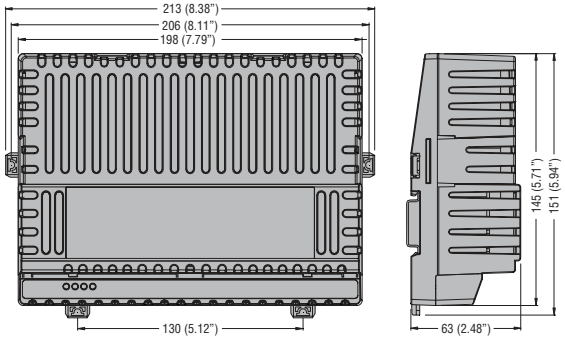
BCG0612 - BCG0524



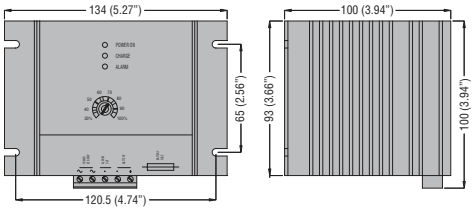
Mounting adapter BCGX00



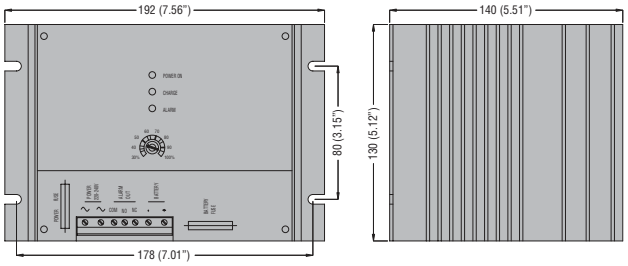
BCG1212 - BCG1024



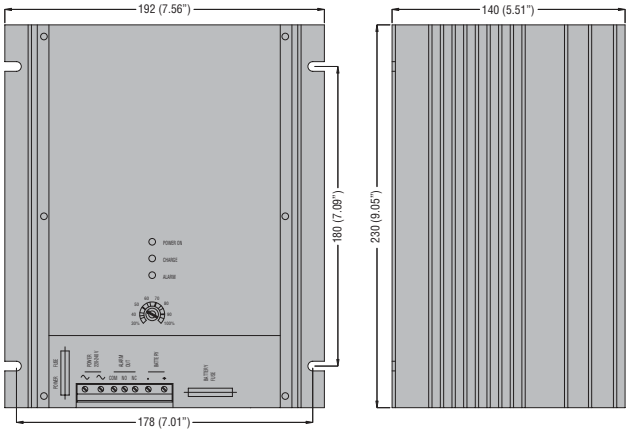
BCE0312 - BCE2V524



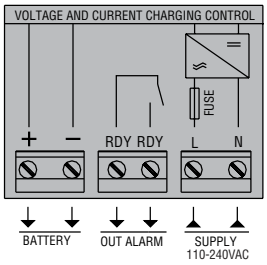
BCE0612 - BCE0524



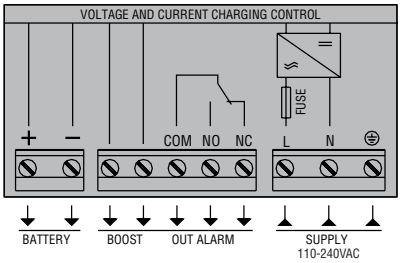
BCE1212 - BCE1024



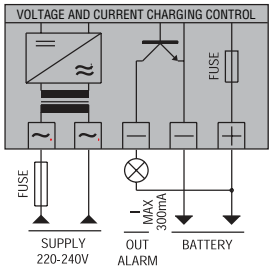
BCF...



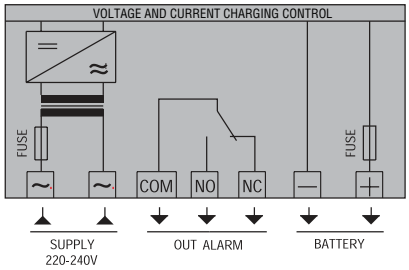
BCG...

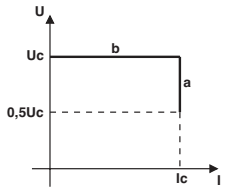


BCE2V5... - BCE03...



BCE05... - BCE06... - BCE10... - BCE12...



TYPE	**BCF...**	**BCG...**	**BCE...**
Description	Single phase automatic battery charger 1 charging level for lead-acid batteries	Single phase automatic battery charger 1 charging level for lead-acid batteries	Single phase automatic battery charger 1 charging level for lead-acid batteries
Supply voltage	100...240VAC ±10%; 50/60Hz ±5%	110...240VAC ±10%; 50/60Hz ±10%	220...240VAC ±10% 50/60Hz ±5%
Rated output voltage (Uoc)	12-24VDC		
Rated charging current (Ic)	2.5-4.5A (12VDC) 1.25-2.5A (24VDC)	6-12A (12VDC) 5-10A (24VDC)	3-6-12A (12VDC) 2.5-5-10A (24VDC)
CHARGING CYCLE			
Reference standards	DIN 41773		
Diagram	 a - constant current charge b - constant voltage charge		
End charging voltage Uc	12V battery: 13.6VDC (2.27V/cell) 24V battery: 27.2VDC (2.27V/cell)	12V battery with DIP2: – in pos. V1: 13.8V – in pos. V2: 13.5V (default) 24V battery with DIP2: – in pos. V1: 27.6V – in pos. V2: 27.0V (default)	12V battery: 13.8VDC (2.3V/cell) 24V battery: 27.6VDC (2.3V/cell)
Charging current	Fixed	Adjustable 20% to 100% Ic (using potentiometer/trimpot)	Adjustable 30% to 100% Ic (using potentiometer)
Current limit	Yes		
Boost	—	+4.4% Uc	—
PROTECTION			
Type	– Mains supply fuse – Charging inhibition due to: • Short circuit at battery terminals • Reverse battery polarity • Low voltage at battery poles (<0.5 Uoc) • Output overload	– Mains supply fuse – Charging inhibition due to: • Short circuit at battery terminals • Reverse battery polarity • Low voltage at battery poles (<0.5 Uoc) • Output overload	– Mains supply fuse (5, 6, 10, 12A types only) – Battery output fuse – Charging inhibition due to: • Short circuit at battery terminals • Reverse battery polarity • Low voltage at battery poles (<0.5 Uoc) • Disconnected battery
ALARM OUTPUT CIRCUIT			
Type of output	1 relay 3A 250VAC (AC1)	1 relay 5A 30VDC	Static (NPN transistor) ❶; relay with 1 c/o contact (SPDT), 5A 250VAC ❷
AMBIENT CONDITIONS			
Operating temperature	-40...+51°C	-30...+55°C (+55...+70°C with 1-5%Ic/°C derating by trimpot)	-10...+50°C
Storage temperature	-40...+85°C	-30...+80°C	-30...+80°C
HOUSING			
Version	Modular	Internal panel mount	Internal panel mount
Mounting	35mm DIN rail (IEC/EN/BS 60715)	35mm DIN rail (IEC/EN/BS 60715) or screw fixing	Screw fixing
IEC degree of protection	IP20	IP20	IP00
Cooling	Natural		
Connections	Fixed terminals	Fixed terminals	Removable/plug-in terminals❶ Fixed terminals❷

❶ For 2.5A and 3A types only.
❷ For 5, 6, 10 and 12A types only.

Energy management

Energy meters and power analyzers

- Single and three-phase energy meters
- MID certified versions with UTF certificates
- cULus certified versions
- Eichrecht certified versions
- Power analyzer and multifunction digital metering instruments, expandable, with icon display, monochrome or colour
- Connection to single, two and three-phase and for power monitoring systems
- Ideal for distribution systems, electricity cogeneration and within machinery installations
- High measurement accuracy
- Totally programmable digital and analog inputs and outputs
- RS485, RS232, USB, Ethernet, Profibus DP and M-Bus communication ports
- Digital voltmeters, ammeters, wattmeters, frequency meters and cosφ meters.

	Sec. - Page
Energy meters	
Single-phase	28 - 12
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Page 28-12

ENERGY METERS

- Single-phase, three-phase with neutral, three-phase with or without neutral
- Direct connection or by current transformers
- MID or cULus certified versions
- Eichrecht certified versions
- Versions expandable with EXM... expansion modules
- Versions with built-in RS485 or M-Bus communication ports.

Page 28-17

DATA CONCENTRATORS

- Energy consumption data storage for network usage
- Connection up to 14 energy meters equipped with static output
- Expandable with EXM... expansion modules
- Built-in RS485 communication port.

Page 28-18

POWER ANALYZERS WITH WIDESCREEN COLOUR LCD

- Widescreen colour LCD display
- Flush-mount 92x92mm
- Versions with built-in RS485 communication port
- Versions with built-in Ethernet and data memory
- Versions expandable with EXP... expansion modules
- NFC and optical port
- Compatibility with EASY BRANCH power monitoring system.

Page 28-20

DIGITAL LCD MULTIMETERS AND POWER ANALYZERS

- Graphic or icon LCD
- Modular and flush-mount 92x92mm
- Versions expandable with EXM... and EXP... expansion modules
- Version with built-in RS485 communication port.
- Flush-mount version with current reading through Rogowski coils.

Page 28-23

LED MEASURING INSTRUMENTS

- Voltmeters, ammeters and wattmeters
- Modular and flush-mount 96x48mm versions.

SINGLE-PHASE DIRECT CONNECTION ENERGY METERS

Type	DMED100T1	DMED110T1	DMED111	DMED112	DMED115T1	DMED120T1	DMED121	DMED122
Maximum current	40A	40A	40A	40A	40A	63A	63A	63A
Display								
Vertical, no backlight	●	●	●	●				
Horizontal, backlight					●	●	●	●
Measurements								
kWh	●	●	●	●	●	●	●	●
kWh, kW with average and max demand		●	●	●	●	●	●	●
kvarh, kvar, V, I, Hz, PF, total and partial hour counter		●	●	●		●	●	●
Interface								
Pulse output	●							
Programmable output (pulses/thresholds)		●			●	●		
Built-in Modbus-RTU (RS485)			●				●	
Built-in M-Bus				●				●
MID version -25...+55°C❶	●	●	●	●		●	●	●
MID version -25...+70°C❷			●					
Compatibility with Synergy, Synergy Cloud and Xpress software			●				●	

THREE-PHASE ENERGY METERS

Type	DMED300T2	DMED311	DMED302	DMED305T2	DMED330	DMED332	DMED310T2
Maximum current	80A	80A	80A	CT /5 or CT /1	CT /5 or CT /1	CT /5 or CT /1	CT /5
Connection type							
Direct	●	●	●				
Via CT				●	●	●	●
Interface							
Programmable output (pulses/thresholds)	●			●			●
Built-in Modbus-RTU (RS485)		●			●		
Built-in M-Bus			●			●	
Expandability							
Communication (RS485, Ethernet, USB)							●
Relay outputs for load disconnection							●
Data memory (Data logger)							●
MID version -25...+55°C❶❹	●		●	●	●	●	
MID version -25...+70°C❷❹		●					
cULus version (ANSI C12.20)❸	●						
Compatibility with Synergy, Synergy Cloud and Xpress software		●			●		●

❶ For MID versions add "MID"
❷ For MID7 versions add "MID7"
❸ For UL versions add "UL"
❹ UTF certified versions available on request.

Energy meters and power analyzers

Energy meters, multimeters and power analyzers

THREE-PHASE ENERGY METERS

Type	DMED341MID7	DMED341MID7E	DMED341MID7ER
Maximum current	80A	80A	80A
Connection type Direct	●	●	●
Interface Programmable output (pulses/thresholds)	●	●	●
Built-in Modbus-RTU (RS485)	●	●	●
MID version -25...+70°C	●	●	●
Eichrecht version		●	●
MID version -25...+70°C also for reverse/exported energy			●
Compatibility with Synergy, Synergy Cloud and Xpress software	●	●	●

DIN RAIL MOUNTING (MODULAR) MULTIMETERS

Type	DMG100	DMG110	DMG200	DMG210	DMG300
Maximum rated voltage	600VAC	600VAC	690VAC	690VAC	690VAC
Voltage and current measure accuracy	0.5%	0.5%	0.5%	0.5%	0.2%
Active energy measure accuracy	Class 1	Class 1	Class 1	Class 1	Class 0.5s
Single-phase energy meter	●	●			
Harmonic analysis	15th order	15th order	THD only	THD only	31st order
Boolean logic					●
Expandable with EXM... modules					3 modules
Display type	Icons	Icons	Graphic	Graphic	Graphic
Built-in communication port		RS485		RS485	
Communication port with EXM... modules					RS232 USB RS485 Ethernet
Ethernet-RS485 gateway function					●

FLUSH MOUNTING MULTIMETERS AND POWER ANALYZERS

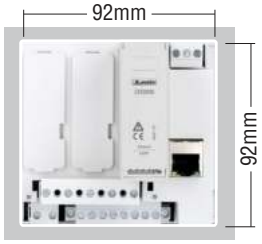
Type	DMG600	DMG610	DMG611	DMG615	DMG620	DMG7000	DMG7500	DMG8000	DMG9000...
Maximum rated voltage	600VAC	600VAC	600VAC	600VAC	600VAC	600VAC	600VAC	600VAC	600VAC
Current reading	CT /5A or CT /1A	CT /5A or CT /1A	Rogowski coils❶	CT /5A or CT /1A	CT /5A or CT /1A	CT /5A or CT /1A	CT /5A or CT /1A	CT /5A or CT /1A	CT /5A or CT /1A
Voltage and current measure accuracy	0.5%	0.5%	0.5%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
Active energy measure accuracy	Class 1	Class 1	Class 1	Class 0.5s	Class 0.5s	Class 0.5s	Class 0.5s	Class 0.5s	Class 0.5s
Single-phase energy meter	●	●	●	●	●	●	●	●	●
Harmonic analysis	15th order	15th order	15th order	15th order	15th order	63rd order	63rd order	63rd order	63rd order
Neutral-earth voltage									●
Neutral current	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Measured
PLC logic						●	●	●	●
Display type	Icons	Icons	Icons	Icons	Icons	Colour graphic	Colour graphic	Colour graphic	Colour graphic
Built-in communication port		RS485	RS485	RS485	Ethernet		RS485	Ethernet	RS485 Ethernet
Expandable with EXP... modules	1 module	1 module	1 module	1 module	1 module	3 modules	3 modules	3 modules	3 modules
Communication port with EXP... modules	RS232 USB RS485 Ethernet	RS232 USB RS485 Ethernet	RS232 USB RS485 Ethernet	RS232 USB RS485 Ethernet	RS232 USB RS485 Ethernet	RS232 USB RS485 Ethernet Profibus DP	RS232 USB RS485 Ethernet Profibus DP	RS232 USB RS485 Ethernet Profibus DP	RS232 USB RS485 Ethernet Profibus DP
Data memory								●	●
Ethernet-RS485 gateway function						●	●	●	●
Energy quality according to EN 50160									●
Compatibility with EASY BRANCH power monitoring system							●	●	●
Degree of protection	IP54	IP54	IP54	IP54	IP54	IP65	IP65	IP65	IP65

❶ Coils and calibration report included.

POWER ANALYZERS WITH WIDESCREEN COLOUR LCD
DMG SERIES

WIDESCREEN COLOUR LCD

The large size of the colour LCD (4.3") allows for the optimal view of measures and parameters in a clear, simple and intuitive way.
The standard cutout dimensions (92x92mm) ensures a perfect compatibility with the usual front panel solutions.



10 LANGUAGES

The language shown can be selected from a large number of choices: English, French, German, Italian, Spanish, Portuguese, Polish, Russian, Czech, Chinese.

PROGRAMMABLE LEDs

3 front LEDs are programmable and let the user know the status of the device at any time: alarms programmed by the user, status of digital inputs or outputs, emission of pulses indicating energy consumption, communication in progress.

HIGH ACCURACY LEVEL FOR MEASUREMENTS

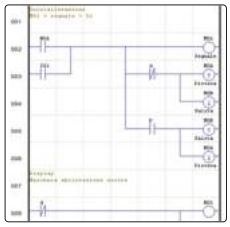
The measurements are verified according to the recognized international standards for measuring instruments: IEC 62053-22 (**class 0.5s**), IEC 62053-24 (**class 1**) and IEC 61557-12 (**class 0.5**).

NFC CONFIGURATION

Thanks to NFC technology, it is possible to configure and modify parameters (even when the device is not powered) through NFC LOVATO App, which can be downloaded for free from the Google Play Store and App Store for Android and iOS smart devices.

PLC LOGIC

Thanks to the built-in PLC logic, the power analyzers can perform simple automations related to timers and alarm states and digital inputs. Programming with "contacts" (**Ladder**) is simple and intuitive thanks to the use of Xpress configuration software.



	DMG7000	DMG7500	DMG8000	DMG9000
Built-in RS485 port	–	●	–	●
Built-in Ethernet port (with web-server)	–	–	●	●
Ethernet-RS485 gateway function	+ EXP1012 + EXP1013	+ EXP1013	+ EXP1012	●
Memory for data collection	–	–	●	●
Statistics of network quality according to EN50160	–	–	–	●
Neutral current measurement through dedicated CT	–	–	–	●
Neutral-Earth voltage measurement	–	–	–	●
Compatibility with EASY BRANCH power monitoring system	–	●	●	●

EVERYTHING UNDER CONTROL!

MEASUREMENTS

DMG power analyzers display all the measurements useful for a complete check of the electrical network. The voltage measurement input does not require external transformers **up to 600VAC**.

CHARTS AND HARMONICS

The electrical measurements are shown with waveform charts, polar diagrams and representations of the **harmonic spectrum up to the 63rd order** which is a useful tool to better understand the state of the system.

STATISTICS

The DMG9000 model also provides statistics on the quality of the network according to the **EN50160** standard - class C - (voltage dips, overvoltages, interruptions, low frequency noises and much more).

Waveforms

Polar diagram

Currents

Energy consumption control

EXPANDABILITY AND COMMUNICATION

EXPANDABILITY

Possibility to add **up to 3** EXP... series expansion modules (additional inputs, outputs and communication ports).

DEGREE OF PROTECTION: IP65

Possibility of use in harsh environments thanks to the gasket on the back which guarantees the **IP65** degree of protection.

INTEGRATION WITH SIGNALS FROM THE FIELD

Thanks to the EXP... expansion modules it is possible to add **digital and analog inputs** by which field measurements such as gas or water consumption, tank levels, temperatures, pressures and much more are integrated into the data collection in order to obtain a complete energy management.

COMMUNICATION

Availability of models with built-in **RS485** and **Ethernet** communication ports.

OPTICAL PORT

The optical port compatible with the communication devices CX01 and CX02 is available and allows, thanks to Xpress software, the parameter configuration, the electrical network diagnostics and the firmware update of the power analyzer.

EASY BRANCH POWER MONITORING SYSTEM

Thanks to the EXS... modules, a simplified and very fast wiring can be achieved in panels where it is necessary to read the electrical parameters of different loads, drastically reducing the costs and the installation times.

WEB-SERVER FUNCTION IN DMG8000 AND DMG9000

SETTING OF ALL PARAMETERS

The programming of the parameters, as well as from the front panel, can also be done through the browser on a PC. The built-in web-server also allows the setting of the parameters of the EASY BRANCH power monitoring system, such as the descriptions of the individual measurement points.

WEB SERVER AND BUILT-IN DATA MEMORY

A flash data memory allows archiving of historical data. Through the built-in web server the user can:
- select the measures (up to 128);
- set the sampling frequency;
- download the .CSV file with the acquired information.

For example, by sampling 20 measurements with 1 minute of sampling time, 10 days of data can be stored.

MEASUREMENT VIEW

Representation of the measured values by means of tables and charts.

EASY BRANCH POWER MONITORING SYSTEM

When inside an electrical panel the parameters of several loads have to be monitored, **EASY BRANCH** power monitoring system is a more efficient and simple alternative solution to install than the traditional one which requires an independent instrument for each measuring point. The electrical distribution panels in shopping centres or in the departments of a production facility represent ideal applications for **EASY BRANCH** system by LOVATO Electric.

SYSTEM COMPONENTS

DMG7500 - 8000 - 9000
Power analyzer

DMG7500, DMG8000, DMG9000 power analyzers.

The power analyzers represent the heart of the system: they measure the electrical voltage in the switchboard and the input current, record the total measurements upstream of the distribution and the measurements of each individual monitored load available on their display. The electrical quantities can also be viewed via the built-in communication ports (RS485 or Ethernet).

On the DMG8000 and DMG9000 models, the system measurements can be viewed within a web page and can be recorded in the data memory to get historical trends.

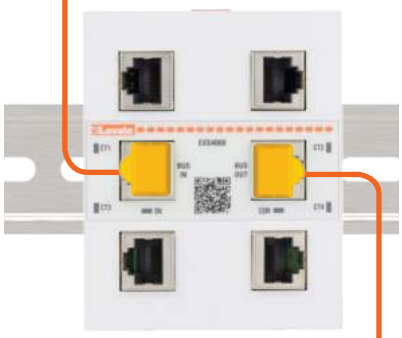
EXS0000
Bus module

EXS0000 bus module

Installed in one of the expansion slots of the power analyzer, by using a standard Ethernet cable (cat.6) it connects and supplies **up to 8 current measuring modules EXS4...** which are automatically recognized without the need for settings by the installer.
When connecting 5 or more EXS4 current modules ... the EXS0000 bus module requires a 24VDC - 0.2A power supply.

MAX 8 EXS4... current measuring modules can be connected to the EXS0000 bus module, to monitor up to:
- 33 three-phase loads;
- 99 single phase loads.

Including the loads connected to the power analyzer.

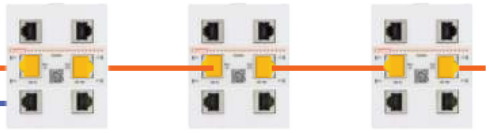


EXS4000
Current measuring module with 4 inputs for electronic RJ45 CTs

Current measuring module EXS4000

The module collects the measurements of the loads monitored by the electronic current transformers EXS3... (three-phase or single-phase) or EXS1... (single-phase). Each module measures **up to 4 three-phase loads or 12 single-phase loads** or a mixed single-phase and three-phase configuration. The module automatically recognizes the connected electronic current transformer and highlights, through diagnostic LEDs, the correct self-configuration of the measurement points and the correct coupling with the power analyzer.

Correct self-configuration LED



EXS1... - EXS3...
Electronic current transformer

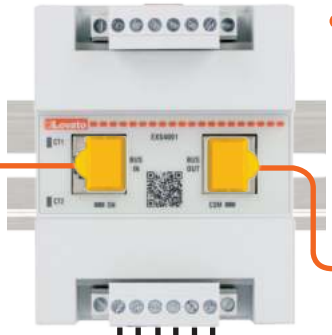
Electronic current transformers EXS1... and EXS3...

They are current transducers suitable to be installed immediately downstream of the magnetic circuit breakers thanks to their compact size. Available **for single-phase or three-phase loads,** the diameter and pitch of the pass-through holes have been designed to be in line with the ones of the MCBs:
- for sizes up to 63A: Ø = 7mm and 18mm pitch;
- for sizes up to 125A: Ø = 12mm and 27mm pitch.

They connect to the EXS4000 current monitoring module via pre-wired **2 meter RJ45 cable,** thus making the connection fast and fail-safe.
EXS3 ... can be programmed to manage even single-phase loads.

2m pre-wired cable

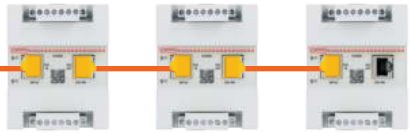
Correct coupling signalling LED



Current measuring module EXS4001

It offers the possibility of connecting monitored measuring points with traditional current transformers within the EASY BRANCH system, managing for each module **up to 2 three-phase loads or 6 single-phase loads** or a mixed single-phase and three-phase configuration. Current transformers of any type with secondary /5A or /1A can be used. The module highlights the successful coupling with the power analyzer through diagnostic LEDs.

Correct coupling signalling LED



EXS4001
Current measuring module with 2 inputs for three-phase traditional CTs or 6 inputs for single-phase traditional CTs

DM...
Current transformers

Traditional current transformer DM...

Current transformers (CTs) type DM... are mounted in an electrical system to reduce the line current to a secondary value of 5A and compatible with EXS4001 current measuring modules.
They are available in many versions:
- with wire-wound primary for reduced currents;
- solid core type;
- high precision for very accurate measurements;
- split-core and pre-wired types which are suitable for updating the panels;-

primary current from 5 to 4000A.

Gateway data logger

A gateway data logger is the key device for the implementation of a modern and well-designed energy monitoring system.
It collects data from LOVATO Electric devices or from environmental sensors relating to any type of energy carrier (water, air, gas, electricity and steam) equipped with a compatible protocol.
The data collected, as well as being represented by the integrated web-server, can be transmitted to Synergy supervision software of LOVATO Electric or forwarded to remote servers in formats suitable for appropriate processing.

EXCGLB...
Gateway data loggers

Supervision software

All the data of the EASY BRANCH system are available on the central power analyzer and, through its communication ports, it is possible to collect them remotely by connecting directly with a browser if the model chosen is DMG8000 or DMG9000, or through Synergy software installed on a local server, or using Synergy Cloud if the gateway data logger EXCGLB... is added to the system.

SYNERGY
Supervision software

EASY BRANCH PLUG & PLAY SYSTEM ADVANTAGES

4 COMPONENTS NEEDED

The EASY BRANCH system consists of a few elements to add to the power analyzer: EXS0000 module to get the communication bus, the EXS4... module to measure currents and the EXS1..., EXS3 electronic current transformers... or traditional /5A or /1A CTs.
Up to 33 three-phase or 99 single-phase measuring points can be obtained!

DRAMATIC REDUCTION OF WIRING TIMES

In a monitoring system with traditional measuring instruments, 4 voltage and 6 current cables are required for each three-phase measuring point and two additional cables for the auxiliary power supply are added: a total of 12 cables to be connected for each measuring point.
With the EASY BRANCH system, for each additional current measuring module (EXS4000) only one cable with RJ45 terminal must be connected, getting 4 three-phase or 12 single-phase measurement points, each of which is connected with a cable with RJ45 terminal, drastically reducing the wiring time.

STOP TO WIRING MISTAKES!

In a monitoring system with traditional measuring instruments, 12 cables to be connected for each three-phase measuring point can cause various wiring errors (phase sequence, phase correspondence between voltages and currents, current transformers sense) which cause errors in reading the electrical quantities and delay the commissioning of the switchboard.
The EASY BRANCH system, thanks to the RJ45 connections of the electronic CTs, is foolproof!

Plug & Play

SETTING TIME REDUCTION

EXS1... and EXS3... electronic transformers have a **self-recognition** system with the current module to which they are connected, avoiding the installer the need to set the CT primary and the type of connection (single-phase, three-phase). A LED on the electronic transformers indicates the correct power supply, while a LED on EXS4000 current measuring module indicates the correct coupling.

NO SPECIAL CABLES NEEDED

No special cable is needed to connect the current measuring modules to EASY BRANCH bus: **a standard Cat.6 Ethernet cable is enough.**

COMPARISON BETWEEN EASY BRANCH AND TRADITIONAL MEASURING SYSTEMS

If 5 three-phase loads are to be monitored in an electrical panel:
- **EASY BRANCH SYSTEM**: 1 power analyzer, 1 display where to search for measurements, 1 EXS0000 bus module, 1 EXS4000 current measuring module, 4 three-phase electronic transformers and only 12 cables to be wired
- **TRADITIONAL SYSTEM**: 5 multimeters, 5 displays where to search for measurements, 15 current transformers and 60 cables to be wired.

The more the measuring points increase, the more the advantages in favour of the EASY BRANCH system are evident.

MEASUREMENT ACCURACY

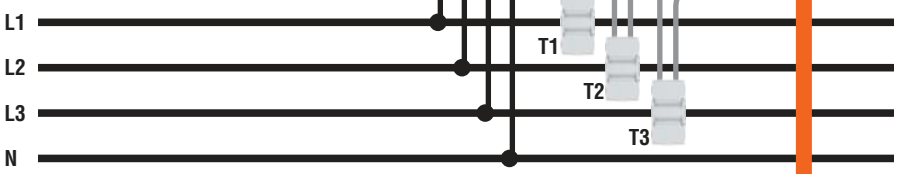
The EASY BRANCH system guarantees high measurement accuracy according to IEC61557-12 and IEC62053-22/23 standards.

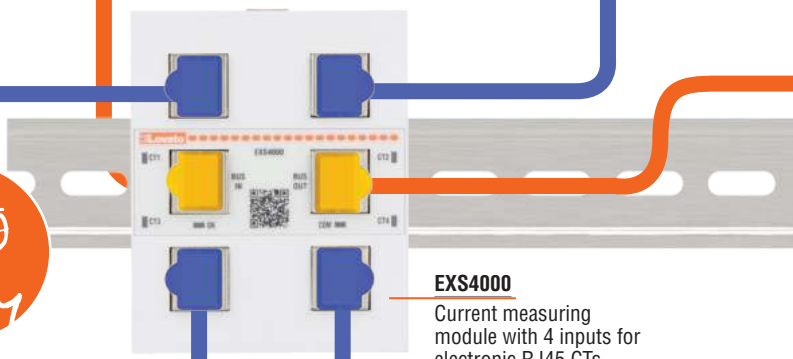
PLANT MANAGEMENT WITH EASY BRANCH

DMG7500 - 8000 - 9000
Power analyzer

EXS0000
Bus module for EASY BRANCH system

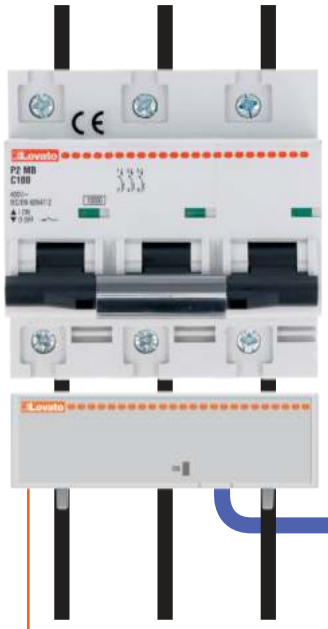
EXS1080
80A single-phase electronic current transformer with RJ45 cable, 2m long



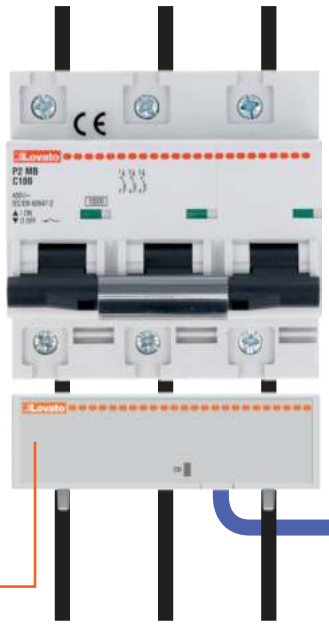


Plug & Play

EXS4000
Current measuring module with 4 inputs for electronic RJ45 CTs

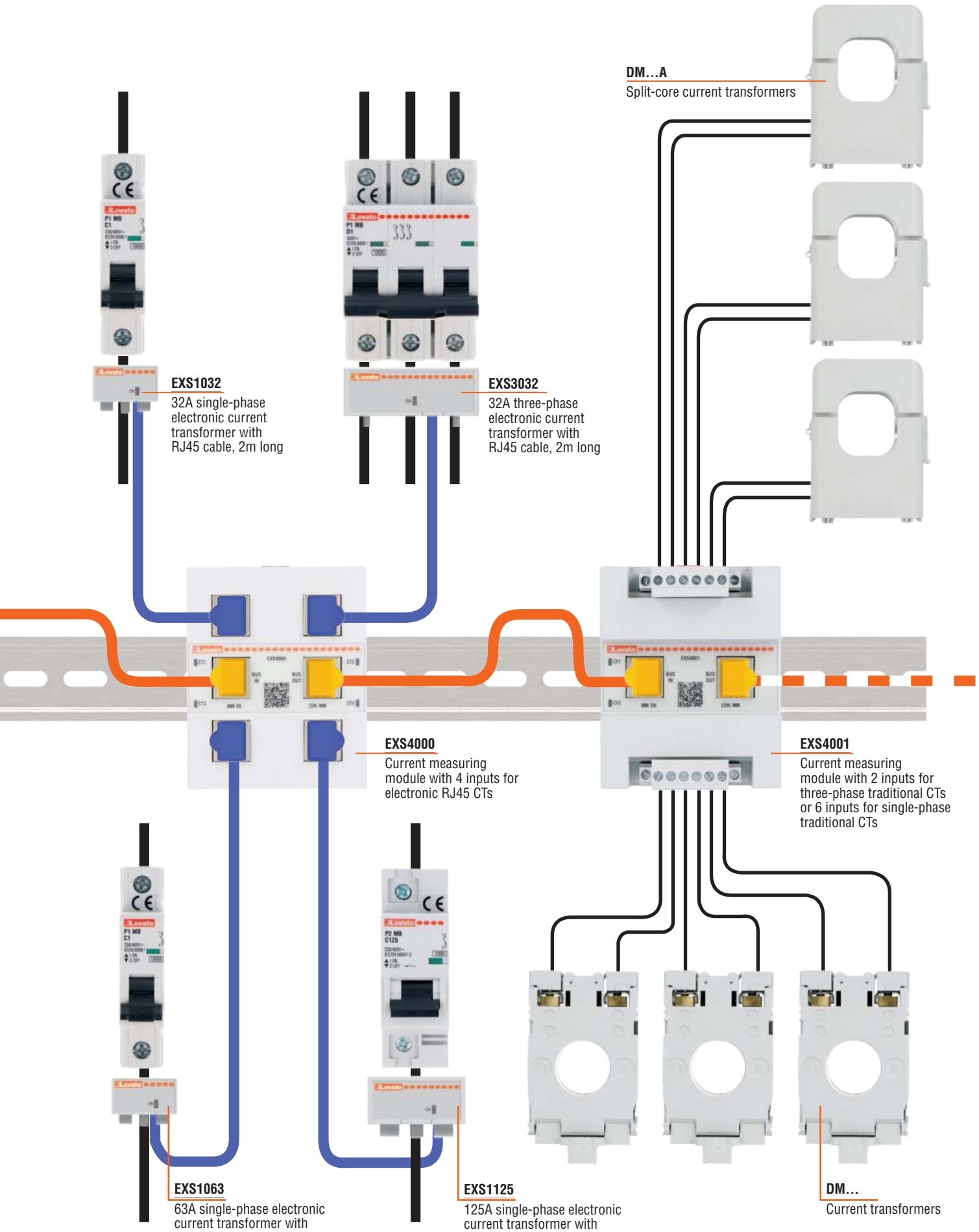


EXS3125
125A three-phase electronic current transformer with RJ45 cable, 2m long



EXS3080
80A three-phase electronic current transformer with RJ45 cable, 2m long

EXS3063
63A three-phase electronic current transformer with RJ45 cable, 2m long



DM...A
Split-core current transformers

EXS1032
32A single-phase electronic current transformer with RJ45 cable, 2m long

EXS3032
32A three-phase electronic current transformer with RJ45 cable, 2m long

EXS4000
Current measuring module with 4 inputs for electronic RJ45 CTs

EXS4001
Current measuring module with 2 inputs for three-phase traditional CTs or 6 inputs for single-phase traditional CTs

EXS1063
63A single-phase electronic current transformer with RJ45 cable, 2m long

EXS1125
125A single-phase electronic current transformer with RJ45 cable, 2m long

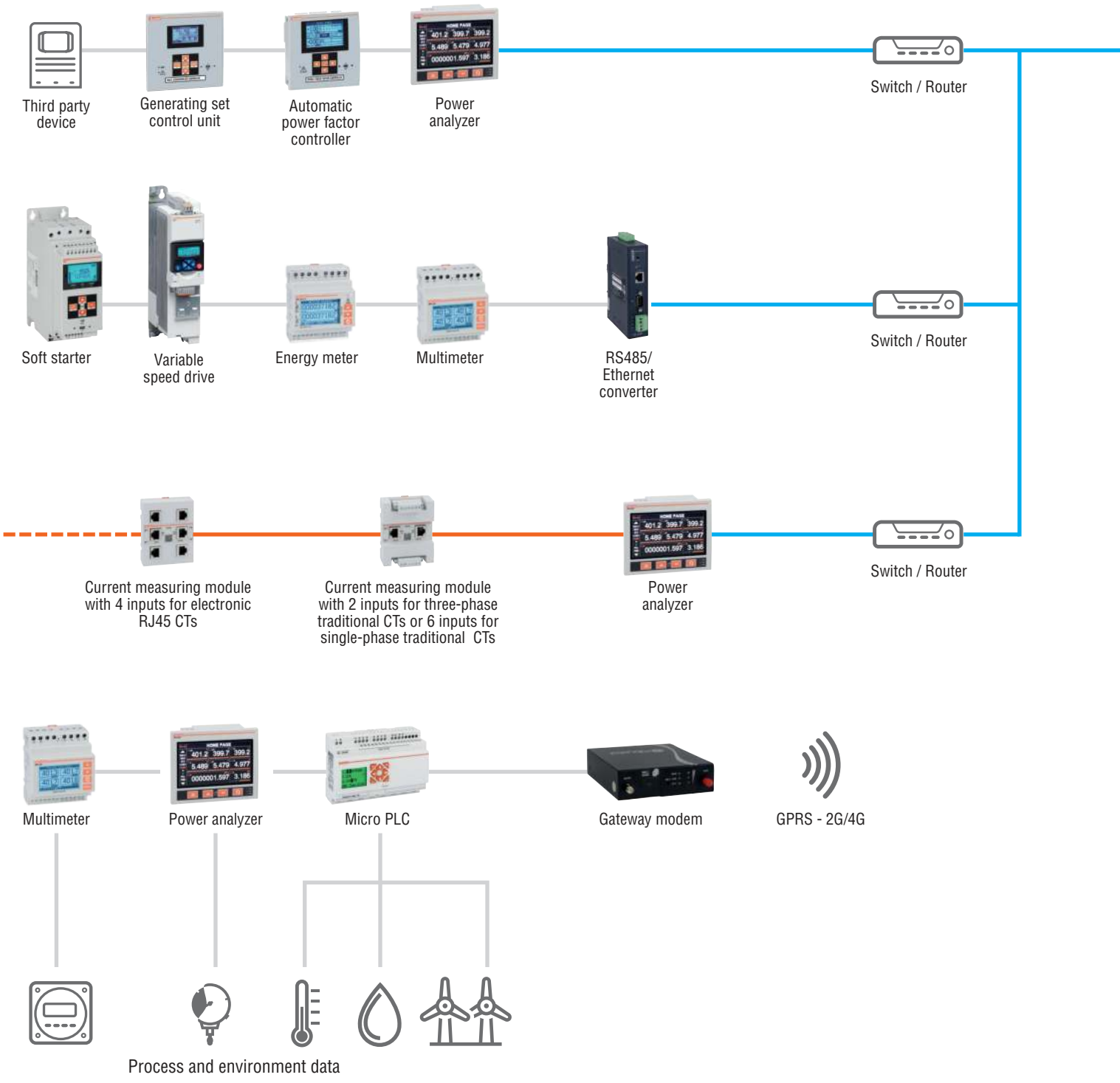
DM...
Current transformers

ENERGY MANAGEMENT SOLUTION BY LOVATO ELECTRIC

For the purpose of monitoring and energy saving, LOVATO Electric provides a complete and integrated solution consisting of:

- **hardware devices** for energy measurement and control (power analyzers, multimeters, energy meters, variable speed drives, soft starters, automatic power factor controllers, gateway data loggers, etc.);
- web based **software** to continuously monitor energy vectors via the Web.

Synergy by LOVATO Electric is an energy monitoring and analysis system with a professional, flexible and integrated approach from an Industry 4.0 perspective. Thanks to the LOVATO Electric **measurement devices** equipped with a communication port and through the web-based supervision platform, it is possible to monitor real time measurements, consult graphics, receive alarms, export customized reports and carry out commands and settings.



GATEWAY DATA LOGGER LOCAL WEB SERVER

LOVATO Electric **EXCGLB...** gateway data loggers provides access to an integrated web server which allows local consultation of the monitored data and acts as a gateway to Synergy supervision software.

Gateway data logger

Built-in web server information view

Pre-defined live pages, charts and data logs

MONITORING AND SUPERVISION SOFTWARE

Synergy

Synergy is a software which can be completely customized by the user who can thus have the key indicators of the monitored systems, be notified in the event of alarms for anomalies in consumption and monitor performance over time. It is open to the integration of third-party instrumentation thanks to the use of the MODBUS communication protocol and the ability to integrate any device equipped with analog or digital output.

Multi-device

Laptop

Tablet

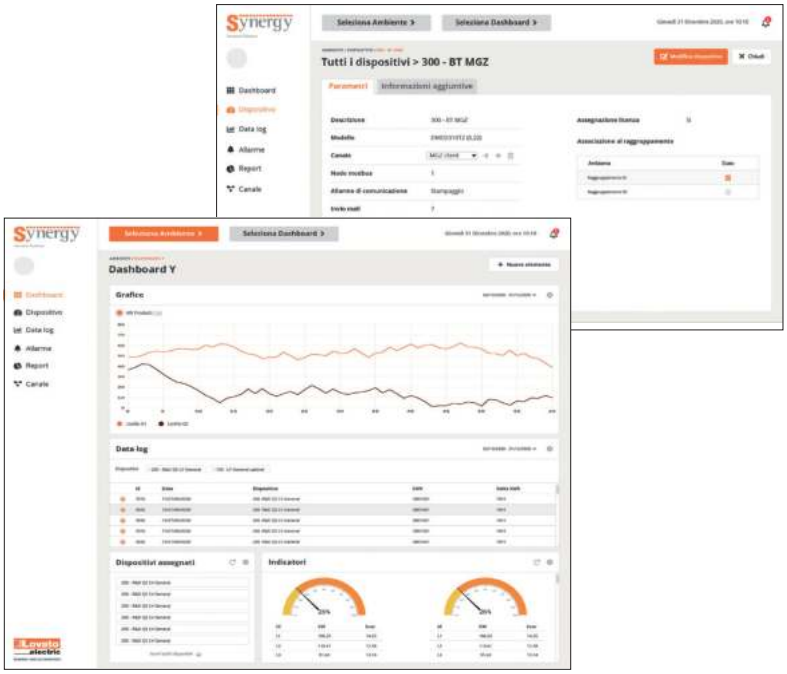
Smartphone

Multi-users

Administrators

Powerusers

Users



Customizable Dashboard, Data Log and Reports

Single-phase

DMED110T1
DMED111
DMED112

DMED115T1
DMED120T1
DMED121 - DMED122

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Digital meter, with LCD screen.			
DMED100T1	40A direct connection, 1U 1 pulse output, 220...240VAC	1	0.086
DMED110T1	40A direct connection, 1U 1 program. static output, multi-measurements❶, 220...240VAC	1	0.090
DMED111	40A direct connection, 1U, RS485 interface multi-measurements❶, 110...240VAC	1	0.090
DMED112	40A direct connection, 1U, M-Bus interface multi-measurements❶, 110...240VAC	1	0.090
Digital meter with backlight LCD display.			
DMED115T1	40A direct connection, 2U, 1 program. static output, multi-measurements ❷, 220...240VAC	1	0.090
DMED120T1	63A direct connection, 2U 1 program. static output, multi-measurements ❶, 220... 240VAC	1	0.148
DMED121	63A direct connection, 2U, RS485 interface multi-measurements❶, 110...240VAC	1	0.148
DMED122	63A direct connection, 2U, M-Bus interface multi-measurements❶, 110...240VAC	1	0.148

General characteristics
The energy meters are instruments for energy consumption measurement in single-phase installations with direct connection.

Operational characteristics
- LCD meter: with 5+1 digit count for DMED100T1, DMED110T1, DMED111, DMED112; backlight with 6+1 digit count for DMED115T1, DMED120T1, DMED121, DMED122
- Direct connection
- Active energy measurement and accuracy:Class 1 (IEC/EN/BS 62053-21)
- Reactive energy measurement and accuracy:Class 2 (IEC/EN/BS 62053-23)
- Metrological LED with pulse emission for consumption indication
- Clearable partial energy measurement
- Built-in RS485 or M-Bus ports for pulse output models compatible with Synergy and Xpress
- Modular housing
- Sealable terminal blocks, standard supplied
- EN degree of protection: IP40 on front; IP20 at terminals.

Synergy supervision and energy management software
See Section 36.

Xpress configuration and remote control software
See Section 36.

Certifications and compliance
Certifications obtained: cULus (DMED100T1, DMED110T1, DMED120T1, DMED121), EAC (for all DMED... type), RCM (for all DMED...type, DMED122 except).
Compliant with standards: IEC/EN/BS 50470-1, IEC/EN/BS 61010-1 for all DMED... type; UL 61010-1, CSA C22-2 n° 61010-1 for DMED100T1, DMED110T1, DMED120T1, DMED121.

❶ Multi-measurements:
- Total and partial active energy
- Total and partial reactive energy
- Voltage
- Current
- Active and reactive power
- Power factor
- Frequency
- Total and partial hour counter
- Average active power (calculation made using the last 15 minutes of data)
- Maximum demand.

❷ Multi-measurements:
- Total and partial active energy
- Active power
- Average active power (calculation made using the last 15 minutes of data)
- Maximum demand.

Single-phase, MID certified

MID

DMED110T1MID
DMED111MID
DMED112MID

-25...+70°C

DMED111MID7

DMED120T1MID
DMED121MID
DMED122MID

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Digital meter with LCD display.			
DMED100T1MID	40A direct connection, 1U 1 pulse output, 230VAC	1	0.090
DMED110T1MID	40A direct connection, 1U 1 programmable static output, multi-measurements ❶, 230VAC	1	0.090
DMED111MID	40A direct connection, 1U, RS485 interface, measurements❶, 230VAC	1	0.090
DMED111MID7	40A direct connection, 1U, RS485 interface, measurements❶, 230VAC, -25...+70°C	1	0.090
DMED112MID	40A direct connection, 1U, M-Bus interface, measurements❶, 230VAC	1	0.090
DMED120T1MID	63A direct connection, 2U 1 programmable static output, multi-measurements ❶, 230VAC	1	0.152
DMED121MID	63A direct connection, 2U, RS485 interface multi-measurements ❶, 230VAC	1	0.148
DMED122MID	63A direct connection, 2U, M-Bus interface multi-measurements ❶, 230VAC	1	0.148

General characteristics
The DME... series energy meters, MID certified, are needed for billing purposes between electricity suppliers and consumers and for energy consumption measurement in directly connected single-phase installations.
MID is the Measuring Instruments Directive of the European Union; instruments must be certified accordingly whenever used for monetary transactions in this territory.

Operational characteristics
- LCD meter: DMED100T1/110T1/111/112MID; backlight with 6+1 digit count for DMED120T1/121/122MID
- Direct connection
- Active energy measurement and accuracy:Class B (EN 50470-3)
- Reactive energy measurement and accuracy: Class 2 (IEC/EN/BS 62053-23)
- Metrological LED with pulse emission for consumption indication
- Clearable partial energy measurements
- Built-in RS485 or M-Bus ports for pulse output models compatible with Synergy and Xpress
- 70°C model ideal for electric vehicle charging stations
- Modular housing
- Sealable terminal blocks, standard supplied
- EN degree of protection: IP40 on front; IP20 at terminals.

Synergy supervision and energy management software
See Section 36.

Xpress configuration and remote control software
See Section 36.

Certifications and compliance
Certifications obtained: MID Class B (EN 50470-1, EN 50470-3), certifications per module B (type tests) + module D (production conformity).
Compliant with standards: EN 50470-1, EN 50470-3, TR50579.

❶ Multi-measurements:
- Total and partial active energy
- Total and partial reactive energy
- Voltage
- Current
- Active and reactive power
- Power factor
- Frequency
- Total and partial hour counter
- Average active power (calculation made using the last 15 minutes of data)
- Maximum demand.

Three-phase with or without neutral, non expandable

DMED300T2
DMED311
DMED302

DMED305T2
DMED330
DMED332

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Digital meter for three-phase with neutral. 80A direct connection.			
DMED300T2	2 programmable static outputs, multi-measurements❶, 4U	1	0.360
DMED300T2UL	2 programmable static outputs, multi-measurements❶, cULus certified, 4U	1	0.360
new DMED311	RS485 interface, multi-measurements❶, 4U	1	0.360
DMED302	M-Bus interface, multi-measurements❶, 4U	1	0.360
Digital meter for three-phase with or without neutral. Connection by CT /1A and /5A.			
DMED305T2	2 programmable static outputs, multi-measurements❶, 4U	1	0.332
DMED330	RS485 interface, multi-measurements❶, 4U	1	0.332
DMED332	M-Bus interface, multi-measurements❶, 4U	1	0.332

Three-phase with or without neutral, expandable

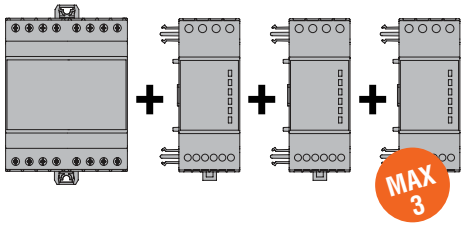
DMED310T2

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Digital meter for three-phase with or without neutral. Connection by CT /5A.			
DMED310T2	2 programmable static outputs, multi-measurements ❶, expandable with EXM... modules series, 4U	1	0.332

Order code	Description
DMED310T2 EXPANSION MODULES. Inputs and outputs.	
EXM1000	2 digital inputs and 2 static outputs, opto-isolated
EXM1001	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC
Communication ports.	
EXM1010	Opto-isolated USB interface
EXM1011	Opto-isolated RS232 interface
EXM1012	Opto-isolated RS485 interface
EXM1013	Opto-isolated Ethernet interface
EXM1020	Opto-isolated RS485 interface and 2 relay outputs rated 5A 250VAC
EXM1030	Data storage, clock-calendar (RTC) with backup reserve energy for data logging

EXM1010

Maximum combination for DMED310T2



General characteristics
The energy meters are digital meters/analyzers of electric energy for systems with direct three-phase connection or by CT.

Operational characteristics
- LCD multifunction meter
- Nominal supply voltage: 380...415VAC (L-L); UL nominal supply voltage: 120VAC (L-N), 240VAC (L-L), 60Hz, direct two-phase + N
- Active energy measurement and accuracy: Class 0.5s (IEC/EN/BS 62053-22) for DMED305T2, DMED330 and DMED332; Class 1❷ (IEC/EN/BS 62053-21) for DMED300T2, DMED311 and DMED302; Class 0.5 (ANSI C12.20) for DME300T2UL
- Active energy measurement and accuracy: Class 2 (IEC/EN/BS 62053-23)
- Metrological LED with pulse emission for consumption indication
- Clearable partial active energy measurements
- 1 programmable digital input
- Built-in RS485 or M-Bus ports for pulse output models compatible with Synergy and Xpress
- Optical interface for EXM... expansion modules with DMED310T2
- Modular housing, 4 module
- Sealable terminal blocks, standard supplied
- EN degree of protection: IP40 on front; IP20 at terminals.

Synergy supervision and energy management software
See Section 36.

Xpress configuration and remote control software
See Section 36.

EXM series expansion modules
See page 35-3.

Certifications and compliance
Certifications obtained: EAC, RCM for all types, cULus for DMED300T2UL.
Compliant with standards: IEC/EN/BS 50470-1, IEC/EN/BS 61010-1, IEC 61010-2-030 for all DMED...; IEC/EN/BS 62052-11, IEC/EN/BS 62052-31 for DMED311..

❶ Multi-measurements:
- Total and partial active energy
- Total and partial reactive energy
- Voltage
- Current
- Active and reactive power
- Power factor
- Frequency
- Total and partial hour counter
- Average active power (calculation made using the last 15 minutes of data)
- Maximum demand.

❷ Class 1 according to IEC/EN/BS 62053-21, accuracy measured in the 0.75A-80A range: 0.5%.

Three-phase with neutral, non expandable, MID certified

MID

DMED300T2MID
DMED311MID7
DMED302MID

new

-25...+70°C

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Digital meter for three-phase with neutral. 80A direct connection.			
DMED300T2MID	2 programmable static outputs, multi-measurements❶, 4U	1	0.360
DMED311MID7	RS485 interface, multi-measurements❶, -25...+70°C, 4U	1	0.360
DMED302MID	M-Bus interface, multi-measurements❶, 4U	1	0.360
Digital meter for three-phase with neutral. Connection by CT /1A and /5A.			
DMED305T2MID	2 programmable static outputs, multi-measurements❶, 4U	1	0.332
DMED330MID	RS485 interface, multi-measurements❶, 4U	1	0.332
DMED332MID	M-Bus interface, multi-measurements❶, 4U	1	0.332

DMED305T2MID
DMED330MID
DMED332MID

Three-phase with neutral, non expandable, for electric vehicle charging stations, with Eichrecht certified versions

DMED341MID7
DMED341MID7E
DMED341MID7ER

-25...+70°C

new

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Digital meter for three-phase with neutral. 80A direct connection, up to 70°C.			
DMED341MID7	RS485 interface, 1 programmable static output, multi-measurements❶, -25...+70°C, 4U	1	0.360
DMED341MID7E	RS485 interface, 1 programmable static output, multi-measurements❶, 4U, Eichrecht certified	1	0.360
DMED341MID7ER	RS485 interface, 1 programmable static output, multi-measurements❶, -25...+70°C, 4U, Eichrecht certified, imported/exported active energy certified	1	0.360

General characteristics
The DME... series energy meters, MID certified, are compulsory in Europe, are needed for billing purposes between electricity suppliers and consumers and for energy consumption measurement in directly or CT connected three-phase installations.
The DMED341MID7... types (4 DIN module three-phase direct insertion up to 80A) have been designed for use in **electric vehicle charging stations.**
- they are suitable for particularly demanding applications from the point of view of thermal exposure
- they are MID certified up to 70°C
- they integrate an RS485 communication port with Modbus RTU protocol.

In particular, the DMED341MID7E... also complies with the requirements of the VDE-AR-E 2418-3-100 2020 edition which is the standard used by charging station manufacturers to satisfy the obligations deriving from the German calibration law (Eichrecht) MessEG (Mess und Eichgesetz) MessEV (Mess und Eichverordnung).
In addition, the DMED341MID7ER is MID certified not only for the energy consumed (imported) but also for the energy produced (exported).

Operational characteristics
- LCD multifunction meter
- Nominal supply voltage: 230VAC (L-N); 400VAC (L-L)
- Voltage range: 187...264VAC (L-N); 323...456VAC (L-L)
- Active energy measurement and accuracy: Class B (EN 50470-3, IEC/EN/BS 62052-11 and IEC/EN/BS 62052-31 only for DMED311MID7 and DMED341MID7...)
- Reactive energy measurement and accuracy: Class 2 (IEC/EN/BS 62053-23)
- Metrological LED with pulse emission for consumption indication
- Clearable partial energy measurements
- 1 programmable digital input
- Built-in RS485 or M-Bus ports for pulse output models compatible with Synergy and Xpress
- Modular housing 4 module
- Sealable terminal blocks, standard supplied
- EN degree of protection: IP40 on front; IP20 at terminals.

Synergy supervision and energy management software
See Section 36.

Xpress configuration and remote control software
See Section 36.

Certifications and compliance
Certifications obtained:
DMED30..., DMED33... :MID Class B (EN 50470-1, EN 50470-3), certifications for module B (type tests) + for module D (production conformity).
DMED311MID7, DMED341MID7...: MID/MIR Class B (IEC/EN 62052-11, IEC/EN 62052-31, EN 50470-3), certifications for module B (type tests) + for module D (production conformity), Eichrecht (VDE-AR-E 2418-3-100) only for DMED341MID7E...
Compliant with standards:
DMED30..., DMED33... :EN 50470-1, EN 50470-3, TR50579.
DMED311MID7, DMED341MID7...: IEC/EN/BS 62052-11, IEC/EN/BS 62052-31, BS EN 50470-3, VDE-AR-E 2418-3-100 (only for DMED341MID7E...).

❶ Multi-measurements:
- Total and partial active energy
- Total and partial reactive energy
- Voltage
- Current
- Active and reactive power
- Power factor
- Frequency
- Total and partial hour counter
- Average active power (calculation made using the last 15 minutes of data)
- Maximum demand.

Three-phase with neutral, MID certified

MID

DMED305F

new

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Digital meter for three-phase with neutral, non expandable, complete with UTF certificates for installations in Italy.			
DMED300F	DMED300T2MID, complete with UTF certificates	1	0.360
DMED311F	DMED311MID7, complete with UTF certificates	1	0.381
DMED305F	DMED305T2MID, complete with UTF certificates	1	0.381
DMED330F	DMED330MID, complete with UTF certificates	1	0.381

General characteristics
The UTF (Finance Technical Office) certification is required in Italy in case of applications where taxes have to be paid due to energy production (Italian regulations for plants >20kW). The certificates must be associated to the energy meter (MID version) and to each single current transformer is needed (see page 29-5 for selection).
DME... energy meters, MID version, for three-phase systems with or without current transformers can be supplied with the certificates included (DME...F). DMED310F... can be expanded up to 3 EXM... modules.
If required, the fifth certificate relevant to the meter and current transformer combination can be supplied as well (see page 29-5).

Operational characteristics
- LCD multifunction meter
- Nominal supply voltage: 230VAC (L-N); 400VAC (L-L)
- Voltage range: 187...264VAC (L-N); 323...456VAC (L-L)
- Active energy measurement and accuracy: Class B (EN 50470-3)
- Reactive energy measurement and accuracy: Class 2 (IEC/EN/BS 62053-23)
- Metrological LED with pulse emission for consumption indication
- Clearable partial energy measurements
- 1 programmable digital input
- Models with 2 programmable static outputs and built-in RS485 compatible with Synergy and Xpress
- Modular housing 4 module
- Sealable terminal blocks, standard supplied
- EN degree of protection: IP40 on front; IP20 at terminals.

Multi-measurements
- Total and partial active energy
- Total and partial reactive energy
- Voltage
- Current
- Active and reactive power
- Power Factor
- Frequency
- Total and partial hour counter
- Average active power (calculation made using the last 15 minutes of data)
- Maximum demand.

Synergy supervision and energy management software
See Section 36.

Xpress configuration and remote control software
See Section 36.

Certifications and compliance
UTF certificates are standard supplied.

Expandable

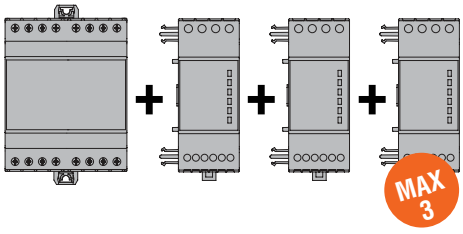
DMECD

EXM1010

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Data concentrator for general use.			
DMECD	With 8 programmable digital inputs, expandable, for pulse count, RS485 port	1	0.337

Order code	Description
DME CD EXPANSION MODULES. Inputs and outputs.	
EXM1000	2 digital inputs and 2 static outputs, opto-isolated
EXM1001	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC
EXM1002	4 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC
Communication ports.	
EXM1010	Opto-isolated USB interface
EXM1011	Opto-isolated RS232 interface
EXM1012	Opto-isolated RS485 interface
EXM1013	Opto-isolated Ethernet interface
EXM1020	Opto-isolated RS485 interface and 2 relay outputs, rated 5A 250VAC
EXM1030	Data storage, clock-calendar (RTC) with backup reserve energy for data logging

Maximum combination for DMECD



General characteristics
DMECD is equipped with 8 inputs, which can be increased up to a maximum of 14 with expansion modules EXM1000/1001/1002, that allow to indirectly interface devices without communication as long as they have at least one pulse output.
It is capable of pulse counting that comes in from the outputs of meters for energy, water, gas and other types of consumption: All data is viewed on its display or can also be available for PCs through its built-in RS485 interface using Synergy or Xpress software .
It can be expanded with up to 3 EXM... series modules by optical interface.
With the programmable functions, average values can be determined for instantaneous quantities, such as power, speed, production rate, gas and water consumption, etc.

Operational characteristics
- Backlight graphic LCD meter, multifunction
- Nominal supply voltage: 100...240VAC/110...250VDC
- Voltage range: 85...264VAC/93.5...300VDC
- 8 inputs, expandable with EXM... modules up to 14
- Built-in RS485 communication port
- Modbus-RTU, ASCII and TCP communication protocol
- Clearable total and partial counters for each channel
- Programmable general counters
- Calculation of derivative average values
- Mathematical operations among counters
- Modular housing, 4 module
- EN degree of protection: IP40 on front; IP20 at terminals.

Synergy supervision and energy management software
See Section 36.

Xpress configuration and remote control software
See Section 36.

EXM series expansion modules
See page 35-3.

Certifications and compliance
Certifications obtained: cULus, EAC.
Compliant with standards: IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3.

Power analyzers with widescreen colour LCD

DMG...

NFC

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Auxiliary supply 100...240VAC.			
DMG7000	Expandable with 3 EXP... modules	1	0.375
DMG7500	Expandable with 3 EXP... modules, built-in RS485 port, compatible with EASY BRANCH power monitoring system	1	0.375
DMG8000	Expandable with 3 EXP... modules, built-in Ethernet port, compatible with EASY BRANCH power monitoring system	1	0.375
DMG9000	Expandable with 3 EXP... modules, built-in RS485 and Ethernet port, compatible with EASY BRANCH power monitoring system	1	0.375
Auxiliary supply 12...48VDC.			
DMG9000D048	Expandable with 3 EXP... modules, built-in RS485 and Ethernet port, compatible with EASY BRANCH power monitoring system	1	0.375

new

Expansion modules

EXP10...

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Inputs and outputs.			
EXP1000	4 opto-isolated digital inputs	1	0.060
EXP1001	4 opto-isolated static outputs	1	0.054
EXP1002	2 digital inputs and 2 static outputs, opto-isolated	1	0.058
EXP1003	2 relay outputs rated 5A 250VAC	1	0.050
EXP1004	2 analog inputs, opto-isolated 0/4...20mA or PT100 or 0...10V or 0...±5V	1	0.056
EXP1005	2 analog outputs, opto-isolated 0/4...20mA, 0-10V or 0...±5V	1	0.064
EXP1008	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC	1	0.058
Communication ports.			
EXP1010	Opto-isolated USB interface	1	0.060
EXP1011	Opto-isolated RS232 interface	1	0.040
EXP1012	Opto-isolated RS485 interface	1	0.050
EXP1013	Opto-isolated Ethernet interface	1	0.060
EXP1014	Opto-isolated Profibus-DP interface	1	0.080

Communication devices

CX01

CX02

Order code	Description	Qty per pkg	Wt
		n°	[kg]
CX01	USB/optical device with PC ↔ LOVATO Electric product connecting cable, for programming, data download, diagnostics and firmware upgrade	1	0.090
CX02	Wi-Fi device for PC ↔ LOVATO Electric product programming, data download, diagnostics and cloning	1	0.090

General characteristics
DMG... power analyzers display electrical values on their large colour LCD display with exceptional accuracy to enable precise monitoring of power grids. They are designed in flush-mount housing (cutout 92x92mm/3.62x3.62") with 3 slots for EXP series plug-in expansion modules to adapt them to a variety of applications.
The use of NFC technology allows the user to configure the unit and make settings with a smart device. The optical port on the back of the unit enables the user to make settings, run power grid diagnostics and update the power analyzer firmware.
The graphic interface, available in 10 languages (English, French, German, Italian, Spanish, Portuguese, Polish, Russian, Czech and Chinese), has been designed to facilitate the display of data, including:
– Voltage (phase, phase-to-phase and system)
– Phase current (calculated neutral current, and measured neutral current on the DMG9000...)
– Measurements on 4 quadrants
– Power (active, reactive and apparent phase and total power)
– Power factor (phase and total)
– Frequency
– Maximum (HIGH), minimum (LOW) and average (AVERAGE) of all measured values
– Peak power/current (max demand)
– Voltage and current asymmetry and active power unbalance
– Total harmonic distortion (voltage and current)
– Voltage and current harmonic analysis up to the 63rd order
– Active, reactive and apparent energy metering (partial and total)
– Hour meter (total and partial, programmable).

The EASY BRANCH multi-circuit measurement system
The DMG7500, DMG8000 and DMG9000... can also be used in multi-circuit applications when more than one load is to be monitored in the electrical switch board. All values are shown on the display or via the integrated communications interface.
Refer to page 28-19 for the components of the EASY BRANCH measurement system.

Operational characteristics
– Auxiliary power:
  • 100...240VAC / 110...250VDC
  • 12-48VDC (DMG9000D048)
– Voltage measurement range: 50...720VAC L-L
– Can be used in medium and high voltage systems using TV
– Nominal input current: 5A or 1A with an external current transformer
– Frequency measurement range: 45...66Hz, 360...440Hz
– Accuracy (IEC/BS 61557-12):
  • voltage: Class 0.2 (V=100...480VAC L-N, 174...830VAC L-L)
    Class 0.5 (V=50...100 VAC L-N, 87...174VAC L-L)
  • current: Class 0.2 (Iref = 5AAC)
  • power: Class 0.5 (active), Class 1 (reactive)
  • power factor: Class 0.5
  • frequency: Class 0.02
  • THD and harmonics V and I: Class 5
  • active energy: Class 0.5s
  • active energy: Class 0.5s (IEC/EN/BS 62053-22)
  • reactive energy: Class 1 (IEC/EN/BS 62053-24)
– Integrated data memory (DMG8000, DMG9000...)
– Integrated communications ports (RS485 or Ethernet)
– Communications protocols: Modbus-RTU, ASCII and TCP
– Compatible with Synergy, Xpress and App NFC
– Protection rating: IP65 for front panel.

Synergy supervision and energy management software
See Section 36.

Xpress configuration and remote control software
See Section 36.

Lovato App NFC
See Section 36.

EXP series expansion modules
See page 35-3.

Certifications and compliance
Certifications: cETLus (in accordance with National Electrical Code (US) and Canadian Electrical Code).
Compliant with standards: IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2 and IEC/EN/BS 61000-6-4.

EASY BRANCH power monitoring system

EXS0000

EXS4000

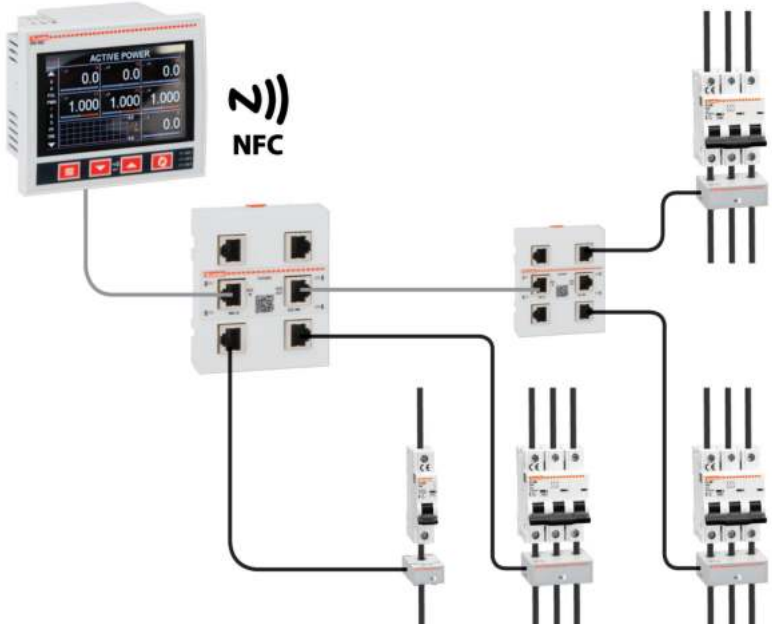
EXS4001

EXS1063

EXS3063

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Modules for EASY BRANCH system.			
EXS0000	Bus module for EASY BRANCH power monitoring system	1	0.090
EXS4000	Current measuring module with 4 inputs for electronic RJ45 CTs	1	0.140
EXS4001	Current measuring module with 2 inputs for three-phase traditional CTs or 6 inputs for single-phase traditional CTs	1	0.210
Electronic current transformers for EASY BRANCH system. Single-phase.			
EXS1032	32A single-phase electronic current transformer with RJ45 cable, 2m long	1	0.060
EXS1063	63A single-phase electronic current transformer with RJ45 cable, 2m long	1	0.060
EXS1080	80A single-phase electronic current transformer with RJ45 cable, 2m long	1	0.105
EXS1125	125A single-phase electronic current transformer with RJ45 cable, 2m long	1	0.105
Three-phase.❶.			
EXS3032	32A three-phase electronic current transformer ❶ with RJ45 cable, 2m long	1	0.080
EXS3063	63A three-phase electronic current transformer ❶ with RJ45 cable, 2m long	1	0.080
EXS3080	80A three-phase electronic current transformer ❶ with RJ45 cable, 2m long	1	0.135
EXS3125	125A three-phase electronic current transformer ❶ with RJ45 cable, 2m long	1	0.135
Traditional current transformers. See Section 29.			

❶ Configurable as single-phase current transformer (3 single-phase measure per each EXS3...).



General characteristics
The EASY BRANCH multi-circuit metering system is a modern solution to the need for electrical parameter metering when more than one load is to be monitored inside a single electrical enclosure. Each DIN rail mounting current metering unit can monitor 2 or 4 measurement points and display the values on the DMG7500, DMG8000 or DMG9000... power analyzers to which it is connected, thus centralising the display of data, which includes:
- Phase current
- Measurements on 4 quadrants
- Power (active, reactive and apparent phase and total power)
- Power factor (phase and total)
- Maximum (HIGH), minimum (LOW) and average (AVERAGE) of all measured values
- Peak power/current (max demand)
- Current asymmetry and active power unbalance
- Total harmonic distortion (current)
- Current harmonic analysis up to the 63rd order
- Active, reactive and apparent energy metering (partial and total).

The RJ45 port on the EXS4000 metering module provides foolproof connection of EXS1... and EXS3... electronic current transformers.
The values can also be monitored using the communications ports of DMG... power analyzers, to which up to 8 current metering modules can be connected in cascade thanks to the integrated communications bus with standard Ethernet cable (cat.6), which also provides power.
Connecting 5 or more EXS4... current metering modules requires a 24VDC-0.2A power supply. Each measurement point can be configured as single- or three-phase, up to a total of 33 three-phase or 99 single-phase points.

Operational characteristics of EXS4… current measuring modules
- Power supplied by the bus cable (connecting 5 or more EXS4... current metering modules requires a 24VDC-0.2A power supply)
- nominal input current:
  EXS4000: 32A, 63A, 80A or 125A, depending on the connected EXS1... or EXS3... electronic transformer.
  EXS4001: 5A or 1A via external current transformer
- Accuracy (IEC/BS 61557-12):
  • current: Class 0.5 (Iref = 5AAC)
  • power: Class 1 (active), Class 2 (reactive)
  • power factor: Class 1
  • THD and current harmonics: Class 5
  • active energy: Class 1
  • active energy: Class 1 (IEC/EN/BS 62053-21)
  • reactive energy: Class 2 (IEC/EN/BS 62053-23)
- Diagnostics LED indicates correct power supply and electronic current transformer recognition
- Mounts to 35mm omega rail (IEC/EN/BS 60715).

Operational characteristics of EXS1… - EXS3… electronic current transformers
- Diagnostics LED to confirm connection
- Pre-wired cable: 2m
- RJ45 connector.

Synergy supervision and energy management software
See Section 36.

Xpress configuration and remote control software
See Section 36.

Lovato App NFC
See Section 36.

Certifications and compliance
Certifications: cETLus (in accordance with National Electrical Code (US) and Canadian Electrical Code).
Compliant with standards: IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2 and IEC/EN/BS 61000-6-4.

Modular LCD multimeters, non expandable

DMG1...

DMG200 - DMG210

Order code	Description	Qty per pkg	Wt
		n°	[kg]
DMG100	Icon LCD, auxiliary supply 100...240VAC/120...250VDC. Multilanguage: Italian, English, French, Spanish, Portuguese and German	1	0.294
DMG110	Icon LCD, built-in RS485 port, auxiliary supply 100...240VAC/120...250VDC. Multilanguage: Italian, English, French, Spanish, Portuguese and German	1	0.294
DMG200	Graphic 128x80 pixel LCD, auxiliary supply 100-240VAC/110-250VDC. Multilanguage: Italian, English, French, Spanish and Portuguese	1	0.294
DMG200L01	Graphic 128x80 pixel LCD, auxiliary supply 100-240VAC/110-250VDC. Multilanguage: English, Czech, Polish, German and Russian	1	0.294
DMG210	Graphic 128x80 pixel LCD, built-in RS485 port, auxiliary supply 100-240VAC/ 110-250VDC. Multilanguage: Italian, English, French, Spanish and Portuguese	1	0.300
DMG210L01	Graphic 128x80 pixel LCD, built-in RS485 port, auxiliary supply 100-240VAC/ 110-250VDC. Multilanguage: English, Czech, Polish, German and Russian	1	0.300

Kits with CT

DMGKIT100150

Order code	Description	Qty per pkg	Wt
		n°	[kg]
DMGKIT100060	Composed of one DMG100 multimeter and n°3 CTs 60/5A for Ø22mm cable	1	1.035
DMGKIT100100	Composed of one DMG100 multimeter and n°3 CTs 100/5A for Ø22mm cable	1	1.035
DMGKIT100150	Composed of one DMG 100 multimeter and n°3 CTs 150/5A for Ø23mm cable	1	0.856
DMGKIT100250	Composed of one DMG100 multimeter and n°3 CTs 250/5A for Ø23mm cable	1	0.856

General characteristics
DMG... digital multimeters are available with a modular housing, 4 module size, and are equipped with a graphic backlight LCD (except DMG100/110 with icon display) capable of providing extremely clear, intuitive and flexible viewing of all electrical parameters of an installation.
For DMG110 and DMG210 versions, there is a built-in isolated RS485 interface.
Main measurements:
- Voltage: phase, line and system values
- Current: phase values (neutral current calculated)
- Power: apparent, active and reactive phase and total values
- P.F.: Power Factor per phase and total
- Frequency of measured voltage value
- HIGH-LOW-AVERAGE value functions of all measurements
- Maximum demand of power and current values
- Asymmetric voltage and current
- Total harmonic distortion (THD) of voltage and current values
- Energy meters for active, reactive and apparent values
- Hour counter (total and partial, 1 on DMG200/210, 4 programmable on DMG100/110)
- Phase energy (DMG100/110)
- Harmonic analysis up to the 15th order (DMG100/110).

Operational characteristic
- Auxiliary supply voltage range: 100...240VAC / 110...250VDC
- Maximum rated measurement voltage
  - 600VAC (DMG100/110)
  - 690VAC (DMG200/210)
- Voltage measurement range:
  - 50...720VAC phase-to-phase (DMG100/110)
  - 20...830VAC phase-to-phase (DMG200/210)
- Usage in medium and high-voltage systems with voltage transformers
- Rated input current: With external CT /5A (also 1A for DMG100/110)
- Current measurement range with CT up to 10,000A
- Frequency measurement range: 45...66Hz, 360...440Hz
- True RMS measurements for voltage and current values
- Accuracy:
  - Voltage: ±0.5% (50...720VAC for DMG1...) (50...830VAC) for DMG2...
  - Current: ±0.5% (0.1...1.1In)
  - Power: ±1% f.s.
  - Frequency: ±0.05%
  - Active energy: Class 1 (IEC/EN/BS 62053-21)
  - Reactive energy: Class 2 (IEC/EN/BS 62053-23)
- Non-volatile memory for data storage
- Communication protocol Modbus-RTU and ASCII (only for DMG110 and DMG210)
- Programming and remote control by software (only for DMG110 and DMG210; compatible with Synergy and Xpress software)
- Modular housing, 4 module
- EN degree of protection: IP40 on front; IP20 at terminals.

CURRENT TRANSFORMERS OF DMG... KITS
- Operating frequency: 50...60Hz
- Secondary output current: 5A
- Overload withstand: 120% Ipn
- Rated insulation voltage Ui: 720V
- Rated short time thermal current Ith: 40...60Ipn for 1 second
- Rated dynamic current Idyn: 2.5Ith for 1 second
- Insulation (dry type): class E
- Faston terminals
- EN degree of protection: IP30.

Synergy supervision and energy management software
See Section 36.

Xpress configuration and remote control software
See Section 36.

Certifications and compliance
Certifications obtained: cULus, EAC and RCM.
Compliant with standards: DMG100/110: IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 61010-1, CSA C22.2 n° 61010-1, UL 61010-2-030, CSA 22.2 n° 61010-2-030.
DMG200/210: IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-4, UL 61010-1, UL508, CSA C22.2 n°14.

Modular LCD multimeters, expandable

DMG300

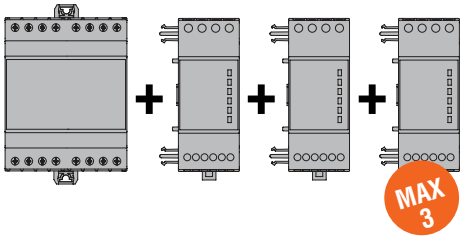
Order code	Description	Qty per pkg	Wt
		n°	[kg]
DMG300	Graphic 128x80 pixel LCD, harmonic analysis, auxiliary supply 100...240VAC/110...250VDC, expandable with modules series EXM... Multilanguage: Italian, English, French, Spanish and Portuguese	1	0.320
DMG300L01	Graphic 128x80 pixel LCD, harmonic analysis, auxiliary supply 100...240VAC/110...250VDC, expandable with modules series EXM... Multilanguage: English, Czech, Polish, German and Russian	1	0.320

Expansion modules

EXM1010

Order code	Description
DMG300 AND DMG300L01 EXPANSION MODULES. Inputs and outputs.	
EXM1000	2 digital inputs and 2 static outputs, opto-isolated
EXM1001	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC
EXM1002	4 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC
Communication ports.	
EXM1010	Opto-isolated USB interface
EXM1011	Opto-isolated RS232 interface
EXM1012	Opto-isolated RS485 interface
EXM1013	Opto-isolated Ethernet interface
EXM1020	Opto-isolated RS485 interface and 2 relay outputs rated 5A 250VAC
EXM1030	Data storage, clock-calendar (RTC) with backup battery for data logging

Maximum combination for DMG300 and DMG300L01



General characteristics

DMG300... digital multimeters are available with a modular housing, 4 module size, and are equipped with a graphic backlight LCD capable of providing extremely clear, intuitive and flexible viewing of all electrical parameters of a system.
The very accurate measurements combined with their extreme compactness provide an ideal solution for every type of application.
Expandable with up to 3 module EXM... series by optical interface.
Main measurements:
- Voltage: phase, line and system values
- Current: phase values (neutral current calculated)
- Power: apparent, active and reactive phase and total values
- P.F.: Power Factor per phase and total
- Frequency of measured voltage value
- HIGH-LOW-AVERAGE value functions for all measurements
- Maximum demand of power and current values
- Voltage and current asymmetry
- Total harmonic distortion (THD) of voltage and current values
- Harmonic analysis of voltage and current up to 31° order
- Energy meters for active, reactive, apparent partial and total values, programmable tariff functions
- Hour counter for programmable total and partial hours
- Pulse counter for general use: consumption pulse counting for water, gas, etc. with expansion module only.

Operational characteristics

- Auxiliary supply voltage range: 85...264VAC / 93.5...300VDC
- Voltage measurement range: 20...830VAC phase-to-phase, 10...480VAC phase-neutral
- Usage in medium and high-voltage systems with voltage transformers
- Rated input current: With external CT, 5A or 1A
- Current measurement range with CT up to 10,000A
- Frequency measurement range: 45...66Hz, 360...440Hz
- True RMS measurements for voltage and current values
- Measurements accuracy:
  - Voltage: ±0.2% (50...830VAC)
  - Current: ±0.2% (0.1...1.1In)
  - Power: ±0.5% f.s.
  - Power factor: ±0.5%
  - Frequency: ±0.05%
  - Active energy: Class 0.5s (IEC/EN/BS 62053-22)
  - Reactive energy: Class 2 (IEC/EN/BS 62053-23)
- Non-volatile memory for data storage
- Communication protocol Modbus-RTU, ASCII and TCP (only with communication expansion modules)
- Programming and remote control by software (only with communication expansion modules); compatible with Synergy and Xpress software
- Modular housing, 4 module
- EN degree of protection: IP40 on front; IP20 at terminals.

Synergy supervision and energy management software
See Section 36.

Xpress configuration and remote control software
See Section 36.

EXM series expansion modules
See page 35-3.

Certifications and compliance

Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices - Multimeters; EAC and RCM for all.
Compliant with standards: IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-4, UL508, CSA C22.2 n° 14.

Flush-mount LCD multimeters, expandable

DMG600 - DMG610
DMG615 - DMG620

DMG611R...

new

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Icon LCD 72X46mm/2.83x1.81", backlight, harmonic analysis, auxiliary supply 100...440/110...250VDC, expandable with modules series EXP...			
DMG600	Front optical port, multilanguage❶	1	0.300
DMG610	Front optical port, built-in RS485 serial port, multilanguage❶	1	0.350
DMG611R0100	Front optical port, built-in RS485 serial port, multilanguage❶. Current reading through 3 Rogowski coils included, max current 100A	1	0.350
DMG611R0500	Front optical port, built-in RS485 serial port, multilanguage❶. Current reading through 3 Rogowski coils included, max current 500A	1	0.350
DMG611R3000	Front optical port, built-in RS485 serial port, multilanguage❶. Current reading through 3 Rogowski coils included, max current 3000A	1	0.350
DMG611R6300	Front optical port, built-in RS485 serial port, multilanguage❶. Current reading through 3 Rogowski coils included, max current 6300A	1	0.350
DMG615	Front optical port, built-in RS485 serial port, multilanguage❶. class 0.5s	1	0.350
DMG620	Front optical port, built-in Ethernet port, multilanguage❶. class 0.5s	1	0.350

❶ Italian, English, French, Spanish and Portuguese.

Expansion modules

EXP10...

Order code	Description
EXPANSION MODULES Inputs and outputs.	
EXP1000	4 opto-isolated digital inputs
EXP1001	4 opto-isolated static outputs
EXP1002	2 digital inputs and 2 static outputs, opto-isolated
EXP1003	2 relay outputs rated 5A 250VAC
EXP1008	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC
Communication ports.	
EXP1010	Opto-isolated USB interface
EXP1011	Opto-isolated RS232 interface
EXP1012	Opto-isolated RS485 interface
EXP1013	Opto-isolated Ethernet interface

Communication devices

CX01

CX02

Order code	Description	Qty per pkg	Wt
		n°	[kg]
CX01	USB/optical device with PC ↔ LOVATO Electric product connecting cable, for programming, data download, diagnostics and firmware upgrade	1	0.090
CX02	Wi-Fi device for PC ↔ LOVATO Electric product programming, data download, diagnostics and cloning	1	0.090

General characteristics
DMG6... digital multimeters are capable of viewing the measurements with high accuracy on the wide icon LCD, which allow to control energy distribution networks.
They are available with a flush-mount housing, (96x96mm/3.78"x3.78") and 1 expansion slot to fit plug-in expansion modules, suitable for numerous applications.
The main features include an extended power supply voltage range, high measurement accuracy, expandability and icon interactive interface for simple use.
They are equipped with a front optical port for programming via USB (CX01) or WI-Fi (CX02) communication devices to allow:
- Configuration of parameters
- Parameters copy
- Cloning of stored data.

Main measurements:
- Voltage: phase, line and system values
- Current: phase values (neutral current calculated)
- Power: apparent, active and reactive phase and total values
- P.F.: Power Factor per phase and total
- Frequency of measured voltage value
- HIGH-LOW-AVERAGE value functions for all measurements
- Maximum demand of power and current values
- Voltage and current asymmetry
- Total harmonic distortion (THD): voltage and current
- Harmonic analysis of voltage and current up to the 15° order
- Energy meters for active, reactive, apparent partial and total values
- Hour counter for programmable total and partial hours.

Operational characteristics
- Auxiliary supply voltage range:
  - 100...440VAC / 110...250VDC❷
- Voltage measurement range:
  50...720VAC L-L
- Usage in medium and high voltage systems with voltage transformers
- Rated input current: By external CT 5A or 1A
- Current reading through Rogowski coils for DMG611...
- Frequency measurement range 45...66Hz, 360...440Hz
- True RMS measurements: for voltage and current
- Measurement accuracy:
  - Voltage: ±0.5% (50...720VAC)
  - Current: ±0.5% (0.1...1.1In)
  - Power: ±1% f.s.
  - Frequency: ±0.05%
  - Active energy: Class 1 (IEC/EN/BS 62053-21)
  - Reactive energy: Class 2 (IEC/EN/BS 62053-23)
- Measurement accuracy DMG615/620::
  - Voltage: ±0.2% (50...720VAC)
  - Current: ±0.2% (0.1...1.1In)
  - Power: ±0.5% f.s.
  - Frequency: ±0.05%
  - Active energy: Class 0.5 (IEC/EN/BS 62053-22)
  - Reactive energy: Class 2 (IEC/EN/BS 62053-23)
- Non-volatile memory for data storage
- Communication protocol Modbus-RTU, ASCII and TCP
- Compatible Synergy and Xpress software
- Flush-mount housing 96x96mm/3.78"x3.78"
- EN degree of protection: IP54 on front.

Synergy supervision and energy management software
See Section 36.

Xpress configuration and remote control software
See Section 36.

EXP series expansion modules
See page 35-2.

Certifications and compliance
Certifications obtained: cULus (except DMG611... and DMG620), EAC, RCM; UL listed for USA and Canada (cULus – File E93601), as Auxiliary Devices – Multimeters.
Compliant with standards: IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 61010-1, CSA C22.2 n° 61010-1, UL 61010-2-030, CSA 22.2 n° 61010-2-030.

❷ Consult Technical support about versions with supply 12...48VDC

Modular LED instruments single-phase, non expandable

DMK80R1

DMK81R1

Order code	Displayed measurements	Relay output	Qty per pkg	Wt
	n°	n°	n°	[kg]
Voltmeter.				
DMK80R1❶	1 voltage value 1 max voltage value 1 min voltage value	1	1	0.268
Ammeter.				
DMK81R1❶	1 current value 1 max current value 1 min current value	1	1	0.268

❶ Relay output with control and protection functions.

General characteristics
The DMK8... instruments are available with modular housing, 3 module size.
Measurements are True RMS values and provide for reliable operation even in the presence of harmonics.

Operational characteristics
- Auxiliary supply voltage: 220...240VAC
- Operating frequency: 50...60Hz
- True RMS measurements
- Max and min measurement storage
- 1 relay output with 1 changeover contact (SPDT)
- Modular DIN 43880 housing, 3 modules
- Terminals: 4mm^2
- EN degree of protection: IP40 on front; IP20 on terminals.

DMK80R1
- Voltage measurement range: 15...660VAC
- Operating frequency range: 45...65Hz
- Programmable VT ratio: 1.00...500.00
- Accuracy: ±0.25% f.s. ±1 digit

DMK81R1
- Current measurement range: 0.05...5.75A
- Operating frequency range: 45...65Hz
- Programmable CT ratio: 5...10,000
- Accuracy: ±0.5% f.s. ±1 digit

Control and protection functions
DMK80R1
- Voltage loss or failure: OFF/5...85%
- Maximum voltage: OFF/102...120%
- Minimum voltage: OFF/70...98%
- Time delay for max-min voltage or voltage loss ❷: 0.0...900.0 seconds.

DMK81R1
- Current loss: OFF/2...100%
- Maximum current: OFF/102...200%
- Maximum current instantaneous tripping: OFF/110...600%
- Minimum current: OFF/5...98%
- Time delay for max-min current or current loss ❷: 0.0...900.0 seconds.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3.

❷ Independent adjustable delays.

Modular LED instruments three-phase, non expandable

DMK70R1

DMK71R1

DMK75R1

Order code	Displayed measurements	Relay output	Qty per pkg	Wt
	n°	n°	n°	[kg]
Voltmeter.				
DMK70R1❷	3 phase voltage values 3 phase to phase voltage values 3 max phase voltage values 3 max phase to phase voltage values 3 min phase voltage values 3 min phase to phase voltage values	1	1	0.264
Ammeter.				
DMK71R1❷	3 phase current values 3 max phase current values 3 min phase current values	1	1	0.272
Combined voltmeter, ammeter and wattmeter.				
DMK75R1❶❷	3 phase voltage values 3 phase to phase voltage values 3 phase current values 4 active power values, phase and total 3 maximum phase voltage values 3 maximum phase to phase voltage values 3 maximum phase current values 4 max active power, phase and total 3 minimum phase voltage values 3 minimum phase to phase voltage values 3 minimum phase current values 4 min active power, phase and total	1	1	0.280

❶ Connection also to single-phase.
❷ Relay output with control and protection functions.

General characteristics
The DMK7... instruments are available with modular housing, 3 module size.
Measurements are True RMS values and provide for reliable operation even in the presence of harmonics.

Operational characteristics
– Auxiliary supply voltage: 220...240VAC
– Operating frequency: 50...60Hz
– True RMS measurements
– Max and min measurement storage
– 1 relay output with 1 changeover contact (SPDT)
– Modular DIN 43880 housing, 3 module
– Terminals: 4mm^2
– EN degree of protection: IP40 on front; IP20 on terminals.

DMK70R1
– Voltage measurement range: 15...660VAC
– Operating frequency range: 45...65Hz
– Programmable VT ratio: 1.00...500.00
– Accuracy: ±0.25% f.s. ±1 digit

DMK71R1
– Current measurement range: 0.05...5.75A
– Operating frequency range: 45...65Hz
– Programmable CT ratio: 5...10,000
– Accuracy: ±0.5% f.s. ±1 digit

DMK75R1
– Voltage measurement range: 35...660VAC
– Current measurement range: 0.05...5.75A
– Frequency measure range: 45...65Hz
– Programmable VT ratio: 1.00...500.00
– Programmable CT ratio: 5...10,000
– Accuracy: Voltage ±0.25% f.s. ±1 digit
– Accuracy: Current ±0.5% f.s. ±1 digit

Control and protection functions
DMK70R1
– Phase loss or failure: OFF/5...85%
– Maximum voltage: OFF/102...120%
– Minimum voltage: OFF/70...98%
– Asymmetry: OFF/2...20%
– Phase sequence: OFF/L1-L2-L3/L3-L2-L1
– Maximum frequency: OFF/101...110%
– Minimum frequency: OFF/90...99%
– Time delay for max-min voltage, phase loss, asymmetry and min-max frequency ❸: 0.0...900.0 seconds.

DMK71R1
– Current loss: OFF/2...100%
– Maximum current: OFF/102...200%
– Maximum current instantaneous tripping: OFF/110...600%
– Minimum current: OFF/5...98%
– Asymmetry: OFF/2...20%
– Time delay for max-min current or current loss and asymmetry ❸: 0.0...900.0 seconds.

DMK75R1
Voltage
– Phase loss or failure: OFF/5...85%
– Maximum voltage: OFF/102...120%
– Minimum voltage: OFF/70...98%
– Asymmetry: OFF/2...20%
– Phase sequence: OFF/L1-L2-L3/L3-L2-L1
Current
– Current loss: OFF/2...100%
– Maximum current: OFF/102...200%
– Maximum current instantaneous tripping: OFF/110...600%
– Minimum current: OFF/5...98%
– Asymmetry: OFF/2...20%
Power
– Rated power: 1...10,000
– Maximum power: OFF/101...200%
– Maximum power instantaneous tripping: OFF/110...600%
– Minimum power: OFF/10...99%
Frequency
– Maximum frequency: OFF/101...110%
– Minimum frequency: OFF/90...99%
– Time delay for max-min voltage, max-min current or current loss, phase loss, asymmetry and min-max power ❸: 0.0...900.0 seconds.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3.

❸ Independent adjustable delays.

Flush-mount LED instruments single-phase, non expandable

DMK0...

Order code	Displayed measurements	Relay output	Qty per pkg	Wt
	n°	n°	n°	[kg]
Voltmeter.				
DMK00R1❷	1 voltage value 1 max voltage value 1 min voltage value	1	1	0.323
Ammeter.				
DMK01R1❷	1 current value 1 max current value 1 min current value	1	1	0.323
Voltmeter or ammeter.				
DMK02❶	1 voltage or current value 1 maximum voltage or current value 1 minimum voltage or current value	–	1	0.290

❶ The DMK02 can operate as a voltmeter or ammeter. It is duly equipped with two front plates (V and A) which must be fitted by the user depending on which instrument is required and on the wiring scheme used.

❷ Relay output for control and protection functions.

General characteristics
The DMK0... instruments are available with flush-mount housing, 96x48mm/3.78x1.89".
Measurements are True RMS values and provide for reliable operation even in the presence of harmonics.

Operational characteristics
- Auxiliary supply voltage: 220...240VAC;
- Operating frequency: 50...60Hz
- True RMS measurements
- Max. and min. measurement storage
- 1 relay output with 1 changeover contact (for DMK...R1 only)
- Housing: flush-mount 96x48mm/3.78x1.89"
- Terminals: 4mm^2
- Degree of protection: IP54 on front; IP20 at terminals.

DMK00R1
- Voltage measurement range: 15...660VAC
- Operating frequency range: 45...65Hz
- Programmable VT ratio: 1.00...500.00
- Accuracy: ±0.25% f.s. ±1 digit

DMK01R1
- Current measurement range: 0.05...5.75A
- Operating frequency range: 45...65Hz
- Programmable CT ratio: 5...10,000
- Accuracy: ±0.5% f.s. ±1 digit

DMK02
- Voltage measurement range: 1...660VAC
- Current measurement range: 0.05...5.75A
- Operating frequency range: 45...65Hz
- Programmable VT ratio: 1.00...500.00
- Programmable CT ratio: OFF/5...10,000
- Accuracy: Voltage ±0.25% f.s. ±1 digit
  Current ±0.5% f.s. ±1 digit

Control and protection functions
DMK00R1
- Voltage loss or failure: OFF/5...85%
- Maximum voltage: OFF/102...120%
- Minimum voltage: OFF/70...98%
- Time delay for max-min voltage or voltage loss❸: 0.0...900.0 seconds.

DMK01R1
- Current loss: OFF/2...100%
- Maximum current: OFF/102...200%
- Maximum current instantaneous tripping: OFF/110...600%
- Minimum current: OFF/5...98%
- Time delay for max-min current or current loss❸: 0.0...900.0 seconds.

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices-Multimeters; EAC.
Compliant with standards: IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL508, CSA C22.2 n° 14.

❸ Independent adjustable delays.

Flush-mount LED instruments three-phase, non expandable

DMK1...

Order code	Displayed measurements	Relay output	Qty per pkg	Wt
	n°	n°	n°	[kg]
Voltmeter.				
DMK10R1❷	3 phase voltage values 3 phase to phase voltage values 3 maximum phase voltage values 3 maximum phase to phase voltage values 3 minimum phase voltage values 3 minimum phase to phase voltage values	1	1	0.330
Ammeter.				
DMK11R1❷	3 phase current values 3 maximum phase current values 3 minimum phase current values	1	1	0.336
Voltmeter, ammeter and wattmeter.				
DMK15R1❶❷	3 phase voltage values 3 phase to phase voltage values 3 phase current values 4 active power values, phase and total 3 maximum phase voltage values 3 maximum phase to phase voltage values 3 maximum phase current values 4 maximum active power values, phase and total 3 minimum phase voltage values 3 minimum phase to phase voltage values 3 minimum phase current values 4 minimum active power values, phase and total	1	1	0.350

❶ Connection also to single-phase.
❷ Relay output for control and protection functions.

General characteristics
The DMK1... instruments are available with flush-mount housing, 96x48mm/3.78x1.89".
Measurements are True RMS values and provide for reliable operation even in the presence of harmonics.

Operational characteristics
- Auxiliary supply voltage: 220...240VAC;
- Operating frequency: 50...60Hz
- True RMS measurements
- Max and min measurement storage
- 1 relay output with 1 changeover contact
- Housing: flush-mount 96x48mm/3.78x1.89"
- Terminals: 4mm^2
- Degree of protection: IP54 on front; IP20 at terminals.

DMK10R1
- Voltage measurement range: 15...660VAC
- Operating frequency range: 45...65Hz
- Programmable VT ratio: 1.00...500.00
- Accuracy: ±0.25% f.s. ±1 digit.

DMK11R1
- Current measurement range: 0.05...5.75A
- Operating frequency range: 45...65Hz
- Programmable CT ratio: 5...10,000
- Accuracy: ±0.5% f.s. ±1 digit.

DMK15R1
- Voltage measurement range: 35...660VAC
- Current measurement range: 0.05...5.75A
- Frequency measure range: 45...65Hz
- Programmable VT ratio: 1.00...500.00
- Programmable CT ratio: 5...10,000
- Accuracy: Voltage ±0.25% f.s. ±1 digit
  Current ±0.5% f.s. ±1 digit
  Power ±1% f.s. ±1 digit.

Control and protection functions
DMK10R1
- Phase loss or failure: OFF/5...85%
- Maximum voltage: OFF/102...120%
- Minimum voltage: OFF/70...98%
- Asymmetry: OFF/2...-20%
- Phase sequence: OFF/L1-L2-L3/L3-L2-L1
- Frequency
  - Maximum frequency: OFF/101...110%
  - Minimum frequency: OFF/90...99%
  - Time delay for max-min voltage, phase loss, asymmetry and min-max frequency ❸: 0.5...900.0 seconds.

DMK11R1
- Current loss: OFF/2...100%
- Maximum current: OFF/102...200%
- Maximum current instantaneous tripping: OFF/110...600%
- Minimum current: OFF/5...98%
- Asymmetry: OFF/2...20%
- Time delay for max-min current or current loss and asymmetry ❸: 0.5...900.0 seconds.

DMK15R1
- Voltage
  - Phase loss or failure: OFF/5...85%
  - Maximum voltage: OFF/102...120%
  - Minimum voltage: OFF/70...98%
  - Asymmetry: OFF/2...20%
  - Phase sequence: OFF/L1-L2-L3/L3-L2-L1
- Current
  - Current loss: OFF/5...85%
  - Maximum current: OFF/102...200%
  - Maximum current instantaneous tripping: OFF/110...600%
  - Minimum current: OFF/5...98%
  - Asymmetry: OFF/2...20%
- Power
  - Rated power: 1...10,000
  - Maximum power: OFF/101...200%
  - Max. power instantaneous tripping: OFF/110...600%
  - Minimum power: OFF/10...99%
- Frequency
  - Maximum frequency: OFF/101...110%
  - Minimum frequency: OFF/90...99%
  - Time delay for max-min voltage, max-min current or current loss, phase loss, asymmetry and min-max power ❸: 0.0...900.0 seconds.

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices-Multimeters; EAC.
Compliant with standards: IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 508, CSA C22.2 n° 14.

❸ Independent adjustable delays.

Flush-mount LED multimeter three-phase, non expandable

DMK16R1

Order code	Displayed measurements	Relay output	Qty per pkg	Wt
	n°	n°	n°	[kg]
DMK16R1 ❶	3 phase voltage values 3 phase to phase voltage values 3 phase current values 4 active power values, phase and total 4 reactive power values, phase and total 4 apparent power values, phase and total 3 phase power factor values 1 frequency value 1 active energy value in kWh 1 reactive energy value in kvarh 1 hour counter 3 maximum phase voltage values 3 maximum phase to phase voltage values 3 maximum phase current values 4 maximum active power values, phase and total 4 maximum reactive power values, phase and total 4 maximum apparent power values, phase and total 3 minimum phase voltage values 3 minimum phase to phase voltage values 3 minimum phase current values 4 minimum active power values, phase and total 4 minimum reactive power values, phase and total 4 minimum apparent power values, phase and total 2 minimum and maximum power factor values	1	1	0.353

❶ Connection also to single-phase.

General characteristics
The DMK16R1 multimeter is available with flush-mount housing, 96x48mm/3.78x1.89”
Measurements are True RMS values and provide for reliable operation even in the presence of harmonics.

Operational characteristics
- Auxiliary supply voltage: 220...240VAC
- Operating frequency: 50...60Hz
- True RMS measurements
- Accuracy: Voltage ±0.25% f.s. ±1 digit
  Current ±0.5% f.s. ±1 digit
- Active energy accuracy: Class 2 (IEC/EN/BS 62053-21 and IEC/EN/BS 62053-23)
- Max and min measurement storage
- Voltage measurement range: 35...660VAC
- Current measurement range: 0.05...5.75A
- Frequency measurement range: 45...65Hz
- Programmable VT ratio: 1.00...500.0
- Programmable CT ratio: 5...10,000
- 1 relay output with 1 changeover (SPDT) contact
- Housing: flush-mount 96x48mm/3.78x1.89”
- Terminals: 4mm²
- EN degree of protection: IP54 on front; IP20 at terminals.

PROGRAMMABLE RELAY OUTPUT
- Voltage
  - Phase loss or failure: OFF/5...85%
  - Maximum voltage: OFF/102...120%
  - Minimum voltage: OFF/70...98%
  - Asymmetry: OFF/2...20%
  - Phase sequence: OFF/L1-L2-L3/L3-L2-L1
- Current
  - Protection inhibition max current: OFF/2...100%
  - Maximum current: OFF/102...200%
  - Maximum current instantaneous tripping: OFF/110...600%
  - Minimum current: OFF/5...98%
  - Asymmetry: OFF/2...20%
- Power factor
  - Maximum power factor: 0.10...1.00
  - Minimum power factor: 0.10...1.00
- Time delay for max-min voltage, max-min current or current loss, phase loss, asymmetry and min-max power factor ❷: 0.0...900.0 seconds.

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices-Multimeters; EAC.
Compliant with standards: IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL508, CSA C22.2 n° 14.

❷ Independent adjustable delays.

Communication devices

CX01

CX02

CX03

Order code	Description	Qty per pkg	Wt
		n°	[kg]
CX01	USB/optical device with PC ↔ LOVATO Electric product connecting cable, for programming, data download, diagnostics and firmware upgrade	1	0.090
CX02	Wi-Fi device for PC ↔ LOVATO Electric product programming, data download, diagnostics and cloning	1	0.090
CX03	GSM/GPRS penta-band antenna (850/900/1800/1900/2100Mhz)	1	0.090

General characteristics
For general characteristics of these accessories see section 35.

Protection covers

PA96X48

Order code	Description	Qty per pkg	Wt
		n°	[kg]
PA96X48	Front protection cover, IEC IP65 for DMK0/1...	1	0.048

General characteristics
When a higher front IP protection degree is needed, the covers can be installed on the corresponding devices and also provide a sealing feature.

Accessories

EXP8000

EXM8004

DMXP03

DMXP04

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXP8000	Plastic insert for customising label fixing for DMG6...	10	0.005
EXM8004	Set of sealable terminal covers for DMG100/110/200/210/300	1	0.020
DMXP03	Panel mounting plate adapter for DMK7... and DMK8...	1	0.052
DMXP04	Panel mounting plate adapter for DMED3... and DMG1..., DMG2... and DMG3...	1	0.054

Gateway data loggers

EXCGLB...

new

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCGLB01	Gateway data logger, 1 RS485 port, 1 Ethernet port, Wi-Fi connection	1	0.190
EXCGLB02	Gateway data logger, 1 RS485 port, 1 Ethernet port, LTE connection, GNSS (GPS)	1	0.190
EXCGLB03	Gateway data logger, 1 RS485 port, 2 Ethernet ports, 4G (LTE) connection	1	0.190

General characteristics
For general characteristics of these accessories see section 34.

Gateway

EXCM4G01

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCM4G01	4G Gateway with RS485 and Ethernet port, Modbus RTU/TCP protocol	1	0.300

General characteristics
For general characteristics of these accessories see section 34.

Converter

EXCCON02

new

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCCON02	RS485/Ethernet converter, 9...48VDC, with Modbus RTU/TCP protocol conversion functionality	1	0.400

General characteristics
For general characteristics of these accessories see section 34.

Remote control and monitoring GSM modem via SMS

Compliant with Italian CEI 0-16 Standard, paragraph 8.8.6.5 and annex M, resolution 421/2014 of the ARERA

EXCGSM01

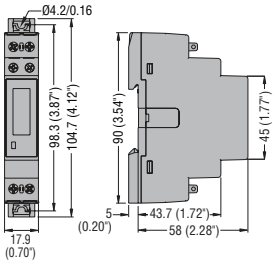
Order code	Description	Qty per pkg	Wt
		n°	[kg]
GSM Modem (modular - 4U). IP69K outside aerial with 2.5 m cable. RJ45-USB programming cable (included).			
EXCGSM01	100...240VAC, 1 digital input, 1 analog input (0...10V, 0...20mA, NTC), 1 relay output, receiving and sending SMS messages for remote controls and alarm signals	1	0.340

General characteristics
For general characteristics of these accessories see section 34.

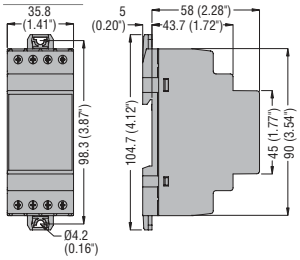
Energy meters and power analyzers
Dimensions [mm(in)]

ENERGY METERS

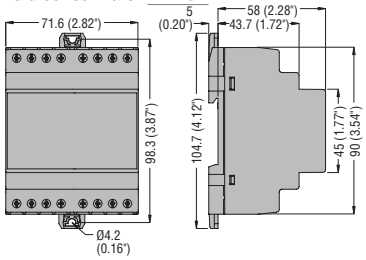
Digital meter DMED100T1... - DMED110T1... - DMED111... - DMED112...



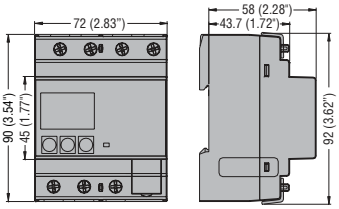
Digital meter DMED115T1 - DMED120T1... - DMED121... - DMED122...



Digital meter DMED305T2... - DMED330... - DMED332... - DMED310T2
Data concentrator DMECD

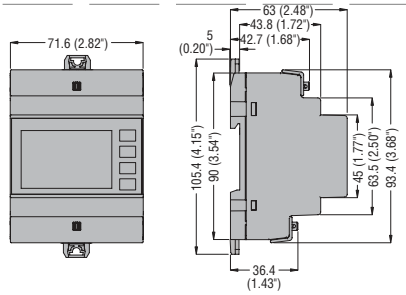


DMED300T2... - DMED311... - DMED302... - DMED341MID7

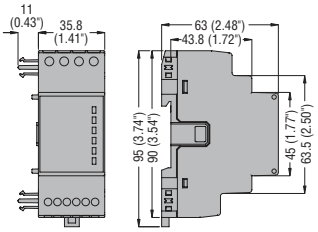


MULTIMETERS

DMG100 - DMG110 - DMG200 - DMG210 - DMG300

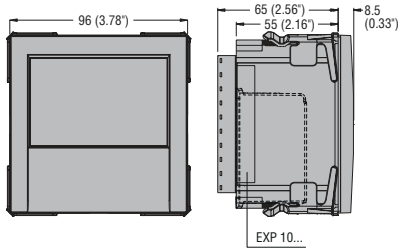


Expansion modules EXM...

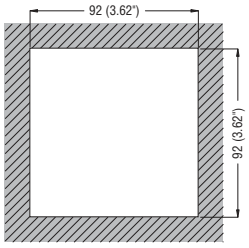


POWER ANALYZERS

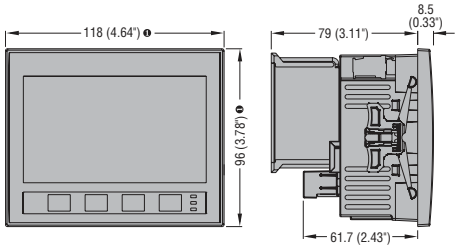
DMG6...



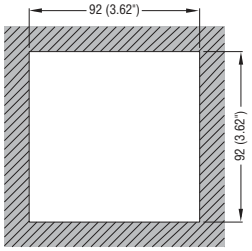
Cutout



DMG7000 - DMG7500 - DMG8000 - DMG9000...



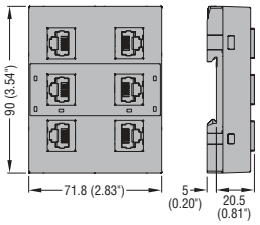
Cutout



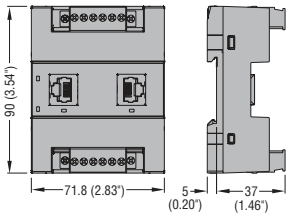
❶ Dimensions with gasket: 122x100mm/4.80x3.94".

CURRENT MEASURING MODULES

EXS4000

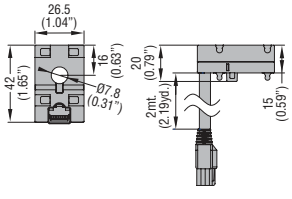


EXS4001

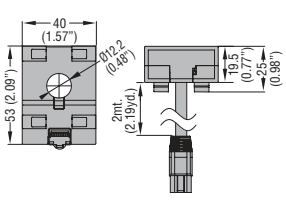


ELECTRONIC CURRENT TRANSFORMERS

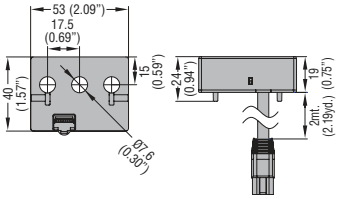
EXS1032 - EXS1063



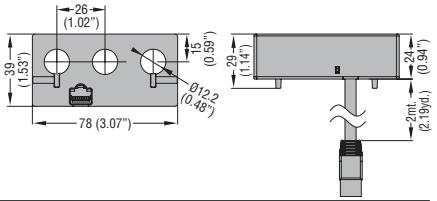
EXS1080 - EXS1125



EXS3032 - EXS3063

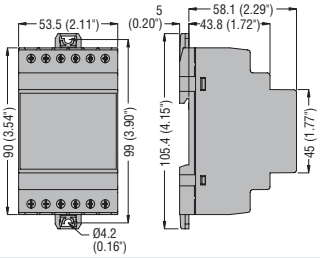


EXS3080 - EXS3125



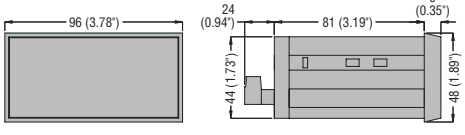
MODULAR DIGITAL METERING INSTRUMENTS

DMK7... - DMK8...

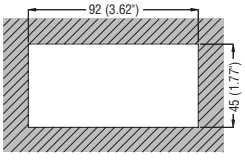


DIGITAL FLUSH-MOUNT METERING INSTRUMENTS

Instruments DMK0... - DMK1...

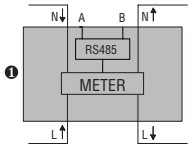


Cutout

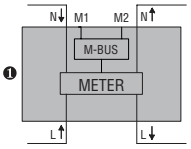


ENERGY METERS

DMED111...

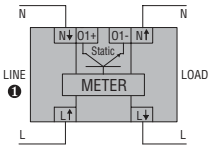


DMED112...

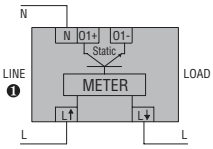


❶ 110-240VAC DMED111, DMED112...

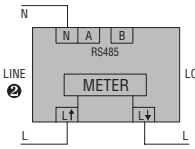
Digital meters DMED100T1... - DMED110T1...



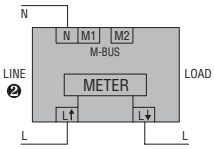
DMED115T1 - DMED120T1...



DMED121...

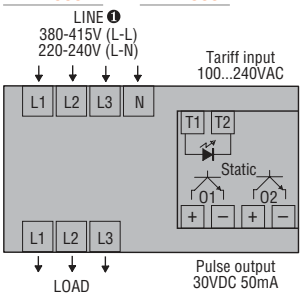


DMED122...

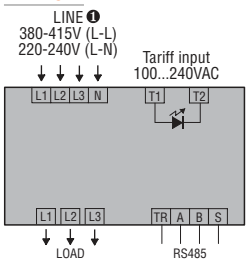


❶ 110-120VAC DMED...A120; 220-240VAC DMED...; 230V 50Hz DMED... T1 MID.
❷ 110-240VAC DMED121, DMED122...

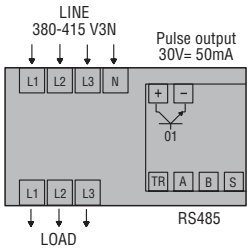
DMED300T2... - DMED300F



DMED311...

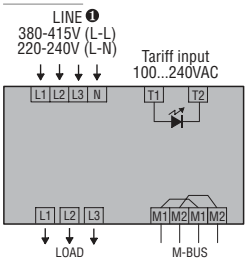


DMED341MID7...



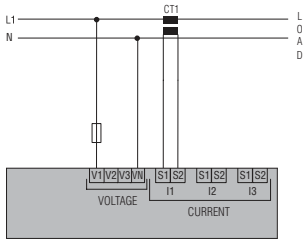
❶ 230V 50Hz (L-N), 400V 50Hz (L-L) DMED... T2 MID / DMED... F.

DMED302

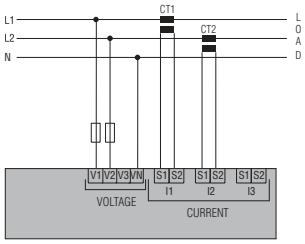


DMED305T2 - DMED330 - DMED332

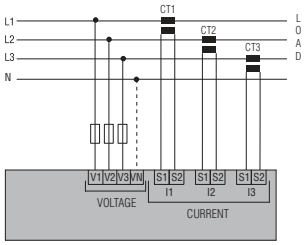
Single-phase



Two-phase

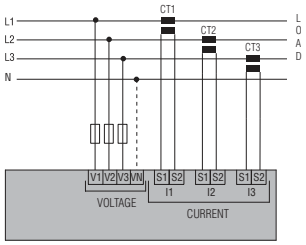


Three-phase with or without neutral

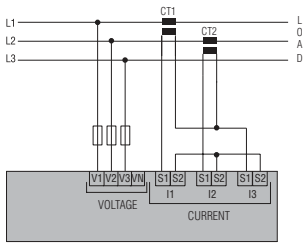


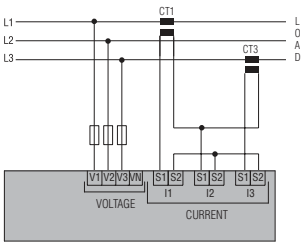
DMED310T2

Three-phase with or without neutral



Three-phase without neutral in ARON connection

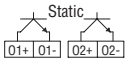




Tariff input

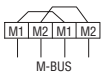
100...240VAC

Pulse output 30VDC 50mA for DMED305T2 - DMED310T2

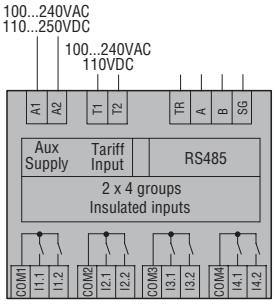


RS485 for DMED330

M-BUS for DMED332

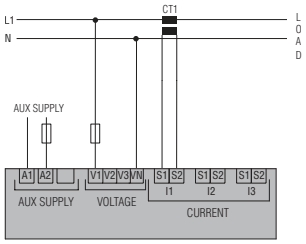


Data concentrator **DMECD**

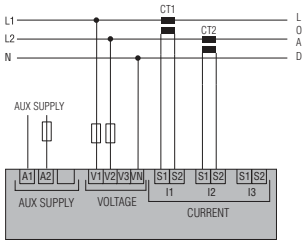


MULTIMETERS **DMG...**

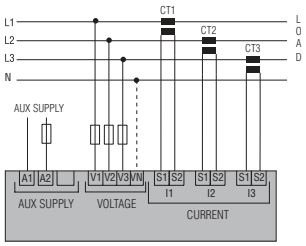
Single-phase



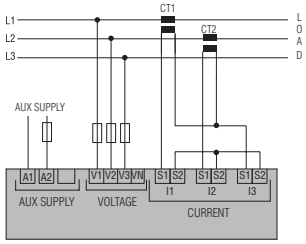
Two-phase

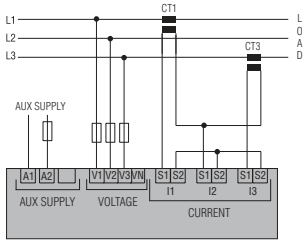


Three-phase with or without neutral

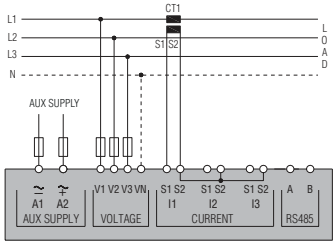


Three-phase without neutral in ARON connection





Balanced 3-phase connection with or without neutral



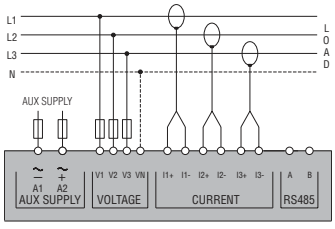
CODE	AUX SUPPLY
DMG100-110-200-210-300	100...240VAC 110...250VDC
DMG6...	100...440VAC 110...250VDC
DMG7000-7500-8000-9000	100...240VAC 110...250VDC

RS485 for DMG110 and DMG210

RS485 for DMG610

RS485 for DMG7500 and DMG9000

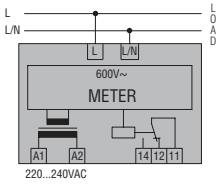
MULTIMETERS **DMG611...**



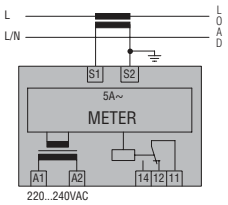
RS485 for DMG611

METERING INSTRUMENTS

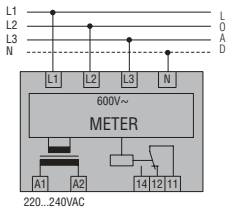
DMK80R1



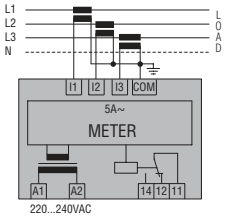
DMK81R1



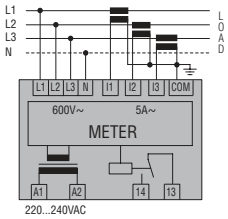
DMK70R1



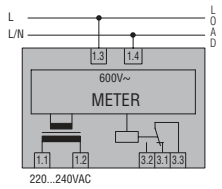
DMK71R1



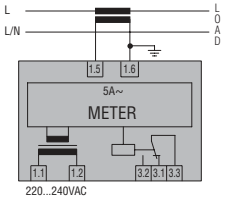
DMK75R1



DMK00R1

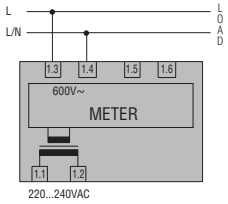


DMK01R1

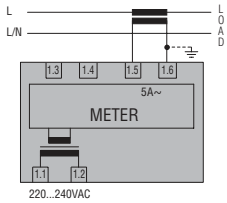


DMK02

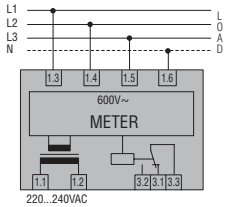
Voltmeter



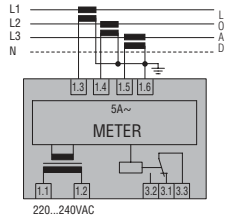
Ammeter



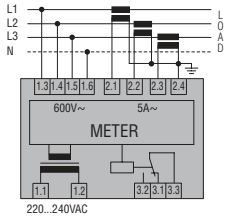
DMK10R1



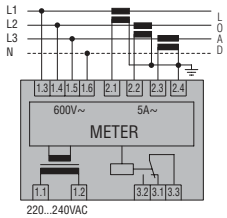
DMK11R1



DMK15R1



DMK16R1



TYPE	DMED100T1	DMED100T1MID	DMED110T1	DMED111/112	DMED110T1MID DMED111MID/MID7 DMED112MID	
	Single-phase	Single-phase	Single-phase	Single-phase	Single-phase	
AUXILIARY SUPPLY						
Rated voltage(Ue)	220...240VAC	230VAC	220...240VAC	110...240VAC	230VAC	
Operating voltage range	187...264VAC	187...264VAC	187...264VAC	93...264VAC	187...264VAC	
Rated frequency	50/60Hz	50Hz	50/60Hz	50/60Hz	50Hz	
Maximum power consumption	7VA			1VA	7VA	
Maximum power dissipation	0.45W			0.4W	0.45W	
CURRENT						
IEC maximum current (Imax)	40A			40A		
IEC minimum current (Imin)	0.25A			0.25A		
IEC rated current (Iref-Ib)	5A			5A		
IEC start current (Ist)	20mA			20mA		
Transition current (Itr)	0.5A			0.5A		
ACCURACY						
Active energy (per IEC/EN/BS 62053-21)	Class 1	Class B (EN 50470-3)	Class 1	Class 1/B	Class B (EN 50470-3)	
OUTPUTS						
LED rate	1000 flash/kWh			1000 flash/kWh		
Pulse rate	1000 pulses/kWh			1000 pulses/kWh		
Pulse duration	30ms			30ms		
STATIC OUTPUTS						
Pulse rate	10 pulses/kWh		1-10-100-1000 pulses/kWh programmable	1-10-100-1000 pulses/kWh programmable (only for DMED...T1...)		
Pulse duration	100ms			100ms		
External voltage	10...30VDC			10...30VDC		
Maximum current	50mA			50mA		
INSULATION						
IEC rated insulation voltage Ui	250VAC			250VAC		
IEC rated impulse withstand voltage Uimp	6kV			6kV		
IEC power frequency withstand voltage	4kV			4kV		
SUPPLY/MEASUREMENT CONNECTION CIRCUIT						
Type of terminals	Fixed			Fixed		
Conductor section (min...max)	1.5...10mm^2 (16...6AWG)			1.5...10mm^2 (16...6AWG)		
Maximum tightening torque	1.5Nm (14lb.in)			1.5Nm (14lb.in)		
CONNECTION (PULSE OUTPUT/RS485/M-BUS)						
Type of terminals	Fixed			Fixed		
Conductor section (min...max)	0.2...4mm^2 (24...12AWG)			0.2...4mm^2 (24...12AWG)		
Maximum tightening torque	0.8Nm (7lb.in)			0.8Nm (7lb.in)		
AMBIENT CONDITIONS						
Operating temperature	-25...+55°C			-25...+55°C (MID7: -25...+70°C)		
Storage temperature	-25...+70°C			-25...+70°C		
Relative humidity	<80%			<80%		
Maximum pollution degree	2			2		
Mechanical environment	Class M1			Class M1		
Magnetic environment	Class E2			Class E2		
HOUSING						
Material	Polyamide			Polyamide		

	DMED115T1	DMED120T1	DMED120T1MID DMED121MID DMED122MID	DMED121
	Single-phase	Single-phase	Single-phase	Single-phase
	220...240VAC	220...240VAC	230VAC	110...240VAC
	187...264VAC	187...264VAC	187...264VAC	88...264VAC
	50/60Hz	50/60Hz	50Hz	50/60Hz
	7VA			4.8VA
	0.45W			1.4W
	40A	63A		63A
	0.5A			0.5A
	10A			10A
	40mA			40mA
	1A			1A
	Class 1		Class B (EN 50470-3)	Class 1
	1000 flash/kWh			1000 flash/kWh
	1000 pulses/kWh			1000 pulses/kWh
	30ms			30ms
	1-10-100-1000 pulses/kWh programmable (only for DMED...T1...)			–
	100ms			–
	10...30VDC			–
	50mA			–
	250VAC			250VAC
	6kV			6kV
	4kV			4kV
	Fixed			Fixed
	2.5...16mm^2 (14...6AWG; 14...10AWG)			2.5...16mm^2 (14...6AWG; 14...10AWG)
	2Nm (26.5lb.in)			2Nm (26.5lb.in)
	Fixed			Fixed
	0.5...4mm^2 (20...11AWG)			0.5...4mm^2 (20...11AWG)
	1.3Nm (12.1lb.in)			1.3Nm (12.1lb.in)
	-25...+55°C (MID7: -25...+70°C)			
	-25...+70°C			-25...+70°C
	<80%			<80%
	2			2
	Class M1			Class M1
	Class E2			Class E2
	Polyamide			Polyamide

TYPE	DMED300T2… DMED311 DMED302	DMED300T2MID DMED311MID7 DMED302MID	DMED341MID7…	DMED310T2 DMED305T2	DMED305T2MID	DMED330 DMED332	DMED330MID DMED332MID
	3 phase with neutral	3 phase with neutral	3 phase with neutral	3 phase with and without neutral	3 phase with neutral	3 phase with and without neutral	3 phase with neutral
AUXILIARY SUPPLY							
Rated voltage (Ue)	380...415VAC (3ph-N) DMED...UL: 120VAC (LN) - 240VAC (L-L)	400VAC (3ph-N)	400VAC (3ph-N)	380...415VAC (3ph-N)	400VAC (3ph-N)	380...415VAC (3ph-N)	400VAC (3ph-N)
Voltage range	187...264VAC phase-neutral / 323...456VAC phase-phase						
Rated frequency	50/60Hz (UL: 60Hz)	50Hz	50Hz	50/60Hz	50Hz	50/60Hz	50Hz
Maximum power consumption	2.5VA (2.4VA DMED311...)		2.4VA	3.5VA			3.5VA
Maximum power dissipation	1W (0.8W DMED311...)		0.8W	2.7W			2.7W
CURRENT							
IEC maximum current (Imax)	80A		80A	5A		5A	5A
IEC minimum current (Imin)	0.75A		0.75A	0.05A		0.05A	0.05A
IEC rated current (Iref-Ib)	15A		15A	5A		5A	5A
IEC start current (Ist)	60mA		60mA	0.005A		0.005A	0.005A
IEC transition current (Itr)	1.5A		1.5A	0.25A		0.25A	0.25A
ACCURACY							
Active energy	Class 1	Class B (EN50470-3)	Class B (EN50470-3)	Class 0.5s DMED305T2 Class 1 DMED310T2	Class B (EN50470-3)	Class 0.5s	Class B (EN50470-3)
TARIFF CIRCUIT INPUT							
Rated voltage (Uc)	100...240VAC		—	100...240VAC			
Voltage range	85...264VAC		—	85...264VAC			
Frequency	50/60Hz		—	50/60Hz			
Maximum power consumption	0.9VA		—	0.25VA			
Maximum power dissipation	0.6W		—	0.18W			
LED							
Pulse rate	1000 pulses/kWh (2000 pulses/kWh DMED311...)		2000 pulses/kWh	1000 pulses/kWh			
Pulse duration	30ms						
STATIC OUTPUTS							
Pulse rate	1-10-100-1000 pulses/kWh programmable (except DMED311/302)		1-10-100 pulses/kWh	0,1-1-10-100 pulses/kWh programmable		—	—
Pulse duration	100ms for 1-10-100 pulses (except DMED311/302) 60ms for 1000 pulses (except DMED311/302)		100ms	100ms		—	—
External voltage	10...30VDC (except DMED311/302)		10...30VDC	10...30VDC		—	—
Maximum current	50mA (except DMED311/302)					—	—
INSULATION							
IEC rated insulation voltage Ui	250VAC (300VAC DMED311...)		300VAC	250VAC			
IEC rated impulse withstand voltage Uimp	6kV						
IEC power frequency withstand voltage	4kV						
SUPPLY/MEASURMENT CIRCUIT CONNECTIONS							
Type of terminals	Fixed			Fixed			
Conductor section (min...max)	2.5...16mm² (16...6AWG)			0.2...4mm² (24...12AWG) for supply/voltage measurement; 0.2...2.5mm² (24...12AWG) for current measurement			
Maximum tightening torque	2Nm (14lb.in)		3Nm (26.5lb.in)	0.8Nm (7lb.in)			
TARIFF CONTROL CIRCUIT CONNECTIONS							
Type of terminals	Fixed			Fixed			
Conductor section (min...max)	0.2...2.5mm² (24...12AWG)			0.2...4mm² (24...12AWG)			
Maximum tightening torque	0.49Nm (4.4lb.in)			0.8Nm (7lb.in)			
CONNECTIONS (PULSE OUTPUT/RS485)							
Type of terminals	Fixed			Fixed			
Conductor section (min...max)	0.2...1.3mm² (24...16AWG)			0.2...2.5mm² (24...12AWG)			
Maximum tightening torque	0.15Nm (1.7lb.in)			0.44Nm (4lb.in)			
AMBIENT CONDITIONS							
Operating temperature	-25...+55°C (MID7: -25...+70°C)						
Storage temperature	-25...+70°C						
Relative humidity	<80% non condensing						
Maximum pollution degree	2		2	2		2	
Mechanical environment	Class M1		Class M1	Class M1		Class M1	
Magnetic environment	Class E2		Class E2	Class E2		Class E2	
HOUSING							
Material	Polyamide						

TYPE	DMECD
AUXILIARY SUPPLY	
Rated voltage (Us)	100...240VAC/110...250VDC
Voltage range	85...264VAC/93.5...300VDC
Rated frequency	50/60Hz
Maximum power consumption	8.8VA
Maximum power dissipation	3.6W
ENERGY METER INPUTS	
Number of inputs	8
Input separations	1 common for every 2 inputs (insulated between each pair 500VRMS)
Type of input	Negative (NPN)
Maximum voltage at inputs	15VDC
Maximum input current	18mA (15mA typical)
High input signal	≥7.6V
Low input signal	≤2V
Maximum frequency	2000Hz
TARIFF CONTROL CIRCUIT	
Rated voltage (Uc)	100...240VAC/110VDC
Voltage range	85...264VAC/93.5...140VDC
Frequency	50/60Hz
Maximum power consumption	0.25VA
Maximum power dissipation	0.18W
RS485 SERIAL INTERFACE	
Baud-rate	Programmable 1200...38400bps
Insulation	1500VAC towards energy meter inputs. Double insulation towards supply and tariff inputs
INSULATION	
IEC rated insulation voltage Ui	250VAC
IEC rated impulse withstand voltage Uimp	6.5kV
IEC power frequency withstand voltage	3.6kV
SUPPLY CIRCUIT CONNECTIONS	
Type of terminals	Fixed
Conductor section (min...max)	0.2...4mm^2 (24...12AWG)
Maximum tightening torque	0.8Nm (7lb.in)
TARIFF INPUT CIRCUIT CONNECTIONS	
Type of terminals	Fixed
Conductor section (min...max)	0.2...4mm^2 (24...12AWG)
Maximum tightening torque	0.8Nm (7lb.in)
RS485 CONNECTION	
Type of terminals	Fixed
Conductor section (min...max)	0.2...4mm^2 (24...12AWG)
Maximum tightening torque	0.8Nm (7lb.in)
ENERGY METER INPUT CONNECTIONS	
Type of terminals	Fixed
Conductor section (min...max)	0.2...2.5mm^2 (24...12AWG)
Maximum tightening torque	0.44Nm (4lb.in)
AMBIENT CONDITIONS	
Operating temperature	-20...+60°C
Storage temperature	-30...+80°C
Relative humidity	<90%
Maximum pollution degree	2
HOUSING	
Material	Polyamide

TYPE	DMG100 - DMG110❶	DMG200	DMG210	DMG300	
AUXILIARY SUPPLY					
Rated voltage Us	100...240VAC/ 110...250VDC				
Voltage range	85...264VAC/ 93.5...300VDC				
Frequency range	45...66Hz, 360...440Hz				
Maximum power consumption	3.5VA	3.5VA	4.5VA	3.2VA	
Maximum power dissipation	1.2W	1.2W	1.7W	1.3W	
Microbreaking immunity	≥50ms	≥50ms	≥50ms	≥50ms	
VOLTAGE INPUTS					
Type of input	Three-phase + neutral				
Maximum rated voltage Ue	690VAC phase-phase (400VAC phase-neutral)				
Measurement range	20...830VAC phase-phase (10...480VAC phase-neutral)				
Frequency range	45...66Hz, 360...440Hz				
Method of measurement	True RMS				
Method of connection	Single, two, three-phase with or without neutral, balanced three-phase systems				
CURRENT INPUTS					
Rated current Ie	1A/5A	5A	5A	1A/5A	
Current reading through Rogowski coils	–	–	–	–	
Measurement range	0.025...1.2A / 0.025...6A	0.01...6A	0.01...6A	0.01...1.2A / 0.01...6A	
Method of measurement	True RMS				
Overload capacity	+20% Ie through external CT with 5A secondary				
Overload peak	50A for 1s				
INSULATION					
IEC rated insulation voltage Ui	690VAC				
IEC rated impulse withstand voltage Uimp	9.5kV				
IEC power frequency withstand voltage	5.2kV				
SUPPLY CIRCUIT/VOLTAGE MEASUREMENT CONNECTIONS					
Type of terminal	Fixed				
Conductor section (min...max)	0.2...4.0mm^2 (24...12AWG)				
Maximum tightening torque	0.8Nm (7lb.in)				
CURRENT MEASUREMENT CIRCUIT AND RS485❶					
Type of terminal	Fixed				
Conductor section (min...max)	0.2...2.5mm^2 (24...12AWG)				
Maximum tightening torque	0.44Nm (4lb.in)				
AMBIENT CONDITIONS					
Operating temperature	-20...+60°C				
Storage temperature	-30...+80°C				
Relative humidity	<90%				
Maximum pollution degree	2				
Measurement class	III				
HOUSING					
Material	Polyamide				

❶ RS485 communication port for DMG110, DMG210, DMG610 and DMG611 only.

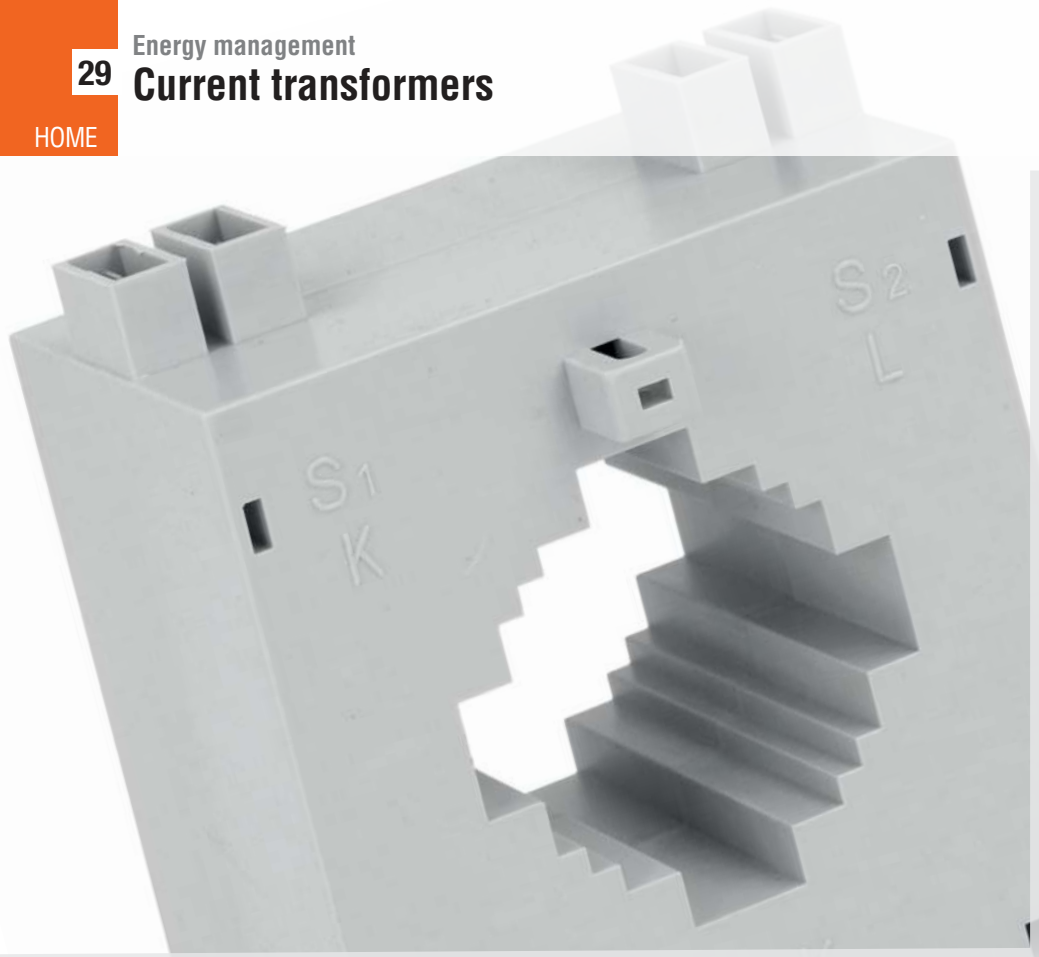
	DMG6...	DMG7000	DMG7500	DMG8000	DMG9000
	100...440VAC 120...250VDC	100...240VAC 120...250VDC			100...240VAC 120...250VDC 12-48VDC (DMG9000D048)
	90...484VAC 93.5...300VDC	90...264VAC 93.5...300VDC			90...264VAC 93.5...300VDC 9...70VDC (DMG9000D048)
	45...66Hz, 360...440Hz	45...66Hz, 360...440Hz			
	9.5VA	15VA			
	3.5W	6W			
	≥50ms	≥50ms			
	Three-phase + neutral	Three-phase + neutral			
	600VAC phase-phase (300VAC phase-neutral)	600VAC phase-phase (300VAC phase-neutral)			
	50...720VAC phase-phase (30...360VAC phase-neutral)	50...720VAC phase-phase (30...360VAC phase-neutral)			
	45...66Hz, 360...440Hz	45...66Hz, 360...440Hz			
	True RMS	True RMS			
	Single, two, three-phase with or without neutral, balanced three-phase systems				
	1A/5A	1A/5A			
	20...6300A (for DMG611...)	–			
	0.025...6A	0.004...6A			
	True RMS	True RMS			
	+20% Ie by external CT with 5A secondary				
	50A for 1s				
	600VAC	600VAC			
	9.5kV	9.5kV			
	5.2kV	5.2kV			
	Removable				
	0.2...2.5mm^2 (24...12AWG)				
	0.5Nm (4.5lb.in)				
	Fixed	Removable			
	0.2...1.5mm^2 (24...12AWG)	0.2...2.5mm^2 (24...12AWG)			
	0.8Nm (7lb.in)	0.5Nm (4.5lb.in)			
	-20...+60°C				
	-30...+80°C				
	<90%				
	2				
	III				
	Polyamide				

TYPE		DMK10R1 DMK70R1	DMK11R1 DMK71R1	DMK15R1 DMK75R1	DMK16R1
AUXILIARY SUPPLY					
Rated voltage Us		220...240VAC			
Operating voltage range		0.85...1.1 Us			
Rated frequency		50...60Hz ±10%			
Maximum power consumption		3.6VA	3.6VA	3.6VA	3.9VA
Maximum power dissipation		1.8W	1.8W	1.8W	2.1W
VOLTAGE INPUTS					
Rated voltage Ue	phase-phase	600VAC	—	600VAC	600VAC
	phase-neutral	347VAC	—	347VAC	347VAC
Operating voltage range	phase-phase	15...660VAC	—	35...660VAC	35...660VAC
	phase-neutral	10...382VAC	—	20...382VAC	20...382VAC
Rated frequency		50...60Hz ±10%	—	50...60Hz ±10%	50...60Hz ±10%
Method of measuring		True RMS	—	True RMS	True RMS
CURRENT INPUTS					
Rated current Ie		—	5A	5A	5A
Measuring range		—	0.05...6A	0.05...5.75A	0.05...5.75A
Rated frequency		—	50...60Hz ±10%	50...60Hz ±10%	50...60Hz ±10%
Type of input		—	Shunts connected by external low voltage CT 5A max		
Type of measuring		—	True RMS	True RMS	True RMS
Overload capacity		—	+20% Ie	+20% Ie	+20% Ie
MEASURING ACCURACY					
Measurement conditions (Temperature +23°C ±1°C) (Relative humidity 45 ±15% R.H.)	voltage	±0.25% f.s. ±1 digit	—	±0.25% f.s. ±1 digit	±0.25% f.s. ±1 digit
	current	—	±0.5% f.s. ±1 digit	±0.5% f.s. ±1 digit	±0.5% f.s. ±1 digit
	power	—	—	1% f.s. ±1 digit	1% f.s. ±1 digit
	energy	—	—	—	Class 2
	frequency	—	—	±1 digit	±1 digit
RELAY OUTPUT					
Number and type of contact		1 changeover	1 changeover	1 changeover❶	1 changeover
Rated voltage		250VAC	250VAC	250VAC	250VAC
IEC/EN/BS 60947-5-1 designation		AC1 8A 250VAC / B300	AC1 8A 250VAC / B300	AC1 8A 250VAC / B300	AC1 8A 250VAC / B300
Electrical life (ops.)		10^5	10^5	10^5	10^5
Mechanical life (ops.)		$30x10^6$	$30x10^6$	$30x10^6$	$30x10^6$
INSULATION					
Rated insulation voltage Ui		600VAC	415VAC	600VAC	600VAC
CONNECTIONS					
Type of terminals		Removable (DMK1...); fixed (DMK7...)			
Maximum tightening torque		0.5Nm (4.5lb.in) for DMK1...; 0.8Nm (7lb.in) for DMK7...			
Conductor section (min...max)		0.2...2.5mm² (24...12AWG) for DMK0... 0.2...4.0mm² (24...12AWG) for DMK7...			
AMBIENT CONDITIONS					
Operating temperature		-20...+60°C	-20...+60°C	-20...+60°C	-20...+60°C
Storage temperature		-30...+80°C	-30...+80°C	-30...+80°C	-30...+80°C
HOUSING					
Material		Thermoplastic (DMK1...) / Polyamide (DMK7...)			

❶ One contact NO for DMK75R1.

TYPE		DMK00R1 DMK80R1	DMK01R1 DMK81R1	DMK02
AUXILIARY SUPPLY				
Rated voltage Us		220...240VAC		
Operating voltage range		0.85...1.1 Us		
Rated frequency		50...60Hz ±10%		
Maximum power consumption		3.6VA		
Maximum power dissipation		1.8W		
VOLTAGE INPUTS				
Rated voltage Ue		600VAC	—	600VAC
Operating voltage range		15...660VAC	—	15...660VAC
Operating voltage range, phase-phase		—	—	—
Rated frequency		50...60Hz ±10%	—	50...60Hz ±10%
Method of measuring		TRMS	—	TRMS
CURRENT INPUTS				
Rated current Ie		—	5A	5A
Measuring range		—	0.05...5.75A	0.05...5.75A
Rated frequency		—	50...60Hz ±10%	50...60Hz ±10%
Type of input		—	Shunts connected by external low voltage CT 5A max	
Type of measuring		—	True RMS	True RMS
Overload capacity		—	+20% Ie	+20% Ie
MEASURING ACCURACY				
Measurement conditions (Temperature +23°C ±1°C) (Relative humidity 45 ±15% R.H.)	cosφ	—	—	—
	voltage	±0.25% f.s. ±1 digit	—	±0.25% f.s. ±1 digit
	current	—	±0.5% f.s. ±1 digit	±0.5% f.s. ±1 digit
	frequency	—	—	—
ADDITIONAL ERRORS				
Relative humidity		±1 digit 60%...90% R.H..		
Temperature		±1 digit -20...+60°C		
RELAY OUTPUT FOR DMK... R1 TYPES ONLY				
Number and type of contact		1 changeover		
Rated voltage		250VAC		
IEC/EN/BS 60947-5-1 designation		AC1 8A 250VAC / B300		
Electrical life (ops.)		10^5		
Mechanical life (ops.)		$30x10^6$		
INSULATION				
Rated insulation voltage Ui		600VAC	415VAC	600VAC
CONNECTIONS				
Type of terminals		Fixed (DMK8...); Removable (DMK0...)		
Maximum tightening torque		0.8Nm (7lb.in) for DMK0... / 0.5Nm (4.5lb.in) for DMK8...		
Conductor section (min...max)		0.2...2.5mm² (24...12AWG) for DMK0... 0.2...4.0mm² (24...12AWG) for DMK8...		
AMBIENT CONDITIONS				
Operating temperature		-20...+60°C		
Storage temperature		-30...+80°C		
HOUSING				
Material		Thermoplastic (DMK0...) / Polyamide (DMK8...)		

Current transformers



- Primary current: 5...4000A
- Secondary current: 5A
- Solid and split-core types
- Instrument and accuracy versions
- Wound primary CT for low currents
- Busbar versions.

Current transformers — **Sec. - Page**

Wound primary type ..... 29 - 2
Solid-core ..... 29 - 2
Accuracy solid-core ..... 29 - 4
Current transformer kit with UTF certificates ..... 29 - 5
Compact prewired split-core ..... 29 - 6
Split-core ..... 29 - 7

Dimensions ..... **29 - 8**

Page 29-2

WOUND PRIMARY CURRENT TRANSFORMERS
- Primary current 5...30A
- Secondary current 5A
- Screw terminals.

Page 29-2

SOLID-CORE CURRENT TRANSFORMERS
- Primary current 40...4000A
- Secondary current 5A
- Busbar versions.

Page 29-4

ACCURACY SOLID-CORE CURRENT TRANSFORMERS
- Primary current 60...3000A
- Secondary current 5A
- Accuracy class 0.5s.

Page 29-5

CURRENT TRANSFORMER KIT WITH UTF CERTIFICATES
- Primary current 60...3000A
- Secondary current 5A
- Kit consisting of 3 transformers and related UTF certificates (Finance Technical Office).

Page 29-6

COMPACT PREWIRED SPLIT-CORE CURRENT TRANSFORMERS
- Primary current 100...600A
- Secondary current 5A
- Compact dimensions
- Cable supplied as standard, length 2m.

Page 29-7

SPLIT-CORE CURRENT TRANSFORMERS
- Primary current 100...4000A
- Secondary current 5A.

Wound primary type

DM0TW...

Order code	Primary current Ipn	Burden cl. 0.5	Burden cl. 1	Burden cl. 3	Qty per pkg	Wt
	/5 [A]	[VA]	[VA]	[VA]	n°	[kg]
Screw primary terminals.						
DM0TW0005	5	1.5	2.5	–	1	0.525
DM0TW0010	10	1.5	2.5	–	1	0.525
DM0TW0020	20	1.5	2.5	–	1	0.525
DM0TW0030	30	1.5	2.5	–	1	0.525

Solid-core

DM0T...

Order code	Primary current Ipn	Burden cl. 0.5	Burden cl. 1	Burden cl. 3	Qty per pkg	Wt
	/5 [A]	[VA]	[VA]	[VA]	n°	[kg]
For Ø22mm/0.87" cable.						
DM0T0040	40	—	—	1.25	1	0.200
DM0T0050	50	—	1.25	—	1	0.200
DM0T0060	60	—	1.5	—	1	0.200
DM0T0080	80	—	1.5	—	1	0.200
DM0T0100	100	—	1.5	—	1	0.200
DM0T0150	150	—	2	—	1	0.200

DM2T...

Order code	Primary current Ipn	Burden cl. 0.5	Burden cl. 1	Qty per pkg.	Wt
	/5 [A]	[VA]	[VA]	n°	[kg]
For Ø23mm/0.90" cable. For 30x10mm/1.18x0.39", 25x12.5mm/0.98x0.49", 20x15mm/0.79x0.59" busbars, width 52mm/2.05".					
DM2T0100	100	—	1	1	0.130
DM2T0150	150	—	1.5	1	0.130
DM2T0200	200	—	2	1	0.130
DM2T0250	250	—	2.5	1	0.130
DM2T0300	300	1.5	3	1	0.130
DM2T0400	400	2	3	1	0.130

DM3T...

Order code	Primary current Ipn	Burden cl. 0.5	Burden cl. 1	Qty per pkg.	Wt
	/5 [A]	[VA]	[VA]	n°	[kg]
For Ø30mm/1.18" cable. For 40x10mm/1.57x0.39", 30x20mm/1.18x0.79", 25x25mm/0.98x0.98" busbars, width 71mm/2.79".					
DM3T0200	200	—	5	1	0.260
DM3T0250	250	—	5	1	0.260
DM3T0300	300	2.5	5	1	0.260
DM3T0400	400	2.5	5	1	0.260
DM3T0500	500	2.5	5	1	0.260
DM3T0600	600	5	10	1	0.260
DM3T0800	800	5	10	1	0.260

DM33...

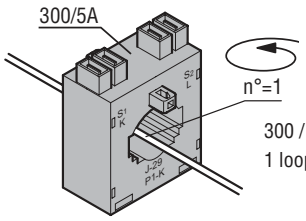
Order code	Primary current Ipn	Burden cl. 0.5	Burden cl. 1	Qty per pkg.	Wt
	/5 [A]	[VA]	[VA]	n°	[kg]
For Ø44mm/1.73" cable. For 51x41mm/2.01x1.61", 61x31mm/2.40x1.22" busbars, width 95mm/3.74".					
DM33T0800	800	5	10	1	0.476
DM33T1000	1000	5	15	1	0.476
DM33T1200	1200	5	15	1	0.476

DM34...

Order code	Primary current Ipn	Burden cl. 0.5	Burden cl. 1	Qty per pkg.	Wt
	/5 [A]	[VA]	[VA]	n°	[kg]
For Ø44mm/1.73" cable. For 69x10mm/2.72x0.39", 50x30mm/1.97x1.18" busbars, width 95mm/3.74".					
DM34T1500	1500	5	15	1	0.476
DM34T1600	1600	5	15	1	0.476

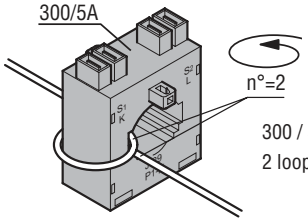
General characteristics

The current transformers (CTs) in the DM series are installed in an electrical system to reduce the line current to a secondary value of 5A compatible with the ammeter inputs of the digital multimeters or protection relays.
DM0TW... are instrument transformers in class 1/0.5 wound primary type and are normally used for low primary current values starting from 5A.
DM... are instrument transformers in class 1/0.5 without a primary winding and are normally used for high primary current values starting from 40A.
The number of loops of the primary cable does not modify the accuracy but converts the primary current value proportional to secondary current.



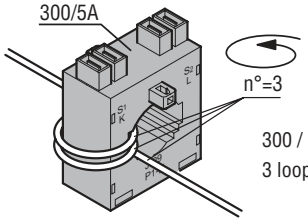
300 / 5A standard
1 loop = 300 / 5A

300:n/5A
300:1/5A=300/5A



300 / 5A
2 loops = 150 / 5A

300:n/5A
300:2/5A=150/5A



300 / 5A
3 loops = 100 / 5A

300:n/5A
300:3/5A=100/5A

Operational characteristics

- Operating frequency: 50...60Hz
- Secondary output current: 5A
- Overload withstand: 120% Ipn
- IEC rated insulation voltage Ui: 720V
- IEC rated short-time thermal current Ith: 40...60 Ipn for 1 second
- IEC rated dynamic current Idyn: 2.5 Ith for 1 second
- Insulation (dry type): Class E
- Terminals:
  - Faston for DM2T... and DM3T... types
  - Screw for DM0T..., DM33T and DN34T... types
- Sealable terminal covers for DM33T..., DM34T... types
- Fixing on 35mm DIN rail (IEC/EN/BS 60715) or by screws (fixing elements standard supplied with the product)
- EN degree of protection: IP30
- Ambient conditions:
  - Operating temperature: -25...+50°C
  - Storage temperature: -40...+80°C
  - Relative humidity, non condensing: 90%.

Certifications and compliance

Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 61869-2, IEC/EN/BS 61869-1.

Solid-core

DM35T...

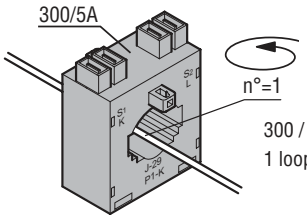
DM37...

DM4T...

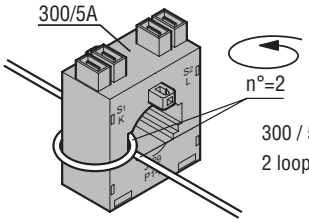
Order code	Primary current Ipn	Burden cl. 0.5	Burden cl. 1	Qty per pkg	Wt
	/5 [A]	[VA]	[VA]	n°	[kg]
For Ø66mm/2.60" cable. For 80x12,5mm/3.15"x0.49", 60x30mm/2.36x1.18", 50x50mm/1.97x1.97" busbars, width 105mm/4.13".					
DM35T0400	400	—	5	1	0.460
DM35T0500	500	5	5	1	0.460
DM35T0600	600	5	10	1	0.460
DM35T0800	800	10	15	1	0.460
DM35T1000	1000	15	20	1	0.460
DM35T1250	1250	15	20	1	0.460
For 101x56mm/3.98x2.20" busbars, width 128mm/5.04".					
DM37T2000	2000	10	15	1	1.000
DM37T2250	2250	10	15	1	1.000
DM37T2500	2500	10	15	1	1.000
DM37T3000	3000	10	15	1	1.000
For Ø86mm/3.38" cable. For 100x30mm/3.94x1.18", 80x50mm/3.15x1,97", 70x60mm/2.75x2.36" busbars, width 140mm/5.51".					
DM4T1000	1000	10	20	1	0.700
DM4T1250	1250	15	30	1	0.760
DM4T1500	1500	20	30	1	0.760
DM4T1600	1600	20	30	1	0.800
DM4T2000	2000	30	45	1	0.840
DM4T2500	2500	35	45	1	0.900
DM4T3000	3000	45	45	1	0.900
DM4T3500	3500	50	50	1	0.900
DM4T4000	4000	50	50	1	0.900

General characteristics

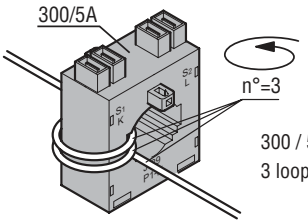
The current transformers (CTs) in the DM series are installed in an electrical system to reduce the line current to a secondary value of 5A compatible with the ammeter inputs of the digital multimeters or protection relays.
DM... are instrument transformers in class 1/0.5 without a primary winding and are normally used for high primary current values starting from 50A.
The number of loops of the primary cable does not modify the accuracy but converts the primary current value proportional to secondary current.



300:n/5A
300:1/5A=300/5A



300:n/5A
300:2/5A=150/5A



300:n/5A
300:3/5A=100/5A

Operational characteristics

- Operating frequency: 50...60Hz
- Secondary output current: 5A
- Overload withstand: 120% Ipn
- IEC rated insulation voltage Ui: 720V
- IEC rated short-time thermal current Ith: 40...60 Ipn for 1 second
- IEC rated dynamic current Idyn: 2.5 Ith for 1 second
- Insulation (dry type): Class E
- Terminals:
  - Screw for DM35T..., DM37T... and DM4T... types
- Sealable terminal covers only for DM35T... and DM4T... types
- Fixing on 35mm DIN rail (IEC/EN/BS 60715) or by screws (fixing elements standard supplied with the product)
- EN degree of protection: IP30
- Ambient conditions:
  - Operating temperature: -25...+50°C
  - Storage temperature: -40...+80°C
  - Relative humidity, non condensing: 90%.

Certifications and compliance

Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 61869-2, IEC/EN/BS 61869-1.

Accuracy solid-core

DM1TP...

DM3TP...

DM4TP...

DM5TP...

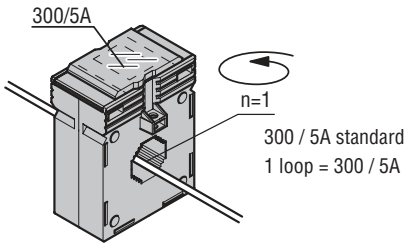
Version with UTF certificates.
See page 29-5.

Order code	Primary current Ipn	Burden cl. 0.5s	Burden cl. 0.5	Qty oer pkg	Weight
	/5 [A]	[VA]	[VA]	n°	[kg]
For Ø28mm/1.10"❶ cable. For 30x10mm/1.18x0.39", 25x12.5mm/0.98x0.49", 20x20mm/0.79x0.79" busbar, width: 75mm/2.95".					
DM1TP0060	60	1.5	1.5	1	0.560
DM1TP0080	80	2.5	2.5	1	0.580
DM1TP0100	100	2.5	3.75	1	0.480
DM1TP0150	150	2.5	3.75	1	0.480
DM1TP0200	200	2.5	3.75	1	0.480
DM1TP0250	250	2.5	5	1	0.480
DM1TP0300	300	2.5	5	1	0.480
DM1TP0400	400	5	5	1	0.480
DM1TP0500	500	5	5	1	0.480
For Ø28mm/1.10"❶ cable. For 30x10mm/1.18x0.39", 25x20mm/0.98x0.79", 20x20mm/0.79x0.79" busbar, width: 75mm/2.95".					
DM1TP0600	600	2.5	5	1	0.480
For Ø52mm/2.04"❶ cable. For 60x20mm/2.36x0.79", 50x25mm/1.97x0.98" busbar, width: 101mm/3.98".					
DM3TP0500	500	3.75	5	1	0.700
DM3TP0600	600	5	10	1	0.700
DM3TP0800	800	5	10	1	0.700
DM3TP1000	1000	5	10	1	0.700
For Ø80mm/3.15"❶ cable. For 82x30mm/3.23x1.18" busbar, width: 128mm/5.04".					
DM4TP1200	1200	–	10	1	0.800
For Ø85.5mm/3.37"❶ cable. For 100x20mm/3.94x0.79", 80x45mm/3.15x1.77" busbar, width: 144mm/5.67".					
DM5TP1000	1000	5	10	1	0.900
DM5TP1250	1250	7.5	10	1	0.900
DM5TP1600	1600	7.5	10	1	0.900
DM5TP2000	2000	10	15	1	0.900
DM5TP2500	2500	10	15	1	0.900
DM5TP3000	3000	10	15	1	0.900

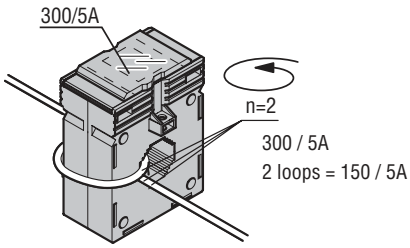
❶ Consult Technical support to inquiry about versions with Italian UTF certificates.

General characteristics

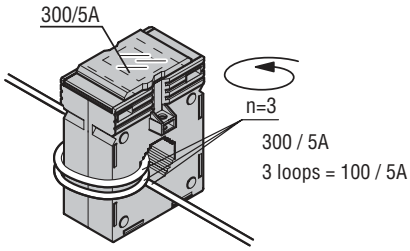
The DM...TP type accuracy current transformers (CTs) are installed in an electrical system to reduce the line current to a secondary value of 5A compatible with the ammeter inputs of the digital multimeters or protection relays.
DM...TP are accuracy current transformers in class 0.5s without a primary winding and are normally used for high primary current values starting from 60A.
The number of loops of the primary cable does not modify the accuracy but converts the primary current value proportional to secondary current.



300:n/5A
300:1/5A=300/5A



300:n/5A
300:3/5A=100/5A



300:n/5A
300:3/5A=100/5A

Operational characteristics

- Operating frequency: 50...60Hz
- Secondary output current: 5A
- Overload withstand: 120% Ipn
- IEC rated insulation voltage Ui: 720V
- IEC rated short-time thermal current Ith: 40...60 Ipn for 1 second
- IEC rated dynamic current Idyn: 2.5 Ith for 1 second
- Insulation (dry type): Class E
- Screw terminals
- Sealable terminal covers
- Fixing on 35mm DIN rail (IEC/EN/BS 60715) or by screws (fixing elements standard supplied with the product)
- EN degree of protection: IP30
- Ambient conditions:
  - Operating temperature: -25...+50°C
  - Storage temperature: -40...+80°C.
  - Relative humidity, non condensing: 90%.

Certifications and compliance

Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 61869-2, IEC/EN/BS 61869-1.

Current transformer kit with UTF certificates

DM...

Order code	Description of CTs included	Qty per pkg	Wt
		n°	[kg]
Kit comprising of three /5A and class 0.5s current transformers.			
DM1TP0060FKIT	3 DM1TP0060, complete with UTF certificate	1	1.440
DM1TP0080FKIT	3 DM1TP0080, complete with UTF certificate	1	1.440
DM1TP0100FKIT	3 DM1TP0100, complete with UTF certificate	1	1.560
DM1TP0150FKIT	3 DM1TP0150, complete with UTF certificate	1	1.680
DM1TP0200FKIT	3 DM1TP0200, complete with UTF certificate	1	1.620
DM1TP0250FKIT	3 DM1TP0250, complete with UTF certificate	1	1.620
DM1TP0300FKIT	3 DM1TP0300, complete with UTF certificate	1	1.680
DM1TP0400FKIT	3 DM1TP0400, complete with UTF certificate	1	1.680
DM1TP0600FKIT	3 DM1TP0600, complete with UTF certificate	1	1.680
DM3TP0500FKIT	3 DM3TP0500, complete with UTF certificate	1	2.160
DM3TP0600FKIT	3 DM3TP0600, complete with UTF certificate	1	2.160
DM3TP0800FKIT	3 DM3TP0800, complete with UTF certificate	1	2.280
DM4TP1200FKIT	3 DM4TP1200, complete with UTF certificate	1	2.280
DM5TP1000FKIT	3 DM5TP1000, complete with UTF certificate	1	2.820
DM5TP1250FKIT	3 DM5TP1250, complete with UTF certificate	1	2.760
DM5TP1600FKIT	3 DM5TP1600, complete with UTF certificate	1	2.880
DM5TP2000FKIT	3 DM5TP2000, complete with UTF certificate	1	2.940
DM5TP2500FKIT	3 DM5TP2500, complete with UTF certificate	1	3.120
DM5TP3000FKIT	3 DM5TP3000, complete with UTF certificate	1	2.940

System certificate

Order code	Description
DMCERTUTF	UTF system certificate

General characteristics

The UTF (Finance Technical Office) certification is required in Italy in case of applications where taxes have to be paid due to energy production (Italian regulations for plants >20kW). The certificates must be associated to the energy meter (MID version, see page 28-12 for selection) and to each single current transformer is needed.

The DM...TP type accuracy current transformers (CTs) can be provided in a kit version made by three CTs and relative UTF certificates.

If required, the fifth certificate relevant to the meter and current transformer combination can be supplied as well.

The DM...TP type accuracy current transformers (CTs) are installed in an electrical system to reduce the line current to a secondary value of 5A compatible with the ammeter inputs of the digital multimeters or protection relays.

DM...TP are accuracy current transformers in class 0.5s without a primary winding and are normally used for high primary current values starting from 60A.

The number of loops of the primary cable does not modify the accuracy but converts the primary current value proportional to secondary current (see page 29-4).

Operational characteristics

- Operating frequency: 50...60Hz
- Secondary output current: 5A
- Overload withstand: 120% Ipn
- Rated insulation voltage Ui: 720V
- Rated short time thermal current Ith: 40-60Ipn for 1 second
- Rated dynamic current Idyn: 2.5Ith for 1 second
- Insulation (dry type): class E
- Screw fixing terminals
- Sealable terminal covers
- Fixing on 35mm DIN rail (IEC/EN/BS 60715) or by screws (fixing elements standard supplied with the product)
- EN degree of protection: IP30.
- Ambient conditions
  - Operating temperature: -25...+50°C
  - Storage temperature: -40...+80°C.
  - Relative humidity, non condensing: 90%.

Compliance

Compliant with standards: IEC/EN/BS 61869-2, IEC/EN/BS 61869-1.

Compact prewired split-core

DM1TMA...

DM2TMA...

Order code	Primary current Ipn	Burden cl. 0.5	Burden cl. 1	Qty per pkg	Wt
	/5 [A]	[VA]	[VA]	n°	[kg]
24x24mm/0.94x0.94" hole. Cable supplied as standard, length 2m.					
DM1TMA0100	100	—	1.0	1	0.200
DM1TMA0150	150	—	1.0	1	0.200
DM1TMA0200	200	—	1.0	1	0.200
DM1TMA0250	250	—	1.0	1	0.200
36x38mm/1.42x1.50" hole. Cable supplied as standard, length 2m.					
DM2TMA0250	250	0.5	1.5	1	0.380
DM2TMA0300	300	0.5	1.5	1	0.380
DM2TMA0400	400	0.5	1.5	1	0.380
DM2TMA0500	500	0.5	1.5	1	0.380
DM2TMA0600	600	0.5	1.5	1	0.380

General characteristics

The DM...TMA type current transformers (CTs) are installed in an electrical system to reduce the line current to a secondary value of 5A compatible with the ammeter inputs of the digital multimeters or protection relays.
DM...TMA are instrument transformers in class 1 without a primary winding and are normally used for high primary current values starting from 100A.

Operational characteristics

- Operating frequency: 50...60Hz
- Secondary output current: 5A
- Overload withstand: 120% Ipn
- IEC rated insulation voltage Ui: 720V
- IEC rated short-time thermal current Ith: 40...60 Ipn for 1 second
- IEC rated dynamic current Idyn: 2.5 Ith for 1 second
- Cable supplied as standard, length 2m.
- Insulation (dry type): Class E
- Ambient conditions:
  - Operating temperature: -25...+50°C
  - Storage temperature: -40...+80°C
  - Relative humidity, non condensing: 90%.

Certifications and compliance

Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 61869-2, IEC/EN/BS 61869-1.

Split-core

DM1TA...

DM2TA...

DM3TA...

DM4TA...

Order code	Primary current Ipn	Burden cl. 0.5	Burden cl. 1	Burden cl. 3	Qty per pkg	Wt
	/5 [A]	[VA]	[VA]	[VA]	n°	[kg]
32x21mm/1.26x0.83" hole. Width: 89mm/3.50".						
DM0TA0100	100	—	—	1	1	0.900
DM0TA0150	150	—	1	2.5	1	0.900
DM0TA0200	200	—	2.5	—	1	0.900
50x80mm/1.97x3.15" hole. Width: 114mm/4.89".						
DM1TA0250	250	1	2		1	0.900
DM1TA0300	300	1.5	3		1	0.900
DM1TA0400	400	1.5	3		1	0.900
DM1TA0500	500	2.5	5		1	0.900
DM1TA0600	600	2.5	5		1	0.900
DM1TA0800	800	3	7.5		1	0.900
DM1TA1000	1000	5	10		1	0.900

Order code	Primary current Ipn	Burden cl. 0.5	Burden cl. 1	Qty per pkg	Wt
	/5 [A]	[VA]	[VA]	n°	[kg]
80x80mm/3.15x3.15" hole. Width: 142mm/5.59".					
DM2TA0250	250	1	2	1	1.050
DM2TA0300	300	1.5	3	1	1.050
DM2TA0400	400	1.5	3	1	1.050
DM2TA0500	500	2.5	5	1	1.050
DM2TA0600	600	2.5	5	1	1.050
DM2TA0800	800	3	7.5	1	1.050
DM2TA1000	1000	5	10	1	1.050
DM2TA1250	1250	—	15	1	1.050
80x120mm/3.15x4.72" hole. Width: 142mm/5.59".					
DM3TA0500	500	—	4	1	1.250
DM3TA0600	600	—	5	1	1.250
DM3TA0800	800	3	7.5	1	1.250
DM3TA1000	1000	5	10	1	1.250
DM3TA1250	1250	7.5	15	1	1.250
DM3TA1500	1500	8	17	1	1.250
DM3TA2000	2000	—	17	1	1.250
80x160mm/3.15x6.30" hole. Width: 184mm/7.24".					
DM4TA2000	2000	15	20	1	3.160
DM4TA2500	2500	15	20	1	3.340
DM4TA3000	3000	20	25	1	3.500
DM4TA4000	4000	20	25	1	3.760

General characteristics

The DM...TA type current transformers (CTs) are installed in an electrical system to reduce the line current to a secondary value of 5A compatible with the ammeter inputs of the digital multimeters or protection relays.
DM...TA are instrument transformers in class 0.5/1 without a primary winding and are normally used for high primary current values starting from 250A.

Operational characteristics

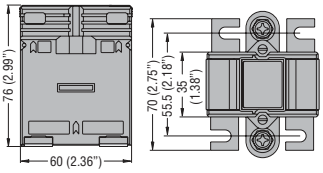
- Operating frequency: 50...60Hz
- Secondary output current: 5A
- Overload withstand: 120% Ipn
- IEC rated insulation voltage Ui: 720V
- IEC rated short-time thermal current Ith: 40...60 Ipn for 1 second
- IEC rated dynamic current Idyn: 2.5 Ith for 1 second
- Insulation (dry type): Class E
- Screw terminals
- Sealable terminal covers
- Screw fixing (fixing elements standard supplied with the product)
- IEC degree of protection: IP30
- Ambient conditions:
  - Operating temperature: -25...+50°C
  - Storage temperature: -40...+80°C
  - Relative humidity, non condensing: 90%.

Certifications and compliance

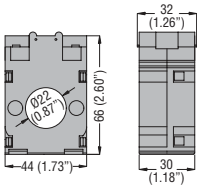
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 61869-2, IEC/EN/BS 61869-1.

CURRENT TRANSFORMERS

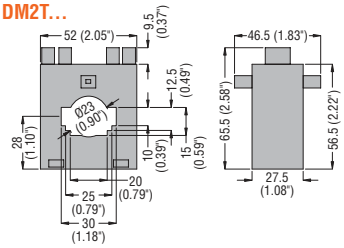
Wound primary **DM0TW...**



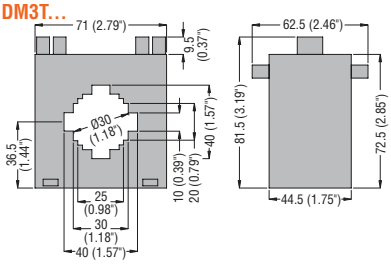
Solid core **DM0T...**



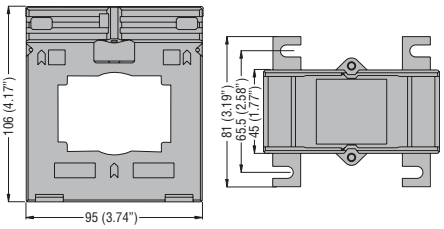
DM2T...



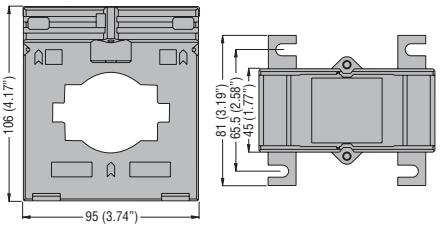
DM3T...



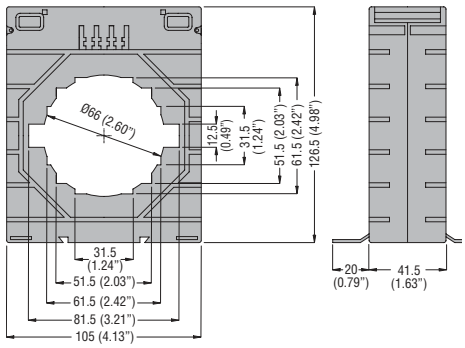
DM33T...



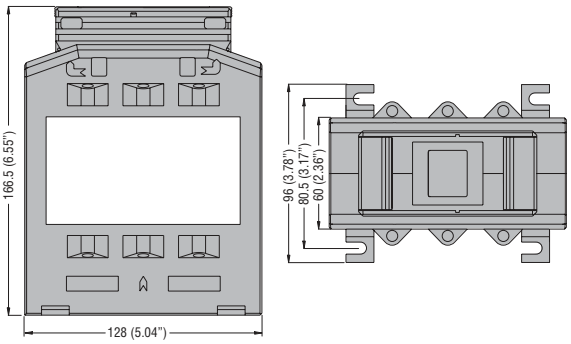
DM34T...



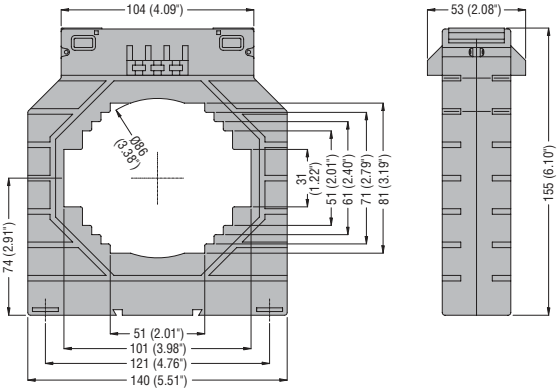
DM35T...



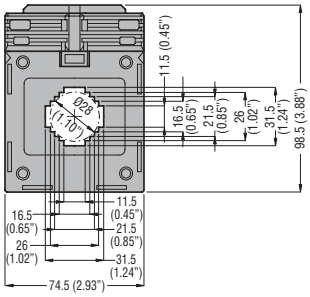
DM37T...



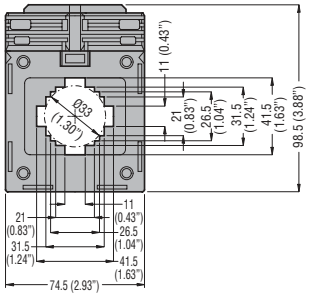
DM4T...

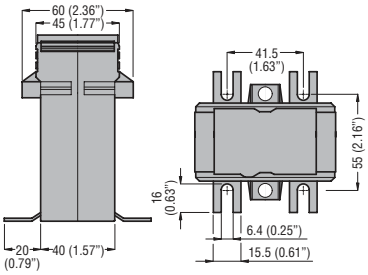


DM1TP0060... - DM1TP0300

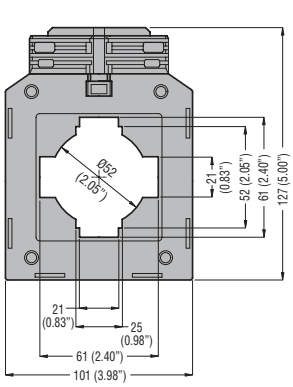


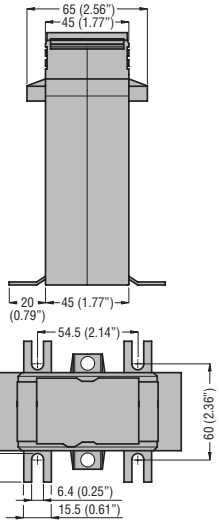
DM1TP0400... - DM1TP0600



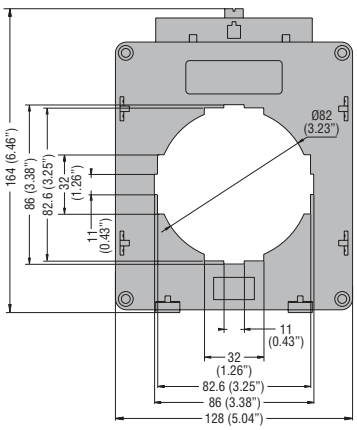


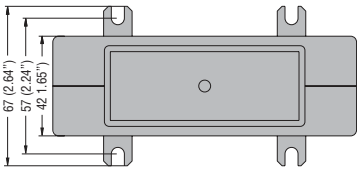
DM3TP...



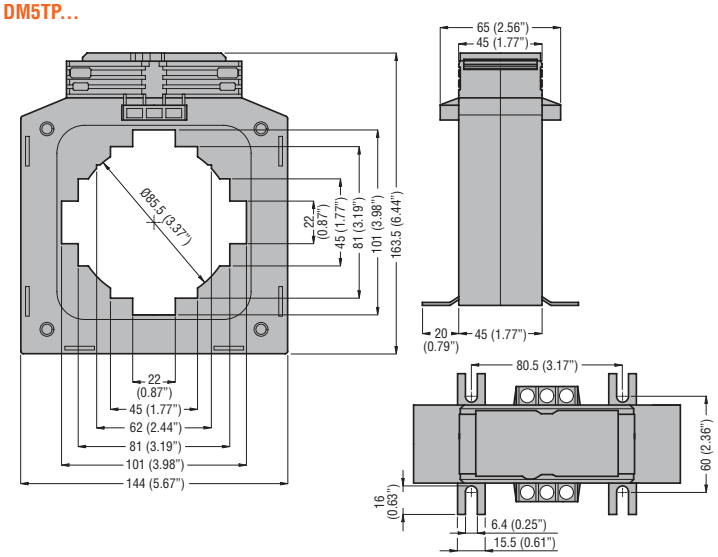


DM4TP1200



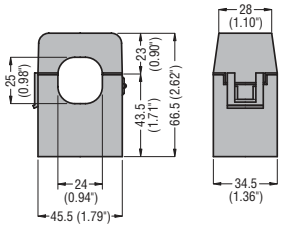


DM5TP...

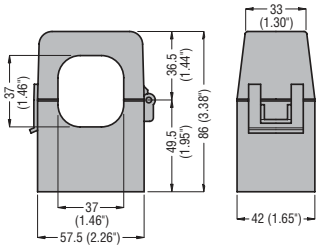


Compact prewired split-core

DM1TMA...

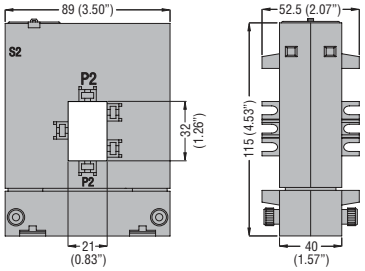


DM2TMA...

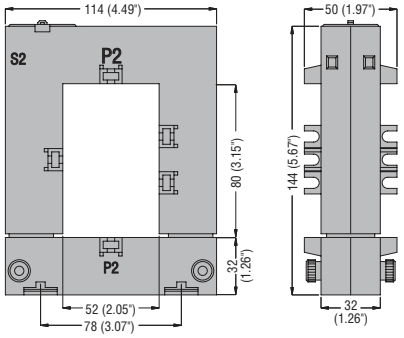


Split-core

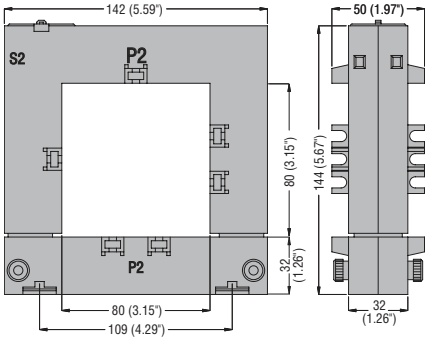
DM0TA...



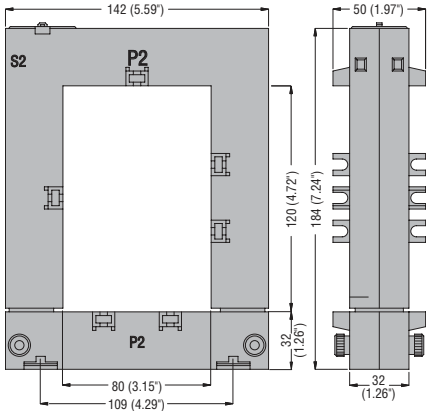
DM1TA...



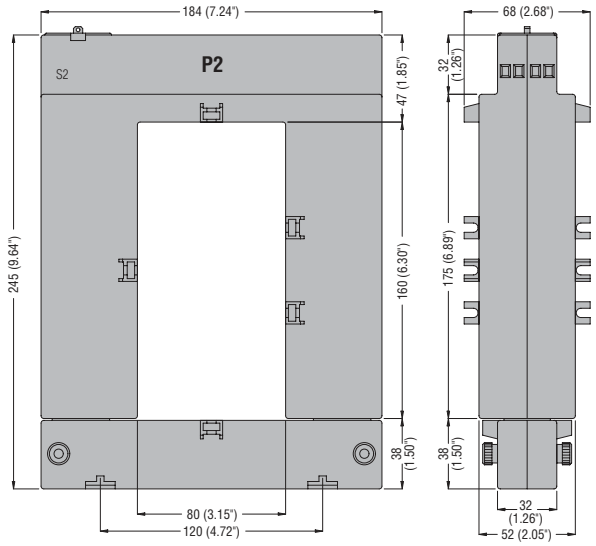
DM2TA...



DM3TA...



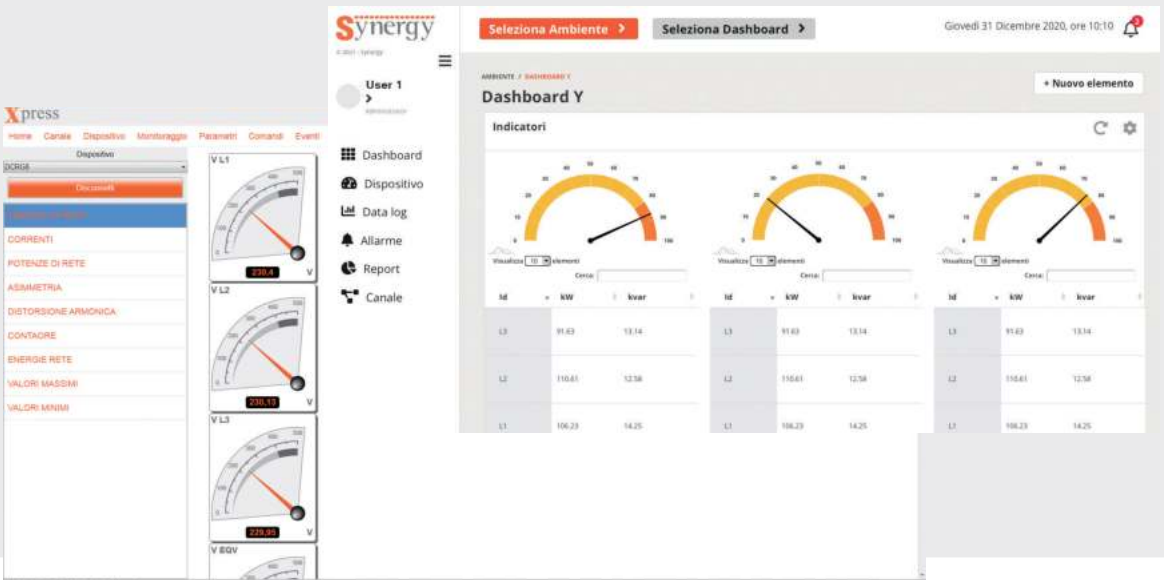
DM4TA...



Automatic power factor controllers and thyristor modules

- Microprocessor supervision and control
- Accurate TRMS measurement circuit
- Automatic intelligent adjustment system
- Versions from 2 to 24 steps and up to 32 with Master-Slave function
- Versions with static outputs
- Versions for capacitive reactive power factor correction
- Use in cogeneration and medium-voltage systems
- Basic controller functionalities can be extended using the EXP series of expansion modules
- USB, serial, Ethernet communication interfaces
- Modbus-RTU and ASCII communication protocols
- Thyristor modules for dynamic correction.

	Sec. - Page
Reactive current control relay	
DCRM series	30 - 8
Automatic power factor controllers	
DCRL series	30 - 9
DCRG series	30 - 10
Software	30 - 11
Communication devices, gateway data loggers, gateway, converter, GSM modem	30 - 12
Thyristor modules	**30 - 13**
Dimensions	**30 - 14**
Wiring diagrams	**30 - 15**
Technical characteristics	**30 - 17**



Page 30-8

DCRM SERIES

- Reactive current control relay
- Modular housing
- 2 steps
- Settings by front potentiometers
- 3 LED indications.

Page 30-9

DCRL SERIES (EXPANDABLE)

- Flush-mount housing: DCRL3 - DCRL5 (96x96mm/3.78x3.78") DCRL8 (144x144mm/5.67x5.67")
- 3/5/8 steps, expandable with EXP series modules (step increment, digital outputs, communication ports, etc.)
- Backlit icon LCD
- Ethernet communication interface (only for DCRL8)
- Alarm codes with scrolling texts, programmable in 6 languages (Italian, English, Spanish, French, German and Portuguese)
- Independent voltage measurement input
- Suitable for low and medium voltage systems
- Capacitor overload protection
- Internal panel temperature sensor
- Voltage and current harmonic-content measurement up to 15th order
- Front optical USB and Wi-Fi communication port for PC, smartphone and tablet connection
- Programmable alarms
- Protection via 2-level password to prevent all undesired access
- Compatible with Synergy and Synergy cloud, supervision and energy management software, Xpress configuration and remote control software and with the Sam1 application for Android/iOS.

Page 30-10

DCRG SERIES (EXPANDABLE)

- Flush-mount housing: DCRG8 - DCRG8F - DCRG8IND (144x144mm/5.67x5.67")
- 8 steps, expandable with EXP series modules (step increment, inputs and outputs, communication ports, GPRS/GSM modem, data memory, etc.) and with Master-Slave function
- 128x80 backlit graphic LCD, facilitating data reading even in poor lighting conditions and the display of system information clearly and intuitively
- Ethernet communication interface
- Texts in 10 languages: Italian, English, Spanish, French, German, Czech, Polish, Russian, Portuguese and one customisable
- Voltage measurement input independent from the supply input
- Suitable for low and medium voltage systems
- Capacitor overload protection
- Internal panel temperature sensor
- Voltage and current harmonic-content measurement up to 31st order
- Dynamic power factor correction (DCRG8F version).
- Power factor correction by single phase (SPPFC)
- Capacitive reactive power factor correction (DCRG8IND version)
- Front optical USB and Wi-Fi communication port for PC, smartphone and tablet connection
- Programmable alarms
- Protection via 2-level password to prevent any undesired access
- Calendar-clock with backup reserve energy
- Logging of up to 250 events
- Compatible with Synergy and Synergy cloud, supervision and energy management software, Xpress configuration and remote control software and with the Sam1 application for Android/iOS.

Page 30-13

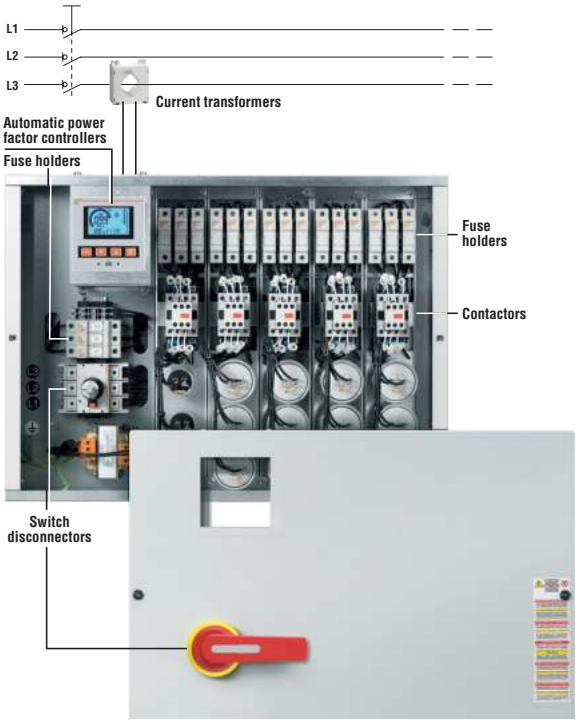
THYRISTOR MODULES DCTL SERIES

- Version for steps from 7.5kvar to 120kvar
- Version with rated voltage from 400 to 690VAC
- Suitable for dynamic power factor correction
- Zero-crossing controlled connection-disconnection
- Over-temperature protection
- Monitoring and protection of current, power and current harmonics of the capacitor bank
- NFC connectivity for parameter settings and programming of protection thresholds with APP NFC
- Optical port for programming and diagnostic with software Xpress and APP Sam1
- Optional RS485 port for the command and monitoring by DCRG8F controller.

Lovato electric

	DCRL3	**DCRL5**	**DCRL8**	**DCRG8 / DCRG8IND**	**DCRG8F**
Steps	3 relay steps (up to 6 with EXP1007)	5 relay steps (up to 8 with EXP1007)	8 relay steps (up to 14 with EXP1007)	8 relay steps (up to 18 relay outputs with EXP1006 and EXP1007) (up to 24 mixed relay and static outputs with EXP1001)	8 static steps (up to 24 static outputs with EXP1001) (up to 23 mixed relays and static outputs with EXP1006, EXP1007 and EXP1001)
ON FRONT/HOUSING					
Display	Backlit icon LCD			128x80 pixel backlit graphic LCD	
Languages	6 (scrolling text of alarm codes only) Italian, English, Spanish, French, German, Portuguese			10 Italian, English, Spanish, French, German, Czech, Polish, Russian, Portuguese and 1 customisable	
Dimensions	96x96mm/ 3.78x3.78”	96x96mm/ 3.78x3.78”	144x144mm/ 5.67x5.67”	144x144mm/ 5.67x5.67”	
Protection rating	IP54	IP54	IP65	IP65	
Expandable with EXP... modules	●			●	
CONTROL/FUNCTIONS					
Automatic recognition of current flow direction	●			●	
4-quadrant operation	●			●	
Master-Slave function				● (DCRG8 / DCRG8IND)	
Independent auxiliary supply input	●			●	
Three-phase voltage control				●	
Current inputs	1 (by 5A or 1A CTs)			3 (by 5A or 1A CTs)	
Dynamic (FAST) power factor correction				● with EXP1001 (maximum 16 static outputs)	●
Power factor correction by single phase				●	
Possibility of connecting inductive steps				● (DCRG8IND)	
Possibility of use in medium voltage	●			●	
Possibility of phase-neutral insertion on a three-phase system	●			●	
Analog inputs				● with EXP1004	
Analog outputs				● with EXP1005	
Input programmable as function or external temperature sensor				● with EXP1004	
USB communication interface	● with EXP1010			● with EXP1010	
RS232 communication interface	● with EXP1011			● with EXP1011	
Opto-isolated RS485 communication interface	● with EXP1012			● with EXP1012	
Ethernet communication interface	● with EXP1013 (only for DCRL8)			● with EXP1013	
Opto-isolated Profibus-DP interface				● with EXP1014	
GPRS/GSM modem				● with EXP1015	
Optical USB communication port on front	● with CX01			● with CX01	
Optical Wi-Fi communication port on front	● with CX02			● with CX02	
Fast setting of current transformer	●			●	
Compatible with Xpress configuration and remote control software	●			●	
Compatible with Synergy and Synergy Cloud, supervision and energy management software	●			●	
Compatible with Sam1 App	●			●	
Calendar-clock with backup reserve power				●	
Data logging memory				● with EXP1030	
Event logging: alarms, setup changes, etc.				●	
Customisable internal counters				●	

	DCRL3	DCRL5	DCRL8	DCRG8 / DCRG8IND	DCRG8F
MEASUREMENTS					
Rated measurement voltage	600VAC max			600VAC max	
Measurement voltage range	50...720VAC			50...720VAC	
Instantaneous cosφ	●			●	
Instantaneous and average weekly power factor values	●			●	
Voltage and current	●			●	
Reactive power to reach set-point and total values	●			●	
Capacitor overload	●			●	
Electrical panel temperature	●			●	
Maximum voltage and current value	●			●	
Maximum capacitor overload value	●			●	
Maximum panel temperature value	●			●	
Maximum capacitor temperature value				● with EXP1004 and EXP1016	
Active and apparent power value				●	
Active, reactive, apparent energy				●	
Current and voltage harmonic analysis	● up to 15th			● up to 31st	
Var-measured value for each step	●			●	
Number of switches for each step	●			●	
PROTECTIONS					
Voltage too high and too low	●			●	
Current too high and too low	●			●	
Over compensation (capacitors disconnected and cosφ higher than set-point)	●			●	
Under compensation (capacitors connected and cosφ lower than set-point)	●			●	
Capacitor overload	●			●	
Capacitor overload on all 3 phases				●	
Over temperature	●			●	
Mains micro-breaking	●			●	
Capacitor bank failure	●			●	
Exceeding switching limits	●			●	
Exceeding of maximum harmonic distortion level limit	●			●	
Programmable alarm property (enable, trip delay, relay energising, etc.)	●			●	
Capacitor protection				● with EXP1016	



ESSENTIAL AND PERFORMANCE TOO!
DCRL3 - DCRL5

OPTICAL COMMUNICATION PORT

The optical port on the front permits communication with PCs, smartphones and tablets through the USB and Wi-Fi standards for carrying out programming, diagnostics and data download without disconnecting power to the electrical panel.

CX01

CX02

USER INTERFACE

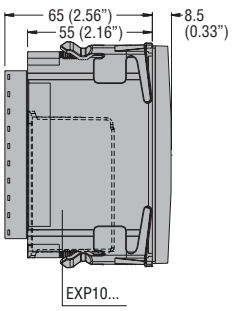
The backlit icon LCD ensures excellent legibility as well as the texts for the display of measurements and description of alarms. The 4 navigation buttons are for settings and functions.

AN EXPANSION SLOT FOR EXP... SERIES MODULES

EXPANDABLE UP TO 8 STEPS

COMPACT SIZE

The space taken by the housing does not increase (96x96x73mm / 3.78x3.78x2.87") even with the expansion module fitted.



FIXING SYSTEM

The fixing system with clips is simple, with a press to click into place and push to ensure retention over time.
Correct application of the standard seal and clips in the panel ensures a front **IP54** protection degree.

EXPANDABILITY

Basic controller functionality can be extended easily using the EXP series expansion modules:
– digital outputs
– relay outputs to increase number of steps
– opto-isolated USB interface
– opto-isolated RS232 interface
– opto-isolated RS485 interface.

MAX 1

SOFTWARE COMPATIBILITY

- Sarm1 Application for Android and iOS
- Xpress for configuration and remote control
- Synergy and Synergy Cloud for supervision and energy management.

CHARACTERISTICS OF THE DCRL SERIES

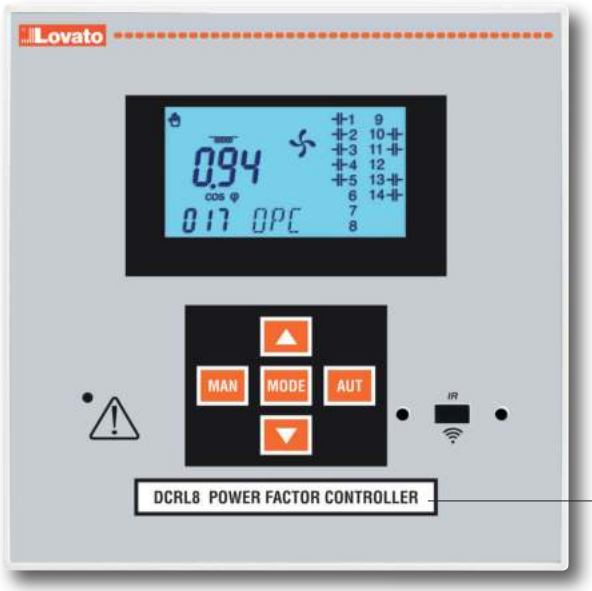
– **WIDE RANGE OF VOLTAGE MEASUREMENTS**
The wide measurement range between 50...720VAC L-L and between 50...415VAC L-N allows the controllers to be used in most applications.

– **SUITABLE FOR LOW- AND MEDIUM-VOLTAGE SYSTEMS**
The controllers can be used in medium-voltage systems thanks to the ability to set a voltage transformer ratio, obtaining measurements regarding the transformer primary value both for adjustment and for the display.

– **ALARM MESSAGES IN 6 LANGUAGES**
The alarm texts can be displayed in Italian, English, French, German, Portuguese and Spanish.

– **DEFECTIVE STEP**
The DCRL measures the percentage of residual power for each step, comparing it with the value set in the main menu.
The defective step alarm is generated if this value is below the set limit.

DCRL8



USER INTERFACE
The backlit icon LCD ensures excellent legibility as well as the texts for the display of measurements and description of alarms. The 5 navigation buttons are for settings and functions, while an LED indicates the alarms and the optical port for communication via USB and Wi-Fi.

EXPANDABLE UP TO 14 STEPS

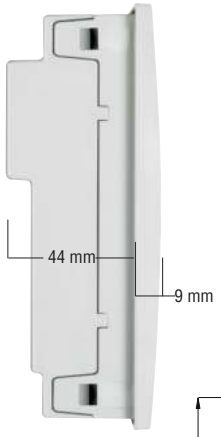
OPTICAL COMMUNICATION PORT
The optical port on the front permits communication with PCs, smartphones and tablets through the USB and Wi-Fi standards for carrying out programming, diagnostics and data download without disconnecting power to the electrical panel.

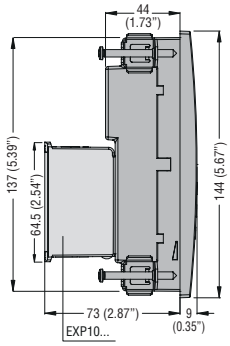
TWO EXPANSION SLOTS FOR EXP... SERIES MODULES

ETHERNET COMMUNICATION INTERFACE
By using the expansion module EXP1013.

CUSTOMISATION
An insert for labels customised with text, logos, codes, etc. is available, to be fixed onto the controller frames.

COMPACT SIZE
Reduced profile and depth simplify installation of the power factor controller even in very compact electrical panels.
The total depth of the controller is 73mm (2.87") inside the panel with the expansion modules installed.





FIXING SYSTEM
The fixing system **with metal screws** guarantees excellent, lasting retention over time.

HIGH PROTECTION RATING
The front of the controller and seal have been designed to ensure a front protection rating of **IP65**.

EXPANDABILITY
Basic controller functionality can be extended easily using the EXP series expansion modules:
– relay outputs to increase number of steps
– digital outputs
– opto-isolated RS232 interface
– opto-isolated RS485 interface
– opto-isolated ETHERNET interface.

MAX 2

SOFTWARE COMPATIBILITY
- Sam1 Application for Android and iOS
- Xpress for configuration and remote control
- Synergy and Synergy Cloud for supervision and energy management.

CHARACTERISTICS OF THE DCRL SERIES

– **5A OR 1A IN THE SAME CONTROLLER**
A parameter setting can easily allow to use 5A or 1A secondary current transformers.

– **WHITE BACKLIT DISPLAY**
It can be programmed to flash during alarm conditions.

– **HARMONIC ANALYSIS**
It includes voltage and current THD measurements and single harmonic measurement up to the 15th order and they can be shown on the display.

– **MAINTENANCE INTERVALS**
There are 2 counters: one to count the operating hours of the steps and the other for the number of interventions of each step. An alarm threshold can be set for both counters.

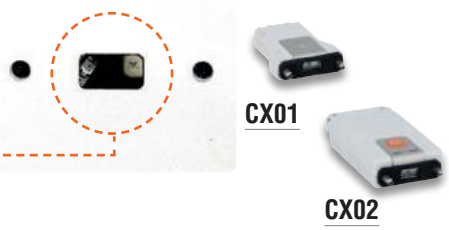
– **BUILT-IN TEMPERATURE SENSOR**
The internal temperature of the controller is monitored constantly by the built-in sensor.
The user can program the thresholds to activate and stop the cooling fan and/or generate the temperature alarm.

THE SOLUTION FOR ALL APPLICATIONS!
DCRG8

BACKLIT GRAPHIC LCD
High-legibility 128x80 pixels, with adjustable brightness.

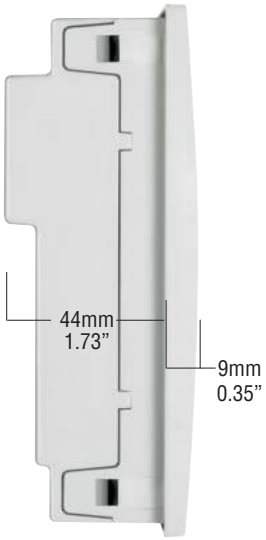
3 VERSIONS AVAILABLE:
- DCRG8: for traditional power factor correction with contactors or dynamic (fast) power factor correction with EXP1001
- DCRG8F: for dynamic (fast) power factor correction
- DCRG8IND: for capacitive reactive power factor correction.

OPTICAL COMMUNICATION PORT
The optical port on the front permits communication with PCs, smartphones and tablets through the USB and Wi-Fi standards for carrying out programming, diagnostics and data download without disconnecting power to the electrical panel.

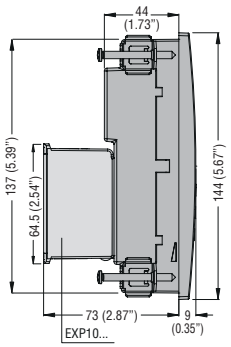


CUSTOMISATION
There is a customisation slot available on the front panel for the description of the controller by adding texts, logos, codes, etc.

COMPACT SIZE



Slim frame profile and reduced total depth simplify installation of the controller also in very compact electric panels.



FIXING SYSTEM

The fixing system with **metal screws** guarantees excellent retention over time.

HIGH PROTECTION DEGREE
The controller front and the rear seal have been designed to warrant an **IP54** protection degree.

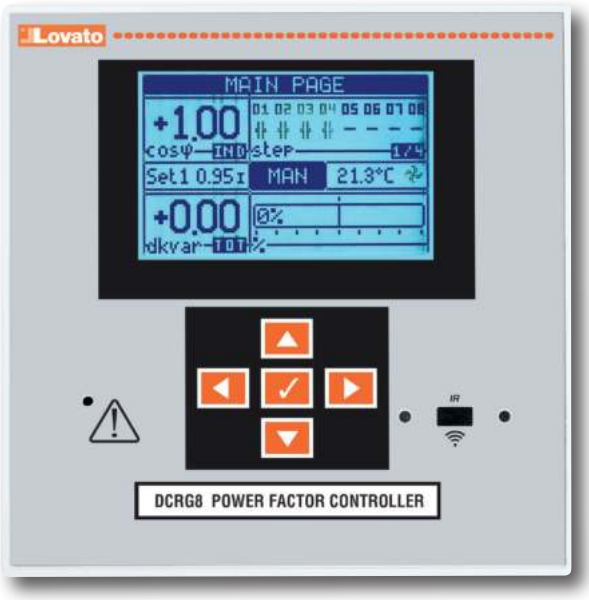
EXPANDABILITY

Basic controller functionality can be extended easily using the EXP series expansion modules:
- Relay outputs to increase the number of steps
- Opto-isolated static outputs (also for dynamic correction)
- Capacitor protection
- Digital and analog inputs and outputs
- Expandable up to 24 mixed outputs
- Opto-isolated RS232 interface
- Opto-isolated RS485 interface
- Opto-isolated ETHERNET interface
- Opto-isolated Profibus-DP interface
- GPRS/GSM modem
- Data memory, calendar-clock with backup reserve power for data logging.

SOFTWARE COMPATIBILITY
- Sam1 Application for Android and iOS
- Xpress for configuration and remote control
- Synergy and Synergy Cloud for supervision and energy management.

Automatic power factor controllers and thyristor modules

DCRG series

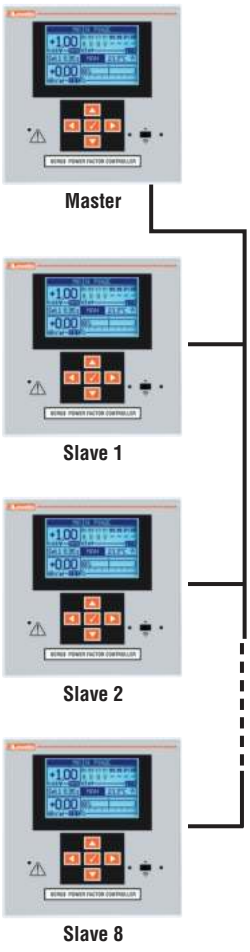


- SUITABLE FOR POWER FACTOR CORRECTION USING CONTACTORS AND THYRISTOR MODULES (WITH DCRG8F MODEL OR DCRG8 + EXP1001)
- INDEPENDENT POWER FACTOR CORRECTION FOR EACH SINGLE PHASE
- CAPACITIVE REACTIVE POWER FACTOR CORRECTION VIA INDUCTIVE STEP MANAGEMENT (WITH DCRG8IND MODEL)
- SMS SENDING FOR ALARM TRIGGERING
- DATA SENDING BY EMAIL OR FTP SERVER
- STREAMLINE DESIGN

  The DCRG controller has an ergonomic design and, at the same time, particular care has been given to details.

MASTER-SLAVE FUNCTION

The DCRG controller can control the outputs of other compatible controllers in addition to its own steps. In this way, it offers a **Master-Slave** architecture.
Up to 8 slaves can be controlled to create a system with a maximum of 32 steps.



CAPACITOR PROTECTION

By adding the dedicated EXP1016 expansion module, the DCRG controller can be equipped with additional capacitor protection functions. The module can measure the harmonic current values and the capacitor temperature on-site as well as detecting malfunction on any phase.

3 CURRENT INPUTS

- **Independent power factor correction** for each single phase
- Analysis of all electrical measurements in the system (multimeter).

WIDE RANGE OF RATED VOLTAGE MEASUREMENTS

The wide measurement range between 100...600VAC allows the controller to be used in most applications.

GSM/GPRS MODEM

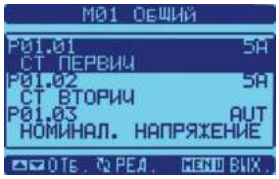
With the EXP1015 expansion module, the controller is equipped with a GSM/GPRS modem, which it is automatically configured. This simplifies installation and wiring. Once a data-enabled SIM card is inserted, the controller can send alarm or event SMS and **e-mails** and data files can be transmitted to FTP servers.

5A AND 1A BOTH IN THE SAME CONTROLLER

By configuring a specific parameter, the controller can be enabled for use with either a 5A or 1A secondary current transformer.

GRAPHS AND TEXTS IN 10 LANGUAGES

Display of waveforms, graphs and texts in 10 languages: Italian, English, Spanish, French, German, Czech, Polish, Russian, Portuguese and one customisable.



SUITABLE FOR MEDIUM-VOLTAGE SYSTEMS

The controller can be used in medium-voltage systems thanks to the ability to set a voltage transformer ratio, obtaining measurements regarding the transformer primary value both for adjustment and for the display.

DYNAMIC (FAST) POWER FACTOR CORRECTION

Thyristor-based dynamic power factor correction systems are necessary where the reactive load varies rapidly over time. DCRG8F has 8 built-in static outputs, while DCRG8 + EXP1001, by taking advantage of the built-in relay outputs as well, realizes a mixed traditional (relay) and dynamic system.

INDEPENDENT POWER FACTOR CORRECTION FOR EACH SINGLE PHASE (SPPFC)

In highly unbalanced three-phase systems, power factor correction by single phase can be implemented. The DCRG controller can monitor the cosφ of each single phase and correct through the joint use of single- and three-phase capacitor banks.

CAPACITIVE REACTIVE POWER FACTOR CORRECTION (DCRG8IND).

The DCRG8IND version can connect both capacitors and inductors to achieve the desired cosφ should it be necessary to correct the capacitive reactive power factor as well.

DCRM series

DCRM2

Order code	Steps	Auxiliary supply voltage	Qty per pkg	Wt
	n°	[V]	n°	[kg]
Single and three-phase low-voltage systems.				
DCRM2	2	380...415VAC	1	0.284

General characteristics
The DCRM allows the reactive current of a system to be controlled.
It allows to reach the best cosφ value possible, reducing the request for reactive current from the mains.
It can control the connection of two capacitor banks.
Each one can be individually enabled and its power can be set through a dedicated trimmer.
It is also possible to adjust the time for connection and disconnection of the capacitors, thereby modifying the reaction speed of the system.
The controller can be used both in single-phase and three-phase wiring.

Operational characteristics
- Auxiliary supply voltage:
  - 380...415VAC standard
  - 220...240VAC and 440...480VAC on request
- Rated frequency: 50/60Hz
- 80...528VAC voltage measurement input
- Current measurement input:
  - By CT /5A
  - Measuring range: 0.1...6A
  - Measurement type: true root mean square (TRMS)
  - Automatic identification of CT connection polarity (straight / inverted)
- Relay outputs:
  - 2 relays (steps), each with 1 changeover contact
  - Rated current: 8A 250VAC (AC1)
  - Individual enablement of control of the two relays
- Modular DIN 43880 housing (3 modules)
- IEC degree of protection: IP40 on front (if placed in IP40 housing and/or electrical panel), IP20 terminals.

ADJUSTMENTS

“C/K Step 1”	C/K ratio step 1 (0.15...2)
“C/K Step 2”	C/K ratio step 2 (0.15...2)
“Connection delay”	Step connection delay 1...60s
“Disconnection delay”	Step disconnection delay 0.1...60s
“System configuration”	Single- or three-phase wiring selection.

INDICATIONS
- 1 green LED for power on and inhibition time
- 2 red LEDs for relay connection.

Certifications and compliance
Certifications obained: UL Listed, for USA and Canada (File E93601), as Auxiliary Devices-Modular ampere monitoring relays (with 415VAC maximum only); EAC.
Compliant with standards: IEC/EN/BS 60255-5, IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL508, CSA C22.2 n°14.

DCRL series

DCRL3 - DCRL5

DCRL8

EXP8000

EXP10...

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Single and three-phase low and medium-voltage systems.			
DCRL3	3 steps, expandable up to 6 steps, 100...440VAC	1	0.340
DCRL5	5 steps, expandable up to 8 steps, 100...440VAC	1	0.340
DCRL8	8 steps, expandable up to 14 steps, 100...440VAC	1	0.640
Accessory.			
EXP8000	Plastic insert for customisation label (only for DCRL3 and DCRL5)	10	0.050

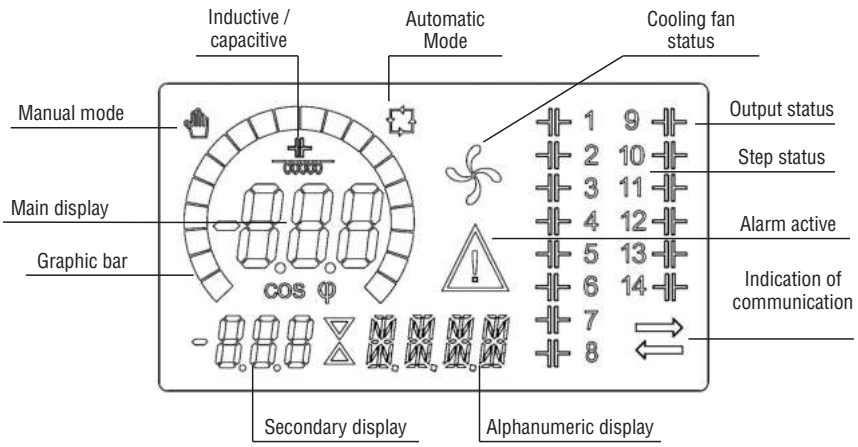
Order code	Description
EXPANSION MODULES. Additional steps.	
EXP1006	2 relay outputs to increase number of power factor correction steps
EXP1007	3 relay outputs to increase number of power factor correction steps
Inputs and outputs.	
EXP1003	2 relay outputs 5A 250VAC
Communication ports.	
EXP1010	Opto-isolated USB interface
EXP1011	Opto-isolated RS232 interface
EXP1012	Opto-isolated RS485 interface
EXP1013	Opto-isolated ETHERNET interface (only for DCRL8)

Snap-in fixing of EXP... expansion modules

DCRL3 - DCRL5 with 1 module

DCRL8 with 2 modules

Backlit icon LCD



General characteristics

The DCRL series has been developed with advanced functionality and produced with a dedicated ultra-compact housing. It combines modern front design with practical mounting and expandability (EXP... modules).
Its main features are:
- Backlit icon LCD with excellent information display
- Alarm codes with scrolling texts, programmable in 6 languages (Italian, English, Spanish, French, German and Portuguese)
- Connection in single or three phase lines and co-generation systems with 4-quadrant operation
- Voltage measurement input independent from the supply and which can be used in medium-voltage lines with VTs
- Drastic reduction of the the number of switching operations
- Balanced use of steps with same power rating
- Measurement of reactive power installed for each step
- Capacitor over-current protection
- Panel over-temperature protection via internal sensor
- Accurate micro-breaking protection
- Vast choice of measurements available, including voltage and current THD with single harmonic analysis up to the 15th order
- Wide voltage measurement range
- High accuracy of true root mean square (TRMS) measurements
- Front optical USB (CX01 dongle) and Wi-Fi (CX02 dongle) communication port for PC, smartphone and tablet connection
- Compatible with Ethernet communication modules EXP1013 (only for DCRL8)
- Compatible with Synergy and Synergy Cloud supervision and energy management software, Xpress configuration and remote control software and with the Sam1 application for Android/iOS
- Customisation with label on front (only for DCRL8).

Operational characteristics
- Supply:
  - Auxiliary voltage: 100...440VAC
  - Frequency: 50/60Hz ±10%
- Voltage input:
  - Rated voltage: 600VAC L-L (346VAC L-N)
  - Frequency range: 45...65Hz
- Current input:
  - Single-phase connection
  - Rated current: 1A or 5A, configurable
- Measurements and control:
  - Power factor adjustment: 0.5ind....0.5cap.
  - Voltage measurement range: 50...720VAC L-L; 50...415VAC L-N
  - Current measurement range: 0.025...1.2A for 1A full scale; 0.025...6A for 5A full scale
  - Type of voltage and current measurement: true root mean square (TRMS)
- Relay outputs (steps):
  - DRCL3: 3 outputs
  - DCRL5: 5 outputs
  - DCRL8: 8 outputs
  - Contact arrangement: NO; the last is a changeover
  - Rated current: 5A 250VAC AC1
- Flush-mount housing:
  DCRL3, DCRL 5 (96x96mm / 3.78x3.78"); DCRL8 (144x144mm / 5.67x5.67")
- IEC degree of protection:
  DCRL3, DCRL5 IP54 and DCRL8 IP65 on front; IP20 on terminals for all.

Certifications and compliance:

Certifications obtained: UL Listing for USA and Canada (cULus - File E93601), as Auxiliary Devices - Power factor controllers, EAC, RCM.
Compliant with standards: IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61010-2-030, IEC/EN/BS 61000-6-3 (only for DCRL8), IEC/EN/BS 61000-6-4 (only for DCRL3-5), UL 508, CSA C22.2 n°14.

Contactors for power factor correction

See section 2, page 2-18.

Software Synergy , Synergy Cloud , Xpress and Sam1

See section 36.

EXP expansion modules

See section 35.

Automatic power factor controllers and thyristor modules

Automatic power factor controllers

DCRG series

DCRG8

EXP10...

Snap-in fixing of 4 EXP... expansion modules
DCRG8 / DCRG8F / DCRG8IND

Order code	Description	Qty per pkg	Wt
		n°	[kg]
DCRG8	8 relay steps, expandable up to 24 steps, 100...415VAC	1	0.980
DCRG8F	8 static steps, expandable up to 24 steps, 100...415VAC	1	0.980
DCRG8IND	8 relay steps, expandable up to 24 steps, 100...415VAC, for capacitive reactive power factor correction	1	0.980
Accessories.			
NTC01	Remote temperature sensor, length 3m/3.3yd	1	0.150

Order code	Description
EXPANSION MODULES Additional steps.	
EXP1006	2 relay outputs to increase number of power factor correction steps
EXP1007	3 relay outputs to increase number of power factor correction steps
Inputs and outputs.	
EXP1000	4 opto-isolated digital inputs
EXP1001	4 opto-isolated static outputs to increase number of static steps
EXP1002	2 digital inputs and 2 opto-isolated static outputs
EXP1003	2 relay outputs 5A 250VAC
EXP1004	2 PT100 opto-isolated analogue inputs, either 0/4...20mA, 0...10V or 0...±5V
EXP1005	2 opto-isolated analogue inputs 0/4...20mA, 0...10V or 0...±5V
EXP1008	2 opto-isolated digital inputs and 2 relay outputs 5A 250VAC
EXP1016	Capacitor protection with 2 inputs for temperature measurement with NTC sensors and 2 three-phase measurement inputs
Communication ports.	
EXP1010	Opto-isolated USB interface
EXP1011	Opto-isolated RS232 interface
EXP1012	Opto-isolated RS485 interface
EXP1013	Opto-isolated ETHERNET interface
EXP1014	Opto-isolated Profibus-DP interface
EXP1015	GPRS/GSM modem❶, without antenna
Other functions.	
EXP1030	Data memory, calendar-clock with backup reserve power for data logging

❶ For configuration via software, contact our Technical support.

Maximum expandability DCRG8 / DCRG8IND / DCRG8F

		EXP1006	EXP1007	EXP1001	TOTAL STEPS	
		Module with 2 relay outputs	Module with 3 relay outputs	Module with 4 static outputs		
Controller	Steps	no. of modules	no. of modules	no. of modules	Relay	Static
DCRG8 / DCRG8IND	8	4 (2 steps)	–	–	16	–
	8	2 (2 steps)	max 2 (3 steps)	–	18	–
	8	–	–	max 4 (4 steps)	8	16
DCRG8F	8	4 (2 steps)	–	–	8	8
	8	2 (2 steps)	max 2 (3 steps)	–	10	8
	8	–	–	max 4 (4 steps)	–	24

General characteristics
The DCRG automatic power factor controller meets the technical requirements of modern electrical systems in industry. It is designed to comply and has the option to extend its functionality by using specific EXP series expansion modules. Mention should also be made of the optical communication port as standard, for programming the controller, diagnostics and data download.
The backlit graphic LCD facilitates data reading even in poor lighting conditions and permits the display of system information clearly and intuitively.
Its main features are:
- 128x80-pixel backlit graphic LCD with texts in 10 languages: Italian, English, Spanish, French, German, Czech, Polish, Russian, Portuguese and one customisable
- Connection in single and three-phase lines as well as three-phase lines with neutral control and cogeneration systems (4 quadrants)
- Capacitive reactive power factor correction (DCRG8IND only)
- Independent power factor correction for each single phase (SPPFC only for DCRG8 / DCRG8IND)
- Suitable for dynamic power factor correction with DCRG8F or DCRG8 + EXP1001
- Control of thyristor modules type DCTL... with static outputs or RS485 connection with DCRG8F controller
- Use with medium-voltage lines with VTs (DCRG8 / DCRG8IND only)
- Capability for correct operation even in systems characterised by high harmonic content
- Drastic reduction in the number of switching operations
- Balanced use of steps with same power rating
- Measurement of reactive power installed for each step
- Recording of the number of connections for each step
- Capacitor over-current protection on all three phases
- Panel over-temperature protection via internal sensor and external sensor
- Accurate micro-breaking protection
- Current and voltage harmonic analysis
- Quick CT programming function
- USB (CX01 dongle) and Wi-Fi (CX02 dongle) communication port for PC, smartphone and tablet connection
- Modbus-RTU TCP and ASCII communication protocol
- Compatible with Synergy and Synergy Cloud supervision and energy management software, Xpress configuration and remote control software and with the Sam1 application for Android/iOS
- Sending and reception of SMS, sending of e-mails with alarm diagnosis and data files, FTP Client function (with EXP1015 module).

Operational characteristics
- Voltage measurement circuit:
  - Auxiliary supply voltage: 100...415VAC
  - Rated frequency: 50/60Hz (±10%)
- Current measurement circuit:
  - Single and three-phase input
  - Rated current: 5A (1A programmable)
- Measurements and control:
  - Power factor adjustment: 0.5ind....0.5cap.
  - Voltage measurement range: 50...720VAC
  - Current measurement range: 0.025...6A
  - Temperature measurement range: -30...+85°C
  - Capacitor overload current measurement range: 0...250%
  - Type of voltage and current measurement: true root mean square (TRMS)
- Relay outputs:
  - 7 each with NO contact and the last as changeover
  - Rated current: 5A 250VAC AC1
- Flush-mount housing (144x144mm / 5.67x5.67")
- IEC degree of protection: IP65 on front; IP20 on terminals.

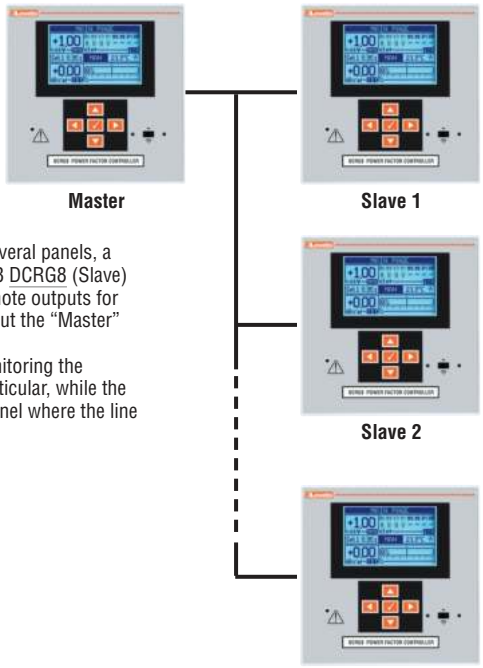
Certifications and compliance
Certifications obtained: UL Listing for USA and Canada (cULus - File E93601), as Auxiliary Devices - Electronic power factor regulator, RCM, EAC.
Compliant with standards: IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-4, UL508, CSA C22.2 n°14.

Contactors for power factor correction
See section 2, page 2-18.

Software Synergy , Synergy Cloud , Xpress and Sam1
See section 36.

EXP expansion modules
See section 35.

"Master-Slave" power factor correction system with DCRG8



When the correction system is divided into several panels, a DCRG8 (Master) controller can control up to 8 DCRG8 (Slave) controllers. The "Slave" controllers act as remote outputs for the connection of capacitor banks that carry out the "Master" controller's commands.
The single controllers are responsible for monitoring the electrical panel and the capacitor banks in particular, while the cosφ reading is centralised in the "Master" panel where the line arrives.

Software and APP

Xpress configuration and remote control software

Synergy Supervision and energy management software

Sam1 APP

General characteristics
By using the Xpress software, the quick setup of the controllers can be carried out via PC, avoiding parameter programming errors.
The parameter programming of a DCRL... or DCRG8... controller can also be saved on PC and quickly loaded into another device requiring the same programming.
It permits the following operations:
- System operation monitoring:
  - Graphical and numerical display of measurements
  - Controller status
- Capacitor efficiency control
  - Current kvar measurement for each step
  - Counters for the number of connections for each step
  - Total hour counter for connection time for each individual step
  - Access all setup parameters
  - Saving / loading parameters
  - Highlighting of changed values
  - Resetting to default values.

The Synergy software permits remote control and supervision of the DCRL... and DCRG8... controllers.
See section 36 for details.
This software has structures and applications based on MS SQL relational databases, and the data can be consulted using the most popular browsers.
It is a highly versatile system, simultaneously accessible to a large number of users/workstations via intranets, VPN or Internet.

APP for smartphone and tablet
The Sam1 application allows the user to program the controller, view alarms, send commands, read measurements, download statistical data and events and send retrieved data by e-mail. The connection is made by Wi-Fi with a smartphone or tablet using the CX02 device.
It is iOS and Android compatible.
For details, consult section 36 or our Technical support; see contact details on inside front cover.

Communication devices for DCRL and DCRG

CX01

CX02

CX03

Order code	Description	Qty per pkg	Wt
		n°	[kg]
CX01	USB connection device PC↔DCRL/DCRG with optical connector for programming, data download, diagnostics and firmware upgrade	1	0.090
CX02	Wi-Fi connection dongle PC↔DCRL/DCRG for data download, diagnostics and firmware upgrade, project upload/download and cloning	1	0.090
For DCRG8... type only.			
CX03	GSM penta-band antenna (850/900/1800/1900/2100MHz)	1	0.090

General characteristics
For general characteristics of these accessories see section 35.

Gateway data loggers

EXCGLB...

new

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCGLB01	Gateway data logger, 1 RS485 port, 1 Ethernet port, Wi-Fi connection	1	0.190
EXCGLB02	Gateway data logger, 1 RS485 port, 1 Ethernet port, LTE connection, GNSS (GPS)	1	0.190
EXCGLB03	Gateway data logger, 1 RS485 port, 2 Ethernet ports, 4G (LTE) connection	1	0.190

General characteristics
For general characteristics of these accessories see section 34.

Gateway

EXCM4G01

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCM4G01	4G Gateway with RS485 and Ethernet port, Modbus RTU/TCP protocol	1	0.300

General characteristics
For general characteristics of these accessories see section 34.

Converter

EXCCON02

new

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCCON02	RS485/Ethernet converter, 9...48VDC, with Modbus RTU/TCP protocol conversion functionality	1	0.400

General characteristics
For general characteristics of these accessories see section 34.

Remote control and monitoring GSM modem via SMS

Compliant with Italian CEI 0-16 Standard, paragraph 8.8.6.5 and annex M, resolution 421/2014 of the ARERA

EXCGSM01

Order code	Description	Qty per pkg	Wt
		n°	[kg]
GSM Modem (modular - 4U). IP69K outside aerial with 2.5 m cable. RJ45-USB programming cable (included).			
EXCGSM01	100...240VAC, 1 digital input, 1 analog input (0...10V, 0...20mA, NTC), 1 relay output, receiving and sending SMS messages for remote controls and alarm signals	1	0.340

General characteristics
For general characteristics of these accessories see section 34.

DCTL series

DCTL...

Order code	Step power	Qty per pkg	Wt
	[kvar]	n°	[kg]
Versions with rated voltage 400VAC.			
DCTLA4000075	7.5kvar at 400VAC step module	1	1.74
DCTLA4000150	15kvar at 400VAC step module	1	1.74
DCTLA4000300	30kvar at 400VAC step module	1	1.74
DCTLA4000500	50kvar at 400VAC step module	1	2.84
DCTLA4001000	100kvar at 400VAC step module	1	6.68
Versions with rated voltage 400...480VAC.			
DCTLA4800090	9kvar at 480VAC step module	1	1.74
DCTLA4800180	18kvar at 480VAC step module	1	1.74
DCTLA4800360	36kvar at 480VAC step module	1	1.74
DCTLA4800600	60kvar at 480VAC step module	1	2.84
DCTLA4801200	120kvar at 480VAC step module	1	6.68
Versions with rated voltage 600...690VAC IEC, 600VAC cULus.			
DCTLA6900300	30kvar at 690VAC step module	1	2.84
DCTLA6900500	50kvar at 690VAC step module	1	2.84
DCTLA6901000	100kvar at 690VAC step module	1	6.68

Accessories for DCTL

EXC1042

EXP8003

NTC01

EXA01

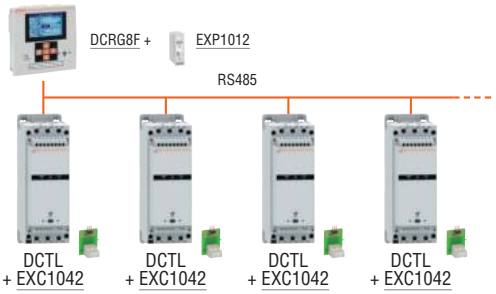
EXA02

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXC1042	RS485 communication board	1	0.020
EXP8003	DIN rail mount kit for DCTL up to 60kvar max	1	0.200
NTC01	Remote temperature sensor, 3m	1	0.150
CX01	USB connection dongle PC↔DCTL, for programming diagnostics and firmware update	1	0.090
CX02	Wi-Fi connection dongle PC↔DCTL, for programming, diagnostics and cloning	1	0.090
EXA01	Kit of 3 UL terminal lugs for DCTLA4001000, DCTLA4801200 and DCTLA6901000	1	0.141
EXA02	Kit of 3 terminal protection covers for DCTLA4001000, DCTLA4801200 and DCTLA6901000	1	0.125

Power connections with double lug clamps

The thyristor modules type DCTL up to 60kvar are provided with power connections with double lug clamps which allows to simplify the wiring, in particular when is necessary to connect more thyristor modules in parallel.

Connection to the automatic power factor controller type DCRG8F via RS485



Alternatively to the standard command from static outputs, the thyristor modules type DCTL can be connected to the automatic power factor controller type DCRG8F with the RS485 optional port (code EXC1042), obtaining a simple and linear wiring.
In this configuration, it is possible to monitor from the display of the DCRG8F controller the status and measures of each DCTL module such as step power, currents, harmonics, temperature, working hours, etc.

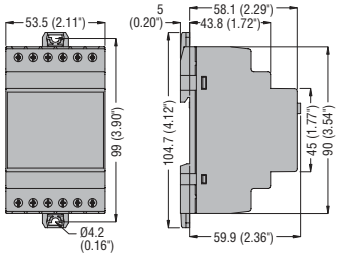
General characteristics
- Suitable for dynamic (fast) power factor correction
- Silent operation
- Zero-crossing switching
- Monitoring and protection of the current, power and current harmonics of the capacitor bank: thanks to the presence of integrated current transformers, it is possible to monitor and protect the capacitor bank against overcurrents caused by events like the distortion of the voltage waveform. It is also possible to monitor electrical measurements of the capacitor bank such as the residual power three-phase voltages and currents, temperatures, THDI, morning hours, etc...
- Over-temperature protection via built-in sensor and input for the optional external temperature sensor NTC01 for the measure of the temperature in the area of installation of the capacitors
- Ready to work without need of any programming when used with standard features
- NFC connectivity for parameter settings and programming of the protection thresholds (overtemperature, overcurrent, overvoltage,...) with the App Lovato NFC freely downloadable from Google Play Store and App Store
- Optical port for programming and diagnostic with software Xpress and App Sam1 ,connection with USB dongle (CX01) or Wi-Fi dongle (CX02)
- Command circuit made by 8...30VDC signal or dry contact (which allows to save the use of a power supply)
- Optional RS485 communication card (code EXC1042) for the command and monitoring from power factor controller type DCRG8F; from the display of DCRG8F is also possible to monitor the status and the measurements (temperature, power,...) of each DCTL
- 1 programmable relay output with changeover contact for the signalling of alarms or fan command
- Possibility to install the thyristor modules DCTL in both vertical and horizontal position without derating, thanks to the built-in fans
- Monitoring of the functioning of the fans with the analog measure of the current through integrated sensor, which allows to control the status of the fan and recognize automatically any fault like jamming or disconnection
- Power connections with double screw terminals (for sizes up to 60kvar), which simplify the wiring, in particular for the connection of more thyristor modules in parallel; it is also possible to decide to cable or not the central phase according to the layout of the power factor correction panel
- Panel fixing with screw or on DIN guide with the optional accessory EXP8003 (only for sizes up to 60kvar).

Operational characteristics
- Step power:
  - 7.5, 15, 30, 50 and 100kvar at 400VAC
  - 9, 18, 36, 60 and 120kvar at 480VAC
  - 30, 50 and 100kvar at 600...690VAC
- Rated operating voltage:
  - 400VAC (IEC and cULus) for version DCTLA400...
  - 400...480VAC (IEC and cULus) for version DCTLA480...
  - 600...690VAC (IEC), 600VAC (cULus) for version DCTLA690...
- Rated frequency 50/60Hz
- Auxiliary supply voltage: 100...240VAC ± 10%
- Command circuit: 8...30VDC or dry contact or RS485 connection from DCRG8F controller
- Controlled phases: 2
- Forced ventilation monitored from the control logic
- Operating temperature: -20...+45°C (up to 55°C with derating)

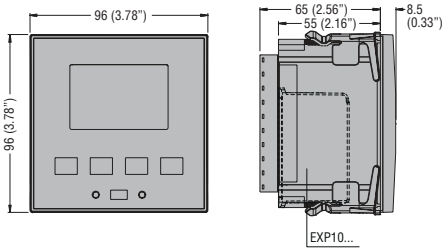
INDICATIONS
- LED POWER: presence of supply
- LED FAULT: alarm active (n° flashes = type of alarm)
- LED ON: command active.

Certifications and compliance:
Certifications obtained: cULus.
Compliant with standards: IEC/EN/BS 60947-4-3, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-4.

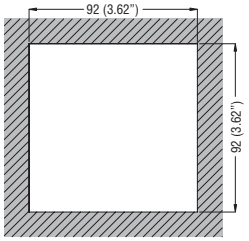
REACTIVE CURRENT CONTROL RELAY
DCRM2



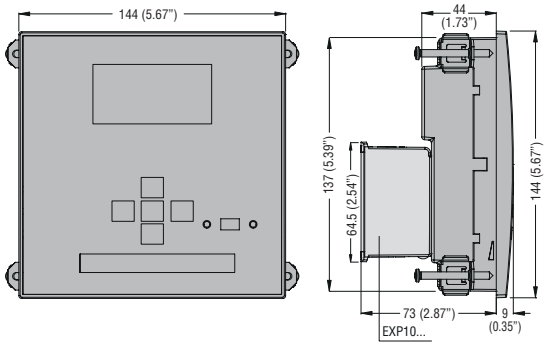
AUTOMATIC POWER FACTOR CONTROLLERS
DCRL3 - DCRL5



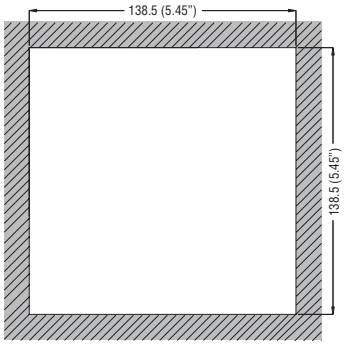
Cutout



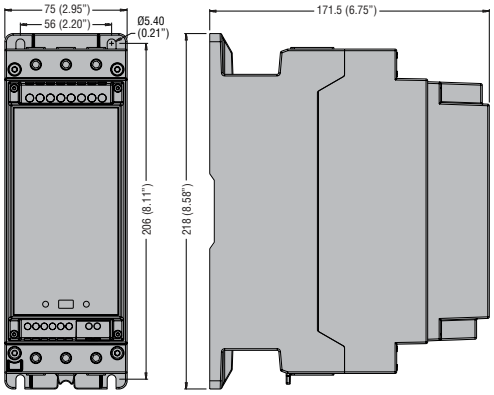
DCRL8 - DCRG8...



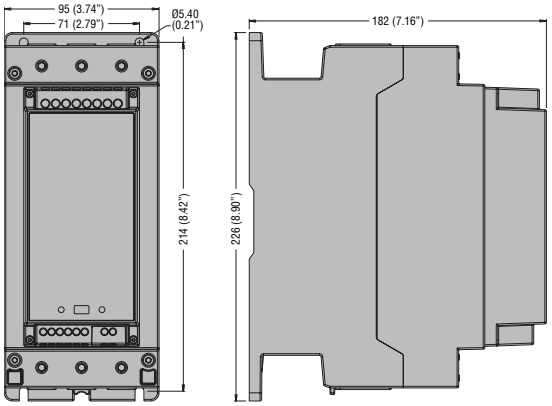
Cutout



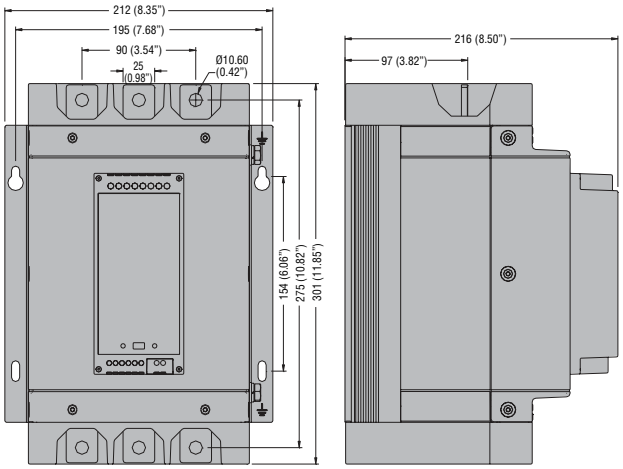
THYRISTOR MODULES
DCTLA4000075 - DCTLA4000150 - DCTLA4000300
DCTLA4800090 - DCTLA4800180 - DCTLA4800360

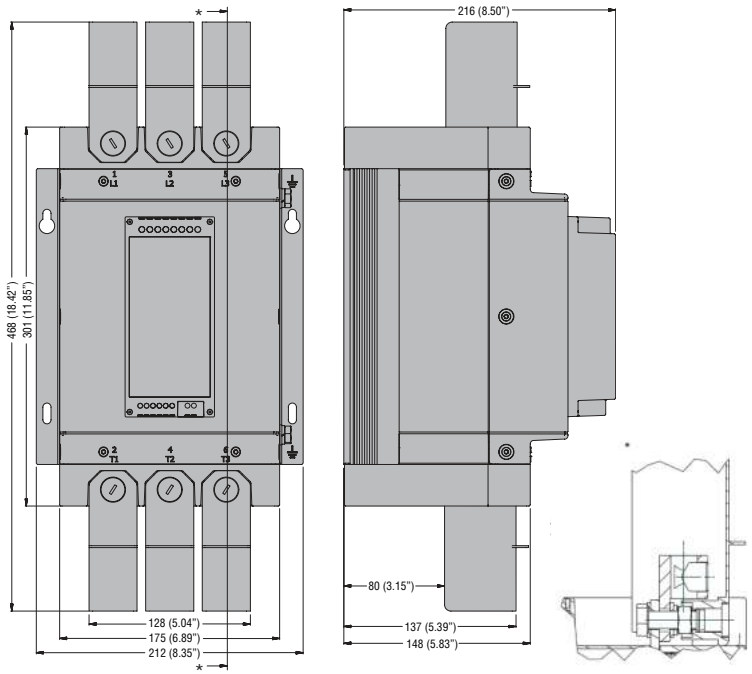


DCTLA4000500 - DCTLA4800600
DCTLA6900300 - DCTLA6900500



DCTLA4001000 - DCTLA4801200
DCTLA6901000

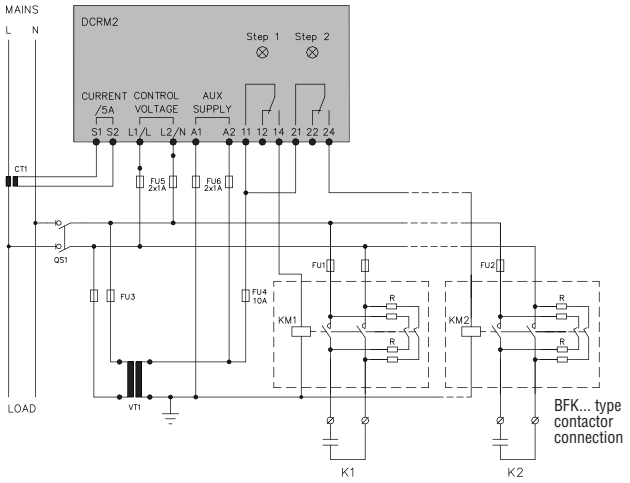




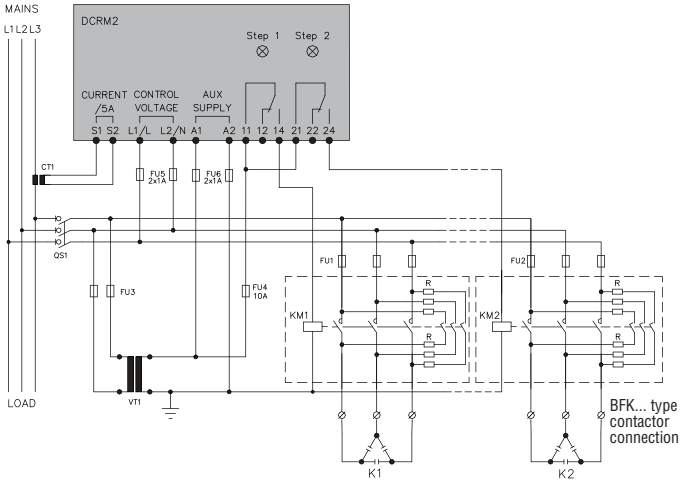
DCTLA4001000, DCTLA4801200, DCTLA6901000 complete with terminal lugs kit EXA01 and terminals protection kit EXA02 (necessary only for cULus compliance).

REACTIVE CURRENT CONTROL RELAY
DCRM2

Single-phase connection



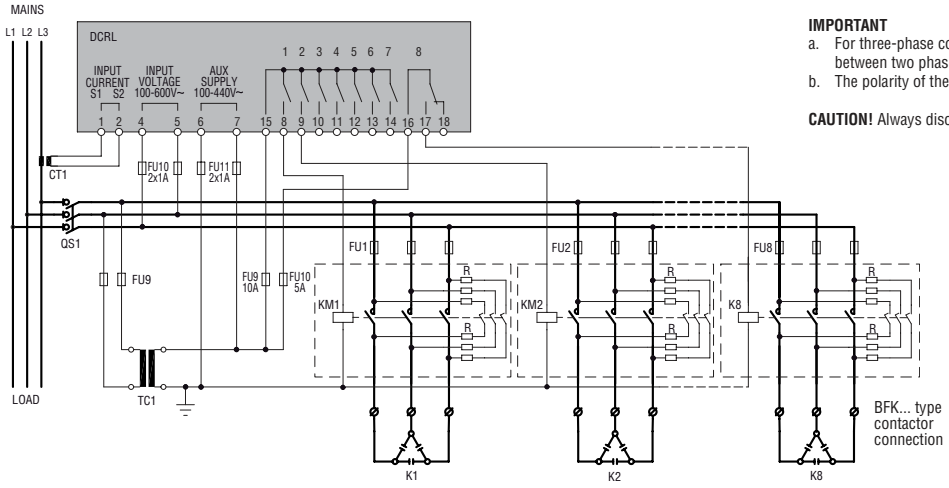
Three-phase connection



IMPORTANT
a. For three-phase connection, the voltage measurement input must be connected between two phases; the line CT must be connected on the remaining phase.
b. The polarity of the current measurement input is irrelevant.

CAUTION! Always disconnect the power supply when operating on the terminals.

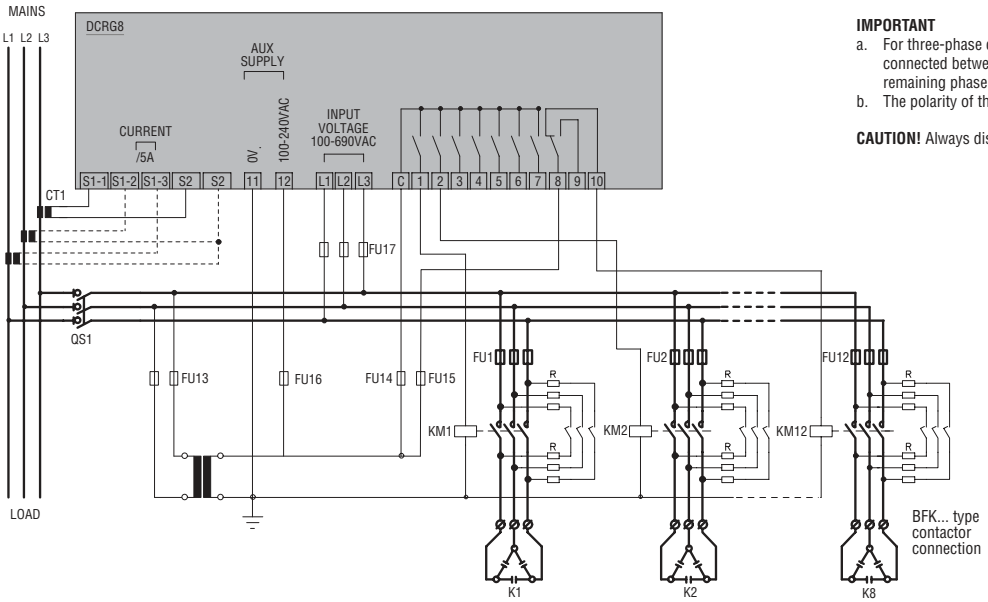
AUTOMATIC POWER FACTOR CONTROLLERS
DCRL... with BFK... type contactors



IMPORTANT
a. For three-phase connection, the voltage measurement input must be connected between two phases; the line CT must be connected on the remaining phase.
b. The polarity of the current measurement input is irrelevant.

CAUTION! Always disconnect the power supply when operating on the terminals.

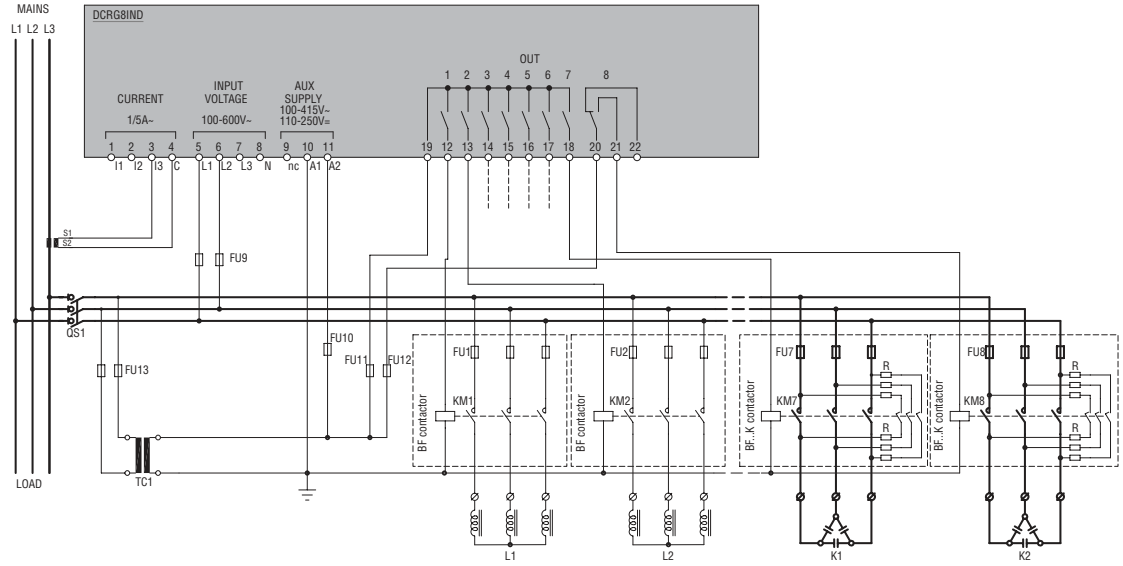
AUTOMATIC POWER FACTOR CONTROLLERS
DCRG8 with BF...K type contactors



IMPORTANT
a. For three-phase connection, the voltage measurement input must be connected between two phases; the line CT must be connected on the remaining phase.
b. The polarity of the current measurement input is irrelevant.

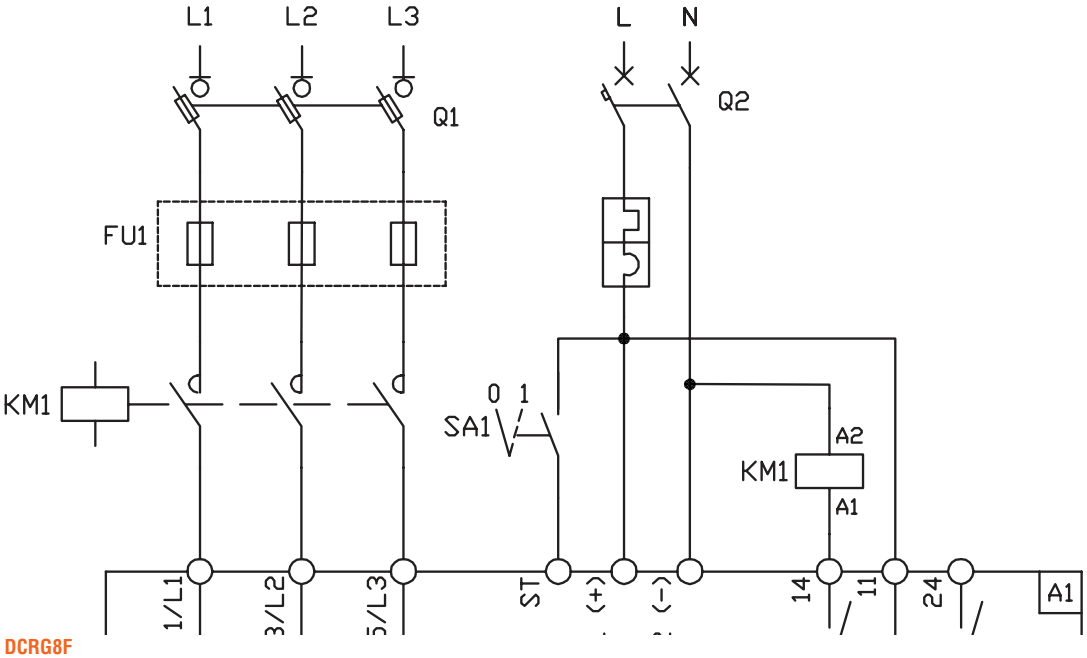
CAUTION! Always disconnect the power supply when operating on the terminals.

DCRG8IND



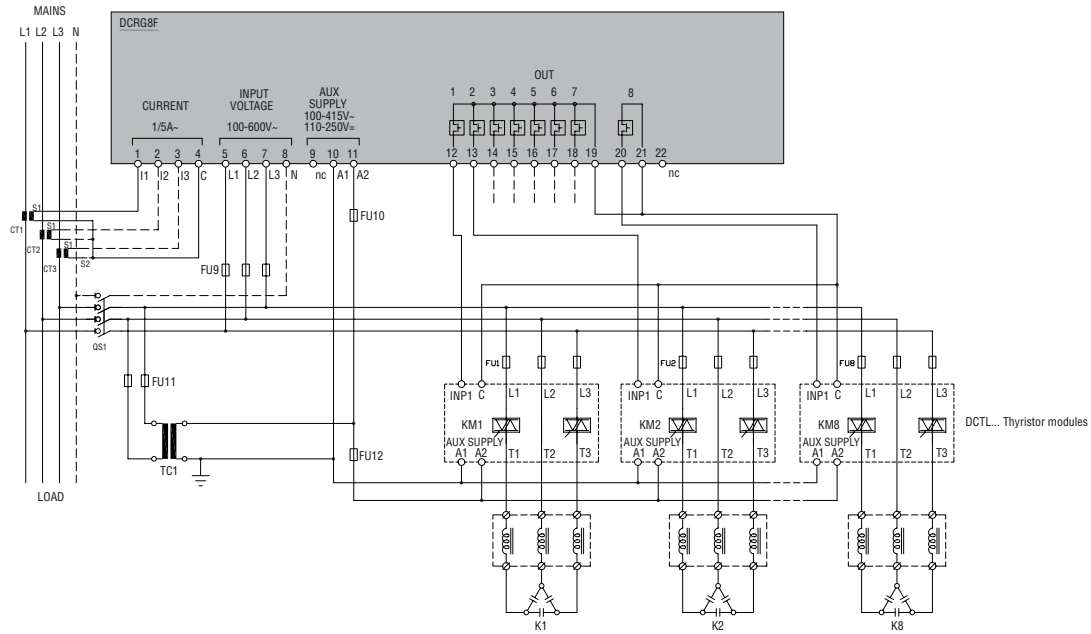
DCRG8F

Thyristor module control via 8 ... 30VDC signal



DCRG8F

Thyristor module control via clean contact (only with DCTL)



TYPE	DCRM2
AUXILIARY SUPPLY CIRCUIT	
Rated auxiliary voltage (Us)	380...415VAC standard 220...240VAC and 440...480VAC on request❶
Operating range	0.85...1.1Us
Rated frequency	50/60Hz ±5%
Maximum power consumption/dissipation	4.4VA / 2.4W
Micro-breaking immunity	≤ 17ms
No-voltage release	≥ 8ms
VOLTAGE INPUT	
Maximum rated voltage Ue	480VAC❶
Measuring range	80...528VAC
Frequency range	50 or 60Hz ±1% self configurable
Measurement input impedance	>1MΩ
Type of connection	L1-L2 or L-N
CURRENT INPUT	
Type of connection	By current transformer (CT)
Rated current Ie	5AAC
Measurement range	0.1...6A
Type of input	Shunt supplied by external current transformer (low voltage). Max. 5A
Measurement method	True RMS value
Overload capacity	+20% Ie
Overload peak	10In for 1s
Dynamic limit	160A for 10ms
Burden	≤ 0.6W
ADJUSTMENTS	
C/K step 1 and 2	OFF / 0.15...2
Connection / disconnection	1...60s
System configuration	3-phase - 1-phase
RELAY OUTPUTS	
Number of relays	2 (each with 1 changeover)
Rated operational voltage	250VAC
Maximum switching voltage	400VAC
IEC conventional free air thermal current (Ith)	8A
IEC/EN/BS 60947-5-1 and UL/CSA designation	B300
Electrical life with rated load	10^5 cycles
Mechanical life	$30x10^6$ cycles
INSULATION (input-output)	
Rated insulation voltage	480VAC
CONNECTIONS	
Maximum tightening torque	0.8Nm (7lb.in; 9lb.in according to UL/CSA)
Conductor section min....max.	0.2...4.0mm² (24...12AWG; 18...12AWG according to UL/CSA)
AMBIENT CONDITIONS	
Operating temperature	–20...+60°C
Storage temperature	–30...+80°C
HOUSING	
Material	Self-extinguishing polyamide

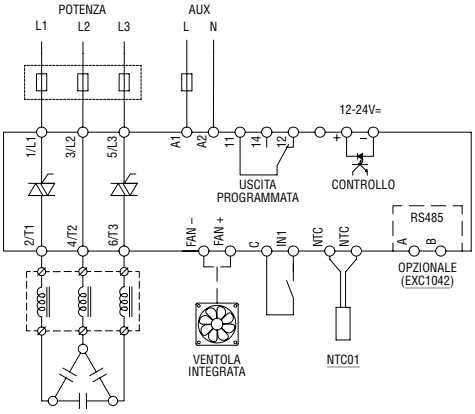
❶ UL/CSA certification obtained with 415VAC maximum.

TYPE	DCRL3	DCRL5	DCRL8	DCRG8 / DCRG8IND	DCRG8F
AUXILIARY SUPPLY CIRCUIT					
Rated supply voltage (Us)	100...440VAC			100...415VAC	
Operating range	90...484VAC			90...456VAC	
Rated frequency	50Hz; 60Hz			50Hz; 60Hz	
Maximum power consumption	9.5VA		7VA	27VA	
Maximum power dissipation (excluding power dissipation from the output contacts)	3.5W		2.5W	10.5W	
VOLTAGE CIRCUIT					
Control voltage	100...600VAC L-L; 100...346VAC L-N			100...600VAC L-L; 100...346VAC L-N	
Operating range	50...720VAC L-L; 50...415VAC L-N			50...720VAC L-L; 50...415VAC L-N	
Frequency range	45...66Hz			45...66Hz; 360...440Hz	
Immunity time for microbreaking	<25ms			35ms (110VAC) - 80ms (220...415VAC)	
No-voltage relay release	≥8ms			≥8ms	
CURRENT CIRCUIT					
Rated current Ie	Programmable 5A or 1A				
Operating range	0.025...6A for 5A full scale; 0.025...1.2A for 1A full scale				
Constant overload	1.2 Ie				
Overload peak	50A for 1 second				
Power consumption	0.6VA				
MEASUREMENT DATA					
Type of voltage and current measurement	True RMS value				
Power factor adjustment	0.5 ind...0.5 cap.				
Type of temperature sensor type	Internal			Internal + PT100 with EXP1004 + NTC with EXP1016 (DCRG8 / DCRG8IND)	
Temperature measurement range	0...+212°C			0...+212°C	
RELAY OUTPUTS					
Number of outputs	3 (up to 6 with EXP1006 - EXP1007)	5 (up to 8 with EXP1006 - EXP1007)	8 (up to 14 with EXP1006 - EXP1007)	8 (up to 18 with EXP1006 - EXP1007)	0 (up to 10 with EXP1006 - EXP1007)
Contact arrangement	2 NO contacts + 1 changeover	4 NO contacts + 1 changeover	7 NO contacts + 1 changeover	7 NO contacts + 1 changeover	–
IEC rated current	5A 250V AC1			5A 250V AC1	
Maximum current at common contact terminal	10A				
Maximum switching voltage	415VAC				
IEC/EN/BS 60947-5-1 and UL/CSA designation	B300				
Electrical life with rated load	10^5 cycles				
Mechanical life	$30x10^6$ cycles				
STATIC OUTPUTS					
Number of outputs	—			4 or 8 with EXP1001 (55mA)	8 (120mA) (up to 24 with EXP1001)
INSULATION					
Rated insulation voltage Ui	600VAC				
Rated impulse withstand voltage Uimp	9.5kV				
Rated impulse withstand voltage Uimp	5.2kV				
CONNECTIONS					
Type of terminal	Removable				
Conductor section min....max	0.2...2.5mm² (24...12AWG; 18...12AWG according to UL)				
AMBIENT CONDITIONS					
Operating temperature	-20...+60°C			-20...+70°C	
Storage temperature	-30...+80°C			-30...+80°C	
HOUSING					
Version	Flush-mount 96x96mm (3.78x3.78")		Flush-mount 144x144mm (5.67x5.67")		
Material	Polycarbonate		Polycarbonate		
IEC degree of protection	IP54		IP65		

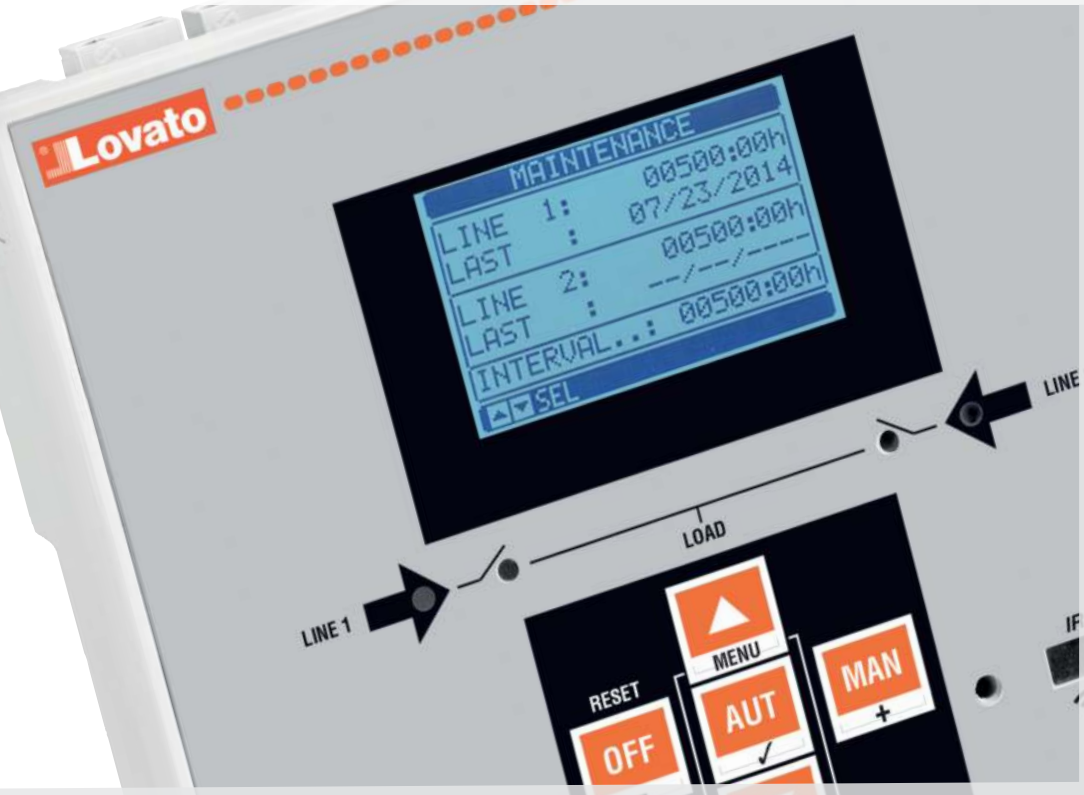
TYPE		DCTLA 4000075	DCTLA 4000150	DCTLA 4000300	DCTLA 4000500	DCTLA 4001000	DCTLA 4800090	DCTLA 4800180	DCTLA 4800360	DCTLA 4800600	DCTLA 4801200	DCTLA 6900300	DCTLA 6900500	DCTLA 6901000
Rated operating voltage Us		400VAC					400...480VAC					600...690VAC		
Rated frequency		50/60Hz												
Rated current Ie		11A	22A	43A	72A	144A	11A	22A	43A	72A	144A	29A	48A	96A
Step power	400VAC	7.5kvar	15kvar	30kvar	50kvar	100kvar	7.5kvar	15kvar	30kvar	50kvar	100kvar	20kvar	33kvar	67kvar
	440VAC	–	–	–	–	–	8kvar	16.5kvar	33kvar	55kvar	110kvar	22kvar	37kvar	73kvar
	480VAC	–	–	–	–	–	9kvar	18kvar	36kvar	60kvar	120kvar	24kvar	40kvar	80kvar
	525VAC	–	–	–	–	–	–	–	–	–	–	26kvar	44kvar	87kvar
	600VAC	–	–	–	–	–	–	–	–	–	–	30kvar	50kvar	100kvar
	690VAC	–	–	–	–	–	–	–	–	–	–	30kvar	50kvar	100kvar
Peak Inverse Voltage (PIV)		1800VAC					2200VAC					3600VAC		
Number of controlled phases		2												
Auxiliary supply		100...240VAC												
Control circuit		8...30VDC or dry contact or via RS485 serial port (with optional card EXC1042 in combination with controller DCRG8F + EXP1012)												
Over-temperature protection		Yes, via integrated probe or optional external probe NTC01												
Cooling		Forced ventilation												
Operating temperature		-20...+45°C without derating (up to 55°C with derating)❶												

❶ Consult our Technical support for more information; see contact details on front cover.

THYRISTOR MODULES
DCTL



Automatic transfer switch controllers



- Supervision of two or three power sources
- Emergency demand supervision for standby generating set
- Tie-breaker management
- Control of contactors, motorised circuit breakers and motorised changeover switches
- Closed transition
- Automatic non-priority load management
- Event logging
- Remote control and supervision
- Front optical port
- Built-in NFC technology
- Expandable with EXP modules
- Communication protocols Modbus-ASCII, RTU and TCP
- Real time clock
- Enclosed automatic transfer switches ATS.

SEC. - PAGE

Automatic transfer switch controllers for 2 power sources
ATL100 type modular version for controlling 2 power sources with single-phase control ..... 31 - 7
ATL500 type non expandable with synoptic and NFC for controlling 2 power sources ..... 31 - 7
ATL600 and ATL601 type non expandable for controlling 2 power sources ..... 31 - 8
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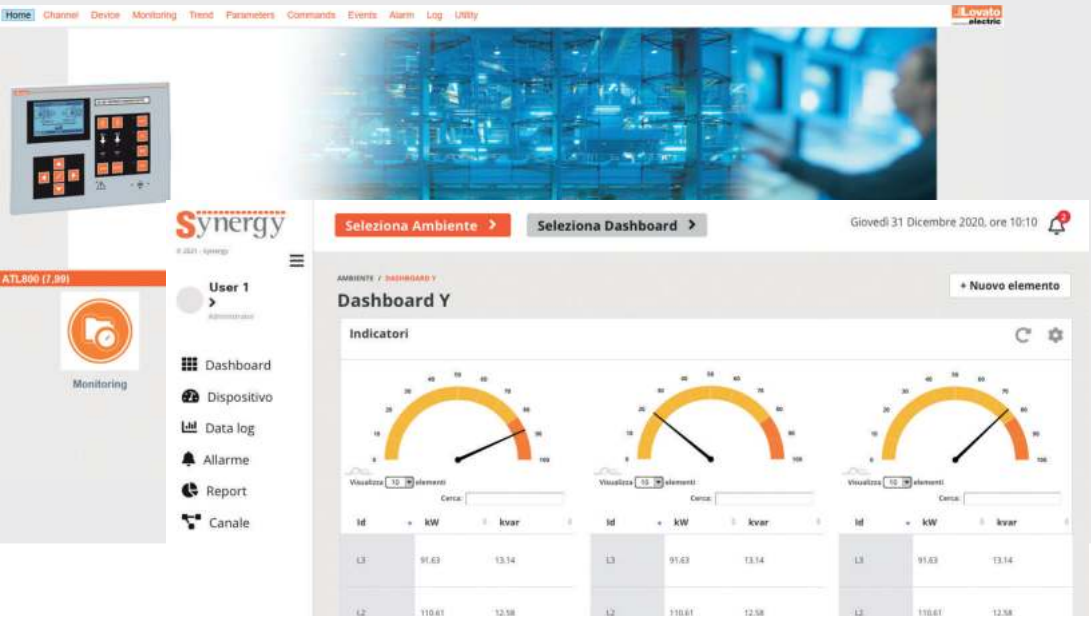
ATL800 type expandable with EXP modules for controlling 2 power sources and 1 tie breaker ..... 31 - 9

Automatic transfer switch controllers for 3 power sources
ATL900 type expandable with EXP modules for controlling 3 power sources and 2 tie breakers ..... 31 - 10

Enclosed automatic transfer switches ATS
ATS with ATL600 automatic transfer switch controller type and contactors ..... 31 - 11

Accessories
Dual power supply module ..... 31 - 12
Communication devices, gateway data loggers, gateway, converter, GSM modem ..... 31 - 13

Dimensions ..... 31 - 14
Wiring diagrams ..... 31 - 15
Technical characteristics ..... 31 - 18



Page 31-7

ATL100
- Modular housing
- Management of two power sources
- Single-phase control.

Page 31-7

ATL500
- Management of two power sources
- Self-seeking power supply
- 2 programmable digital inputs
- 3 programmable digital outputs
- Built-in NFC technology for parameter settings with App NFC.

Page 31-8

ATL600 - ATL601
- Management of two power sources
- AC or DC power supply
- 6 programmable digital inputs
- 7 programmable relay outputs.

Page 31-8

ATL610
- Management of two power sources
- AC and DC power supply
- 6 programmable digital inputs
- 7 programmable relay outputs
- Real time clock (RTC)
- Expandable with EXP series modules (inputs and outputs, communication ports).

Page 31-11

ENCLOSED AUTOMATIC TRANSFER SWITCHES ATS
- Enclosed automatic transfer switches from 45 to 160A
- Management of 2 power sources
- Four-pole interlocked contactors
- Automatic transfer switch controller type ATL600
- Dual power supply module type ATLDPS1 for the measurement and control of voltages present at supply inputs
- Miniature circuit breakers for the protection of the measuring lines
- Metallic enclosure IP65.

Page 31-9

ATL800
- Management of 2 power sources and 1 tie breaker
- AC and DC power supply
- 8 programmable digital inputs
- 7 programmable relay outputs
- Built-in NFC technology for parameter settings with App NFC
- Real time clock (RTC)
- Non-priority load management
- Closed transition with brief parallel configuration
- Built-in RS485 communication
- Built-in PLC logic
- Expandable with EXP series modules (inputs and outputs, communication ports).

Page 31-12

ATLDPS1
- Module specifically designed to control power supply voltage of motorised circuit breakers and changeover switches
- Continuous monitoring of supply line status
- Management via microcontroller management.

Page 31-10

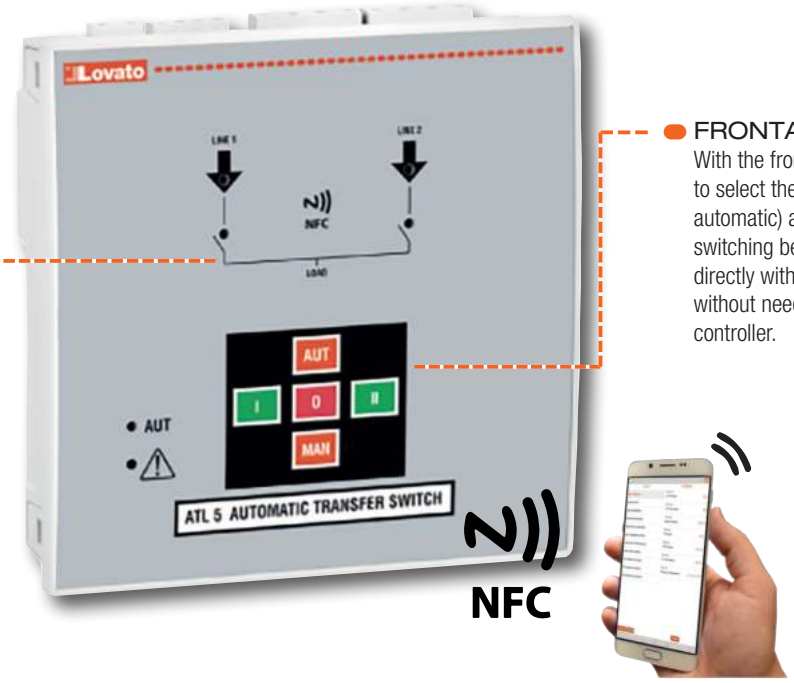
ATL900
- Management of 3 power sources and 2 tie breakers
- AC and DC power supply
- 12 programmable digital inputs
- 4 current inputs
- 10 programmable relay outputs
- 1 programmable static output
- Built-in NFC technology for parameter settings with App NFC
- Real time clock (RTC)
- Non-priority load management
- Closed transition with brief parallel configuration
- Built-in RS485 communication
- Built-in PLC logic
- Expandable with EXP series modules (inputs and outputs, communication ports).

Lovato electric

SIMPLE AND READY TO USE

SYNOPTIC

The frontal synoptic provides a simple and clear view of the status of the plant, signalling with LEDs the status of the power sources and the status of the changeover devices.

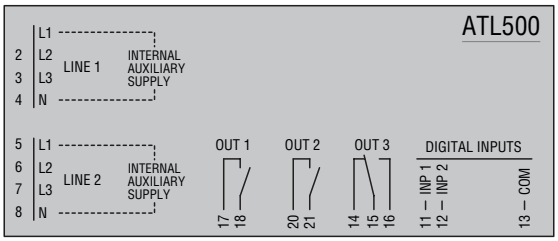


FRONTAL KEYBOARD

With the frontal keyboard it is possible to select the operating mode (manual or automatic) and command manually the switching between the power sources directly with the buttons I-0-II on the front, without need to program any setting on the controller.

SELF-SEEKING POWER SUPPLY

ATL500 has a self-seeking power supply, which automatically selects the best of the two available power sources for the internal supply, taken directly from the two measuring inputs (rated voltage 110...240VAC L-N), without the need of an external circuit or dual power supply module for the selection of the power for the auxiliary supply.



THREE-PHASE WITH NEUTRAL VOLTAGE MONITORING INPUTS

ATL500 is provided with three-phase with neutral voltage monitoring inputs for a complete monitoring of the voltage and frequency of both power sources. The controller can be configured to be used in three-phase with neutral, single-phase or two-phase systems.

PROGRAMMABLE DIGITAL INPUTS AND OUTPUTS

The function of the programmable digital inputs and outputs can be configured via NFC to satisfy different application needs.

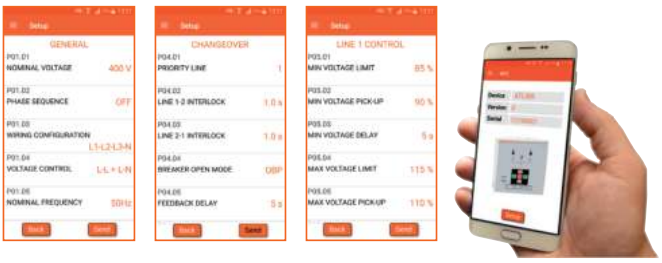
HIGH PROTECTION DEGREE

The controller front and the optional frame seal have been designed to warrant an IP65 protection degree.

NFC CONNECTION

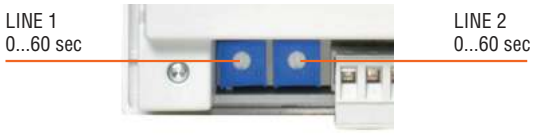
ATL500 is provided with built-in NFC connectivity for the programming via Android and iOS smart devices (smartphone and tablets) with the LOVATO NFC App in a simple, fast and innovative way, which does not need any connection cable and is able to operate even without power supply on the controller.
With the LOVATO NFC App it is possible to configure:

- system parameters: rated system voltage, rated frequency, type of wiring, voltage control mode, etc.
- password for the protection of the access to the settings
- changeover settings: priority line selection, interlock times, feedback delays, etc.
- protection thresholds and tripping delays: min/max voltage, min/max frequency, phase sequence, asymmetry
- function of the programmable digital inputs and outputs
- function of the potentiometers
- alarms properties.



POTENTIOMETERS

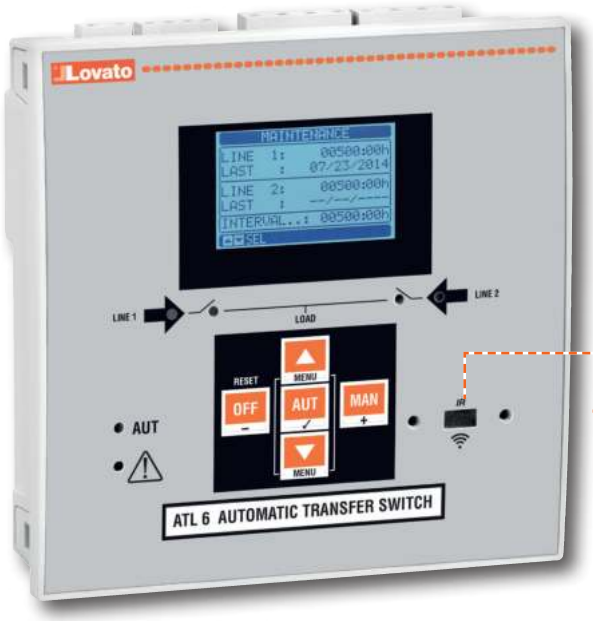
ATL500 is provided with two potentiometers on the back, one for each power source, which can be used for the manual setting of the line presence delays (default setting) or to set the tripping delays of the protection thresholds, in alternative to the setting via NFC. The function of the potentiometers can be modified with the LOVATO NFC App.

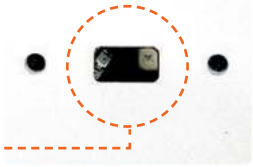


STAY IN CONTROL!

BACKLIT GRAPHIC LCD DISPLAY

128x80 pixel, with excellent legibility with adjustable brightness and display of events, alarms and measurements in 5 languages: English, Italian, French, Spanish and German.

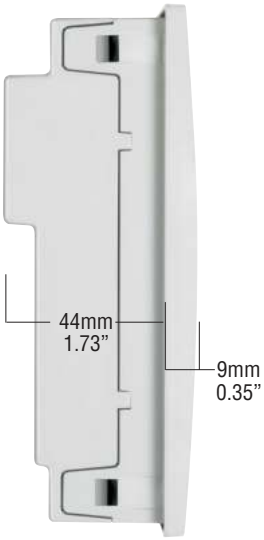




OPTICAL COMMUNICATION PORT

The optical port on the front, using a standard USB or Wi-Fi point, permits communication with a PC, smartphone and tablet, to carry out programming, diagnostics and data download without removing power to the electric panel.

COMPACT SIZE



Slim frame profile and reduced total depth simplify installation of the transfer switch controller also in very compact electric panels.

HIGH PROTECTION DEGREE

The controller front and the optional frame seal have been designed to warrant an **IP65** protection degree.

MAINTENANCE COUNTERS

ATL features two counters used for maintenance; the first monitors the operating time and the second counts the number of switching operations. Exceeding the limit set on the counters activates the corresponding alarm.

FIXING SYSTEM

The fixing system with **metal screws** guarantees excellent, lasting hold over time.

STATISTICS AND EVENTS

The recorded statistical data is available to the user for understanding how the system operates. A cyclical internal memory records up to 100 events.

EMERGENCY DEMAND SUPERVISION FOR STANDBY GENERATING SET

In applications where one of the two supply sources is a generating set, the transfer switch controller has specific functions to supervise the generator starting and stopping operations.

INPUTS, OUTPUTS, INTERNAL VARIABLES, COUNTERS

The inputs and outputs can be configured by the user to manage the various application requirements. Also available to the user are limit thresholds, counters, user alarms and remote control variables (ATL610 only) to customise the control functions. The limit and counter statuses, if enabled, are shown in the appropriate pages on the display.

CALENDAR CLOCK (ATL610)

Built-in calendar-clock with backup reserve power.

DUAL POWER SUPPLY (ATL610)

110...240VAC and 12/24VDC supply.

EXPANDABILITY (ATL610)

Basic functions of the transfer switch controllers can be easily extended using EXP series expansion modules:
- Relay outputs
- Digital and analogue inputs and outputs
- Opto-isolated RS232 interface
- Opto-isolated RS485 interface
- Opto-isolated Ethernet interface.

Using modules dedicated to communications the device can be controlled and supervised by the Synergy and Synergy Net softwares and controlled remotely and configured with the Xpress software.

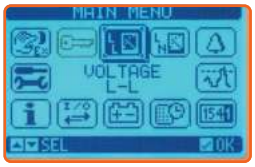
12/24VDC battery supply input (only for ATL601 and ATL610)

VERSATILE CONFIGURATION

ATL800

- Management of 2 energy sources and 1 tie breaker.
- 6 preconfigured system layouts.
- Non-priority load management.
- Management of transition with brief parallel configuration.
- RS485 built-in.
- Built-in NFC technology for parameter settings with the NFC App.
- App and software: Synergy, Xpress, Sam1, NFC .

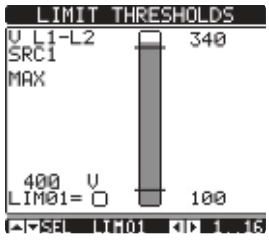
GRAPHIC LCD AND 8 LANGUAGE TEXT
The backlit graphic display simplifies the user interface and permits good visibility in environments with poor lighting.
For ATL800 and ATL900 the texts are available in 8 languages: English, Italian, French, Spanish, German, Portuguese, Polish and Russian.
The new interface allows the user to see, clearly and simply:
- System status
- Measurements
- Statistical data
- Threshold control
- Alarm pop-up windows.

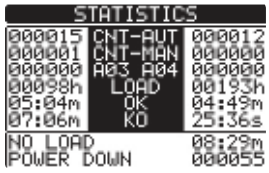


MAINTENANCE COUNTERS
Two counters can be used for scheduling maintenance on the transfer systems installed: the first for recording the operating time and the second for monitoring the number of switching operations. Exceeding the limit set on the counters activates the corresponding alarm.

INPUTS, OUTPUTS, INTERNAL VARIABLES, COUNTERS
The input and output functions are preconfigured with the most frequently used settings; the user can easily modify the predefined configuration and adapt the switch to their application requirements.
All the inputs and outputs can be configured. There are various types of programmable internal variables:
- Limit thresholds
- Remote control variables
- User alarms
- Programmable counters
- Timer.

The limit, counter and enabled timer statuses are available for display on dedicated pages.





HIGH PROTECTION RATING
The controller front and the frame seal have been designed to warrant an IP65 protection degree.

STATISTICS AND EVENTS
The statistical data recorded by the transfer switch controller is available to the user for analysing the performance of the switching system. A cyclical internal memory records up to 250 events, providing useful information on the history of the system controlled.

BUILT-IN CALENDAR CLOCK
A built-in calendar clock with backup reserve energy permits each event to be identified using the time and date on which it occurred.

BUILT-IN RS485 COMMUNICATION
Thanks to the built-in RS485 communication port, ATL800 and ATL900 are already set up for remote supervision and control.
In addition to this communication port, the user can install two further types of communication from those available in the EXP... expansion modules.

DUAL AC/DC SUPPLY
ATL switches can deal with all supply solutions demanded by the market. The best and safest solution is the simultaneous use of AC and DC supply. The switches can then be supplied by the AC line available and, during switching, in the absence of the AC line, the switch will be supplied by the battery via the DC inputs. Non-stop control!
AC supply ensures supply during system monitoring and DC supply guarantees constant supply during switching.

PROGRAMMABLE PLC LOGIC (ATL900 only)
With the built-in PLC functions, new switching logic can be defined through appropriate combinations of input, output and internal variable signals.

TIMER
8 timer variables are available for use in the system's PLC logic, in combination with the outputs or user alarms. Each timer variable has an input variable that controls it. When this variable changes state, so does the timer variable, but it remains in the new state only for the time specified then returns automatically to the starting condition.

NFC CONNECTION
Programming the parameters via tablet and smartphone is now possible also through NFC wireless technology.
Bringing a smartphone or tablet with NFC connection enabled close to the display of the ATL800-900 activates the NFC App LOVATO and the switch connected is recognised automatically. It will then be possible to modify the parameters and program the ATL.

USB AND WI-FI COMMUNICATION INTERFACES
ATL800 and ATL900 feature a front optical port for programming via optional USB (CX01) or Wi-Fi (CX02) communication interface.
Advantages:
- Not necessary to disconnect the supply from the panel to connect to the switch
- Electrical safety (no physical connection)
- Convenience of operating on the front.

FLEXIBILITY FOR EVERY REQUIREMENT

ATL900

- Management of 3 energy power sources and 2 tie breakers.
- 4 current inputs for the three-phases and neutral.
- 14 preconfigured system layouts.
- Non-priority load management.
- Management of transition with brief parallel configuration.
- RS485 built-in.
- Built-in NFC technology for parameter settings with the NFC App.
- App and software: Synergy, Xpress, Sam1, NFC .

WI-FI COMMUNICATION INTERFACE (VIA CX02)

This connection can be used to:
- Copy the parameters.
  All the parameters of the ATL can be saved in the CX02 memory and if necessary loaded back into the same device (backup function) or a new switch (replication of the configuration).
- Clone the device settings.
  In addition to copying the parameters, the current values of the statistical data, counters and events can be saved in the memory in order to completely replicate an ATL on another device of the same type or restore the ATL to a previously saved state.

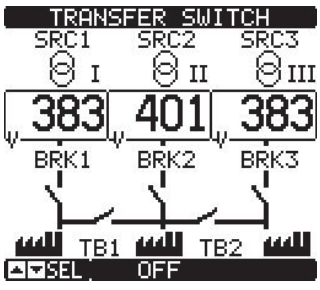
THREE TYPES OF TRANSITION AVAILABLE

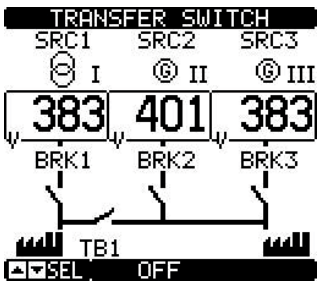
Open transition
The switch transfers the load between the two sources, interrupting the supply for a period of time that can be programmed by the user.

In-phase transition
The switch transfers the load between the two sources, interrupting the supply for a period of time that can be programmed. In this case the load is passed to a new source if spontaneous synchronisation is found;
the amplitude, phase and frequency of the two sources must not differ from the maximum value set.

Closed transition
With switches and external protections, configured appropriately, the two sources will be synchronised (where possible) or spontaneous synchronisation will be expected within a limit time. In presence of all synchronisation conditions the load will be transferred with closed transition and instantaneous parallel without interrupting supply.

ATL900: management of three sources and two tie breakers





A single transfer switch controller can be used to manage applications which in the past required several transfer switch controllers in a cascade connection.
24 system layouts are available.

4 current inputs
The current inputs permit the monitoring of the demand load and defining of the correct switching strategy. Knowing the power demanded by the system and the rated power of the sources, ATL900 can select the best source available that can supply the loads correctly.

EXPANDABILITY

ATL800 and ATL900 functionality can be extended thanks to the EXP... series expansion modules. Three expansion slots are available, and while the switch is restarting the modules are recognised and configured entirely automatically. The following EXP... modules are available:
- Digital I/O modules
- Analogue I/O modules
- USB, RS232, RS485, Ethernet and Profibus communication modules
- GPRS/GSM modem

Since the additional modules are shared with other LOVATO Electric products, it is possible to save in management costs, guaranteeing flexibility and ease of installation, above all when the system has already been commissioned.

EXP10...

Automatic transfer switch controllers
ATL series

	ATL100	ATL500	ATL600 - ATL601	ATL610	ATL800	ATL900
POWER SUPPLY						
Rated DC supply voltage	—	—	12/24VDC (ATL601)	12/24VDC	12/24/48VDC	12/24/48VDC
Rated AC supply voltage	110...230VAC	110...240VAC (self-powered)	110...240VAC (ATL600)	110...240VAC	110...240VAC	110...240VAC
Frequency	45...66Hz	45...66Hz	45...66Hz (ATL600)	45...66Hz	45...66Hz	45...66Hz
FRONT PANEL / HOUSING						
Backlit display	—	—	LCD graphic 128x80 pixel	LCD graphic 128x80 pixel	LCD graphic 128x80 pixel	LCD graphic 128x112 pixel
Languages	—	—	5	5	8	8
Size	Modular housing (3U)	144x144x52.2mm/ 5.67x5.67x2.05”	144x144x52.2mm/ 5.67x5.67x2.05”	144x144x52.2mm/ 5.67x5.67x2.05”	240x180x45mm/ 9.45x7.09x1.77”	240x180x45mm/ 9.45x7.09x1.77”
Degree of protection	IP40 on front / IP20 terminals	IP40 / optional IP65	IP40 / optional IP65	IP40 / optional IP65	IP65	IP65
Expandable with EXP... series modules	—	—	—	2 modules	3 modules	3 modules
VOLTAGE AND CURRENT MEASUREMENT INPUT						
Power sources that can be controlled	—	2	2	2	2	3
Voltage inputs per line	1 phase + neutral	3 phases + neutral	3 phases + neutral	3 phases + neutral	3 phases + neutral	3 phases + neutral
Rated voltage Ue	110...230VAC	110...240VAC L-N	480VAC	480VAC	600VAC	600VAC
Current inputs	—	—	—	—	—	4 (by 5A or 1A)
Frequency range	45...66Hz	45...66Hz	45...66Hz	45...66Hz	45...66Hz	45...66Hz
BUILT-IN DIGITAL INPUTS AND OUTPUTS						
Number of inputs	—	2	6	6	8	12
Number of outputs	3	3	7	7	7	11
Contact configuration	3 NO	2 NO + 1 changeover	6 NO + 1 changeover	6 NO + 1 changeover	4 NO + 3 changeover	6 NO + 4 changeover + 1 SSR
INTERFACE						
Programming with NFC technology	—	●	—	—	●	●
Front optical USB communication port	—	—	● with CX01	● with CX01	● with CX01	● with CX01
Front optical Wi-Fi communication port	—	—	● with CX02	● with CX02	● with CX02	● with CX02
USB communication	—	—	—	● EXP1010	● EXP1010	● EXP1010
RS232 communication	—	—	—	● EXP1011	● EXP1011	● EXP1011
RS485 communication	—	—	—	● EXP1012	● (built-in)	● (built-in)
Ethernet communication	—	—	—	● EXP1013	● EXP1013	● EXP1013
Profibus communication	—	—	—	● EXP1014	● EXP1014	● EXP1014
Communication via Modem	—	—	—	—	● EXP1015	● EXP1015
FUNCTIONS						
Number of tie breakers that can be managed	—	—	—	—	1	2
Programmable source type (utility or generation)	—	●	●	●	●	●
Closed transition	—	—	—	—	●	●
Non-priority load management	—	—	—	—	●	●
Switching management with power thresholds	—	—	—	—	—	●
PLC logic	—	—	—	—	●	●
Timers	—	—	—	—	●	●
System layout available on display	—	—	—	—	6	14
Custom system layouts	—	—	—	—	●	●
User alarms	—	—	●	●	●	●
Limits	—	—	●	●	●	●
Counters	—	—	●	●	●	●
Event logging	—	—	100	100	250	250
Real time clock with backup reserve energy	—	—	—	●	●	●
Acoustic alarms	—	—	—	—	●	●
Analogue inputs	—	—	—	—	● EXP1004	● EXP1004
Analogue outputs	—	—	—	—	● EXP1005	● EXP1005
Accessory for remote alarm status	—	—	—	—	—	● RGKRR

Automatic transfer switch controllers
For 2 power sources

Non expandable modular

ATL100

Order code	Description	Qty per pkg	Wt
		n°	[kg]
ATL100	Automatic transfer switch controller for 2 power sources with single-phase control, modular housing, 110...230VAC supply	1	0.300

General characteristics ATL100
ATL100 is a single-phase automatic transfer switch controller in modular housing. It monitors 2 single-phase voltage inputs and it connects to the output the line that is within the limits. The priority line is the line 1. The 2 outputs can control contactors or motorized changeover switches to perform the transfer between the lines.

Operational characteristics ATL100
- Self-powered
- Input voltage range: 80...300VAC
- Frequency range: 45...66Hz
- 2 relay outputs with 1 NO contact 4A 250VAC
- 1 relay output with 1 NO contact 3A 250VAC.

Non expandable flush-mount

ATL500

Order code	Description	Qty per pkg	Wt
		n°	[kg]
ATL500	Automatic transfer switch controller with NFC technology and synoptic, for 2 power sources with three-phase control (144x144mm/5.7x5.7") self-seeking power supply 110...240VAC	1	0.580

General characteristics ATL500
ATL500 is an automatic transfer switch controller for the automatic or manual switching of the load from the MAIN LINE to a stand-by or emergency SECONDARY LINE and vice versa.
With the integrated outputs, it is possible to control contactors or motorised changeover switches.
The main features are:
- Self-seeking power supply from the two measurement inputs
- Measurement inputs for three-phase + neutral voltage values, also suitable for 1 and 2 phase lines
- Synoptic on front with LEDs for a simple and clear visualisation of the status of the lines and the changeover devices
- Parameter programming via NFC technology and LOVATO NFC App downloadable from Google Play Store and App Store. With LOVATO NFC App is possible to set: rated system parameters, line control settings, changeover settings, password and I/O functions
- Frontal keyboard for the selection of the operating mode and the manual command of the changeover devices
- 2 programmable digital inputs
- 3 programmable relay outputs
- Potentiometers on the back for the manual setting of the line presence delays or the tripping delays of the protection thresholds.

Operational characteristics ATL500
- Power supply:
  - Self-seeking power supply from the measurement inputs 110...240VAC L-N (range: 90...300VAC L-N)
- Voltage measurement inputs:
  - Rated voltage Ue: 110...240VAC L-N / 190...415VAC L-L
  - Measuring range: 90...300VAC L-N / 155...519VAC L-L
  - Frequency range: 45...66Hz
- Programmable digital inputs:
  - Negative inputs
- Programmable relay outputs:
  - 2 each with 1 normally open contact (NO - SPST) rated 8A 250VAC
  - 1 with 1 changeover contact (NO/NC - SPDT) rated 8A 250VAC
- Enclosure:
  - Flush-mount housing: 144x144mm/5.7x5.7"
  - IEC degree of protection: IP40 on front; IP65 with optional seal EXP8001; IP20 at rear.

Accessories

EXP8001

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXP8001	IP65 gasket seal for ATL500/600/601/610	1	0.009

Certifications and compliance
Certifications obtained: EAC, RCM (only for ATL500).
Compliant with standards: IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 60947-1, IEC/EN/BS 60947-6-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3.

Automatic transfer switch controllers
For 2 power sources

Non expandable

ATL600

Order code	Description	Qty per pkg	Wt
		n°	[kg]
ATL600	Automatic transfer switch controller with LCD display and optical port for 2 power sources with three-phase control (144x144mm/5.7x5.7"), 110...240VAC supply	1	0.600
ATL601	Automatic transfer switch controller with LCD display and optical port for 2 power sources with three-phase control (144x144mm/5.7x5.7"), 12...24VDC supply	1	0.600

Expandable with EXP... modules

ATL610

Order code	Description	Qty per pkg	Wt
		n°	[kg]
ATL610	Automatic transfer switch controller with LCD display and optical port for 2 power sources with three-phase control (144x144mm/5.7x5.7"), 110...240VAC and 12/24VDC, supply expandable with EXP... series modules	1	0.680

EXP10...

Order code	Description
EXPANSION MODULES FOR ATL610 Snap on fixing of two modules on ATL610 rear. Inputs and outputs.	
EXP1000	4 opto-isolated digital inputs
EXP1001	4 opto-isolated static outputs
EXP1002	2 digital inputs and 2 static outputs, opto-isolated
EXP1003	2 relay outputs with changeover contact 5A 250VAC
EXP1006	2 relay outputs, normally open contact 5A 250VAC
EXP1007	3 relay outputs, normally open contact 5A 250VAC
EXP1008	2 opto-isolated digital inputs and 2 5A relay outputs, normally open contact 250VAC
Communication ports.	
EXP1010	Opto-isolated USB interface
EXP1011	Opto-isolated RS232 interface
EXP1012	Opto-isolated RS485 interface
EXP1013	Opto-isolated Ethernet interface
EXP1014	Opto-isolated Profibus-DP interface

EXP... expansion modules fixing on ATL610

Accessories

EXP8001

51C4

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXP8001	Protective seal IP65 for ATL500/600/601/610	1	0.150
For ATL610 - ATL800 - ATL900.			
51C2	Connection cable PC ↔ ATL610/800/900 with EXP1011, length 1.8m	1	0.090
51C4	Connection cable PC ↔ product RS232/RS485, length 1.8m	1	0.147

General characteristics ATL600 - ATL601 - ATL610
The automatic transfer switch controllers ATL600 / ATL601 / ATL610 are used for the automatic or manual switching of the load from the MAIN LINE to a stand-by or emergency SECONDARY LINE and vice versa. They have two outputs for the "automatic" and/or "manual" control of contactors or motorised circuit breakers and switches.
The main features are:
- Supply input:
  - Single in AC for ATL600
  - Single in DC for ATL601
  - Dual in AC and DC for ATL610
- Measurement inputs for three-phase + neutral voltage values; also suitable for 1 and 2 phase lines
- 128x80 pixel backlit graphic LCD to view measurements, events and alarms in 5 languages (English, Italian, French, Spanish and German)
- 2 status indication LEDs
- 6 programmable digital inputs
- 7 programmable relay outputs
- Viewing of L-L and L-N voltage values of the controlled lines
- Status viewing of contactor or motorised circuit breakers and switches
- Configuration programming of lines, control and supervision parameters for emergency demand of generating set
- Event logging
- Microprocessor supervision of functions; including virtual real time clock for ATL610
- Communication interface by front optical port with CX01 or CX02 dongle using USB or Wi-Fi
- Compatible with Synergy, supervision and energy management software, Xpress remote control and configuration software and with the Sam1 application for Android/iOS
- Modbus-RTU, ASCII and TCP communication protocol.

CONTROL FUNCTIONS OF THE LINES
- Phase sequence and phase loss
- Minimum and maximum voltage
- Voltage asymmetry
- Minimum and maximum frequency.

Operational characteristics ATL600 - ATL601 - ATL610
- Power supply:
  - Power supply voltage: 110...240VAC (ATL600); 12/24VDC (ATL601); 12/24VDC - 110...240VAC (ATL610)
- Voltage measurement inputs:
  - Rated voltage Ue: 100...480VAC (L-L)
  - Measuring range: 50...576VAC (L-L)
  - Frequency range: 45...66Hz
- Programmable digital inputs:
  - Negative inputs
- Programmable relay outputs:
  - 6 each with 1 normally open contact (NO - SPST) rated 8A 250VAC
  - 1 with changeover contact (NO/NC - SPDT) rated 8A 250VAC
- Enclosure:
  - Flush-mount housing: 144x144mm/5.7x5.7"
  - IEC degree of protection: IP40 on front; IP65 with optional seal EXP8001; IP20 at rear.

Synergy, Synergy Cloud, Xpress, Sam1 software and App
See section 36.

EXP expansion modules
See page 35-2.

Certifications and compliance
Certifications obtained: cULus, RCM, LOVAG (only for ATL600 - ATL610), EAC.
Compliant with standards: IEC/EN/BS 61000-6-3 (only for ATL601), IEC/EN/BS 61000-6-4 (only for ATL600 - ATL610), IEC/EN/BS 60947-1, IEC/EN/BS 60947-6-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL508, CSA C22.2 n° 14.

Expandable with EXP... modules

ATL800

Order code	Description	Qty per pkg	Wt
		n°	[kg]
ATL800	Automatic transfer switch controller (240x180mm/ 9.45"-7.09") with LCD display, optical port and NFC for 2 lines control and 1 tie breaker, 110...240VAC supply and 12/24/48VDC, expandable with EXP... series modules	1	1.000

EXP10...

Order code	Description
EXPANSION MODULES. Snap on fixing of three modules on rear of ATL800. Digital inputs and outputs.	
EXP1000	4 opto-isolated digital inputs
EXP1001	4 opto-isolated static outputs
EXP1002	2 digital inputs and 2 static outputs, opto-isolated
EXP1003	2 relay outputs 5A 250VAC, changeover contact
EXP1006	2 relay outputs, normally open contact 5A 250VAC
EXP1007	3 relay outputs, normally open contact 5A 250VAC
EXP1008	2 opto-isolated digital inputs and 2 5A relay outputs, normally open contact 250VAC
Analogue inputs and outputs.	
EXP1004	2 opto-isolated analogue inputs 0/4...20mA or PT100 or 0...10V or 0...+-5V
EXP1005	2 opto-isolated analogue outputs 0/4...20mA or 0...10V or 0...+-5V
Communication ports.	
EXP1010	Opto-isolated USB interface
EXP1011	Opto-isolated RS232 interface
EXP1012	Opto-isolated RS485 interface
EXP1013	Opto-isolated Ethernet interface
EXP1014	Opto-isolated Profibus-DP interface
EXP1015	GPRS/GSM modem

EXP... expansion module fixing on ATL800

Accessories

51C4

Order code	Description	Qty per pkg	Wt
		n°	[kg]
51C2	Connection cable PC ↔ ATL610/800/900 with EXP1011, length 1.8m	1	0.090
51C4	Connection cable PC ↔ product RS232/RS485, length 1.8m	1	0.147

General characteristics
The automatic transfer switch controller ATL800 is used for the automatic or manual switching of the load between two lines in accordance with the selected switching logic.
It has outputs for the "automatic" and/or "manual" control of contactors or motorised circuit breakers and switches.
It can also manage a third control device as tie breaker or non-priority load management. The layout and system status are displayed directly on the graphic LCD.
The main features are:
- AC and DC supply inputs
- Measurement inputs for three-phase + neutral voltage values; also suitable for 1 and 2 phase lines
- 128x80 pixel backlit graphic LCD to view measurements, events and alarms in 8 languages (English, Italian, French, Spanish, German, Portuguese, Polish and Russian)
- Active operating mode indicator LED
- Viewing of L-L and L-N voltage values of the controlled lines
- Viewing the status of contactors or motorised circuit breakers both via display and LED
- 6 system layouts available
- Management of a tie breaker
- 8 programmable digital inputs
- 7 programmable relay outputs
- Viewing of L-L and L-N voltage values of the controlled lines
- Configuration programming of lines, type of source (line/generator), control and supervision parameters for emergency demand of generating set
- Possibility of transferring load with closed transition and spontaneous or controlled genset synchronisation
- Non-priority load management
- Built-in programmable PLC logic
- Built-in RS485 communication
- Event logging
- Virtual calendar clock (RTC)
- Communication interface by front optical port with CX01 or CX02 dongle using USB or Wi-Fi
- Parameter programming via NFC technology and the App NFC downloadable from Google Play Store and App Store
- Compatible with Synergy, supervision and energy management software, Xpress remote control and configuration software and with the Sam1 application for Android/iOS
- Modbus-RTU, ASCII and TCP communication protocol.

CONTROL FUNCTIONS OF THE LINES
- Phase sequence and phase loss
- Minimum and maximum voltage
- Voltage asymmetry
- Minimum and maximum frequency.

Operational characteristics
- Power supply:
  - Power supply voltage: 100...240VAC; 12/24/48VDC
- Voltage measurement inputs:
  - Rated voltage Ue: 100...600VAC (L-L)
  - Frequency range: 45...66Hz
- Programmable digital inputs:
  - Negative inputs
- Programmable relay outputs:
  - 2 each with 1 normally open contact (NO - SPST) rated 12A 250VAC
  - 2 each with 1 normally open contact (NO - SPST) rated 8A 250VAC
  - 3 each with 1 changeover contact (NO/NC - SPDT) rated 8A 250VAC
- Enclosure:
  - Flush-mount housing: 180x240mm/7.09x9.45"
  - IEC degree of protection: IP65 on front; IP20 at back.

Synergy, Synergy Cloud, Xpress, Sam1 and NFC software and App
See section 36.

EXP expansion modules
See page 35-2.

Certifications and compliance
Certifications obtained: cULus, EAC, RCM, LOVAG.
Compliant with standards: IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-4, IEC/EN/BS 60947-1, IEC/EN/BS 60947-6-1, UL508 and CSA C22.2 n° 14.

Expandable with EXP... modules

ATL900

Order code	Description	Qty per pkg	Wt
		n°	[kg]
ATL900	Automatic transfer switch controller (240x180mm/ 9.45"-7.09") with LCD display, optical port and NFC for 3 lines control and 2 tie breakers, 110...240VAC supply and 12/24/48VDC, expandable with EXP... series modules	1	1.800

EXP10...

Order code	Description
EXPANSION MODULES. Snap on fixing of three modules on rear of ATL900. Digital inputs and outputs.	
EXP1000	4 opto-isolated digital inputs
EXP1001	4 opto-isolated static outputs
EXP1002	2 digital inputs and 2 static outputs, opto-isolated
EXP1003	2 relay outputs 5A 250VAC, changeover contact
EXP1006	2 relay outputs, normally open contact 5A 250VAC
EXP1007	3 relay outputs, normally open contact 5A 250VAC
EXP1008	2 opto-isolated digital inputs and 2 5A relay outputs, normally open contact 250VAC
Analogue inputs and outputs.	
EXP1004	2 opto-isolated analogue inputs 0/4...20mA or PT100 or 0...10V or 0...+-5V
EXP1005	2 opto-isolated analogue outputs 0/4...20mA or 0...10V or 0...+-5V
Communication ports.	
EXP1010	Opto-isolated USB interface
EXP1011	Opto-isolated RS232 interface
EXP1012	Opto-isolated RS485 interface
EXP1013	Opto-isolated Ethernet interface
EXP1014	Opto-isolated Profibus-DP interface
EXP1015	GPRS/GSM modem

EXP... expansion module fixing on ATL900

Accessories

51C4

RGKRR

Order code	Description	Qty per pkg	Wt
		n°	[kg]
51C2	Connection cable PC ↔ ATL610/800/900 with EXP1011, length 1.8m	1	0.090
51C4	Connection cable PC ↔ product RS232/RS485, length 1.8m	1	0.147
RGKRR	Remote unit for status and alarms, 12/24 VDC, 12 relay outputs, pulse input	1	0.420

RGKRR is an expansion unit for remote status and alarms.
RGKRR can be connected at a maximum distance of 1000m/39.37" using the static output of the ATL900.
RGK RR has 12 output relays, 7 normally open (2.5A 250VAC/C38) and 5 changeover contacts (5A 250VAC/B300).

General characteristics
The automatic transfer switch controller ATL900 is used for the automatic or manual switching of the load between three lines in accordance with the selected switching logic.
It has outputs for the "automatic" and/or "manual" control of contactors or motorised circuit breakers and switches.
It can also manage two more control devices as tie breakers or non-priority load management. It has four current inputs for managing switching with power thresholds. The layout and system status are displayed directly on the graphic LCD.
The main features are:
- AC and DC supply inputs
- Measurement inputs for three-phase + neutral voltage values; also suitable for 1 and 2 phase lines
- 4 current measurement inputs
- 128x112 pixel backlit graphic LCD to view measurements, events and alarms in 8 languages (English, Italian, French, Spanish, German, Portuguese, Polish and Russian)
- Active operating mode indicator LED
- Viewing of L-L and L-N voltage values of the controlled lines
- Viewing the status of contactors or motorised circuit breakers both via display and LED
- 6 system layouts available
- Management of a tie breaker
- 12 programmable digital inputs
- 10 programmable relay outputs
- 1 static output
- Viewing of L-L and L-N voltage values of the controlled lines
- Configuration programming of lines, type of source (line/generator), control and supervision parameters for emergency demand of generating set
- Possibility of transferring load with closed transition and spontaneous or controlled genset synchronisation
- Non-priority load management
- Built-in programmable PLC logic
- Built-in RS485 communication
- Event logging
- Virtual calendar clock (RTC)
- Communication interface by front optical port using USB CX01 or Wi-Fi CX02 dongle
- Parameter programming via NFC technology and the App NFC downloadable from Google Play Store and App Store
- Compatible with Synergy, supervision and energy management software, Xpress remote control and configuration software and with the Sam1 application for Android/iOS
- Modbus-RTU ASCII and TCP communication protocol.

CONTROL FUNCTIONS OF THE LINES
- Phase sequence and phase loss
- Minimum and maximum voltage
- Voltage asymmetry
- Minimum and maximum frequency.

Operational characteristics
- Power supply:
  - Power supply voltage: 100...240VAC; 12/24/48VDC
- Voltage measurement inputs:
  - Rated voltage Ue: 100...600VAC (L-L)
  - Frequency range: 45...665Hz
- Programmable digital inputs:
  - Negative inputs
- Programmable relay outputs:
  - 3 each with 1 normally open contact (NO - SPST) rated 12A 250VAC
  - 3 each with 1 normally open contact (NO - SPST) rated 8A 250VAC
  - 4 each with 1 changeover contact (NO/NC - SPDT) rated 8A 250VAC
  - 1 30VDC 50mA static output
- Enclosure:
  - Flush-mount housing: 180x240mm/5.7x5.7"
  - IEC degree of protection: IP65 on front; IP20 at back.

Synergy, Synergy Cloud, Xpress, Sam1 and NFC software and App
See section 36.

EXP expansion modules
See page 35-2.

Certifications and compliance
Certifications obtained: cULus, EAC, RCM, LOVAG.
Compliant with standards: IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-4, IEC/EN/BS 60947-1, IEC/EN/BS 60947-6-1, UL508 and CSA C22.2 n° 14.

ATS with ATL600 automatic transfer switch controller type and contactors

ATP...

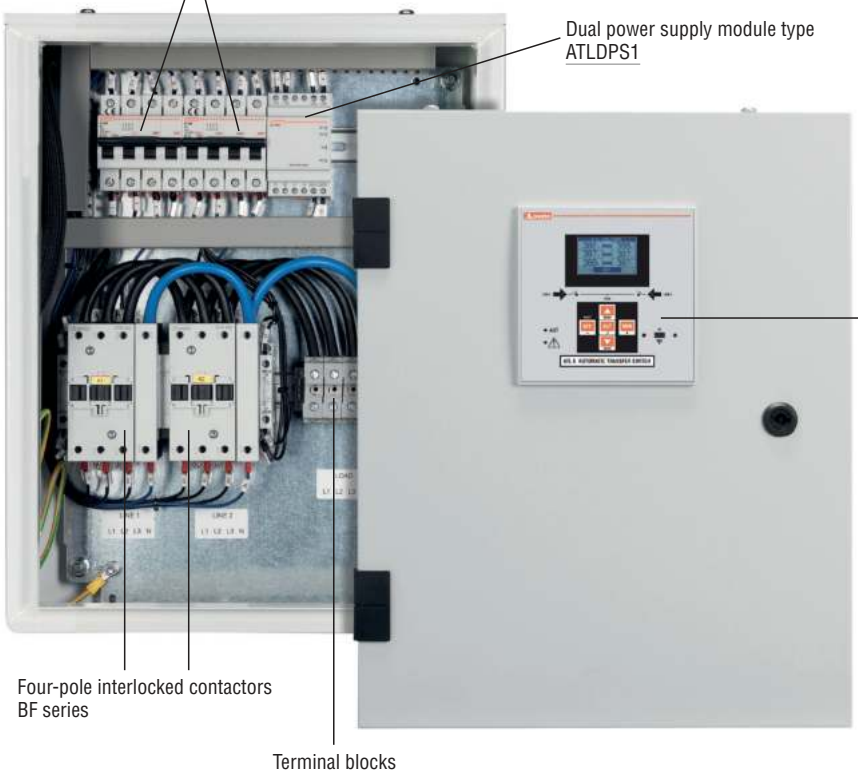
Order code	Operating current AC1	Power (400V)	Dimensions
	[A]	[kVA]	[mm]
Auxiliary supply 230VAC, with four-pole contactors versions.			
ATP0045T4A230C600A	45	31	500x400x200 (19.68x15.75x7.87")
ATP0060T4A230C600A	60	42	500x400x200 (19.68x15.75x7.87")
ATP0080T4A230C600A	80	55	500x400x200 (19.68x15.75x7.87")
ATP0100T4A230C600A	100	69	500x400x200 (19.68x15.75x7.87")
ATP0125T4A230C600A	125	87	600x400x250 (23.62x15.75x9.84")
ATP0160T4A230C600A	160	111	600x400x250 (23.62x15.75x9.84")

General characteristics
The enclosed automatic transfer switches ATP series are supplied in a IP65 metallic enclosure, complete with automatic transfer switch controller type ATL600, four-pole contactors BF series, dual power supply module type ATLDPS1 and miniature circuit breakers (MCB) type P1MB for the protection of the measuring lines.
They are used for the automatic or manual switching of the load between two lines ("MAIN LINE" and "SECONDARY LINE").
They are available in versions from 45 to 160A in four-pole configuration.

CONTROL FUNCTIONS OF THE LINES
– Phase sequence and phase loss
– Minimum and maximum voltage
– Voltage asymmetry
– Minimum and maximum frequency

Operational characteristics
– Power supply:
  • Auxiliary supply voltage: 230VAC (taken from the input lines)
– Voltage measurement inputs:
  • Rated voltage Ue: 100...480VAC (L-L)
  • Measuring range: 50...576VAC (L-L)
  • Frequency range: 45...66Hz
– 6 programmable digital inputs
– 7 programmable relay outputs:
  • 6 each with 1 normally open contact (NO-SPST) rated 8A 250VAC
  • 1 with 1 changeover contact (NO/NC – SPDT) rated 8A 250VAC
– Enclosure:
  • Metallic enclosure
  • Flanges for cable entries in the top and bottom sides
  • PVC locking system with double-comb tool insert
  • Opening with left hinges
  • IEC degree of protection: IP65.

Certifications and compliance
Certification obtained: EAC.
Compliant with standards: IEC/EN/BS 61439-2.



Dual power supply module

Order code	Description	Qty per pkg	Wt
		n°	[kg]
ATLDPS1	For controlling and selecting supply for motorised circuit breakers and changeover switches 110...230VAC configurable	1	0.300

ATLDPS1

	110VAC		230VAC	
	MIN	MAX	MIN	MAX
Line absent	< 88V	> 152V	< 176V	> 288V
Line present	> 92V	< 144V	> 185V	< 273V

Using the thresholds above ATLDPS1 outputs one of the power supplies available according to the logic shown in the table:

Status Line 1	LED Line 1	Status Line 2	LED Line 2	Output	LED Output	ATLDPS1	Alarm contact	LED Fault
OK	ON	<MIN OR >MAX	OFF	ON - from line 1	ON	ON - OK	Closed	OFF
OK	ON	OK	ON	ON - from line 1	ON	ON - OK	Closed	OFF
<MIN OR >MAX	OFF	OK	ON	ON - from line 2	ON	ON - OK	Closed	OFF
<MIN	OFF	<MIN	OFF	OFF	OFF	OFF	Open	OFF
>MAX	OFF	<MIN OR >MAX	OFF	OFF	OFF	ON	Open	ON
<MIN OR >MAX	OFF	>MAX	OFF	OFF	OFF	ON	Open	ON
>MIN	ON	OK	ON	OFF	OFF	ON - Fault Internal relays	Open	ON
		<MIN OR >MAX	OFF					
OK	ON	>MIN	ON	OFF	OFF	ON - Fault Internal relays	Open	ON
<MIN O >MAX	OFF							

General characteristics

ATLDPS1 is capable of measuring and controlling voltages at its inputs selecting the most ideal to connect to the output. It is suitable to supply motorised circuit breakers and changeover switches in automatic switching systems of 2 three-phase supply lines.
The two voltage inputs of the module are independent and insulated; each is capable of supplying the internal measuring circuit managed by the microcontroller.
It reduces the number of components and improves installation safety.
Main ATLDPS1 features include:
- Voltage value selectable via bypass terminals
- Minimum and maximum voltage tripping thresholds
- 2 single-phase L+N inputs
- 1 single-phase L+N output
- L1 priority line
- Use with motorised control units powered at 110VAC or 230VAC
- Output voltage monitoring
- Internal relay self-diagnosis
- Indicating LEDs for abnormal conditions and status of inputs and outputs.

Operational characteristics
- Rated supply voltage: 110...230VAC configurable
- Frequency: 50/60Hz
- Input voltage range: 80...300VAC
- Voltage tripping thresholds min / max: 80% and 120% of preset value
- 2 line inputs L1-L2: Single-phase, between phase and neutral
- Current output: 4A max.
- Priority line: L1 when both input values are within limits
- Fixed delay time between line switching: 0.5s
- 4 status indication LEDs for voltage of each line within limits, voltage present at output, relay output anomaly
- Mounting: 35mm DIN rail (IEC/EN/BS 60715) or screw-type by means of removable clips
- Modular housing, 3 module
- IEC degree of protection: IP40 on front; IP20 at rear.

Certifications and compliance

Certifications obtained: cULus, EAC, RCM, LOVAG.
Compliant with standards: IEC/EN/BS 61010-2-030, IEC/EN/BS 61010-2, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-4, IEC/EN/BS 60947-1, IEC/EN/BS 60947-6-1, UL508 and C22.2 n° 14.

Communication devices

CX01

CX02

CX03

Order code	Description	Qty per pkg	Wt
		n°	[kg]
CX01	USB connection device PC↔ATL600/610/800/900 with optical connector for programming, data download, diagnostics and firmware upgrade	1	0.090
CX02	Wi-Fi connection dongle PC↔ATL600/610/800/900 for data download, diagnostics and firmware upgrade, project upload/ download and cloning	1	0.090
CX03	GSM penta-band antenna (850/900/1800/1900/2100MHz)	1	0.090

General characteristics
For general characteristics of these accessories see section 35.

Gateway data loggers

EXCGLB...

new

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCGLB01	Gateway data logger, 1 RS485 port, 1 Ethernet port, Wi-Fi connection	1	0.190
EXCGLB02	Gateway data logger, 1 RS485 port, 1 Ethernet port, LTE connection, GNSS (GPS)	1	0.190
EXCGLB03	Gateway data logger, 1 RS485 port, 2 Ethernet ports, 4G (LTE) connection	1	0.190

General characteristics
For general characteristics of these accessories see section 34.

Gateway

EXCM4G01

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCM4G01	4G Gateway with RS485 and Ethernet port, Modbus RTU/TCP protocol	1	0.300

General characteristics
For general characteristics of these accessories see section 34.

Converter

EXCCON02

new

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCCON02	RS485/Ethernet converter, 9...48VDC, with Modbus RTU/ TCP protocol conversion functionality	1	0.400

General characteristics
For general characteristics of these accessories see section 34.

Remote control and monitoring GSM modem via SMS

Compliant with Italian CEI 0-16 Standard, paragraph 8.8.6.5 and annex M, resolution 421/2014 of the ARERA

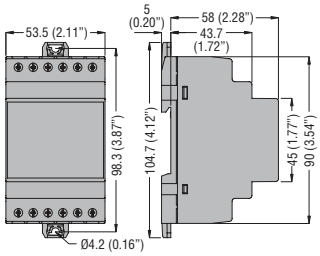
EXCGSM01

Order code	Description	Qty per pkg	Wt
		n°	[kg]
GSM Modem (modular - 4U). IP69K outside aerial with 2.5 m cable. RJ45-USB programming cable (included).			
EXCGSM01	100...240VAC, 1 digital input, 1 analog input (0...10V, 0...20mA, NTC), 1 relay output, receiving and sending SMS messages for remote controls and alarm signals	1	0.340

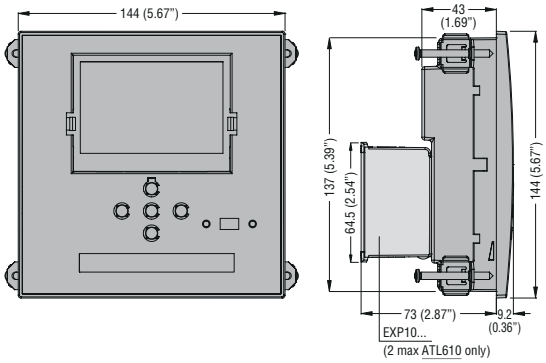
General characteristics
For general characteristics of these accessories see section 34.

AUTOMATIC TRANSFER SWITCH CONTROLLERS

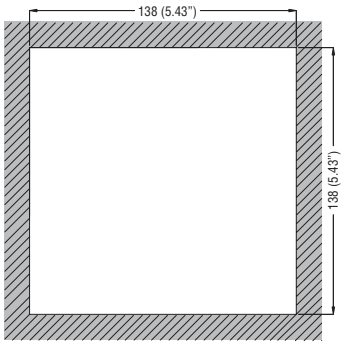
ATL100



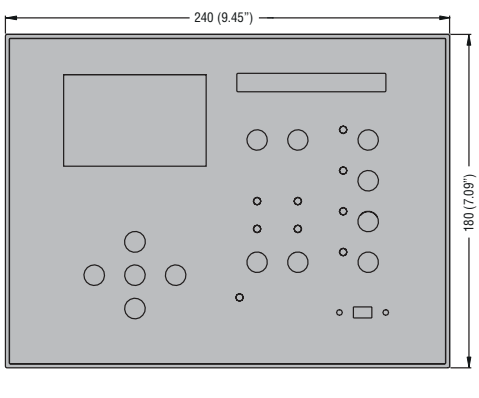
ATL500 - ATL600 - ATL601 - ATL610

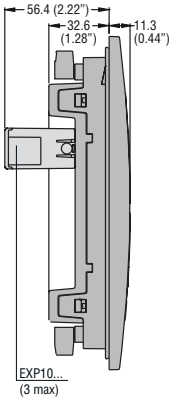


Cutout

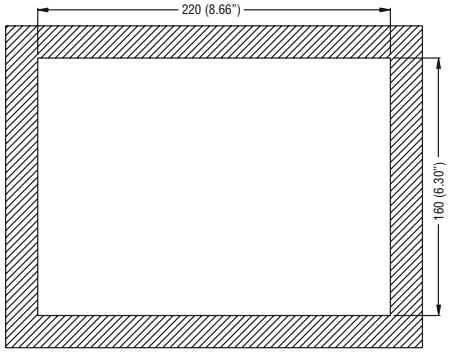


ATL800 - ATL900



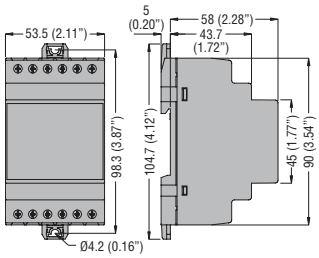


Cutout



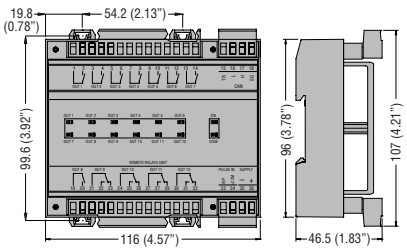
DUAL POWER SUPPLY MODULE

ATLDPS1



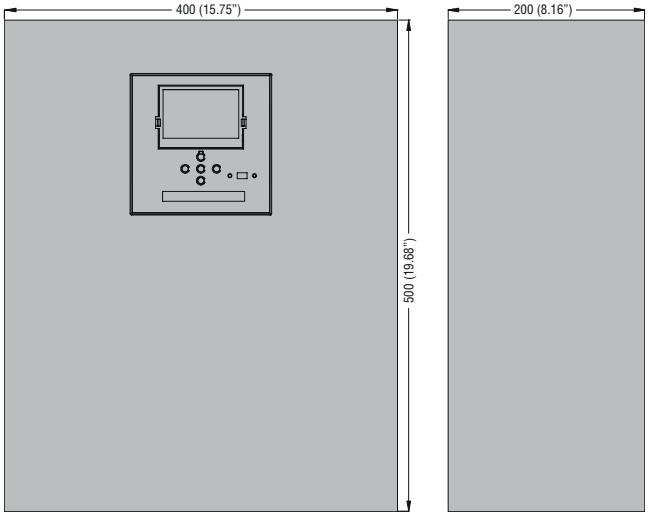
EXPANSION UNIT

RGKRR

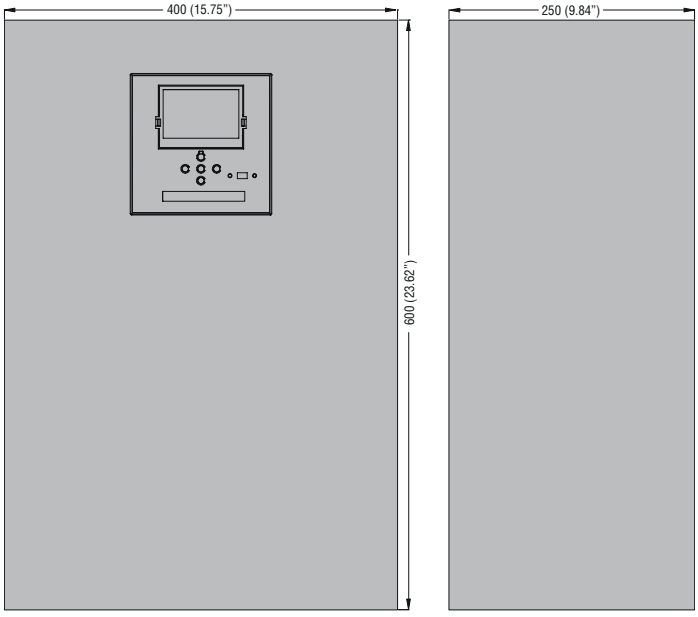


ENCLOSED AUTOMATIC TRANSFER SWITCHES ATS

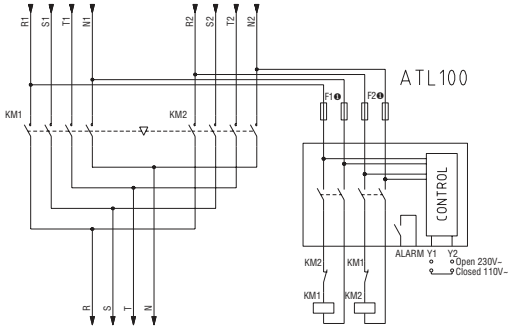
ATP0045... - ATP0060... - ATP0080... - ATP0100...

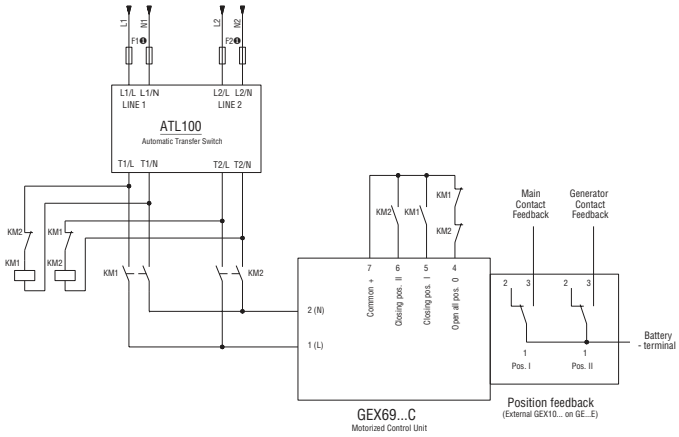


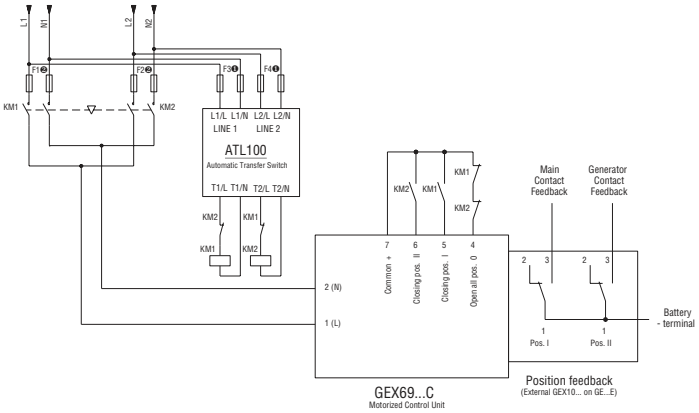
ATP0125... - ATP0160...



ATL100
Connection diagrams

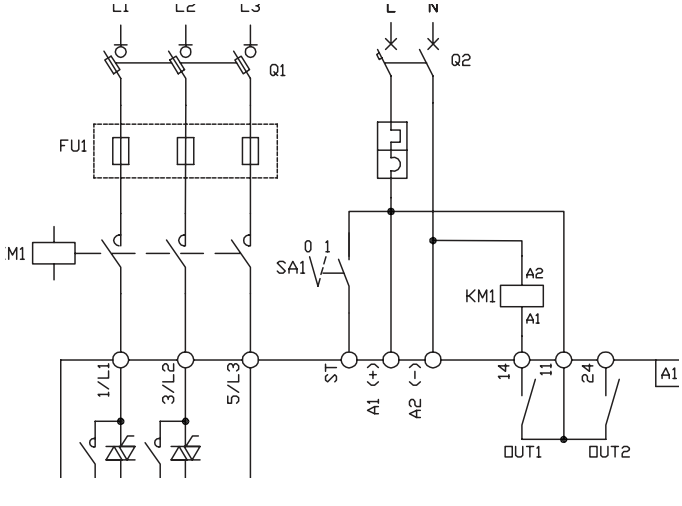




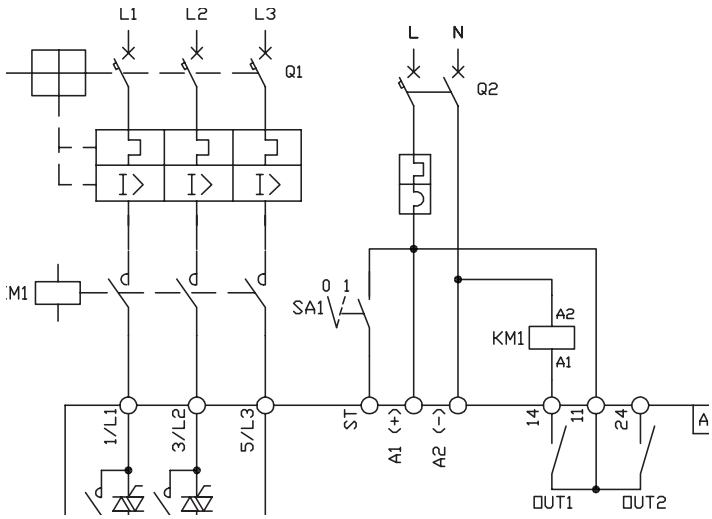


❶ 4A maximum fuses.
❷ 1A maximum fuses.

ATL500 ❸
Connection diagrams
Contactors control



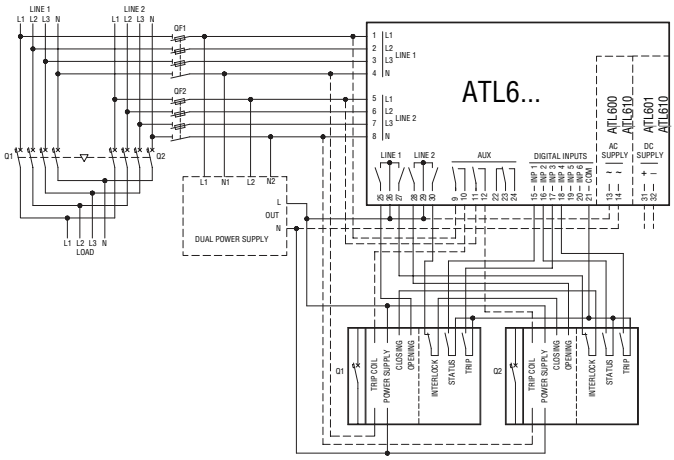
Connection diagrams
Motorised changeover switches control



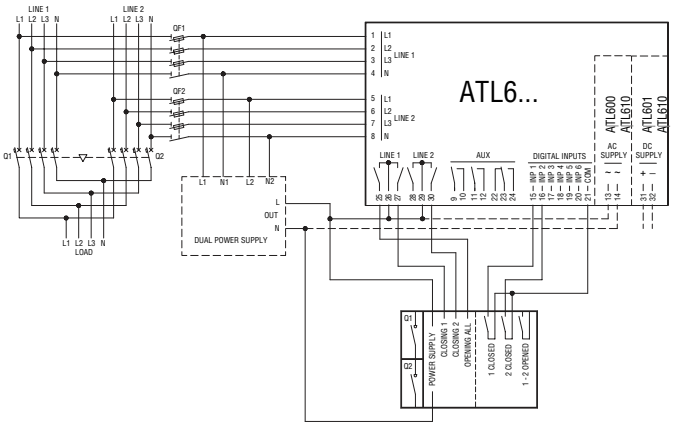
❸ For the correct programming of inputs and outputs, consult the installation manuals available at www.LovatoElectric.com.

ATL600 - ATL601 - ATL610 ❶

Connection diagrams
Motorised breaker control



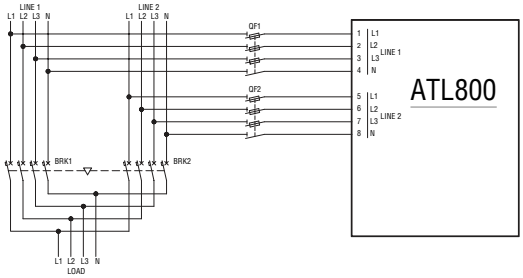
Connection diagrams
Motorised changeover switches control



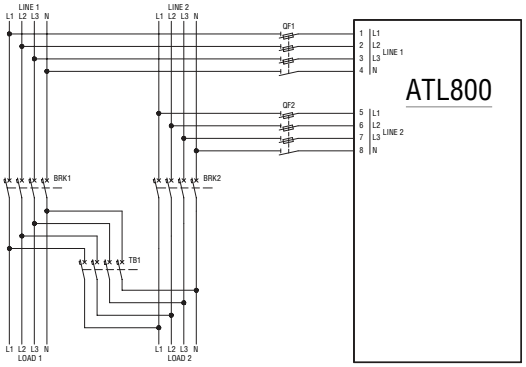
❶ For the correct programming of inputs and outputs, consult the installation manuals available at www.LovatoElectric.com.

ATL800 ❶

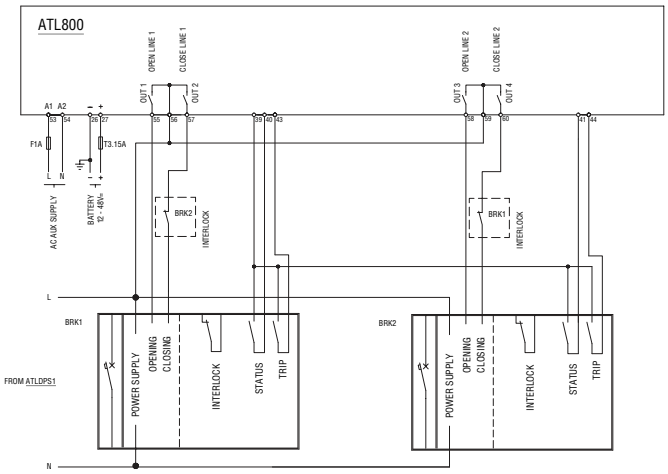
Power connection diagrams
Two breakers



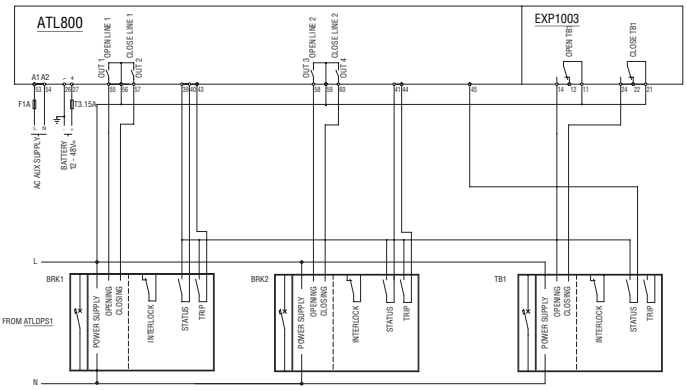
Power connection diagrams
Two breakers and a tie breaker



Control connection diagrams
Two breakers



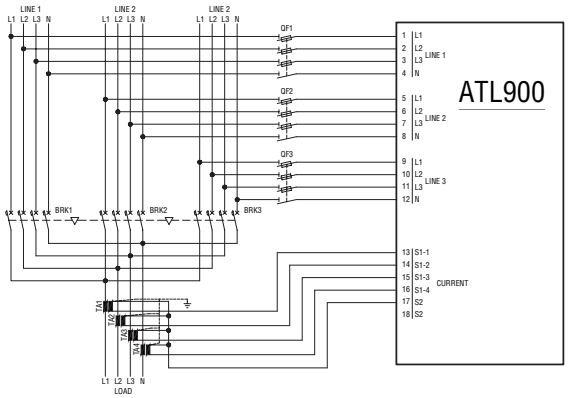
Control connection diagrams
Two breakers and a tie breaker



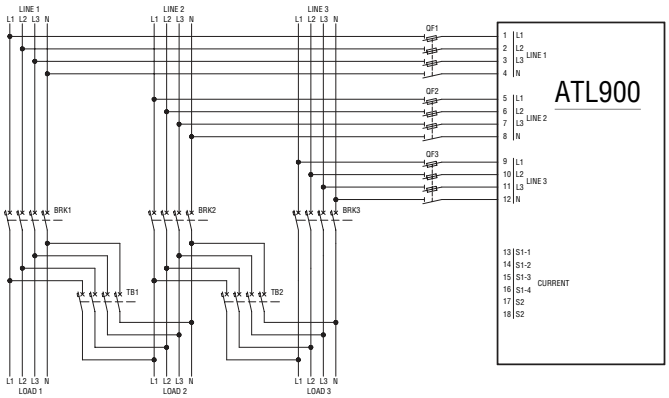
❶ For the correct programming of inputs and outputs, consult the installation manuals available at www.LovatoElectric.com.

ATL900 ❶

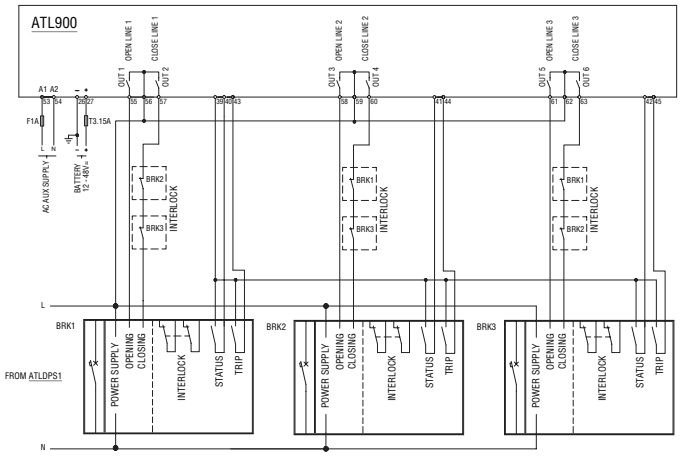
Power connection diagrams
Three breakers



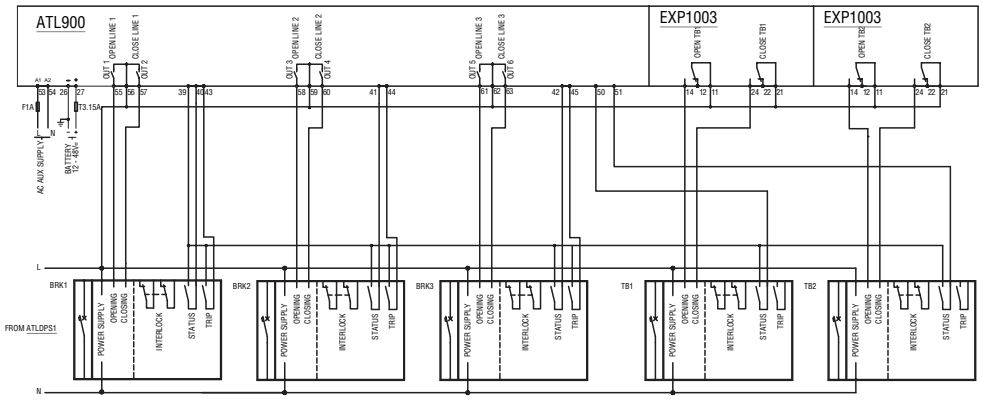
Power connection diagrams
Three breakers and two tie breakers



Control connection diagrams
Three breakers

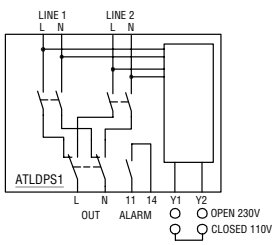


Control connection diagrams
Three breakers and two tie breakers



ATLDPS1 ❶

Connection diagram



❶ For the correct programming of inputs and outputs, consult the installation manuals available at www.LovatoElectric.com.

TYPE	ATL100	ATL500	ATL600 - ATL601 - ATL610	ATL800	ATL900
AC POWER					
IEC rated supply voltage Us	110...230VAC	100...240VAC	100...240VAC (ATL600, ATL610)	100...240VAC	100...240VAC
Operating range	80...300VAC	90...300VAC	90...264VAC (ATL600, ATL610)	90...264VAC	90...264VAC
Frequency	45...66Hz	45...66Hz	45...66Hz	45...66Hz	45...66Hz
Immunity time for micro-breaking	—	≤200ms (110VAC) ≤400ms (220VAC)	≤50ms (110VAC) ≤250ms (220VAC)	≤40ms (110VAC) ≤200ms (220VAC)	≤40ms (110VAC) ≤200ms (220VAC)
Immunity time for micro-breaking (with EXP expansions)	—	—	≤25ms (110VAC) ≤120ms (220VAC)	≤20ms (110VAC) ≤100ms (220VAC)	≤20ms (110VAC) ≤100ms (220VAC)
DC POWER					
Rated battery voltage	—	—	12-24VDC (ATL601, ATL610)	12-24-48VDC	12-24-48VDC
Operating range	—	—	7.5...33VDC (ATL601, ATL610)	7.5...57.6VDC	7.5...57.6VDC
Maximum current consumption	—	—	230mA at 12VDC; 120mA at 24VDC	400mA at 12VAC; 220mA at 24VDC; 100mA at 48VDC	510mA at 12VAC; 260mA at 24VDC; 135mA at 48VDC
Maximum power consumption/dissipation	—	—	2.9W	4.8W	6.5W
VOLTMETER INPUTS					
Maximum rated voltage Ue	110...230VAC	415VAC L-L (240VAC L-N)	480VAC L-L (277VAC L-N)	600VAC L-L (346VAC L-N)	600VAC L-L (346VAC L-N)
Measuring range	80...300VAC	155...519VAC L-L (300VAC L-N)	50...576VAC L-L (333VAC L-N)	50...720VAC L-L (415VAC L-N)	50...720VAC L-L (415VAC L-N)
Frequency range	45...66Hz	45...66Hz	45...66Hz	45...66Hz	45...66Hz
Measurement method	True root mean square (TRMS)	True root mean square (TRMS)	True root mean square (TRMS)	True root mean square (TRMS)	True root mean square (TRMS)
Measuring input impedance	L-N >8MΩ	>0.5MΩ L-N, >1.0MΩ L-L	>0.5MΩ L-N, >1.0MΩ L-L	>0.55MΩ L-N, >1.10MΩ L-L	>0.55MΩ L-N, >1.10MΩ L-L
Wiring method	Single-phase and neutral	Single-phase, two-phase, three-phase line with neutral	Single-phase, two-phase, three-phase line with or without neutral		
AMMETER INPUTS					
Rated current Ie	—	—	—	—	1A~ or 5A~
Measuring range	—	—	—	—	for scale 5A: 0.02 - 6A~ for scale 1A: 0.02 - 1.2A~
Type of input	—	—	—	—	Shunt supplied by current transformer external (low voltage) 5A max.
Measurement type	—	—	—	—	True root mean square (TRMS)
Overload capacity	—	—	—	—	-20% Ie
Overload peak	—	—	—	—	50A for 1 second
Burden	—	—	—	—	<0.6VA
MEASUREMENT ACCURACY					
Mains and genset voltage	±0.25% f.s.	±0.25% f.s.	±0.25% f.s. ±1 digit	±0.25% f.s. ±1 digit	±0.25% f.s. ±1 digit
DIGITAL INPUTS					
Number of inputs	—	2	6	8	12
Type of input	—	Negative	Negative	Negative	Negative
Input current	—	≤5mA	<8mA	<8mA	<8mA
Low input signal	—	≤2.6V	≤2.2V	≤2.2V	≤2.2V
High input signal	—	≥3.1V	≥3.4V	≥3.4V	≥3.4V
Input signal delay	—	≥50ms	≥50ms	≥50ms	≥50ms
CALENDAR CLOCK					
Backup reserve power	—	—	Backup capacitor (ATL610)	Backup capacitor	Backup capacitor
Operation without power voltage	—	—	5 min approx. (ATL610)	14 days approx.	14 days approx.
RELAY OUTPUTS					
Number of outputs	3	3	7	7	10
Configuration	– 2NO: AC1 - 4A 250VAC; 1.5A 250V~ AC15 – 1NO: AC1 - 3A 250VAC; DC1 - 3A 30VDC	– 2NO: AC1 - 8A 250VAC; AC15 -1.5A 250VAC; – 1 changeover: AC1 - 8A 250VAC, DC1 - 8A 30VDC; AC15 - 1.5A 250VAC	– 6NO: AC1 - 8A 250VAC; AC15 -1.5A 250VAC; B300 – 1 changeover: AC1 - 8A 250VAC, DC1 - 8A 30VDC; AC15 - 1.5A 250VAC, B300 30VDC1A Auxiliary service	– 2NO: AC1 - 12A 250VAC; AC15 - 1.5A 250VAC; B300 – 2NO: AC1 - 8A 250VAC; AC15 - 1.5A 250VAC; B300 – 3 changeover: AC1 - 8A 250VAC, DC1 - 8A 30VDC; AC15 - 1.5A 250VAC; B300 30VDC 1A Auxiliary service	– 3NO: AC1 - 12A 250VAC; AC15 - 1.5A 250VAC; B300 – 3NO: AC1 - 8A 250VAC; AC15 - 1.5A 250VAC; B300 – 4 changeover: AC1 - 8A 250VAC, DC1 - 8A 30VDC; AC15 - 1.5A 250VAC; B300 30VDC 1A Auxiliary service
Mechanical / electrical endurance	$1x10^7$ / $1x10^5$ operations	$1x10^7$ / $1x10^5$ operations	$1x10^7$ / $1x10^5$ operations	$1x10^7$ / $1x10^5$ operations	$1x10^7$ / $1x10^5$ operations

TYPE	ATL100	ATL500	ATL600 - ATL601 - ATL610	ATL800	ATL900
STATIC OUTPUT					
Output type	—	—	—	—	NO
Operating voltage	—	—	—	—	10-30V
Maximum current	—	—	—	—	50mA
AMBIENT CONDITIONS					
Operating temperature	-30...+70°C				
Storage temperature	-30...+80°C				
Relative humidity	<80% (IEC/EN/BS 60068-2-78)				
Maximum pollution degree	2				
Overvoltage category	3				
Climatic sequence	III				
Climatic sequence	Z/ABDM (IEC/EN/BS 60068-2-61)				
Shock resistance	15g (IEC/EN/BS 60068-2-27)				
Vibration resistance	0.7g (IEC/EN/BS 60058-2-6)				
HOUSING					
Version	Modular housing 3 modules (DIN 43880)	Flush-mount			
Material	Polyamide RAL 7035	Polycarbonate			
IEC degree of protection	IP40 on front IP20 on terminals	IP40 on front IP65 with optional gasket IP20 on terminals		IP65 on front IP20 on terminals	
Weight	300g	580g	600g (ATL600 - ATL601) 680g (ATL610)	1000g	1090g
CERTIFICATIONS AND COMPLIANCE					
Certifications obtained	EAC	EAC, RCM	cULus, RCM (except ATL601), EAC, LOVAG (ATL610, ATL800, ATL900)		
Compliance with standards	IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-4, IEC/EN/BS 60947-1, IEC/EN/BS 60947-6-1	IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, IEC/EN/BS 60947-1, IEC/EN/BS 60947-6-1	IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 61010-2, IEC/EN/BS 61000-6-2,IEC/EN/BS 61000-6-4, IEC/EN/BS 60947-1, IEC/EN/BS 60947-6-1, UL508 e CSA C22.2 n°14		

Engine and generator controllers

- Extensive selection of functions to satisfy all application requirements
- Power supply range 12-24VDC for each single product
- Totally programmable inputs, outputs and alarms
- RS232, RS485, USB, Ethernet communication interface
- Engine control by CANbus
- Setup and supervision software
- Modem control for sending alarm messages and emails.

Engine and generator controllers — SEC. - PAGE

Engine protection controllers ..... 32 - 6
Stand alone gen-set controllers ..... 32 - 7
Automatic mains failure (AMF) gen-set controllers ..... 32 - 8
Paralleling controllers for mains-generator and generator-generator ..... 32 - 9
Remote and alarm-status relay units ..... 32 - 10
Communication devices, gateway data loggers, gateway, converter, GSM modem ..... 32 - 11
Software ..... 32 - 12

Dimensions ..... **32 - 13**

Page 32-6

STAND ALONE GEN-SET CONTROLLERS

- Generator voltage and current control
- Engine protection
- Programmable inputs and outputs
- Programmable alarm properties.

Page 32-8

AUTOMATIC MAINS FAILURE (AMF) GEN-SET CONTROLLERS

- Automatic starting of generator and load switching to stand-by emergency source in case of mains failure
- Management in “open transition” for contactors, motorised circuit breakers and motorised changeover switches
- Engine protection
- Programmable inputs, outputs and alarms.

Page 32-9

PARALLELING CONTROLLERS FOR MAINS-GENERATOR AND GENERATOR-GENERATOR

- Mains-generator synchronising “closed transition”
- Mains-generator load sharing with source peak demand control
- Generator paralleling management (island mode with load sharing).

Page 32-10

REMOTE UNITS

- Remote viewing and control panels
- Remote annunciator for alarm and status indication
- Digital outputs for alarm and status condition remotely.

Page 32-11

COMMUNICATION DEVICES, GATEWAYS AND SOFTWARE

- Communication interfaces
- Additional digital and analog inputs and outputs
- GPRS-GSM module
- Setup and supervision software
- APP.

	STAND ALONE GEN-SET CONTROLLERS			
	RGK400SA RGK420SA	**RGK600SA RGK601SA**	**RGK700SA**	**RGK800SA**
Generator voltage control	L1-L2-L3-N	L1-L2-L3-N	L1-L2-L3-N	L1-L2-L3-N
Current control	L1	L1-L2-L3	L1-L2-L3	L1-L2-L3-N
Rated frequency	50/60Hz	50/60Hz	50/60Hz	50/60/400Hz
Digital inputs n°	5 neg.+1 pos. (emergency)	4 neg.+1 pos. (emergency)	6 neg.+1 pos. (emergency)	8 neg.+1 pos. (emergency)
Digital outputs n°	5 (SSR)	6 (SSR)	3 (Relay) + 4 (SSR)	3 (Relay)+6 (SSR)+1(SO)
Engine running inputs	"D+", Hz	"D+", Hz	"D+", "AC", Hz	"D+", "AC", Hz
Ohmic inputs for fuel-pressure-temperature (programmable as digital inputs)	1+2 (EXP1040)	●	●	●
Remote supervision	–	–	●	●
CANbus interface	–	RGK601SA	●	●
Rated battery voltage	12/24VDC	12/24VDC	12/24VDC	12/24VDC
Power supply range	7...33VDC	7...33VDC	7...33VDC	7...33VDC
Mains voltage control	–	–	–	–
Rated voltage range	100...480VAC	100...480VAC	30...600VAC	30...600VAC
VT programming	●	●	●	●
Rated input current	5A/1A	5A/1A	5A/1A	5A/1A
TRMS voltage measurement	●	●	●	●
TRMS current measurement	●	●	●	●
Display	LCD with icons and backlight	Graphic backlight LCD, 128x80 pixels	Graphic backlight LCD, 128x80 pixels	Graphic backlight LCD, 128x80 pixels
Engine running magnetic pick-up input	●	RGK600SA	●	●
Engine speed input	"W" or generator frequency or "Pick-up"	"W" or generator frequency or "Pick-up" (RGK600SA)	"W" or generator frequency or "Pick-up"	"W" or generator frequency or "Pick-up"
Auxiliary analog input	–	–	–	●
I/O expansion	1 x EXP1040	RGKRR	RGKRR	3 x EXP... + RGKRR
USB/Optical port on front	●	●	●	●
Wi-Fi port on front	●	●	●	●
USB port at rear	–	–	–	EXP1010
Ethernet port with Web server function	–	–	–	EXP1013
GPRS/GSM modem	–	–	–	EXP1015
RS232 serial port	–	–	●	EXP1011
RS485 serial port	–	–	–	●
Event logging	–	●	●	●
RTC (Real Time Clock)	–	–	–	●
Programmable Inputs/Outputs	●	●	●	●
PLC logic function	–	–	●	●
Alarms	●	●	●	●
User alarms n°	2	4	8	8
Alarm property customising	●	●	●	●
Texts for alarms, events and parameters	●	●	●	●
Multilanguage (type) n°	5 (GB - I - F - E - D)	5 (GB - I - F - P - E)❶	5 (GB - I - F - P - E)❶	5 (GB - I - F - P - E)❶
Upload languages	–	●	●	●
Load sharing	–	–	–	–
Generator paralleling	–	–	–	–
Mains-generator synchronising (closed transition)	–	–	–	–
IEC front degree of protection	IP40, IP65 with optional gasket seal❷	IP40, IP65 with optional gasket seal	IP65	IP65
Certifications	cULus, EAC	cULus, EAC	cULus, EAC	cULus, EAC

❶ Controller uploading of other mutilanguage sets.
❷ For RGK400SA only.

	AUTOMATIC MAINS FAILURE (AMF) GEN-SET CONTROLLERS				PARALLELING / LOAD SHARING CONTROLLERS	
	RGK600 RGK601 RGK610	**RGK700**	**RGK750**	**RGK800**	**RGK900**	**RGK900SA**
Generator voltage control	L1-L2-L3-N	L1-L2-L3-N	L1-L2-L3-N	L1-L2-L3-N	L1-L2-L3-N	L1-L2-L3-N
Current control	L1-L2-L3	L1-L2-L3	L1-L2-L3	L1-L2-L3-N	L1-L2-L3-N	L1-L2-L3-N
Rated frequency	50/60Hz	50/60Hz	50/60Hz	50/60/400Hz	50/60/400Hz	50/60/400Hz
Digital inputs n°	4 neg.+1 pos. (emergency)	6 neg.+1 pos. (emergency)	8 neg.+1 pos. (emergency)	8 neg.+1 pos. (emergency)	12 neg.+1 pos. (emergency)	12 neg.+1 pos. (emergency)
Digital outputs n°	6 (SSR)	3 (Relay) + 4 (SSR)	3 (Relay) + 6 (SSR) + 1(SO)	3 (Relay) + 6 (SSR) + 1(SO)	3 (Relay) + 6 (SSR) + 1(SO)	3 (Relay) + 6 (SSR) + 1(SO)
Engine running inputs	"D+", Hz	"D+", "AC", Hz	"D+", "AC", Hz	"D+", "AC", Hz	"D+", "AC", Hz	"D+", "AC", Hz
Ohmic inputs for fuel-pressure-temperature	●	●	●	●	●	●
Remote supervision	RGK610	●	●	●	●	●
CANbus interface	RGK601	●	●	●	●	●
Rated battery voltage	12/24VDC	12/24VDC	12/24VDC	12/24VDC	12/24VDC	12/24VDC
Power supply range	7...33VDC	7...33VDC	7...33VDC	7...33VDC	7...36VDC	7...36VDC
Mains voltage control	L1-L2-L3-N	L1-L2-L3-N	L1-L2-L3-N	L1-L2-L3-N	L1-L2-L3-N	–
Rated voltage range	100...480VAC	30...600VAC	100...480VAC	30...600VAC	30...600VAC	30...600VAC
VT programming	●	●	●	●	●	●
Rated input current	5A/1A	5A/1A	5A/1A	5A/1A	5A/1A	5A/1A
TRMS voltage measurement	●	●	●	●	●	●
TRMS current measurement	●	●	●	●	●	●
Display	Graphic backlight LCD, 128x80 pixels	Graphic backlight LCD, 128x80 pixels	Graphic backlight LCD, 128x80 pixels	Graphic backlight LCD, 128x80 pixels	Graphic backlight LCD, 128x112 pixels	Graphic backlight LCD, 128x112 pixels
Engine running magnetic pick-up input	RGK600/RGK610	●	●	●	●	●
Engine speed input	"W"/"Pick-up" (RGK600/RGK610) or generator frequency	"W" or generator frequency or "Pick-up"	"W" or generator frequency or "Pick-up"	"W" or generator frequency or "Pick-up"	"W" or generator frequency or "Pick-up"	"W" or generator frequency or "Pick-up"
Auxiliary analog input	–	–	●	●	●	●
I/O expansion	1 x EXP... + RGKRR	RGKRR	2 x EXP... + RGKRR	3 x EXP... + RGKRR	4 x EXP... + RGKRR	4 x EXP... + RGKRR
USB/Optical port on front	●	●	●	●	●	●
Wi-Fi port on front	●	●	●	●	●	●
USB port at rear	EXP1010 (RGK610)	–	EXP1010	EXP1010	EXP1010	EXP1010
Ethernet port with Web server function	–	–	EXP1013	EXP1013	EXP1013	EXP1013
GPRS/GSM modem	–	–	EXP1015	EXP1015	EXP1015	EXP1015
RS232 serial port	EXP1011 (RGK610)	●	EXP1011	EXP1011	EXP1011	EXP1011
RS485 serial port	EXP1012 (RGK610)	–	EXP1012	●	●	●
Event logging	●	●	●	●	●	●
RTC (Real Time Clock)	–	–	●	●	●	●
Programmable Inputs/Outputs	●	●	●	●	●	●
PLC logic function	–	●	●	●	●	●
Alarms	●	●	●	●	●	●
User alarms n°	4	8	8	8	16	16
Alarm property customising	●	●	●	●	●	●
Texts for alarms, events and parameters	●	●	●	●	●	●
Multilanguage (type) n°	5 (GB - I - F - P - E)❶	5 (GB - I - F - P - E)❶	5 (GB - I - F - P - E)❶	5 (GB - I - F - P - E)❶	5 (GB - I - F - P - E)❶	5 (GB - I - F - P - E)❶
Upload languages	–	●	●	●	●	●
Load sharing	–	–	–	–	●	●
Generator paralleling	–	–	–	–	–	
Mains-generator synchronising (closed transition)	–	–	–	–	●	–
IEC front degree of protection	IP40, IP65 with optional gasket seal	IP65	IP65	IP65	IP65	IP65
Certifications	cULus, EAC	cULus, EAC		cULus, EAC	cULus, EAC	cULus, EAC

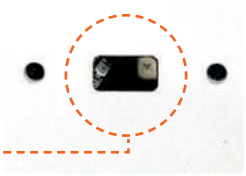
A SUPERIOR CLASS!

CUSTOMISING OPTION

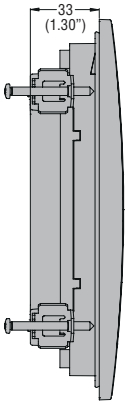
There is a customising slot available on the front to show controller brand name, logo, trademark, part number, brief indication or wording, etc.

PROGRAMMING OPTICAL PORT

The optical port on the panel front, using a standard USB or Wi-Fi point, allows communication with a PC, smartphone and tablet, to carry out programming, diagnostics and data download, without removing power to the electric panel.

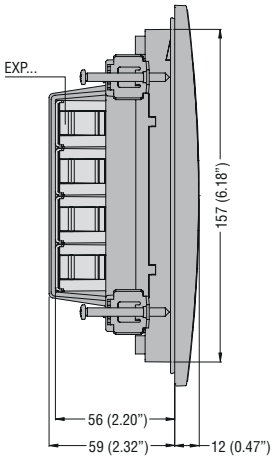


COMPACT SIZE



RGK700
RGK800
RGK900

Slim frame profile and reduced total depth simplify installation of the controllers in very compact electric panels.



RGK800
RGK900

IP65 DEGREE OF PROTECTION

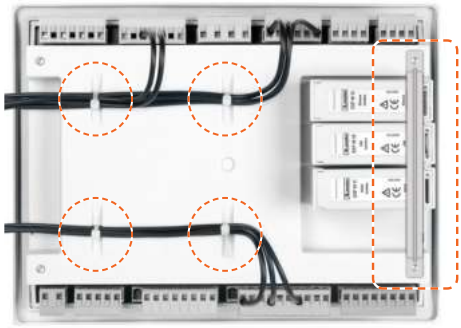
The controller front and the internal display frame seal have been designed to warrant an **IP65** protection degree. This with the **UV film** also allow outdoor installation.

INSTALLATION

The fixing with **metal screws** guarantees excellent adhesion over time.

CABLING AND EXPANSION MODULE FIXING SYSTEM

The controller rear has 4 fitting slots to secure cables connected to the terminals with cable ties, in an orderly way inside the electric panel. In addition, a plastic retainer is supplied as standard to keep the expansion modules in place when installed in applications with strong vibrations.



RGK800
RGK900

EXPANDABILITY

Basic RGK750, RGK800 and RGK900 controller functions can be easily extended using up to 4 EXP series expansion modules:
- Digital and analog inputs and outputs
- Opto-isolated static outputs
- Relay outputs
- Opto-isolated RS232 interface
- Opto-isolated RS485 interface
- Opto-isolated Ethernet interface
- GPRS/GSM modem.

RGK750 (2 modules)
RGK800 (3 modules)
RGK900 (4 modules)

Engine and generator controllers

RGK700 - 750 - 800 - 900

EXPANDABILITY

An extensive selection of modules is available to increase the controller functionality.

GPRS/GSM MODEM

Among the expansion modules, there is a GPRS/GSM modem, automatically configured by the genset controller.

MAINTENANCE

Maintenance supervision at programmed intervals.

STREAMLINE DESIGN

The controller has an ergonomic design and, at the same time, particular care has been given to details.

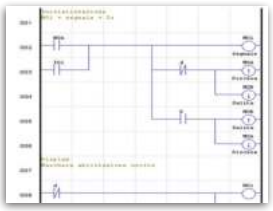
GPRS/GSM MODEM

Once a data-enabled SIM card is inserted, RGK750 - RGK800 - RGK900 controllers can send SMS with alarm and event conditions as well as the latest logged events to a FTP server.

CANBUS COMMUNICATION PORT

Most models are standard equipped with CAN-J1939 communication port.

PLC FUNCTION



Capability to combine together internal status of controllers with signals incoming from the field to activate outputs and generate alarms.

LOAD MANAGEMENT

There are different methods of controlling the load conditions; each controller has special parameters functions as follows:
- RGK700 - RGK750 - RGK800 types: load shedding and dummy load modes
- RGK900 types: base-load and peak shaving modes.

PARALLELING

RGK900 and RGK900SA controllers can control the switching between the mains and generators without having to switch off the power supply to the load.
In addition, they can control the paralleling connection of two or more generators sharing in this way the load on more than one source.
The RGK900MC can control and synchronise mains parallel operation with a power bus composed by a series of generating sets.

REMOTE UNITS

Remote display panels

There are "**mirror**" display units available to remotely operate as if in front of the generating set.

Remote annunciator

A remote display can view alarm conditions and can be operated for silencing them.

Alarm-state relay unit

The relay unit allows to transmit, on voltage-free contacts, the status and alarms of RGK... controllers.

SUPERVISION SOFTWARE

Synergy is web-based and provides for an easy and efficient way to monitor and control electrical installations as well as field equipment.

It is a server-multiclient system based on MS SQL RDBMS with web-browser interface.
Simultaneous management of different communication channels with independent configuration (protocols, speed rate, RS232, RS485, Ethernet, modem) is possible.
Live page view, data log tables, charts and alarms are available.

CLOUD SOLUTION

The supervision software is ready as Synergy Cloud solution as well, so that the user does not have to install any package on its own servers.

CONFIGURATION AND REMOTE CONTROL SOFTWARE

Xpress is a parameter configuration and remote monitoring software shared by the entire latest generation of RGK gen-set controllers with communication port.

Engine protection controllers

NFC

RGK400SA

NFC

RGK420SA

Order code	Description	Qty per pkg	Wt
		n°	[kg]
RGK400SA	12/24VDC, icon LCD display	1	0.410
RGK420SA	12/24VDC, icon LCD display, built-in 3 position key switch	1	0.430

The app can be downloaded from Google Play Store and App Store.

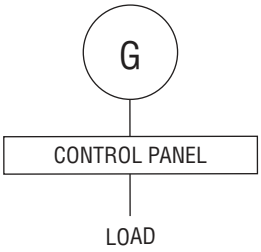
ANDROID APP ON Google play

Available on the App Store

EXP10…

Order code	Description
ACCESSORIES FOR RGK4...SA	
RGK400SA	12/24VDC, icon LCD display
EXPANSION MODULES FOR RGK4...SA Inputs and outputs.	
EXP1040	2 digital/resistive inputs, 2 static outputs
EXP1043T	4 digital input and 2 static outputs, PCB tropicalized
Communications interfaces.	
EXP1010	Opto-isolated USB interface
EXP1011	Opto-isolated RS232 interface
EXP1012	Opto-isolated RS485 interface
EXP1013	Ethernet interface
EXP1015	GPRS/GSM modem

STAND ALONE APPLICATION



General characteristics for RGK400SA - RGK420SA

- Key with 3 positions (OFF, local start, remote start), removable in OFF and remote start position (for RGK420SA)
- Power supply: 7...33VDC
- VAC inputs: Generator L1-L2-L3-N
- Single, two and three phase voltage control
- Rated measurement voltage range: 100...480VLL (3PH+N)
- Programmable VT ratio
- Frequency measurement range: 45...65Hz
- Current input: 1PH, /5A or /1A
- Display: LCD with icons (52x35mm/2.05x1.38")
- Programming port: IR with support of CX01 (USB) and CX02 (Wi-Fi) dongles
- NFC technology for parameter setup
- Powersave mode
- Inputs: 5 negative + 1 positive for emergency
- Outputs: 5 positive, 2A, protected
- Common pin dedicated to EV and START outputs to be used with emergency push button
- Engine running detection: "D+", Hz
- Engine speed inputs: "W" or Magnetic "Pick-up"
- 1 analog ohmic input for oil pressure, engine temperature or fuel level control
- Alarm and parameter text in 5 languages
- Customisable alarm text (2 alarms)
- Operating temperature: -30...+60°C
- Parameter configuration by NFC technology with NFC App freely downloadable from Google Play Store and App Store
- Compatible with Xpress software.

Certification and compliance

Certifications obtained: IEC/BS 61010-1, IEC/BS 61010-2-030, IEC/BS 61000-6-2, IEC/BS 61000-6-4, UL508, CSA C22.2 n. 14.

Accessories

EXP8005

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXP8005	IP65 110mm/4.33" housing gasket for RGK4...SA	1	0.009

Stand alone gen-set controllers

RGK600SA - RGK601SA

RGK700SA - RGK800SA

Order code	Description	Qty per pkg	Wt
		n°	[kg]
RGK600SA	12/24VDC, graphic LCD display, w/Pick-up speed input	1	0.540
RGK601SA	12/24VDC, graphic LCD display, CANbus port	1	0.530
RGK700SA	12/24VDC, graphic LCD display, RS232 serial port, CANbus port	1	0.900
RGK800SA	12/24VDC, graphic LCD display, RS485 serial port, CANbus port. Expandable with EXP... modules	1	0.980

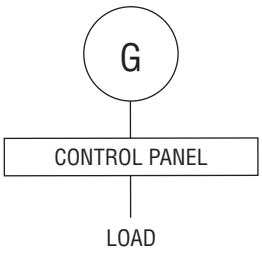
Programmable functions and properties

Charact.	RGK6...SA	RGK700SA	RGK800SA
Inputs	4	6	8
Relay outputs	–	3	3
Protected static outputs	6	4	7
Resistive/ Digital inputs	3	3	4

EXP10...

Order code	Description
ACCESSORIES FOR RGK600SA AND RGK601SA	
EXP8001	IP65 housing gasket
EXPANSION MODULES FOR RGK800SA Inputs and outputs.	
EXP1041	2 thermocouple inputs, 2 static outputs
EXP1042T	6 digital inputs, PCB tropicalized
EXP1043T	4 digital input and 2 static outputs, PCB tropicalized
Inputs and outputs.	
EXP1000	4 opto-isolated digital inputs
EXP1001	4 opto-isolated static outputs
EXP1002	2 digital inputs and 2 static outputs, opto-isolated
EXP1003	2 relay outputs rated 5A 250VAC
EXP1004	2 opto-isolated analog inputs 0/4-20mA or PT100 or 0-10V or 0...±5V
EXP1005	2 opto-isolated analog outputs 0/4-20mA or 0-10V or 0...±5V
EXP1008	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC
Communications interfaces.	
EXP1010	Opto-isolated USB interface
EXP1011	Opto-isolated RS232 interface
EXP1012	Opto-isolated RS485 interface
EXP1013	Ethernet interface
EXP1015	GPRS/GSM modem

STAND ALONE APPLICATION



Accessories

EXP8001

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXP8001	IP65 gasket seal for RGK600..., RGK601... and RGK610 controllers	1	0.009

General characteristics for RGK600SA - RGK601SA - RGK700SA - RGK800SA

- Power supply: 7...33VDC
- VAC inputs: Generator L1-L2-L3-N
- Single, two and three phase voltage control
- Rated measurement voltage range:
  - 100...480VAC for RGK600SA and RGK601SA
  - 30...600VAC for RGK700SA and RGK800SA
- Programmable VT ratio
- Frequency measurement range: 45...65Hz
- Current input: 3PH, /5A or /1A
- Graphic LCD: 128x80 pixels with backlight
- Programming port: IR with support of CX01 (USB) and CX02 (Wi-Fi) dongles
- Common pin dedicated to EV and START outputs to be used with emergency push button
- Engine running detection: "D+", Hz
- Engine speed inputs: "W" or Magnetic "Pick-up" (RGK601SA excluded)
- 1 CANbus-J1939 port (RGK600SA excluded)
- 3 analog ohmic inputs for oil pressure, engine temperature and fuel level control
- 1 built-in alarm remote port
- Non-volatile memory for event storage
- Alarm, event and parameter text in 5 languages
- Customisable alarm text (8 alarms)
- Operating temperature: -30...+70°C
- Modbus-RTU and Modbus-ASCII protocols
- Compatible with Synergy, Synergy Cloud and Xpress software.

For RGK700SA – RGK800SA only

- PLC logic for inputs, outputs and internal status
- 1 communication port: RS232 for RGK700SA; RS485 for RGK800SA
- Degree of protection: IEC IP65 on front; suitable for use with UL/CSA Type 4X outdoor enclosure installation.

For RGK800SA only

- Neutral current measurement range: 0.050...6A or 0.050...1.2A
- 400Hz frequency support
- 1 programmable analog input
- Modbus-TCP communication protocol
- Current leakage control towards earth/ground
- Clock-calendar (RTC)

Certification and compliance

Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices - Generator controllers; EAC. Compliant with standards for RGK600/601: IEC/BS 61010-1, IEC/BS 61010-2-030, IEC/BS 61000-6-2, IEC/BS 61000-6-3, UL508, CSA C22.2 n. 14.
Compliant with standards for RGK700 and RGK800: IEC/BS 61010-1, IEC/BS 61000-6-2, IEC/BS 61000-6-3, UL508, CSA C22.2 n. 14.

Synergy, Synergy Cloud, and Xpress software
See Section 36.

EXP series expansion modules
See Section 35, page 2.

Automatic mains failure (AMF) gen-set controllers

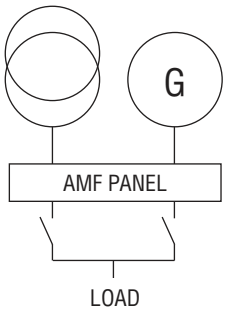
RGK600 - RGK601 - RGK610

RGK700 - RGK800

RGK750

EXP10...

AMF (AUTOMATIC MAINS FAILURE) APPLICATION



Order code	Description	Qty per pkg	Wt
		n°	[kg]
RGK600	W/Pick-up speed input	1	0.540
RGK601	CANbus port	1	0.540
RGK610	W/Pick-up speed input, expandable with EXP... modules	1	0.600
RGK700	RS232 serial port, CANbus port	1	0.880
RGK750	CANbus port, expandable with EXP... modules	1	0.960
RGK800	RS485 serial port, CANbus port, expandable with EXP... modules	1	0.960

Programmable functions and properties

Characteristic	RGK600 RGK601 RGK610	RGK700	RGK750	RGK800
Inputs	4	6	8	8
Relay outputs	–	3	3	3
Protected static outputs	6	4	7	7
Resistive/ Digital inputs	3	3	3	4

Order code	Description
EXPANSION MODULES FOR RGK610, RGK750 AND RGK800 Communications interfaces.	
EXP1010	Opto-isolated USB interface
EXP1011	Opto-isolated RS232 interface
EXP1012	Opto-isolated RS485 interface
Inputs and outputs.	
EXP1042T	6 digital inputs, PCB tropicalized
EXP1043T	4 digital input and 2 static outputs, PCB tropicalized
EXPANSION MODULES FOR RGK750 Inputs and outputs.	
EXP1000	4 opto-isolated digital inputs
EXP1001	4 opto-isolated static outputs
EXP1002	2 digital inputs and 2 static outputs, opto-isolated
EXP1003	2 relay outputs rated 5A 250VAC
EXP1008	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC
EXPANSION MODULES FOR RGK800 Inputs and outputs.	
EXP1004	2 opto-isolated analog inputs 0/4-20mA or PT100 or 0-10V or 0...±5V
EXP1005	2 opto-isolated analog outputs 0/4-20mA or 0-10V or 0...±5V
EXP1040	2 digital/resistive inputs, 2 static outputs
EXP1041	2 thermocouple inputs, 2 static outputs
Communications interfaces.	
EXP1013	Ethernet interface with Web server function
EXP1015	GPRS/GSM modem

Accessories

EXP8001

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXP8001	IP65 gasket seal for RGK600..., RGK601... and RGK610 controllers	1	0.009

General characteristics for RGK600 - RGK601 - RGK610 - RGK700 - RGK750 - RGK800
- Power supply: 7...33VDC
- VAC inputs: mains and generator L1-L2-L3-N
- Voltage control for one, two and three phase systems with or without neutral
- Rated measurement voltage range:
  - 100...480VAC for RGK600, RGK601, RGK610 and RGK750
  - 30...600VAC for RGK700 and RGK800
- Frequency measurement range: 45...65Hz
- Programmable VT ratio
- Current measurement range (3 PH): 0.050...6A or 0.050...1.2A
- Graphic LCD: 128x80 pixels with backlight
- 1 USB/optical and Wi-Fi port on front for programming
- Engine running detection: "D+", generator voltage and frequency
- Engine speed inputs: "W" or Magnetic "Pick-up"(RGK601 excluded)
- 1 CANbus-J1939 port (RGK600 and RGK610 excluded)
- 3 analog ohmic inputs for oil pressure, engine temperature and fuel level control
- 1 built-in alarm remote port
- Non-volatile memory for event storage
- Alarm, event and parameter text in 5 languages
- Alarm text customisable (8 alarms)
- Event log
- Modbus-RTU and Modbus-ASCII communication protocols (RGK600 and RGK601 excluded)
- Compatible with Synergy, Synergy Cloud and Xpress software
- 1 slot for EXP modules for RGK610
- 2 slots for EXP modules for RGK750
- 3 slots for EXP modules for RGK800.

For RGK700 - RGK750 - RGK800 only
- PLC logic for inputs, outputs and internal status
- Degree of protection: IEC IP65 on front.

For RGK700 - RGK800 only
- 1 communication port: RS232 for RGK700; RS485 for RGK800
- Degree of protection: IEC IP65 on front; suitable for use with UL/CSA Type 4X outdoor enclosure installation.

For RGK800 only
- Neutral current measurement range: 0.050...6A or 0.050...1.2A
- 400Hz frequency support
- 1 programmable analog input
- Modbus-TCP communication protocol
- Current leakage control towards earth/ground
- Clock-calendar (RTC).

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus - File E93601), as Auxiliary Devices - Generator controllers except for RGK750; EAC (except for RGK750). Compliant with standards: IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL 508, CSA C22.2 n° 14.

Synergy, Synergy Cloud, and Xpress software
See Section 36.

EXP series expansion modules
See Section 35, page 2.

Paralleling controllers for mains-generator and generator-generator

RGK900SA - RGK900

Order code	Description	Qty per pkg	Wt
		n°	[kg]
RS485 port and USB/optical and Wi-Fi point programming port on front. Expandable with EXP... modules			
RGK900SA	Stand-alone controller. Paralleling control among generating sets	1	1.040
RGK900	AMF (Automatic Mains Failure) controller. Mains-generator paralleling control	1	1.040
RGK900MC	Mains-ATS (Automatic Transfer Switching) controller. Control of mains, automatic transfer switching (ATS) and paralleling on multiple generators controlled by RGK900SA	1	1.040

EXP10...

Order code	Description
EXPANSION MODULES FOR RGK900... Inputs and outputs.	
EXP1000	4 opto-isolated digital inputs
EXP1001	4 opto-isolated static outputs
EXP1002	2 digital inputs and 2 static outputs, opto-isolated
EXP1003	2 relay outputs rated 5A 250VAC
EXP1004	2 opto-isolated analog inputs 0/4-20mA or PT100 or 0-10V or 0...±5V
EXP1005	2 opto-isolated static outputs 0/4-20mA or 0-10V or 0...±5V
EXP1008	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC
EXP1041	2 thermocouple inputs, 2 static outputs
Inputs and outputs.	
EXP1042T	6 digital inputs, PCB tropicalized
EXP1043T	4 digital input and 2 static outputs, PCB tropicalized
Communications interfaces.	
EXP1010	Opto-isolated USB interface
EXP1011	Opto-isolated RS232 interface
EXP1012	Opto-isolated RS485 interface
EXP1013	Ethernet interface with web server function
EXP1015	GPRS/GSM modem

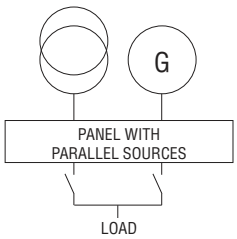
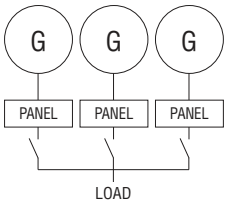
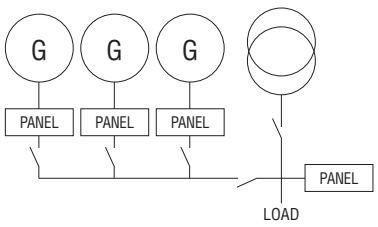
EXP series expansion modules
See Section 35, page 2.

General characteristics
- Power supply: 7...36VDC
- VAC inputs: mains L1-L2-L3-N (not RGK900SA)
- VAC inputs: generator L1-L2-L3-N
- Voltage measurement rated value: 600VAC (UL/CSA)
- Voltage measurement range: 30...720VAC
- Frequency measurement range: 45...65Hz or 360...440Hz
- Programmable VT ratio
- Current measurement input (3 PH+N): 0.05...6A or 0.05...1.2A
- Fourth CT for neutral measurement or earth/ground leakage detection
- Graphic LCD, 128x112 pixels with backlight
- 13 digital inputs
- 3 relay outputs rated 8A 250VAC
- 6 static outputs rated 2A, protected
- 1 static output 50mA
- Engine running detection: "D+" generator voltage and frequency
- 1 engine speed input: "W" or "Magnetic Pick-up"
- 3 analog ohmic inputs for oil pressure, engine temperature and fuel level control
- 1 programmable analog input
- 2 analog outputs for engine speed control (governor) / voltage regulator (AVR)
- Alarm-event-parameter text in 5 languages
- Alarm text customisable (16 alarms)
- Event log
- Modbus-RTU, Modbus-ASCII and Modbus-TCP communication protocols
- PLC logic for inputs, outputs and internal status
- Compatible with Synergy, Synergy Cloud and Xpress software
- Degree of protection: IEC IP65 on front; suitable for use with UL/CSA Type 4X outdoor enclosure installation
- Built-in buzzer
- Multi-level passwords
- Sleep function (power saving mode)
- Synchronising and load sharing.

MAIN FUNCTIONS
- Menus for quick selection of rated parameter settings
- Mains / Generator controls: phase sequence, phase loss, max and min voltage and frequency, voltage asymmetry
- Programmable maintenance at various intervals
- Current leakage control towards earth/ground
- Mains-generator synchronising (ATS closed transition)
- Base-load or peak shaving management
- Paralleling supervision of generators (island mode)
- Generating set start scheduling.

Certifications and compliance
Certifications obtained: UL Listed for USA and Canada (cULus - File E93601), as Auxiliary Devices, Generator controllers; EAC.
Compliant with standards for RGK900: IEC/BS 61010-1, IEC/BS 61010-2-030, IEC/BS 61000-6-2, IEC/BS 61000-6-3, UL508, CSA C22.2 n. 14

Synergy, Synergy Cloud, and Xpress software
See Section 36.

MAINS-GENERATOR PARALLELING	ISLAND MODE	ATS AND PARALLELING OF MAINS WITH MULTIPLE GENSETS
		
RGK900 is designed for mains-generator synchronising applications, such as: a) Single generator in maintained parallel with the mains in "base-load" mode (generator power supplied at a steady rate) b) Single generator in maintained parallel with the mains, in peak-shaving mode (import-export – mains power is limited to constant value and load peaks during heavy demand for power are supplied by generator) c) Single generator in AMF with temporary parallel with the mains (for emergency, with AMF in closed transition).	**RGK900SA** is designed for applications with load sharing on an isolated bus, without mains: a) Parallel among generators working together in island mode on power bus with load shared among them b) Generators connected together to maintain the power reserve (total power available minus load power) within a preset range, switching on and off generators according to a priority level.	Combination of RGK900SA and RGK900MC units is designed for load govern controls with multiple generators in parallel on power bus and mains. In these circumstances, the **RGK900MC** unit controls, in base-load or peak-shaving mode, the mains and power bus composed by multiple generators, each controlled by an **RGK900SA**.

Remote units

RGK900RD

RGKRA

Order code	Description	Qty per pkg	Wt
		n°	[kg]
RGK900RDSA	Remote display panel for RGK900SA controllers	1	0.980
RGK900RD	Remote display panel for RGK900 controllers	1	0.980
RGKRA	For RGK7..., RGK8..., RGK9..., controllers graphic LCD, touch screen 128x112 pixels	1	0.360

Alarm-status relay unit

RGKRR

Order code	Description	Qty per pkg	Wt
		n°	[kg]
RGKRR	Alarms-status relay unit 12/24VDC, 12 relay outputs, pulse input, CANbus communication port	1	0.420

Remote display panel RGK...RD characteristics
For remote control supervision and viewing, the user operates the remote display panel as if directly in front of the generating set.
- 12/24VDC battery power supply
- Graphic LCD with backlight, 128x112 pixels
- 13 function and setting keys
- 10 Indication LEDs for operating modes and status
- Built-in buzzer
- 4 digital inputs
- 2 digital outputs
- Front degree of protection: IEC IP65; UL/CSA Type 4X outdoor enclosure installation
- Serial interface ports: opto-isolated RS485.

Remote display panel RGKRA characteristics
Alarm conditions can be viewed on the remote display and alarm silencing can also be activated.
- Dual 100-240VAC / 12-24VDC power supply
- Touch screen 128x112 pixel backlight graphic LCD
- Built-in buzzer
- Static (SSR) output for global alarm signalling
- Opto-isolated RS485 interface port
- Front degree of protection: IEC IP54; UL Type 1.

Alarm-status relay unit RGKRR characteristics
External relay expansion unit for alarm and status remoting.
Fixing on 35mm DIN rail (IEC/EN/BS 60715).
Communication with RGK... controllers by CANbus or pulse inputs:
- 12 relay outputs of which 5 with changeover (SPDT) contact rated 5A 250VAC / B300 and 7 N/O (SPST) contact rated 2.5A 250VAC / C300
- 12/24VDC power supply
- Up to 2 RGKRR units can be connected in cascade for a total of 24 relays
- Maximum installation distance from the RGK6... and RGK700... RGK900 controllers:
  - CANbus: 30m/33yd (high speed)
  - Inputs/Outputs: 1,000m/1,094yd (low speed).

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus – File E93601), as Auxiliary Devices, Generator controllers remote and relay units; EAC.
Comply with standards: IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/BS 61000-6-3, UL508, CSA C22.2 n° 14.

For wiring schemes and technical characteristics, refer to technical instructions in Downloads area of local or global website www.LovatoElectric.com or consult Technical support; see contact details on inside front cover.

Communication devices

CX01

CX02

CX03

Order code	Description	Qty per pkg	Wt
		n°	[kg]
CX01	USB connection device PC↔RGK4/RGK6/RGK7/RGK8/ RGK9 with optical connector for programming, data download, diagnostics and firmware upgrade	1	0.090
CX02	Wi-Fi connection dongle PC↔RGK4/RGK6/RGK7/RGK8/ RGK9 for data download, diagnostics and firmware upgrade, project upload/download and cloning	1	0.090
CX03	GSM penta-band antenna (850/900/1800/1900/2100MHz)	1	0.090

General characteristics
For general characteristics of these accessories see section 35.

Gateway data loggers

EXCGLB...

new

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCGLB01	Gateway data logger, 1 RS485 port, 1 Ethernet port, Wi-Fi connection	1	0.190
EXCGLB02	Gateway data logger, 1 RS485 port, 1 Ethernet port, LTE connection, GNSS (GPS)	1	0.190
EXCGLB03	Gateway data logger, 1 RS485 port, 2 Ethernet ports, 4G (LTE) connection	1	0.190

General characteristics
For general characteristics of these accessories see section 34.

Gateway

EXCM4G01

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCM4G01	4G Gateway with RS485 and Ethernet port, Modbus RTU/TCP protocol	1	0.300

General characteristics
For general characteristics of these accessories see section 34.

Converter

EXCCON02

new

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCCON02	RS485/Ethernet converter, 9...48VDC, with Modbus RTU/ TCP protocol conversion functionality	1	0.400

General characteristics
For general characteristics of these accessories see section 34.

Remote control and monitoring GSM modem via SMS

Compliant with Italian CEI 0-16 Standard, paragraph 8.8.6.5 and annex M, resolution 421/2014 of the ARERA

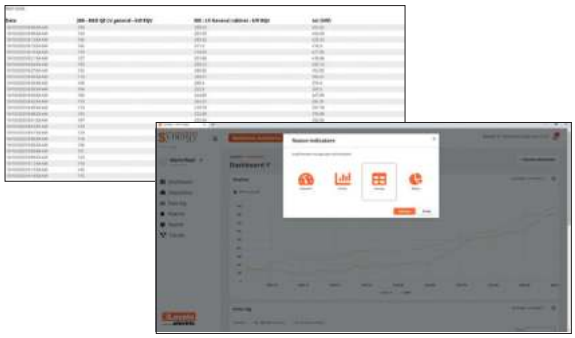
EXCGSM01

Order code	Description	Qty per pkg	Wt
		n°	[kg]
GSM Modem (modular - 4U). IP69K outside aerial with 2.5 m cable. RJ45-USB programming cable (included).			
EXCGSM01	100...240VAC, 1 digital input, 1 analog input (0...10V, 0...20mA, NTC), 1 relay output, receiving and sending SMS messages for remote controls and alarm signals	1	0.340

General characteristics
For general characteristics of these accessories see section 34.

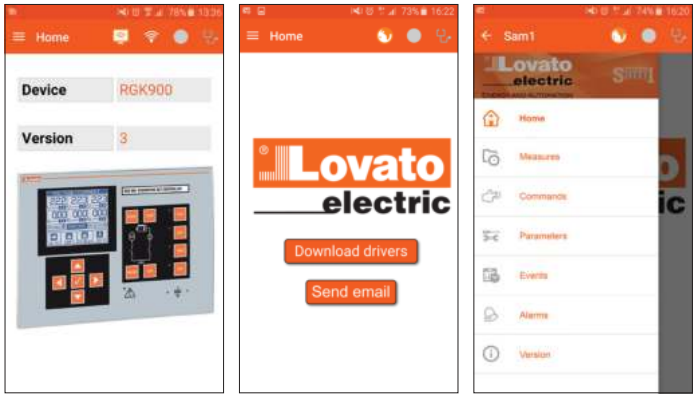
Synergy Supervision and Energy management software

Synergy Vision



Xpress Parameter configuration and remote control software

Sam1 APP



NFC APP

Supervision and Energy management software

The Synergy and Synergy Vision softwares provides for the remote control and supervision of the RGK... controllers.
See details given in Section 36.
Its structure and applications are based on MS SQL relational database management system. Consulting is made through popular programs for Internet browsing available across different platforms and operating systems.
It is a highly versatile system, simultaneously accessible to a large number of users/workstations via intranets, VPN or Internet.

Parameter configuration and remote control software

The Xpress at the beginning and just say "Express is a parameter configuration and remote monitoring software shared by the entire latest generation of RGK gen-set controllers with communication port. It can be installed in the Windows® environment and connect individually (one node at a time) to the RGK gen-set controller connected to the network.

- Supports connection via CX01 (USB) or CX02 (Wi-Fi) dongle, USB, RS232, RS485, Ethernet and modem
- Product configuration:
  - Parameter setting
  - Project file management
- Product firmware upgrade (via CX01)
- Remote control:
  - Monitoring of main measurements
  - Sending commands to products
- Reading alarms and events memory.

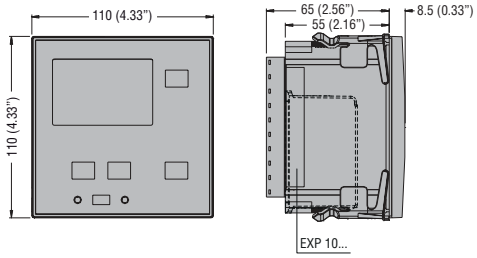
See details given in Section 36.

APP for smartphone and tablets

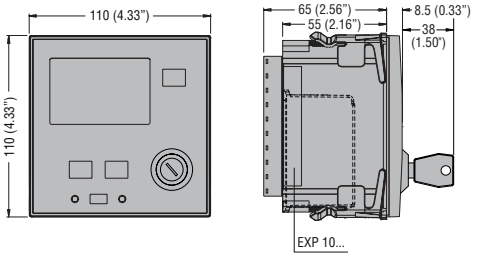
Sam1 application allows the user to program the controller, view alarm conditions, send commands, read measurements, download statistical data and events and send retrieved data by email. The connection is made by Wi-Fi with a smartphone or tablet using CX02 dongle. It is iOS and Android compatible. For more details, see Section 36 or consult Technical support; see contact details on inside front cover.

NFC App for RGK4...SA, with integrated NFC technology, allows remote parameter configuration.
The parameters can be saved in a file for archive purposes.
It is Android and iOs compatible. For more details, see Section 36 or consult Technical support; see contact details on inside front cover.

STAND-ALONE GEN-SET CONTROLLERS
RGK400SA



RGK420SA



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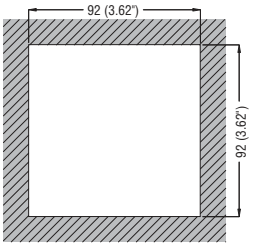
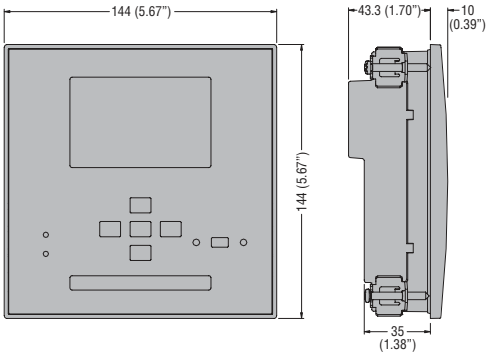


GEN-SET CONTROLLERS **RGK600... - RGK601... - RGK610**



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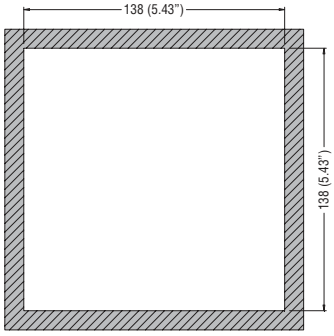
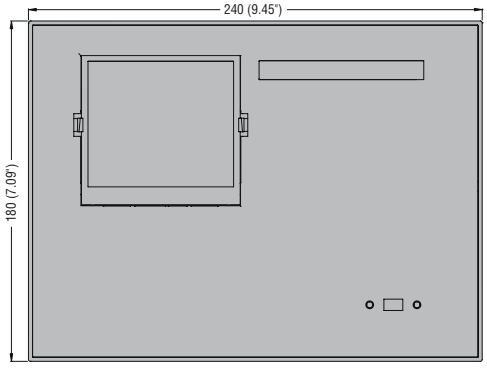
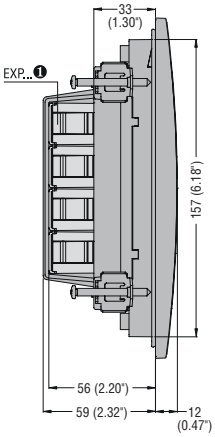


GEN-SET CONTROLLERS **RGK700... - RGK750... - RGK800... - RGK900...** - REMOTE DISPLAY PANELS **RGK900RD - RGK900RDSA**



❶ RGK700, RGK900RD... excluded.



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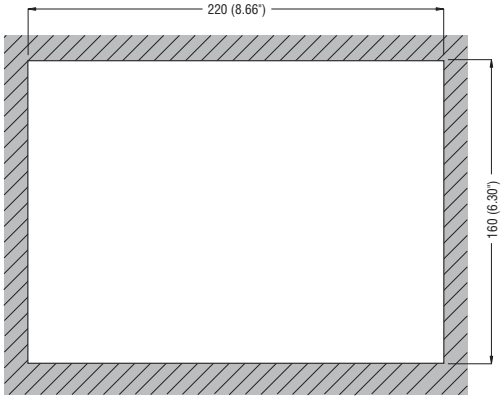
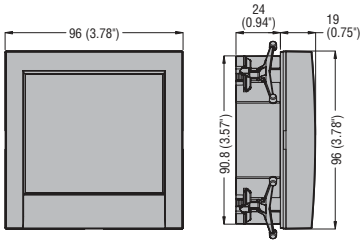


REMOTE DISPLAY UNIT **RGKRA**



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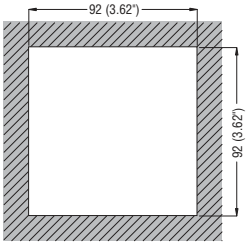
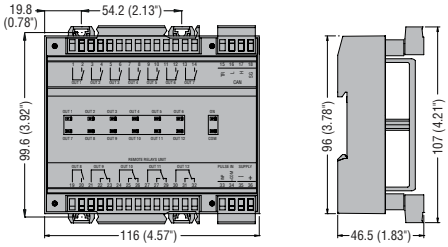
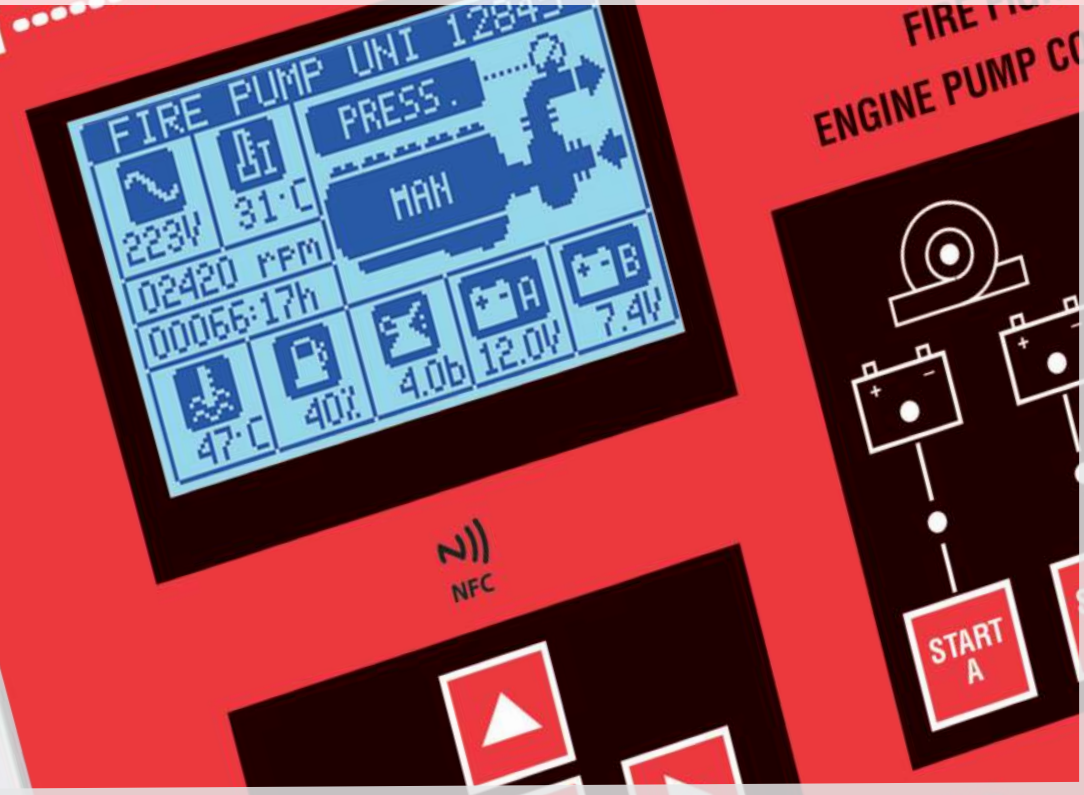


ALARM-STATUS RELAY UNIT **RGKRR**



Fire pump controllers



- Fire pump controllers according to EN/BS 12845
- Remote alarm panels according to EN/BS 12845
- Advanced programmable I/O functions to control the fire fighting system
- Expandable with EXP modules
- Controllers and expansion modules with tropicalized PCB
- Controllers with built-in NFC technology
- RS485 and Ethernet communication interfaces
- Setup and supervision software
- Modem control for sending alarm messages and emails.

	Sec. - Page
Fire pump controllers	
Diesel engine fire pump controllers	33 - 2
Electric fire pump controllers	33 - 3
Remote alarm panels for fire pump applications	**33 - 4**
Accessories	
Communication devices, gateway data loggers, gateway, converter, GSM modem	33 - 5
Dimensions	**33 - 6**
Technical characteristics	**33 - 7**

Page 33-2

DIESEL ENGINE FIRE PUMP CONTROLLERS

- Crank cycle according to EN/BS 12845
- Batteries monitoring
- Advanced programmable functions for fire fighting systems
- AC voltage monitoring
- Possibility of setup via NFC technology and APP
- Built-in RS485 communication
- PLC logic integrated.

Page 33-3

ELECTRIC FIRE PUMP CONTROLLERS

- Designed in accordance to EN/BS 12845
- 1 phase or 3 phase voltage measure inputs
- 1 phase or 3 phase current measure inputs
- 24VAC or 230VAC power supply
- Advanced programmable functions for fire fighting systems
- Possibility of setup via NFC technology and APP
- Built-in RS485 communication
- PLC logic integrated.

Page 33-4

REMOTE ALARM PANELS FOR FIRE PUMP APPLICATIONS

- Remote panels according to EN/BS 12845
- LED or LCD display versions
- Pushbutton to silence the siren and test the LEDs
- Built-in buzzer.

Diesel engine fire pump controllers

NFC

FFL...DP

Order code	Description	Qty per pkg	Wt
		n°	[kg]
FFL700DP	Controller for diesel engine fire pumps in accordance with EN/BS 12845, power supply 12/24VDC, built-in RS485	1	0.980
FFL800DP	Controller for diesel engine fire pumps in accordance with EN/BS 12845, power supply 12/24VDC, built-in RS485, expandable with EXP... expansion modules	1	0.980

The app can be downloaded from Google Play Store and App Store.

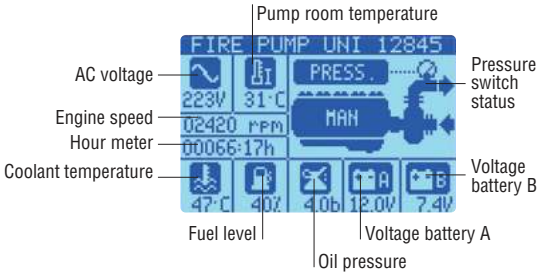
ANDROID APP ON Google play

Available on the App Store

Order code	Description
EXPANSION MODULES. Inputs and outputs.	
EXP1008T	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VA, tropicalized PCB
EXP1042T	6 digital inputs, tropicalized PCB
EXP1043T	4 digital inputs and 2 static outputs, tropicalized PCB
EXP1004T	2 opto-isolated analog inputs 0/4-20mA or PT100 or 0-10V or 0...±5V, tropicalized PC
Communication ports.	
EXP1012T	Opto-isolated RS485 interface, tropicalized PCB
EXP1013T	Ethernet interface, tropicalized PCB
EXP1015	GPRS/GSM modem

EXP...

FFL800DP



General characteristics
FFL...DP controllers integrate all the functions required by the EN/BS 12845 standard regarding the diesel engine fire pump management and help the user to monitor and maintain the performance of the entire firefighting system.
The backlit graphic 128x80 pixel LCD display ensures high visibility in low light conditions.
Inputs and outputs are programmable and the number can be increased with the I/O expansion modules (FFL800DP), moreover they can be managed by the integrated PLC logic. This all means a complete solution with less wiring, less components and less programming to set up the firefighting system. Within the main page, it is possible to see all the information about the engine fire pump.
Functions for the maintenance and the test of the firefighting system are available directly on the display. Furthermore there is the possibility to receive remotely this information by the digital outputs or the Modbus communication through the built-in RS485.
The controller monitors constantly the temperature inside the pump room using the integrated or an external temperature sensor and the status of the auxiliary voltage with the single-phase AC voltage measurement input.

Features
- Automatic diesel engine fire pump control
- Backlit graphic LCD display with 5 languages (ENG, ITA, FRA, SPA, DEU)
- Synoptic with 9 LEDs to display operating modes and status
- Dual DC power supply from two separate batteries 12/24VDC
- Dedicated page for LED test and commissioning
- Dedicated page for jockey pump monitoring
- Automatic starting sequence according to EN/BS 12845
- Input of single-phase AC voltage measurement for charger power supply monitoring
- 10 programmable digital inputs
- Input to monitor the starter pinion
- Input for engine speed reading W and pick-up
- Input for monitor the D + voltage from alternator battery charger
- 10 programmable relay outputs
- 1 programmable static output
- 3 analog inputs for resistive sensors programmable usable for the monitoring of oil pressure, coolant temperature, oil temperature and fuel level
- Built-in NTC temperature sensor
- Input for remotable NTC temperature sensor (measuring range: -40...+85°C)
- 2 password levels
- Advanced I/O functions
- Built-in isolated RS485 communication port
- Integrated PLC logic with thresholds, counters, alarms, status
- Built-in real time clock
- Storage of last 128 events
- Communication interface with front optical port, compatible with USB (CX01) and Wi-Fi (CX02) devices
- NFC connectivity for programming via LOVATO NFC App, freely downloadable from Google Play Store and App Store
- Expandability with 2 EXP... modules with tropicalized PCB (only FFL800DP)
- Compatible with FFLRA... remote alarm panels
- Compatible with software Xpress, Synergy, Synergy cloud and App NFC and Sam1.

Operational characteristics
- Power supply voltage: 12 or 24VDC
- Voltage measurement inputs:
  - Rated voltage Ue: 100...240VAC
  - Measurement range: 50...264VAC
  - Frequency range: 45...65Hz
- Operating temperature: -25...+70°C
- PCB tropicalized
- Degree of protection: IP65 on front. IP20 on terminals.

Synergy, Xpress and Sam1 software, NFC App
See Section 36.

EXP... series expansion modules
See Section 35, page 2.

Compliance
Compliant with standards: UNI EN/BS 12845, IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3.

Electric fire pump controllers

NFC

FFL...EP

Order code	Description	Qty per pkg	Wt
		n°	[kg]
FFL700EP	Controller for electric fire pumps in accordance with EN/BS 12845, power supply 24VAC, built-in RS485	1	0.980
FFL800EP	Controller for electric fire pumps in accordance with EN/BS 12845, power supply 24VAC or 110...240VAC, built-in RS485, expandable with EXP... expansion modules	1	0.980

The app can be downloaded from Google Play Store and App Store.

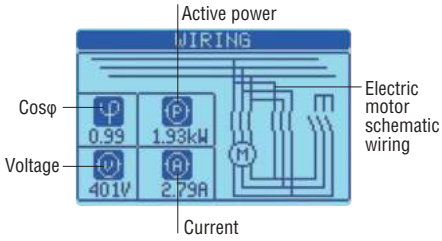
ANDROID APP ON Google play

Available on the App Store

EXP...

Order code	Description
EXPANSION MODULES. Inputs and outputs.	
EXP1008T	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VA, tropicalized PCB
EXP1042T	6 digital inputs, tropicalized PCB
EXP1043T	4 digital inputs and 2 static outputs, tropicalized PCB
EXP1004T	2 opto-isolated analog inputs 0/4-20mA or PT100 or 0-10V or 0...±5V, tropicalized PCB
Communication ports.	
EXP1012T	Opto-isolated RS485 interface, tropicalized PCB
EXP1013T	Ethernet interface, tropicalized PCB
EXP1015	GPRS/GSM modem

FFL800EP

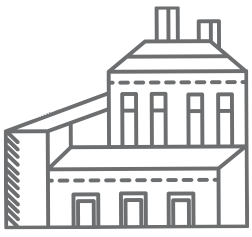


Single phase pump applications:

- Skyscrapers
- Residences
- Civil Buildings.

3-phase pump applications:

- Industry
- Shopping malls
- Hospitals
- Warehouses.
- Etc.



General characteristics
FFL...EP controllers integrate all the functions required by the EN/BS 12845 standard regarding the electric fire pump management and help the user to monitor and maintain the performance of the entire firefighting system.
The backlit graphic 128x80 pixel LCD display ensures high visibility in low light conditions.
Inputs and outputs are programmable and the number can be increased with the I/O expansion modules (FFL800EP), moreover they can be managed by the integrated PLC logic. This all means a complete solution with less wiring, less components and less programming to set up the firefighting system. Within the main page, it is possible to see all the information about fire pump and the electrical engine.
Functions for the maintenance and the test of the firefighting system are available directly on the display. Furthermore there is the possibility to receive remotely this information by the digital outputs or the Modbus communication through the built-in RS485.
The controller monitors constantly the temperature inside the pump room using the integrated or an external temperature sensor.

Features
- Possibility to control single phase or three phase electric fire pump
- Backlit graphic LCD display with 5 languages (ENG, ITA, FRA, SPA, DEU)
- Synoptic with 8 LEDs: electric pump running, main status, electric motor status, starting request, global alarm, failure to start, stop enabled, automatic start excluded
- Dedicated page for LED test and commissioning
- Dedicated page for jockey pump monitoring
- single phase or three phase current measurements inputs: 1/5A
- 8 programmable digital inputs
- 7 (FFL700EP) or 9 (FFL800EP) programmable relay outputs
- 1 programmable static output
- Built-in NTC temperature sensor
- Input for remotable NTC temperature sensor (measuring range: -40...+85°C)
- 2 password levels
- Advanced I/O functions
- Built-in isolated RS485 communication port
- Integrated PLC logic with thresholds, counters, alarms, status
- Built-in real time clock
- Storage of last 128 events
- Communication interface with front optical port, compatible with USB (CX01) and Wi-Fi (CX02) devices
- NFC connectivity for programming via LOVATO NFC App, freely downloadable from Google Play Store and App Store
- Expandability with 2 EXP... modules with tropicalized PCB (only FFL800EP)
- Compatible with FFLRA... remote alarm panels
- Compatible with software Xpress, Synergy, Synergy Cloud and App NFC and Sam1.

Operational characteristics
- Power supply voltage: 24VAC (FFL700EP), 24VAC and 110...240VAC (FFL800EP)
- Voltage measurement inputs:
  - single phase or three phase
  - Rated voltage Ue: 100...600VAC
  - Measurement range: 80...720VAC
  - Frequency range: 45...65Hz
- Operating temperature: -25...+70°C
- PCB tropicalized
- Degree of protection: IP65 on front. IP20 on terminals.

Synergy, Xpress and Sam1 software, NFC App
See Section 36.

EXP... series expansion modules
See Section 35, page 2.

Compliance
Compliant with standards: UNI EN/BS 12845, IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3.

Remote alarm panels for fire pump applications

FFLRA200

FFLRA400

EXP...

Order code	Description	Qty per pkg	Wt
		n°	[kg]
FFLRA200	Remote alarm panel with LED, buzzer, pushbutton to silence the siren and test the LEDs. It supports up to 2 fire pump controllers	1	1.120
FFLRA400	Remote alarm panel with LCD graphic display (128x80pxls), buzzer, expandable with 2 EXP... expansion modules. It supports up to 3 fire pump controllers	1	2.670

The app can be downloaded from Google Play Store and App Store.

ANDROID APP ON Google play

Available on the App Store

Order code	Description
EXPANSION MODULES FOR FFLRA400 (2 AVAILABLE SLOTS) Inputs and outputs.	
EXP1000	4 opto-isolated digital inputs
EXP1001	4 opto-isolated static outputs
EXP1002	2 digital inputs and 2 static outputs, opto-isolated
EXP1003	2 relay outputs 5A 250VAC
EXP1008	2 opto-isolated digital inputs and 2 5A relay outputs 250VAC
EXP1042T	6 digital inputs, tropicalized PCB
EXP1043T	4 digital inputs and 2 static outputs, tropicalized PCB
Communication ports.	
EXP1010	Opto-isolated USB interface
EXP1011	Opto-isolated RS232 interface
EXP1012	Opto-isolated RS485 interface
EXP1013	Opto-isolated Ethernet interface
EXP1015	GPRS/GSM modem

General characteristics FFLRA200

FFLRA200 is a simple remote annunciator for the displaying via LEDs of the alarm status of two motor pump or electric pump controllers FFL... series.
The communication between the remote indicator and the FFL... controllers takes place via a pulsed digital signal.
On the front of the panel there are two columns of LEDs referring to each of the fire pump controllers. The LEDs are equipped with user-customizable labels to identify alarms, that are included in the package. A template of alarm labels model can be downloaded from www.LovatoElectric.com.
FFLRA200 is also equipped with a buzzer with sound level in compliance with the EN12845 standard, as well as buttons for silencing the alarms and for the LED test. The alarms notified on the remote panel are configurable directly on the FFL controllers. No setup on the FFLRA200 remote panel is required.
3 status LEDs indicate the presence of the power supply, the status of the communication and general failure.
FFLRA200 is supplied with voltage 100...240VAC and it supports a backup battery 12VDC (not included) whose buffer charge is maintained automatically.

Operational characteristics

- Power supply rated voltage: 100...240VAC
- Voltage operating range: 90...264VAC
- Frequency range: 45...66Hz
- Arrangement for internal battery 12VDC support is built-in (battery is not included)
- Compatible software: NFC App freely downloadable from Google Play Store and App Store
- Operating temperature: -25...+50°C
- Degree of protection: IP40.

Compliance

Compliant with standards: UNI EN/BS 12845, IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3.

General characteristics FFLRA400

FFLRA400 is an advanced remote annunciator with backlit graphic LCD display. It is expandable with 2 EXP modules to increase its features in terms of communication, digital inputs and digital outputs.
The communication between the remote panel and the FFL controller is performed by means of a pulsed signal or through RS485 if the EXP1012 expansion module is added. Up to 3 FFL controllers can be connected to one FFLRA400 with RS485 communication. On the front of the remote alarm panel, LEDs and a buzzer are present to display and notify the alarms and to see them from a distance; at the same time a complete description of the alarms is available on the graphic LCD display.
The texts are available in 10 different languages: English, Italian, French, Spanish, German, Portuguese, Russian, Polish, Czech and Turkish.
By fitting the EXP1015 expansion module, the remote annunciator is automatically equipped and configured with a GSM/GPRS modem. Once a data-enabled SIM card is inserted, SMS with alarms or events and email messages can be transmitted by the remote annunciator.

Operational characteristics

- Power supply rated voltage: 100...240VAC
- Voltage operating range: 90...264VAC
- Frequency range: 47...63Hz
- Arrangement for internal battery 12VDC support (battery not included) is built-in
- 6 digital inputs, 5 of which are programmable
- 3 programmable relay outputs
- Expandibility with EXP... modules (2 available slots)
- Optical port on front for CX01 and CX02 device
- Compatible software: Sam1, Xpress, NFC, Synergy and Synergy Cloud software (see section 36)
- Degree of protection: IP40
- Operating temperature: -25...+50°C.

Synergy, Xpress and Sam1 software, NFC App
See Section 36.

EXP... series expansion modules
See Section 35, page 2.

Compliance

Compliant with standards: UNI EN/BS 12845, IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3.

Communication devices

CX01

CX02

CX03

Order code	Description	Qty per pkg	Wt
		n°	[kg]
CX01	USB connection device PC↔FFL... with optical connector for programming, data download, diagnostics and firmware upgrade	1	0.090
CX02	Wi-Fi connection dongle PC↔FFL... for data download, diagnostics and firmware upgrade, project upload/download and cloning	1	0.090
CX03	GSM penta-band antenna (850/900/1800/1900/2100MHz)	1	0.090

General characteristics
For general characteristics of these accessories see section 35.

Gateway data loggers

EXCGLB...

new

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCGLB01	Gateway data logger, 1 RS485 port, 1 Ethernet port, Wi-Fi connection	1	0.190
EXCGLB02	Gateway data logger, 1 RS485 port, 1 Ethernet port, LTE connection, GNSS (GPS)	1	0.190
EXCGLB03	Gateway data logger, 1 RS485 port, 2 Ethernet ports, 4G (LTE) connection	1	0.190

General characteristics
For general characteristics of these accessories see section 34.

Gateway

EXCM4G01

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCM4G01	4G Gateway with RS485 and Ethernet port, Modbus RTU/TCP protocol	1	0.300

General characteristics
For general characteristics of these accessories see section 34.

Converter

EXCCON02

new

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCCON02	RS485/Ethernet converter, 9...48VDC, with Modbus RTU/TCP protocol conversion functionality	1	0.400

General characteristics
For general characteristics of these accessories see section 34.

Remote control and monitoring GSM modem via SMS

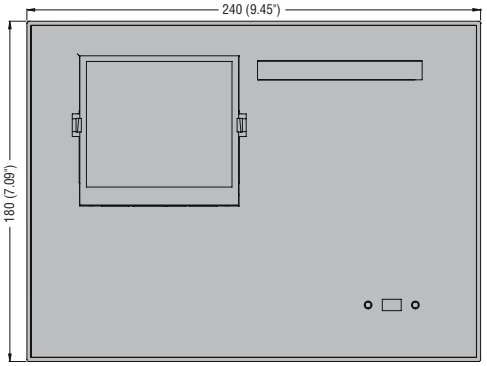
Compliant with Italian CEI 0-16 Standard, paragraph 8.8.6.5 and annex M, resolution 421/2014 of the ARERA

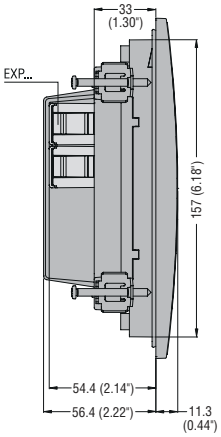
EXCGSM01

Order code	Description	Qty per pkg	Wt
		n°	[kg]
GSM Modem (modular - 4U). IP69K outside aerial with 2.5 m cable. RJ45-USB programming cable (included).			
EXCGSM01	100...240VAC, 1 digital input, 1 analog input (0...10V, 0...20mA, NTC), 1 relay output, receiving and sending SMS messages for remote controls and alarm signals	1	0.340

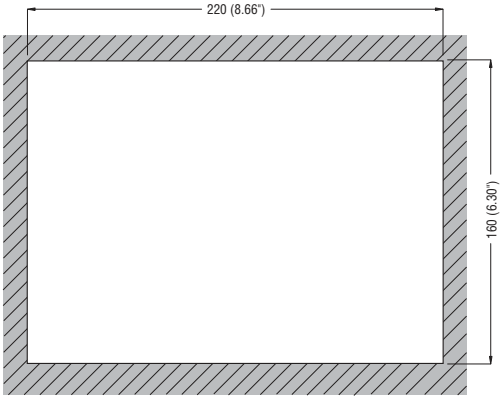
General characteristics
For general characteristics of these accessories see section 34.

FFL700... - FFL800...

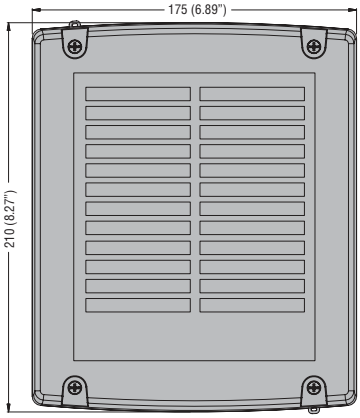


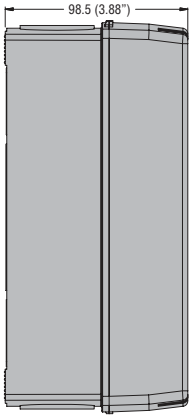


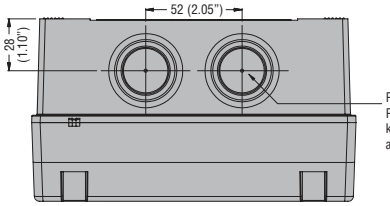
Drilling for surface fixing



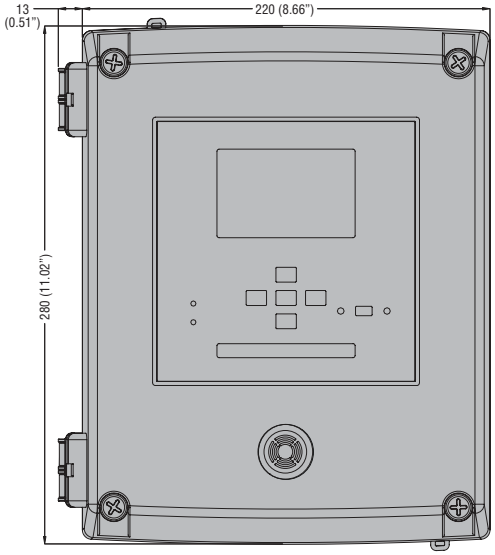
FFLRA200

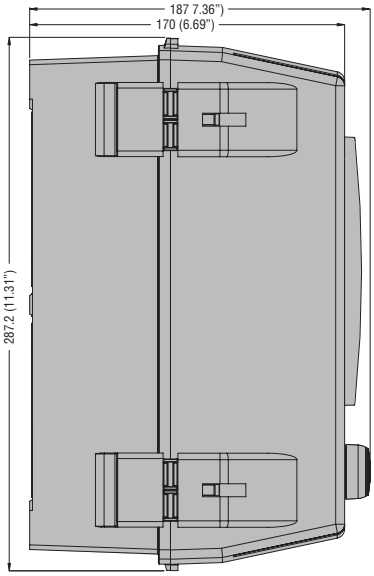






FFLRA400





TYPE	FFL...DP	FFL...EP
SUPPLY		
Rated voltage	12...24VDC	24VAC (FFL700EP); 24VAC/110...240VAC (FFL800EP)
MAIN VOLTAGE INPUT		
Rated voltage Ue	100...250VAC	100...600VAC
Measuring range	50...264VAC	80...720VAC
Frequency range	45...66Hz	
ENGINE RUNNING INPUT (D+) FOR PRE-EXCITED ALTERNATOR		
Voltage range	0...36VDC	—
Maximum input current	0.5mA	—
Maximum voltage at D+ terminal	12 or 24VDC (battery voltage)	—
Excitation current	210mA 12VDC / 130mA 24VDC	—
ENGINE SPEED INPUT (PICK-UP/W)		
Input type	AC	—
Minimum reading frequency voltage: high sensitivity	≥2.8Vpp (1Vrms) at 40Hz ≥10Vpp (3.5Vrms) at 20000Hz	—
Minimum reading frequency voltage: low sensitivity	≥3.7Vpp (1.3Vrms) at 40Hz ≥7Vpp (2.5Vrms) at 2000Hz	—
Measurement input impedance	> 100kΩ	—
Maximum voltage	84Vpp (30Vrms)	—
PINION INPUT		
Voltage range	0...33VDC	—
Current input	≤8mA	—
Threshold	Adjustable	—
Input delay	Adjustable	—
NTC PROBE INPUT		
Type of sensor	NTC (LOVATO code NTC01)	
Measuring range	-40...+85°C	
Maximum connection length	3m	
DIGITAL INPUTS		
Input type	Negative	
Input current	≤6mA	
Low input signal	≤1.25V (tipical 1.9V)	
High input signal	≥4.9V (tipical 3.8V)	
Input signal delay	≥50ms	
RELAY OUTPUTS		
Outputs 1-2	2 x 1NO - 12A 30VAC/DC	—
Output 3	1NO 8A 30VDC (DC1); 30VDC 1A pilot duty	—
Output 4	1NO 4A 30VDC (DC1)	—
Outputs 5-10	6 x 1C/O - 8A 250VAC (AC1); 1.5A 250VAC (AC15)	—
Alarm outputs	—	4 x C/O - 8A 250VAC (FFL700EP) 6 x C/O - 8A 250VAC (FFL800EP)
Motor command output	—	3NA - 16A 250VAC (AC1)
STATIC OUTPUT		
Output type	NO	
Rated voltage	10...30VDC	
Maximum current	50mA	
RS485 SERIAL INTERFACE		
Interface type	Isolated	
Baud-rate	Programmable 1200...115200bps	
Insulation voltage (RS485 – V Batt.)	1kV=	
AMBIENT CONDITIONS		
Operating temperature	-25...+70°C	
Storage temperature	-30...+80°C	
Relative humidity	<80% (IEC/EN/BS 60068-2-78)	
CONNECTIONS		
Terminals type	Removable screw-type	
Wire cross-section (min. and max.)	0.2...2.5mm² (24...12AWG)	
Tightening torque	0.56Nm (5lb.in)	
HOUSING		
Installation	Flush-mount	
Material	Polycarbonate	
Degree of protection	IP65 Frontal; IP20 on terminals	

Energy management

Communication devices

- Gateway
- Data storage on local memory
- Data transfer via internet
- Ethernet cable, Wi-Fi or mobile connection to the internet
- Geolocation.

	Sec. - Page
Communication devices	
Gateway data loggers	34 - 4
Gateway	34 - 5
Converter	34 - 5
Antennas	34 - 5
Remote control and monitoring GSM modem via SMS	34 - 6
Dimensions	**34 - 7**

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GATEWAYS
- Data loggers
- RS485 serial communication port
- 1 or 2 Ethernet ports
- Connection to Wi-Fi access point
- 4G (LTE) mobile connections
- GNSS (GPS) support.

Page 34-5

CONVERTER
- RS485-Ethernet converter
- Modbus RTU-TCP protocol conversion.

Page 34-5

ANTENNAS
- Antenna for 4G networks
- Antenna for GNSS receivers
- Antenna for Wi-Fi networks
- SMA male connectors.

EXCGLB... GATEWAY DATA LOGGERS

The EXCGLB... is a combined gateway and data logger and is key to the construction of modern, functional and efficient monitoring systems. The device logs data from LOVATO Electric devices or ambient sensors running compatible protocols and monitors all kinds of energy vector (water, air, gas, electricity or steam). Logged data can be consulted via the built-in web server and transmitted either to LOVATO Electric's Synergy supervision software or to remote servers in suitable formats for further processing.

WEB SERVER INTEGRATION

The EXCGLB... is equipped with a built-in web server that lets you:
- consult and download collected data
- view time-referenced charts and tables for historic analyses
- define what categories of collected data must be sent automatically to the Synergy supervision software or other destinations.

INTEGRATION WITH Synergy

The Synergy energy supervision system is the result of LOVATO Electric's extensive experience in four different but synergic areas: hardware devices, monitoring software, technical assistance and training.
Connecting the EXCGLB... to LOVATO Electric's Synergy cloud monitoring services delivers the following advantages:
- automatic access to data loggers, synoptic pages and graphics in a standard configuration that does not require any user intervention
- transmitted data can be processed freely and displayed graphically on web pages that can be customised to meet specific customer needs
- guaranteed data security even in the event of internet instability.

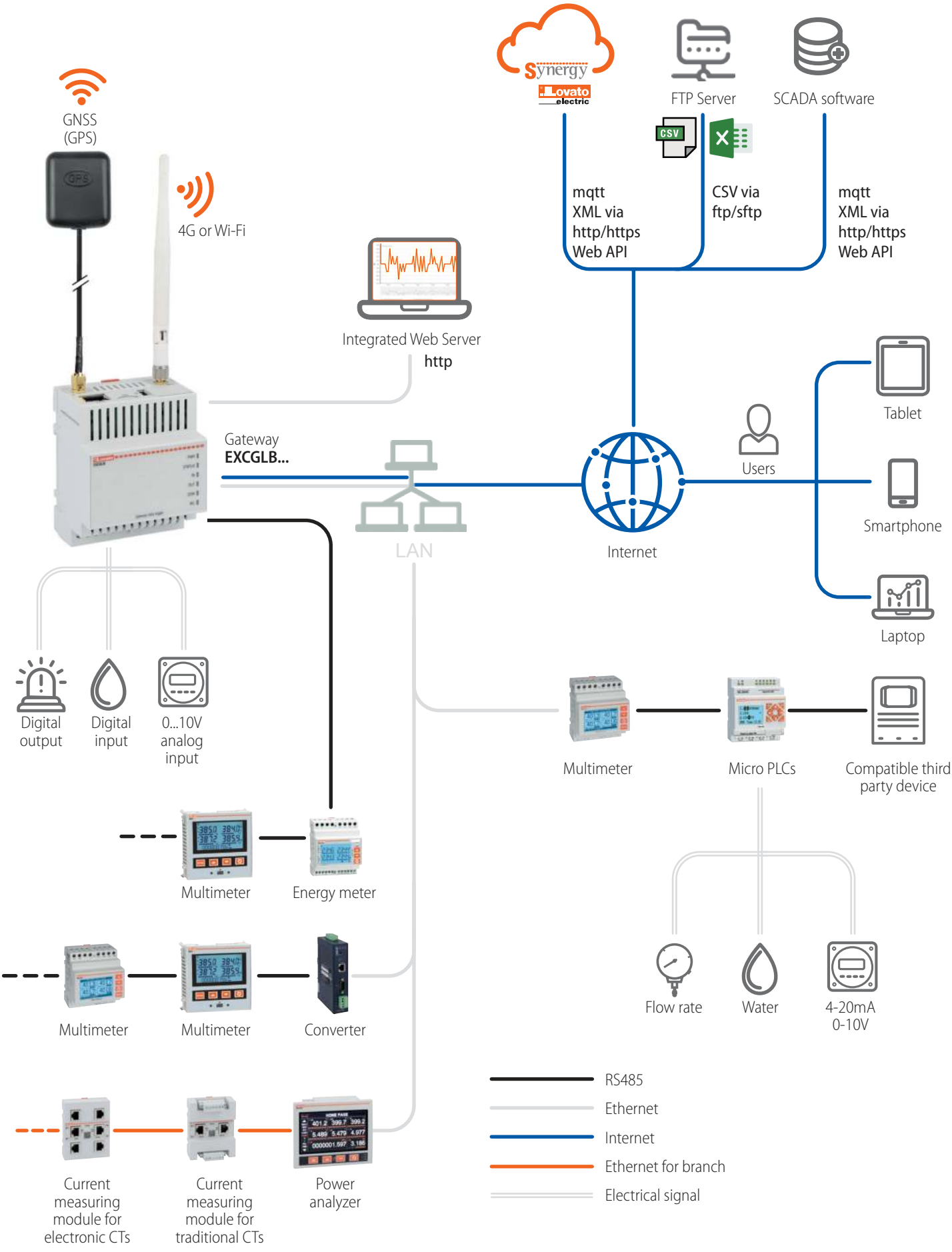
THIRD PARTY COMPATIBILITY

- Regular transfer of data to third party software in encrypted mode in XML via http/https or CSV files via sftp/ftp
- mqtt live data transfer
- Third party Modbus devices support.

FUNCTIONAL CHARACTERISTICS

- Connection to field devices via RS485 and/or Ethernet
- Internet connection via cabled network, Wi-Fi or 4G modem
- Geolocation via GNSS (GPS)
- Communication with remote servers via http, https, ftp and sftp protocols: neither static public IP addresses nor specific TCP ports are needed
- Regular transfer of data to Synergy supervision software in encrypted mode in XML files via http/https or CSV files via sftp/ftp
- mqtt live data transfer to Synergy
- Data and report export via web servers in Excel or CSV format
- Plug and play: auto-recognition of compatible devices connected via the Ethernet or serial channel
- Automatic data bank creation based on a set of typical measurements.

NETWORK TYPE



Gateway data loggers

new

EXCGLB...

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCGLB01	Gateway data logger, 1 RS485 port, 1 Ethernet port, Wi-Fi connection	1	0.190
EXCGLB02	Gateway data logger, 1 RS485 port, 1 Ethernet port, LTE connection, GNSS (GPS)	1	0.190
EXCGLB03	Gateway data logger, 1 RS485 port, 2 Ethernet ports, 4G (LTE) connection	1	0.190

Available versions

Communication	EXCGLB01	EXCGLB02	EXCGLB03
RS485 port	● (Modbus RTU master)	● (Modbus RTU master)	● (Modbus RTU master)
Ethernet port	1	1	2 (independent networks)
Wi-Fi connection	●	-	-
4G mobile connection (built-in)	-	● (MicroSim)	● (MicroSim)
GNSS (GPS) function	-	●	-
Digital/Analog input, digital output	1 digital input 1 analog input 0...10V 1 digital output @24VDC	1 digital input 1 analog input 0...10V 1 digital output @24VDC	1 digital input 1 analog input 0...10V 1 digital output @24VDC
Network protocols and services	MQTT http/https VPN client Modbus TCP master (device side) FTP	MQTT http/https VPN client Modbus TCP master (device side) FTP	MQTT http/https VPN client Modbus TCP master (device side) FTP

Typical applications

	EXCGLB01	EXCGLB02	EXCGLB03
Metering instruments (power analyzer, energy meter...)	●	-	●
Power factor controllers	●	-	-
Power factor controllers (with advanced analysis requirements)	-	-	●
Soft starters	●	●	-
Variable speed drives	●	●	-
Micro PLCs	●	●	-
Automatic transfer switch controllers	●	-	-
Engine and generator controllers	-	●	-

General characteristics EXCGLB...

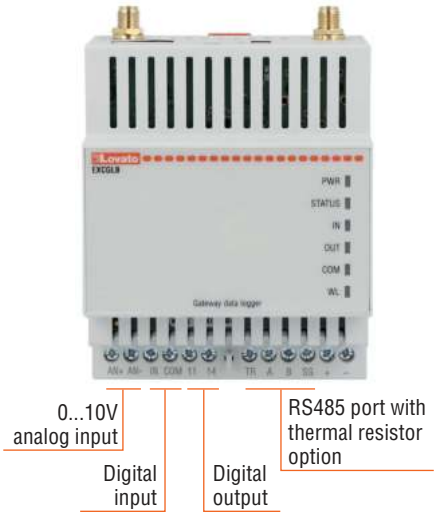
The EXCGLB... gateway data loggers have been designed to concentrate field data and make them available for consultation via a local web interface or remote software. They are suitable for use in monitoring simple systems such as pumps driven by soft starters, machines equipped with motors with variable speed drives or microPLCs, power factor correction systems, or for the supervision of complex systems such as shopping centers or industries. With the version equipped with GPS it is also possible to geolocate machines, such as rental generators.
Communication with the devices in the field takes place via RS485 serial port or Ethernet, while the connection to the data collection software can be via the integrated Ethernet ports or via the 4G (LTE) mobile network.

Operational characteristics

- Power supply: 12...24VDC
- RS485 serial port: TR – A – B – GND
- Ethernet port (1 or 2, independent)
- 1 digital input
- 1 analog input 0...10
- 1 static NO output
- 4G antenna connector
- GPS antenna connector
- LED: power, device status, data, input status, output status, wireless communication
- Native integration with Synergy and Synergy cloud
- Third party software support
- Third-party device support
- Data storage in flash memory
- Operating temperature: -20...+60°C
- Modular DIN 43880 housing (4 modules)
- IEC degree of protection: IP20.

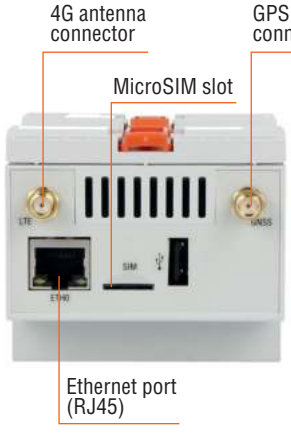
Compliance

Compliance with standards: EN/BS 60950-1.

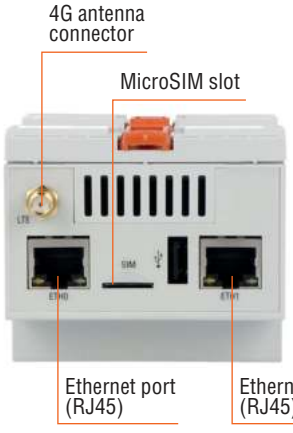


EXCGLB01

EXCGLB02



EXCGLB03



Gateway

EXCM4G01

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCM4G01	4G Gateway with RS485 and Ethernet port, Modbus RTU/TCP protocol	1	0.300

EXCM4G01 general characteristics

The EXCM4G01 gateway can interface "Slave" devices connected in a RS485 with a "Master" using a 4G network:

- Connection to TCP server through 4G or 2G network
- Operating mode either as transparent or Modbus-RTU/TCP protocol conversion from serial side to mobile network
- Settable parameters: TCP server IP and remote port, network operator apn (with username and password), SIM card pin (with enabling), connection time-out, serial parameters (baud rate from 1,200 bps to 115,200 bps, stop bit, character length, parity)
- Programming via built-in web server
- 1 Ethernet port 10/100Mbps
- 1 RS485 port
- Supply 9...36VDC
- Operating temperature -40...75°C.

Compliance

Compliance with standards: EN/BS 60950-1.

Converter

new

EXCCON02

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCCON02	RS485/Ethernet converter, 9...48VDC, with Modbus RTU/TCP protocol conversion functionality	1	0.400

General characteristics EXCCON02

EXCCON02 converter lets the "Slaves" devices connected to an RS485 network be interfaced with a "Master" equipped of Ethernet ports:

- Modbus RTU/TCP protocol conversion
- Programming via web interface
- Power supply excluded.

Compliance

Compliant with standards: IEC/EN/BS 55032, IEC/EN/BS 55024, IEC/EN/BS 55035.

Antennas

new

CX05

CX06

CX07

Order code	Description	Qty per pkg	Wt
		n°	[kg]
CX05	4G (LTE) antenna 698-960MHz/1710-2700MHz	1	0.030
CX06	GNSS (GPS, BeiDou/COMPASS) antenna 1575.42MHz/1561.098 MHz	1	0.150
CX07	Wi-Fi antenna 2.4-2.5GHz/4.9-5.825GHz	1	0.010

Compatibility of antennas with LOVATO Electric products

	GATEWAY DATA LOGGERS			GATEWAY
TIPO	EXCGLB01	EXCGLB02	EXCGLB03	EXCM4G01
CX05		●	●	●
CX06		●		
CX07	●			

General characteristics

CX05

Omnidirectional antenna for use with 4G (LTE) networks in the 698-960MHz/1710-2700MHz frequency bands. SMA male plug directly connected to the antenna connector.

CX06

Active antenna for GNSS receivers (GPS, BeiDou/COMPASS) in the 1575.42MHz ± 3MHz and 1561.098 MHz ± 5MHz bands.
SMA male plug connected to the receiver via a 3m cable.
IP65 protection rating.
Fixing via magnetic base.

CX07

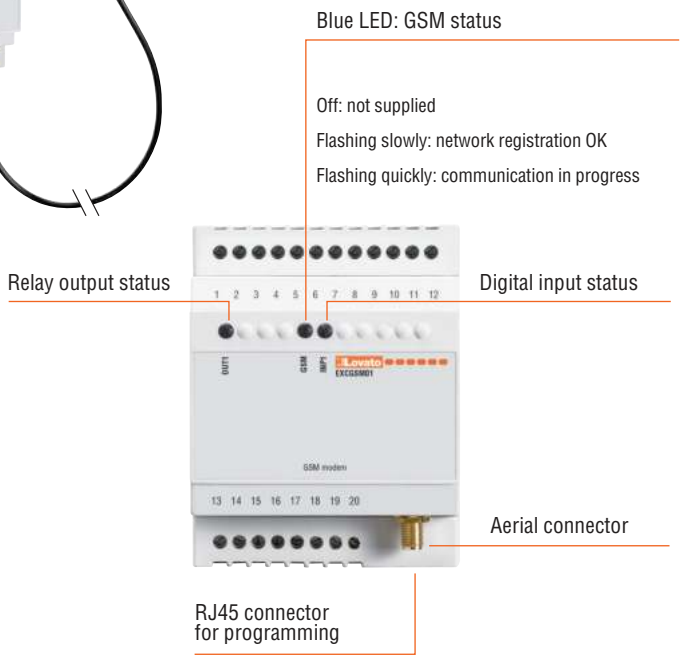
Omnidirectional antenna for use with 2.4GHz and 5GHz Wi-Fi networks in the 2.4-2.5GHz/4.9-5.825GHz frequency bands.
SMA male plug directly connected to the antenna connector.

Remote control and monitoring GSM modem via SMS

Compliant with Italian CEI 0-16 Standard, paragraph 8.8.6.5 and annex M, resolution 421/2014 of the ARERA

Order code	Description	Qty per pkg	Wt
		n°	[kg]
GSM Modem (modular - 4U). IP69K outside aerial with 2.5 m cable. RJ45-USB programming cable (included).			
EXCGSM01	100...240VAC, 1 digital input, 1 analog input (0...10V, 0...20mA, NTC), 1 relay output, receiving and sending SMS messages for remote controls and alarm signals	1	0.340

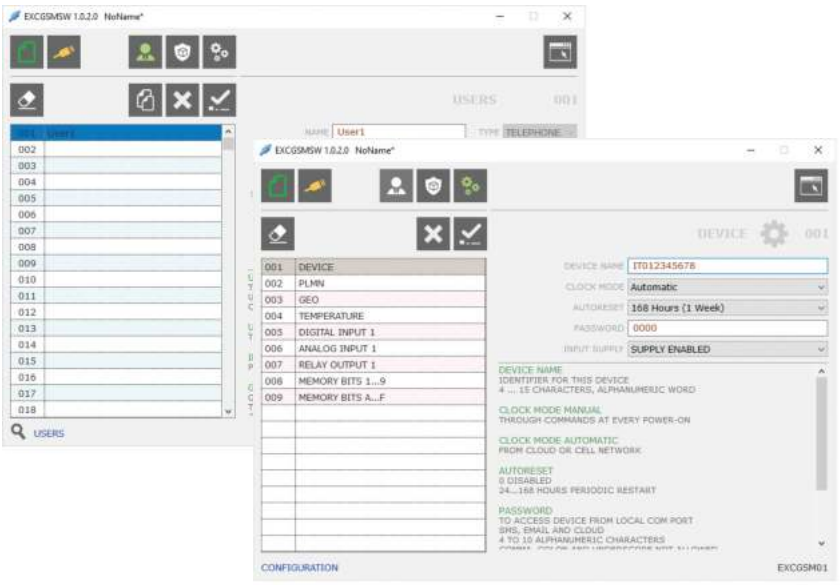
EXCGSM01



Software

To configure the EXCGSM01 modem (using the RJ45-USB programming cable included), the EXCGSMSW software must be used. This can be downloaded for free from the **www.LovatoElectric.com** website.
The software allows you to set:
- The users enabled to exchange messages with the modem
- The identifier of the modem, for example the active customer code (POD) in CEI 0-16 applications
- The functions assigned to the digital output and input and to analog input
- The texts of the SMS associated with the commands
- The logic of the actions taken following the SMS arrival, change of input status, alarm situations.

Configuration is also possible off-line, creating a file to transfer to the modem at another time.



Application requirements
With EXCGSM01 it is possible to remotely operate a relay output and obtain information on the system by sending programmable SMS.
Using the configuration software (available for download free of charge from www.lovatoelectric.com) the user can control the relay output and both the digital and analog inputs.
The logic is based on events (for example, the activation of the digital input or the arrival of an SMS with specific text), to which the user can decide specific actions (reply either by SMS or voice message, or by switching the relay output).
The analog input can be connected to detectors of physical measures like pressure, fluid tank level or temperature to allow remote reading of values or sending text messages via SMS or alarms.
The EXCGSM01 modem interfaces with the cellular network to regularly update its internal clock and dawn/dusk settings, so that it can manage time-scheduled events properly.
Information can be retrieved from phone network cells relative to the position of the modem (reading position information and sending alarms via SMS).
Applications:
- Detection of boiler temperature thresholds
- Fluid tank level alarms
- Time and date based load management
- Remote lighting and air conditioning system control
- Detection of moving of rental equipment.

Use with CEI 0-16
The CEI 0-16 standard in paragraph 8.8.6.5 and in attachment M prescribes that the electricity production plants powered by wind or solar photovoltaic sources with power greater than or equal to 100kW, connected or to be connected to medium voltage grids, are equipped with GSM modem.
Thanks to this modem it is possible to manage the disconnection of the generation through the messages sent by the energy distributor.

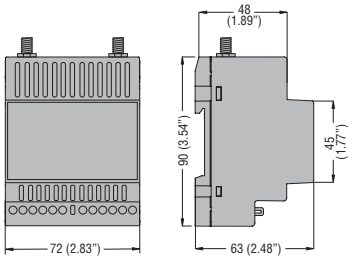
Functional characteristics
- Connection to the GSM network for sending and receiving SMS messages
- Programmable message texts
- Command output piloted by SMS or internal logic, for example to send the remote disconnection command to the interface switch CEI 0-16
- Programmable digital input, for example to detect the status of the Interface switch (IS) and sending of successful IS opening and closing SMSs
- POD management (active user code)
- Management of the list of caller IDs (CLI) up to 5000 callers enabled
- Detection of mobile network coverage
- Full compatibility with medium-voltage IP LOVATO Electric PMVF30: no software/hardware updates or programming required
- **Compatibility with third-party IPs where the remote disconnection signal is transmitted via digital input (dry contact)**For additional information contact our Technical support Tel. + 39 035 4282422; E-mail: service@LovatoElectric.com.

Operational characteristics
MODEM
- 35mm DIN (IEC/EN/BS 60715) rail fixing
- 4 modules
- Supply: 100...240VAC
- Consumption: 5VAC
- 1 digital output 3A 250VAC
- 1 self-supplied digital input
- 1 analog input 0...10V, 0...20mA, NTC
- Housing for 3V and 1.8V SIM card
- SIM PIN management
- Temperature sensor
- Update time, sunrise and sunset via GSM network
- Position update via GSM
- Certified according to FCC rules, part 15B
- Operating temperature: -20...+60°C
- Protection rating: IP40 on front; IP20 on terminals.

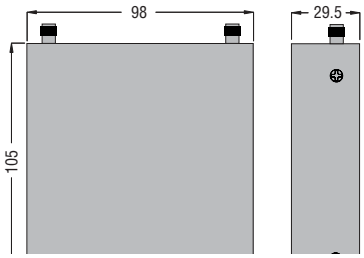
AERIAL
- Quad band 850/900/1800/1900MHz
- Degree of protection: outside IP69K
- 2.5m cable
- Fixing via M10 hole:
  - with adhesive seal
  - with threaded pin and nut.

Compliance
Compliant with standards: EN/BS 62368, EN/BS 62311.

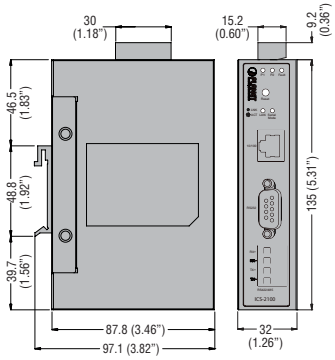
GATEWAY DATA LOGGERS
EXCGLB...



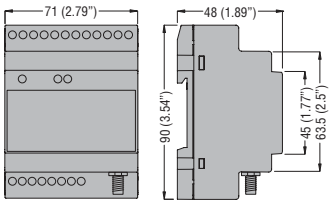
GATEWAY
EXCM4G01



CONVERTER
EXCCON02



REMOTE CONTROL AND MONITORING GSM MODEM VIA SMS
EXCGSM01



Expansion modules and accessories

- Digital inputs and outputs
- Analog inputs and outputs
- Communication interfaces
- Data storage with clock-calendar
- Communication devices and cables to connect LOVATO Electric products to personal computers, smartphones and tablets.

	Sec. - Page
Expansion modules	
EXP series	35 - 2
EXM series	35 - 3
Accessories	
Communication devices	35 - 4
Remote display unit	35 - 4
Protective cover	35 - 7
Other accessories	35 - 7
Connecting cable	35 - 7

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EXP SERIES EXPANSION MODULES

- For flush-mount products
- Digital inputs and outputs
- Analog inputs and outputs
- Inputs for PT100 sensors
- Communication modules (RS232, RS485, Ethernet, etc.)
- GSM/GPRS modem
- Data storage with clock-calendar (RTC)
- Powered directly by the base product
- Automatic identification by base product
- Tropicalized versions.

Page 35-3

EXM SERIES EXPANSION MODULES

- For modular products.
- Digital inputs and outputs
- Communication modules (RS232, RS485, Ethernet, etc.)
- Data storage with clock-calendar (RTC)
- Separate auxiliary power supply
- Base product connection by IR port
- Automatic identification by base product.

Page 35-4

ACCESSORIES

- Communication devices
- Remote display unit
- Protective cover
- Connecting cable.

Expansion modules for flush-mount products

EXP10...

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Inputs and outputs.			
EXP1000	4 digital inputs, opto-isolated	1	0.060
EXP1001	4 static outputs, opto-isolated	1	0.054
EXP1002	2 digital inputs and 2 static outputs, opto-isolated	1	0.058
EXP1003	2 relay outputs, rated 5A 250VAC	1	0.050
EXP1004 **EXP1004T❷**	2 analog inputs, opto-isolated 0/4...20mA or PT100 or 0...10V or 0...±5V	1	0.056
EXP1005	2 analog outputs, opto-isolated 0/4...20mA, 0-10V or 0...±5V	1	0.064
EXP1006	2 relay outputs to increase number of steps	1	0.064
EXP1007	3 relay outputs to increase number of steps	1	0.085
EXP1008 **EXP1008T❷**	2 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC	1	0.058
EXP1040	2 digital/resistive inp. 2 static out.	1	0.054
EXP1041	2 thermocouple inp. 2 static out.	1	0.054
EXP1042T❷	6 digital inputs	1	0.054
EXP1043T❷	4 digital inputs and 2 static outputs	1	0.054
Communication ports.			
EXP1010	Opto-isolated USB interface	1	0.060
EXP1011	Opto-isolated RS232 interface	1	0.040
EXP1012 **EXP1012T❷**	Opto-isolated RS485 interface	1	0.050
EXP1013 **EXP1013T❷**	Opto-isolated Ethernet interface	1	0.060
EXP1014	Opto-isolated Profibus-DP interface	1	0.080
EXP1018❶	IEC/EN/BS 61850 interface	1	0.060
Various functionalities.			
EXP1015	GPRS/GSM modem	1	0.080
EXP1016	Capacitor bank protection	1	0.080
EXP1030	Data storage, clock-calendar	1	0.050

❶ **IEC/EN/BS 61850 protocol**
The module will be made available only when the competent authorities have established the exact terms of the supervision and control of the specific commands (at the time of catalogue printing, currently under study as specified in the Italian CEI 0-16 and CEI 0-21 standards).
❷ PCB tropicalized.

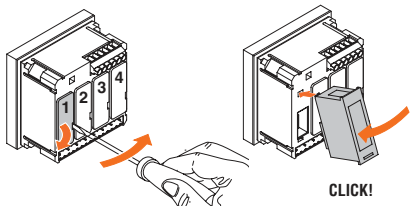
General characteristics
EXP series expansion modules can increase the functionality of the LOVATO Electric products, such as:
- Digital inputs
- Relay outputs
- Static outputs
- Analog inputs
- Inputs for PT100 temperature sensor
- Thermocouple inputs “J” or “K” types
- Analog outputs
- Communication interface
- GPRS/GSM modem (without antenna, see page 35-4)
- Data storage.

– Powered directly by the base product
– Automatic identification by the base product
– Rear base product mounting with no need of tools
– **T suffixed versions have tropicalized PCB.**

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus File E93601), as Listed Accessory under Auxiliary Devices; EXP1018 excluded, EAC.
Compliant with standards:
– For EXP1018: IEC/EN/BS 61850 and Italian CEI 0-16, CEI 0-21
– For EXP1004, EXP1010 and EXP1013: IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-4, UL508, CSA C22.2 n° 14
– For EXP1015: IEC/EN/BS 61010-1, IEC/EN/BS 62311, ETSI EN 301 489-1, ETSI EN 301 469-7, EN 301 511, USA/FCC 47 CFR part 15, Subpart B, CAN/ICES-003
– For all other types: IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL508, CSA C22.2 n° 14.

For overall dimensions, wiring diagrams and technical characteristics, consult the technical instructions in Downloads of the local or global websites; see details on inside front cover.

Expansion module fixing



EXP series compatibility with LOVATO Electric products

	INTERFACE PROTECT. SYSTEM UNIT	DIGITAL MULTIMETERS		AUTOMATIC POWER FACTOR CONTROLLERS			AUTOMATIC TRANSFER SWITCH CONTROLLERS		FIRE PUMP CONTROLLERS		ENGINE AND GENERATOR CONTROLLERS			MOTORIZED CHANGEOVER SWITHCES
TYPE	PMVF3000	DMG 6...	DMG7000 DMG7500 DMG8000 DMG9000	DCRL3/5	DCRL8	DCRG8 DCRG8F	ATL610	ATL800/900	FFL800...	FFLRA400	RGK4...	RGK610	RGK750 RGK8... RGK9...	GLCM...
EXP1000		●	●			●	●	●		●			●	
EXP1001		●	●			●	●	●		●			●	
EXP1002		●	●			●	●	●		●			●	
EXP1003	●	●	●	●	●	●	●	●		●			●	●
EXP1004...			●			●		●	**EXP1004T**				● (not RGK750)	
EXP1005			●			●		●					● (not RGK750)	
EXP1006				●	●	●	●	●						●
EXP1007				●	●	●	●	●						
EXP1008...		●	●			●	●	●	**EXP1008T**	●			●	
EXP1010	●	●	●	●	●	●	●	●		●		●	●	
EXP1011	●	●	●	●	●	●	●	●		●		●	●	
EXP1012...	●	●	●	●	●	●	●	●	**EXP1012T**	●		●	●	●
EXP1013...	●	●	●		●	●	●	●	**EXP1013T**	●			●	
EXP1014			●			●	●	●						
EXP1015						●		●	●	●			●	
EXP1016						● (not DCRG8F)								
EXP1018	●													
EXP1030						●								
EXP1040											●			
EXP1041													●	
EXP1042T									●	●		●	●	
EXP1043T									●	●	●	●	●	
Max n° of	2	1	3	1	2	4	2	3	2	2	1	1	2/3/4	1

Expansion modules for modular products

EXM1000

EXM1010

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Inputs and outputs.			
EXM1000	2 digital inputs and 2 static outputs, opto-isolated	1	0.137
EXM1001	2 digital inputs, opto-isolated and 2 relay outputs, rated 5A 250VAC	1	0.147
EXM1002	4 opto-isolated digital inputs and 2 relay outputs rated 5A 250VAC	1	0.155
Communication ports.			
EXM1010	Opto-isolated USB interface	1	0.140
EXM1011	Opto-isolated RS232 interface	1	0.125
EXM1012	Opto-isolated RS485 interface	1	0.140
EXM1013	Opto-isolated Ethernet interface	1	0.140
EXM1018❶	IEC/EN/BS 61850 interface	1	0.140
EXM1020	Opto-isolated RS485 interface and 2 relay outputs, rated 5A 250VAC	1	0.140
EXM1030	Data storage, RTC with backup reserve energy for data logging	1	0.140

❶ **IEC/EN/BS 61850 protocol**
The module will be made available only when the competent authorities have established the exact terms of the supervision and control of the specific commands (at the time of catalogue printing, currently under study as specified in the Italian CEI 0-21 standard).

General characteristics
EXM series expansion modules can increase functionality of LOVATO Electric products, such as:
- Digital inputs
- Relay outputs
- Static outputs
- Communication interfaces
- Data storage.

– Connection to base product by IR (infrared beam) port
– Automatic identification by the base product
– Side base product mounting
– Auxiliary power supply: 100-240VAC 50/60Hz.

Certifications and compliance
Certifications obtained: UL Listed, for USA and Canada (cULus File E93601), as Listed Accessory under Auxiliary Devices; EXM10 18 excluded, EAC.
Compliant with standards:
– For EXM1018: IEC/EN/BS 61850 and Italian CEI 0-21
– For EXM1012, 1020, 1013: IEC(EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-4, UL 508, CSA C22.2 n° 14
– For all other types: IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3, UL508, CSA C22.2 n° 14.

For overall dimensions, wiring diagrams and technical characteristics, consult technical instructions online in Downloads of the local or global website; see details on inside front cover.

Expansion module fixing

CLICK!

EXM series compatibility with LOVATO Electric products

TYPE	INTERFACE PRO. SYSTEM UNITS	ENERGY METER	DATA CONCENTRATOR	DIGITAL MULTIMETER
	PMVF52/61/71/81/90	DMED310T2	DMECD	DMG300
EXM1000		●	●	●
EXM1001	●	●	●	●
EXM1002			●	●
EXM1010	●	●	●	●
EXM1011	●	●	●	●
EXM1012	●	●	●	●
EXM1013	●	●	●	●
EXM1018	●			
EXM1020		●	●	●
EXM1030		●	●	●
Max n° of modules addable	2	3	3	3

Communication devices

CX01

CX02

CX03

Order code	Description	Qty per pkg	Wt
		n°	[kg]
CX01	USB connection device PC↔LOVATO Electric device with optical connector for programming, data download, diagnostics and firmware upgrade	1	0.090
CX02	Wi-Fi connection dongle PC↔LOVATO Electric device for data download, diagnostics and firmware upgrade, project upload/ download and cloning	1	0.090
CX03	GSM penta-band antenna (850/900/1800/1900/2100MHz)	1	0.090

General characteristics
Communication devices to link LOVATO Electric products to:
– Personal computers (PC)
– Smartphones
– Tablets.

CX01
The USB/optical device, complete with cable, allows to connect LOVATO Electric products to a PC without having to disconnect the power supply from the electric panel and to carry out:
– Parameter programming
– Copy of the settings
– Data and event download
– Carry out the diagnostics
– Firmware upgrade.
The PC identifies the connection as a standard USB.

CX02
This Wi-Fi point connection lets LOVATO Electric products be viewed by PC, smartphone and tablet with no need for cabling and to carry out:
– Parameter programming
– Data and event download
– Diagnostics project upload/download and controller cloning.

CX03
Antenna compatible with the majority of worldwide mobile networks thanks to the available frequencies at 850/900/1800/1900/2100MHz.
– IP67 IEC protection degree.
– Fixing by Ø10mm/0.39" drilling.
– Cable length 2.5m/2.73yd.

For dimensions, wiring schemes and technical characteristics, refer to technical instructions in downloads of local or global website or consult Technical support; see contact details on inside front cover.

Compliance for CX02
Compliant with standards: EN/BS 60950-1, EN 62311, EN 301 489-1 V2.2.0, EN 301 489-17 V3.2.0, EN300 328 V2.1.1.

Remote display unit

new

EXCRDU2

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXCRDU2	Remote display unit, widescreen colour LCD graphic display, built-in RS485 port, for the monitoring and control of max 32 starters, IP65, 3m cable included	1	0.420

General characteristics
With the EXCRDU2 remote display unit it is possible to command and monitor up to 32 starters via RS485 communication, at choiche between soft starters ADXL... or ADXNP... series and variable speed drives VLB... series.
– Auxiliary power supply: 100...240VAC 50/60Hz, 110...250VDC
– Widescreen colour LCD graphic display 118x96mm
– Isolated RS485 communication port, Modbus-RTU protocol
– Configurable communication parameters
– Integrated optical port for firmware update
– Flush mount, standard 92x92mm cut-out
– Compatible with:
  • soft starters ADXL... series equipped with RS485 communication card code EXC1042
  • soft starters ADXNP... series equipped with RS485 communication module, code CX04
  • variable speed drives VLB... series equipped with RS485 logic unit, code VLBXL06 (already built-in on complete drives type VLB3...A480)
– RS485 cable included, 3m length
– IEC degree of protection: IP65 frontal with gasket (provided as standard), IP20 housing and terminals.

Certifications and compliance
Certifications: cETLus.
Compliant with standards: IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 61000-6-2, IEC61000-6-4.

Accessories

EXP8000

EXP8001

EXP8003

EXP8004

EXM8004

DMXP03

DMXP04

NTC01

Order code	Description	Qty per pkg	Wt
		n°	[kg]
EXP8000	Plastic insert for customising label for DMG6... and DCRL3/5	10	0.005
EXP8001	IP65 gasket seal for ATL500/600/601/610 and DCRL8	1	0.009
EXP8003	35mm/1.38" DIN rail mounting accessory for ADXL0018600..., ADXL0115600 and DCTL... up to 60Kvar	1	0.200
EXP8004	Fan for ADXL... soft starter and DCTL... thyristor modules	1	0.004
EXM8004	Set of sealable terminal covers for DMG100/110/200/210/300	1	0.020
DMXP03	Panel mounting for 3 modules devices	1	0.052
DMXP04	Panel mounting for 4 modules devices	1	0.054
NTC01	External/remote temperature sensor, with 3m/10ft long cable	1	0.150

Connecting cable

51C2

Order code	Description	Qty per pkg	Wt
		n°	[kg]
51C2	For PC ↔ LOVATO Electric device, 1.8m/6ft long	1	0.090

General characteristics
Connecting cable to link LOVATO Electric devices with RS232 port to personal computers.

Certification
Certification obtained: EAC.

Software and Apps

- Multiclient web based monitoring software, Cloud and on premises solutions.
- Software to monitor and configure LOVATO Electric devices.
- APP for monitoring and configuration via Wi-Fi or NFC.

Software — SEC. - PAGE

Synergy: supervision and Energy Management software ..... 36 - 2

Xpress: configuration and remote control software ..... 36 - 5

APP

Sam1: APP for smartphone and tablet to setup and monitor LOVATO Electric devices ..... 36 - 6

NFC: APP for programming LOVATO Electric devices via NFC technology ..... 36 - 7

Synergy

Page 36-2

SUPERVISION AND ENERGY MANAGEMENT SOFTWARE

- Windows services and web applications to collect and publish device data on the most popular browsers
- Data management in MS SQL database
- Multi-user access either in local area networks or internet
- Cloud service available on LOVATO Electric portal.

Xpress

Page 36-5

CONFIGURATION AND REMOTE CONTROL SOFTWARE - FREE OF CHARGE

- Parameter setting
- Point-by-point monitoring
- Memory module management.

Sam1

Page 36-6

APP FOR SMARTPHONES AND TABLETS

- Users can program the device, view alarm conditions, send commands, read measurements, download statistical data and events and send retrieved data by email
- iOS and Android compatible.

NFC

Page 36-7

APP FOR PROGRAMMING VIA NFC TECHNOLOGY

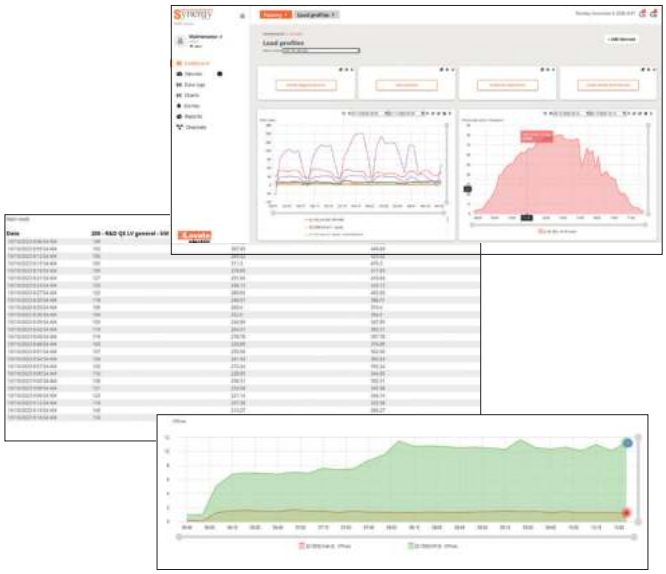
- Parameter setting with NFC technology
- Access without the need to power up the LOVATO Electric device
- iOS and Android compatible.

Synergy

Synergy is a supervision and Energy Management web-based software that provides the monitoring and control of the electrical installation, from every computer or mobile device through the most popular web browsers in a simple and efficient way.
It is valid software to sustain the activities indicated by the standard EN ISO 50001 “Energy Management systems. Requirements with guidance for use”.
In addition to electrical quantities, it allows to check all environmental and process information (operating status, alarms, etc.), acquired from LOVATO Electric products, equipped with communication port, and thereby to carry out commands and parameterising.
It is possible to create, without limitations, browsable pages with widgets for charts, data tables, measure indicators and alarm conditions. Data is available to be downloaded to user's computers and possibly to be sent to either a list of e-mail recipients or to FTP servers. Users can configure the exported files according to their needs.
Synergy's flexibility lets third party devices which are able to exchange data through Modbus RTU/TCP protocol be included in the monitoring system and third party softwares gather data for further elaborations by connecting to web API service.
Third party softwares are able to access Synergy database by means of web API call. Third party Modbus devices are able to access to Synergy by means of customizable interface drivers.

FUNCTIONALITY

- Communication with all LOVATO Electric measurement and control devices, via serial ports, Ethernet or modem
- Integration of third party devices with Modbus
- Reading of instantaneous values
- Definition of custom pages with charts, data tables, measure indicators and alarm conditions
- Data tables which can be exported to customisable files, for example to generate reports with user's logo and post-processing elaborations
- Data access through web API service
- Energy consumption, minimum, maximum and average values of the instantaneous measures divided per time slots
- Alarm management with e-mail notification
- Parameter changing of devices in the field
- User's access level management.



ALARMS

Each value recorded in the archives (datalogs) can be associated with one or more alarms, defining for each one: an upper and lower limit, a reference calendar (for enabling/disabling), any representation in trend graphs and the option of automatically sending an e-mail. If the limits are exceeded, Synergy records the anomaly and reports it in the software header. A specific menu allows the display of detailed information, silencing of alarms and consultation of the datalog.

SIMPLE, GUIDED, INTUITIVE CONFIGURATION

Programming Synergy does not require any particular computer knowledge since specific configuring instruments have been developed to guide through the configuration of product networks, graphic pages, datalog reports and charts, in a simple and intuitive way.

SERVER-MULTICLIENT SYSTEM

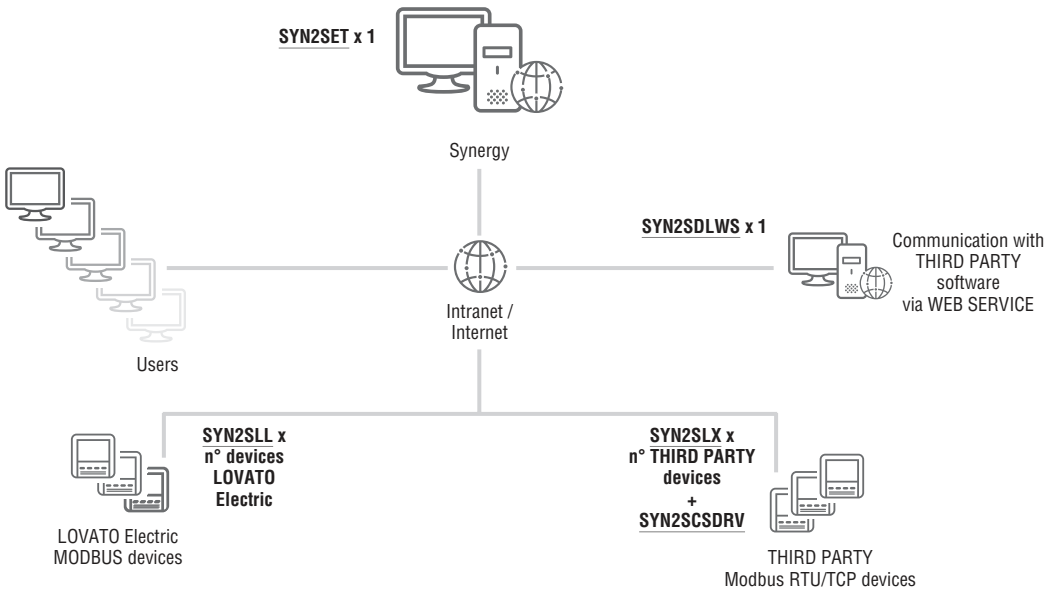
Synergy structure and applications are based on a MS SQL relational database management system.
Synergy is consulted through the most popular browsers, so it’s available on various platforms and operating systems. These characteristics make Synergy a highly versatile system, simultaneously accessible to a large number of users/workstations via intranets, VPN or Internet.

FURTHER INFORMATION
For further information on the software, consult the site:
http://**em.LovatoElectric.com**

Synergy Software

Order code	Description	Details	Provisioning
Software.			
SYN2SET	Supervision and Energy Management Synergy software	Supervision and Energy Management software web based for Windows operating system	Permanent licence
Licence.			
SYN2SLL	Synergy licence for LOVATO Electric device	Monitoring function for each LOVATO Electric device equipped by Modbus communication port	Permanent licence for single device
SYN2SLX	Synergy licence for THIRD PARTY devices	Monitoring function for each THIRD PARTY device equipped by Modbus communication port	Permanent licence for single device
SYN2SDLWS	Licence to access to Synergy database	Access function by WEB API to Synergy MS SQL database by THIRD PARTY software	Permanent licence
SYN2SLM	Licence to access to Synergy updates	Access to Synergy updates (e.g. compliant with new operating systems and new Synergy features for each LOVATO Electric or THIRD PARTY devices)	Annual subscription licence for single device
SYN2UPG	Update to Synergy2	Update from Synergy to Synergy2	Permanent licence for single device
Technical support and training.			
SYN2SCS00	Synergy technical support	Synergy technical support by phone or team viewer	Hourly rate
SYN2SCS11	Synergy commissioning	On site Synergy technical support: – check on field devices configuration – SYN2SET setup on customer PC – check of exchanging data between Synergy and on field devices – Synergy configuration based on customer needs – travel costs and labour hours to setup Synergy and on field devices	Commissioning cost
SYN2SCSDRV	Interface driver development for THIRD PARTY devices	Synergy support to develop the interface driver between Synergy and THIRD PARTY devices for a maximum of 5 measurements and feasibility study by LOVATO Electric Technical support (Tel. + 39 035 4282422; E-mail: service@LovatoElectric.com)	Cost for each driver
SYN2TRAINING	Synergy training sessions (basic and advanced courses)	Introduction to Energy Management topics. Measurement devices: range and selection criteria with case studies. Synergy software key features for monitoring and supervisioning: architecture and access, channels, tools, graphs, data logs, pages and access criteria. Practical exercises. For further information visit EVENTS section on **www.LovatoElectric.com**	Based on requirements

Example of a Synergy on premises solution:



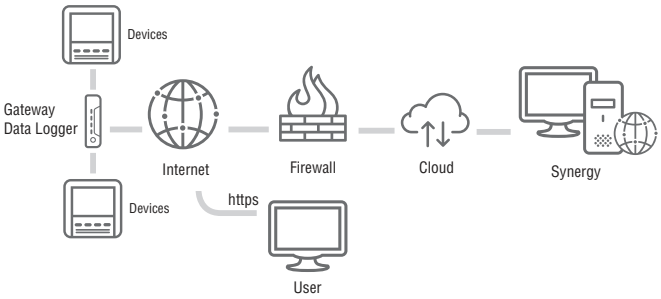
Synergy cloud

Synergy Cloud is a subscription service that allows the supervision and control of systems via LOVATO Electric Cloud server accessible from any computer or mobile device through the most common web browsers. The functions of the Synergy Cloud software are the same as those made available with the local installation of the Synergy software but without the need to install any software and without the need of a dedicated server at company premises.
The costs of purchase, configuration and maintenance of the hardware and software necessary for energy monitoring are saved.
The devices in the field send the monitored data to the Gateway Data Logger (EXCGLB...) device which collects and represents them at the integrated web server. Synergy Cloud lets the user remotely view the instantaneous monitored data, receive reports about alarms via email and execute commands (SYN2CLRW licence).
With the appropriate licence for supervision and Energy Management (SYN2CLL licence), Synergy Cloud periodically receives via Internet (either wired or mobile network) the data collected by the Gateway Data Logger in order to store historical data, process and represent them graphically as well.

SECURITY

The security of the data is guaranteed by HTTPS encryption with certificate between server and client PC, by daily backup of the data collected and by state-of-the-art firewall for server access.

The Synergy Cloud solution:



FEATURES

- Extremely intuitive interface: no particular technical background required
- Data access from all over the world thanks to the Internet and common browsers
- Specific design for client requirements (selection of measurement scenarios)
- Low data traffic thanks to the extreme economy of the protocol used (Modbus)
- Instantaneous data acquisition from various devices that can even be located in different sites
- Simple and clear reporting of all energy data
- No investment in software database or server
- Extremely secure data thanks to HTTPS and daily backup
- Automatic updates included
- Limited subscription cost.

Order code	Description	Details	Provisioning
Licence.			
SYN2CLRW	Synergy licence for basic remote view	Remote view of instantaneous data, creation of alarms and relevant mail sending, execution of commands	Annual subscription licence (365 days) for each device
SYN2CLL	Synergy Cloud licence for LOVATO Electric device	Supervision, Energy Management, data storage functions for a LOVATO Electric device with Modbus communication	Annual subscription licence (365 days) for each device
SYN2CLX	Synergy Cloud licence for THIRD PARTY devices	Supervision, Energy Management, data storage functions for a third party device with Modbus communication	Annual subscription licence (365 days) for each device
SYN2CDLWS	Licence to access to Synergy database	Access function by WEB API to Synergy MS SQL database by THIRD PARTY software	Annual subscription licence (365 days)
Technical support.			
SYN2SCS00	Synergy Technical support	Synergy Technical support by phone or team viewer	Hourly rate
SYN2SCS11	Synergy commissioning	On site Synergy technical support: – check on field devices configuration – SYN2SET setup on customer PC – check of exchanging data between Synergy and on field devices – Synergy configuration based on customer needs – travel costs and labour hours to set up Synergy and on field devices	Commissioning cost
SYN2SCSDRV	Interface driver development for THIRD PARTY devices	Synergy support to develop the interface driver between Synergy and third party devices for a maximum of 5 measurements and feasibility study by LOVATO Electric Technical support	Cost for each driver
SYN2TRAINING	Synergy training sessions (basic and advanced courses)	Introduction to Energy Management topics. Measurement devices: range and selection criteria with case studies. Synergy software key features for monitoring and supervision architecture and access, channels, tools, graphs, data logs, pages and access criteria. Practical exercises. For further information visit EVENTS section on **www.LovatoElectric.com**	Based on requirements

Note: every monitored device has a defined set of measures that are stored and available for a customizable period.
Further information available on: **http://em.LovatoElectric.com.**

Xpress

Xpress is parameter configuration and remote monitoring software shared by the entire latest generation of LOVATO Electric products with communication port.
It can be installed in the Windows environment and connected individually (one node at a time) to the LOVATO Electric products.

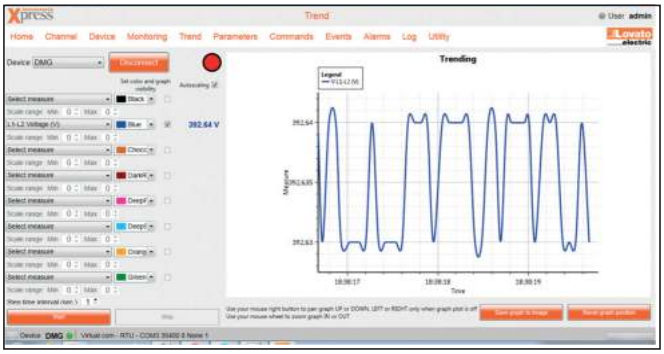
- Supports connection via CX01 (USB) or CX02 (Wi-Fi) device, USB, RS232, RS485, Ethernet or modem
- Product configuration:
  - Parameter setting
  - Project file management
- Product firmware update (via CX01)
- Remote control:
  - Monitoring of main measurements
  - Measurements graphic trends
  - Sending commands to products
- Reading alarms and events memory
- Memory modules management EXP1030, EXM1030, EXP1031.

Consult the **www.LovatoElectric.com** site for the list of products supported by Xpress.

Xpress can be ordered using code SYN1XP00 or downloaded for free from:
www.LovatoElectric.com

MONITORING

The measurements of the product connected are divided into context menus to make searching for the right value easy and shown on appropriate graphical gauges. It is also possible to show measurements trends.

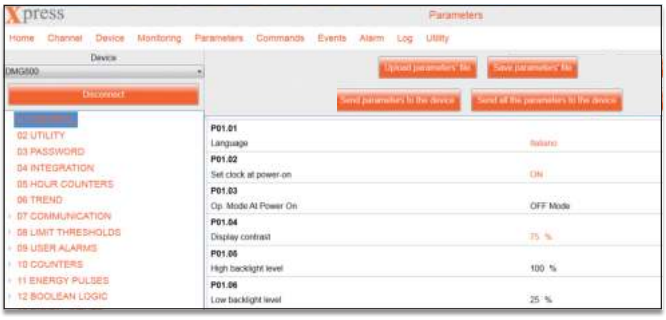


COMMANDS

A command can be sent to the product connected to energise outputs or reset energy consumption or operating time counters for maintenance.

PARAMETERS

The options in the setup menu and parameters on the product connected are replicated in the software to allow the user to operate using the terms that they already know. Parameters that differ from the factory values are highlighted in a different colour.
The parameters can be saved to a file and recalled in subsequent installations, or defined even in the absence of a connection to the product, to permit preparation of a project to send later.



EVENTS

If the product connected features an event memory, the complete list can be downloaded for saving as an external file, in text or spreadsheet format.

DATA-LOGGER MEMORY MANAGEMENT

Xpress can be used to configure and manage the EXP1030, EXP1031 or EXM1030 memory modules, in order to create tables indicating the history of the measurements selected by the user.
In particular, the software can be used to set:

- The measurements to be sampled
- The sampling time
- The event that triggers and ends sampling
- Memory capacity management (FIFO or stop when memory is full).

The software can show the waveforms stored in EXP1031 Energy Quality module as well.
The data acquired can be displayed in graphs and exported to text files or spreadsheets.

ALARMS

The alarms active on the product connected can be displayed in the software, for a single screen with the complete list of the faults detected.

APP Sam1

General characteristics

Configuration and maintenance operations, often done in intolerable or awkward environments due to weather or noisy conditions or narrow places, are now easier to do for all LOVATO Electric devices with communication interface on the front, compatible with CX02 device. Tablets and smartphones with Android or iOS operating systems can connect to them using the new application called Sam1 . Therefore, it is no longer necessary to connect and switch on a PC using cables to change configurations, setup parameters etc.

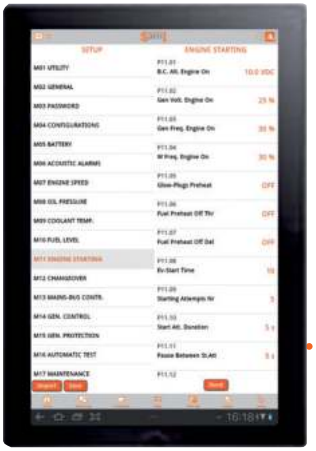
With this APP, a file previously saved can be uploaded; commands can be sent; measured quantities can be read from LOVATO Electric devices. The events can be viewed and saved in a text file and later shared.

The Sam1 App LOVATO can be downloaded from Google Play Store or App store.

ANDROID APP ON Google play

Available on the App Store

PARAMETERS SETTING



SENDING COMMANDS

EVENT LOG VIEWING

ALARMS VIEWING

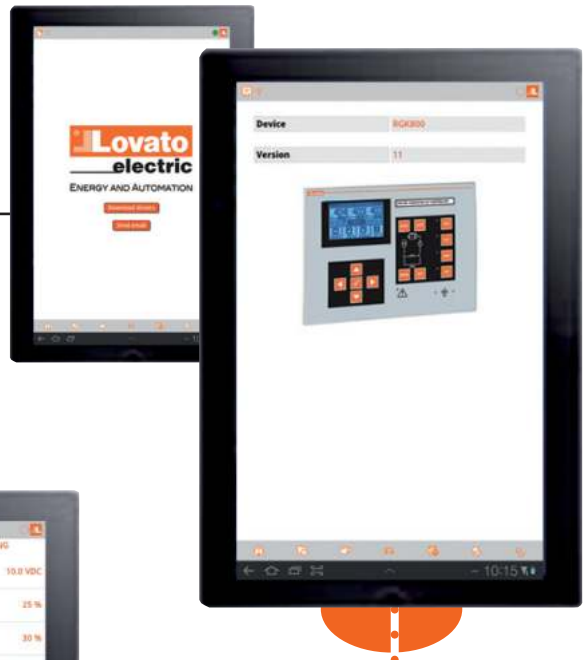
MEASUREMENTS VIEWING

APP

NFC

Updating driver

Sending e-mail (parameters)



General characteristics

The parameter setting for some LOVATO Electric products is now possible via tablet and smartphone through NFC wireless technology.

Bringing the display of a smartphone or tablet (with NFC connection enabled) in close proximity to a LOVATO Electric product, activates the LOVATO NFC App and the device connected is recognised automatically.

The parameters can be set without powering up the LOVATO Electric device.

The application allows you to:

- Set the parameters for the product connected
- Save the parameters in a file and share it
- Load a parameter file saved previously
- Simple, fast and intuitive programming
- Very high accuracy and repeatability of the settings.

The app can be downloaded from Google Play Store and App Store.

ANDROID APP ON Google play

Available on the App Store

PARAMETERS SETTING