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Automation Panel 5000

User's manual
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MAAP5000-ENG

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1 Introduction

Information:

B&R makes every effort to keep documents as current as possible. The most current versions are available for download on the B&R website (www.br-automation.com).

1.1 Manual history

Version	Date	Comment[1)]
2.30	February 2025	**New content** • International and national certifications see "UL certification" on page 205 **Content updates** • cULus certification for link module 5DLDPO.1001-00 see "Technical data" on page 107 • Adjustment of the max. ambient temperature in operation with link module 5DLDPO.1001-00 see "Maximum ambient temperature for worst-case operation" on page 48
2.20	October 2024	• Updated "Order number key" on page 20. • Updated chapter "Mounting orientations" on page 45. • Revised "Cable lengths and resolutions for SDL transfer" on page 61. • Revised "Cable lengths and resolutions for DVI transfer" on page 61. • Added link module "5DLDPO.1001-00". • Added flange "5AC725.FLGC-00". • Revised "Touch screen calibration" in chapter "Commissioning". • Added Windows 10 2021 LTSC. • Added Linux for B&R 12. • Updated section "Touch screen" in the chapter on chemical resistance.
2.12	November 2021	• Editorial revisions. • Updated chapter Accessories. • Updated VESA IP54 mounting units ("5ACCMA00.0100-000" on page 121 and "5ACCMA00.0101-000" on page 123). • Added 5ACCHP00.0004-000.

1) Editorial corrections are not listed.

1.2 Information about this document

Information:

This document is not intended for end customers! The safety guidelines required for end customers must be incorporated into the operating instructions for end customers in the respective national language by the machine manufacturer or system provider.

1.2.1 Organization of notices

Safety notices

Contain **only** information that warns of dangerous functions or situations.

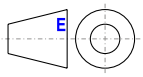
Signal word	Description
Danger!	Failure to observe these safety guidelines and notices will result in death, severe injury or substantial damage to property.
Warning!	Failure to observe these safety guidelines and notices can result in death, severe injury or substantial damage to property.
Caution!	Failure to observe these safety guidelines and notices can result in minor injury or damage to property.
Notice!	Failure to observe these safety guidelines and notices can result in damage to property.

General notices

Contain **useful** information for users and instructions for avoiding malfunctions.

Signal word	Description
Information:	Useful information, application tips and instructions for avoiding malfunctions.

1.2.2 Guidelines



European dimension standards apply to all dimension diagrams.

Information:

All specifications in dimension diagrams and associated tables are in millimeters [mm].

Unless otherwise specified, the following general tolerances apply:

Nominal dimension range	General tolerance per DIN ISO 2768 medium
Up to 6 mm	±0.1 mm
Over 6 to 30 mm	±0.2 mm
Over 30 to 120 mm	±0.3 mm
Over 120 to 400 mm	±0.5 mm
Over 400 to 1000 mm	±0.8 mm

2 General safety guidelines

2.1 Intended use

In all cases, applicable national and international standards, regulations and safety measures must be taken into account and observed!

The B&R products described in this manual are intended for use in industry and industrial applications. The intended use includes control, operation, monitoring, drive and HMI tasks as part of automation processes in machines and systems.

B&R products are only permitted to be used in their original condition. Modifications and extensions are only permitted if they are described in this manual.

B&R excludes liability for damage of any kind resulting from the use of B&R products in any intended way.

B&R products have not been designed, developed and manufactured for use that involves fatal risks or hazards that could result in death, injury, serious physical harm or other loss without the assurance of exceptionally stringent safety precautions.

B&R products are explicitly not intended for use in the following applications:

- Monitoring and control of thermonuclear processes
- Weapon systems control
- Flight and traffic control systems for passenger and freight transport
- Health monitoring and life support systems

2.2 Protection against electrostatic discharge

Electrical assemblies that can be damaged by electrostatic discharge (ESD) must be handled accordingly.

2.2.1 Packaging

- **Electrical assemblies with housing:**
  Do not require special ESD packaging but must be handled properly (see "Electrical assemblies with housing").
- **Electrical assemblies without housing:**
  Are protected by ESD-suitable packaging.

2.2.2 Regulations for proper ESD handling

Electrical assemblies with housing

- Do not touch the connector contacts of connected cables.
- Do not touch the contact tips on circuit boards.

Electrical assemblies without housing

The following applies in addition to "Electrical assemblies with housing":

- All persons handling electrical assemblies and devices in which electrical assemblies are installed must be grounded.
- Assemblies are only permitted to be touched on the narrow sides or front plate.
- Always place assemblies on suitable surfaces (ESD packaging, conductive foam, etc.). Metallic surfaces are not suitable surfaces!
- Assemblies must not be subjected to electrostatic discharges (e.g. due to charged plastics).
- A minimum distance of 10 cm from monitors or television sets must be maintained.
- Measuring instruments and devices must be grounded.
- Test probes of floating potential measuring instruments must be discharged briefly on suitable grounded surfaces before measurement.

Individual components

- ESD protective measures for individual components are implemented throughout B&R (conductive floors, shoes, wrist straps, etc.).
- The increased ESD protective measures for individual components are not required for handling B&R products at customer locations.

2.3 Regulations and measures

Electronic devices are generally not failsafe. If the programmable logic controller, operating or control device or uninterruptible power supply fails, the user is responsible for ensuring that connected devices (such as motors) are brought to a safe state.

When using programmable logic controllers as well as when using operating and monitoring devices as control systems in conjunction with a Soft PLC (e.g. B&R Automation Runtime or similar product) or Slot PLC (e.g. B&R LS251 or similar product), the safety measures that apply to industrial controllers (protection by protective equipment such as emergency stops) must be observed in accordance with applicable national and international regulations. This also applies to all other connected devices, such as drives.

All work such as installation, commissioning and servicing are only permitted to be carried out by qualified personnel. Qualified personnel are persons who are familiar with the transport, installation, assembly, commissioning and operation of the product and have the appropriate qualifications for their job (e.g. IEC 60364). National accident prevention regulations must be observed.
The safety guidelines, information about connection conditions (nameplate and documentation) and limit values specified in the technical data must be read carefully before installation and commissioning and must be strictly observed.

2.4 Transport and storage

During transport and storage, devices must be protected against undue stress (mechanical stress, temperature, humidity, aggressive atmosphere).

2.5 Installation

- The devices are not ready for use and must be installed and wired according to the requirements of this documentation in order to comply with EMC limit values.
- Installation must be carried out according to the documentation using suitable equipment and tools.
- Devices are only permitted to be installed in a voltage-free state and by qualified personnel. The control cabinet must first be disconnected from the power supply and secured against being switched on again.
- General safety regulations and national accident prevention regulations must be observed.
- The electrical installation must be carried out in accordance with relevant regulations (e.g. line cross section, fuse protection, protective ground connection).

2.6 Operation

2.6.1 Protection against contact with electrical parts

In order to operate programmable logic controllers, operating and monitoring devices and uninterruptible power supplies, it is necessary for certain components to carry dangerous voltages over 42 VDC. Touching one of these components can result in a life-threatening electric shock. There is a risk of death, serious injury or damage to property.

Before switching on programmable logic controllers, operating and monitoring devices and uninterruptible power supplies, it must be ensured that the housing is properly connected to ground potential (PE rail). Ground connections must also be made if the operating and monitoring device and uninterruptible power supply are only connected for testing purposes or only operated for a short time!

Before switching on, live parts must be securely covered. All covers must be kept closed during operation.

2.6.2 Ambient conditions - Dust, moisture, aggressive gases

The use of operating and monitoring devices (e.g. industrial PCs, Power Panels, Mobile Panels) and uninterruptible power supplies in dusty environments must be avoided. This can otherwise result in dust deposits that affect the functionality of the device, especially in systems with active cooling (fans), which may no longer ensure sufficient cooling.

The presence of aggressive gases in the environment can also result in malfunctions. In combination with high temperature and relative humidity, aggressive gases – for example with sulfur, nitrogen and chlorine components – trigger chemical processes that can very quickly impair or damage electronic components. Blackened copper surfaces and cable ends in existing installations are indicators of aggressive gases.

When operated in rooms with dust and condensation that can endanger functionality, operating and monitoring devices such as Automation Panels or Power Panels are protected on the front against the ingress of dust and moisture when installed correctly (e.g. cutout installation). The back of all devices must be protected against the ingress of dust and moisture, however, or the dust deposits must be removed at suitable intervals.

2.6.3 Programs, viruses and malicious programs

Any data exchange or installation of software using data storage media (e.g. floppy disk, CD-ROM, USB flash drive) or via networks or the Internet poses a potential threat to the system. It is the direct responsibility of the user to avert these dangers and to take appropriate measures such as virus protection programs and firewalls to protect against them and to use only software from trustworthy sources.

2.7 Cybersecurity disclaimer for products

B&R products communicate via a network interface and were developed for secure connection with internal and, if necessary, other networks such as the Internet.

Information:

In the following, B&R products are referred to as "product" and all types of networks (e.g. internal networks and the Internet) are referred to as "network".

It is the sole responsibility of the customer to establish and continuously ensure a secure connection between the product and the network. In addition, appropriate security measures must be implemented and maintained to protect the product and entire network from any security breaches, unauthorized access, interference, digital intrusion, data leakage and/or theft of data or information.

B&R Industrial Automation GmbH and its subsidiaries are not liable for damages and/or losses in connection with security breaches, unauthorized access, interference, digital intrusion, data leakage and/or theft of data or information.

The aforementioned appropriate security measures include, for example:

- Segmentation of the network (e.g. separation of the IT network from the control network[1)])
- Use of firewalls
- Use of authentication mechanisms
- Encryption of data
- Use of anti-malware software

Before B&R Industrial Automation GmbH releases products or updates, they are subjected to appropriate functional testing. Independently of this, we recommend that our customers develop their own test processes in order to be able to check the effects of changes in advance. Such changes include, for example:

- Installation of product updates
- Significant system modifications such as configuration changes
- Deployment of updates or patches for third-party software (non-B&R software)
- Hardware replacement

These tests should ensure that implemented security measures remain effective and that systems in the customer's environment behave as expected.

[1)] The term "control network" refers to computer networks used to connect control systems. The control network can be divided into zones, and there can be several separate control networks within a company or site. The term "control systems" refers to all types of B&R products such as controllers (e.g. X20), HMI systems (e.g. Power Panel T30), process control systems (e.g. APROL) and supporting systems such as engineering workstations with Automation Studio.

3 System overview

3.1 Information about this user's manual

This user's manual contains all the necessary information for a functioning Automation Panel 5000 swing arm device.

This user's manual applies to the modular Automation Panel 5000 product generation. For information about the Panel PC 2100 or Panel PC 2200 in combination with the Automation Panel 5000, see "Panel PC 2100 support arm devices (AP5000)" or "Panel PC 2200 support arm devices (AP5000)" user's manual.

Information:

All specifications in dimension diagrams and associated tables are in millimeters [mm].

3.2 Easy customization

The Automation Panel 5000 can be used either as part of a Panel PC or in conjunction with a link module. The operator panel is always identical.

3.3 Description of individual modules

3.3.1 AP5000 panels

The AP5000 series forms the basis for the Automation Panel 5000 and two Panel PC variants: Panel PC 2100 or Panel PC 2200 swing arm device with Automation Panel 5000. They consist of a display and touch screen. Different display sizes, touch screen technologies, mounting systems and panels with operating elements are available. The panels can only be operated as a complete system in combination with a link module (Automation Panel 5000) or system unit (PPC2100 or PPC2200 swing arm device with a panel from the Automation Panel 5000 series).
Single-touch panels start with order number 5AP5120.xxxx-xxx, multi-touch panels start with 5AP5130.xxxx-xxx and multi-touch panels with an expansion option start with order number 5AP5230.xxxx-xxx.

3.3.2 Link modules

Link modules have various graphics interfaces and connections. An Automation Panel is put together by installing a link module onto a panel.

A link module cannot be operated without a panel.

3.3.3 Mounting units

Mounting units are installed on the back of the panel. They are used to protect the installed link module or system unit and thus provide the complete system with a different degree of protection depending on the variant.

A flange is installed on 5ACCMA00.000x-000 swing arm mounting units. Due to the symmetrical design of the back of the panel, it is possible to install the mounting unit in 2 directions. If a flange is selected as the mounting system, a flange output is possible on the top or bottom. This mounting unit provides IP65 protection.

AbN
automation

A VESA bracket is installed on VESA IP54 mounting units (5ACCMA00.010x-000). If a VESA bracket is selected as the mounting system, VESA 100 or VESA 75 installation is possible. These mounting units provide IP54 protection.

A VESA bracket is installed on VESA mounting unit 5ACCMA01.0100-000. If a VESA bracket is selected as the mounting system, VESA 100 or VESA 75 installation is possible. This mounting unit provides a degree of protection up to IP20.

3.3.4 Flanges

A flange is installed on the mounting unit and establishes the connection between the Automation Panel or Panel PC and the swing arm system.

3.3.5 Expansion units

Expansion units can be installed on AP5230 panels with expansion option. It is possible to choose between an expansion cover and an expansion unit.
Expansion covers have cutouts that can be used to install the desired operating elements at a later time. The operating elements are already integrated in expansion units.

3.3.6 Handles

Handles can be installed on the sides of the panel to enable comfortable, ergonomic operation.

3.4 Configuration

The following individual components are mandatory for operation as an Automation Panel 5000:

- Panel
- Link module
- Swing arm mounting unit or VESA
- Flange (swing arm mounting unit only)
- Expansion unit (only for AP5230)

Configuration						
Panels						Select 1
		Diagonal	**Resolution**	**Touch screen**	**Keys**	**Format**
	5120 panels					
	5AP5120.1505-000	15.0"	XGA	Single-touch	No	Landscape
	5AP5120.1906-000	19.0"	SXGA	Single-touch	No	Landscape
	5130 panels					
	5AP5130.156B-000	15.6"	HD	Multi-touch	No	Landscape
	5AP5130.156C-000	15.6"	FHD	Multi-touch	No	Landscape
	5AP5130.185B-000	18.5"	HD	Multi-touch	No	Landscape
	5AP5130.185C-000	18.5"	FHD	Multi-touch	No	Landscape
	5AP5130.215C-000	21.5"	FHD	Multi-touch	No	Landscape
	5AP5130.240C-000	24.0"	FHD	Multi-touch	No	Landscape
	5230 panels[1]					
	5AP5230.156B-000	15.6"	HD	Multi-touch	Yes	Landscape
	5AP5230.156C-000	15.6"	FHD	Multi-touch	Yes	Landscape
	5AP5230.185B-000	18.5"	HD	Multi-touch	Yes	Landscape
	5AP5230.185C-000	18.5"	FHD	Multi-touch	Yes	Landscape
	5AP5230.215C-000	21.5"	FHD	Multi-touch	Yes	Landscape
	5AP5230.215I-000	21.5"	FHD	Multi-touch	Yes	Portrait
	5AP5230.240C-000	24.0"	FHD	Multi-touch	Yes	Landscape
Link modules						Select 1
	5DLDPO.1001-00 DP receiver[2] 5DLSDL.1001-00 SDL/DVI receiver 5DLSD3.1001-00 SDL3 receiver 5DLSD4.1001-00 SDL4 receiver					
Mounting units						Select 1
	Mounting unit without USB interface 5ACCMA00.0000-000 Mounting unit with USB interface 5ACCMA00.0001-000 Mounting unit with 2x USB interface 5ACCMA00.0002-000 VESA mounting unit 5ACCMA01.0100-000 IP54 VESA mounting unit 5ACCMA00.0100-000 5ACCMA00.0101-000 HMI VESA IP54 mounting unit with USB interface					
Flange[2]						Select 1
	Rotary flange 5ACCFL00.0000-000 5ACCFL00.0100-000 swivel-tilt flange 5AC725.FLGC-00 Rittal flange Rittal flange adapter 5ACCFL00.0200-000					
Expansion units[1]						Select 1
	5ACCKP00.156B-000 5ACCKP00.185B-000 5ACCKP00.215C-000 5ACCKP00.215I-000 5ACCKP00.240C-000	5ACCKP01.156B-000 5ACCKP01.185B-000 5ACCKP01.215C-000 5ACCKP01.215I-000 5ACCKP01.240C-000	5ACCKP04.156B-000 5ACCKP04.185B-000 5ACCKP04.215C-000 5ACCKP04.215I-000 5ACCKP04.240C-000			
	5ACCKP03.185B-000 5ACCKP03.215C-000 5ACCKP03.240C-000		5ACCKP05.185B-000 5ACCKP05.215C-000 5ACCKP05.240C-000			
Handles[3]						Select 1
	5ACCHD00.1505-000 5ACCHD00.156B-000 5ACCHD00.185B-000 5ACCHD00.1906-000 5ACCHD00.215C-000 5ACCHD00.240C-000		5ACCHD01.156B-000 5ACCHD01.185B-000 5ACCHD01.215C-000 5ACCHD01.215I-000 5ACCHD01.240C-000			
Terminal blocks						Select 1
	Power supply connectors 0TB103.9 0TB103.91					

1) Expansion units can only be combined with AP5230 panels.
2) Only in conjunction with a multi-touch device.
3) A flange must be selected if a standard mounting unit is used.
4) The handles cannot be factory-installed, but are installed after delivery.

3.4.1 Order number key

Information:

A current order number key is available on the B&R website for easy identification of the device configuration:

Home > Downloads > Industrial PCs and panels > Automation Panel 5000

3.5 Overview

Order number	Short description	Page
	Accessories	
0TB103.9	Connector 24 VDC - 3-pin, female - Screw clamp terminal block 3.31 mm²	197
0TB103.91	Connector 24 VDC - 3-pin, female - Cage clamp terminal block 3.31 mm²	197
5SWUTI.0001-000	HMI Service Center USB flash drive - Hardware diagnostic software - For APC910/PPC900 - For PPC1200 - For APC2100/PPC2100 - For APC2200/PPC2200 - For APC3100/PPC3100 - For APC mobile - For AP800/AP900 - For AP9x3/AP9xD - For AP1000/AP5000	192
	Expansion units	
5ACCKP00.156B-000	AP5000 swing arm expansion option - Expansion cover - For built-in operating elements - 10x options for 22.3 mm built-in elements - For panel 5AP5230.156B/156C-000	132
5ACCKP00.185B-000	AP5000 swing arm expansion option - Expansion cover - For built-in operating elements - 11x options for 22.3 mm built-in elements - For panel 5AP5230.185B/185C-000	132
5ACCKP00.215C-000	AP5000 swing arm expansion option - Expansion cover - For built-in operating elements - 13x options for 22.3 mm built-in elements - For panel 5AP5230.215C-000	132
5ACCKP00.215I-000	AP5000 swing arm expansion option - Expansion cover - For built-in operating elements - 7x options for 22.3 mm built-in elements - For panel 5AP5230.215I-000	132
5ACCKP00.240C-000	AP5000 swing arm expansion option - Expansion cover - For built-in operating elements - 14x options for 22.3 mm built-in elements - For panel 5AP5230.240C-000	132
5ACCKP01.156B-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.156B/156C-000	133
5ACCKP01.185B-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.185B/185C-000	133
5ACCKP01.215C-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.215C-000	133
5ACCKP01.215I-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.215I-000	133
5ACCKP01.240C-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.240C-000	133
5ACCKP03.185B-000	AP5000 swing arm expansion option - Expansion unit - 1x RFID read/write unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.185B/185C-000	135
5ACCKP03.215C-000	AP5000 swing arm expansion option - Expansion unit - 1x RFID read/write unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.215C-000	135
5ACCKP03.240C-000	AP5000 swing arm expansion option - Expansion unit - 1x RFID read/write unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.240C-000	135
5ACCKP04.156B-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.156B/156C-000	138
5ACCKP04.185B-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.185B/185C-000	138
5ACCKP04.215C-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.215C-000	138
5ACCKP04.215I-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.215I-000	138
5ACCKP04.240C-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.240C-000	138
5ACCKP05.185B-000	AP5000 swing arm expansion option - Expansion unit - 1x RFID read/write unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.185B/185C-000	140
5ACCKP05.215C-000	AP5000 swing arm expansion option - Expansion unit - 1x RFID read/write unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.215C-000	140
5ACCKP05.240C-000	AP5000 swing arm expansion option - Expansion unit - 1x RFID read/write unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.240C-000	140
	Flanges	
5AC725.FLGC-00	Flange - Rittal - For PPC725 - For AP5000	131
5ACCFL00.0000-000	AP5000 flange - Swing arm rotary flange - For swing arm mounting unit	125
5ACCFL00.0100-000	AP5000 flange - Swivel-tilt flange for swing arm - For swing arm mounting unit	127
5ACCFL00.0200-000	AP5000 flange - Swing arm flange adapter - For Rittal - For swing arm mounting unit	129
	Handles	
5ACCHD00.1505-000	AP5000 swing arm handles - For panel 5AP5120.1505-000	144
5ACCHD00.156B-000	AP5000 swing arm handles - For panel 5AP5130.156B/156C-000	144
5ACCHD00.185B-000	AP5000 swing arm handles - For panel 5AP5130.185B/185C-000	144
5ACCHD00.1906-000	AP5000 swing arm handles - For panel 5AP5120.1906-000	144
5ACCHD00.215C-000	AP5000 swing arm handles - For panel 5AP5130.215C-000	144
5ACCHD00.240C-000	AP5000 swing arm handles - For panel 5AP5130.240C-000	144
5ACCHD01.156B-000	AP5000 swing arm handles - For panel 5AP5230.156B/156C-000	144
5ACCHD01.185B-000	AP5000 swing arm handles - For panel 5AP5230.185B/185C-000	144
5ACCHD01.215C-000	AP5000 swing arm handles - For panel 5AP5230.215C-000	144
5ACCHD01.215I-000	AP5000 swing arm handles - For panel 5AP5230.215I-000	144
5ACCHD01.240C-000	AP5000 swing arm handles - For panel 5AP5230.240C-000	144
	Heat pipe	
5ACCHP00.0002-000	AP5000 heat pipe - For PPC2200 - For swing arm mounting unit	202
5ACCHP00.0003-000	AP5000 heat pipe - For PPC2200 - For VESA mounting unit	202
5ACCHP00.0004-000	AP5000 heat pipe - For PPC2100 (5PPC2100.BYxx-002) - For VESA mounting unit	202
	Hypervisor	
1TC4700.00	License for B&R Hypervisor (TC). One license per target system is required. This license is supported starting with version 4.9.	181

Order number	Short description	Page
	Link modules	
5DLDPO.1001-00	Automation Panel link module - DisplayPort receiver - For Automation Panel 933/1130 - For Automation Panel 5130 - For Automation Panel 5230 (only with 5ACCKP00.xxxx-000)	107
5DLSD3.1001-00	Automation Panel link module - SDL3 receiver - For Automation Panel 923/933/1000 - For Automation Panel 5000	111
5DLSD4.1001-00	Automation Panel link module - SDL4 receiver - For Automation Panel 923/933/1000 - For Automation Panel 5000	109
5DLSDL.1001-00	Automation Panel link module - SDL/DVI receiver - For Automation Panel 923/933/1000 - For Automation Panel 5000	113
	Mounting units	
5ACCMA00.0000-000	AP5000 swing arm mounting unit	115
5ACCMA00.0001-000	AP5000 swing arm mounting unit - 1x rear USB interface	116
5ACCMA00.0002-000	AP5000 swing arm mounting unit - 2x rear USB interface	118
5ACCMA00.0100-000	HMI mounting unit VESA IP54 - Leak tightness is only provided with suitable cable grommets.	121
5ACCMA00.0101-000	HMI mounting unit VESA IP54 w/USB - Leak tightness is only provided with suitable cable grommets.	123
5ACCMA01.0100-000	AP5000 VESA mounting unit IP10/IP20 - IP20 with 5AP5120.*-000 - IP10 with 5AP5130.*-000, 5AP5230.*-000	120
	Other	
5ACCRHMI.0007-000	HMI installation tool for swing arm: - 1x torque wrench 0.4 - 2.0 Nm - 1x torque wrench 2.0 - 10.0 Nm - 1x hex head bit 3.0, length 89 mm - 1x hex head bit 5.0, length 89 mm - 1x Torx 10 bit, length 90 mm - 1x Torx 20 bit, length 89 mm - 1x Torx 25 bit, length 89 mm - 1x Torx 30 bit, length 89 mm	196
	Panels	
5AP5120.1505-000	Automation Panel 15.0" XGA TFT - 1024 x 768 pixels (4:3) - Single-touch (analog resistive) - Swing arm mounting - Landscape format - For PPC2100 / PPC2200 / link modules	72
5AP5120.1906-000	Automation Panel 19.0" SXGA TFT - 1280 x 1024 pixels (5:4) - Single-touch (analog resistive) - Swing arm mounting - Landscape format - For PPC2100 / PPC2200 / link modules	74
5AP5130.156B-000	Automation Panel 15.6" HD TFT - 1366 x 768 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - For PPC2100 / PPC2200 / link modules	76
5AP5130.156C-000	Automation Panel 15.6" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - For PPC2100 / PPC2200 / link modules	78
5AP5130.185B-000	Automation Panel 18.5" HD TFT - 1366 x 768 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - For PPC2100 / PPC2200 / link modules	80
5AP5130.185C-000	Automation Panel 18.5" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - For PPC2100 / PPC2200 / link modules	82
5AP5130.215C-000	Automation Panel 21.5" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - For PPC2100 / PPC2200 / link modules	84
5AP5130.240C-000	Automation Panel 24.0" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - For PPC2100 / PPC2200 / link modules	86
5AP5230.156B-000	Automation Panel 15.6" HD TFT - 1366 x 768 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - Expansion option - For PPC2100 / PPC2200 / link modules	88
5AP5230.156C-000	Automation Panel 15.6" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - Expansion option - For PPC2100 / PPC2200 / link modules	90
5AP5230.185B-000	Automation Panel 18.5" HD TFT - 1366 x 768 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - Expansion option - For PPC2100 / PPC2200 / link modules	92
5AP5230.185C-000	Automation Panel 18.5" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - Expansion option - For PPC2100 / PPC2200 / link modules	95
5AP5230.215C-000	Automation Panel 21.5" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - Expansion option - For PPC2100 / PPC2200 / link modules	98
5AP5230.215I-000	Automation Panel 21.5" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Portrait format - Expansion option - For PPC2100 / PPC2200 / link modules	101
5AP5230.240C-000	Automation Panel 24.0" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - Expansion option - For PPC2100 / PPC2200 / link modules	104
	Runtime	
1TC4601.06-5	License for Automation Runtime Embedded (TC). One license per target system is required. This license is supported starting with version 4.9.	181
	Technology Guard	
0TG1000.01	Technology Guard (MSD)	181
0TG1000.02	Technology Guard (HID)	181
0TGF016.01	Technology Guard (MSD) with integrated flash drive, 16 GB (MLC)	181
1TG4601.06-5	Automation Runtime Embedded, TG license	181
1TG4601.06-T	Automation Runtime Embedded Terminal TG license	181
1TG4700.00	B&R Hypervisor	181
	USB accessories	
5MMUSB.032G-02	USB 3.0 flash drive 32 GB MLC	200
5MMUSB.2048-01	USB 2.0 flash drive 2048 MB B&R	198
5MMUSB.4096-01	USB 2.0 flash drive 4096 MB B&R	198

4 Technical data

4.1 Complete system

4.1.1 Connection options

The Automation Panel can be connected to a B&R industrial PC in SDL, DVI, SDL3, SDL4 and DP mode. The connection options described below provide an overview of the operating modes and possible limitations.

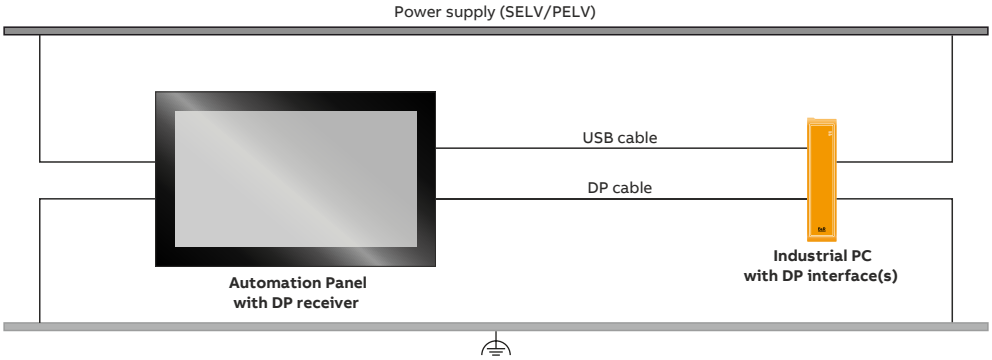
4.1.1.1 DP operation

If an Automation Panel with PCT touch screen (multi-touch) is operated with DisplayPort receiver, a DP and USB type A/B cable must be connected.

4.1.1.1.1 DP operation with multi-touch Automation Panel

The display device can be installed up to 7.5 m away from the B&R industrial PC. USB 2.0 is also transferred over this distance. External adapter modules are not required. A monitor/panel with DP interface or an Automation Panel with DP receiver can be used as a display device.

The brightness of the display can be adjusted via the on-screen display (OSD).



Availability of the interfaces on the Automation Panel with DP receiver:

DP interface (In)	✓	24 VDC power supply	✓
USB	✓ USB 2.0 (up to 2x)	Grounding	✓

Maximum cable length:

- 7.5 m

Requirements

- Automation Panel with DP receiver
- Industrial PC with DP interface (onboard or IF option)
- DP and USB type A/B cable

Information:

B&R cannot guarantee support for third-party products.

The permissibility and suitability of the monitor/panel must be checked individually by users in accordance with local technical and legal requirements.

4.1.1.1.2 General limitations/characteristics

- Key and LED data is not transferred.
- Data from operating elements is not transferred.
- Service and diagnostic data is not transferred.
- The maximum cable length is limited to 7.5 m.
- Single-touch (analog resistive) is not supported.

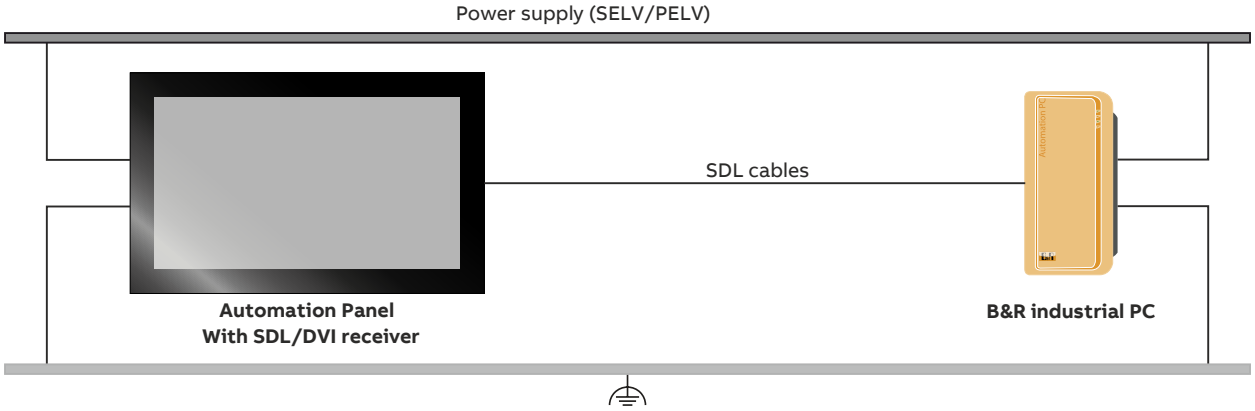
4.1.1.2 SDL operation

4.1.1.2.1 SDL operation without USB cable (mode 1)

With this connection option, all communication between the Automation Panel and B&R industrial PC takes place via a single SDL cable.

In addition to the display data, information from the touch screen, matrix keys, LEDs and service/diagnostic data is transferred. The Automation Panel can be installed up to 30 m away from the B&R industrial PC. USB 1.1 is also transferred over this distance and fully integrated into SDL. External adapter modules are not required.

The brightness of the display can be set via the ADI Control Center, for example.



Availability of the interfaces on the Automation Panel with SDL/DVI receiver:

Panel In	✓	USB In	x	Power supply	✓	Brightness controls	x
USB1, USB2	✓ USB 1.1	COM interface for touch screen	x	Grounding	✓		

Maximum cable length: 30 m

Requirements

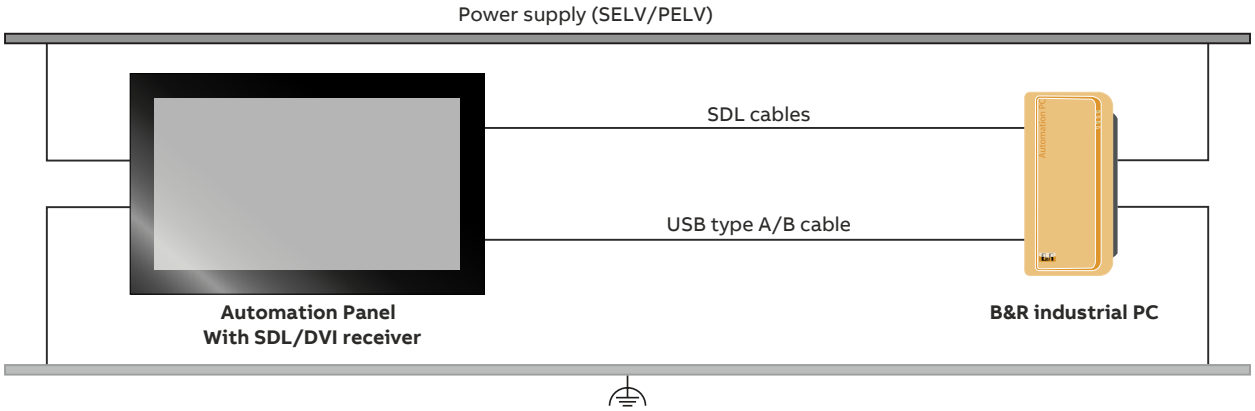
- Automation Panel with SDL/DVI receiver
- B&R industrial PC with SDL interface
- SDL cable

4.1.1.2.2 SDL operation with USB cable (mode 2)

With this connection option, communication between the Automation Panel and B&R industrial PC takes place via an SDL cable that is connected to interface "Panel In" and a USB type A/B cable that is connected to interface "USB In".

Display data as well as information from the resistive touch screen keys, matrix keys, LEDs and service/diagnostic data is transferred via the SDL cable. The touch screen data from the multi-touch screen is transferred via the USB type A/B cable. The Automation Panel can be installed up to 5 m (USB specification) away from the B&R industrial PC. USB 2.0 can be transferred over this distance via the USB type A/B cable. External adapter modules are not required.

The brightness of the display can be set via the ADI Control Center, for example.



Availability of the interfaces on the Automation Panel with SDL/DVI receiver:

Panel In	✓	USB In	✓ USB 2.0	Power supply	✓	Brightness controls	x
USB1, USB2	✓ USB 2.0	COM interface for touch screen	x	Grounding	✓		

Maximum cable length: 5 m

Requirements

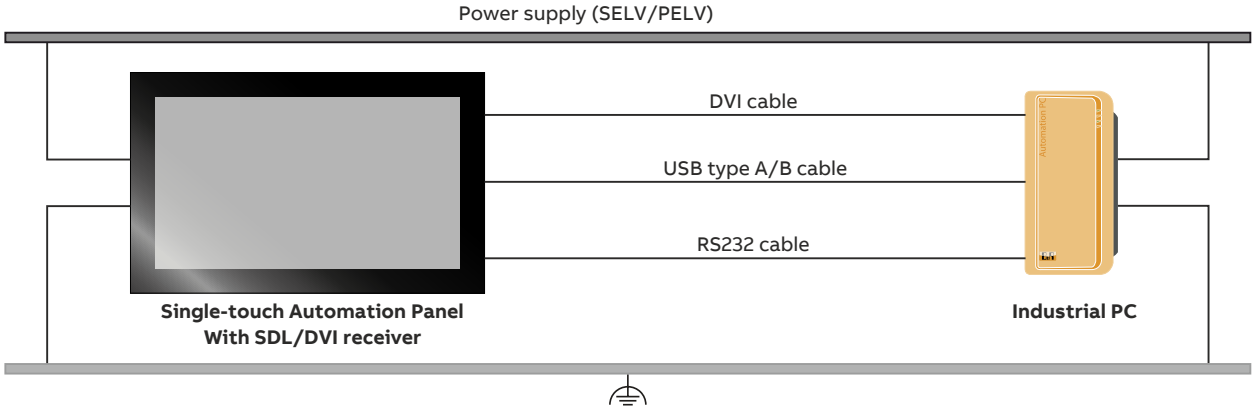
- Automation Panel with SDL/DVI receiver
- B&R industrial PC with SDL interface
- SDL cable, USB type A/B cable

4.1.1.3 DVI operation

In DVI operation, all signals needed to operate the Automation Panel are transferred via a separate cable. The brightness of the display can be set using the brightness buttons.

4.1.1.3.1 DVI operation with single-touch Automation Panel

If an Automation Panel with resistive touch screen (single-touch) is operated with DVI, a DVI, USB type A/B and RS232 cable must be connected.



Availability of the interfaces on the Automation Panel with SDL/DVI receiver:

Panel In	✓	USB In	✓ USB 2.0	Power supply	✓	Brightness controls	✓
USB1, USB2	✓ USB 2.0	COM interface for touch screen	✓	Grounding	✓		

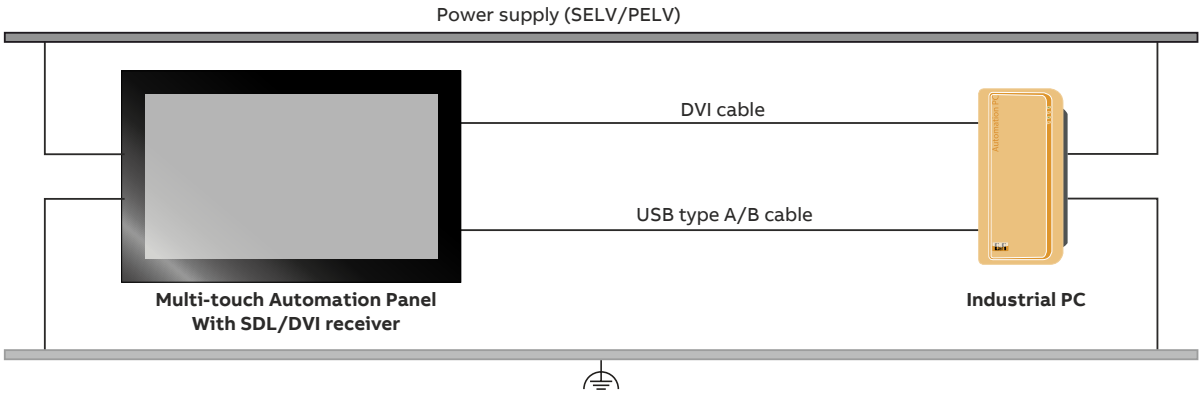
Maximum cable length: 5 m

Requirements

- Automation Panel with SDL/DVI receiver
- Industrial PC with DVI interface
- DVI cable, USB type A/B cable, RS232 cable

4.1.1.3.2 DVI operation with multi-touch Automation Panel

If an Automation Panel with PCT touch screen (multi-touch) is operated with DVI, a DVI and USB type A/B cable must be connected.



Availability of the interfaces on the Automation Panel with SDL/DVI receiver:

Panel In	✓	USB In	✓ USB 2.0	Power supply	✓	Brightness controls	✓
USB1, USB2	✓ USB 2.0	COM interface for touch screen	x	Grounding	✓		

Maximum cable length: 5 m

Requirements

- Automation Panel with SDL/DVI receiver
- Industrial PC with DVI interface
- DVI cable, USB type A/B cable

4.1.1.3.3 General limitations/characteristics

- Key and LED data is not transferred.
- Data from operating elements is not transferred.
- Service and diagnostic data is not transferred.
- The maximum cable length is limited to 5 m.
- Upgrading the firmware of Automation Panels is not possible.

4.1.1.4 SDL3 operation

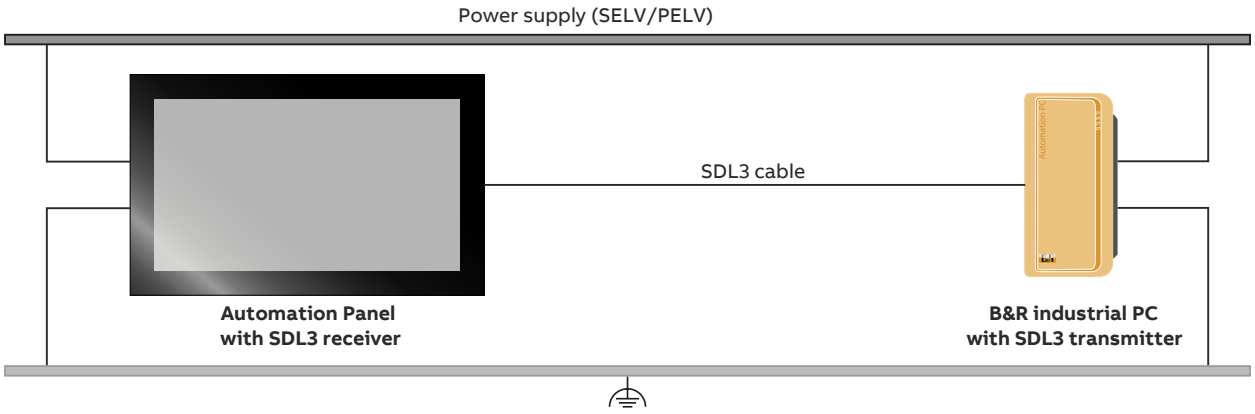
Smart Display Link 3 (SDL3) technology transfers all communication channels between a B&R industrial PC and panel up to 100 m over a standard Ethernet cable (min. Cat 6a). An RJ45 connector is used for the device connection, which is ideal for confined spaces in feed-throughs and swing arm systems.

4.1.1.4.1 SDL3 operation with SDL3 transmitter

In SDL3 operation with an SDL3 transmitter in the B&R industrial PC, all communication between the Automation Panel and B&R industrial PC takes place via a single SDL3 cable.

In addition to the display data, information from the touch screen, matrix keys, LEDs and service/diagnostic data is transferred. The Automation Panel can be installed up to 100 m away from the B&R industrial PC. USB 2.0 is also transferred over this distance and fully integrated into SDL3. External adapter modules are not required.

The brightness of the display can be set via the ADI Control Center.



Availability of interfaces on Automation Panels with an SDL3 receiver:

SDL3 interface	✓	USB1, USB2	✓	USB 2.0	Power supply	✓	Grounding ✓

Maximum cable length for SDL3: 100 m

Requirements

- Automation Panel with SDL3 receiver
- B&R industrial PC with SDL3 interface
- SDL3/SDL4 cable

4.1.1.4.2 General limitations/characteristics

- USB 2.0 transfer is limited to 30 Mbit/s with SDL3.
- A display is always emulated by the SDL3 transmitter using EDID data and hot plug detection, so DVI-compatible operation is possible. For this reason, the following behavior may occur during operation with multiple displays. In the operating system, a connected panel is reported by the video driver even in the following situations:
  - No SDL3/SDL4 cable is connected.
  - There is no connection established yet between the SDL3 link module and SDL3 transmitter.

  This behavior can be avoided by appropriate configuration in BIOS or via the graphics driver.

4.1.1.5 SDL4 operation

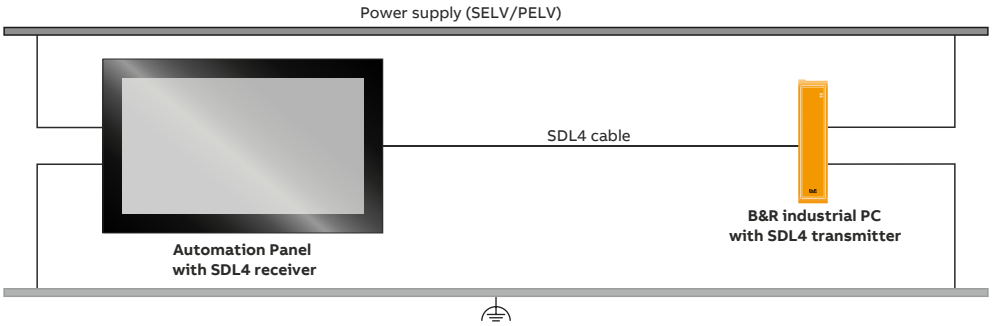
Smart Display Link 4 (SDL4) technology transfers all communication channels between a B&R industrial PC and panel up to 100 m over a standard Ethernet cable (min. Cat 6a). An RJ45 connector is used for the device connection, which is ideal for confined spaces in feed-throughs and swing arm systems.

4.1.1.5.1 SDL4 operation with SDL4 transmitter

In SDL4 operation with an SDL4 transmitter in the B&R industrial PC, all communication between the Automation Panel and B&R industrial PC takes place via a single SDL4 cable.

In addition to the display data, information from the touch screen, matrix keys, LEDs and service/diagnostic data is transferred. The Automation Panel can be installed up to 100 m away from the B&R industrial PC. USB 2.0 is also transferred over this distance and fully integrated into SDL4. External adapter modules are not required.

The brightness of the display can be set via the ADI, for example.



Availability of the interfaces on the Automation Panel with SDL4 receiver:

SDL4 interface	✓	USB1, USB2	✓	USB 2.0	Power supply	✓	Grounding ✓

Maximum cable length for SDL4: 100 m

Requirements

- Automation Panel with SDL4 receiver
- B&R industrial PC with SDL4 interface
- SDL3/SDL4 cable

4.1.1.5.2 General limitations

- USB 2.0 transfer is limited to 150 Mbit/s with SDL4.
- A display is always emulated by the SDL4 transmitter using EDID data and hot plug detection, so DVI-compatible operation is possible. For this reason, the following behavior may occur during operation with multiple displays.
  In the operating system, a connected panel is reported by the video driver even in the following situations:
  - No SDL3/SDL4 cable is connected.
  - There is no connection established yet between the SDL4 link module and SDL4 transmitter.

  This behavior can be avoided by appropriate configuration in BIOS or via the graphics driver.

4.1.1.5.2.1 General limitations

Determining the maximum available USB endpoints

Multi-touch panels

The following limitations apply to multi-touch panels:

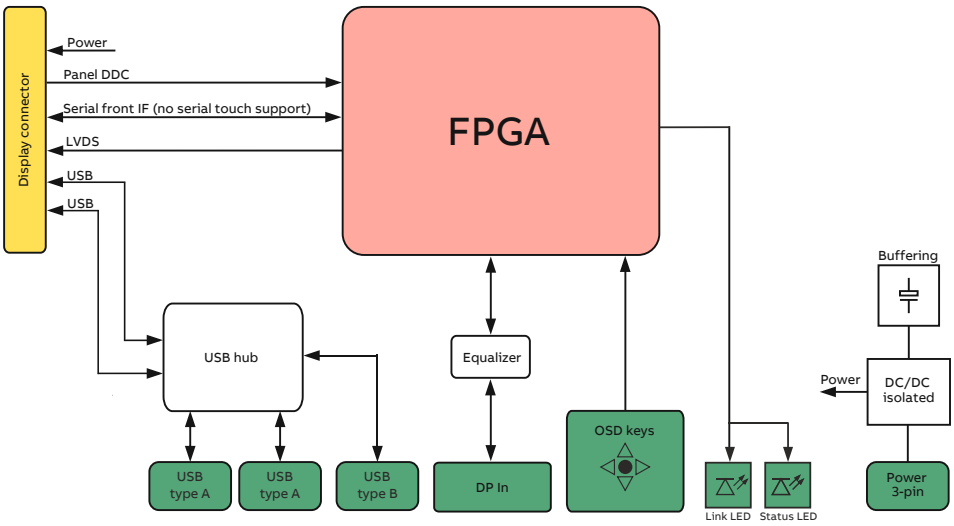
- A maximum of two USB hubs with up to eight ports per hub is supported.
- A maximum of six additional USB devices can be connected.
- Maximum permissible USB endpoints:

Transfer rate of the devices	Endpoints	
	IN	OUT
High speed	11	12
Full speed / Low speed	8	10

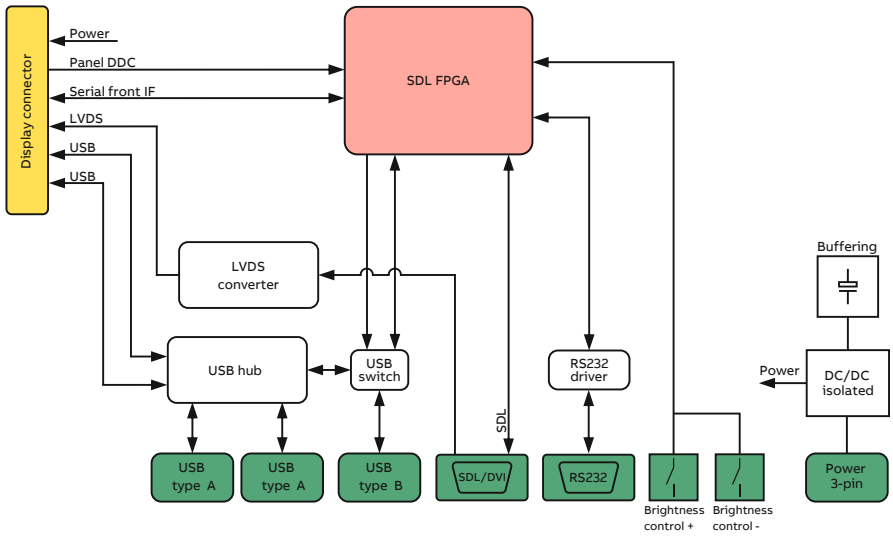
4.1.2 Electrical properties

4.1.2.1 Block diagrams

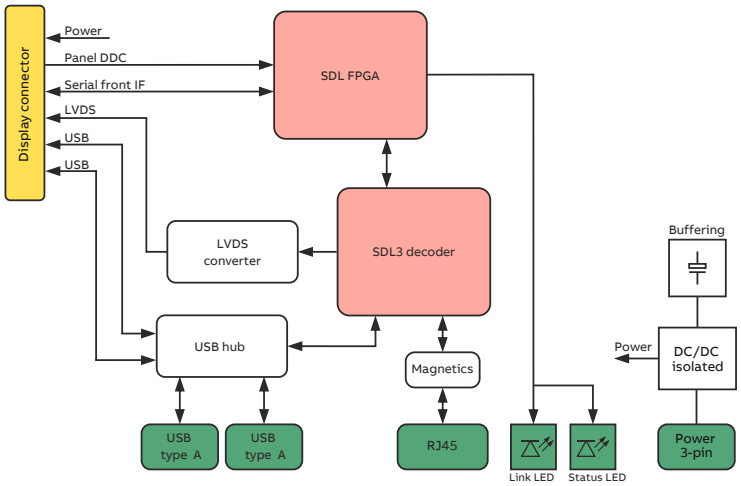
The following block diagram shows the simplified structure of DP receiver link module 5DLDPO.1001-00.



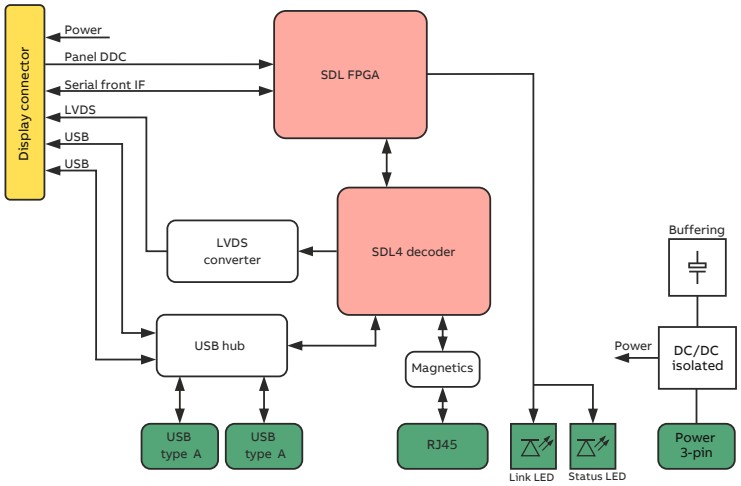
The following block diagram shows the simplified structure of the 5DLSDL.1001-00 SDL/DVI receiver link module.



The following block diagram shows the simplified structure of the 5DLSD3.1001-00 SDL3 receiver link module.



The following block diagram shows the simplified structure of the 55DLSD4.1001-00 SDL4 receiver link module.



4.1.2.2 Power calculation

In order to calculate the total power of the Automation Panel, the power rating of the display being used must be added to the power rating of the link module being used.

Information:

Unless otherwise specified, the following values are maximum values and additional consumers are not taken into account.

Link modules

Type	Order number	Total power consumption of link module
DP receiver	5DLDPO.1001-00	Max. 3.1 W (without USB consumer) Max. 8.1 W (with USB consumer)
SDL/DVI receiver	5DLSDL.1001-00	Max. 3.6 W (without USB consumer) Max. 8.6 W (with USB consumer)
SDL3 receiver	5DLSD3.1001-00	Max. 8.1 W (without USB consumer) Max. 13.1 W (with USB consumer)
SDL4 receiver	5DLSD4.1001-00	Max. 8.1 W (without USB consumer) Max. 13.1 W (with USB consumer)

Panels

Type	Model number	+5 V	+3.3 V	+12 V	Total power consumption
15" single-touch	5AP5120.1505-000	-	2.1 W	8.9 W	11 W
15.6" multi-touch	5AP5130.156B-000	1.8 W	-	15.6 W	17.4 W
15.6" multi-touch	5AP5130.156C-000	6 W	-	18 W	24 W
15.6" multi-touch expansion unit	5AP5230.156B-000	1.8 W	-	15.6 W	17.4 W
15.6" multi-touch expansion unit	5AP5230.156C-000	6 W	-	18 W	24 W
18.5" multi-touch	5AP5130.185B-000	6.1 W	-	10.8 W	16.9 W
18.5" multi-touch	5AP5130.185B-000 (Rev. H0 and later)	3.85 W	-	7.92 W	11.77 W
18.5" multi-touch	5AP5130.185C-000	7 W	-	18.6 W	24.6 W
18.5" multi-touch expansion unit	5AP5230.185B-000	6.1 W	-	10.8 W	16.9 W
18.5" multi-touch expansion unit	5AP5230.185B-000 (Rev. J0 and later)	3.85 W	-	7.92 W	11.77 W
18.5" multi-touch expansion unit	5AP5230.185C-000	7 W	-	18.6 W	24.6 W
19" single-touch	5AP5120.1906-000	5 W	-	22 W	27 W
21.5" multi-touch	5AP5130.215C-000	4 W	-	15 W	19 W
21.5" multi-touch expansion unit	5AP5230.215C-000	4 W	-	15 W	19 W
21.5" multi-touch expansion unit	5AP5230.215I-000	4 W	-	15 W	19 W
24.0" multi-touch	5AP5130.240C-000	5 W	-	24.5 W	29.5 W
24.0" multi-touch expansion unit	5AP5230.240C-000	5 W	-	24.5 W	29.5 W

Expansion option

Type	Model number	+5 V	+3.3 V	+12 V	Total power consumption
Expansion units	5ACCKP01.xxxx-000	0.50 W	0.20 W	-	0.70 W
	5ACCKP03.xxxx-000	1.7 W	0.20 W	-	1.90 W
	5ACCKP04.xxxx-000	0.50 W	0.20 W	-	0.70 W
	5ACCKP05.xxxx-000	1.7 W	0.20 W	-	1.90 W

Example

24.0" panel 5AP5230.240C-000	29.5 W	29.5 W
24.0" 5ACCKP01.240C-000 expansion unit	0.7 W	0.7 W
5DLSDL.1001-00 SDL/DVI receiver	8.6 W (with USB consumer)	8.6 W
	Total max.:	**38.8 W**

4.1.3 Mechanical properties

4.1.3.1 Dimensions

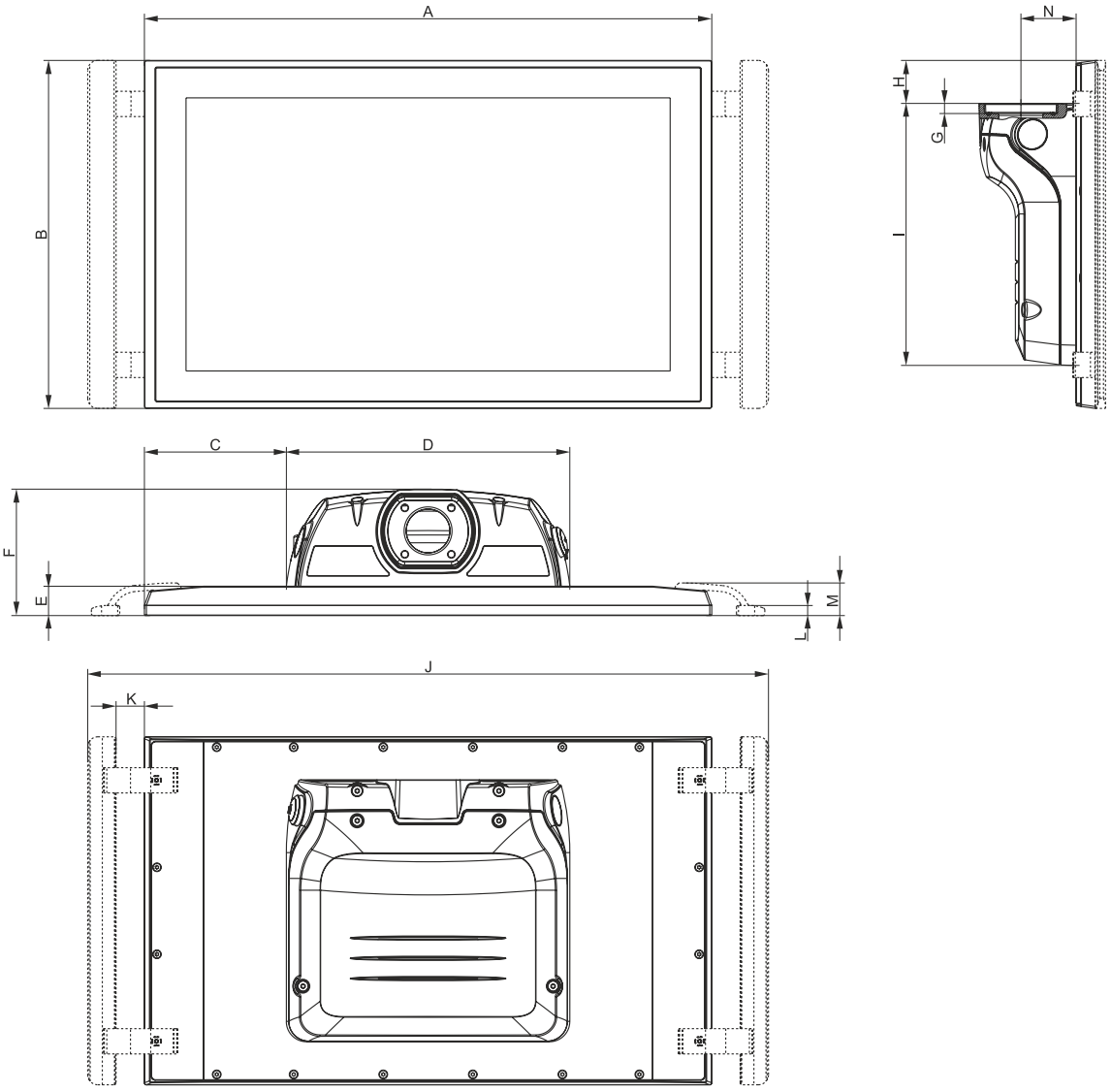
Information:

All specifications in dimension diagrams and associated tables are in millimeters [mm].

The following diagrams are symbolic and only meant to illustrate how the dimension tables should be read.

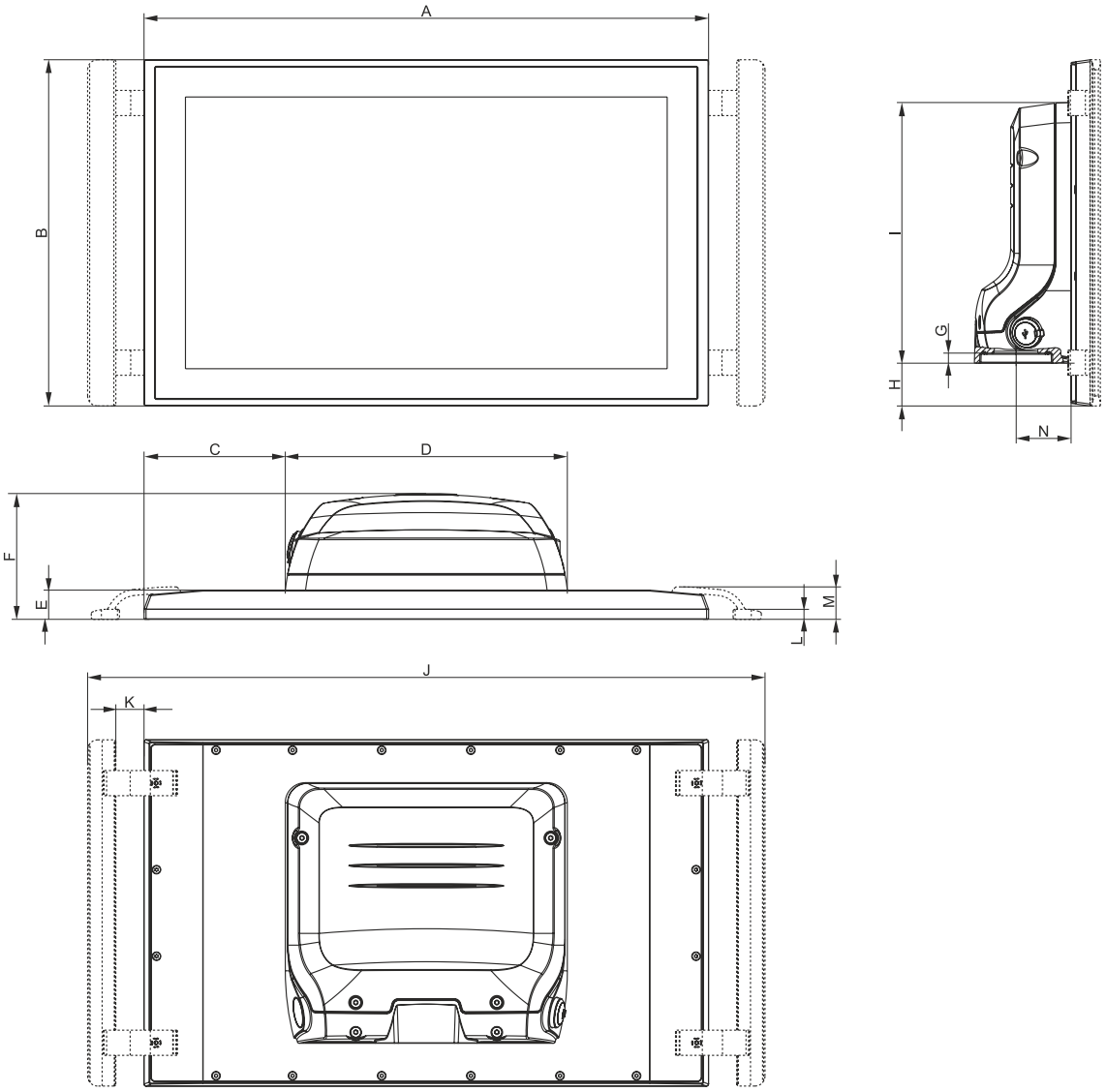
2D and 3D data (DXF and STEP formats) can be downloaded from the B&R website (www.br-automation.com). To do this, search for the order number of the device using the search bar.

AP5120/5130 with flange connection on top - Dimensions



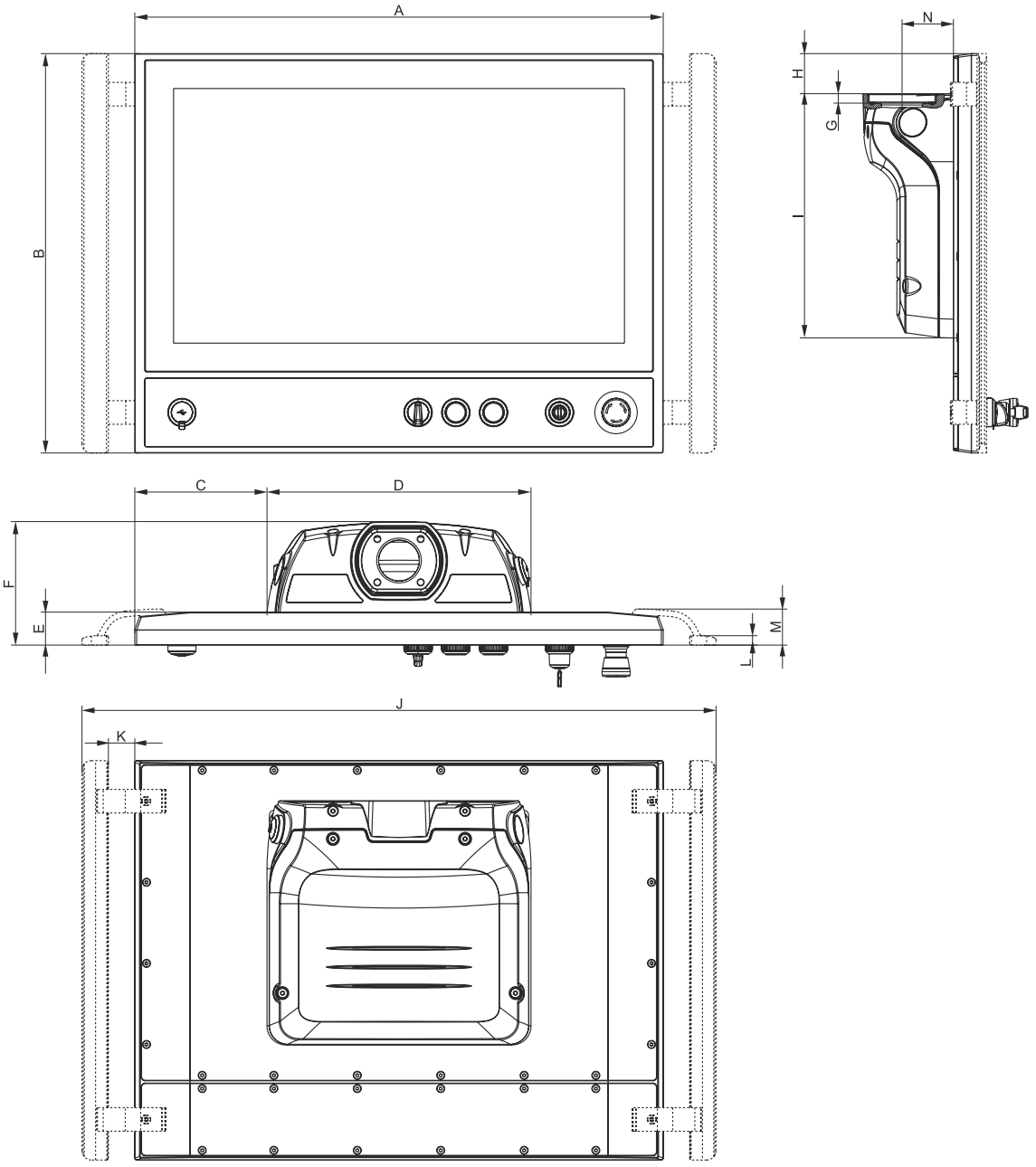
Panels															
Type	Model number	A	B	C	D	E	F	G	H	I	J	K	L	M	N
15.0" single-touch	5AP5120.1505-000	389	299	54.5	280	28	124	10	20	259	501	28	10	32.2	54.5
15.6" multi-touch	5AP5130.156B-000	433	269.5	76.5	280	29	125	10	5.25	259	545	28	10	32.2	54.5
15.6" multi-touch	5AP5130.156C-000	433	269.5	76.5	280	29	125	10	5.25	259	545	28	10	32.2	54.5
18.5" multi-touch	5AP5130.185B-000	494	306	107	280	29	125	10	23.5	259	606	28	10	32.2	54.5
18.5" multi-touch	5AP5130.185C-000	494	306	107	280	29	125	10	23.5	259	606	28	10	32.2	54.5
19.0" single-touch	5AP5120.1906-000	461.2	372	90.6	280	28	124	10	56.5	259	573.2	28	10	32.2	54.5
21.5" multi-touch	5AP5130.215C-000	560.5	344	140.25	280	29	125	10	42.5	259	672.5	28	10	32.2	54.5
24.0" multi-touch	5AP5130.240C-000	617.5	375	168.75	280	29	125	10	58	259	729.5	28	10	32.2	54.5

AP5120/5130 with flange connection on bottom - Dimensions



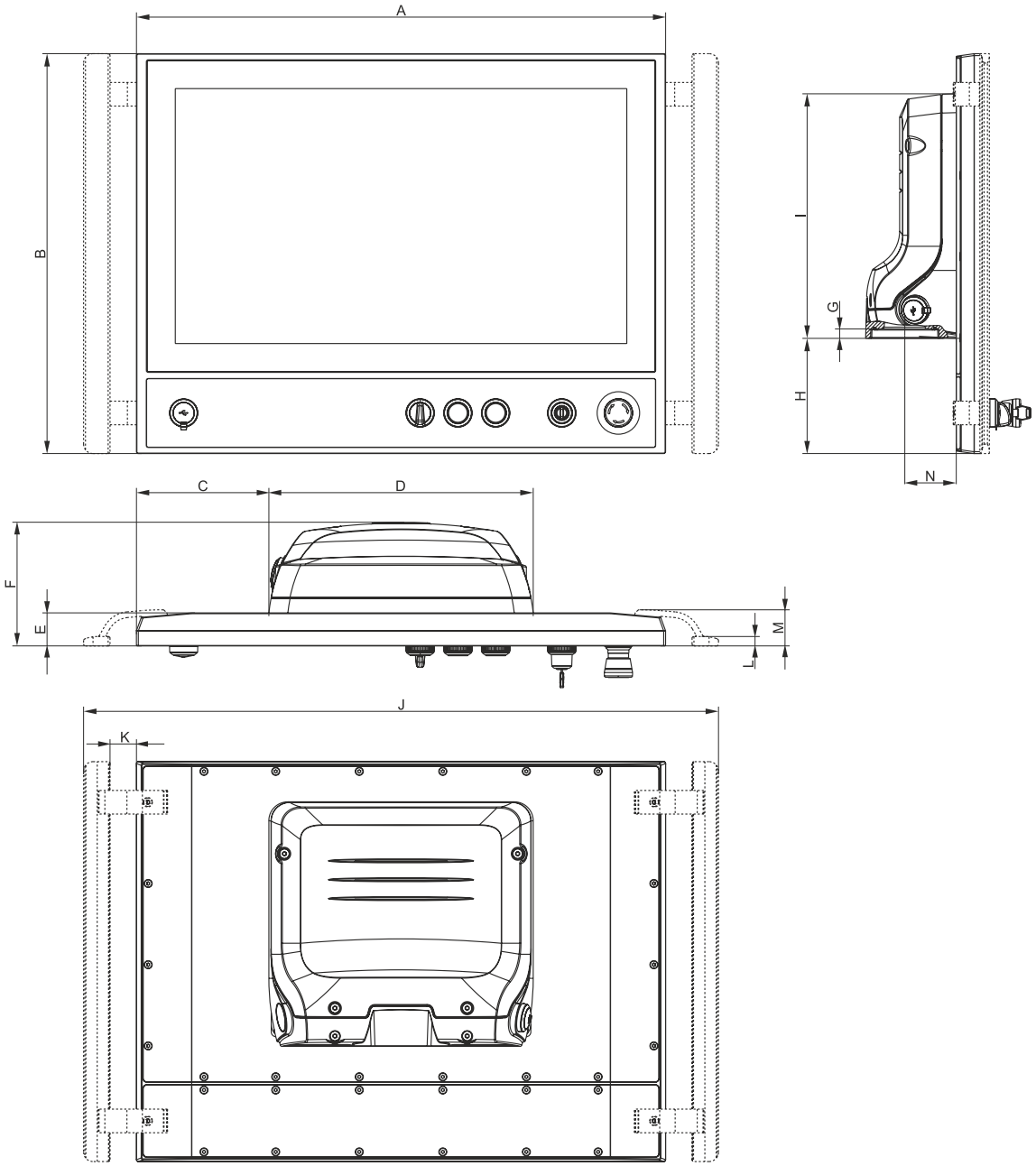
Panels															
Type	**Model number**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**
15.0" single-touch	5AP5120.1505-000	389	299	54.5	280	28	124	10	20	259	501	28	10	32.2	54.5
15.6" multi-touch	5AP5130.156B-000	433	269.5	76.5	280	29	125	10	5.25	259	545	28	10	32.2	54.5
15.6" multi-touch	5AP5130.156C-000	433	269.5	76.5	280	29	125	10	5.25	259	545	28	10	32.2	54.5
18.5" multi-touch	5AP5130.185B-000	494	306	107	280	29	125	10	23.5	259	606	28	10	32.2	54.5
18.5" multi-touch	5AP5130.185C-000	494	306	107	280	29	125	10	23.5	259	606	28	10	32.2	54.5
19.0" single-touch	5AP5120.1906-000	461.2	372	90.6	280	28	124	10	56.5	259	573.2	28	10	32.2	54.5
21.5" multi-touch	5AP5130.215C-000	560.5	344	140.25	280	29	125	10	42.5	259	672.5	28	10	32.2	54.5
24.0" multi-touch	5AP5130.240C-000	617.5	375	168.75	280	29	125	10	58	259	729.5	28	10	32.2	54.5

AP5230 with flange connection on top - Dimensions



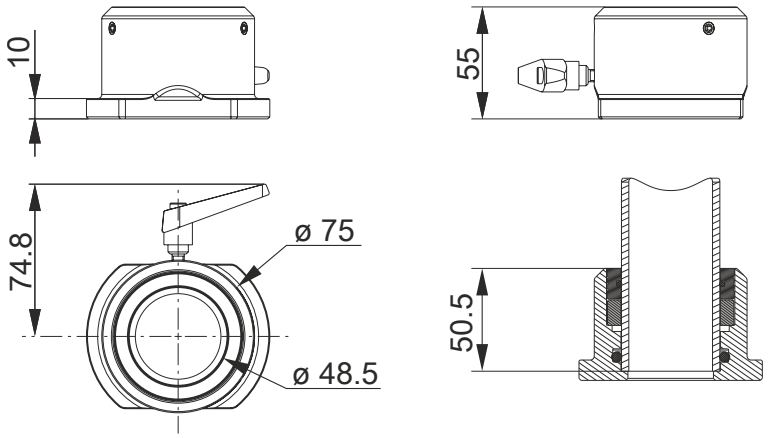
Panels (with expansion option)															
Type	**Model number**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**
15.6" multi-touch	5AP5230.156B-000	433	349	76.5	280	35	131	10	5.25	259	545	28	10	38.2	54.5
15.6" multi-touch	5AP5230.156C-000	433	349	76.5	280	35	131	10	5.25	259	545	28	10	38.2	54.5
18.5" multi-touch	5AP5230.185B-000	494	385.5	107	280	35	131	10	23.5	259	606	28	10	38.2	54.5
18.5" multi-touch	5AP5230.185C-000	494	385.5	107	280	35	131	10	23.5	259	606	28	10	38.2	54.5
21.5" multi-touch	5AP5230.215C-000	560.5	423.5	140.25	280	35	131	10	42.5	259	672.5	28	10	38.2	54.5
21.5" multi-touch	5AP5230.215I-000	352	632	36	280	35	131	10	146.75	259	464	28	10	39.9	54.5
24.0" multi-touch	5AP5230.240C-000	617.5	454.5	168.75	280	35	131	10	58	259	729.5	28	10	38.2	54.5

AP5230 with flange connection on bottom - Dimensions

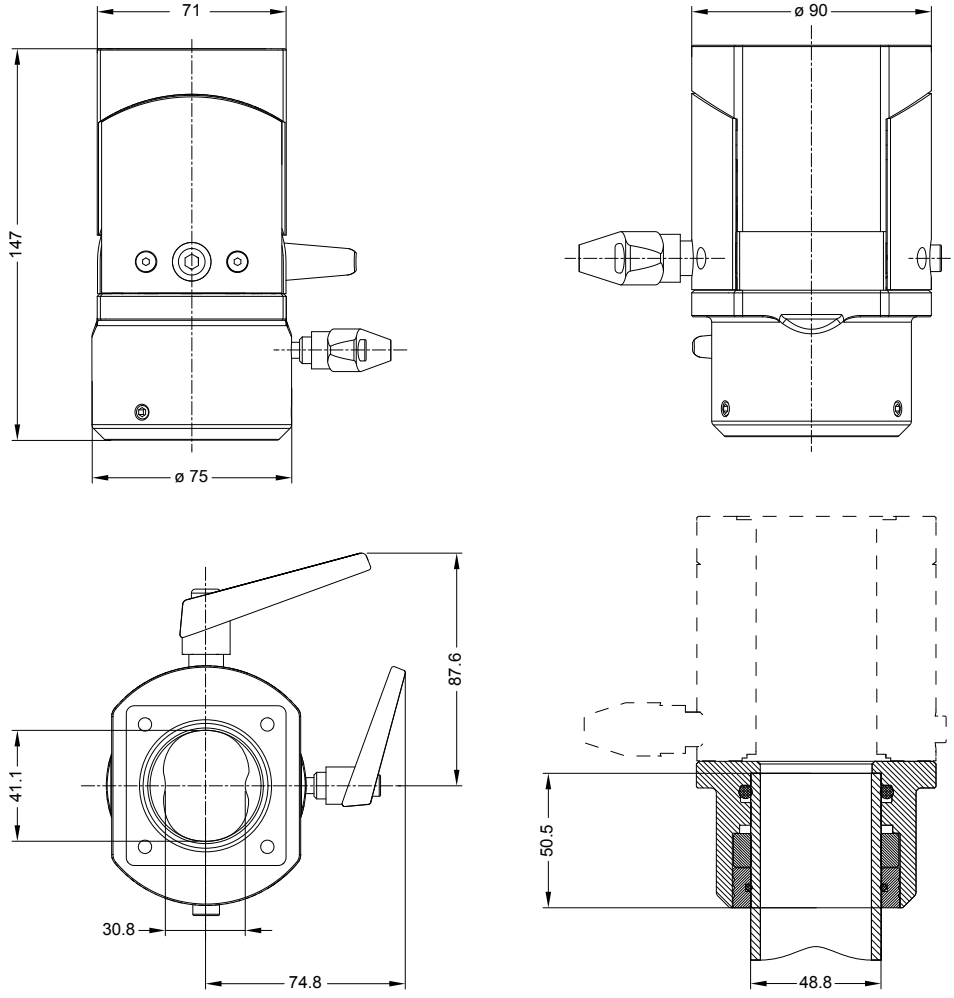


Panels (with expansion option)															
Type	**Model number**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**
15.6" multi-touch	5AP5230.156B-000	433	349	76.5	280	35	131	10	84.75	259	545	28	10	38.2	54.5
15.6" multi-touch	5AP5230.156C-000	433	349	76.5	280	35	131	10	84.75	259	545	28	10	38.2	54.5
18.5" multi-touch	5AP5230.185B-000	494	385.5	107	280	35	131	10	103	259	606	28	10	38.2	54.5
18.5" multi-touch	5AP5230.185C-000	494	385.5	107	280	35	131	10	103	259	606	28	10	38.2	54.5
21.5" multi-touch	5AP5230.215C-000	560.5	423.5	140.25	280	35	131	10	122	259	672.5	28	10	38.2	54.5
21.5" multi-touch	5AP5230.215I-000	352	632	36	280	35	131	10	226.25	259	464	28	10	39.9	54.5
24.0" multi-touch	5AP5230.240C-000	617.5	454.5	168.75	280	35	131	10	137.5	259	729.5	28	10	38.2	54.5

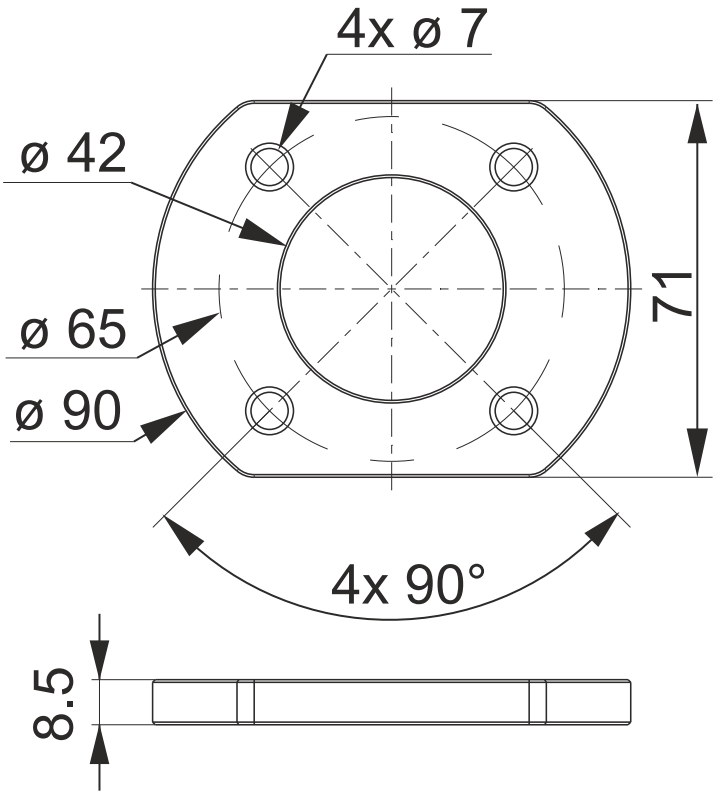
Rotary flange (5ACCFL00.0000-000) - Dimensions



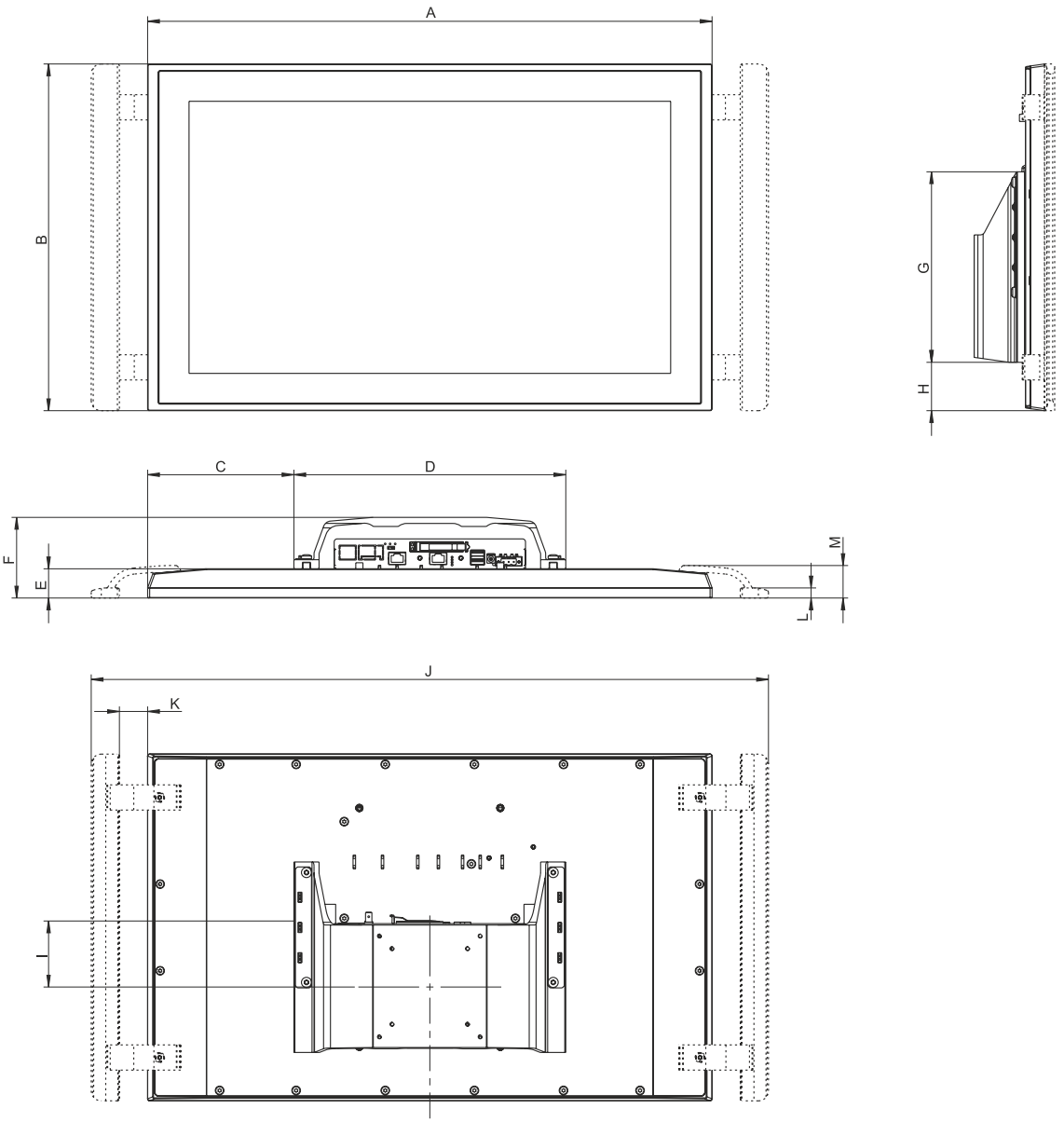
Swivel-tilt flange (5ACCFL00.0100-000) - Dimensions



Adapter for Rittal flange (5ACCFL00.0200-000) - Dimensions

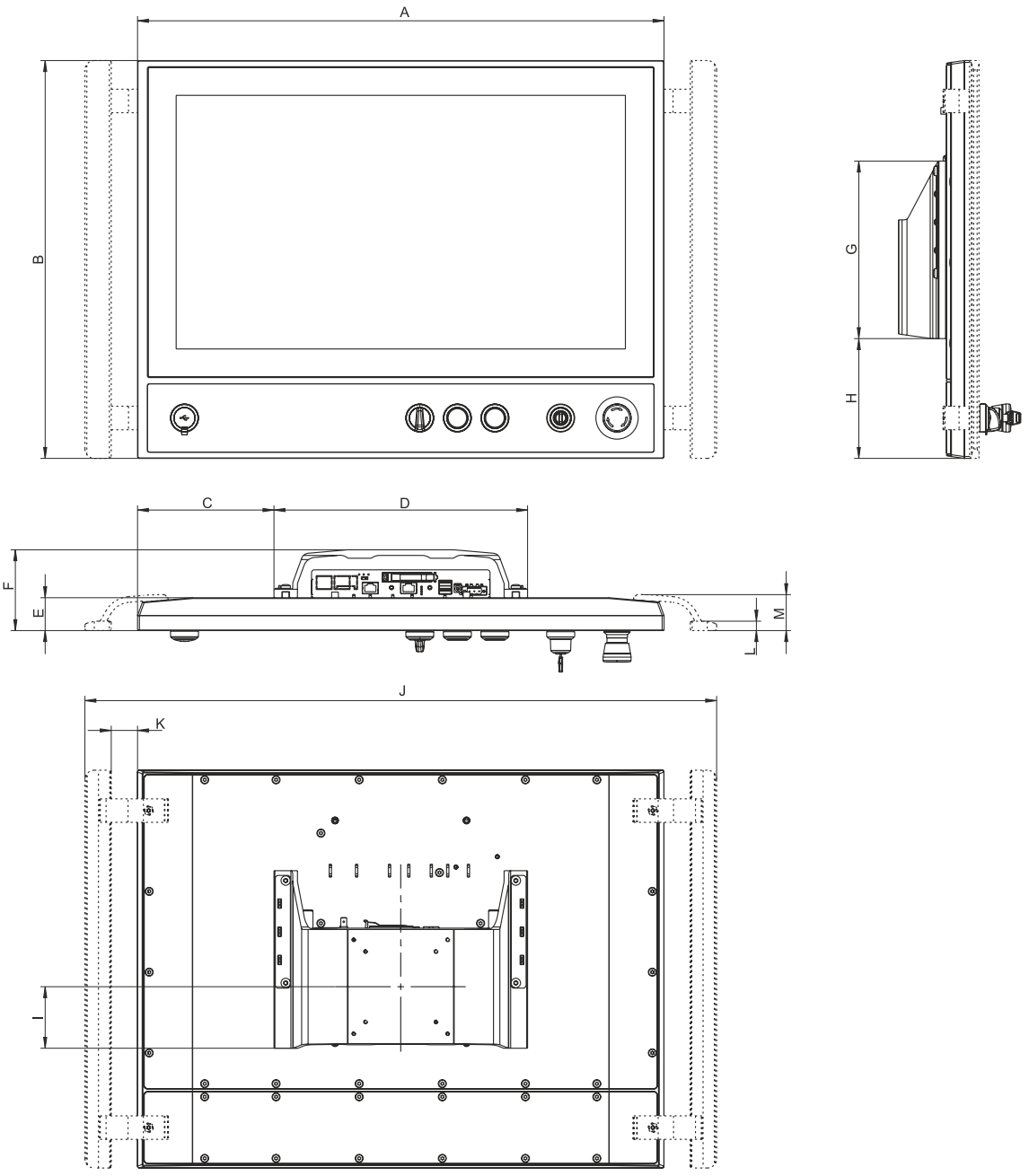


AP5120/5130 VESA connection - Dimensions



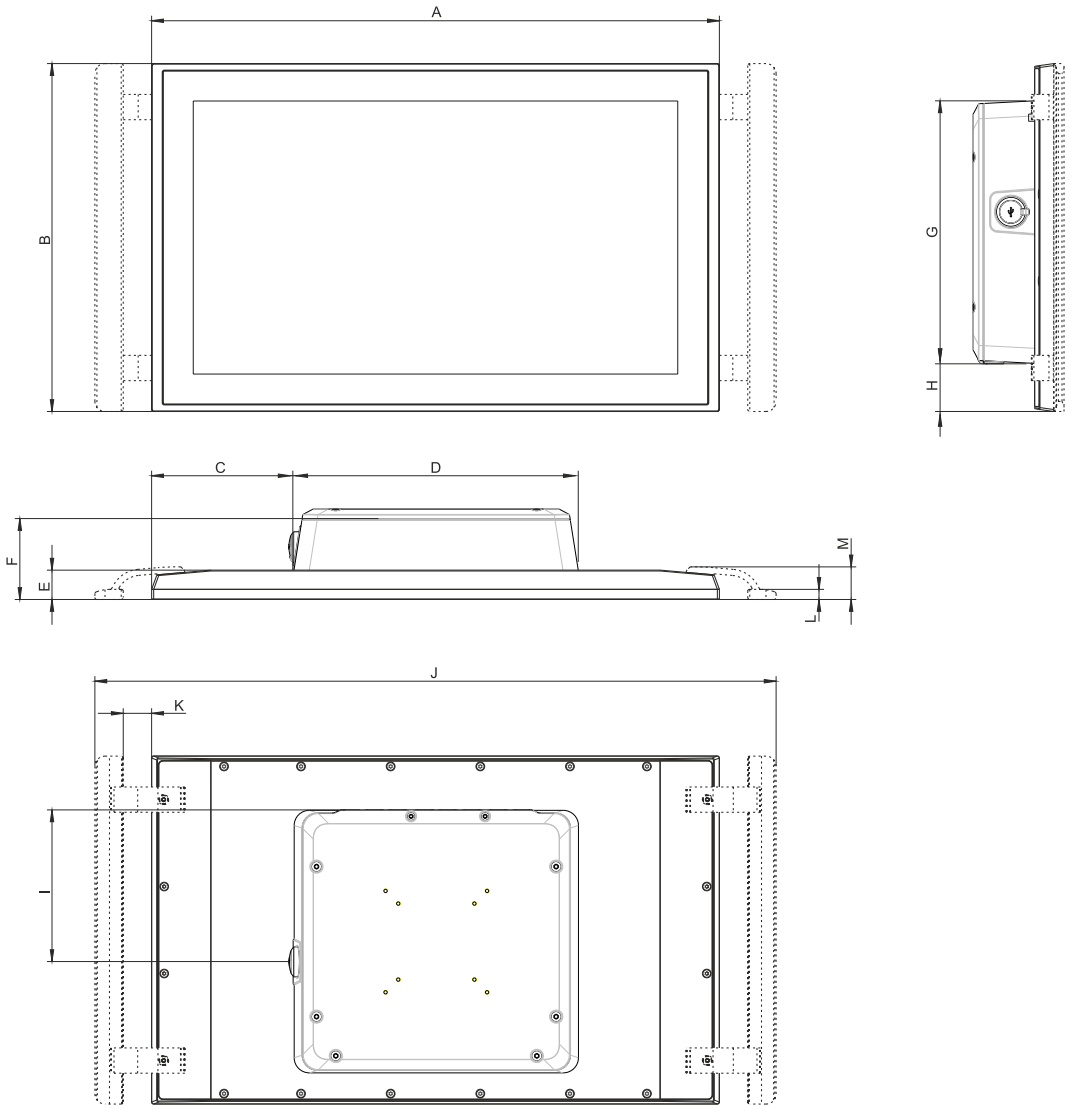
Panels														
Type	**Model number**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**
15" single-touch	5AP5120.1505-000	389	299	59.5	270	28	79	189	25.5	65.5	501	28	10	32.2
15.6" multi-touch	5AP5130.156B-000	433	269.5	81.5	270	29	80	189	10.75	65.5	545	28	10	32.2
15.6" multi-touch	5AP5130.156C-000	433	269.5	81.5	270	29	80	189	10.75	65.5	545	28	10	32.2
18.5" multi-touch	5AP5130.185B-000	494	306	112	270	29	80	189	29	65.5	606	28	10	32.2
18.5" multi-touch	5AP5130.185C-000	494	306	112	270	29	80	189	29	65.5	606	28	10	32.2
19" single-touch	5AP5120.1906-000	461.2	372	95.6	270	28	79	189	62	65.5	573.2	28	10	32.2
21.5" multi-touch	5AP5130.215C-000	560.5	344	145.25	270	29	80	189	48	65.5	672.5	28	10	32.2
24.0" multi-touch	5AP5130.240C-000	617.5	375	173.75	270	29	80	189	63.5	65.5	729.5	28	10	32.2

AP5230 VESA connection - Dimensions



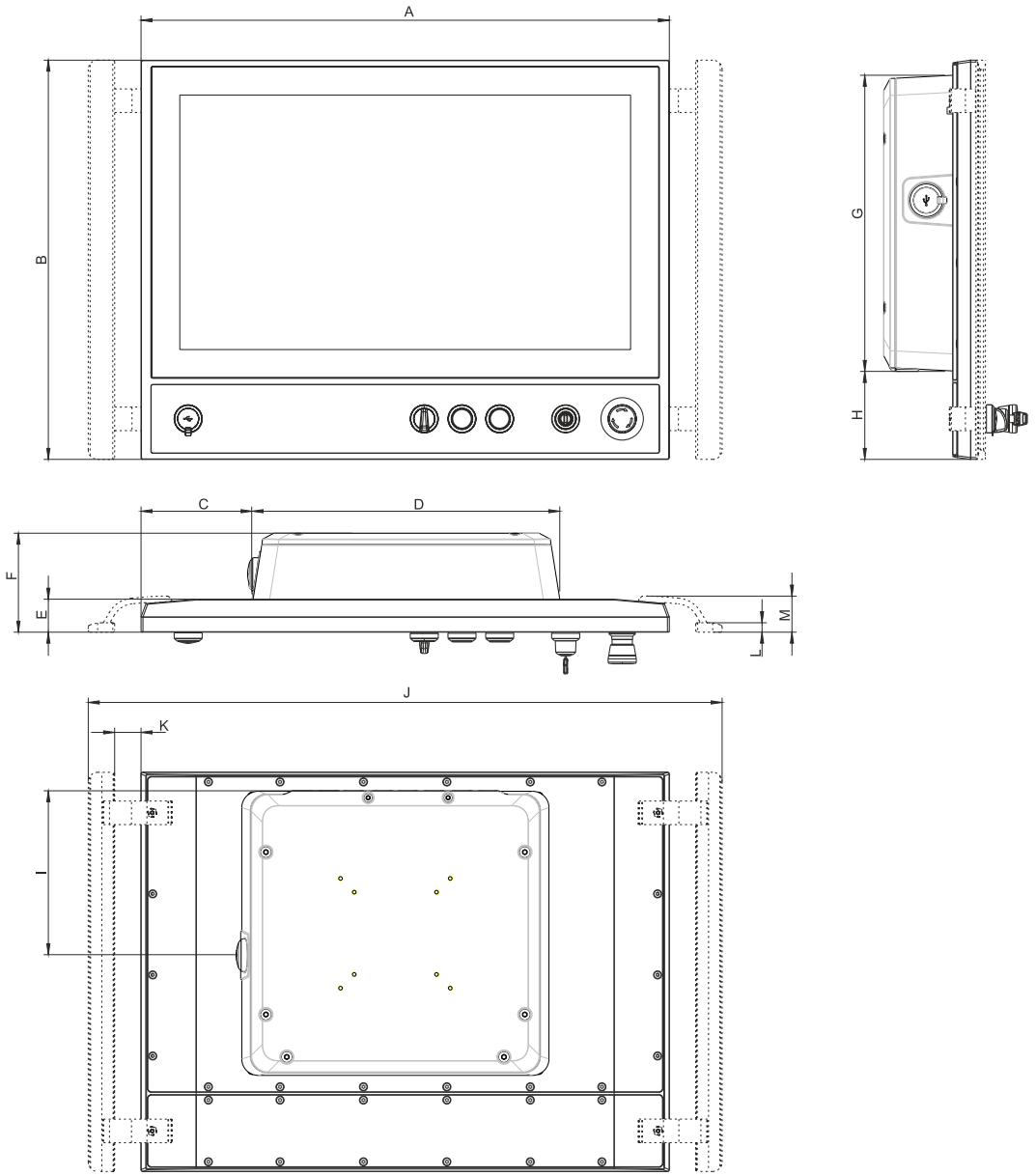
Panels (with expansion option)														
Type	**Model number**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**
15.6" multi-touch	5AP5230.156B-000	433	349	81.5	270	35	86	189	90.25	65.5	545	28	10	38.2
15.6" multi-touch	5AP5230.156C-000	433	349	81.5	270	35	86	189	90.25	65.5	545	28	10	38.2
18.5" multi-touch	5AP5230.185B-000	494	385.5	112	270	35	86	189	108.5	65.5	606	28	10	38.2
18.5" multi-touch	5AP5230.185C-000	494	385.5	112	270	35	86	189	108.5	65.5	606	28	10	38.2
21.5" multi-touch	5AP5230.215C-000	560.5	423.5	145.25	270	35	86	189	127.5	65.5	672.5	28	10	38.2
21.5" multi-touch	5AP5230.215I-000	352	632	41	270	35	86	189	231.75	65.5	464	28	10	39.9
24.0" multi-touch	5AP5230.240C-000	617.5	454.5	173.75	270	35	86	189	143	65.5	729.5	28	10	38.2

AP5120/5130 IP54 VESA connection - Dimensions



Panels														
Type	**Order number**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**
15" single-touch	5AP5120.1505-000	389	299	54.5	280	28	88.3	259	20	149.5	501	28	10	32.2
15.6" multi-touch	5AP5130.156B-000	433	269.5	76.5	280	29	89.3	259	5.3	149.5	545	28	10	32.2
15.6" multi-touch	5AP5130.156C-000	433	269.5	76.5	280	29	89.3	259	5.3	149.5	545	28	10	32.2
18.5" multi-touch	5AP5130.185B-000	494	306	107	280	29	89.3	259	23.5	149.5	606	28	10	32.2
18.5" multi-touch	5AP5130.185C-000	494	306	107	280	29	89.3	259	23.5	149.5	606	28	10	32.2
19" single-touch	5AP5120.1906-000	461.2	372	90.6	280	28	89.3	259	56.5	149.5	573.2	28	10	32.2
21.5" multi-touch	5AP5130.215C-000	560.5	344	140.3	280	29	89.3	259	42.5	149.5	672.5	28	10	32.2
24.0" multi-touch	5AP5130.240C-000	617.5	375	168.8	280	29	89.3	259	58	149.5	729.5	28	10	32.2

AP5230 IP54 VESA connection - Dimensions



Panels (with expansion option)														
Type	**Order number**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**
15.6" multi-touch	5AP5230.156B-000	433	349	76.5	280	35	95.3	259	84.8	149.5	545	28	10	38.2
15.6" multi-touch	5AP5230.156C-000	433	349	76.5	280	35	95.3	259	84.8	149.5	545	28	10	38.2
18.5" multi-touch	5AP5230.185B-000	494	385.5	107	280	35	95.3	259	103	149.5	606	28	10	38.2
18.5" multi-touch	5AP5230.185C-000	494	385.5	107	280	35	95.3	259	103	149.5	606	28	10	38.2
21.5" multi-touch	5AP5230.215C-000	560.5	423.5	140.3	280	35	95.3	259	122	149.5	672.5	28	10	38.2
21.5" multi-touch	5AP5230.215I-000	352	632	36	280	35	95.3	259	226.3	149.5	464	28	10	39.9
24.0" multi-touch	5AP5230.240C-000	617.5	454.5	168.8	280	35	95.3	259	137.1	149.5	729.5	28	10	38.2

4.1.3.2 Mounting orientations

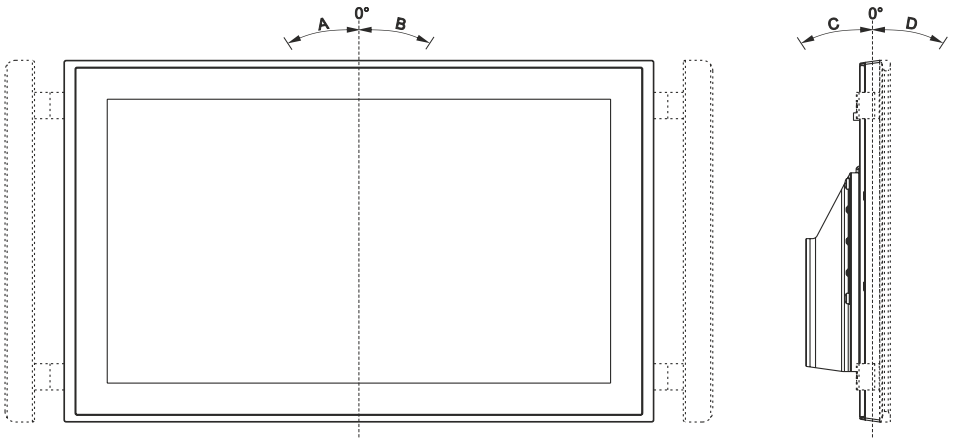
Use the locking lever on the flange to set the angle of rotation of the Automation Panel 5000 between -150° and +150° (variant with mounting unit 5ACCMA00.000x-000).

Caution!

After the angle of rotation has been set, the locking lever must be locked into position (approx. 5 Nm).

The screw in the locking lever is not permitted to be tightened. Fixing must be carried out exclusively with the locking lever.

The following diagrams show the approved mounting orientations for AP5000 devices with VESA mounting unit 5ACCMA01.0100-000. These are only permitted to be installed as specified below.



Mounting orientation		Derating the ambient temperature
A, B	0° to ±20°	None
A, B	±21° to ±45°	5°C.
A, B	±46° to ±90°	10°C.
C, D	0° to ±20°	None
C, D	±21° to ±45°	5°C.
C, D	±46° to ±90°	10°C.

4.1.3.3 Weight

Panels

Type	Model number	Weight [g]
15" single-touch	5AP5120.1505-000	5200
15.6" multi-touch	5AP5130.156B-000	4700
15.6" multi-touch	5AP5130.156C-000	4700
15.6" multi-touch (expansion option)	5AP5230.156B-000	6400
15.6" multi-touch (expansion option)	5AP5230.156C-000	6400
18.5" multi-touch	5AP5130.185B-000	6700
18.5" multi-touch	5AP5130.185C-000	6700
18.5" multi-touch (expansion option)	5AP5230.185B-000	8300
18.5" multi-touch (expansion option)	5AP5230.185C-000	8300
19" single-touch	5AP5120.1906-000	7300
21.5" multi-touch	5AP5130.215C-000	7300
21.5" multi-touch (expansion option)	5AP5230.215C-000	8900
21.5" multi-touch (expansion option)	5AP5230.215I-000	9600
24.0" multi-touch	5AP5130.240C-000	8500
24.0" multi-touch (expansion option)	5AP5230.240C-000	10300

Link modules

Type	Model number	Weight [g]
DP receiver	5DLDPO.1001-00	490
SDL/DVI receiver	5DLSDL.1001-00	538
SDL3 receiver	5DLSD3.1001-00	527
SDL4 receiver	5DLSD4.1001-00	525

Mounting units

Type	Model number	Weight [g]
Swing arm mounting unit without USB	5ACCMA00.0000-000	2500
Swing arm mounting unit with 1x USB	5ACCMA00.0001-000	2500
Swing arm mounting unit with 2x USB	5ACCMA00.0002-000	2500
VESA mounting unit	5ACCMA01.0100-000	700
IP54 VESA mounting unit	5ACCMA00.0100-000	2500
VESA IP54 mounting unit with USB connection	5ACCMA00.0101-000	2500

Flanges

Type	Model number	Weight [g]
Rotary flange	5ACCFL00.0000-000	530
Swivel-tilt flange	5ACCFL00.0100-000	1666
Rittal flange	5AC725.FLGC-00	1100
Rittal flange adapter	5ACCFL00.0200-000	93

Extension options

Type	Model number	Weight [g]
15.6" expansion cover	5ACCKP00.156B-000	600
15.6" expansion units	5ACCKP01.156B-000	800
	5ACCKP04.156B-000	800
18.5" expansion cover	5ACCKP00.185B-000	600
18.5" expansion units	5ACCKP01.185B-000	900
	5ACCKP03.185B-000	900
	5ACCKP04.185B-000	900
	5ACCKP05.185B-000	900
21.5" expansion cover	5ACCKP00.215C-000	800
21.5" expansion units	5ACCKP01.215C-000	1000
	5ACCKP03.215C-000	1000
	5ACCKP04.215C-000	1000
	5ACCKP05.215C-000	1000
21.5" expansion cover	5ACCKP00.215I-000	500
21.5" expansion units	5ACCKP01.215I-000	700
	5ACCKP04.215I-000	700
24.0" expansion cover	5ACCKP00.240C-000	900
24.0" expansion units	5ACCKP01.240C-000	1100
	5ACCKP03.240C-000	1100
	5ACCKP04.240C-000	1100
	5ACCKP05.240C-000	1100

Handles

Type	Model number	Weight [g]
15" handles for AP5120	5ACCHD00.1505-000	500
15.6" handles for AP5130	5ACCHD00.156B-000	300
15.6" handles for AP5230	5ACCHD01.156B-000	600
18.5" handles for AP5130	5ACCHD00.185B-000	500
18.5" handles for AP5230	5ACCHD01.185B-000	700
19" handles for AP5120	5ACCHD00.1906-000	600
21.5" handles for AP5130	5ACCHD00.215C-000	600
21.5" handles for AP5230	5ACCHD01.215C-000	700
21.5" handles for AP5230	5ACCHD01.215I-000	1000
24.0" handles for AP5130	5ACCHD00.240C-000	600
24.0" handles for AP5230	5ACCHD01.240C-000	800

4.1.4 Environmental properties

4.1.4.1 Temperature specifications

Because it is possible to combine different panels and link modules, the following table provides a component-dependent overview of the maximum ambient temperatures resulting from these combinations.

Information:

The maximum specified ambient temperatures for operation were determined under worst-case conditions. Experience has shown that higher ambient temperatures can be achieved with typical applications in Microsoft Windows, for example. The relevant test and assessment must be carried out individually by the user on site (reading out the temperatures in BIOS or using the B&R Control Center, for example).

Information about worst-case conditions

- Thermal Analysis Tool (TAT) from Intel for simulating processor utilization (100% CPU, 100% memory, 100% graphic)
- BurnInTest 7.1 from PassMark Software for simulating 100% interface utilization using loopback adapters (100% network)
- 2x 1 A USB load
- Maximum expansion and power consumption of the system
- 100% display brightness

4.1.4.1.1 Maximum ambient temperature for worst-case operation

The table refers to using the panels with a swing arm mounting unit (5ACCMA00.000x-000) or IP54 VESA mounting unit (5ACCMA00.010x-000).

All temperature specifications in degrees Celsius (°C) at 500 m above sea level, **non-condensing**		**Link module**			
The maximum ambient temperature is typically derated 1°C per 1000 meters starting at 500 m above sea level.		**5DLDPO.1001-00** DP[1]	**5DLSDL.1001-00** SDL/DVI	**5DLSD3.1001-00** SDL3[2]	**5DLSD4.1001-00** SDL4
Maximum ambient temperature		**55**	**55**	**55**	**55**
Panels	5AP5120.1505-000	-	✓	✓	✓
	5AP5130.156B-000	50	✓	50	50
	5AP5130.156C-000	50	✓	50	50
	5AP5230.156B-000	50	✓	50	50
	5AP5230.156C-000	50	✓	50	50
	5AP5130.185B-000	✓	50	50	50
	5AP5130.185C-000	50	✓	50	50
	5AP5230.185B-000	✓	✓	50	50
	5AP5230.185C-000	50	✓	50	50
	5AP5120.1906-000	-	✓	50	50
	5AP5130.215C-000	50	50	50	50
	5AP5230.215C-000	50	✓	50	50
	5AP5230.215I-000	50	50	45	45
	5AP5130.240C-000	50	45	45	45
	5AP5230.240C-000	50	50	45	45
Expansion units	5ACCKP01.xxxx-000	-	✓	✓	✓
	5ACCKP03.xxxx-000	-	✓	✓	✓
	5ACCKP04.xxxx-000	-	✓	✓	✓
	5ACCKP05.xxxx-000	-	✓	✓	✓

1) The maximum ambient temperature for the DisplayPort link module is limited to 50°C at a max. nominal current of 2.3 A. At a continuous nominal current of max. 2.0 A, the specified max. ambient temperature applies.
2) The max. ambient temperature for SDL3 link module 5DLSD3.1001-00 < Rev. A5 with the corresponding panel is 5 °C lower.

The table refers to the use of panels with a VESA mounting unit (5ACCMA01.0100-000).

All temperature specifications in degrees Celsius (°C) at 500 m above sea level, **non-condensing** The maximum ambient temperature is typically derated 1°C per 1000 meters starting at 500 m above sea level.		Link module			
		5DLDPO.1001-00 DP[1]	**5DLSDL.1001-00** SDL/DVI	**5DLSD3.1001-00** SDL3[2]	**5DLSD4.1001-00** SDL4
Maximum ambient temperature		**55**	**55**	**55**	**55**
Panels	5AP5120.1505-000	-	✓	50	50
	5AP5130.156B-000	✓	✓	✓	✓
	5AP5130.156C-000	✓	✓	✓	✓
	5AP5230.156B-000	✓	✓	✓	✓
	5AP5230.156C-000	✓	✓	✓	✓
	5AP5130.185B-000	50	50	50	50
	5AP5130.185C-000	✓	✓	✓	✓
	5AP5230.185B-000	50	50	50	50
	5AP5230.185C-000	✓	✓	✓	✓
	5AP5120.1906-000	-	✓	✓	✓
	5AP5130.215C-000	50	50	50	50
	5AP5230.215C-000	50	50	50	50
	5AP5230.215I-000	50	45	45	45
	5AP5130.240C-000	50	45	45	45
	5AP5230.240C-000	50	45	45	45
Expansion units	5ACCKP01.xxxx-000	-	✓	✓	✓
	5ACCKP03.xxxx-000	-	✓	✓	✓
	5ACCKP04.xxxx-000	-	✓	✓	✓
	5ACCKP05.xxxx-000	-	✓	✓	✓

1) The maximum ambient temperature for the DisplayPort link module is limited to 50°C at a max. nominal current of 2.3 A. At a continuous nominal current of max. 2.0 A, the specified max. ambient temperature applies.
2) The max. ambient temperature for SDL3 link module 5DLSD3.1001-00 < Rev. A5 with the corresponding panel is 5°C lower.

4.1.4.1.2 Minimum ambient temperature for worst-case operation

All temperature specifications in degrees Celsius (°C) at 500 m above sea level, **non-condensing** The maximum ambient temperature is typically derated 1°C per 1000 meters starting at 500 m above sea level.		Link module			
		5DLDPO.1001-00 DP	**5DLSDL.1001-00** SDL/DVI	**5DLSD3.1001-00** SDL3	**5DLSD4.1001-00** SDL4
Minimum ambient temperature		**-10**	**0**	**0**	**0**
Panels	5AP5120.1505-000	-	✓	✓	✓
	5AP5130.156B-000	✓	✓	✓	✓
	5AP5130.156C-000	✓	✓	✓	✓
	5AP5230.156B-000	✓	✓	✓	✓
	5AP5230.156C-000	✓	✓	✓	✓
	5AP5130.185B-000	✓	✓	✓	✓
	5AP5130.185C-000	✓	✓	✓	✓
	5AP5230.185B-000	✓	✓	✓	✓
	5AP5230.185C-000	✓	✓	✓	✓
	5AP5120.1906-000	-	✓	✓	✓
	5AP5130.215C-000	✓	✓	✓	✓
	5AP5230.215C-000	✓	✓	✓	✓
	5AP5230.215I-000	✓	✓	✓	✓
	5AP5130.240C-000	✓	✓	✓	✓
	5AP5230.240C-000	✓	✓	✓	✓
Expansion units	5ACCKP01.xxxx-000	-	✓	✓	✓
	5ACCKP03.xxxx-000	-	✓	✓	✓
	5ACCKP04.xxxx-000	-	✓	✓	✓
	5ACCKP05.xxxx-000	-	✓	✓	✓

4.1.4.1.3 Determining the ambient temperature

1. Select the link module.
2. The rows specify the maximum ambient temperature of the complete system in conjunction with the respective link module.
3. The panel determines if there are temperature limits.
   - If the installed component has a "✓" (check mark), it can be operated without any problems at the maximum ambient temperature of the complete system.
   - If the installed component has a temperature specification (e.g. "45[°C]"), the ambient temperature of the complete system is not permitted to exceed this value.

4.1.4.1.4 Ambient temperature for storage and transport

The individual components can be transported and stored within the following temperature ranges.

Panels

Type	Model number	Storage [°C]	Transport [°C]
15" single-touch	5AP5120.1505-000	-25 to 80	-25 to 80
15.6" multi-touch	5AP5130.156B-000	-25 to 70	-25 to 70
15.6" multi-touch	5AP5130.156C-000	-20 to 70	-20 to 70
15.6" multi-touch (expansion option)	5AP5230.156B-000	-25 to 70	-25 to 70
15.6" multi-touch (expansion option)	5AP5230.156C-000	-20 to 70	-20 to 70
18.5" multi-touch	5AP5130.185B-000	-20 to 60	-20 to 60
18.5" multi-touch	5AP5130.185C-000	-25 to 70	-25 to 70
18.5" multi-touch (expansion option)	5AP5230.185B-000	-20 to 60	-20 to 60
18.5" multi-touch (expansion option)	5AP5230.185C-000	-25 to 70	-25 to 70
19" single-touch	5AP5120.1906-000	-25 to 70	-25 to 70
21.5" multi-touch	5AP5130.215C-000	-20 to 60	-20 to 60
21.5" multi-touch (expansion option)	5AP5230.215C-000	-20 to 60	-20 to 60
21.5" multi-touch (expansion option)	5AP5230.215I-000	-20 to 60	-20 to 60
24.0" multi-touch	5AP5130.240C-000	-25 to 70	-25 to 70
24.0" multi-touch (expansion option)	5AP5230.240C-000	-25 to 70	-25 to 70

Link modules

Type	Model number	Storage [°C]	Transport [°C]
DP receiver	5DLDPO.1001-00	-20 to 60	-20 to 60
SDL/DVI receiver	5DLSDL.1001-00	-20 to 60	-20 to 60
SDL3 receiver	5DLSD3.1001-00	-20 to 60	-20 to 60
SDL4 receiver	5DLSD4.1001-00	-20 to 60	-20 to 60

Extension options

Type	Model number	Storage [°C]	Transport [°C]
Expansion units	5ACCKP01.xxxx-000	-20 to 80	-20 to 80
	5ACCKP03.xxxx-000	-20 to 80	-20 to 80
	5ACCKP04.xxxx-000	-20 to 80	-20 to 80
	5ACCKP05.xxxx-000	-20 to 80	-20 to 80

4.1.4.1.5 Temperature monitoring

A sensor in the display monitors the temperature of the AP5000 panel. For the position of the temperature sensor, see the figure below. The specified values represent the defined maximum temperature for this measuring point. If the temperature is exceeded, no alarm is triggered.

Temperatures[1)] can be read out in different ways in approved operating systems:

- BIOS
- B&R Control Center[2)]
- B&R ADI Development Kit[1)]
- B&R ADI .NET SDK[1)]
- B&R HMI Service Center[1)]
- B&R HMI Diagnose[1)]
- B&R PVI ADI line[1)]
- B&R ADI SNMP Agent[1)]
- Automation Runtime library[1)]

For applications that do not run in approved operating systems, temperatures can be evaluated using the B&R MTCX Development Kit. The B&R MTCX Development Kit also contains executable EFI sample programs.

4.1.4.1.6 Temperature sensor positions

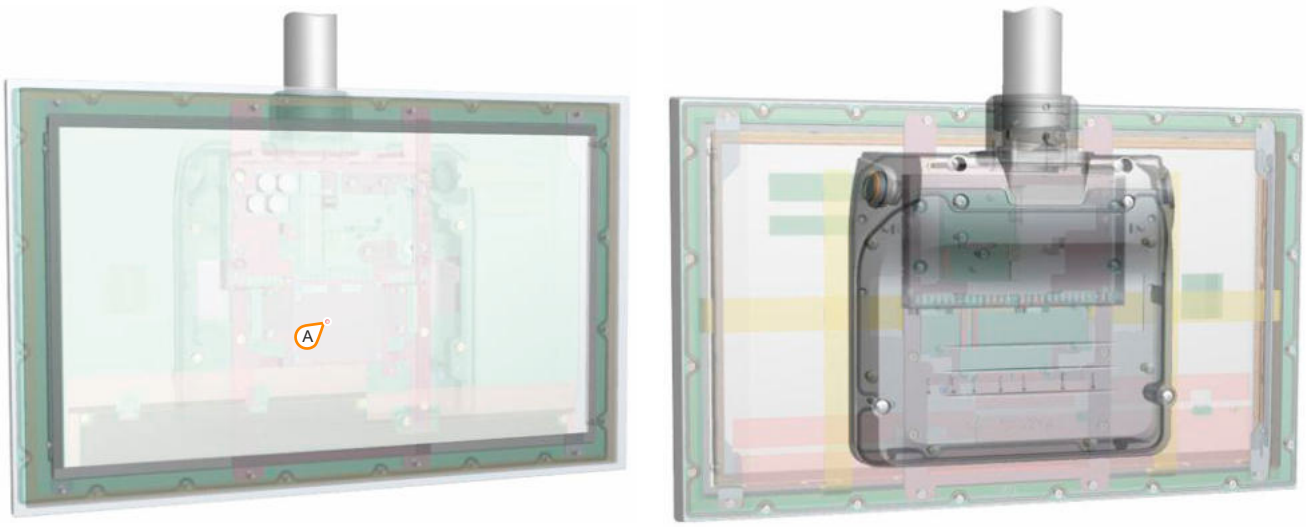


Figure 1: Automation Panel 5000 - Temperature sensor position

ADI sensors	Position	Measuring point for	Measurement	Max. specified
Panel	A	Display	Temperature of the display (sensor integrated on the panel).	5AP5120.1505-000: 85°C 5AP5130.156B-000: 75°C 5AP5130.156C-000: 80°C 5AP5230.156B-000: 80°C 5AP5230.156C-000: 80°C 5AP5130.185B-000: 80°C 5AP5130.185C-000: 80°C 5AP5230.185B-000: 80°C 5AP5230.185C-000: 80°C 5AP5120.1906-000: 80°C 5AP5130.215C-000: 80°C 5AP5230.215C-000: 80°C 5AP5230.215I-000: 80°C 5AP5130.240C-000: 75°C 5AP5230.240C-000: 75°C

1) The measured temperature is a guide value for the immediate ambient temperature, but it may have been influenced by neighboring components.
2) Drivers for approved operating systems can be downloaded at no cost from the Downloads section of the B&R website (www.br-automation.com).

4.1.4.2 Relative humidity

Panels

Type	Model number	Operation [%]	Storage [%]	Transport [%]
15" single-touch	5AP5120.1505-000	8 to 90	8 to 90	8 to 90
15.6" multi-touch	5AP5130.156B-000	5 to 90	5 to 90	5 to 90
15.6" multi-touch	5AP5130.156C-000	5 to 90	5 to 90	5 to 90
15.6" multi-touch (expansion option)	5AP5230.156B-000	5 to 90	5 to 90	5 to 90
15.6" multi-touch (expansion option)	5AP5230.156C-000	5 to 90	5 to 90	5 to 90
18.5" multi-touch	5AP5130.185B-000	5 to 90	5 to 90	5 to 90
18.5" multi-touch	5AP5130.185C-000	5 to 90	5 to 90	5 to 90
18.5" multi-touch (expansion option)	5AP5230.185B-000	5 to 90	5 to 90	5 to 90
18.5" multi-touch (expansion option)	5AP5230.185C-000	5 to 90	5 to 90	5 to 90
19" single-touch	5AP5120.1906-000	5 to 90	5 to 90	5 to 90
21.5" multi-touch	5AP5130.215C-000	5 to 90	5 to 90	5 to 90
21.5" multi-touch (expansion option)	5AP5230.215C-000	5 to 90	5 to 90	5 to 90
21.5" multi-touch (expansion option)	5AP5230.215I-000	5 to 90	5 to 90	5 to 90
24.0" multi-touch	5AP5130.240C-000	5 to 90	5 to 90	5 to 90
24.0" multi-touch (expansion option)	5AP5230.240C-000	5 to 90	5 to 90	5 to 90

Link modules

Type	Order number	Operation [%]	Storage [%]	Transport [%]
DP receiver	5DLDPO.1001-00	5 to 90	5 to 95	5 to 95
SDL/DVI receiver	5DLSDL.1001-00	5 to 90	5 to 95	5 to 95
SDL3 receiver	5DLSD3.1001-00	5 to 90	5 to 95	5 to 95
SDL4 receiver	5DLSD4.1001-00	5 to 90	5 to 95	5 to 95

Expansion option

Type	Model number	Operation [%]	Storage [%]	Transport [%]
Expansion units	5ACCKP01.xxxx-000	5 to 90	5 to 90	5 to 90
	5ACCKP03.xxxx-000	5 to 90	5 to 90	5 to 90
	5ACCKP04.xxxx-000	5 to 90	5 to 90	5 to 90
	5ACCKP05.xxxx-000	5 to 90	5 to 90	5 to 90

4.1.4.3 Vibration and shock

The following table provides an overview of the maximum vibrations and shock values of the complete system. Limitations are possible due to individual components.

Swing arm mounting unit - Vibration				
	Operation[1]		Storage[1)3)]	Transport[1)3)]
	Continuous	Periodic		
Automation Panel 5000	2 to 9 Hz: 1.75 mm amplitude 9 to 200 Hz: 0.5 g	2 to 9 Hz: 3.5 mm amplitude 9 to 200 Hz: 1 g	2 to 8 Hz: 7.5 mm amplitude 8 to 200 Hz: 2 g 200 to 500 Hz: 4 g	2 to 8 Hz: 7.5 mm amplitude 8 to 200 Hz: 2 g 200 to 500 Hz: 4 g
Vibration VESA mounting unit and IP54 VESA mounting unit				
	Operation[1]		Storage[1)3)]	Transport[1)3)]
	Continuous			
Automation Panel 5000	2 to 9 Hz: 1.75 mm amplitude 9 to 200 Hz: 0.5 g		2 to 8 Hz: 7.5 mm amplitude 8 to 200 Hz: 2 g 200 to 500 Hz: 4 g	2 to 8 Hz: 7.5 mm amplitude 8 to 200 Hz: 2 g 200 to 500 Hz: 4 g
Shock				
	Operation[2)]		Storage[2)3)]	Transport[2)3)]
Automation Panel 5000	15 g, 11 ms		30 g, 6 ms	30 g, 6 ms

1) Testing is performed per EN 60068-2-6.
2) Testing is performed per EN 60068-2-27.
3) The specification refers to a device in its original packaging.

4.1.4.4 Degree of protection

Under the following conditions, the Automation Panel 5000 offers **IP65 protection** on all sides per EN 60529:

- Correct installation of the Automation Panel (see Automation Panel 5000 - Installation)
- The 5ACCMA00.000x-000 mounting unit is installed correctly.
- Installation of all covers or components on interfaces and slots
- All ambient conditions are observed.

Under the following conditions, the Automation Panel 5000 offers **IP54 protection** on all sides per EN 60529:

AbN
automation

- Correct installation of the Automation Panel (see Automation Panel 5000 - Installation)
- Correct installation of mounting unit 5ACCMA00.010x-000
- Installation of all covers or components on interfaces and slots
- All ambient conditions are observed.

4.1.5 Device interfaces

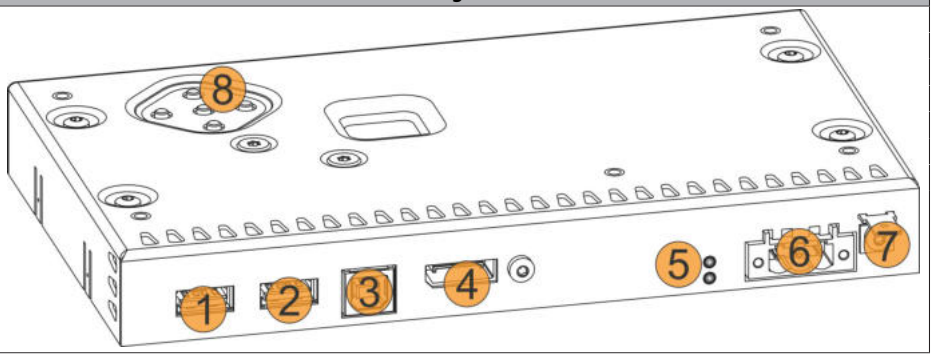
4.1.5.1 Overview

Information:

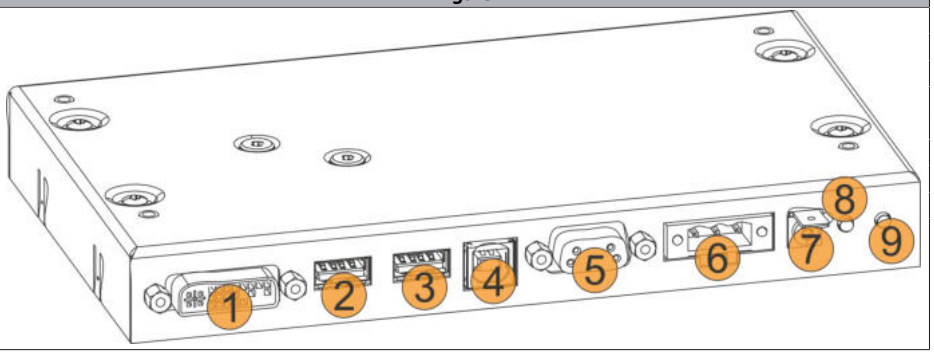
The interfaces available on the device or module are numbered for the purpose of clear differentiation. The numbering used by the operating system may deviate, however.

The receiver interfaces are located on the back of the complete system. To access, the mounting unit must be removed (see "Removing the mounting unit cover" on page 151).

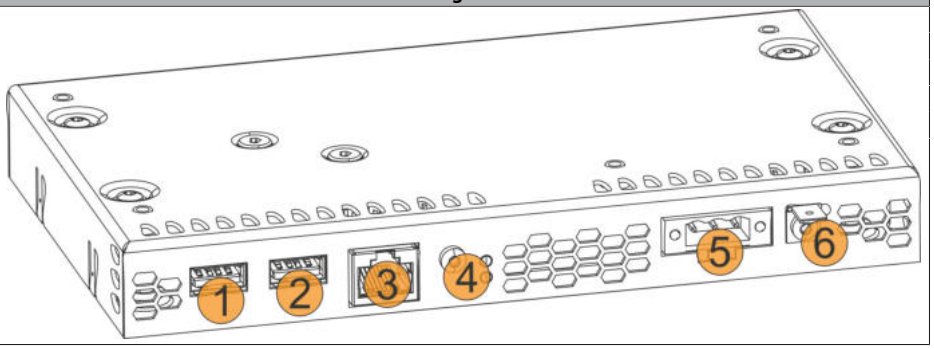
DP receiver 5DLDPO.1001-00

Legend		Figure
1	"USB1 interface"	
2	"USB2 interface"	
3	"USB In interface"	
4	"DP interface"	
5	"LED status indicators"	
6	"+24 VDC power supply"	
7	"Grounding"	
8	"OSD control panel"	

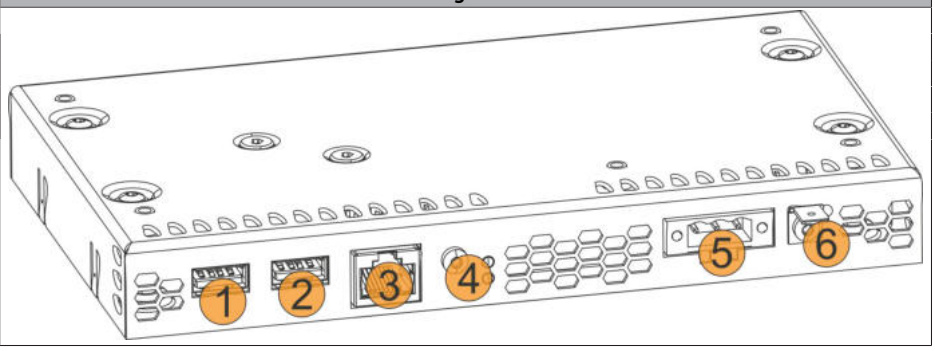
5DLSDL.1001-00 SDL/DVI receiver

Legend		Figure
1	"Panel In (SDL/DVI)"	
2	"USB1 interface"	
3	"USB2 interface"	
4	"USB In interface"	
5	"Serial interface"	
6	"+24 VDC power supply"	
7	"Grounding"	
8	"Brightness control + (DVI)"	
9	"Brightness control - (DVI)"	

SDL3 receiver 5DLSD3.1001-00

Legend		Figure
1	"USB1 interface"	
2	"USB2 interface"	
3	"SDL3 In interfaces"	
4	"SDL3 In LEDs"	
5	"+24 VDC power supply"	
6	"Grounding"	

SDL4 receiver 5DLSD4.1001-00

Legend		Figure
1	"USB1 interface"	
2	"USB2 interface"	
3	"SDL4 In interface"	
4	"SDL4 In LEDs"	
5	"+24 VDC power supply"	
6	"Grounding"	

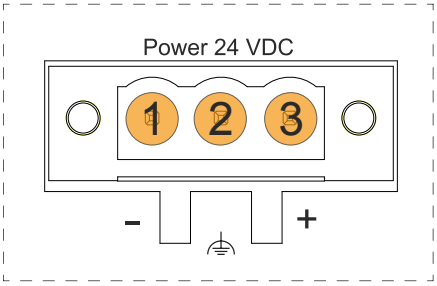
4.1.5.1.1 +24 VDC power supply

Danger!

This device is only permitted to be supplied with a SELV/PELV power supply unit or with safety extra-low voltage (SELV) per IEC 61010-2-201.

The necessary 3-pin connector is not included in delivery; for suitable accessories, see 0TB103.9x.

The device is protected against overload and reverse polarity by a soldered fuse. If the fuse is defective (e.g. due to overload), the device must be sent to B&R for repairs. If the polarity is reversed, it is not necessary to replace the fuse.

Pin	Description	Figure
1	-	
2	Functional ground	
3	+	

- Reverse polarity protection
- 3-pin
- Male

Electrical properties	
Nominal voltage	24 VDC, SELV[1]
Nominal current	5DLSDx.1001-00: Max. 3 A
	5DLDPO.1001-00: Max. 2.3 A[2]
Operating voltage	24 VDC ±25%
Fuse	5DLSDx.1001-00: 10 A, fast-acting
	5DLDPO.1001-00: 6.3 A, fast-acting
Overvoltage category per EN 61131-2	II
Galvanic isolation	Yes
Uninterruptible power supply	No

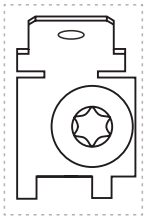
1) IEC 61010-2-201 requirements must be observed.
2) The maximum ambient temperature for the DisplayPort link module is limited to 50°C at a maximum nominal current of 2.3 A.

At a continuous nominal current of max. 2.0 A, the specified max. ambient temperature applies.see "Maximum ambient temperature for worst-case operation" on page 48

4.1.5.1.2 Grounding

Caution!

The functional ground (power supply pin 2 and ground connection) must be connected to the central grounding point (e.g. control cabinet or system) via the shortest possible path with the lowest possible resistance and with the largest possible wire cross section. This type of grounding is mandatory for proper functionality.

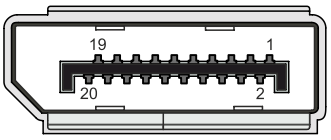


For example, a copper strip must be attached to the ground connection at a central grounding point of the control cabinet or system in which the device is installed. The wire cross section should be as large as possible (at least 2.5 mm²).

4.1.5.1.3 DP receiver (5DLDPO.1001-00)

4.1.5.1.3.1 DisplayPort interface

The DisplayPort interface is 20-pin (female) and can be operated with DisplayPort, DVI or HDMI transmission technologies.



Pin	Pinout	Description	Pin	Pinout	Description
1	DP_LANE3-	DisplayPort lane 3 (negative)	11	GND	Ground
2	GND	Ground	12	DP_LANE0+	DisplayPort lane 0 (positive)
3	DP_LANE3+	DisplayPort lane 3 (positive)	13	CONFIG1	Configuration pin 1 (connected to ground)
4	DP_LANE2-	DisplayPort lane 2 (negative)	14	CONFIG2	Configuration pin 2 (connected to ground)
5	GND	Ground	15	DP_AUX+	Auxiliary channel (positive)
6	DP_LANE2+	DisplayPort lane 2 (positive)	16	GND	Ground
7	DP_LANE1-	DisplayPort lane 1 (negative)	17	DP_AUX-	Auxiliary channel (negative)
8	GND	Ground	18	DP_HPD#	Hot plug detection
9	DP_LANE1+	DisplayPort lane 1 (positive)	19	RETURN	Return for power
10	DP_LANE0-	DisplayPort lane 0 (negative)	20	DP_PWR	Power for connector

Information:

Hot plugging output devices on the interface for service purposes is supported by the hardware and graphic drivers of approved operating systems.

A maximum of 10,000 mating cycles are specified for this interface.

Information:

Cable lengths and resolutions for DP transfer:

The maximum cable length for DP transfer is 7.5 m with a B&R DP cable (regardless of the panel resolution).

4.1.5.1.3.2 USB interfaces

The link module is equipped with a USB 2.0 (Universal Serial Bus) host controller with several USB ports, of which 2 USB interfaces are routed externally and freely available to the user.

Warning!

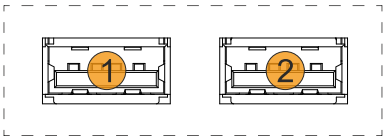
USB peripheral devices can be connected to the USB interfaces. Due to the variety of USB devices available on the market, B&R cannot guarantee their functionality. The functionality of USB devices available from B&R is ensured.

Caution!

Due to the general PC specification, this interface must be handled with the utmost care with regard to EMC, cable routing, etc.

Information:

For using B&R Hypervisor operating mode, see the chapter in B&R Hypervisor.

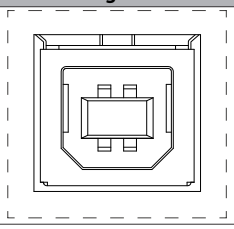
	USB1 - 2	
Standard	USB 2.0	
Variant	Type A, female	
Transfer rate	Low speed (1.5 Mbit/s) Full speed (12 Mbit/s) High speed (480 Mbit/s)	
Current-carrying capacity[1)] USB1 (1) USB2 (2)	Total max. 1 A	
Cable length USB 2.0	Max. 5 m (without hub)	

1) The USB interfaces are protected by a shared maintenance-free "USB current-limiting switch" (total max. 1 A).

4.1.5.1.3.3 USB In interface

The USB In interface is a USB 2.0 type B interface that is used to transfer USB data. It must be connected to a USB interface on the output device (e.g. B&R industrial PC). For possible transfer methods, see section "Connection options" on page 23.

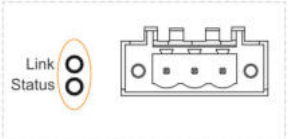
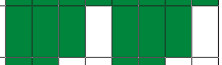
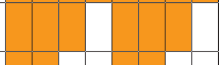
If the interface is connected to an output device (e.g. B&R industrial PC), then USB 2.0 transfer rates are possible on the USB1 and USB2 interfaces.

Description		Figure
Standard	USB 2.0	
Variant	Type B, female	
Transfer rate	Low speed (1.5 Mbit/s) Full speed (12 Mbit/s) High speed (480 Mbit/s)	
Current-carrying capacity[1)]	Max. 500 mA	
Cable length	Max. 7.5 m (without hub)	
-		

1) The USB interface is protected by a maintenance-free "USB current-limiting switch" (max. 500 mA).

4.1.5.1.3.4 LED status indicators

The LEDs are located on the connection side of the DP receiver.

Assignment	LED	Color	Status	Explanation	LED status indicators[1)]
	**Link**	Reserved			
	Status	Green	On	Power LED, image transfer taking place	
			Blinking	Device working but no signal from the PC	
				Hot plugging	
		Yellow	On	Power LED, image transfer taking place, a firmware image is corrupt.	
			Blinking	Device working, no signal from the PC, a firmware image is corrupt.	
				Hot plugging, a firmware image is corrupt.	

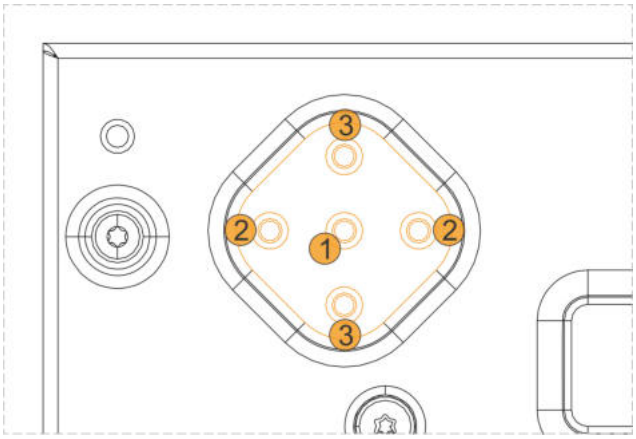
1) Two columns form 1 interval of 500 ms each.

4.1.5.1.3.5 On-screen display (OSD)

The OSD menu is available to display information for service purposes. It is possible to adjust the display brightness at room temperature during commissioning or maintenance tasks.

OSD control panel

The OSD control panel for menu navigation is located on the back of the DP receiver of the Automation Panel.

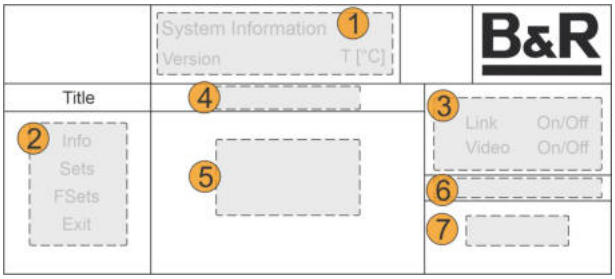


	Key	Option
1	Center menu button	Opens and closes the OSD menu
2	Horizontal cursor keys	Navigates left and right
3	Vertical cursor keys	Navigates up and down

OSD main menu

The OSD menu is not shown as an original screen-shot in this documentation, but systematically as a graphic.

The OSD menu is opened using the menu button on the DP receiver.



	Menu	Contents
1	System information	**DisplayPort receiver 5DLDPO.1001-00** • Device revision • Serial number • Installed firmware Temperature measured on the panel in degrees Celsius.
2	Submenu	• Info • Sets • FSets • Exit
3	Status and activity indicator	For information, see LED status indicators.
4	Currently selected submenu	
5	Displays the properties and settings of the submenu	
6	Selected parameter	
7	Change parameters	• Brightness of the display in percent • Backup of modified data • Reset to factory setting

The OSD menu can be navigated using the cursor keys.

Submenu	Contents	Options
Info	CRC (cyclic redundancy check - error detection)	Okay/Fail
	Image	High/Low
	PME	Reserved
	ICT	Reserved
	RecE	Reserved
Sets	Brightness setting of the display	Setting in percent

Submenu	Contents	Options
FSets	Information only	• DP receiver used • Panel used • Expansion unit used
Exit	Closes the OSD menu	Via the menu button
	Saves any changed values	Sets WR to "open", default "locked"
	Reset to factory setting	Sets default to "set", standard "back"

Sets - Brightness setting

In submenu Sets, it is possible to read out the set brightness in % and adjust it to the ambient conditions of the Automation Panel.

1. Open the OSD menu.
2. Select submenu **Sets** using the vertical cursor keys.
3. Press the horizontal cursor key on the control panel until the % value in the parameter field is highlighted in yellow.
4. Use the vertical cursor keys to adjust the brightness.
5. Navigate back to the submenu.
6. Set WR (write protect) to "open" in menu **Exit**.
7. Exit the OSD menu.

Information:

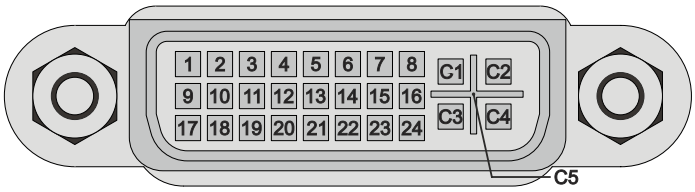
The brightness value is only saved by leaving menu Exit with WR "open" so that the setting is retained even after a power interruption.

4.1.5.1.4 SDL/DVI receiver (5DLSDL.1001-00)

4.1.5.1.4.1 Panel In interface

The interface is designed as a DVI-I connector (female) and can be operated with DVI-D or SDL transmission technology.
For additional information, see sections "SDL operation" on page 25 and "DVI operation" on page 27.

Video signals SDL and DVI are available for the following link modules: 5DLSDL.1001-00. For details, see the technical data for the link module or panel used.



Pin	Pinout	Description	Pin	Pinout	Description
1	TMDS data 2-	DVI lane 2 (negative)	16	HPD	Hot plug detection
2	TMDS data 2+	DVI lane 2 (positive)	17	TMDS data 0-	DVI lane 0 (negative)
3	TMDS data 2/4 SHIELD	Shield for data pairs 2 and 4	18	TMDS data 0+	DVI lane 0 (positive)
4	SDL-	SDL lane (negative)	19	TMDS data 0/XUSB1 SHIELD	Shield of data pair 0 and USB1
5	SDL+	SDL lane (positive)	20	XUSB1-	USB lane 1 (negative)
6	DDC clock	DDC-based control signal (clock)	21	XUSB1+	USB lane 1 (positive)
7	DDC data	DDC-based control signal (data)	22	TMDS clock shield	Shield of clock pair
8	Not connected	Not connected	23	TMDS clock+	DVI clock (positive)
9	TMDS data 1-	DVI lane 1 (negative)	24	TMDS clock -	DVI clock (negative)
10	TMDS data 1+	DVI lane 1 (positive)	C1	Not connected	Not connected
11	TMDS data 1/XUSB0 SHIELD	Shield of data pair 1 and USB0	C2	Not connected	Not connected
12	XUSB0-	USB lane 0 (negative)	C3	Not connected	Not connected
13	XUSB0+	USB lane 0 (positive)	C4	Not connected	Not connected
14	+5 V power[1)]	+5 V power supply	C5	Not connected	Not connected
15	Ground (return for +5 V, HSync and VSync)	Ground	-	-	

1) Protected internally by a multifuse.

Information:

Hot plugging output devices on the interface for service purposes is supported by the hardware and graphic drivers of approved operating systems. Recalibration may be required for touch screen devices.

A maximum of 100 mating cycles are specified for this interface.

It is important to note the following information about the transfer rate:

- In SDL operation without USB type A/B cable, the USB transfer rate is limited to USB 1.1.
- A USB transfer rate of USB 2.0 is possible in DVI or SDL operation with a USB type A/B cable.

Cable lengths and resolutions for SDL transfer

The following table shows the relationship between segment length and maximum resolution depending on the SDL cable:

SDL cable	Resolution			
Segment length [m]	XGA 1024 x 768	HD 1366 x 768	SXGA 1280 x 1024	FHD 1920 x 1080
0.8	5CASDL.0008-00	5CASDL.0008-00	5CASDL.0008-00	5CASDL.0008-00
1.8	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03
5	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03
6	5CASDL.0060-00	5CASDL.0060-00	5CASDL.0060-00	5CASDL.0060-00
10	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03
15	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	- - 5CASDL.0150-03
20	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	- 5CASDL.0200-03
25	5CASDL.0250-00 5CASDL.0250-03	5CASDL.0250-00 5CASDL.0250-03	- -	- -

5CASDL.0xxx-01 SDL cables must be routed through the swing arm shaft with the straight connector; the 45° connected must be used on the industrial PC side.

Cable lengths and resolutions for DVI transfer

The following table shows the relationship between segment length and maximum resolution depending on the DVI cable:

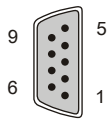
DVI cable	Resolution			
Segment length [m]	XGA 1024 x 768	HD 1366 x 768	SXGA 1280 x 1024	FHD 1920 x 1080
1.8	5CADVI.0018-00	5CADVI.0018-00	5CADVI.0018-00	5CADVI.0018-00
5	5CADVI.0050-00	5CADVI.0050-00	5CADVI.0050-00	5CADVI.0050-00

The maximum cable length for DVI transfer is limited to 5 m due to the USB specification.

4.1.5.1.4.2 Serial interface

The serial interface is only available for use with a single-touch display in DVI operation. It is used to transfer data from the resistive touch screen and must be connected to a serial interface on the output device.

COM interface	
	RS232
Type	Modem supported, not galvanically isolated, DSUB, 9-pin, female
UART	16550-compatible, 16-byte FIFO buffer
Transfer rate	Max. 115 kbit/s
Bus length	Max. 15 m
Pin	**Pinout**
1	NC
2	RXD
3	TXD
4	NC
5	GND
6	NC
7	RTS
8	CTS
9	NC



4.1.5.1.4.3 USB interfaces

The link module is equipped with a USB 2.0 (Universal Serial Bus) host controller with several USB ports, of which 2 USB interfaces are routed externally and freely available to the user.

Warning!

USB peripheral devices can be connected to the USB interfaces. Due to the variety of USB devices available on the market, B&R cannot guarantee their functionality. The functionality of USB devices available from B&R is ensured.

Caution!

Due to the general PC specification, this interface must be handled with the utmost care with regard to EMC, cable routing, etc.

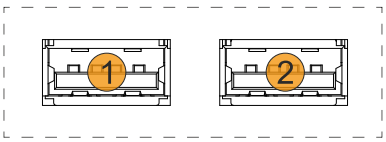
USB1, USB2

Depending on the type of transfer (SDL or DVI operation), there are limitations regarding the transfer rate for interfaces USB1 and USB2. For possible transfer methods, see section "Connection options" on page 23.

Transfer method	USB type	Max. cable length
SDL operation without USB cable	USB 1.1	25 m[1)]
SDL operation with USB cable	USB 2.0	5 m
Single-touch DVI operation	USB 2.0	5 m
Multi-touch DVI operation	USB 2.0	5 m

1) The max. cable length of 25 m depends on the resolution. For more detailed information, see table Cable lengths and resolutions for SDL transfer.

USB1 - 2	
Standard	USB 2.0
Variant	Type A, female
Transfer rate	Low speed (1.5 Mbit/s) Full speed (12 Mbit/s) High speed (480 Mbit/s)
Current-carrying capacity[1)] USB1 (1) USB2 (2)	Total max. 1 A
Cable length USB 2.0	Max. 5 m (without hub)



1) The USB interfaces are protected by a shared maintenance-free "USB current-limiting switch" (total max. 1 A).

Front USB interface

Expansion units are equipped with a USB 2.0 interface on the front. For more information, see section "USB interface" on page 69.

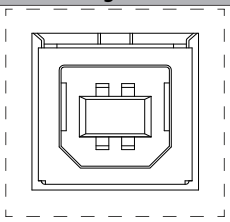
USB interface on mounting unit

Mounting units 5ACCMA00.0001-000 and 5ACCMA00.0101-000 are equipped with a USB 2.0 interface on the side. For more information, see section "USB interface" on page 117.

4.1.5.1.4.4 USB In interface

The USB In interface is a USB 2.0 type B interface that is used to transfer USB data. It must be connected to a USB interface on the output device (e.g. B&R industrial PC) if DVI operation or SDL operation with a USB type A/B cable was chosen as the transfer method. For possible transfer methods, see section "Connection options" on page 23.

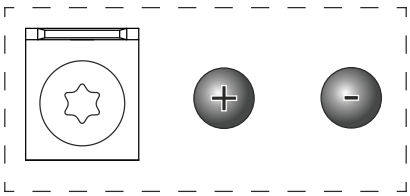
If the interface is connected to an output device (e.g. B&R industrial PC), then USB 2.0 transfer rates are possible on the USB1 and USB2 interfaces.

Description		Figure
Standard	USB 2.0	
Variant	Type B, female	
Transfer rate	Low speed (1.5 Mbit/s) Full speed (12 Mbit/s) High speed (480 Mbit/s)	
Current-carrying capacity[1)]	Max. 500 mA	
Cable length	Max. 5 m (without hub)	
-		

1) The USB interface is protected by a maintenance-free "USB current-limiting switch" (max. 500 mA).

4.1.5.1.4.5 Brightness controls

The brightness controls can be used to set the brightness of the backlight on the Automation Panel in DVI operation. Buttons have no function during SDL operation; the brightness can be set via the B&R Control Center, for example.



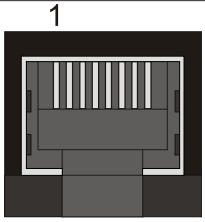
4.1.5.1.5 SDL3 receiver (5DLSD3.1001-00)

4.1.5.1.5.1 SDL3 In interfaces

Information:

For additional information, see section "SDL3 operation" on page 29.

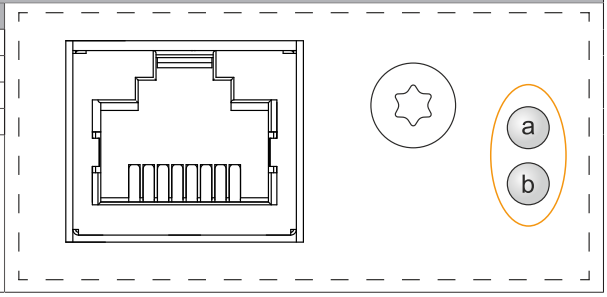
The "SDL3 In" interface is a female RJ45 connector and operated with SDL3 transmission technology.

Description		Figure
The following shows an overview of the video signals possible on the panel input. For details, see the technical data for the link module or panel used.		1 
Variant	RJ45 connector, female	
Link module	**Video signals**	
5DLSD3.1001-00	SDL3	
-		

Information:

Cable lengths and resolutions for SDL3 transfer:

The maximum cable length for SDL3 transfers is 100 m with a B&R SDL3/SDL4 cable (regardless of the panel resolution).

SDL3 In LEDs				
LED	**Color**	**Status**	**Explanation**	
Link (a)	Yellow	On	Indicates an active SDL3 connection.	
		Off	No active SDL3 connection.	
Status (b)	Yellow	On	The SDL3 connection is established and OK.	
		Off	No active SDL3 connection.	
		Blinking	The SDL3 connection is OK, but a firmware image is corrupt.	

Information:

Hot plugging display devices on the SDL3 In interface for service purposes is supported by the hardware and graphics drivers of approved operating systems. The female RJ45 connector is specified for 500 mating cycles.

Information:

If a display device with touch screen is connected to the SDL3 In interface and then disconnected again during operation (hot plugging), it may be necessary to recalibrate the touch screen.

4.1.5.1.5.2 USB interfaces

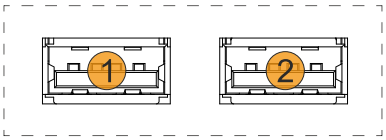
The link module is equipped with a USB 2.0 (Universal Serial Bus) host controller with several USB ports, of which 2 USB interfaces are routed externally and freely available to the user.

Warning!

USB peripheral devices can be connected to the USB interfaces. Due to the variety of USB devices available on the market, B&R cannot guarantee their functionality. The functionality of USB devices available from B&R is ensured.

Caution!

Due to the general PC specification, this interface must be handled with the utmost care with regard to EMC, cable routing, etc.

	USB1 - 2	
Standard	USB 2.0	
Variant	Type A, female	
Transfer rate	Low speed (1.5 Mbit/s) Full speed (12 Mbit/s) High speed (30 Mbit/s)	
Current-carrying capacity[1)] USB1 (1) USB2 (2)	Total max. 1 A	
Cable length USB 2.0	Max. 5 m (without hub)	

1) The USB interfaces are protected by a shared maintenance-free "USB current-limiting switch" (total max. 1 A).

Front USB interface

Expansion units are equipped with a USB 2.0 interface on the front. For more information, see section "USB interface" on page 69.

USB interface on mounting unit

Mounting unit 5ACCMA00.0001-000 is equipped with a USB 2.0 interface on the side. For more information, see section "USB interface" on page 117.

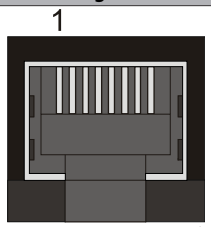
4.1.5.1.6 SDL4 receiver (5DLSD4.1001-00)

4.1.5.1.6.1 SDL4 In interface

Information:

For additional information, see section "SDL4 operation" on page 30.

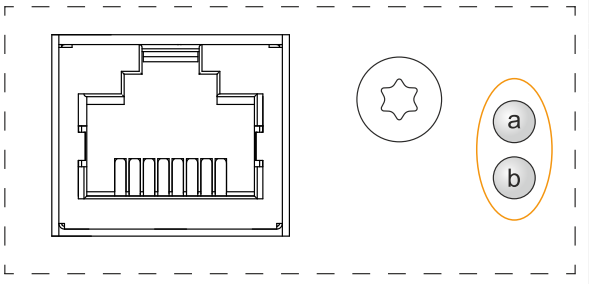
The SDL4 In interface is a female RJ45 connector and operated with SDL4 transmission technology.

Description		Figure
The following shows an overview of the video signals possible on the panel input. For details, see the technical data for the link module or panel used.		
Variant	RJ45 connector, female	
Link module	**Video signals**	
5DLSD4.1001-00	SDL4	
-		

Information:

Cable lengths and resolutions for SDL4 transfer:

The maximum cable length for SDL4 transfer with a B&R SDL3/SDL4 cable is 100 meters (regardless of the resolution of the panel).

SDL4 In LEDs				
LED	**Color**	**Status**	**Explanation**	
Link (a)	Yellow	On	Indicates an active SDL4 connection.	
		Off	No active SDL4 connection.	
Status (b)	Yellow	On	The SDL4 connection is established and OK.	
		Off	No active SDL4 connection.	
		Blinking	The SDL4 connection is OK, but a firmware image is corrupt.	

Information:

Hot plugging display devices on the SDL4 In interface for service purposes is supported by the hardware and graphics drivers of approved operating systems. The female RJ45 connector is specified for 500 mating cycles.

Information:

If a display device with touch screen is connected to the SDL4 In interface and then disconnected again during operation (hot plugging), it may be necessary to recalibrate the touch screen.

4.1.5.1.6.2 USB interfaces

The link module is equipped with a USB 2.0 (Universal Serial Bus) host controller with several USB ports, of which 2 USB interfaces are routed externally and freely available to the user.

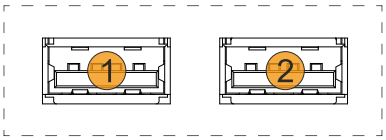
Warning!

USB peripheral devices can be connected to the USB interfaces. Due to the variety of USB devices available on the market, B&R cannot guarantee their functionality. The functionality of USB devices available from B&R is ensured.

Caution!

Due to the general PC specification, this interface must be handled with the utmost care with regard to EMC, cable routing, etc.

	USB1 - 2	
Standard	USB 2.0	
Variant	Type A, female	
Transfer rate	Low speed (1.5 Mbit/s) Full speed (12 Mbit/s) High speed (150 Mbit/s)	
Current-carrying capacity[1)] USB1 (1) USB2 (2)	Total max. 1 A	
Cable length USB 2.0	Max. 5 m (without hub)	



1) The USB interfaces are protected by a shared maintenance-free "USB current-limiting switch" (total max. 1 A).

Front USB interface

Expansion units are equipped with a USB 2.0 interface on the front. For more information, see section "USB interface" on page 69.

USB interface on mounting unit

Mounting units 5ACCMA00.0001-000 and 5ACCMA00.0101-000 are equipped with a USB 2.0 interface on the side. For more information, see section "USB interface" on page 117.

4.1.6 Equipping panels with expansion units

Expansion options can be installed on AP5230 panels. There are two variants of expansion options:

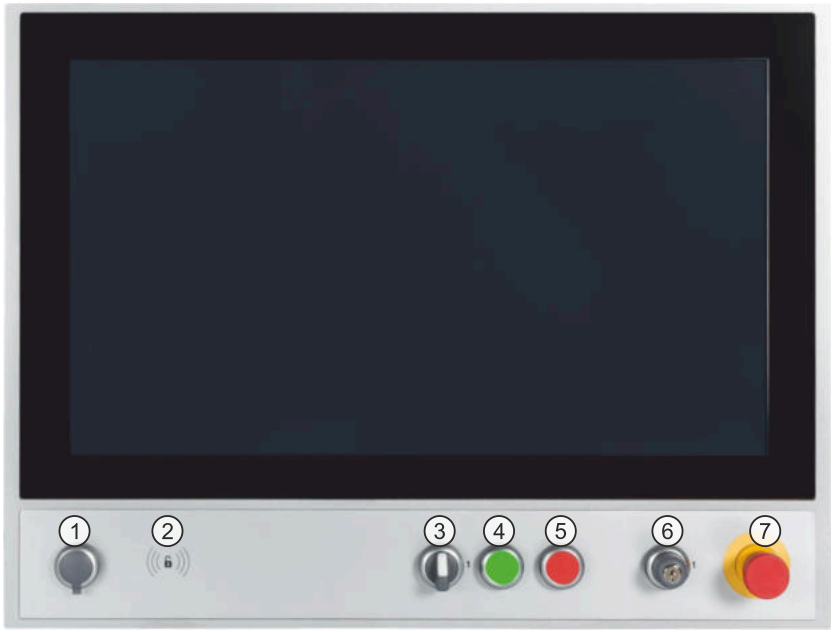
- Expansion cover
- Expansion unit with operating elements

Expansion covers (5ACCKP00.xxxx-000)

Expansion covers are not equipped by B&R with operating elements. Depending on the variant, 7 to 14 cutouts are available to be equipped with operating elements by the user.

Expansion units with operating elements (5ACCKP0x.xxxx-000)

Expansion units with operating elements are equipped with a USB interface on the front, green and red pushbuttons, selector switch or blue pushbutton, key switch and emergency stop device or an RFID interface (see "Expansion units" on page 132).



Legend			
1	Front USB	2	RFID interface (5ACCKP03.xxxx-000 and 5ACCKP05.xxxx-000)
3	Selector switches (5ACCKP01.xxxx-000 and 5ACCKP03.xxxx-000) Blue pushbuttons (5ACCKP04.xxxx-000 and 5ACCKP05.xxxx-000)	4	Green pushbutton
5	Red pushbutton	6	Key switch
7	Emergency stop	-	

4.1.6.1 Button/Switching elements

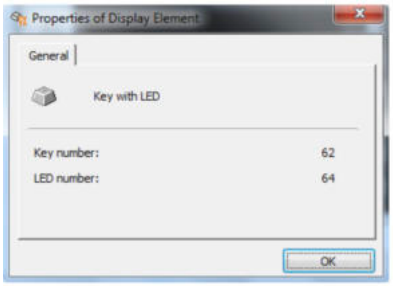
Button/Switch	Actuating element used	Switching element
Selector switch	"Selector switch RAFIX 22 FS+, 1.30.272.102/2200" on page 214	"Switching element RAFIX 22 FS universal, 1.20.126.005/0000" on page 215
Blue pushbutton	"Pushbutton RAFIX 22 FS+, 1.30.270.021/2600" on page 214	"Switching element RAFIX 22 FS universal, 1.20.126.005/0000" on page 215
Green pushbutton	"Pushbutton RAFIX 22 FS+, 1.30.270.021/2500" on page 214	"Switching element RAFIX 22 FS universal, 1.20.126.005/0000" on page 215
Red pushbutton	"Pushbutton RAFIX 22 FS+, 1.30.270.021/2300" on page 214	"Switching element RAFIX 22 FS universal, 1.20.126.005/0000" on page 215
Key switch	"Key switch RAFIX 22 FS+, 1.30.275.222/0000" on page 215	"Switching element RAFIX 22 FS universal, 1.20.126.005/0000" on page 215
Emergency stop	"Emergency stop RAFIX 22 FS+ "Plus 1", 1.30.273.512/0300" on page 215	"Switching element RAFIX 22 FS+ PCB gold, 1.20.126.414/0000" on page 216

4.1.6.2 Button, switch and LED configuration

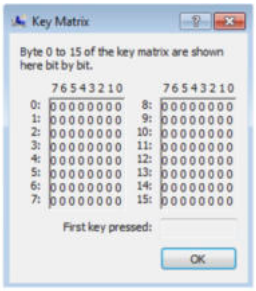
Each key and LED can be individually configured and adapted to the application. Various tools from B&R are available for configuration:

- B&R Key Editor for Windows operating systems
- B&R KCF Editor for Windows operating systems
- Visual Components

Keys and LEDs from each device are processed by the matrix controller in a bit string of 128 bits each. The positions of the keys and LEDs in the matrix are displayed as hardware numbers and can be read directly on the target system using B&R tools and the ADI Control Center.



B&R Key Editor

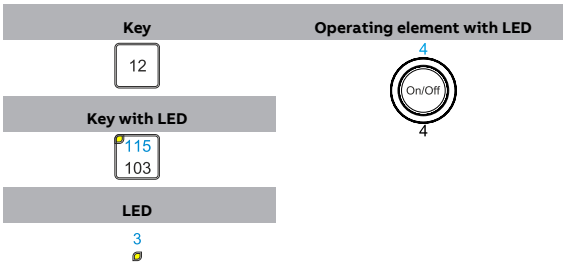


ADI Control Center

Keys and LEDs in the matrix:

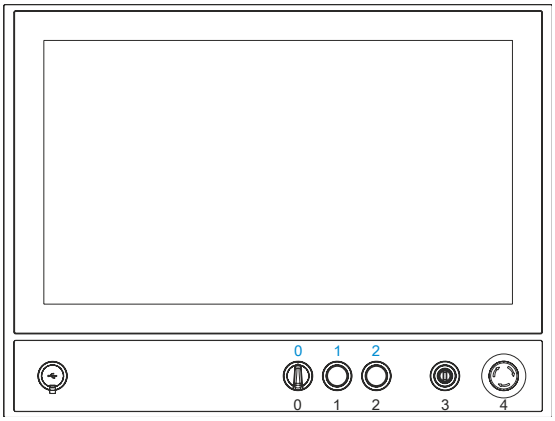
- Hardware numbers of keys are specified in the following with black indexes.
- Hardware numbers of LEDs are specified in the following with blue indexes.

Illustration examples:



Configuration with mounted expansion unit 5ACCKP0x.xxxx-000 for panels:

- 5AP5230.156x-000
- 5AP5230.185x-000
- 5AP5230.215C-000
- 5AP5230.215I-000
- 5AP5230.240C-000



4.1.6.3 USB interface

Panels with expansion options are equipped with a USB 2.0 interface on the front. This is equipped with a protective cover.

Caution!

IP65 protection can only be achieved if the USB protective cover is properly installed.

Warning!

USB peripheral devices can be connected to the USB interfaces. Due to the variety of USB devices available on the market, B&R cannot guarantee their functionality. The functionality of USB devices available from B&R is ensured.

Caution!

Due to the general PC specification, this interface must be handled with the utmost care with regard to EMC, cable routing, etc.

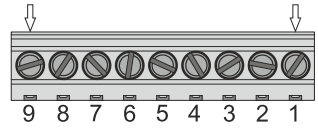
Front USB

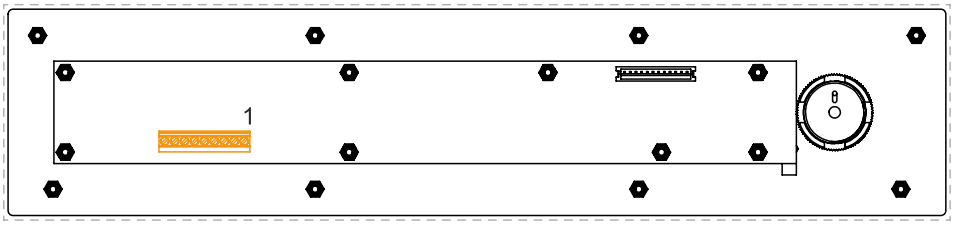
The front USB interface is available to the user for service purposes.
For a more detailed description, see "USB interface" on page 134.

4.1.6.4 Button/Switch interface

The button/switch interface can be used to externally wire button and switching elements. It is located inside the panel on the expansion unit. To access, the cover on the back for the expansion option must be removed first (see "Installing the expansion unit/cover" on page 168). Button and switching elements are wired using the 9-pin terminal strip and a screwdriver.

Description				Figure
Pin	Name	Button/Switch	Contact	
1	T_Select	Selector switch	(normally open contact)	
	T_Blue	Blue pushbutton	(normally open contact)	
2	T_Green	Green pushbutton	(normally open contact)	
3	T_Red	Red pushbutton	(normally open contact)	
4	T_Key	Key switch	(normally open contact)	
5	V_Button		Reference potential for pins 1-4	
6	NH22	Emergency stop	Normally closed contact pair 1 emergency stop	
7	NH21	Emergency stop	Normally closed contact pair 1 emergency stop	
8	NH12	Emergency stop	Normally closed contact pair 2 emergency stop	
9	NH11	Emergency stop	Normally closed contact pair 2 emergency stop	





4.1.6.5 B&R wireless assembly

B&R wireless assembly RFM-2-NF of 5ACCKP03.xxxx-000 or 5ACCK05.xxxx-000 expansion units consists of the following wireless module:

- SRD (RFID/NFC) module TWN4 MultiTech Nano from Elatec with circuit board antenna from B&R.

The B&R wireless assembly must be connected internally to the system using the USB 2.0 cable.

4.1.6.5.1 Drivers, software and documentation

Drivers, software tools and documentation for approved operating systems are available for download in the Downloads section of the B&R website (www.br-automation.com). The software packages for the TWN4 MultiTech Nano with the TWN4 Simple Protocol must be used.

4.2 Individual components

Information:

The following specified characteristic data, features and limit values are only valid for these individual components and may differ from those of the complete system. The specific data specified for the complete system applies to the complete system in which an individual component is used.

4.2.1 Panels

4.2.1.1 5AP5120.1505-000

4.2.1.1.1 General information

- 15.0" TFT XGA color display
- Single-touch (analog resistive)
- Flexible swing arm mounting or VESA
- IP65 protection with mounting unit 5ACCMA00.000x-000
- IP54 protection with mounting unit 5ACCMA00.010x-000
- IP20 protection with mounting unit 5ACCMA01.0100-000

4.2.1.1.2 Order data

Order number	Short description	Figure
	Panels	
5AP5120.1505-000	Automation Panel 15.0" XGA TFT - 1024 x 768 pixels (4:3) - Single-touch (analog resistive) - Swing arm mounting - Landscape format - For PPC2100 / PPC2200 / link modules	
	Optional accessories	
	Flanges	
5ACCFL00.0000-000	AP5000 flange - Swing arm rotary flange - For swing arm mounting unit	
5ACCFL00.0100-000	AP5000 flange - Swivel-tilt flange for swing arm - For swing arm mounting unit	
5ACCFL00.0200-000	AP5000 flange - Swing arm flange adapter - For Rittal - For swing arm mounting unit	
	Handles	
5ACCHD00.1505-000	AP5000 swing arm handles - For panel 5AP5120.1505-000	
	Mounting units	
5ACCMA00.0000-000	AP5000 swing arm mounting unit	
5ACCMA00.0001-000	AP5000 swing arm mounting unit - 1x rear USB interface	
5ACCMA00.0002-000	AP5000 swing arm mounting unit - 2x rear USB interface	
5ACCMA00.0100-000	HMI VESA IP54 mounting unit - Leak tightness is only provided with suitable cable grommets.	
5ACCMA00.0101-000	HMI VESA IP54 mounting unit w/USB - Leak tightness is only provided with suitable cable grommets.	
5ACCMA01.0100-000	AP5000 VESA mounting unit IP10/IP20 - IP20 with 5AP5120.*-000 - IP10 with 5AP5130.*-000, 5AP5230.*-000	

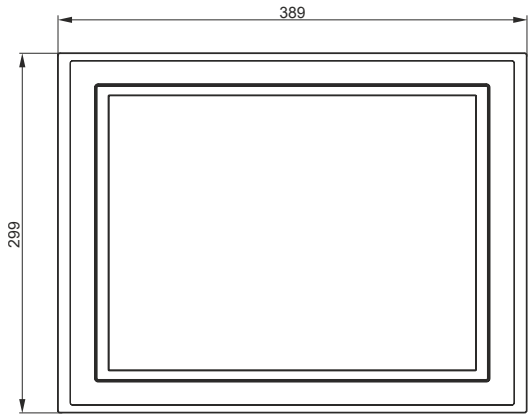
4.2.1.1.3 Technical data

Order number	5AP5120.1505-000
General information	
B&R ID code	0xE9CB
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
Display	
Type	TFT color
Diagonal	15.0"
Colors	16.7 million
Resolution	XGA, 1024 x 768 pixels
Contrast	700:1
Viewing angles	
Horizontal	Direction R = 80° / Direction L = 80°
Vertical	Direction U = 70° / Direction D = 70°

Order number	5AP5120.1505-000
Backlight	
Type	LED
Brightness (dimmable)	Typ. 20 to 400 cd/m²
Half-brightness time [1]	50,000 h
Touch screen	
Technology	Analog, resistive
Controller	B&R, serial, 12-bit
Transmittance	81% ±3%
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	IP65 with mounting unit 5ACCMA00.000x-000 IP54 with mounting unit 5ACCMA00.010x-000
Degree of protection per UL 50	Type 4X indoor with mounting unit 5ACCMA00.000x-000 Type 1 with mounting unit 5ACCMA00.010x-000
Mechanical properties	
Housing	
Material	Aluminum, coated
Coating	White aluminum
Front	
Frame	Aluminum, coated
Panel overlay	
Material	Polyester
Dark border color around display	RAL 7024
Dimensions	
Width	389 mm
Height	299 mm
Weight	5200 g

1) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.

4.2.1.1.4 Dimensions



4.2.1.1.5 Temperature/Humidity diagram

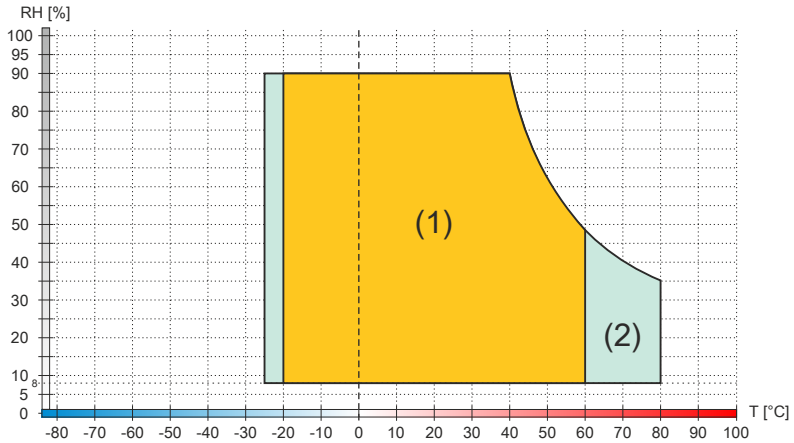


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.2 5AP5120.1906-000

4.2.1.2.1 General information

- 19.0" TFT SXGA color display
- Single-touch (analog resistive)
- Flexible swing arm mounting or VESA
- IP65 protection with mounting unit 5ACCMA00.000x-000
- IP54 protection with mounting unit 5ACCMA00.010x-000
- IP20 protection with mounting unit 5ACCMA01.0100-000

4.2.1.2.2 Order data

Order number	Short description	Figure
	Panels	
5AP5120.1906-000	Automation Panel 19.0" SXGA TFT - 1280 x 1024 pixels (5:4) - Single-touch (analog resistive) - Swing arm mounting - Landscape format - For PPC2100 / PPC2200 / link modules	
	Optional accessories	
	Flanges	
5ACCFL00.0000-000	AP5000 flange - Swing arm rotary flange - For swing arm mounting unit	
5ACCFL00.0100-000	AP5000 flange - Swivel-tilt flange for swing arm - For swing arm mounting unit	
5ACCFL00.0200-000	AP5000 flange - Swing arm flange adapter - For Rittal - For swing arm mounting unit	
	Handles	
5ACCHD00.1906-000	AP5000 swing arm handles - For panel 5AP5120.1906-000	
	Mounting units	
5ACCMA00.0000-000	AP5000 swing arm mounting unit	
5ACCMA00.0001-000	AP5000 swing arm mounting unit - 1x rear USB interface	
5ACCMA00.0002-000	AP5000 swing arm mounting unit - 2x rear USB interface	
5ACCMA00.0100-000	HMI VESA IP54 mounting unit - Leak tightness is only provided with suitable cable grommets.	
5ACCMA00.0101-000	HMI VESA IP54 mounting unit w/USB - Leak tightness is only provided with suitable cable grommets.	
5ACCMA01.0100-000	AP5000 VESA mounting unit IP10/IP20 - IP20 with 5AP5120.*-000 - IP10 with 5AP5130.*-000, 5AP5230.*-000	

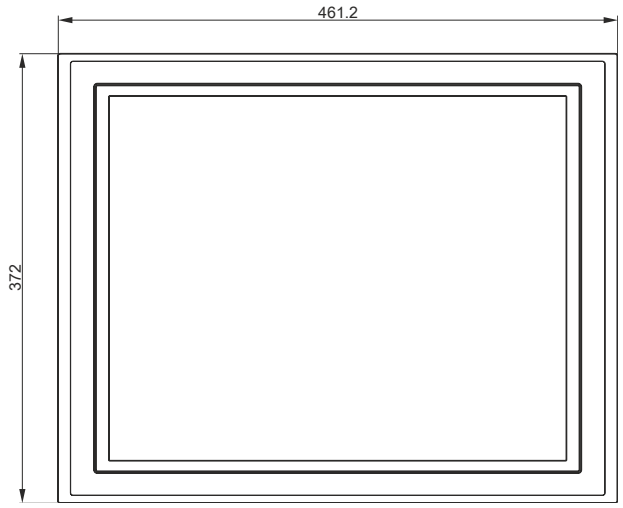
4.2.1.2.3 Technical data

Order number	5AP5120.1906-000
General information	
B&R ID code	0xE9CC
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
Display	
Type	TFT color
Diagonal	19.0"
Colors	16.7 million
Resolution	SXGA, 1280 x 1024 pixels
Contrast	1500:1
Viewing angles	
Horizontal	Direction R = 85° / Direction L = 85°
Vertical	Direction U = 85° / Direction D = 85°
Backlight	
Type	LED
Brightness (dimmable)	Typ. 35 to 350 cd/m²
Half-brightness time [1)]	70,000 h
Touch screen	
Technology	Analog, resistive
Controller	B&R, serial, 12-bit
Transmittance	81% ±3%
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	IP65 with mounting unit 5ACCMA00.000x-000 IP54 with mounting unit 5ACCMA00.010x-000
Degree of protection per UL 50	Type 4X indoor with mounting unit 5ACCMA00.000x-000 Type 1 with mounting unit 5ACCMA00.010x-000

Order number	5AP5120.1906-000
Mechanical properties	
Housing	
Material	Aluminum, coated
Coating	White aluminum
Front	
Frame	Aluminum, coated
Panel overlay	
Material	Polyester
Dark border color around display	RAL 7024
Dimensions	
Width	461.2 mm
Height	372 mm
Weight	7300 g

1) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.

4.2.1.2.4 Dimensions



4.2.1.2.5 Temperature/Humidity diagram

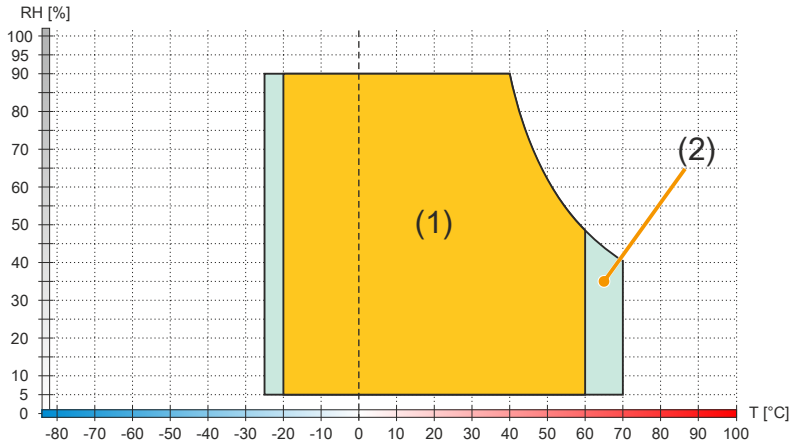


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.3 5AP5130.156B-000

4.2.1.3.1 General information

- 15.6" TFT HD color display
- Multi-touch (PCT)
- Flexible swing arm mounting or VESA
- IP65 protection with mounting unit 5ACCMA00.000x-000
- IP54 protection with mounting unit 5ACCMA00.010x-000
- IP10 protection with mounting unit 5ACCMA01.0100-000

4.2.1.3.2 Order data

Order number	Short description	Figure
	Panels	
5AP5130.156B-000	Automation Panel 15.6" HD TFT - 1366 x 768 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - For PPC2100 / PPC2200 / link modules	
	Optional accessories	
	Flanges	
5ACCFL00.0000-000	AP5000 flange - Swing arm rotary flange - For swing arm mounting unit	
5ACCFL00.0100-000	AP5000 flange - Swivel-tilt flange for swing arm - For swing arm mounting unit	
5ACCFL00.0200-000	AP5000 flange - Swing arm flange adapter - For Rittal - For swing arm mounting unit	
	Handles	
5ACCHD00.156B-000	AP5000 swing arm handles - For panel 5AP5130.156B/156C-000	
	Mounting units	
5ACCMA00.0000-000	AP5000 swing arm mounting unit	
5ACCMA00.0001-000	AP5000 swing arm mounting unit - 1x rear USB interface	
5ACCMA00.0002-000	AP5000 swing arm mounting unit - 2x rear USB interface	
5ACCMA00.0100-000	HMI VESA IP54 mounting unit - Leak tightness is only provided with suitable cable grommets.	
5ACCMA00.0101-000	HMI VESA IP54 mounting unit w/USB - Leak tightness is only provided with suitable cable grommets.	
5ACCMA01.0100-000	AP5000 VESA mounting unit IP10/IP20 - IP20 with 5AP5120.*-000 - IP10 with 5AP5130.*-000, 5AP5230.*-000	

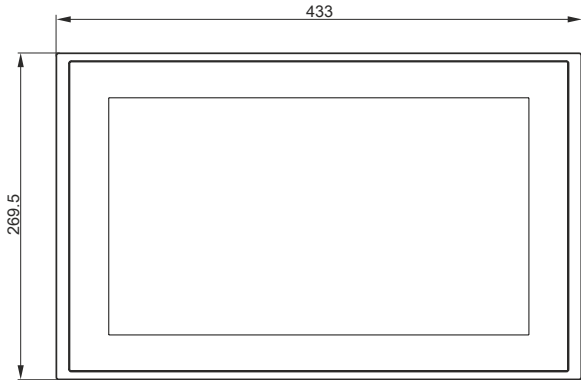
4.2.1.3.3 Technical data

Order number	5AP5130.156B-000
General information	
B&R ID code	0xE9C7
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
Display	
Type	TFT color
Diagonal	15.6"
Colors	16.7 million
Resolution	HD, 1366 x 768 pixels
Contrast	1000:1
Viewing angles	
Horizontal	Direction R = 85° / Direction L = 85°
Vertical	Direction U = 85° / Direction D = 85°
Backlight	
Type	LED
Brightness (dimmable)	Typ. 40 to 400 cd/m²
Half-brightness time [1)]	70,000 h
Touch screen	
Technology	Projected capacitive touch (PCT)
Transmittance	>90%
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	IP65 with mounting unit 5ACCMA00.000x-000 IP54 with mounting unit 5ACCMA00.010x-000
Degree of protection per UL 50	Type 4X indoor with mounting unit 5ACCMA00.000x-000 Type 1 with mounting unit 5ACCMA00.010x-000

Order number	5AP5130.156B-000
Mechanical properties	
Housing	
Material	Aluminum, coated
Coating	White aluminum (similar to RAL 9006)
Front	
Frame	Aluminum (similar to RAL 9006), coated
Design	Black
Dimensions	
Width	433 mm
Height	269.5 mm
Weight	4700 g

1) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.

4.2.1.3.4 Dimensions



4.2.1.3.5 Temperature/Humidity diagram

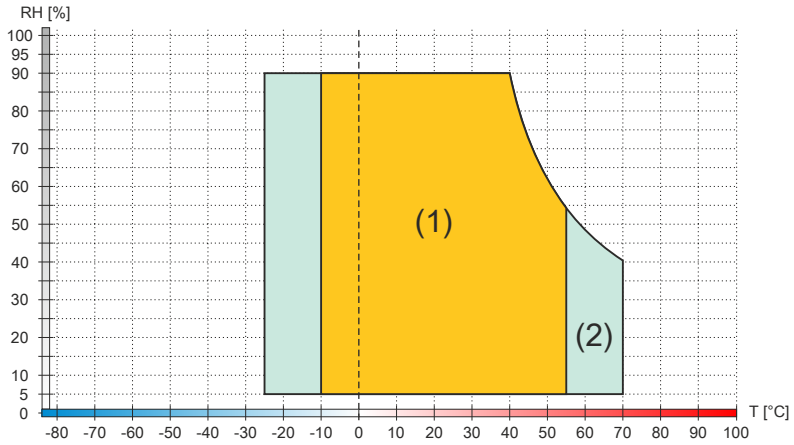


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.4 5AP5130.156C-000

4.2.1.4.1 General information

- 15.6" TFT FHD color display
- Multi-touch (PCT)
- Flexible swing arm mounting or VESA
- IP65 protection with mounting unit 5ACCMA00.000x-000
- IP54 protection with mounting unit 5ACCMA00.010x-000
- IP10 protection with mounting unit 5ACCMA01.0100-000

4.2.1.4.2 Order data

Order number	Short description	Figure
	Panels	
5AP5130.156C-000	Automation Panel 15.6" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - For PPC2100 / PPC2200 / link modules	
	Optional accessories	
	Flanges	
5ACCFL00.0000-000	AP5000 flange - Swing arm rotary flange - For swing arm mounting unit	
5ACCFL00.0100-000	AP5000 flange - Swivel-tilt flange for swing arm - For swing arm mounting unit	
5ACCFL00.0200-000	AP5000 flange - Swing arm flange adapter - For Rittal - For swing arm mounting unit	
	Handles	
5ACCHD00.156B-000	AP5000 swing arm handles - For panel 5AP5130.156B/156C-000	
	Mounting units	
5ACCMA00.0000-000	AP5000 swing arm mounting unit	
5ACCMA00.0001-000	AP5000 swing arm mounting unit - 1x rear USB interface	
5ACCMA00.0002-000	AP5000 swing arm mounting unit - 2x rear USB interface	
5ACCMA00.0100-000	HMI VESA IP54 mounting unit - Leak tightness is only provided with suitable cable grommets.	
5ACCMA00.0101-000	HMI VESA IP54 mounting unit w/USB - Leak tightness is only provided with suitable cable grommets.	
5ACCMA01.0100-000	AP5000 VESA mounting unit IP10/IP20 - IP20 with 5AP5120.*-000 - IP10 with 5AP5130.*-000, 5AP5230.*-000	

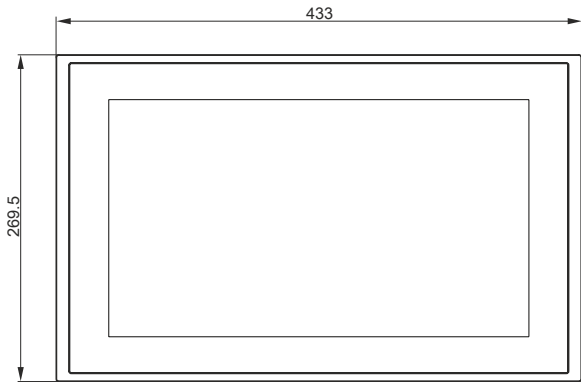
4.2.1.4.3 Technical data

Order number	5AP5130.156C-000
General information	
B&R ID code	0XF24A
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
CE	Yes
Display	
Type	TFT color
Diagonal	15.6"
Colors	16.7 million
Resolution	FHD, 1920 x 1080
Contrast	Starting with hardware revision F0: 800:1 Up to hardware revision E0: 1500:1
Viewing angles	
Horizontal	Direction R = 85° / Direction L = 85°
Vertical	Direction U = 85° / Direction D = 85°
Backlight	
Type	LED
Brightness (dimmable)	Starting with hardware revision F0: Typ. 40 to 450 cd/m² Up to hardware revision E0: Typ. 40 to 400 cd/m²
Half-brightness time	Starting with hardware revision F0: ≥50,000 h Up to hardware revision E0: 70,000 h [1)]
Touch screen	
Technology	Projected capacitive touch (PCT)
Transmittance	>90%
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	IP65 with mounting unit 5ACCMA00.000x-000 IP54 with mounting unit 5ACCMA00.010x-000

Order number	5AP5130.156C-000
Degree of protection per UL 50	Type 4X indoor with mounting unit 5ACCMA00.000x-000 Type 1 with mounting unit 5ACCMA00.010x-000
Mechanical properties	
Housing	
Material	Aluminum, coated
Coating	White aluminum (similar to RAL 9006)
Front	
Frame	Aluminum (similar to RAL 9006), coated
Design	Black
Dimensions	
Width	433 mm
Height	269.5 mm
Weight	4700 g

1) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.

4.2.1.4.4 Dimensions



4.2.1.4.5 Temperature/Humidity diagram

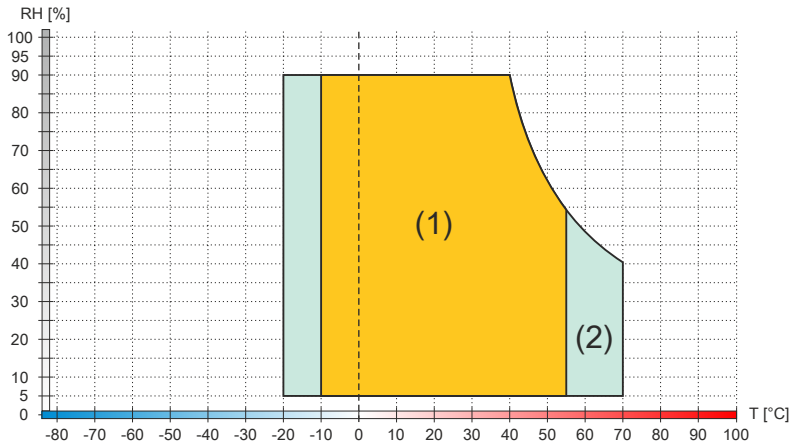


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.5 5AP5130.185B-000

4.2.1.5.1 General information

- 18.5" TFT HD color display
- Multi-touch (PCT)
- Flexible swing arm mounting or VESA
- IP65 protection with mounting unit 5ACCMA00.000x-000
- IP54 protection with mounting unit 5ACCMA00.010x-000
- IP10 protection with mounting unit 5ACCMA01.0100-000

4.2.1.5.2 Order data

Order number	Short description	Figure
	Panels	
5AP5130.185B-000	Automation Panel 18.5" HD TFT - 1366 x 768 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - For PPC2100 / PPC2200 / link modules	
	Optional accessories	
	Flanges	
5ACCFL00.0000-000	AP5000 flange - Swing arm rotary flange - For swing arm mounting unit	
5ACCFL00.0100-000	AP5000 flange - Swivel-tilt flange for swing arm - For swing arm mounting unit	
5ACCFL00.0200-000	AP5000 flange - Swing arm flange adapter - For Rittal - For swing arm mounting unit	
	Handles	
5ACCHD00.185B-000	AP5000 swing arm handles - For panel 5AP5130.185B/185C-000	
	Mounting units	
5ACCMA00.0000-000	AP5000 swing arm mounting unit	
5ACCMA00.0001-000	AP5000 swing arm mounting unit - 1x rear USB interface	
5ACCMA00.0002-000	AP5000 swing arm mounting unit - 2x rear USB interface	
5ACCMA00.0100-000	HMI VESA IP54 mounting unit - Leak tightness is only provided with suitable cable grommets.	
5ACCMA00.0101-000	HMI VESA IP54 mounting unit w/USB - Leak tightness is only provided with suitable cable grommets.	
5ACCMA01.0100-000	AP5000 VESA mounting unit IP10/IP20 - IP20 with 5AP5120.*-000 - IP10 with 5AP5130.*-000, 5AP5230.*-000	

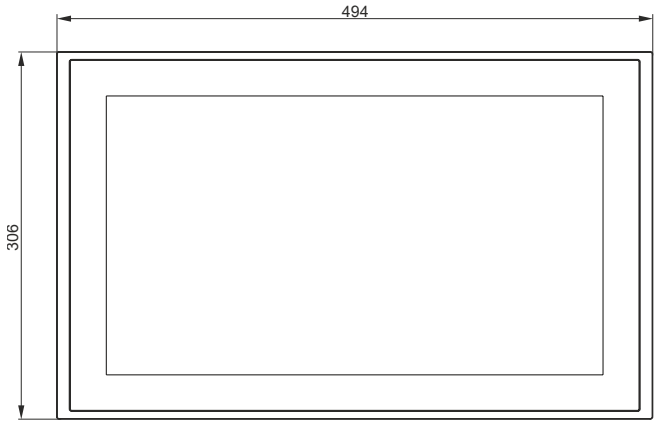
4.2.1.5.3 Technical data

Order number	5AP5130.185B-000
General information	
B&R ID code	0xE9C8
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
Display	
Type	TFT color
Diagonal	18.5"
Colors	16.7 million
Resolution	HD, 1366 x 768 pixels
Contrast	1000:1
Viewing angles	
Horizontal	Direction R = 85° / Direction L = 85°
Vertical	Direction U = 80° / Direction D = 80°
Backlight	
Type	LED
Brightness (dimmable)	Rev. H0 and later: Typ. 15 to 450 cd/m² Up to Rev. G0: Typ. 15 to 300 cd/m²
Half-brightness time [1)]	50,000 h
Touch screen	
Technology	Projected capacitive touch (PCT)
Transmittance	>90%
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	IP65 with mounting unit 5ACCMA00.000x-000 IP54 with mounting unit 5ACCMA00.010x-000
Degree of protection per UL 50	Type 4X indoor with mounting unit 5ACCMA00.000x-000 Type 1 with mounting unit 5ACCMA00.010x-000

Order number	5AP5130.185B-000
Mechanical properties	
Housing	
Material	Aluminum, coated
Coating	White aluminum (similar to RAL 9006)
Front	
Frame	Aluminum (similar to RAL 9006), coated
Design	Black
Dimensions	
Width	494 mm
Height	306 mm
Weight	Rev. H0 and later: 6300 g Up to Rev. G0: 6700 g

1) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.

4.2.1.5.4 Dimensions



4.2.1.5.5 Temperature/Humidity diagram

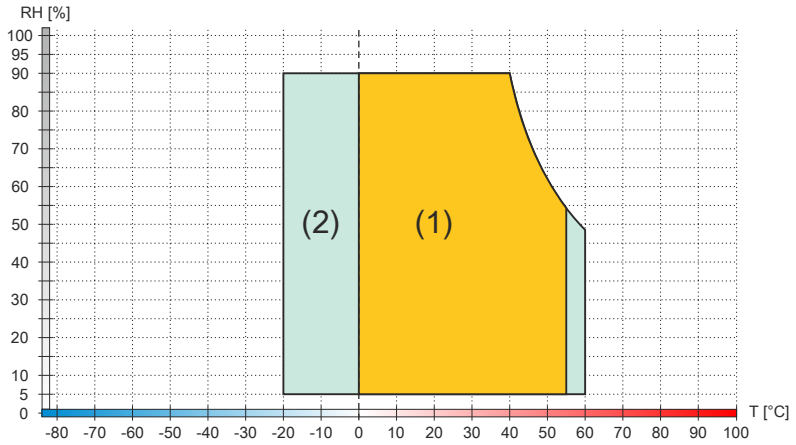


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.6 5AP5130.185C-000

4.2.1.6.1 General information

- 18.5" TFT FHD color display
- Multi-touch (PCT)
- Flexible swing arm mounting or VESA
- IP65 protection with mounting unit 5ACCMA00.000x-000
- IP54 protection with mounting unit 5ACCMA00.010x-000
- IP10 protection with mounting unit 5ACCMA01.0100-000

4.2.1.6.2 Order data

Order number	Short description	Figure
	Panels	
5AP5130.185C-000	Automation Panel 18.5" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - For PPC2100 / PPC2200 / link modules	
	Optional accessories	
	Flanges	
5ACCFL00.0000-000	AP5000 flange - Swing arm rotary flange - For swing arm mounting unit	
5ACCFL00.0100-000	AP5000 flange - Swivel-tilt flange for swing arm - For swing arm mounting unit	
5ACCFL00.0200-000	AP5000 flange - Swing arm flange adapter - For Rittal - For swing arm mounting unit	
	Handles	
5ACCHD00.185B-000	AP5000 swing arm handles - For panel 5AP5130.185B/185C-000	
	Mounting units	
5ACCMA00.0000-000	AP5000 swing arm mounting unit	
5ACCMA00.0001-000	AP5000 swing arm mounting unit - 1x rear USB interface	
5ACCMA00.0002-000	AP5000 swing arm mounting unit - 2x rear USB interface	
5ACCMA00.0100-000	HMI VESA IP54 mounting unit - Leak tightness is only provided with suitable cable grommets.	
5ACCMA00.0101-000	HMI VESA IP54 mounting unit w/USB - Leak tightness is only provided with suitable cable grommets.	
5ACCMA01.0100-000	AP5000 VESA mounting unit IP10/IP20 - IP20 with 5AP5120.*-000 - IP10 with 5AP5130.*-000, 5AP5230.*-000	

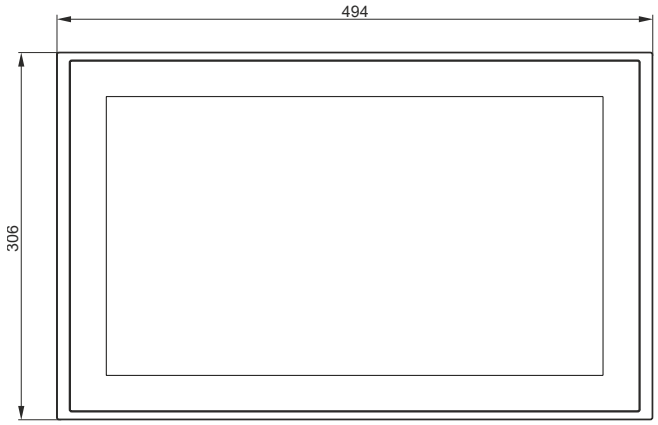
4.2.1.6.3 Technical data

Order number	5AP5130.185C-000
General information	
B&R ID code	0xF24C
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
CE	Yes
Display	
Type	TFT color
Diagonal	18.5"
Colors	16.7 million
Resolution	FHD, 1920 x 1080 pixels
Contrast	1500:1
Viewing angles	
Horizontal	Direction R = 85° / Direction L = 85°
Vertical	Direction U = 85° / Direction D = 85°
Backlight	
Type	LED
Brightness (dimmable)	Typ. 40 to 400 cd/m²
Half-brightness time	50,000 h [1)]
Touch screen	
Technology	Projected capacitive touch (PCT)
Transmittance	>90%
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	IP65 with mounting unit 5ACCMAS00.000x-000 IP54 with mounting unit 5ACCMA00.010x-000
Degree of protection per UL 50	Type 4X indoor with mounting unit 5ACCMAS00.000x-000 Type 1 with mounting unit 5ACCMA00.010x-000

Order number	5AP5130.185C-000
Mechanical properties	
Housing	
Material	Aluminum, coated
Coating	White aluminum (similar to RAL 9006)
Front	
Frame	Aluminum (similar to RAL 9006), coated
Design	Black
Dimensions	
Width	494 mm
Height	306 mm
Weight	6700 g

1) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.

4.2.1.6.4 Dimensions



4.2.1.6.5 Temperature/Humidity diagram

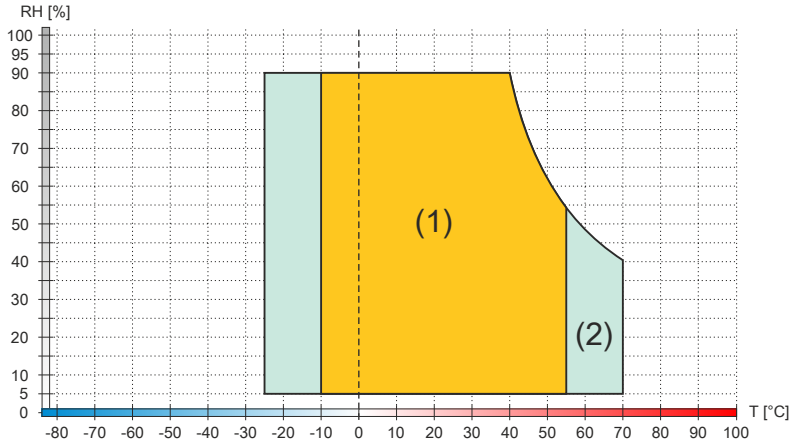


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.7 5AP5130.215C-000

4.2.1.7.1 General information

- 21.5" TFT FHD color display
- Multi-touch (PCT)
- Flexible swing arm mounting or VESA
- IP65 protection with mounting unit 5ACCMA00.000x-000
- IP54 protection with mounting unit 5ACCMA00.010x-000
- IP10 protection with mounting unit 5ACCMA01.0100-000

4.2.1.7.2 Order data

Order number	Short description	Figure
	Panels	
5AP5130.215C-000	Automation Panel 21.5" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - For PPC2100 / PPC2200 / link modules	
	Optional accessories	
	Flanges	
5ACCFL00.0000-000	AP5000 flange - Swing arm rotary flange - For swing arm mounting unit	
5ACCFL00.0100-000	AP5000 flange - Swivel-tilt flange for swing arm - For swing arm mounting unit	
5ACCFL00.0200-000	AP5000 flange - Swing arm flange adapter - For Rittal - For swing arm mounting unit	
	Handles	
5ACCHD00.215C-000	AP5000 swing arm handles - For panel 5AP5130.215C-000	
	Mounting units	
5ACCMA00.0000-000	AP5000 swing arm mounting unit	
5ACCMA00.0001-000	AP5000 swing arm mounting unit - 1x rear USB interface	
5ACCMA00.0002-000	AP5000 swing arm mounting unit - 2x rear USB interface	
5ACCMA00.0100-000	HMI VESA IP54 mounting unit - Leak tightness is only provided with suitable cable grommets.	
5ACCMA00.0101-000	HMI VESA IP54 mounting unit w/USB - Leak tightness is only provided with suitable cable grommets.	
5ACCMA01.0100-000	AP5000 VESA mounting unit IP10/IP20 - IP20 with 5AP5120.*-000 - IP10 with 5AP5130.*-000, 5AP5230.*-000	

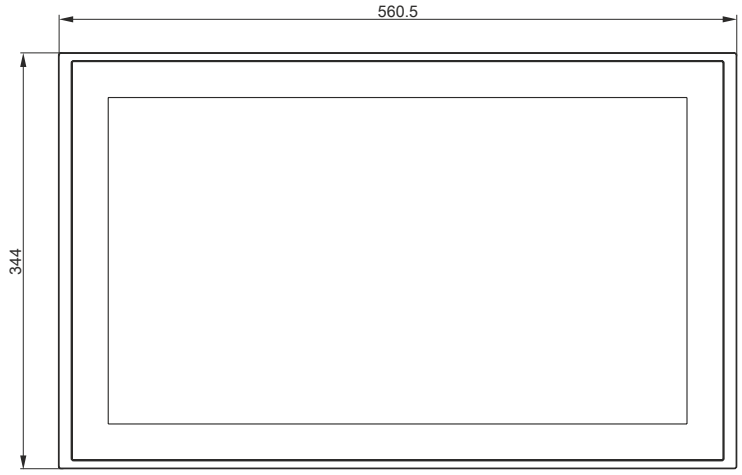
4.2.1.7.3 Technical data

Order number	5AP5130.215C-000
General information	
B&R ID code	0xE9C9
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
Display	
Type	TFT color
Diagonal	21.5"
Colors	16.7 million
Resolution	FHD, 1920 x 1080 pixels
Contrast	5000:1
Viewing angles	
Horizontal	Direction R = 89° / Direction L = 89°
Vertical	Direction U = 89° / Direction D = 89°
Backlight	
Type	LED
Brightness (dimmable)	Typ. 12.5 to 250 cd/m²
Half-brightness time [1)]	30,000 h
Touch screen	
Technology	Projected capacitive touch (PCT)
Transmittance	>90%
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	IP65 with mounting unit 5ACCMA00.000x-000 IP54 with mounting unit 5ACCMA00.010x-000
Degree of protection per UL 50	Type 4X indoor with mounting unit 5ACCMA00.000x-000 Type 1 with mounting unit 5ACCMA00.010x-000

Order number	5AP5130.215C-000
Mechanical properties	
Housing	
Material	Aluminum, coated
Coating	White aluminum (similar to RAL 9006)
Front	
Frame	Aluminum (similar to RAL 9006), coated
Design	Black
Dimensions	
Width	560.5 mm
Height	344 mm
Weight	7300 g

1) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.

4.2.1.7.4 Dimensions



4.2.1.7.5 Temperature/Humidity diagram

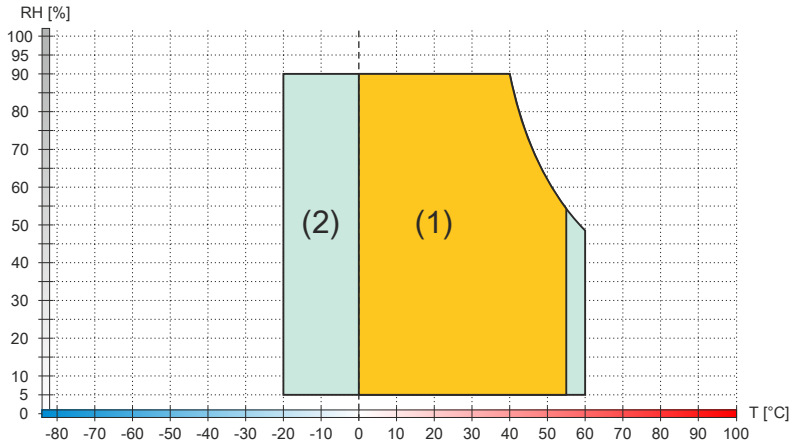


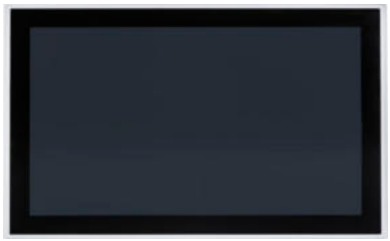
Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.8 5AP5130.240C-000

4.2.1.8.1 General information

- 24.0" TFT FHD color display
- Multi-touch (PCT)
- Flexible swing arm mounting or VESA
- IP65 protection with mounting unit 5ACCMA00.000x-000
- IP54 protection with mounting unit 5ACCMA00.010x-000
- IP10 protection with mounting unit 5ACCMA01.0100-000

4.2.1.8.2 Order data

Order number	Short description	Figure
	Panels	
5AP5130.240C-000	Automation Panel 24.0" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - For PPC2100 / PPC2200 / link modules	
	Optional accessories	
	Flanges	
5ACCFL00.0000-000	AP5000 flange - Swing arm rotary flange - For swing arm mounting unit	
5ACCFL00.0100-000	AP5000 flange - Swivel-tilt flange for swing arm - For swing arm mounting unit	
5ACCFL00.0200-000	AP5000 flange - Swing arm flange adapter - For Rittal - For swing arm mounting unit	
	Handles	
5ACCHD00.240C-000	AP5000 swing arm handles - For panel 5AP5130.240C-000	
	Mounting units	
5ACCMA00.0000-000	AP5000 swing arm mounting unit	
5ACCMA00.0001-000	AP5000 swing arm mounting unit - 1x rear USB interface	
5ACCMA00.0002-000	AP5000 swing arm mounting unit - 2x rear USB interface	
5ACCMA00.0100-000	HMI VESA IP54 mounting unit - Leak tightness is only provided with suitable cable grommets.	
5ACCMA00.0101-000	HMI VESA IP54 mounting unit w/USB - Leak tightness is only provided with suitable cable grommets.	
5ACCMA01.0100-000	AP5000 VESA mounting unit IP10/IP20 - IP20 with 5AP5120.*-000 - IP10 with 5AP5130.*-000, 5AP5230.*-000	

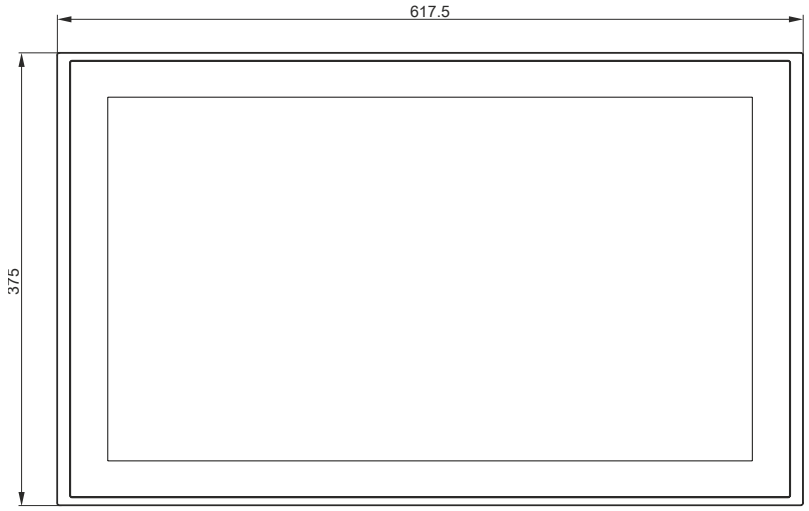
4.2.1.8.3 Technical data

Order number	5AP5130.240C-000
General information	
B&R ID code	0xE9CA
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
Display	
Type	TFT color
Diagonal	24.0"
Colors	16.7 million
Resolution	FHD, 1920 x 1080 pixels
Contrast	5000:1
Viewing angles	
Horizontal	Direction R = 89° / Direction L = 89°
Vertical	Direction U = 89° / Direction D = 89°
Backlight	
Type	LED
Brightness (dimmable)	Typ. 30 to 300 cd/m²
Half-brightness time [1)]	50,000 h
Touch screen	
Technology	Projected capacitive touch (PCT)
Transmittance	>90%
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	IP65 with mounting unit 5ACCMA00.000x-000 IP54 with mounting unit 5ACCMA00.010x-000
Degree of protection per UL 50	Type 4X indoor with mounting unit 5ACCMA00.000x-000 Type 1 with mounting unit 5ACCMA00.010x-000

Order number	5AP5130.240C-000
Mechanical properties	
Housing	
Material	Aluminum, coated
Coating	White aluminum (similar to RAL 9006)
Front	
Frame	Aluminum (similar to RAL 9006), coated
Design	Black
Dimensions	
Width	617.5 mm
Height	375 mm
Weight	8500 g

1) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.

4.2.1.8.4 Dimensions



4.2.1.8.5 Temperature/Humidity diagram

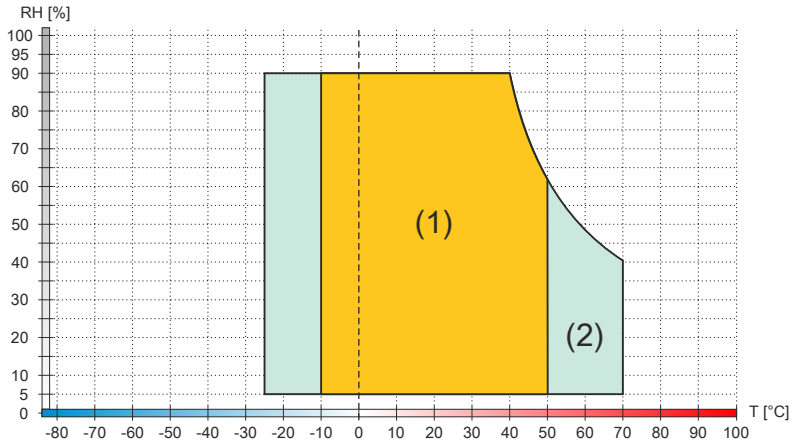


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.9 5AP5230.156B-000

4.2.1.9.1 General information

- 15.6" TFT HD color display
- Multi-touch (PCT)
- Possible to install expansion unit
- Flexible swing arm mounting or VESA
- IP65 protection with mounting unit 5ACCMA00.000x-000
- IP54 protection with mounting unit 5ACCMA00.010x-000
- IP10 protection with mounting unit 5ACCMA01.0100-000

4.2.1.9.2 Order data

Order number	Short description	Figure
	Panels	
5AP5230.156B-000	Automation Panel 15.6" HD TFT - 1366 x 768 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - Expansion option - For PPC2100 / PPC2200 / link modules	
	Optional accessories	
	Expansion units	
5ACCKP00.156B-000	AP5000 swing arm expansion option - Expansion cover - For built-in operating elements - 10x options for 22.3 mm built-in elements - For panel 5AP5230.156B/156C-000	
5ACCKP01.156B-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.156B/156C-000	
5ACCKP04.156B-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.156B/156C-000	
	Flanges	
5ACCFL00.0000-000	AP5000 flange - Swing arm rotary flange - For swing arm mounting unit	
5ACCFL00.0100-000	AP5000 flange - Swivel-tilt flange for swing arm - For swing arm mounting unit	
5ACCFL00.0200-000	AP5000 flange - Swing arm flange adapter - For Rittal - For swing arm mounting unit	
	Handles	
5ACCHD01.156B-000	AP5000 swing arm handles - For panel 5AP5230.156B/156C-000	
	Mounting units	
5ACCMA00.0000-000	AP5000 swing arm mounting unit	
5ACCMA00.0001-000	AP5000 swing arm mounting unit - 1x rear USB interface	
5ACCMA00.0002-000	AP5000 swing arm mounting unit - 2x rear USB interface	
5ACCMA00.0100-000	HMI VESA IP54 mounting unit - Leak tightness is only provided with suitable cable grommets.	
5ACCMA00.0101-000	HMI VESA IP54 mounting unit w/USB - Leak tightness is only provided with suitable cable grommets.	
5ACCMA01.0100-000	AP5000 VESA mounting unit IP10/IP20 - IP20 with 5AP5120.*-000 - IP10 with 5AP5130.*-000, 5AP5230.*-000	

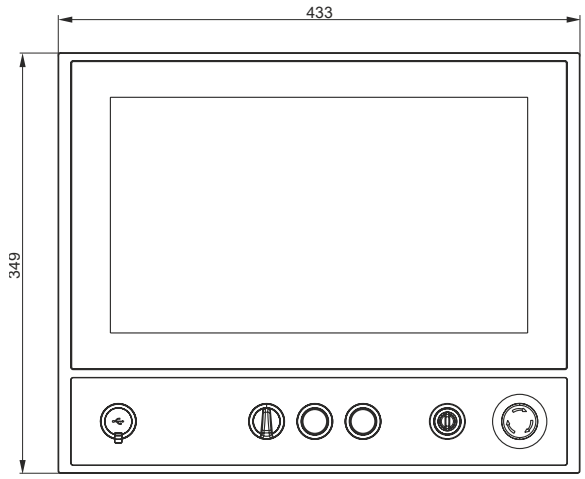
4.2.1.9.3 Technical data

Order number	5AP5230.156B-000
General information	
B&R ID code	0xE9F5
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
Display	
Type	TFT color
Diagonal	15.6"
Colors	16.7 million
Resolution	HD, 1366 x 768 pixels
Contrast	1000:1
Viewing angles	
Horizontal	Direction R = 85° / Direction L = 85°
Vertical	Direction U = 85° / Direction D = 85°

Order number	5AP5230.156B-000
Backlight	
Type	LED
Brightness (dimmable)	Typ. 40 to 400 cd/m²
Half-brightness time [1]	70,000 h
Touch screen	
Technology	Projected capacitive touch (PCT)
Transmittance	>90%
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	IP65 with mounting unit 5ACCMA00.000x-000 IP54 with mounting unit 5ACCMA00.010x-000
Degree of protection per UL 50	Type 4X indoor with mounting unit 5ACCMA00.000x-000 Type 1 with mounting unit 5ACCMA00.010x-000
Mechanical properties	
Housing	
Material	Aluminum, coated
Coating	White aluminum (similar to RAL 9006)
Front	
Frame	Aluminum (similar to RAL 9006), coated
Design	Black
Dimensions	
Width	433 mm
Height	349 mm
Weight	6400 g

1) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.

4.2.1.9.4 Dimensions



4.2.1.9.5 Temperature/Humidity diagram

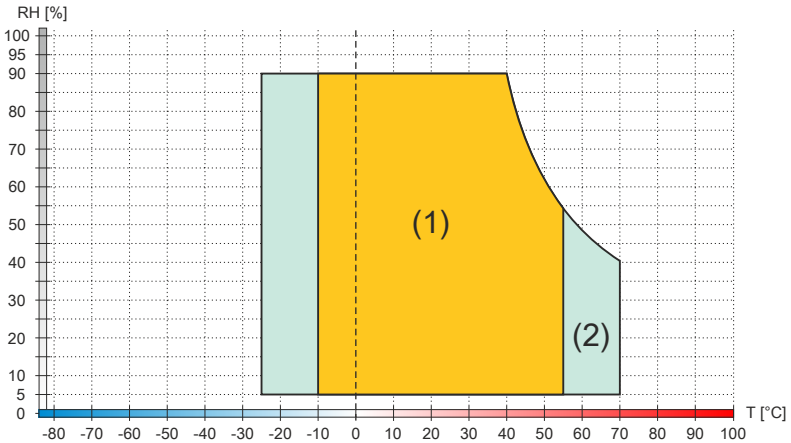


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.10 5AP5230.156C-000

4.2.1.10.1 General information

- 15.6" TFT FHD color display
- Multi-touch (PCT)
- Possible to install expansion unit
- Flexible swing arm mounting or VESA
- IP65 protection with mounting unit 5ACCMA00.000x-000
- IP54 protection with mounting unit 5ACCMA00.010x-000
- IP10 protection with mounting unit 5ACCMA01.0100-000

4.2.1.10.2 Order data

Order number	Short description	Figure
	Panels	
5AP5230.156C-000	Automation Panel 15.6" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - Expansion option - For PPC2100 / PPC2200 / link modules	
	Optional accessories	
	Expansion units	
5ACCKP00.156B-000	AP5000 swing arm expansion option - Expansion cover - For built-in operating elements - 10x options for 22.3 mm built-in elements - For panel 5AP5230.156B/156C-000	
5ACCKP01.156B-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.156B/156C-000	
5ACCKP04.156B-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.156B/156C-000	
	Flanges	
5ACCFL00.0000-000	AP5000 flange - Swing arm rotary flange - For swing arm mounting unit	
5ACCFL00.0100-000	AP5000 flange - Swivel-tilt flange for swing arm - For swing arm mounting unit	
5ACCFL00.0200-000	AP5000 flange - Swing arm flange adapter - For Rittal - For swing arm mounting unit	
	Handles	
5ACCHD01.156B-000	AP5000 swing arm handles - For panel 5AP5230.156B/156C-000	
	Mounting units	
5ACCMA00.0000-000	AP5000 swing arm mounting unit	
5ACCMA00.0001-000	AP5000 swing arm mounting unit - 1x rear USB interface	
5ACCMA00.0002-000	AP5000 swing arm mounting unit - 2x rear USB interface	
5ACCMA00.0100-000	HMI VESA IP54 mounting unit - Leak tightness is only provided with suitable cable grommets.	
5ACCMA00.0101-000	HMI VESA IP54 mounting unit w/USB - Leak tightness is only provided with suitable cable grommets.	
5ACCMA01.0100-000	AP5000 VESA mounting unit IP10/IP20 - IP20 with 5AP5120.*-000 - IP10 with 5AP5130.*-000, 5AP5230.*-000	

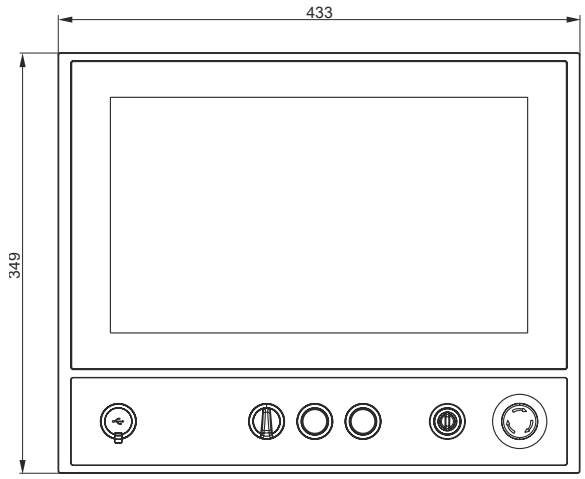
4.2.1.10.3 Technical data

Order number	5AP5230.156C-000
General information	
B&R ID code	0xF24B
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
CE	Yes
Display	
Type	TFT color
Diagonal	15.6"
Colors	16.7 million
Resolution	FHD, 1920 x 1080 pixels
Contrast	1500:1
Viewing angles	
Horizontal	Direction R = 85° / Direction L = 85°
Vertical	Direction U = 85° / Direction D = 85°

Order number	5AP5230.156C-000
Backlight	
Type	LED
Brightness (dimmable)	Typ. 40 to 400 cd/m²
Half-brightness time	70,000 h [1]
Touch screen	
Technology	Projected capacitive touch (PCT)
Transmittance	>90%
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	IP65 with mounting unit 5ACCMA00.000x-000 IP54 with mounting unit 5ACCMA00.010x-000
Degree of protection per UL 50	Type 4X indoor with mounting unit 5ACCMA00.000x-000 Type 1 with mounting unit 5ACCMA00.010x-000
Mechanical properties	
Housing	
Material	Aluminum, coated
Coating	White aluminum (similar to RAL 9006)
Front	
Frame	Aluminum (similar to RAL 9006), coated
Design	Black
Dimensions	
Width	433 mm
Height	349 mm
Weight	6400 g

1) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.

4.2.1.10.4 Dimensions



4.2.1.10.5 Temperature/Humidity diagram

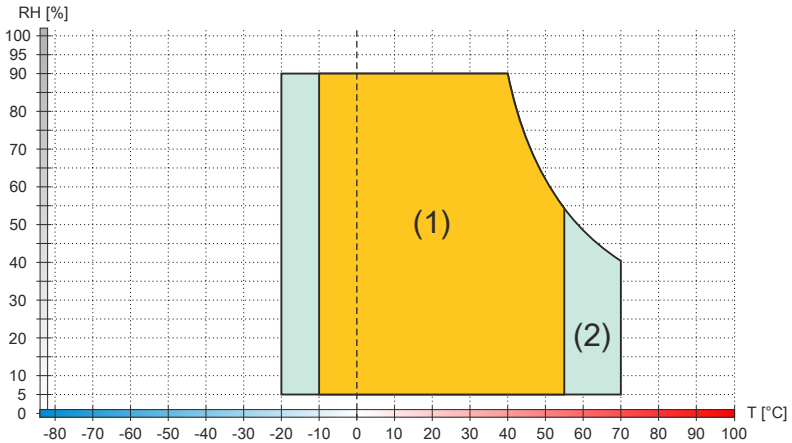


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.11 5AP5230.185B-000

4.2.1.11.1 General information

- 18.5" TFT HD color display
- Multi-touch (PCT)
- Possible to install expansion unit
- Flexible swing arm mounting or VESA
- IP65 protection with mounting unit 5ACCMA00.000x-000
- IP54 protection with mounting unit 5ACCMA00.010x-000
- IP10 protection with mounting unit 5ACCMA01.0100-000

4.2.1.11.2 Order data

Order number	Short description	Figure
	Panels	
5AP5230.185B-000	Automation Panel 18.5" HD TFT - 1366 x 768 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - Expansion option - For PPC2100 / PPC2200 / link modules	
	Optional accessories	
	Expansion units	
5ACCKP00.185B-000	AP5000 swing arm expansion option - Expansion cover - For built-in operating elements - 11x options for 22.3 mm built-in elements - For panel 5AP5230.185B/185C-000	
5ACCKP01.185B-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.185B/185C-000	
5ACCKP03.185B-000	AP5000 swing arm expansion option - Expansion unit - 1x RFID read/write unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.185B/185C-000	
5ACCKP04.185B-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.185B/185C-000	
5ACCKP05.185B-000	AP5000 swing arm expansion option - Expansion unit - 1x RFID read/write unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.185B/185C-000	
	Flanges	
5ACCFL00.0000-000	AP5000 flange - Swing arm rotary flange - For swing arm mounting unit	
5ACCFL00.0100-000	AP5000 flange - Swivel-tilt flange for swing arm - For swing arm mounting unit	
5ACCFL00.0200-000	AP5000 flange - Swing arm flange adapter - For Rittal - For swing arm mounting unit	
	Handles	
5ACCHD01.185B-000	AP5000 swing arm handles - For panel 5AP5230.185B/185C-000	
	Mounting units	
5ACCMA00.0000-000	AP5000 swing arm mounting unit	
5ACCMA00.0001-000	AP5000 swing arm mounting unit - 1x rear USB interface	
5ACCMA00.0002-000	AP5000 swing arm mounting unit - 2x rear USB interface	
5ACCMA00.0100-000	HMI VESA IP54 mounting unit - Leak tightness is only provided with suitable cable grommets.	
5ACCMA00.0101-000	HMI VESA IP54 mounting unit w/USB - Leak tightness is only provided with suitable cable grommets.	
5ACCMA01.0100-000	AP5000 VESA mounting unit IP10/IP20 - IP20 with 5AP5120.*-000 - IP10 with 5AP5130.*-000, 5AP5230.*-000	

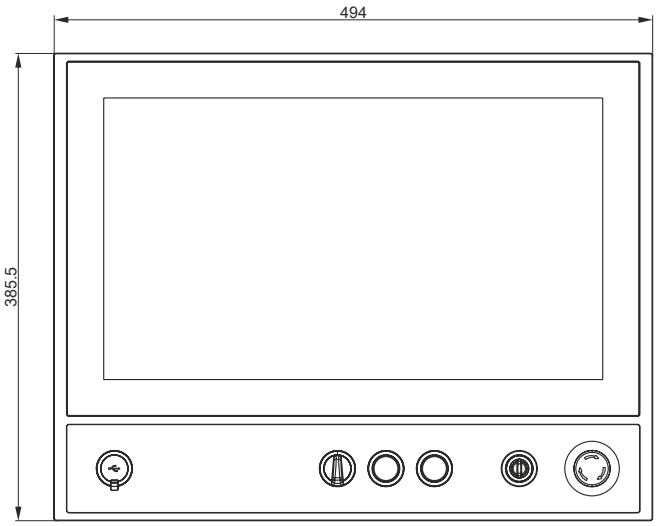
4.2.1.11.3 Technical data

Order number	5AP5230.185B-000
General information	
B&R ID code	0xE9F6
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
Display	
Type	TFT color
Diagonal	18.5"

Order number	5AP5230.185B-000
Colors	16.7 million
Resolution	HD, 1366 x 768 pixels
Contrast	1000:1
Viewing angles	
Horizontal	Direction R = 85° / Direction L = 85°
Vertical	Direction U = 80° / Direction D = 80°
Backlight	
Type	LED
Brightness (dimmable)	Rev. J0 and later: Typ. 15 to 450 cd/m² Up to Rev. I0: Typ. 15 to 300 cd/m²
Half-brightness time [1]	50,000 h
Touch screen	
Technology	Projected capacitive touch (PCT)
Transmittance	>90%
Slots	
Expansion unit	Yes
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	IP65 with mounting unit 5ACCMA00.000x-000 IP54 with mounting unit 5ACCMA00.010x-000
Degree of protection per UL 50	Type 4X indoor with mounting unit 5ACCMA00.000x-000 Type 1 with mounting unit 5ACCMA00.010x-000
Mechanical properties	
Housing	
Material	Aluminum, coated
Coating	White aluminum (similar to RAL 9006)
Front	
Frame	Aluminum (similar to RAL 9006), coated
Design	Black
Dimensions	
Width	494 mm
Height	385.5 mm
Weight	Rev. J0 and later: 7920 g Up to Rev. I0: 8300 g

1) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.

4.2.1.11.4 Dimensions



4.2.1.11.5 Temperature/Humidity diagram

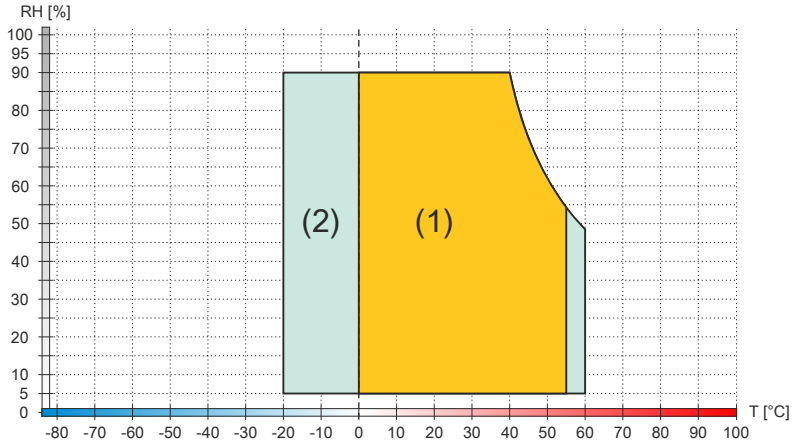


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.12 5AP5230.185C-000

4.2.1.12.1 General information

- 18.5" TFT FHD color display
- Multi-touch (PCT)
- Possible to install expansion unit
- Flexible swing arm mounting or VESA
- IP65 protection with mounting unit 5ACCMA00.000x-000
- IP54 protection with mounting unit 5ACCMA00.010x-000
- IP10 protection with mounting unit 5ACCMA01.0100-000

4.2.1.12.2 Order data

Order number	Short description	Figure
	Panels	
5AP5230.185C-000	Automation Panel 18.5" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - Expansion option - For PPC2100 / PPC2200 / link modules	
	Optional accessories	
	Expansion units	
5ACCKP00.185B-000	AP5000 swing arm expansion option - Expansion cover - For built-in operating elements - 11x options for 22.3 mm built-in elements - For panel 5AP5230.185B/185C-000	
5ACCKP01.185B-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.185B/185C-000	
5ACCKP03.185B-000	AP5000 swing arm expansion option - Expansion unit - 1x RFID read/write unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.185B/185C-000	
5ACCKP04.185B-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.185B/185C-000	
5ACCKP05.185B-000	AP5000 swing arm expansion option - Expansion unit - 1x RFID read/write unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.185B/185C-000	
	Flanges	
5ACCFL00.0000-000	AP5000 flange - Swing arm rotary flange - For swing arm mounting unit	
5ACCFL00.0100-000	AP5000 flange - Swivel-tilt flange for swing arm - For swing arm mounting unit	
5ACCFL00.0200-000	AP5000 flange - Swing arm flange adapter - For Rittal - For swing arm mounting unit	
	Handles	
5ACCHD01.185B-000	AP5000 swing arm handles - For panel 5AP5230.185B/185C-000	
	Mounting units	
5ACCMA00.0000-000	AP5000 swing arm mounting unit	
5ACCMA00.0001-000	AP5000 swing arm mounting unit - 1x rear USB interface	
5ACCMA00.0002-000	AP5000 swing arm mounting unit - 2x rear USB interface	
5ACCMA00.0100-000	HMI VESA IP54 mounting unit - Leak tightness is only provided with suitable cable grommets.	
5ACCMA00.0101-000	HMI VESA IP54 mounting unit w/USB - Leak tightness is only provided with suitable cable grommets.	
5ACCMA01.0100-000	AP5000 VESA mounting unit IP10/IP20 - IP20 with 5AP5120.*-000 - IP10 with 5AP5130.*-000, 5AP5230.*-000	

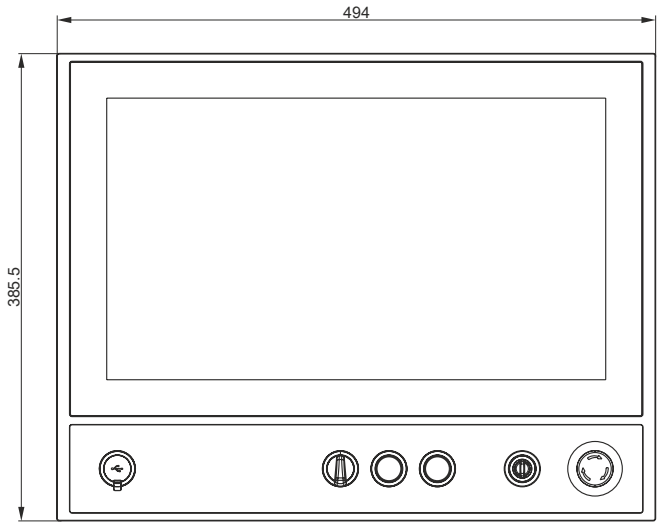
4.2.1.12.3 Technical data

Order number	5AP5230.185C-000
General information	
B&R ID code	0xF24D
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
Display	
Type	TFT color
Diagonal	18.5"

Order number	5AP5230.185C-000
Colors	16.7 million
Resolution	FHD, 1920 x 1080
Contrast	1500:1
Viewing angles	
Horizontal	Direction R = 85° / Direction L = 85°
Vertical	Direction U = 85° / Direction D = 85°
Backlight	
Type	LED
Brightness (dimmable)	Typ. 40 to 400 cd/m²
Half-brightness time	50,000 h [1)]
Touch screen	
Technology	Projected capacitive touch (PCT)
Transmittance	>90%
Slots	
Expansion unit	Yes
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	IP65 with mounting unit 5ACCMA00.000x-000 IP54 with mounting unit 5ACCMA00.010x-000
Degree of protection per UL 50	Type 4X indoor with mounting unit 5ACCMA00.000x-000 Type 1 with mounting unit 5ACCMA00.010x-000
Mechanical properties	
Housing	
Material	Aluminum, coated
Coating	White aluminum (similar to RAL 9006)
Front	
Frame	Aluminum (similar to RAL 9006)
Design	Black
Dimensions	
Width	494 mm
Height	385.5 mm
Weight	8300 g

1) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.

4.2.1.12.4 Dimensions



4.2.1.12.5 Temperature/Humidity diagram

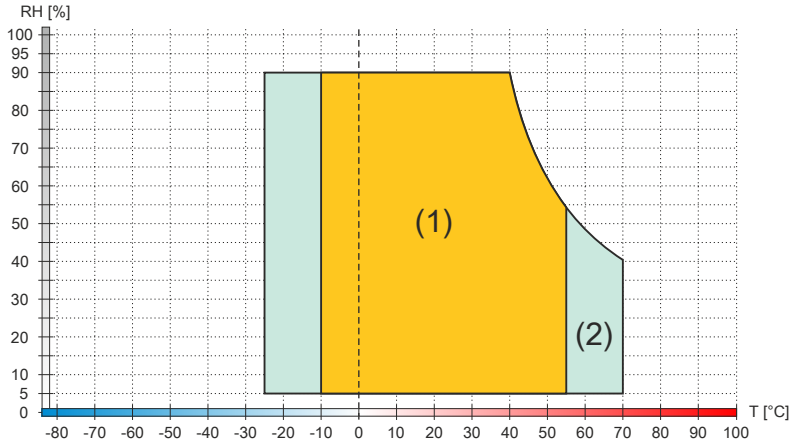


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.13 5AP5230.215C-000

4.2.1.13.1 General information

- 21.5" TFT FHD color display
- Multi-touch (PCT)
- Possible to install expansion unit
- Flexible swing arm mounting or VESA
- IP65 protection with mounting unit 5ACCMA00.000x-000
- IP54 protection with mounting unit 5ACCMA00.010x-000
- IP10 protection with mounting unit 5ACCMA01.0100-000

4.2.1.13.2 Order data

Order number	Short description	Figure
	Panels	
5AP5230.215C-000	Automation Panel 21.5" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - Expansion option - For PPC2100 / PPC2200 / link modules	
	Optional accessories	
	Expansion units	
5ACCKP00.215C-000	AP5000 swing arm expansion option - Expansion cover - For built-in operating elements - 13x options for 22.3 mm built-in elements - For panel 5AP5230.215C-000	
5ACCKP01.215C-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.215C-000	
5ACCKP03.215C-000	AP5000 swing arm expansion option - Expansion unit - 1x RFID read/write unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.215C-000	
5ACCKP04.215C-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.215C-000	
5ACCKP05.215C-000	AP5000 swing arm expansion option - Expansion unit - 1x RFID read/write unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.215C-000	
	Flanges	
5ACCFL00.0000-000	AP5000 flange - Swing arm rotary flange - For swing arm mounting unit	
5ACCFL00.0100-000	AP5000 flange - Swivel-tilt flange for swing arm - For swing arm mounting unit	
5ACCFL00.0200-000	AP5000 flange - Swing arm flange adapter - For Rittal - For swing arm mounting unit	
	Handles	
5ACCHD01.215C-000	AP5000 swing arm handles - For panel 5AP5230.215C-000	
	Mounting units	
5ACCMA00.0000-000	AP5000 swing arm mounting unit	
5ACCMA00.0001-000	AP5000 swing arm mounting unit - 1x rear USB interface	
5ACCMA00.0002-000	AP5000 swing arm mounting unit - 2x rear USB interface	
5ACCMA00.0100-000	HMI VESA IP54 mounting unit - Leak tightness is only provided with suitable cable grommets.	
5ACCMA00.0101-000	HMI VESA IP54 mounting unit w/USB - Leak tightness is only provided with suitable cable grommets.	
5ACCMA01.0100-000	AP5000 VESA mounting unit IP10/IP20 - IP20 with 5AP5120.*-000 - IP10 with 5AP5130.*-000, 5AP5230.*-000	

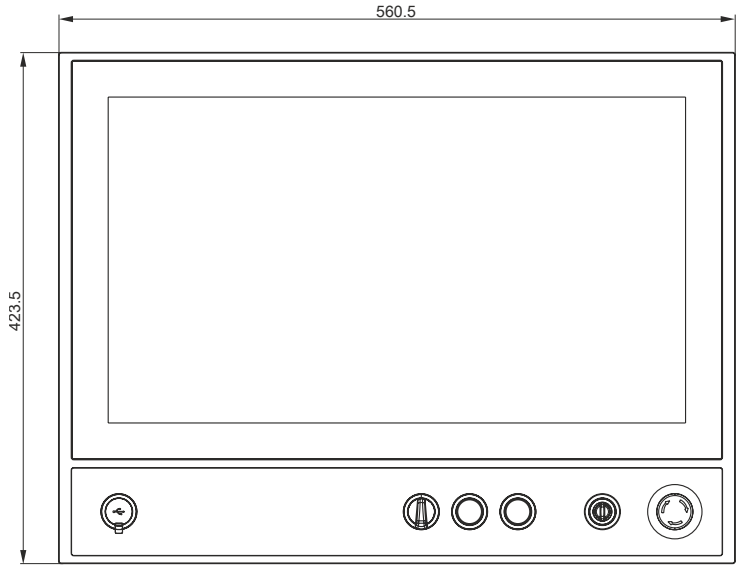
4.2.1.13.3 Technical data

Order number	5AP5230.215C-000
General information	
B&R ID code	0xE9F7
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
Display	
Type	TFT color
Diagonal	21.5"
Colors	16.7 million
Resolution	FHD, 1920 x 1080 pixels

Order number	5AP5230.215C-000
Contrast	5000:1
Viewing angles	
Horizontal	Direction R = 89° / Direction L = 89°
Vertical	Direction U = 89° / Direction D = 89°
Backlight	
Type	LED
Brightness (dimmable)	Typ. 12.5 to 250 cd/m²
Half-brightness time [1]	30,000 h
Touch screen	
Technology	Projected capacitive touch (PCT)
Transmittance	>90%
Slots	
Expansion unit	Yes
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	IP65 with mounting unit 5ACCMA00.000x-000 IP54 with mounting unit 5ACCMA00.010x-000
Degree of protection per UL 50	Type 4X indoor with mounting unit 5ACCMA00.000x-000 Type 1 with mounting unit 5ACCMA00.010x-000
Mechanical properties	
Housing	
Material	Aluminum, coated
Coating	White aluminum (similar to RAL 9006)
Front	
Frame	Aluminum (similar to RAL 9006), coated
Design	Black
Dimensions	
Width	560.5 mm
Height	423.5 mm
Weight	8900 g

1) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.

4.2.1.13.4 Dimensions



4.2.1.13.5 Temperature/Humidity diagram

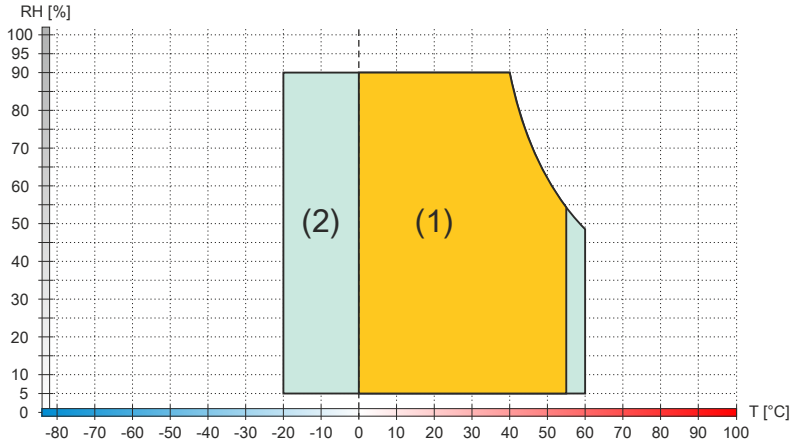


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

AbN
automation

4.2.1.14 5AP5230.215I-000

4.2.1.14.1 General information

- 21.5" TFT FHD color display
- Multi-touch (PCT)
- Possible to install expansion unit
- Flexible swing arm mounting or VESA
- IP65 protection with mounting unit 5ACCMA00.000x-000
- IP54 protection with mounting unit 5ACCMA00.010x-000
- IP10 protection with mounting unit 5ACCMA01.0100-000

4.2.1.14.2 Order data

Order number	Short description	Figure
	Panels	
5AP5230.215I-000	Automation Panel 21.5" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Portrait format - Expansion option - For PPC2100 / PPC2200 / link modules	
	Optional accessories	
	Expansion units	
5ACCKP00.215I-000	AP5000 swing arm expansion option - Expansion cover - For built-in operating elements - 7x options for 22.3 mm built-in elements - For panel 5AP5230.215I-000	
5ACCKP01.215I-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.215I-000	
5ACCKP04.215I-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.215I-000	
	Flanges	
5ACCFL00.0000-000	AP5000 flange - Swing arm rotary flange - For swing arm mounting unit	
5ACCFL00.0100-000	AP5000 flange - Swivel-tilt flange for swing arm - For swing arm mounting unit	
5ACCFL00.0200-000	AP5000 flange - Swing arm flange adapter - For Rittal - For swing arm mounting unit	
	Handles	
5ACCHD01.215I-000	AP5000 swing arm handles - For panel 5AP5230.215I-000	
	Mounting units	
5ACCMA00.0000-000	AP5000 swing arm mounting unit	
5ACCMA00.0001-000	AP5000 swing arm mounting unit - 1x rear USB interface	
5ACCMA00.0002-000	AP5000 swing arm mounting unit - 2x rear USB interface	
5ACCMA00.0100-000	HMI VESA IP54 mounting unit - Leak tightness is only provided with suitable cable grommets.	
5ACCMA00.0101-000	HMI VESA IP54 mounting unit w/USB - Leak tightness is only provided with suitable cable grommets.	
5ACCMA01.0100-000	AP5000 VESA mounting unit IP10/IP20 - IP20 with 5AP5120.*-000 - IP10 with 5AP5130.*-000, 5AP5230.*-000	

4.2.1.14.3 Technical data

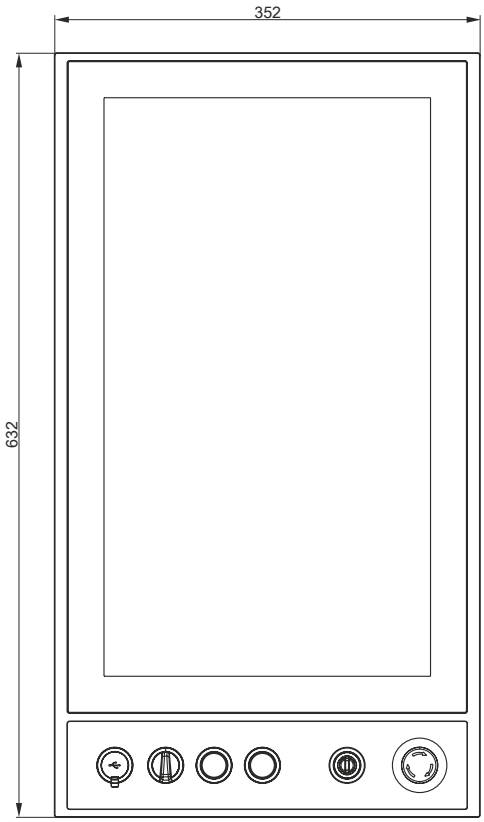
Order number	5AP5230.215I-000
General information	
B&R ID code	0xE9F8
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
Display	
Type	TFT color
Diagonal	21.5"
Colors	16.7 million
Resolution	FHD, 1920 × 1080 pixels
Contrast	5000:1
Viewing angles	
Horizontal	Direction R = 89° / Direction L = 89°
Vertical	Direction U = 89° / Direction D = 89°

Technical data

Order number	5AP5230.215I-000
Backlight	
Type	LED
Brightness (dimmable)	Typ. 12.5 to 250 cd/m²
Half-brightness time [1]	30,000 h
Touch screen	
Technology	Projected capacitive touch (PCT)
Transmittance	>90%
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	IP65 with mounting unit 5ACCMA00.000x-000 IP54 with mounting unit 5ACCMA00.010x-000
Degree of protection per UL 50	Type 4X indoor with mounting unit 5ACCMA00.000x-000 Type 1 with mounting unit 5ACCMA00.010x-000
Mechanical properties	
Housing	
Material	Aluminum, coated
Coating	White aluminum (similar to RAL 9006)
Front	
Frame	Aluminum (similar to RAL 9006), coated
Design	Black
Dimensions	
Width	352 mm
Height	632 mm
Weight	9,600 g

1) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.

4.2.1.14.4 Dimensions



4.2.1.14.5 Temperature/Humidity diagram

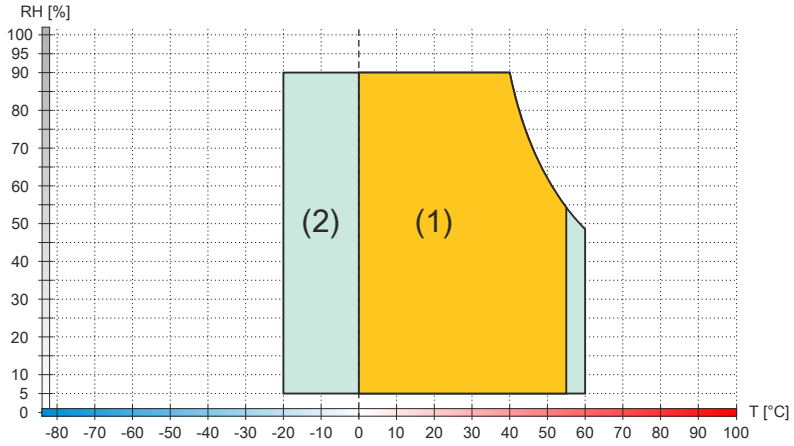


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.1.15 5AP5230.240C-000

4.2.1.15.1 General information

- 24.0" TFT FHD color display
- Multi-touch (PCT)
- Possible to install expansion unit
- Flexible swing arm mounting or VESA
- IP65 protection with mounting unit 5ACCMA00.000x-000
- IP54 protection with mounting unit 5ACCMA00.010x-000
- IP10 protection with mounting unit 5ACCMA01.0100-000

4.2.1.15.2 Order data

Order number	Short description	Figure
	Panels	
5AP5230.240C-000	Automation Panel 24.0" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - Expansion option - For PPC2100 / PPC2200 / link modules	
	Optional accessories	
	Expansion units	
5ACCKP00.240C-000	AP5000 swing arm expansion option - Expansion cover - For built-in operating elements - 14x options for 22.3 mm built-in elements - For panel 5AP5230.240C-000	
5ACCKP01.240C-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.240C-000	
5ACCKP03.240C-000	AP5000 swing arm expansion option - Expansion unit - 1x RFID read/write unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.240C-000	
5ACCKP04.240C-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.240C-000	
5ACCKP05.240C-000	AP5000 swing arm expansion option - Expansion unit - 1x RFID read/write unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.240C-000	
	Flanges	
5ACCFL00.0000-000	AP5000 flange - Swing arm rotary flange - For swing arm mounting unit	
5ACCFL00.0100-000	AP5000 flange - Swivel-tilt flange for swing arm - For swing arm mounting unit	
5ACCFL00.0200-000	AP5000 flange - Swing arm flange adapter - For Rittal - For swing arm mounting unit	
	Handles	
5ACCHD01.240C-000	AP5000 swing arm handles - For panel 5AP5230.240C-000	
	Mounting units	
5ACCMA00.0000-000	AP5000 swing arm mounting unit	
5ACCMA00.0001-000	AP5000 swing arm mounting unit - 1x rear USB interface	
5ACCMA00.0002-000	AP5000 swing arm mounting unit - 2x rear USB interface	
5ACCMA00.0100-000	HMI VESA IP54 mounting unit - Leak tightness is only provided with suitable cable grommets.	
5ACCMA00.0101-000	HMI VESA IP54 mounting unit w/USB - Leak tightness is only provided with suitable cable grommets.	
5ACCMA01.0100-000	AP5000 VESA mounting unit IP10/IP20 - IP20 with 5AP5120.*-000 - IP10 with 5AP5130.*-000, 5AP5230.*-000	

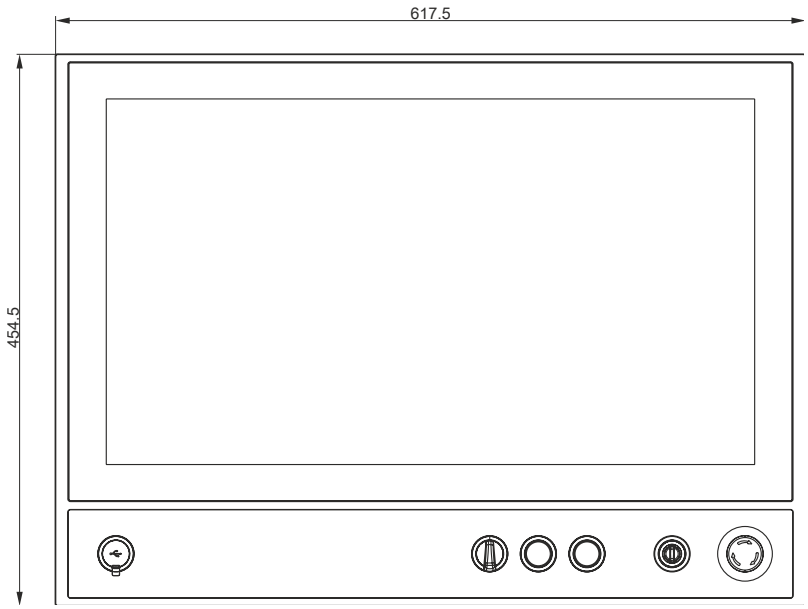
4.2.1.15.3 Technical data

Order number	5AP5230.240C-000
General information	
B&R ID code	0xE9F9
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
Display	
Type	TFT color
Diagonal	24.0"
Colors	16.7 million

Order number	5AP5230.240C-000
Resolution	FHD, 1920 x 1080 pixels
Contrast	5000:1
Viewing angles	
Horizontal	Direction R = 89° / Direction L = 89°
Vertical	Direction U = 89° / Direction D = 89°
Backlight	
Type	LED
Brightness (dimmable)	Typ. 30 to 300 cd/m²
Half-brightness time [1]	50,000 h
Touch screen	
Technology	Projected capacitive touch (PCT)
Transmittance	>90%
Slots	
Expansion unit	Yes
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	IP65 with mounting unit 5ACCMA00.000x-000 IP54 with mounting unit 5ACCMA00.010x-000
Degree of protection per UL 50	Type 4X indoor with mounting unit 5ACCMA00.000x-000 Type 1 with mounting unit 5ACCMA00.010x-000
Mechanical properties	
Housing	
Material	Aluminum, coated
Coating	White aluminum (similar to RAL 9006)
Front	
Frame	Aluminum (similar to RAL 9006), coated
Design	Black
Dimensions	
Width	617.5 mm
Height	454.5 mm
Weight	10300 g

1) At 25°C ambient temperature. Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.

4.2.1.15.4 Dimensions



4.2.1.15.5 Temperature/Humidity diagram

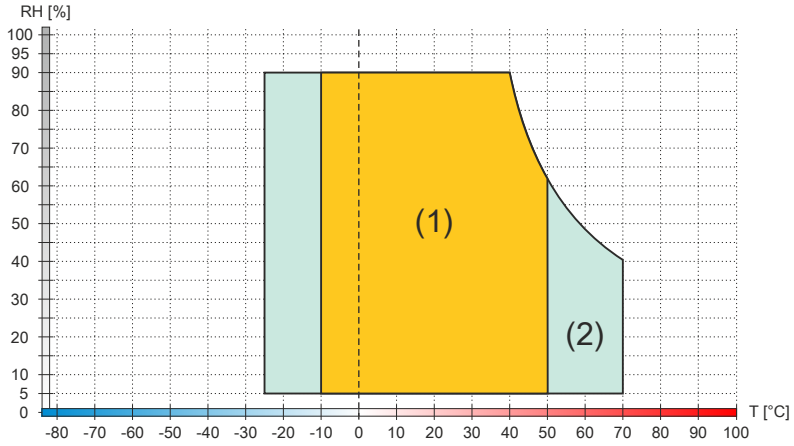


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

4.2.2 Link modules

4.2.2.1 5DLDPO.1001-00

4.2.2.1.1 General information

- Link module for Automation Panel 933/1130/5130 and 5230 (only with 5ACCKP00.xxxx-000)
- 1x DisplayPort interface
- 1x USB In (USB 2.0 type B)
- 2x USB 2.0 type A
- 1x OSD control panel
- Compatible with the APC910, APC3100 and APC4100

4.2.2.1.2 Order data

Order number	Short description	Figure
	Link modules	
5DLDPO.1001-00	Automation Panel link module - DisplayPort receiver - For Automation Panel 933/1130 - For Automation Panel 5130 - For Automation Panel 5230 (only with 5ACCKP00.xxxx-000)	
	Required accessories	
	Accessories	
0TB103.9	Connector 24 VDC - 3-pin, female - Screw clamp terminal block 3.31 mm²	
0TB103.91	Connector 24 VDC - 3-pin, female - Cage clamp terminal block 3.31 mm²	
	Optional accessories	
	DisplayPort cables	
5CADPO.0018-00	DisplayPort cable 1.8 m	
5CADPO.0050-00	DisplayPort cable 5 m	
5CADPO.0075-00	DisplayPort cable 7.5 m	
	USB cables	
5CAUSB.0018-00	USB 2.0 connection cable - Type A - type B connector - 1.8 m	
5CAUSB.0050-00	USB 2.0 connection cable - Type A - type B connector - 5 m	
5CAUSB.0075-00	USB 2.0 connection cable - Type A - type B connector - 7.5 m	

4.2.2.1.3 Technical data

Order number	5DLDPO.1001-00
General information	
LEDs	Status, Link
B&R ID code	0x2F1A
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
Interfaces	
USB	
Quantity	3
Type	USB 2.0
Variant	2x type A, 1x type B
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (480 Mbit/s)
Current-carrying capacity	Total max. 1 A [1)]
Panel In	
Quantity	1
Variant	DisplayPort
Electrical properties	
Nominal voltage	24 VDC, SELV [2)]
Nominal current	Max. 2.3 A [3)]
Operating voltage	24 VDC ±25%
Overvoltage category per EN 61131-2	II
Galvanic isolation	Yes
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2

Technical data

Order number	5DLDPO.1001-00
Mechanical properties	
Dimensions	
Width	190 mm
Height	110 mm
Depth	23.6 mm
Weight	490 g

1) For the 2 USB type A female connectors.
2) IEC 61010-2-201 requirements must be observed.
3) The maximum ambient temperature for the DisplayPort link module is limited to 50°C at a maximum nominal current of 2.3 A. At a continuous nominal current of max. 2.0 A, the specified max. ambient temperature applies.

4.2.2.2 5DLSD4.1001-00

4.2.2.2.1 General information

- Link module for Automation Panel 9x3/1000/5000
- 1x SDL4 Panel In interface
- 2x USB 2.0 type A

4.2.2.2.2 Order data

Order number	Short description	Figure
	Link modules	
5DLSD4.1001-00	Automation Panel link module - SDL4 receiver - For Automation Panel 923/933/1000 - For Automation Panel 5000	
	Required accessories	
	Accessories	
0TB103.9	Connector 24 VDC - 3-pin, female - Screw clamp terminal block 3.31 mm²	
0TB103.91	Connector 24 VDC - 3-pin, female - Cage clamp terminal block 3.31 mm²	
	Optional accessories	
	SDL3/SDL4/PoE cables	
5CASD3.0010-00	SDL3/SDL4/FT50 cable - 1 m - FT50 including Power over Ethernet	
5CASD3.0030-00	SDL3/SDL4/FT50 cable - 3 m - FT50 including Power over Ethernet	
5CASD3.0050-00	SDL3/SDL4/FT50 cable - 5 m - FT50 including Power over Ethernet	
5CASD3.0070-00	SDL3/SDL4/FT50 cable - 7 m - FT50 including Power over Ethernet	
5CASD3.0100-00	SDL3/SDL4/FT50 cable - 10 m - FT50 including Power over Ethernet	
5CASD3.0150-00	SDL3/SDL4/FT50 cable - 15 m - FT50 including Power over Ethernet	
5CASD3.0200-00	SDL3/SDL4/FT50 cable - 20 m - FT50 including Power over Ethernet	
5CASD3.0300-00	SDL3/SDL4/FT50 cable - 30 m - FT50 including Power over Ethernet	
5CASD3.0500-00	SDL3/SDL4/FT50 cable - 50 m - FT50 including Power over Ethernet	
5CASD3.1000-00	SDL3/SDL4/FT50 cable - 100 m - FT50 including Power over Ethernet	

4.2.2.2.3 Technical data

Order number	5DLSD4.1001-00
General information	
LEDs	Status, Link
B&R ID code	0xECE3
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4
Interfaces	
USB	
Quantity	2
Type	USB 2.0
Variant	2x type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (150 Mbit/s)
Current-carrying capacity	Total max. 1 A
SDL4 In	
Variant	RJ45, shielded
Type	SDL4
Electrical properties	
Nominal voltage	24 VDC, SELV [1)]
Nominal current	Max. 3 A
Operating voltage	24 VDC ±25%
Overvoltage category per EN 61131-2	II
Galvanic isolation	Yes
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2

Technical data

Order number	5DLSD4.1001-00
Mechanical properties	
Dimensions	
Width	190 mm
Height	110 mm
Depth	23.6 mm
Weight	525 g

1) IEC 61010-2-201 requirements must be observed.

4.2.2.3 5DLSD3.1001-00

4.2.2.3.1 General information

- Link module for Automation Panel 9x3/1000/5000
- 1x SDL3 Panel In interface
- 2x USB 2.0 type A

4.2.2.3.2 Order data

Order number	Short description	Figure
	Link modules	
5DLSD3.1001-00	Automation Panel link module - SDL3 receiver - For Automation Panel 923/933/1000 - For Automation Panel 5000	
	Required accessories	
	Accessories	
0TB103.9	Connector 24 VDC - 3-pin, female - Screw clamp terminal block 3.31 mm²	
0TB103.91	Connector 24 VDC - 3-pin, female - Cage clamp terminal block 3.31 mm²	
	Optional accessories	
	SDL3/SDL4/PoE cables	
5CASD3.0010-00	SDL3/SDL4/FT50 cable - 1 m - FT50 including Power over Ethernet	
5CASD3.0030-00	SDL3/SDL4/FT50 cable - 3 m - FT50 including Power over Ethernet	
5CASD3.0050-00	SDL3/SDL4/FT50 cable - 5 m - FT50 including Power over Ethernet	
5CASD3.0070-00	SDL3/SDL4/FT50 cable - 7 m - FT50 including Power over Ethernet	
5CASD3.0100-00	SDL3/SDL4/FT50 cable - 10 m - FT50 including Power over Ethernet	
5CASD3.0150-00	SDL3/SDL4/FT50 cable - 15 m - FT50 including Power over Ethernet	
5CASD3.0200-00	SDL3/SDL4/FT50 cable - 20 m - FT50 including Power over Ethernet	
5CASD3.0300-00	SDL3/SDL4/FT50 cable - 30 m - FT50 including Power over Ethernet	
5CASD3.0500-00	SDL3/SDL4/FT50 cable - 50 m - FT50 including Power over Ethernet	
5CASD3.1000-00	SDL3/SDL4/FT50 cable - 100 m - FT50 including Power over Ethernet	

4.2.2.3.3 Technical data

Order number	5DLSD3.1001-00
General information	
LEDs	Status, Link
B&R ID code	0xE3FC
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4
Interfaces	
USB	
Quantity	2
Type	USB 2.0
Variant	2x type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (30 Mbit/s)
Current-carrying capacity	Total max. 1 A
SDL3 In	
Variant	RJ45, shielded
Type	SDL3
Electrical properties	
Nominal voltage	24 VDC, SELV [1)]
Nominal current	Max. 3 A
Operating voltage	24 VDC ±25%
Overvoltage category per EN 61131-2	II
Galvanic isolation	Yes
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2

Technical data

Order number	5DLSD3.1001-00
Mechanical properties	
Dimensions	
Width	190 mm
Height	110 mm
Depth	23.6 mm
Weight	527 g

1) IEC 61010-2-201 requirements must be observed.

4.2.2.4 5DLSDL.1001-00

4.2.2.4.1 General information

- Link module for Automation Panel 9x3/1000/5000
- 1x SDL/DVI Panel In interface
- 2x USB 2.0 type A
- 1x USB In (USB type B)
- 1x RS232 interface
- Display brightness buttons

4.2.2.4.2 Order data

Order number	Short description	Figure
	Link modules	
5DLSDL.1001-00	Automation Panel link module - SDL/DVI receiver - For Automation Panel 923/933/1000 - For Automation Panel 5000	
	Required accessories	
	Accessories	
0TB103.9	Connector 24 VDC - 3-pin, female - Screw clamp terminal block 3.31 mm²	
0TB103.91	Connector 24 VDC - 3-pin, female - Cage clamp terminal block 3.31 mm²	

4.2.2.4.3 Technical data

Order number	5DLSDL.1001-00
General information	
B&R ID code	0xE1A4
Brightness buttons	Yes [1]
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4
DNV	Temperature: **B** (0 to 55°C) Humidity: **B** (up to 100%) Vibration: **A** (0.7 g) EMC: **B** (bridge and open deck)
CCS	Yes
LR	ENV3
KR	Yes
ABS	Yes
BV	**EC31B** Temperature: 5 - 55°C Vibration: 0.7 g EMC: Bridge and open deck
Interfaces	
COM	
Type	RS232, modem supported, not galvanically isolated
Variant	DSUB, 9-pin, female
UART	16550-compatible, 16-byte FIFO buffer
Max. baud rate	115 kbit/s
USB	
Quantity	3 (2x Type A; 1x Type B)
Type	USB 2.0 [2]
Variant	2x type A 1x type B
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (480 Mbit/s)
Current-carrying capacity	Total max. 1 A [3]
Panel In	
Variant	DVI-D
Type	SDL/DVI
Electrical properties	
Nominal voltage	24 VDC, SELV [4]
Nominal current	Max. 3 A
Operating voltage	24 VDC ±25%
Overvoltage category per EN 61131-2	II
Galvanic isolation	Yes

Technical data

Order number	5DLSDL.1001-00
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Mechanical properties	
Dimensions	
Width	190 mm
Height	110 mm
Depth	23.6 mm
Weight	538 g

1) The brightness controls can be used to set the brightness of the backlight on the Automation Panel in DVI operation.
2) Max. USB 1.1 is possible in "SDL operation without USB cable".
3) For the 2 USB type A female connectors.
4) IEC 61010-2-201 requirements must be observed.

4.2.3 Mounting units

4.2.3.1 5ACCMA00.0000-000

4.2.3.1.1 General information

The mounting unit is installed on the back of the panel. It protects the installed link module / system unit, enabling IP65 protection for the complete system. The flange is installed on the mounting unit. Due to the symmetrical design of the back of the panel, it is possible to install the mounting unit in 2 directions. If a flange is selected for mounting, flange output is possible towards the top or bottom.

- Protects the installed link module / system unit
- For swing arm mounting with flange
- IP65 protection

4.2.3.1.2 Order data

Order number	Short description	Figure
	Mounting units	
5ACCMA00.0000-000	AP5000 swing arm mounting unit	
	Optional accessories	
	Flanges	
5ACCFL00.0000-000	AP5000 flange - Swing arm rotary flange - For swing arm mounting unit	
5ACCFL00.0100-000	AP5000 flange - Swivel-tilt flange for swing arm - For swing arm mounting unit	
5ACCFL00.0200-000	AP5000 flange - Swing arm flange adapter - For Rittal - For swing arm mounting unit	

4.2.3.1.3 Technical data

Order number	5ACCMA00.0000-000
General information	
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	IP65 [1]
Degree of protection per UL 50	Type 4X indoor [1]
Mechanical properties	
Housing	
Material	Aluminum, coated
Coating	White aluminum (similar to RAL 9006)
Installation	Swing arm (with flange)
Dimensions	
Width	280 mm
Height	259 mm
Depth	96 mm
Weight	2500 g

1) Only with proper installation on the panel and proper installation on the swing arm.

4.2.3.2 5ACCMA00.0001-000

4.2.3.2.1 General information

The mounting unit is installed on the back of the panel. It protects the installed link module / system unit, enabling IP65 protection for the complete system. The flange is installed on the mounting unit. Due to the symmetrical design of the back of the panel, it is possible to install the mounting unit in 2 directions. If a flange is selected for mounting, flange output is possible towards the top or bottom.

A USB interface is available on the side of the mounting unit for service purposes.

- Protects the installed link module / system unit
- For swing arm mounting with flange
- USB 2.0 interface
- IP65 protection

4.2.3.2.2 Order data

Order number	Short description	Figure
	Mounting units	
5ACCMA00.0001-000	AP5000 swing arm mounting unit - 1x rear USB interface	
	Optional accessories	
	Flanges	
5ACCFL00.0000-000	AP5000 flange - Swing arm rotary flange - For swing arm mounting unit	
5ACCFL00.0100-000	AP5000 flange - Swivel-tilt flange for swing arm - For swing arm mounting unit	
5ACCFL00.0200-000	AP5000 flange - Swing arm flange adapter - For Rittal - For swing arm mounting unit	

4.2.3.2.3 Technical data

Order number	5ACCMA00.0001-000
General information	
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
Interfaces	
USB	
Quantity	1
Type	USB 2.0
Variant	Type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (30 Mbit/s)
Current-carrying capacity	Max. 500 mA
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	IP65 [1)]
Degree of protection per UL 50	Type 4X indoor [1)]
Mechanical properties	
Housing	
Material	Aluminum, coated
Coating	White aluminum (similar to RAL 9006)
Installation	Swing arm (with flange)
Dimensions	
Width	280 mm
Height	259 mm
Depth	96 mm
Weight	2500 g

1) Only with proper installation on the panel and proper installation on the swing arm.

4.2.3.2.4 USB interface

The mounting unit is equipped with a USB 2.0 interface. This is equipped with a protective cover.

Caution!

IP65 protection can only be achieved if the USB protective cover is properly installed.

Warning!

USB peripheral devices can be connected to the USB interfaces. Due to the variety of USB devices available on the market, B&R cannot guarantee their functionality. The functionality of USB devices available from B&R is ensured.

Caution!

Due to the general PC specification, this interface must be handled with the utmost care with regard to EMC, cable routing, etc.

USB on mounting unit

The USB interface is available to the user for service purposes.

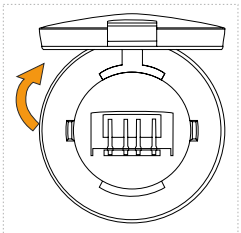
Information:

In the default configuration, the USB interface is the USB1 interface on the link module.

Depending on the transfer method (SDL or DVI operation), there are limitations regarding the transfer rate for interfaces USB1 and USB2. For possible transfer methods, see section "Connection options" on page 23.

Transfer method	USB type	Max. cable length
SDL operation without USB cable	USB 1.1	25 m
SDL operation with USB cable	USB 2.0	5 m
Single-touch DVI operation	USB 2.0	5 m
Multi-touch DVI operation	USB 2.0	5 m
SDL3 operation	USB 2.0	100 m
SDL4 operation	USB 2.0	100 m

USB on mounting unit	
Standard	USB 2.0
Variant	Type A, female
Transfer rate	Low speed (1.5 Mbit/s)
	Full speed (12 Mbit/s)
	High speed (480 Mbit/s)[1]
Current-carrying capacity[2]	Max. 0.5 A
Cable length	
USB 2.0	<3 m (without hub)
-	



1) In SDL operation without USB cable (mode 1), the USB transfer rate is limited to USB 1.1.
In SDL3 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (30 Mbit/s)
In SDL4 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (150 Mbit/s)
2) The USB interface is protected by a maintenance-free "USB current-limiting switch" (max. 0.5 A).

4.2.3.3 5ACCMA00.0002-000

4.2.3.3.1 General information

The mounting unit is installed on the back of the panel. It protects the installed link module / system unit, enabling IP65 protection for the complete system. The flange is installed on the mounting unit. Due to the symmetrical design of the back of the panel, it is possible to install the mounting unit in 2 directions. If a flange is selected for mounting, flange output is possible towards the top or bottom.

2 USB interfaces are available on the side of the mounting unit for service purposes.

- Protects the installed link module / system unit
- For swing arm mounting with flange
- 2x USB 2.0 interface
- IP65 protection

4.2.3.3.2 Order data

Order number	Short description	Figure
	Mounting units	
5ACCMA00.0002-000	AP5000 swing arm mounting unit - 2x rear USB interface	
	Optional accessories	
	Flanges	
5ACCFL00.0000-000	AP5000 flange - Swing arm rotary flange - For swing arm mounting unit	
5ACCFL00.0100-000	AP5000 flange - Swivel-tilt flange for swing arm - For swing arm mounting unit	
5ACCFL00.0200-000	AP5000 flange - Swing arm flange adapter - For Rittal - For swing arm mounting unit	

4.2.3.3.3 Technical data

Order number	5ACCMA00.0002-000
General information	
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
Interfaces	
USB	
Quantity	2
Type	USB 2.0
Variant	Type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (30 Mbit/s)
Current-carrying capacity	Max. 500 mA
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	IP65 [1)]
Degree of protection per UL 50	Type 4X indoor [1)]
Mechanical properties	
Housing	
Material	Aluminum, coated
Coating	White aluminum (similar to RAL 9006)
Installation	Swing arm (with flange)
Dimensions	
Width	280 mm
Height	259 mm
Depth	96 mm
Weight	2500 g

1) Only with proper installation on the panel and proper installation on the swing arm.

4.2.3.3.4 USB interface

The mounting unit is equipped with 2 USB 2.0 interfaces. They are equipped with a protective cover.

Caution!

IP65 protection can only be achieved if the USB protective cover is properly installed.

Warning!

USB peripheral devices can be connected to the USB interfaces. Due to the variety of USB devices available on the market, B&R cannot guarantee their functionality. The functionality of USB devices available from B&R is ensured.

Caution!

Due to the general PC specification, this interface must be handled with the utmost care with regard to EMC, cable routing, etc.

USB on mounting unit

The USB interfaces are available to the user for service purposes.

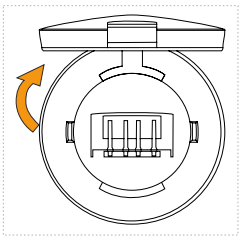
Information:

In the default configuration, the USB interfaces are the USB1 and USB2 interfaces on the link module.

Depending on the transfer method (SDL or DVI operation), there are limitations regarding the transfer rate for interfaces USB1 and USB2. For possible transfer methods, see section "Connection options" on page 23.

Transfer method	USB type	Max. cable length
SDL operation with USB cable	USB 1.1	25 m
SDL operation without USB cable	USB 2.0	5 m
Single-touch DVI operation	USB 2.0	5 m
Multi-touch DVI operation	USB 2.0	5 m
SDL3 operation	USB 2.0	100 m
SDL4 operation	USB 2.0	100 m

USB on mounting unit	
Standard	USB 2.0
Variant	Type A, female
Quantity	2
Transfer rate	Low speed (1.5 Mbit/s)
	Full speed (12 Mbit/s)
	High speed (480 Mbit/s)[1]
Current-carrying capacity[2]	Max. 0.5 A
Cable length	
USB 2.0	<3 m (without hub)
-	



1) In SDL operation without USB cable (mode 1), the USB transfer rate is limited to USB 1.1.
In SDL3 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (30 Mbit/s)
In SDL4 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (150 Mbit/s)
2) The USB interface is protected by a maintenance-free "USB current-limiting switch" (max. 0.5 A).

4.2.3.4 5ACCMA01.0100-000

4.2.3.4.1 General information

The mounting unit is installed on the back of the panel. It protects the installed link module / system unit. The VESA bracket is installed on the mounting unit. If a VESA bracket is selected for mounting, VESA 100 or VESA 75 installation is possible.

- Protects the installed link module / system unit
- For installation with VESA bracket
- IP20 protection with 5AP5120.xxxx-000
- IP10 protection with 5AP5130.xxxx-000 and 5AP5230.xxxx-000

4.2.3.4.2 Order data

Order number	Short description	Figure
	Mounting units	
5ACCMA01.0100-000	AP5000 VESA mounting unit IP10/IP20 - IP20 with 5AP5120.*-000 - IP10 with 5AP5130.*-000, 5AP5230.*-000	

4.2.3.4.3 Technical data

Order number	5ACCMA01.0100-000
General information	
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	IP10 [1]
Degree of protection per UL 50	Type 1 [1]
Mechanical properties	
Housing	
Material	Aluminum, coated
Coating	White aluminum (similar to RAL 9006)
Installation	VESA
Dimensions	
Width	270 mm
Height	189 mm
Depth	51 mm
Weight	900 g

1) Only with proper installation on the panel.

4.2.3.5 5ACCMA00.0100-000

4.2.3.5.1 General information

The mounting unit is installed on the back of the panel. It protects the installed link module / system unit.

- For installation with a 75 x 75 and 100 x 100 VESA mount
- Can also be installed when rotated 180°.
- IP54 protection

VESA IP54 5ACCMA00.010x-000 mounting units are approved for the following configurations:

AP5000 with link module	5ACCMA00.010x-000
5DLSD4.1001-00 (SDL4 Link)	✓
5DLSDL.1001-00 (SDL/DVI Link)	✓
AP5000 with system unit	**5ACCMA00.010x-000**
5PPC2100.BYxx-002 with heat pipe 5ACCHP00.0004-000	✓
5PPC2200.ALxx-000 with heat pipe 5ACCHP00.0003-000	✓

Notice!

It is important to note that no cable grommets are included in delivery.

IP54 protection and UL Type 1 enclosure rating can only be ensured if appropriate cable grommets are ordered and installed. The cable grommet must be selected to match the cable diameter.

4.2.3.5.2 Order data

Order number	Short description	Figure
	Mounting units	
5ACCMA00.0100-000	HMI mounting unit VESA IP54 - Leak tightness is only provided with suitable cable grommets.	
	Required accessories	
	Cable grommets	
5ACCCG00.0000-000	Blanking grommet	
5ACCCG00.0304-000	Cable grommet 3-4 mm	
5ACCCG00.0405-000	Cable grommet 4-5 mm	
5ACCCG00.0506-000	Cable grommet 5-6 mm	
5ACCCG00.0607-000	Cable grommet 6-7 mm	
5ACCCG00.0708-000	Cable grommet 7-8 mm	
5ACCCG00.0809-000	Cable grommet 8-9 mm	
5ACCCG00.0910-000	Cable grommet 9-10 mm	
5ACCCG00.1011-000	Cable grommet 10-11 mm	
5ACCCG00.1112-000	Cable grommet 11-12 mm	
5ACCCG00.1213-000	Cable grommet 12-13 mm	
5ACCCG00.1314-000	Cable grommet 13-14 mm	
5ACCCG00.1415-000	Cable grommet 14-15 mm	
	Optional accessories	
	Heat pipe	
5ACCHP00.0004-000	AP5000 heat pipe - For PPC2100 (5PPC2100.BYxx-002) - For VESA mounting unit	

4.2.3.5.3 Technical data

Order number	5ACCMA00.0100-000
General information	
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	IP54 [1]
Degree of protection per UL 50	Type 1 [1]
Mechanical properties	
Housing	
Material	Aluminum, coated
Coating	White aluminum (similar to RAL 9006)
Installation	VESA

Technical data

Order number	5ACCMA00.0100-000
Dimensions	
Width	280 mm
Length	259 mm
Height	60.25 mm
Weight	2.6 kg

1) Only with proper installation on the panel.

4.2.3.6 5ACCMA00.0101-000

4.2.3.6.1 General information

The mounting unit is installed on the back of the panel. It protects the installed link module / system unit.

- For installation with a 75 x 75 and 100 x 100 VESA mount
- Can also be installed when rotated 180°.
- USB connection routed externally.
- IP54 protection

VESA IP54 5ACCMA00.010x-000 mounting units are approved for the following configurations:

AP5000 with link module	5ACCMA00.010x-000
5DLSD4.1001-00 (SDL4 Link)	✓
5DLSDL.1001-00 (SDL/DVI Link)	✓
AP5000 with system unit	**5ACCMA00.010x-000**
5PPC2100.BYxx-002 with heat pipe 5ACCHP00.0004-000	✓
5PPC2200.ALxx-000 with heat pipe 5ACCHP00.0003-000	✓

Notice!

It is important to note that no cable grommets are included in delivery.

IP54 protection and UL Type 1 enclosure rating can only be ensured if appropriate cable grommets are ordered and installed. The cable grommet must be selected to match the cable diameter.

4.2.3.6.2 Order data

Order number	Short description	Figure
	Mounting units	
5ACCMA00.0101-000	HMI mounting unit VESA IP54 w/USB - Leak tightness is only provided with suitable cable grommets.	
	Required accessories	
	Cable grommets	
5ACCCG00.0000-000	Blanking grommet	
5ACCCG00.0304-000	Cable grommet 3-4 mm	
5ACCCG00.0405-000	Cable grommet 4-5 mm	
5ACCCG00.0506-000	Cable grommet 5-6 mm	
5ACCCG00.0607-000	Cable grommet 6-7 mm	
5ACCCG00.0708-000	Cable grommet 7-8 mm	
5ACCCG00.0809-000	Cable grommet 8-9 mm	
5ACCCG00.0910-000	Cable grommet 9-10 mm	
5ACCCG00.1011-000	Cable grommet 10-11 mm	
5ACCCG00.1112-000	Cable grommet 11-12 mm	
5ACCCG00.1213-000	Cable grommet 12-13 mm	
5ACCCG00.1314-000	Cable grommet 13-14 mm	
5ACCCG00.1415-000	Cable grommet 14-15 mm	
	Optional accessories	
	Heat pipe	
5ACCHP00.0004-000	AP5000 heat pipe - For PPC2100 (5PPC2100.BYxx-002) - For VESA mounting unit	

4.2.3.6.3 Technical data

Order number	5ACCMA00.0101-000
General information	
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
Interfaces	
USB	
Quantity	1
Type	USB 2.0
Variant	Type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (30 Mbit/s)
Current-carrying capacity	Max. 500 mA
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	IP54 [1)]

Order number	5ACCMA00.0101-000
Degree of protection per UL 50	Type 1 [1]
Mechanical properties	
Housing	
Material	Aluminum, coated
Coating	White aluminum (similar to RAL 9006)
Installation	VESA
Dimensions	
Width	280 mm
Length	259 mm
Height	60.25 mm
Weight	2.6 kg

1) Only with proper installation on the panel.

4.2.3.6.4 USB interface

The mounting unit is equipped with a USB 2.0 interface. This is equipped with a protective cover.

Caution!

IP54 protection can only be achieved if the USB protective cover is properly installed.

Warning!

USB peripheral devices can be connected to the USB interfaces. Due to the variety of USB devices available on the market, B&R cannot guarantee their functionality. The functionality of USB devices available from B&R is ensured.

Caution!

Due to the general PC specification, this interface must be handled with the utmost care with regard to EMC, cable routing, etc.

USB on mounting unit

The USB interface is available to the user for service purposes.

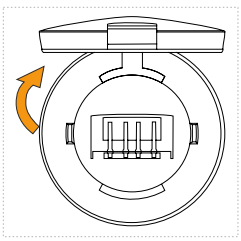
Information:

In the default configuration, the USB interface is the USB1 interface on the link module.

Depending on the transfer method (SDL or DVI operation), there are limitations regarding the transfer rate for interfaces USB1 and USB2. For possible transfer methods, see section "Connection options" on page 23.

Transfer method	USB type	Max. cable length
SDL operation without USB cable	USB 1.1	25 m
SDL operation with USB cable	USB 2.0	5 m
Single-touch DVI operation	USB 2.0	5 m
Multi-touch DVI operation	USB 2.0	5 m
SDL3 operation	USB 2.0	100 m
SDL4 operation	USB 2.0	100 m

USB on mounting unit	
Standard	USB 2.0
Variant	Type A, female
Transfer rate	Low speed (1.5 Mbit/s)
	Full speed (12 Mbit/s)
	High speed (480 Mbit/s)[1]
Current-carrying capacity[2]	Max. 0.5 A
Cable length	
USB 2.0	<3 m (without hub)
-	



1) In SDL operation without USB cable (mode 1), the USB transfer rate is limited to USB 1.1.
In SDL3 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (30 Mbit/s)
In SDL4 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (150 Mbit/s)
2) The USB interface is protected by a maintenance-free "USB current-limiting switch" (max. 0.5 A).

4.2.4 Flanges

4.2.4.1 5ACCFL00.0000-000

4.2.4.1.1 General information

The rotary flange is installed on the mounting unit and designed for swing arm systems with 48 mm shaft diameter. The range of rotation is -150° to +150°.

- Rotary flange
- Range of rotation ±150°
- Stepless adjustment of range of rotation
- For swing arm systems with 48 mm shaft diameter

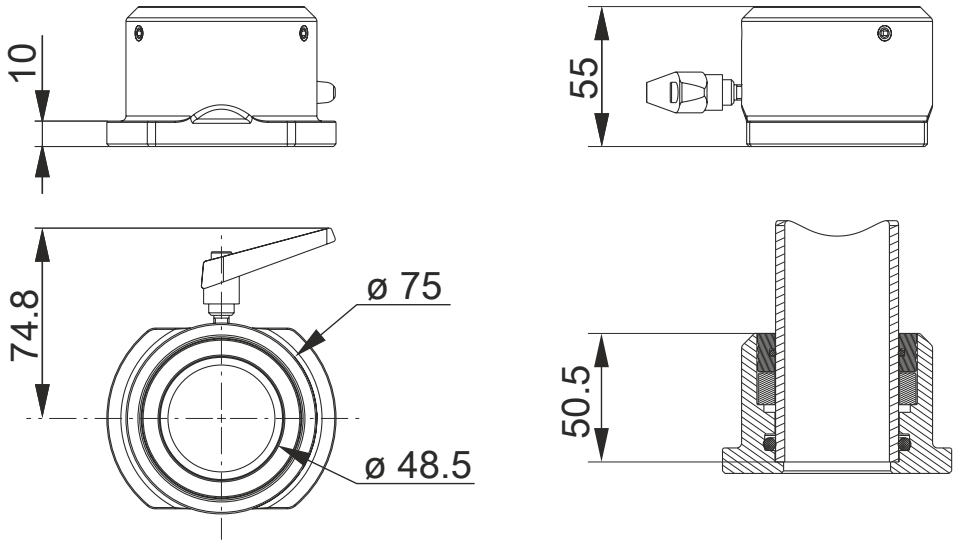
4.2.4.1.2 Order data

Order number	Short description	Figure
	Flanges	
5ACCFL00.0000-000	AP5000 flange - Swing arm rotary flange - For swing arm mounting unit	

4.2.4.1.3 Technical data

Order number	5ACCFL00.0000-000
General information	
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Mechanical properties	
Material	Aluminum (similar to RAL 9006), coated
Dimensions	
Height	55 mm
Diameter	75 mm (outer diameter) 48.5 mm (inner diameter)
Weight	530 g

4.2.4.1.4 Dimensions



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4.2.4.2 5ACCFL00.0100-000

4.2.4.2.1 General information

The swivel-tilt flange is installed on the mounting unit and designed for swing arm systems with 48 mm shaft diameter. The range of rotation is from -150° to +150°; the tilting range is up to a maximum of 15°.

- Swivel-tilt flange
- Range of rotation: ±150°
- Tilting range: ±15°
- Stepless adjustment of the range of rotation and tilting range
- For swing arm systems with 48 mm shaft diameter
- Tightening torque for tilt flange locking lever: Max. 7 Nm
- Tightening torque rotary flange locking lever: 5 Nm
- Tightening torque for locking screw (M6) opposite the clamping lever: Max. 3 Nm

Warning!

The swivel-tilt flange is generally compatible with all panel sizes.
Use in conjunction with panels in portrait format is not recommended since the range of rotation and tilt cannot be fully utilized.

Caution!

After adjusting the rotation and/or tilt angle, the corresponding locking lever must be fixed in position (see above for the maximum tightening torques).
The screw in the locking lever is not permitted to be tightened. Fixing must be carried out exclusively with the locking lever.

4.2.4.2.2 Order data

Order number	Short description	Figure
	Flanges	
5ACCFL00.0100-000	AP5000 flange - Swivel-tilt flange for swing arm - For swing arm mounting unit	

4.2.4.2.3 Technical data

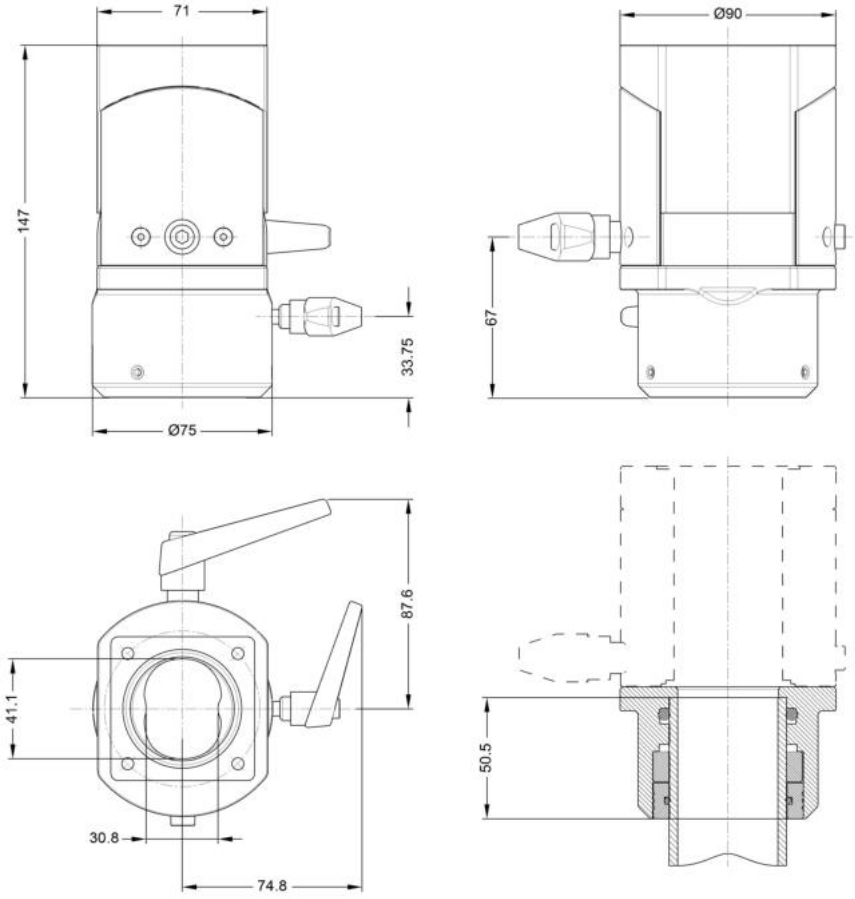
Order number	5ACCFL00.0100-000
General information	
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Mechanical properties	
Material	Anodized aluminum E6/C0
Dimensions	
Height	147 mm
Diameter	90 mm
Weight	1666 g

Danger!

+24 VDC power supply

The swivel-tilt flange is only permitted to be used in conjunction with devices supplied with a SELV/PELV power supply unit or with safety extra-low voltage (SELV) per IEC 61010-2-201.

4.2.4.2.4 Dimensions



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4.2.4.3 5ACCFL00.0200-000

4.2.4.3.1 General information

The adapter is installed on the mounting unit and designed for the installation of Rittal coupling CP40 (steel).

- Adapter for Rittal coupling CP40 (steel)

Rittal coupling "CP 40" (steel, 90 x 71 mm) must be used for installation.

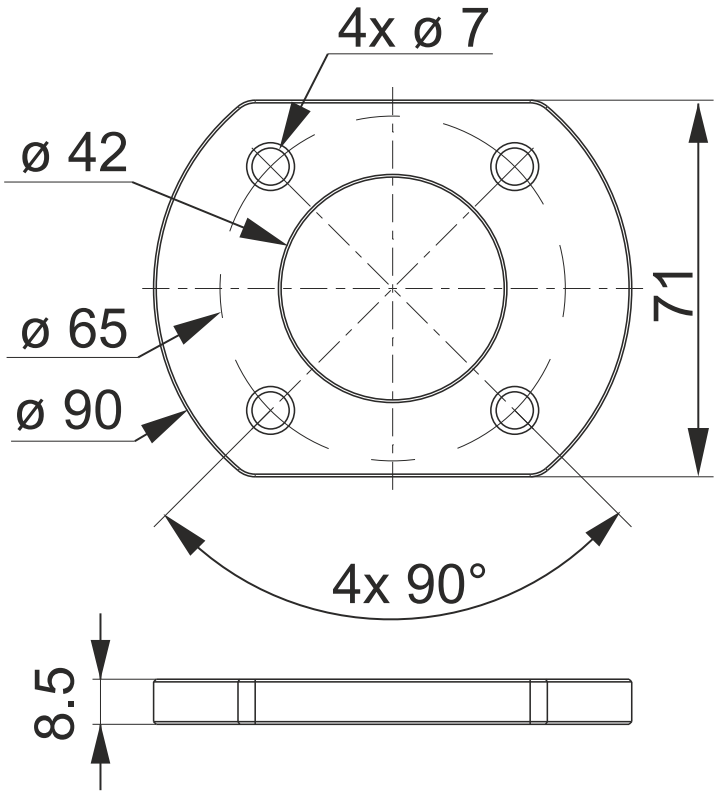
4.2.4.3.2 Order data

Order number	Short description	Figure
	Flanges	
5ACCFL00.0200-000	AP5000 flange - Swing arm flange adapter - For Rittal - For swing arm mounting unit	

4.2.4.3.3 Technical data

Order number	5ACCFL00.0200-000
General information	
Certifications	
CE	Yes
UKCA	Yes
UL	cULus E115267 Industrial control equipment
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Mechanical properties	
Material	Aluminum, coated
Dimensions	
Height	8.5 mm
Diameter	90 mm (outer diameter) 42 mm (inner diameter)
Weight	93 g

4.2.4.3.4 Dimensions



4.2.4.4 5AC725.FLGC-00

4.2.4.4.1 General information

The flange is used to secure the system to a swing arm system.

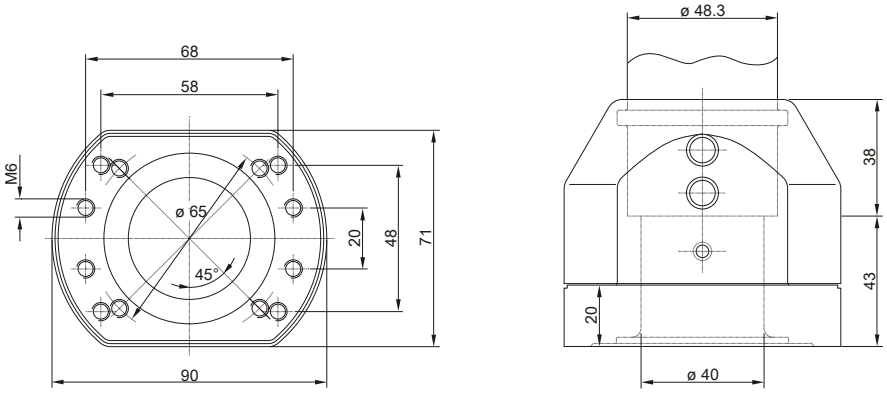
4.2.4.4.2 Order data

Order number	Short description	Figure
	Flanges	
5AC725.FLGC-00	Flange - Rittal - For PPC725 - For AP5000	

4.2.4.4.3 Technical data

Order number	5AC725.FLGC-00
General information	
Certifications	
CE	Yes
UKCA	Yes
Mechanical properties	
Housing	
Material	Zinc die-cast
Coating	RAL 7024
Dimensions	
Width	90 mm
Height	81 mm
Depth	71 mm
Weight	Approx. 1,100 g

4.2.4.4.4 Dimensions



4.2.5 Expansion units

For more information regarding expansion units and operating elements, see section "Equipping panels with expansion units" on page 68.

4.2.5.1 5ACCKP00.xxxx-000

4.2.5.1.1 General information

5ACCKP00.xxxx-000 expansion units are expansion covers that can be installed on the Automation Panel 5230. Depending on the variant, 7 to 14 cutouts are available to be equipped with operating elements.

For specifications regarding the operating and switching elements used by B&R, see section "Features" under "5ACCSE00.000x-00x" on page 216.

Information:

The maximum installation depth of operating and switching elements is 26 mm at the thinnest point and 30 mm at the thickest point.

4.2.5.1.2 Order data

Order number	Short description	Figure
	Expansion units	
5ACCKP00.156B-000	AP5000 swing arm expansion option - Expansion cover - For built-in operating elements - 10x options for 22.3 mm built-in elements - For panel 5AP5230.156B/156C-000	
5ACCKP00.185B-000	AP5000 swing arm expansion option - Expansion cover - For built-in operating elements - 11x options for 22.3 mm built-in elements - For panel 5AP5230.185B/185C-000	
5ACCKP00.215C-000	AP5000 swing arm expansion option - Expansion cover - For built-in operating elements - 13x options for 22.3 mm built-in elements - For panel 5AP5230.215C-000	
5ACCKP00.215I-000	AP5000 swing arm expansion option - Expansion cover - For built-in operating elements - 7x options for 22.3 mm built-in elements - For panel 5AP5230.215I-000	
5ACCKP00.240C-000	AP5000 swing arm expansion option - Expansion cover - For built-in operating elements - 14x options for 22.3 mm built-in elements - For panel 5AP5230.240C-000	
	Optional accessories	
	Operating elements	
5ACCSE00.0000-000	RAFIX 22 FS+ pushbutton - With 5 replaceable colored lenses - No color, red, green, blue, yellow - Normally open contact - Illuminated with white LED	
5ACCSE00.0000-001	RAFIX 22 FS+ pushbutton - With 5 replaceable colored lenses - No color, red, green, blue, yellow - Normally closed contact - Illuminated with white LED	
5ACCSE00.0000-002	RAFIX 22 FS+ pushbutton - With 5 replaceable colored lenses - No color, red, green, blue, yellow - Normally closed contact - Normally open contact - Illuminated with white LED	
5ACCSE00.0001-000	RAFIX 22 FS emergency stop button	
5ACCSE00.0002-000	RAFIX 22 FS key switch 2x90°	
5ACCSE00.0003-000	RAFIX 22 FS key switch 1x90°	
5ACCSE00.0004-000	RAFIX 22 FS+ selector switch 1-90°	
5ACCSE00.0005-000	RAFIX FS 22+ USB IP65 400 mm	

4.2.5.1.3 Technical data

Order number	5ACCKP00.156B-000	5ACCKP00.185B-000	5ACCKP00.215C-000	5ACCKP00.215I-000	5ACCKP00.240C-000
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cULus E115267 Industrial control equipment				
Features					
Optional operating elements					
Quantity	10	11	13	7	14
Operating conditions					
Pollution degree per EN 61131-2	Pollution degree 2				
Mechanical properties					
Material	Steel sheet				
Weight	600 g		800 g	500 g	900 g

4.2.5.2 5ACCKP01.xxxx-000

4.2.5.2.1 General information

5ACCKP01.xxxx-000 expansion units are equipped with various operating elements as well as a USB interface and can be installed in Automation Panel 5230.

- Expansion units
- Front USB interface
- Green and red pushbuttons
- Selector switch
- Key switch
- Emergency stop

4.2.5.2.2 Order data

Order number	Short description	Figure
	Expansion units	
5ACCKP01.156B-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.156B/156C-000	
5ACCKP01.185B-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.185B/185C-000	
5ACCKP01.215C-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.215C-000	
5ACCKP01.215I-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.215I-000	
5ACCKP01.240C-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.240C-000	

4.2.5.2.3 Technical data

Order number	5ACCKP01.156B-000	5ACCKP01.185B-000	5ACCKP01.215C-000	5ACCKP01.215I-000	5ACCKP01.240C-000
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cULus E115267 Industrial control equipment				
Interfaces					
USB					
Quantity	1				
Type	USB 2.0				
Variant	Type A				
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (480 Mbit/s)				
Current-carrying capacity	500 mA				
Features					
Pushbuttons					
Quantity	2 (green, red)				
Type	RAFIX 22 FS+, 1.30.270.021/2500 (green), 1.30.270.021/2300 (red)				
Contact element	Momentary				
Selector switch					
Quantity	1				
Type	RAFIX 22 FS+, 1.30.272.102/2200				
Contact element	Maintained				
Key switch					
Quantity	1				
Type	RAFIX 22 FS 1.30.275.222/0000				
Contact element	Maintained				
Emergency stop					
Quantity	1				
Type	RAFIX 22 FS+, Plus 1, 1.30.273.512/0300				
Contact element	Maintained				

Order number	5ACCKP01.156B-000	5ACCKP01.185B-000	5ACCKP01.215C-000	5ACCKP01.215I-000	5ACCKP01.240C-000
Operating conditions					
Pollution degree per EN 61131-2	Pollution degree 2				
Mechanical properties					
Material	Steel sheet				
Weight	800 g	900 g	1000 g	700 g	1100 g

4.2.5.2.4 USB interface

The expansion unit is equipped with a USB 2.0 interface. This is equipped with a protective cover.

Caution!

IP65 protection can only be achieved if the USB protective cover is properly installed.

Warning!

USB peripheral devices can be connected to the USB interfaces. Due to the variety of USB devices available on the market, B&R cannot guarantee their functionality. The functionality of USB devices available from B&R is ensured.

Caution!

Due to the general PC specification, this interface must be handled with the utmost care with regard to EMC, cable routing, etc.

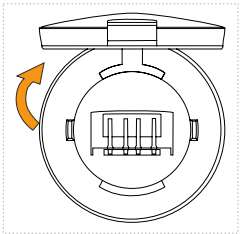
The USB interface is internally connected to the system via USB 2.0 and available to the user for service purposes.

Depending on the transfer method (SDL, DVI, SDL3 or SDL4 operation), there may be limitations with regard to the transfer rate of the USB interfaces. For possible transfer methods, see section "Connection options" on page 23.

Transfer method	USB type	Max. cable length
SDL operation without USB cable	USB 1.1	25 m[1)]
SDL operation with USB cable	USB 2.0	5 m
Single-touch DVI operation	USB 2.0	5 m
Multi-touch DVI operation	USB 2.0	5 m
SDL3 operation	USB 2.0	100 m
SDL4 operation	USB 2.0	100 m

1) The max. cable length of 25 m depends on the resolution. For exact specifications, see table "" on page 61 " in the AP5000 user's manual.

Front USB of the expansion unit[1)]	
Standard	USB 2.0
Variant	Type A, female
Transfer rate	Low speed (1.5 Mbit/s)
	Full speed (12 Mbit/s)
	High speed (480 Mbit/s)[2)]
Current-carrying capacity[3)]	Max. 0.5 A
Cable length	
USB 2.0	<3 m (without hub)
-	



1) The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.
2) In SDL operation without USB cable (mode 1), the USB transfer rate is limited to USB 1.1.
In SDL3 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (30 Mbit/s)
In SDL4 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (150 Mbit/s)
3) The USB interface is protected by a maintenance-free "USB current-limiting switch" (max. 0.5 A).

4.2.5.3 5ACCKP03.xxxx-000

4.2.5.3.1 General information

5ACCKP03.xxxx-000 expansion units are equipped with various operating elements as well as interfaces (e.g. USB, RFID). They can be installed in Automation Panel 5230.

- Expansion units
- Front USB interface
- Green and red pushbuttons
- Selector switch
- Key switch
- Emergency stop
- RFID read/write unit

4.2.5.3.2 Order data

Order number	Short description	Figure
	Expansion units	
5ACCKP03.185B-000	AP5000 swing arm expansion option - Expansion unit - 1x RFID read/write unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.185B/185C-000	
5ACCKP03.215C-000	AP5000 swing arm expansion option - Expansion unit - 1x RFID read/write unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.215C-000	
5ACCKP03.240C-000	AP5000 swing arm expansion option - Expansion unit - 1x RFID read/write unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.240C-000	

4.2.5.3.3 Technical data

Order number	5ACCKP03.185B-000	5ACCKP03.215C-000	5ACCKP03.240C-000
General information			
Certifications			
CE	Yes		
UKCA	Yes		
UL	cULus E115267 Industrial control equipment		
FCC	Contains FCC ID: 2ADFV-RFM-2-NF		
IC	Contains IC: 12444A-RFM2NF		
Interfaces			
USB			
Quantity	1		
Type	USB 2.0		
Variant	Type A		
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (480 Mbit/s)		
Current-carrying capacity	500 mA		
RFID read/write transponder unit			
Variant	RFM-2-NF		
Type	ELATEC TWN4 MultiTech Nano		
Frequency	Short range device (SRD) 13.56 MHz		
Output power	Max. 8.13 dB µA/m @10 m		
Standard	ISO14443A/B, ISO15693, ISO18092 / ECMA-340 (NFC)		
Read/Write range in air	Up to 2 cm (depends on transponder)		
Features			
Pushbuttons			
Quantity	2 (green, red)		
Type	RAFIX 22 FS+, 1.30.270.021/2500 (green), 1.30.270.021/2300 (red)		
Contact element	Momentary		
Selector switch			
Quantity	1		
Type	RAFIX 22 FS+, 1.30.272.102/2200		
Contact element	Maintained		
Key switch			
Quantity	1		
Type	RAFIX 22 FS 1.30.275.222/0000		
Contact element	Maintained		

Order number	5ACCKP03.185B-000	5ACCKP03.215C-000	5ACCKP03.240C-000
Emergency stop			
Quantity		1	
Type		RAFIX 22 FS+, Plus 1, 1.30.273.512/0300	
Contact element		Maintained	
Operating conditions			
Pollution degree per EN 61131-2		Pollution degree 2	
Mechanical properties			
Material		Steel sheet	
Weight	900 g	1000 g	1100 g

4.2.5.3.4 B&R wireless assembly

B&R wireless assembly RFM-2-NF of 5ACCKP03.xxxx-000 or 5ACCK05.xxxx-000 expansion units consists of the following wireless module:

- SRD (RFID/NFC) module TWN4 MultiTech Nano from Elatec with circuit board antenna from B&R.

The B&R wireless assembly must be connected internally to the system using the USB 2.0 cable.

4.2.5.3.4.1 Drivers, software and documentation

Drivers, software tools and documentation for approved operating systems are available for download in the Downloads section of the B&R website (www.br-automation.com). The software packages for the TWN4 MultiTech Nano with the TWN4 Simple Protocol must be used.

4.2.5.3.5 USB interface

The expansion unit is equipped with a USB 2.0 interface. This is equipped with a protective cover.

Caution!

IP65 protection can only be achieved if the USB protective cover is properly installed.

Warning!

USB peripheral devices can be connected to the USB interfaces. Due to the variety of USB devices available on the market, B&R cannot guarantee their functionality. The functionality of USB devices available from B&R is ensured.

Caution!

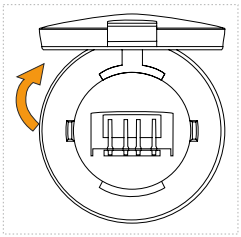
Due to the general PC specification, this interface must be handled with the utmost care with regard to EMC, cable routing, etc.

The USB interface is internally connected to the system via USB 2.0 and available to the user for service purposes.

Depending on the transfer method (SDL, DVI, SDL3 or SDL4 operation), there may be limitations with regard to the transfer rate of the USB interfaces. For possible transfer methods, see section "Connection options" on page 23.

Transfer method	USB type	Max. cable length
SDL operation without USB cable	USB 1.1	25 m[1)]
SDL operation with USB cable	USB 2.0	5 m
Single-touch DVI operation	USB 2.0	5 m
Multi-touch DVI operation	USB 2.0	5 m
SDL3 operation	USB 2.0	100 m
SDL4 operation	USB 2.0	100 m

1) The max. cable length of 25 m depends on the resolution. For exact specifications, see table "" on page 61 " in the AP5000 user's manual.

Front USB of the expansion unit[1]		
Standard	USB 2.0	
Variant	Type A, female	
Transfer rate	Low speed (1.5 Mbit/s)	
	Full speed (12 Mbit/s)	
	High speed (480 Mbit/s)[2]	
Current-carrying capacity[3]	Max. 0.5 A	
Cable length		
USB 2.0	<3 m (without hub)	
-		

1) The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.
2) In SDL operation without USB cable (mode 1), the USB transfer rate is limited to USB 1.1.
In SDL3 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (30 Mbit/s)
In SDL4 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (150 Mbit/s)
3) The USB interface is protected by a maintenance-free "USB current-limiting switch" (max. 0.5 A).

4.2.5.4 5ACCKP04.xxxx-000

4.2.5.4.1 General information

5ACCKP04.xxxx-000 expansion units are equipped with various operating elements as well as an interface (e.g. USB). They can be installed in Automation Panel 5230.

- Expansion units
- Front USB interface
- Blue, green and red pushbuttons
- Key switch
- Emergency stop

4.2.5.4.2 Order data

Order number	Short description	Figure
	Expansion units	
5ACCKP04.156B-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.156B/156C-000	
5ACCKP04.185B-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.185B/185C-000	
5ACCKP04.215C-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.215C-000	
5ACCKP04.215I-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.215I-000	
5ACCKP04.240C-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.240C-000	

4.2.5.4.3 Technical data

Order number	5ACCKP04.156B-000	5ACCKP04.185B-000	5ACCKP04.215C-000	5ACCKP04.215I-000	5ACCKP04.240C-000
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cULus E115267 Industrial control equipment				
Interfaces					
USB					
Quantity	1				
Type	USB 2.0				
Variant	Type A				
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (480 Mbit/s)				
Current-carrying capacity	500 mA				
Features					
Pushbuttons					
Quantity	3 (blue, green, red)				
Type	RAFIX 22 FS+, 1.30.270.021/2600 (blue), 1.30.270.021/2500 (green), 1.30.270.021/2300 (red)				
Contact element	Momentary				
Key switch					
Quantity	1				
Type	RAFIX 22 FS 1.30.275.222/0000				
Contact element	Maintained				
Emergency stop					
Quantity	1				
Type	RAFIX 22 FS+, Plus 1, 1.30.273.512/0300				
Contact element	Maintained				
Operating conditions					
Pollution degree per EN 61131-2	Pollution degree 2				
Mechanical properties					
Material	Steel sheet				
Weight	800 g	900 g	1000 g	700 g	1100 g

4.2.5.4.4 USB interface

The expansion unit is equipped with a USB 2.0 interface. This is equipped with a protective cover.

Caution!

IP65 protection can only be achieved if the USB protective cover is properly installed.

Warning!

USB peripheral devices can be connected to the USB interfaces. Due to the variety of USB devices available on the market, B&R cannot guarantee their functionality. The functionality of USB devices available from B&R is ensured.

Caution!

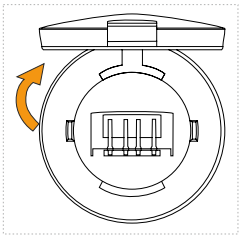
Due to the general PC specification, this interface must be handled with the utmost care with regard to EMC, cable routing, etc.

The USB interface is internally connected to the system via USB 2.0 and available to the user for service purposes.

Depending on the transfer method (SDL, DVI, SDL3 or SDL4 operation), there may be limitations with regard to the transfer rate of the USB interfaces. For possible transfer methods, see section "Connection options" on page 23.

Transfer method	USB type	Max. cable length
SDL operation without USB cable	USB 1.1	25 m[1)]
SDL operation with USB cable	USB 2.0	5 m
Single-touch DVI operation	USB 2.0	5 m
Multi-touch DVI operation	USB 2.0	5 m
SDL3 operation	USB 2.0	100 m
SDL4 operation	USB 2.0	100 m

1) The max. cable length of 25 m depends on the resolution. For exact specifications, see table "" on page 61 " in the AP5000 user's manual.

Front USB of the expansion unit[1)]		
Standard	USB 2.0	
Variant	Type A, female	
Transfer rate	Low speed (1.5 Mbit/s)	
	Full speed (12 Mbit/s)	
	High speed (480 Mbit/s)[2)]	
Current-carrying capacity[3)]	Max. 0.5 A	
Cable length		
USB 2.0	<3 m (without hub)	
-		

1) The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.
2) In SDL operation without USB cable (mode 1), the USB transfer rate is limited to USB 1.1.
In SDL3 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (30 Mbit/s)
In SDL4 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (150 Mbit/s)
3) The USB interface is protected by a maintenance-free "USB current-limiting switch" (max. 0.5 A).

4.2.5.5 5ACCKP05.xxxx-000

4.2.5.5.1 General information

5ACCKP05.xxxx-000 expansion units are equipped with various operating elements as well as interfaces (e.g. USB, RFID). They can be installed in Automation Panel 5230.

- Expansion units
- Front USB interface
- Blue, green and red pushbuttons
- Key switch
- Emergency stop
- RFID read/write unit

4.2.5.5.2 Order data

Order number	Short description	Figure
	Expansion units	
5ACCKP05.185B-000	AP5000 swing arm expansion option - Expansion unit - 1x RFID read/write unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.185B/185C-000	
5ACCKP05.215C-000	AP5000 swing arm expansion option - Expansion unit - 1x RFID read/write unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.215C-000	
5ACCKP05.240C-000	AP5000 swing arm expansion option - Expansion unit - 1x RFID read/write unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.240C-000	

4.2.5.5.3 Technical data

Order number	5ACCKP05.185B-000	5ACCKP05.215C-000	5ACCKP05.240C-000
General information			
Certifications			
CE	Yes		
UKCA	Yes		
UL	cULus E115267 Industrial control equipment		
FCC	Contains FCC ID: 2ADFV-RFM-2-NF		
IC	Contains IC: 12444A-RFM2NF		
Interfaces			
USB			
Quantity	1		
Type	USB 2.0		
Variant	Type A		
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (480 Mbit/s)		
Current-carrying capacity	500 mA		
RFID read/write transponder unit			
Variant	RFM-2-NF		
Type	ELATEC TWN4 MultiTech Nano		
Frequency	Short range device (SRD) 13.56 MHz		
Output power	Max. 8.13 dB µA/m @10 m		
Standard	ISO14443A/B, ISO15693, ISO18092 / ECMA-340 (NFC)		
Read/Write range in air	Up to 2 cm (depends on transponder)		
Features			
Pushbuttons			
Quantity	3 (blue, green, red)		
Type	RAFIX 22 FS+, 1.30.270.021/2600 (blue), 1.30.270.021/2500 (green), 1.30.270.021/2300 (red)		
Contact element	Momentary		
Key switch			
Quantity	1		
Type	RAFIX 22 FS 1.30.275.222/0000		
Contact element	Maintained		
Emergency stop			
Quantity	1		
Type	RAFIX 22 FS+, Plus 1, 1.30.273.512/0300		
Contact element	Maintained		

Order number	5ACCKP05.185B-000	5ACCKP05.215C-000	5ACCKP05.240C-000
Operating conditions			
Pollution degree per EN 61131-2		Pollution degree 2	
Mechanical properties			
Material		Steel sheet	
Weight	900 g	1000 g	1100 g

4.2.5.5.4 B&R wireless assembly

B&R wireless assembly RFM-2-NF of 5ACCKP03.xxxx-000 or 5ACCK05.xxxx-000 expansion units consists of the following wireless module:

- SRD (RFID/NFC) module TWN4 MultiTech Nano from Elatec with circuit board antenna from B&R.

The B&R wireless assembly must be connected internally to the system using the USB 2.0 cable.

4.2.5.5.4.1 Drivers, software and documentation

Drivers, software tools and documentation for approved operating systems are available for download in the Downloads section of the B&R website (www.br-automation.com). The software packages for the TWN4 MultiTech Nano with the TWN4 Simple Protocol must be used.

4.2.5.5.5 USB interface

The expansion unit is equipped with a USB 2.0 interface. This is equipped with a protective cover.

Caution!

IP65 protection can only be achieved if the USB protective cover is properly installed.

Warning!

USB peripheral devices can be connected to the USB interfaces. Due to the variety of USB devices available on the market, B&R cannot guarantee their functionality. The functionality of USB devices available from B&R is ensured.

Caution!

Due to the general PC specification, this interface must be handled with the utmost care with regard to EMC, cable routing, etc.

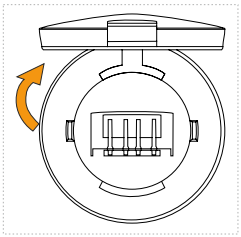
The USB interface is internally connected to the system via USB 2.0 and available to the user for service purposes.

Depending on the transfer method (SDL, DVI, SDL3 or SDL4 operation), there may be limitations with regard to the transfer rate of the USB interfaces. For possible transfer methods, see section "Connection options" on page 23.

Transfer method	USB type	Max. cable length
SDL operation without USB cable	USB 1.1	25 m[1)]
SDL operation with USB cable	USB 2.0	5 m
Single-touch DVI operation	USB 2.0	5 m
Multi-touch DVI operation	USB 2.0	5 m
SDL3 operation	USB 2.0	100 m
SDL4 operation	USB 2.0	100 m

1) The max. cable length of 25 m depends on the resolution. For exact specifications, see table "" on page 61 " in the AP5000 user's manual.

Front USB of the expansion unit[1]	
Standard	USB 2.0
Variant	Type A, female
Transfer rate	Low speed (1.5 Mbit/s)
	Full speed (12 Mbit/s)
	High speed (480 Mbit/s)[2]
Current-carrying capacity[3]	Max. 0.5 A
Cable length	
USB 2.0	<3 m (without hub)
-	



1) The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.
2) In SDL operation without USB cable (mode 1), the USB transfer rate is limited to USB 1.1.
In SDL3 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (30 Mbit/s)
In SDL4 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (150 Mbit/s)
3) The USB interface is protected by a maintenance-free "USB current-limiting switch" (max. 0.5 A).

4.2.5.6 5ACCKPSx.xxxx-xxx

Safe variants of expansion units are also available. For details, see www.br-automation.com.

4.2.6 Handles

4.2.6.1 5ACCHD0x.xxxx-000

4.2.6.1.1 General information

Handles can be installed on the side of the panel to improve its ergonomic properties and ease of use.

Handles are not factory-installed and must be mounted after delivery. For information about installation, see section "Installing the handles" on page 153.

4.2.6.1.2 Order data

Order number	Short description	Figure
	Handles	
5ACCHD00.1505-000	AP5000 swing arm handles - For panel 5AP5120.1505-000	
5ACCHD00.156B-000	AP5000 swing arm handles - For panel 5AP5130.156B/156C-000	
5ACCHD00.185B-000	AP5000 swing arm handles - For panel 5AP5130.185B/185C-000	
5ACCHD00.1906-000	AP5000 swing arm handles - For panel 5AP5120.1906-000	
5ACCHD00.215C-000	AP5000 swing arm handles - For panel 5AP5130.215C-000	
5ACCHD00.240C-000	AP5000 swing arm handles - For panel 5AP5130.240C-000	
5ACCHD01.156B-000	AP5000 swing arm handles - For panel 5AP5230.156B/156C-000	
5ACCHD01.185B-000	AP5000 swing arm handles - For panel 5AP5230.185B/185C-000	
5ACCHD01.215C-000	AP5000 swing arm handles - For panel 5AP5230.215C-000	
5ACCHD01.215I-000	AP5000 swing arm handles - For panel 5AP5230.215I-000	
5ACCHD01.240C-000	AP5000 swing arm handles - For panel 5AP5230.240C-000	

4.2.6.1.3 Technical data

5ACCHD00.xxxx-000

Order number	5ACCHD00. 1505-000	5ACCHD00. 156B-000	5ACCHD00. 185B-000	5ACCHD00. 1906-000	5ACCHD00. 215C-000	5ACCHD00. 240C-000
General information						
Certifications						
CE	Yes					
UKCA	Yes					
UL	cULus E115267 Industrial control equipment					
Operating conditions						
Pollution degree per EN 61131-2	Pollution degree 2					
Mechanical properties						
Material	Aluminum, coated					
Coating	White aluminum					
Dimensions						
Height	299 mm	269.5 mm	306 mm	372 mm	344 mm	375 mm
Weight	500 g	300 g	500 g	600 g		

5ACCHD01.xxxx-000

Order number	5ACCHD01. 156B-000	5ACCHD01. 185B-000	5ACCHD01. 215C-000	5ACCHD01.215I-000	5ACCHD01. 240C-000
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cULus E115267 Industrial control equipment				
Operating conditions					
Pollution degree per EN 61131-2	Pollution degree 2				
Mechanical properties					
Material	Aluminum, coated				
Coating	White aluminum				
Dimensions					
Height	349 mm	385.5 mm	423.5 mm	632 mm	454.5 mm
Weight	600 g	700 g		1000 g	800 g

4.2.6.1.4 Content of delivery

- 2x handles
- 4x Torx screws (T20)

5 Installation and wiring

5.1 Basic information

Information:

A damaged device has unpredictable properties and states. The unintentional installation or startup of a damaged device must be prevented. The damaged device must be marked as such and made inaccessible, or it must be returned for repairs immediately.

Unpacking

The following activities must be performed before unpacking the device:

- Check the packaging for visible transport damage.
- If transport damage is noticeable, document this immediately and submit a complaint. If possible, have the damage confirmed by the carrier/delivery service.
- Check the contents of the shipment for completeness and damage.
- If the contents of the packaging are incomplete, damaged or do not correspond to the order, the responsible sales office or B&R Headquarters must be informed immediately.
- The information in section "Protection against electrostatic discharge" on page 11 must be observed for unpacked devices and components.
- Keep the original packaging for further transport.

Power supply

The following information is generally applicable and should be observed before performing any work on the device:

- The entire power supply must be disconnected before removing any covers or components from the device and installing or removing any accessories, hardware or cables.
- Remove the power cable from the device and from the power supply.
- All covers and components, accessories, hardware and cables must be installed or secured before the device is connected to the power supply and switched on.

Caution!

Energy regeneration is not permitted and can cause damage or the device to become defective. Built-in or connected peripheral devices (e.g. USB hubs) are not permitted to introduce any voltage into the device.

Installation

Information:

Optional sets are available that contain all necessary tools for installation. For additional information about tool sets, see section "Installation accessories" on page 196.

Before installation

The following activities and limitations must be observed before installing the device.

- Allow sufficient space for installation, operation and maintenance of the device.
- The device must be installed on a flat, clean and burr-free surface.
- The wall or control cabinet panel must be able to support four times the total weight of the device. If necessary, bracing must be attached to reinforce the mounting surface.

Caution!

If the load-bearing capacity of the mounting surface is insufficient, or if the fastening material is inadequate or incorrect, the device may fall and become damaged.

- To avoid overheating, the device is not permitted to be placed near other heat sources.

Information about the device's environment

- Observe the notes and regulations regarding the power supply and functional ground.
- Observer the specified bend radius when connecting cables.
- Ventilation openings are not permitted to be covered or blocked.
- The device is only permitted to be operated in closed rooms and not permitted to be exposed to direct sunlight.
- The climatic ambient conditions and environmental conditions must be taken into account – see "Environmental properties" on page 48.

General installation instructions

- Inclined installation reduces the air convection through the device and thus the maximum permissible ambient temperature for operation. If there is sufficient external ventilation in an inclined mounting orientation, the maximum permissible ambient temperature must be checked in each individual case. Failure to do so may result in damage to the equipment and void the certifications and warranty for the device.
- When installing the device, the permissible mounting orientations must be observed - see "Mounting orientations" on page 45.
- The device must be installed in such a way that it can be optimally viewed by the user.
- The device must be installed in such a way that reflections on the screen are avoided as far as possible.
- When connecting installed or connected peripherals, follow the instructions in the peripheral device's documentation.

Information about leak tightness

Warning!

Failure to follow instructions can result in damage to property.

- The gasket must be inspected before installation or reinstallation and at regular intervals according to the requirements of the operating environment.
- Replace the entire device if inspection reveals visible scratches, cracks, dirt deposits or excessive wear.
- Do not stretch the gasket unnecessarily.
- It is important to ensure that the gasket is correctly seated all around.
- The housing components must be secured using the specified tightening torque.

Transport and storage

Information:

Condensation may form under certain environmental conditions or rapid climatic changes. For improved acclimatization and to avoid damage, the device must be slowly adapted to the room temperature.

When transporting at low temperatures or in the event of large temperature fluctuations, the collection of moisture in or on the device is not permitted. Moisture can cause short circuits in electrical circuits and damage the device.

If a device is transported or stored without packaging, all environmental influences such as shocks, vibrations, pressure and moisture have an unprotected effect on the device. Damaged packaging indicates that the device has been severely affected by environmental influences and may have been damaged.

This can result in malfunctions of the device, machine or system.

Use of third-party products

If third-party devices or components are used, the relevant manufacturer's documentation must be observed. If limitations or interactions by or with third-party products are possible, this must be taken into account in the application.

5.2 Automation Panel 5000 - Installation

The Automation Panel 5000 is installed on the swing arm system using a rotary flange.

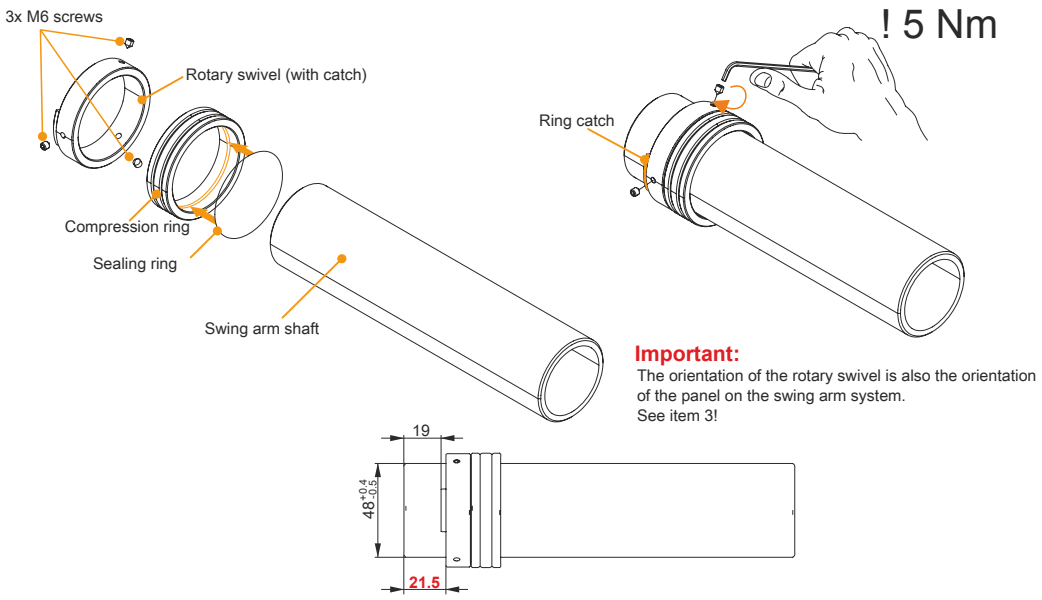
5.2.1 Installation with flange

Information:

Before installing the Automation Panel on a swing arm system, it must be checked as to whether the sealing ring is installed on the flange. In addition, only the flange must be installed on the Automation Panel. For the defined procedure, see section "Installing the 5AC-CFL00.0000-000 rotary flange" on page 154.

An outer diameter of 47.5 to 48.4 mm is permitted for the swing arm shaft. The end of the swing arm shaft installed on the flange must be chamfered at a 45° angle and deburred.

1. The sealing ring must be placed in the groove of the compression ring.
   Slide the rotary swivel and compression ring onto the swing arm shaft and secure them using the 3 M6 headless screws (hex recess, size 3) (tightening torque 5 Nm). The rings must be installed such that the rotary swivel (with catch) is connected to the flange first. The orientation of the rotary swivel should be taken into account. The distance from the bottom edge of the swing arm shaft and the bottom edge of the rotary swivel must be 21.5 mm ±0.5 mm (corresponds to a distance of 19 mm ±0.5 mm from the bottom edge of the swing arm shaft to the ring catch). Spacing between the two rings is not permitted.



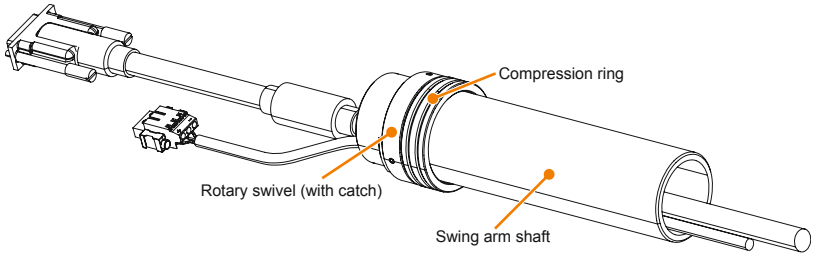
Warning!

The headless screws are equipped with a special screw locking mechanism and only designed to be used once. New headless screws must be used if removing and reinstalling.

Warning!

The distance between the bottom edge of the swing arm shaft and the bottom edge of the rotary swivel must be 21.5 mm ±0.5 mm. If this measurement is not observed, then the Automation Panel will not be sufficiently stable.

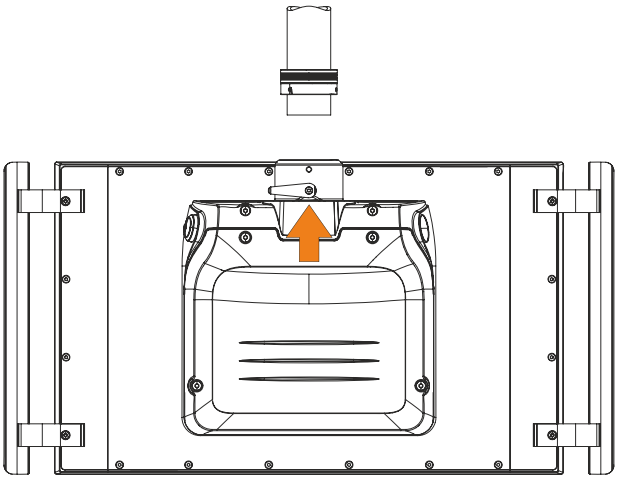
2. Feed the necessary cables through the swing arm shaft. The type of cables that must be used depends on the type of connection. For more information, see section "Connection options" on page 23.

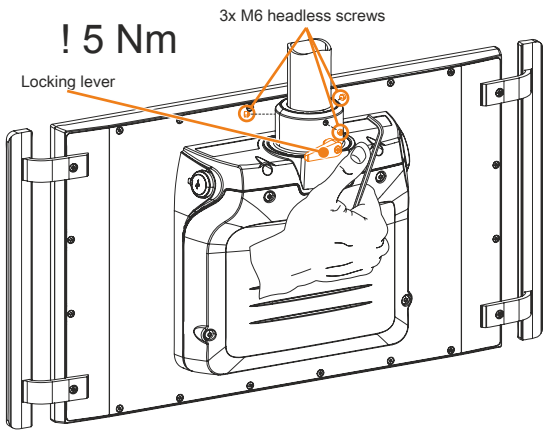


3. Connect the Automation Panel to the swing arm system. The rings must be installed in such a way that the ring catch of the rotary swivel points forward towards the panel. The Automation Panel has been installed correctly if the upper ring is flush with the flange. Fasten the assembly to the swing arm shaft using the 3 M6 headless screws (hex recess, size 3) with a tightening torque of 5 Nm.

   Installation on a swing arm system is possible from the top or bottom depending on how the mounting unit is installed on the panel and the resulting position of the flange output.

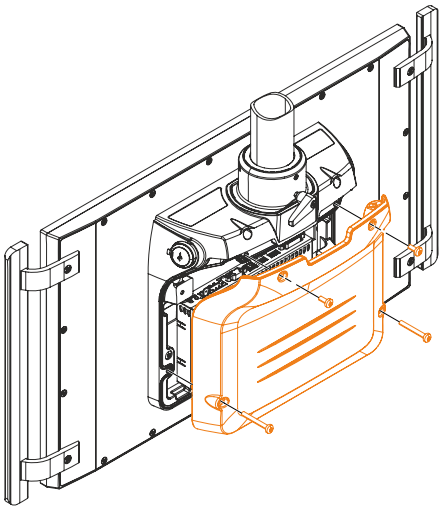
> **Caution!**
>
> **After setting the rotation and/or tilt angle, the corresponding locking lever must be locked into position. For the maximum tightening torques, see the description of the flange used.**
>
> **The screw in the locking lever is not permitted to be tightened. Fixing must be carried out exclusively with the locking lever.**





5.3 Removing the mounting unit cover

1. Disconnect the power supply cable to the Automation Panel (disconnect the power cable!). Disconnect from all sources and poles!
2. Carry out electrostatic discharge at the ground connection.
3. Remove the Torx screws (T25) indicated in the following figure. Insert a flat-blade screwdriver into the slot from the side and remove the cover. Avoid causing irreparable damage to the gasket.



4. Replace the mounting unit cover with the 4 Torx screws removed earlier (tightening torque of the M5x12 screws: 2.5 Nm, for the M5x40 screws: 4.0 Nm). The cover must be installed correctly to ensure IP65 protection.

5.4 Removing the link module

The following requirements must be met:

- All connected cables must be disconnected.
- The Automation Panel must no longer be installed on the swing arm system.

1. Disconnect the power supply cable to the Automation Panel (disconnect the power cable). Disconnect from all sources and poles!
2. Carry out electrostatic discharge at the ground connection.
3. Place the Automation Panel on a clean, flat surface.
4. Remove the Torx screws (T10) indicated in the following figure.

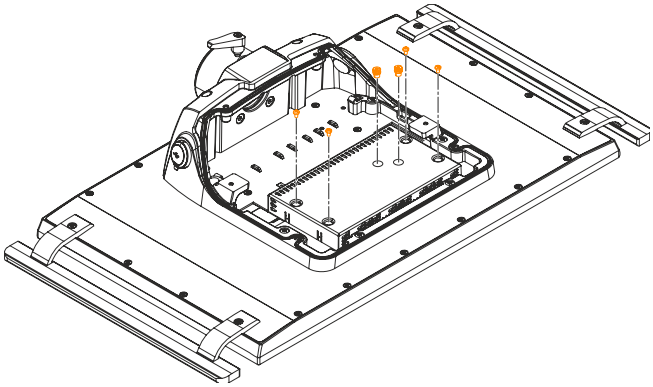


Figure 2: Removing the Torx screws

5. Pull firmly and evenly to remove the link module.

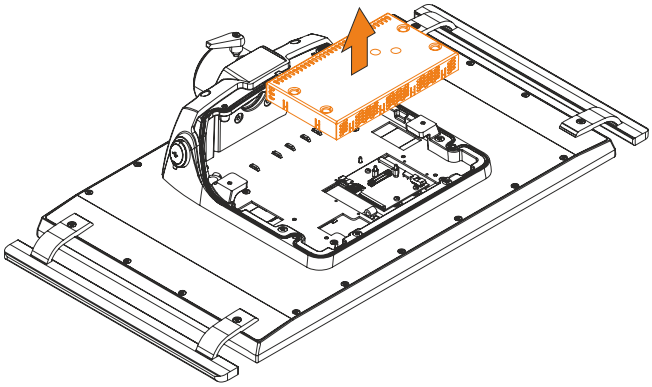


Figure 3: Removing the link module

6. The link module can now be replaced by following these steps in reverse order. The max. tightening torque of the Torx screws (T10) is 0.5 Nm.

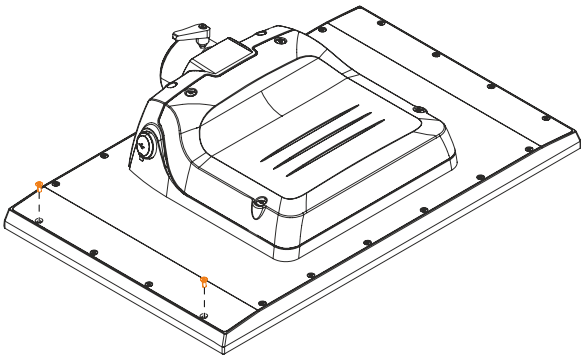
5.5 Installing accessories

5.5.1 Installing the handles

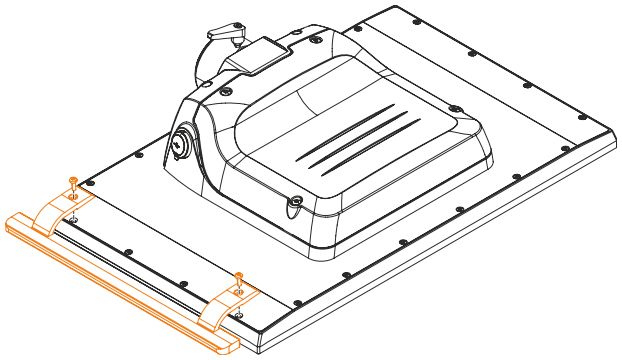
The following requirements must be met:

- All connected cables must be disconnected.
- The Automation Panel must no longer be installed on the VESA or swing arm system.

1. Disconnect the power supply cable to the Automation Panel (disconnect the power cable!). Disconnect from all sources and poles!
2. Carry out electrostatic discharge at the ground connection.
3. Place the Automation Panel on a clean, flat surface.
4. Remove the top and bottom Torx screws (T20) on the side of the panel.



5. Insert the provided Torx screws (T20) through the handle and tighten with max. tightening torque of 1.24 Nm.

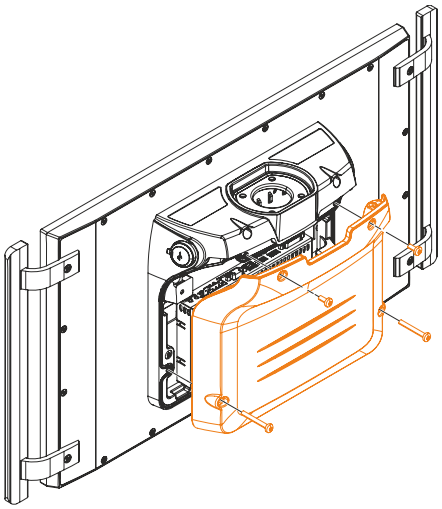


5.5.2 Installing the 5ACCFL00.0000-000 rotary flange

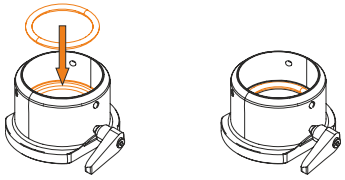
The following requirements must be met:

- All connected cables must be disconnected.
- The Automation Panel must no longer be installed on the VESA or swing arm system.

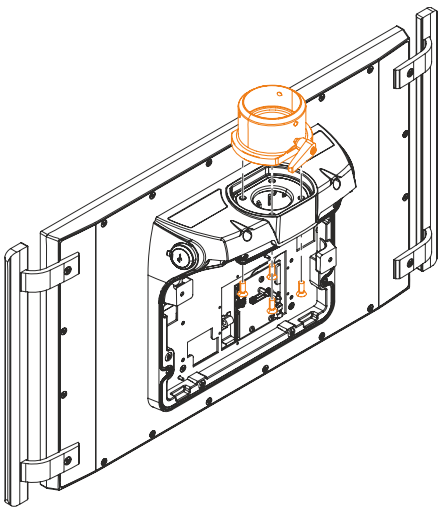
1. Disconnect the power supply cable to the Automation Panel (disconnect the power cable!). Disconnect from all sources and poles!
2. Carry out electrostatic discharge at the ground connection.
3. Place the Automation Panel on a clean, flat surface.
4. Remove the Torx screws (T25) indicated in the following figure. Insert a flat-blade screwdriver into the slot from the side and remove the cover. Avoid causing irreparable damage to the gasket.



5. The link module must be removed before the rotary flange can be installed. To do so, perform the steps provided in section "Removing the link module" on page 152 in reverse order.
6. Check whether the sealing ring is inserted in the rotary flange. If the sealing ring is not installed in the rotary flange, it must be inserted into the sealing recess.



7. Place the rotary flange in the intended opening on the mounting unit with the locking lever pointing towards the mounting unit. Fasten it to the mounting unit using the 4 provided Torx screws (T30) with a tightening torque of 7.2 Nm.

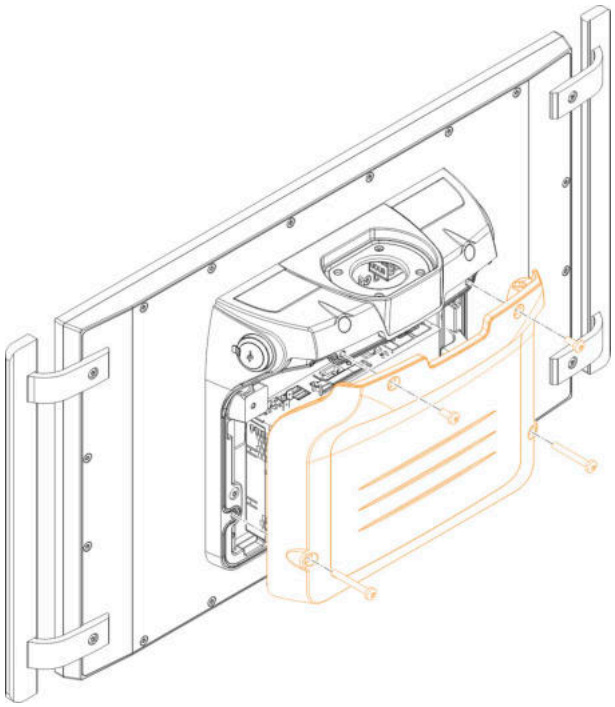


5.5.3 Installing the 5ACCFL00.0100-000 swivel-tilt flange

The following requirements must be met:

- All connected cables must be disconnected.
- The Automation Panel must no longer be installed on the VESA or swing arm system.

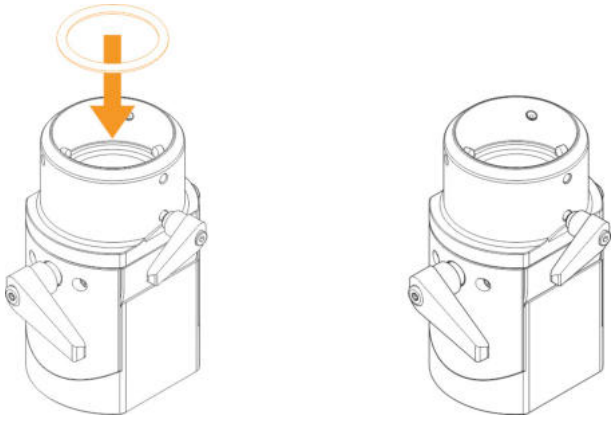
1. Disconnect the power supply cable to the Automation Panel (disconnect the power cable!). Disconnect from all sources and poles!
2. Carry out electrostatic discharge at the ground connection.
3. Place the Automation Panel on a clean, flat surface.
4. Loosen the Torx screws (T25) indicated in the following figure. Insert a flat-blade screwdriver into the slot from the side and remove the cover. Avoid causing irreparable damage to the gasket.



Notice!

Before starting to install the swivel-tilt flange, move it to the zero position!

5. The link module must be removed before the swivel-tilt flange can be installed. To do so, perform the steps provided in section "Removing the link module" on page 152 in reverse order.
6. Check whether the sealing ring is inserted in the swivel-tilt flange. If the sealing ring is not installed in the swivel-tilt flange, it must be inserted into the sealing recess.



7. Guide the cables to be connected through the swing arm (if this is also newly installed) and the swivel-tilt flange.

Information:

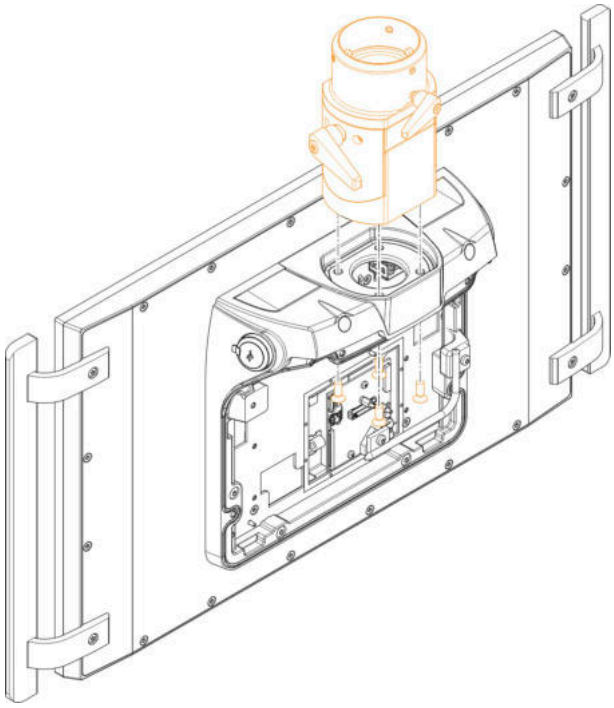
Due to the geometry of the sealing hose, wider connections such as a DVI connection only fit in one direction through the swivel-tilt flange. It is important to ensure that these are guided through the hose at the appropriate angle.

Failure to do so can result in damage to property.

8. Place the swivel-tilt flange in the provided opening on the mounting unit. The locking lever of the swivel-tilt flange must be installed as shown in the following figure. This makes it possible to operate from the rear. Fasten it to the mounting unit using the 4 provided Torx screws (T30) with a tightening torque of 7.2 Nm.

Note:

It is important to ensure that the cables are not pinched!



Warning!

The following tightening torques must be observed:

- **Tilt flange locking lever: 7 Nm**
- **Locking lever rotary flange: 5 Nm**

Failure to do so can result in damage to property.

5.5.4 Removing the swing arm mounting unit

The mounting unit can be rotated 180°, which makes it possible to install on a swing arm system from above or below.

The following requirements must be met:

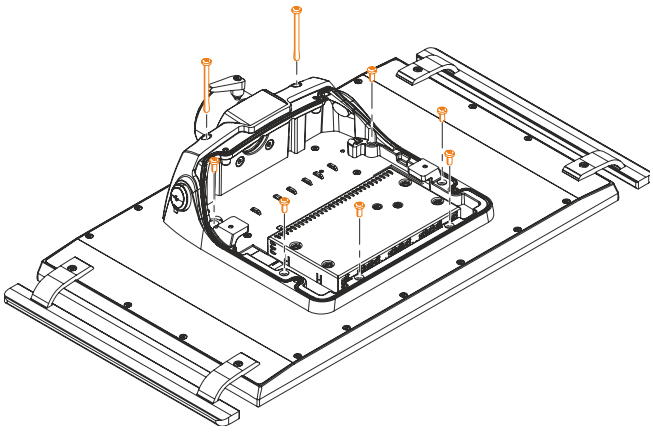
- All connected cables must be disconnected.
- The Automation Panel must no longer be installed on the VESA or swing arm system.

1. Disconnect the power supply cable to the Automation Panel (disconnect the power cable!). Disconnect from all sources and poles!
2. Carry out electrostatic discharge at the ground connection.
3. Place the Automation Panel on a clean, flat surface.
4. Remove the mounting unit cover by following the steps provided in section "Removing the mounting unit cover" on page 151.
5. Remove the 8 Torx screws used to fasten the mounting unit to the Automation Panel (T25: 2x M5x65, 6x M5x12).

Warning!

Failure to follow instructions can result in damage to property.

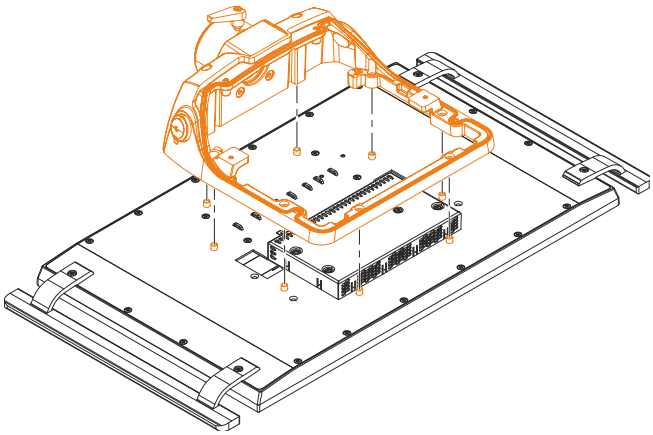
- The gasket must be inspected before installation or reinstallation and at regular intervals according to the requirements of the operating environment.
- Replace the entire device if inspection reveals visible scratches, cracks, dirt deposits or excessive wear.
- Do not stretch the gasket unnecessarily.
- It is important to ensure that the gasket is correctly seated all around.
- The housing components must be secured using the specified tightening torque.



Warning!

The M5x65 screws are equipped with a special screw locking mechanism and only designed to be used once. New screws must be used if removing and reinstalling.

6. Pull evenly to remove the mounting unit from the panel.



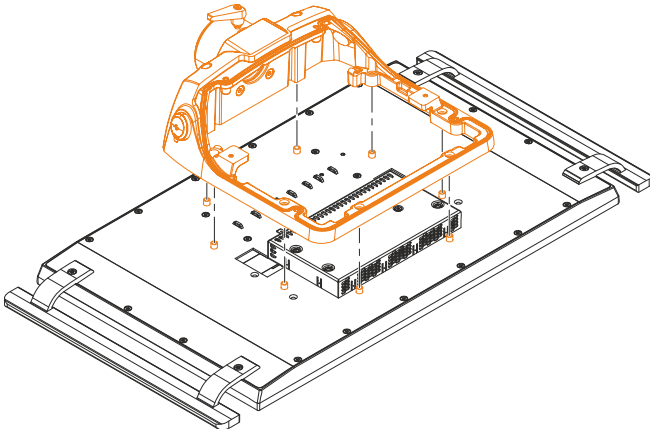
5.5.5 Installing the swing arm mounting unit

The mounting unit can be rotated 180°, which makes it possible to install on a swing arm system from above or below.

The following requirements must be met:

- All connected cables must be disconnected.
- The Automation Panel must no longer be installed on the VESA or swing arm system.

1. Disconnect the power supply cable to the Automation Panel (disconnect the power cable!). Disconnect from all sources and poles!
2. Carry out electrostatic discharge at the ground connection.
3. Place the Automation Panel on a clean, flat surface.
4. Place the mounting unit on the panel. The openings in the mounting unit must be lined up with the mounting pins on the panel.

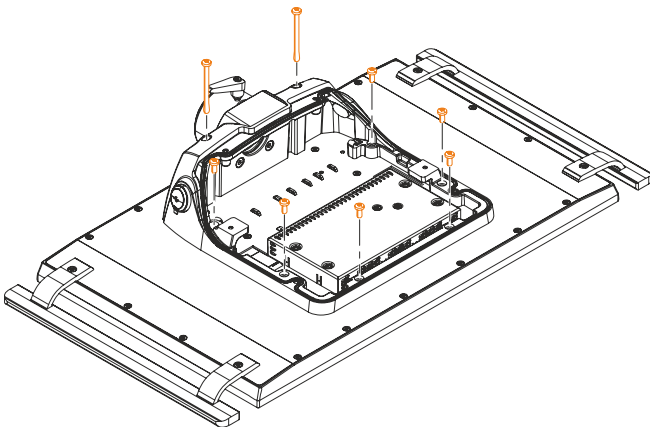


5. Install the mounting unit on the panel using the 8 provided Torx screws (T25: 2x M5x65, 6x M5x12). The tightening torque for each is 2.5 Nm.

Warning!

Failure to follow instructions can result in damage to property.

- The gasket must be inspected before installation or reinstallation and at regular intervals according to the requirements of the operating environment.
- Replace the entire device if inspection reveals visible scratches, cracks, dirt deposits or excessive wear.
- Do not stretch the gasket unnecessarily.
- It is important to ensure that the gasket is correctly seated all around.
- The housing components must be secured using the specified tightening torque.



Warning!

The M5x65 screws are equipped with a special screw locking mechanism and only designed to be used once. New screws must be used if removing and reinstalling.

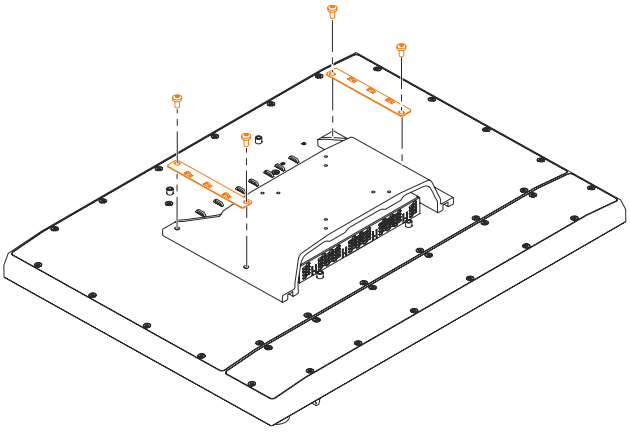
6. Install the cover for the mounting unit by performing the steps provided in section "Removing the mounting unit cover" on page 151 in reverse order.

5.5.6 Removing the VESA mounting unit

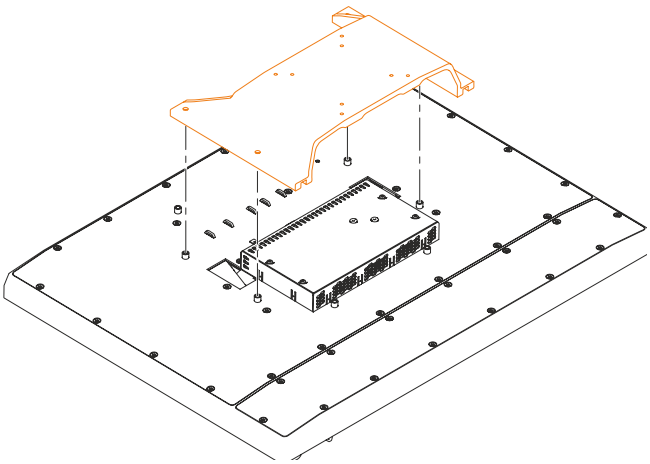
The following requirements must be met:

- All connected cables must be disconnected.
- The Automation Panel must no longer be installed on the VESA or swing arm system.

1. Disconnect the power supply cable to the Automation Panel (disconnect the power cable!). Disconnect from all sources and poles!
2. Carry out electrostatic discharge at the ground connection.
3. Place the Automation Panel on a clean, flat surface.
4. Remove the 4 Torx screws (T25: 4x M5x10) and 2 metal pieces (designed for the cable strain relief clip) used to install the mounting unit on the panel.



5. Pull evenly to remove the mounting unit from the panel.

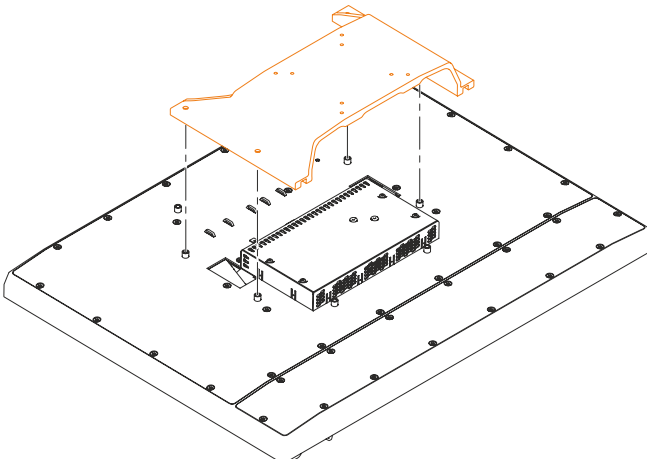


5.5.7 Installing the VESA mounting unit

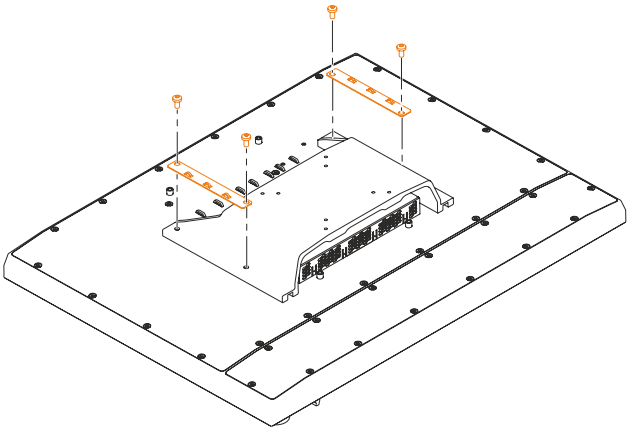
The following requirements must be met:

- All connected cables must be disconnected.
- The Automation Panel must no longer be installed on the VESA or swing arm system.

1. Disconnect the power supply cable to the Automation Panel (disconnect the power cable!). Disconnect from all sources and poles!
2. Carry out electrostatic discharge at the ground connection.
3. Place the mounting unit on the panel. The openings in the mounting unit must be lined up with the mounting pins on the panel.



4. Install the mounting unit on the panel using the 4 provided Torx screws (T25: 4x M5x10) and 2 metal pieces (designed for the cable strain relief clip). The tightening torque for each is 3.5 Nm. Follow the order shown in the following figure.



5. 4 Torx screws (T20: 4x M4x10) and 6 cable ties are supplied for fastening the Automation Panel to a VESA bracket. Observer the installation notes from the manufacturer.

5.5.8 Uninstalling the IP54 VESA mounting unit

Notice!

The following note must be observed when using a AP5000:

The heat pipe can reach an elevated temperature. It is therefore recommended to wait some time after switching off before opening the cover.

The following requirements must be met:

- All connected cables must be disconnected.
- The Automation Panel must no longer be installed on the VESA or swing arm system.

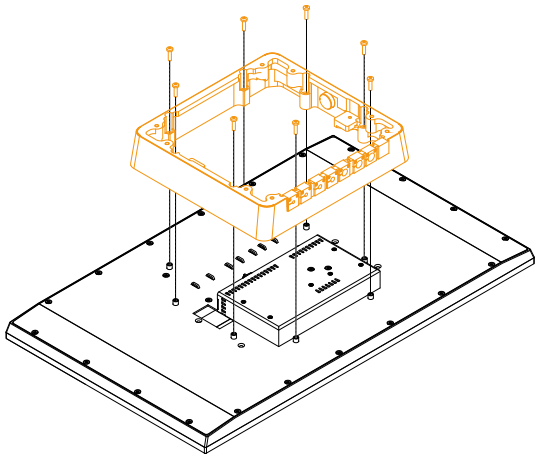
1. To uninstall the IP54 VESA mounting unit, perform the installation in reverse order (see "Installing the IP54 VESA mounting unit" on page 164).

5.5.9 Installing the IP54 VESA mounting unit

The following requirements must be met:

- All connected cables must be disconnected.
- The Automation Panel must no longer be installed on the VESA or swing arm system.

1. Disconnect the power supply cable to the Automation Panel (disconnect the power cable). Disconnect from all sources and poles!
2. Carry out electrostatic discharge at the ground connection.
3. Place the mounting unit frame on the panel. The openings in the frame must be lined up with the mounting pins on the panel.

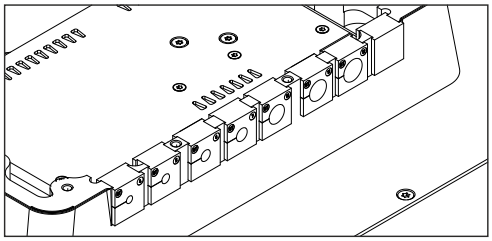


4. Install the frame on the panel using the 8 provided Torx screws (T25: 8x M5x20).
   The tightening torque for each is 2.5 Nm.
5. Secure the cable grommets with the flat side facing upwards.

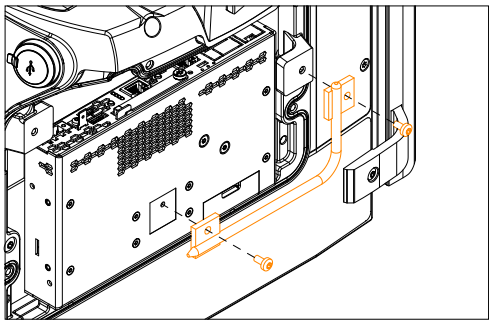
Notice!

It is important to note that the cables must first be inserted into the grommets before they are pushed into the guide.

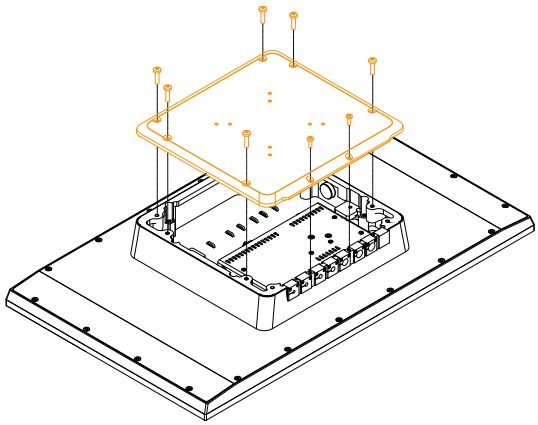
Failure to follow this instruction can result in damage to property.



6. If the mounting unit is used in conjunction with a , the heat pipe including heat pipe cover must also be installed. The following figure symbolically displays the heat pipe installation.



7. Place the mounting unit cover on the frame.



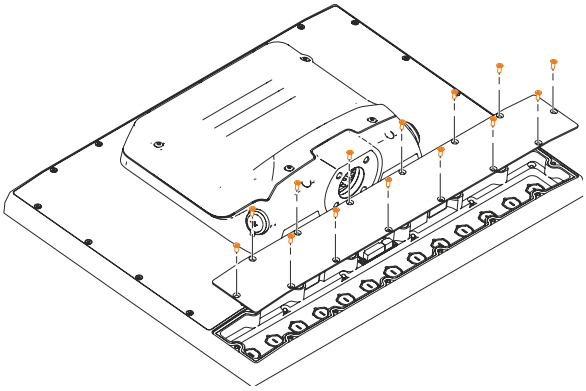
8. Install the cover using the 8 provided Torx screws (T25: 6x M5x20 and T20: 2x M4x12). Tightening torque: 2.5 Nm for M5, 1.24 Nm for M4.

5.5.10 Removing the expansion unit/cover

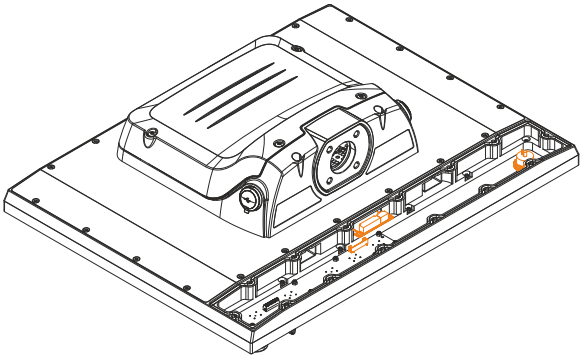
The following requirements must be met:

- All connected cables must be disconnected.
- The Automation Panel must no longer be installed on the VESA or swing arm system.

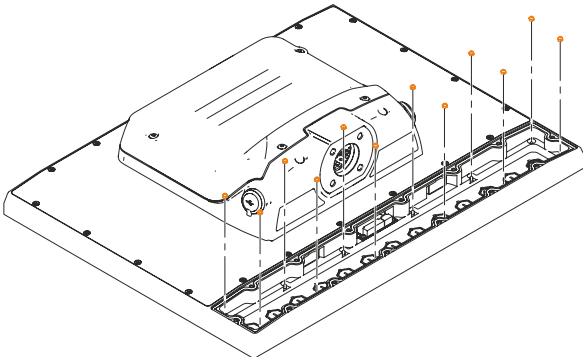
1. Disconnect the power supply cable to the Automation Panel (disconnect the power cable!). Disconnect from all sources and poles!
2. Carry out electrostatic discharge at the ground connection.
3. Place the Automation Panel on a clean, flat surface.
4. Remove the back cover of the panel by removing the 14 Torx screws (T20).



5. If an expansion unit is installed, the cables for the circuit board and front USB interface must be disconnected from the panel's circuit board.



6. Remove the 12 nuts (M3) indicated in the following figure and remove the expansion unit / expansion cover from the panel.



Information about leak tightness

Warning!

Failure to follow instructions can result in damage to property.

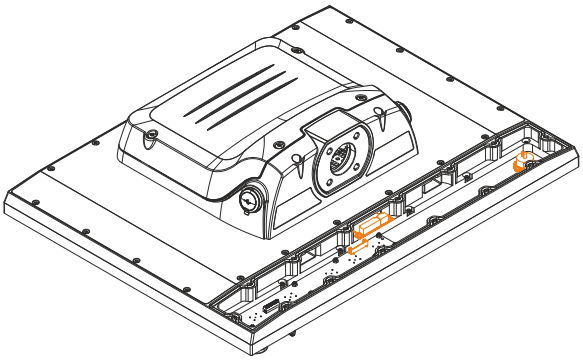
- The gasket must be inspected before installation or reinstallation and at regular intervals according to the requirements of the operating environment.
- Replace the entire device if inspection reveals visible scratches, cracks, dirt deposits or excessive wear.
- Do not stretch the gasket unnecessarily.
- It is important to ensure that the gasket is correctly seated all around.
- The housing components must be secured using the specified tightening torque.

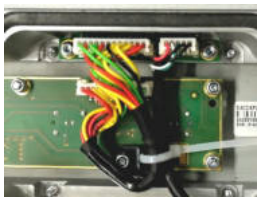
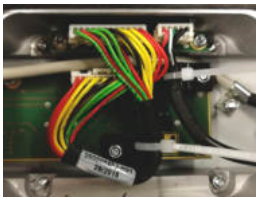
5.5.11 Installing the expansion unit/cover

The following requirements must be met:

- All connected cables must be disconnected.
- The Automation Panel must no longer be installed on the VESA or swing arm system.

1. Disconnect the power supply cable to the Automation Panel (disconnect the power cable!). Disconnect from all sources and poles!
2. Carry out electrostatic discharge at the ground connection.
3. Place the Automation Panel on a clean, flat surface.
4. Insert the front of the expansion unit / expansion cover into the panel. Secure to the back with the 12 nuts (M3). The tightening torque for each is 0.55 Nm.
5. Connect the cables for the circuit board and front USB interface to the terminal strips on the panel's circuit board.

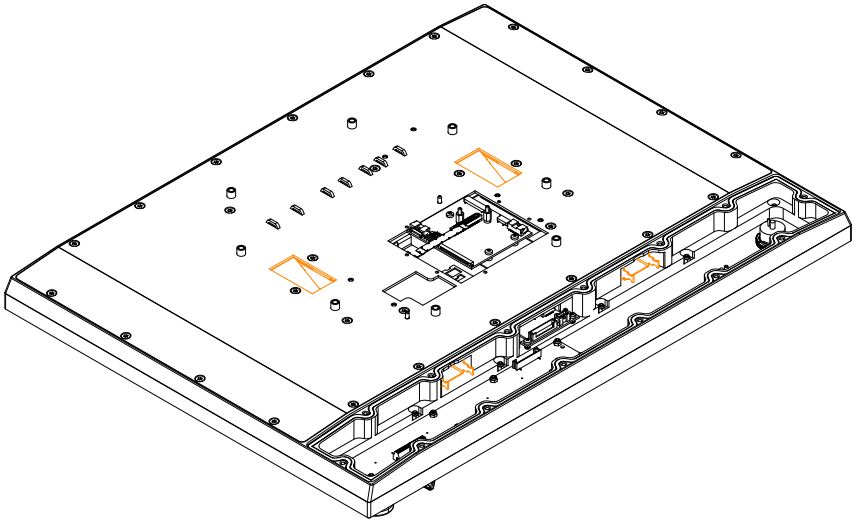


Wiring the expansion unit			
5ACCKP01.185B-000	5ACCKP04.185B-000	5ACCKP03.185B-000	5ACCKP05.185B-000
Execution with one slot:		Execution with two slots:	
			

Warning!

It is important to ensure that cables and wires are not pinched.

6. It is possible to lead any wiring or extensions to the outside through an installed flange via the cable ducts in the panel.



7. If required, wire the operating elements.

   For information about wiring operating elements on the expansion unit, see section "Button/Switch interface" on page 71.

   For information about wiring or installing operating elements on the expansion cover, see section "Installing operating elements on the expansion cover" on page 170.

8. Install the back cover with the 14 Torx screws (T20). The tightening torque for each is 2.3 Nm.

Information about leak tightness

Warning!

Failure to follow instructions can result in damage to property.

- The gasket must be inspected before installation or reinstallation and at regular intervals according to the requirements of the operating environment.
- Replace the entire device if inspection reveals visible scratches, cracks, dirt deposits or excessive wear.
- Do not stretch the gasket unnecessarily.
- It is important to ensure that the gasket is correctly seated all around.
- The housing components must be secured using the specified tightening torque.

5.5.12 Installing operating elements on the expansion cover

The following requirements must be met:

- All connected cables must be disconnected.
- The Automation Panel must no longer be installed on the VESA or swing arm system.

B&R recommends the following operating elements for proper installation and operation:

- RAFIX 22 FS series
- RAFIX 22 FS+ series
- SHORTRON series

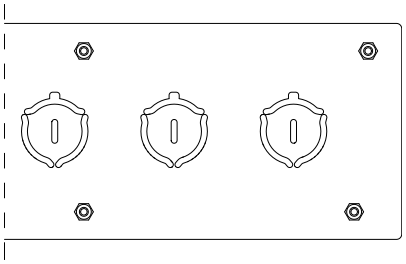
The corresponding manufacturer specifications must be observed when installing operating elements.

1. Disconnect the power supply cable to the device (disconnect the power cable!). Disconnect from all sources and poles!
2. Carry out electrostatic discharge at the ground connection.
3. Place the Automation Panel on a clean, flat surface.
4. If an expansion unit is installed, it must first be removed. To do so, follow the instructions in section "Removing the expansion unit/cover" on page 166.
5. If an expansion cover is not installed, then one must be installed. To do so, follow the instructions in section "Installing the expansion unit/cover" on page 168.

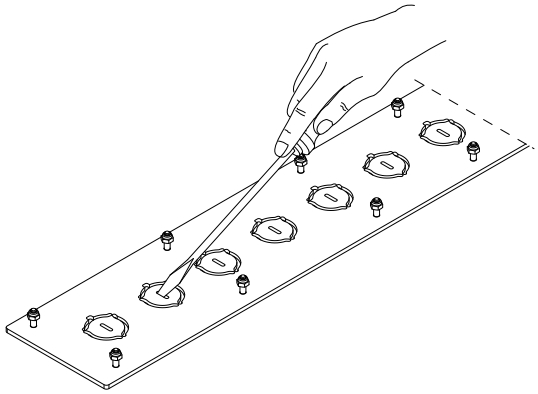
Information:

The following steps can only be performed after an expansion cover has been installed in the Automation Panel 5000.

6. Cut through the panel overlay from the inside with a sharp object (e.g. scalpel) along the outer edges of the 3 curved cutout areas.



7. Carefully cut the panel overlay at the notch for the anti-twist lock.
8. Cut through the panel overlay along the outer edges of the middle cutout with a scalpel.
9. Push though the cutout for the operating element with a flat-blade screwdriver.



10. Cut the panel overlay so that it is flush with the edge of the steel plate.
11. Operating elements can now be installed on the expansion cover.

For more information about operating and switching elements, see section "Features" on page 214.

5.5.13 Replacing colored lenses

1. Place the colored lens on the operating element. Press the notches on the colored lens into the 4 large openings of the pushbutton.
2. If required, the colored lens can be removed using a sharp object.

Refer to the manufacturer guidelines for additional information about installing operating elements.

5.6 Connecting to the power grid

Danger!

- **The entire power supply must be disconnected and electrostatic discharge must take place on the housing or ground connection before removing any covers or components from the device and installing or removing any accessories, hardware or cables.**
- **Remove the power cable from the device and from the power supply.**
- **All covers and components, accessories, hardware and cables must be installed or secured before the device is connected to the power supply and switched on.**

5.6.1 Installing the DC power cable

Danger!

The entire power supply to the B&R industrial PC or B&R Automation Panel must be interrupted. Before connecting the DC power cable, it must be checked whether it has been disconnected from the voltage source (e.g. power supply unit).

5.6.1.1 Wiring

Caution!

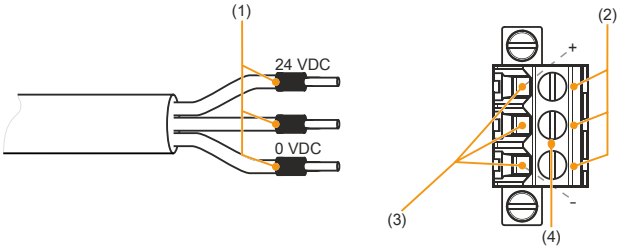
The pinout of the power supply interface must be observed!

The DC power cable must be implemented with a wire cross section of 0.75 mm² to 1.5 mm² and wire end sleeves.

Conductors of the power cable	Terminal connection symbol
+24 VDC	+
GND	⏚
0 VDC	-

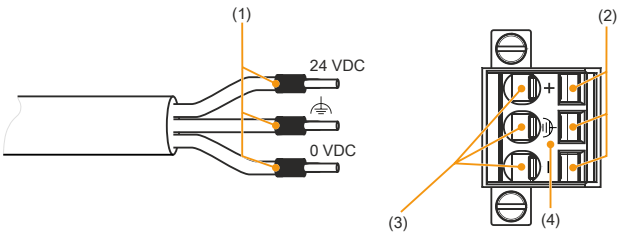
Installing screw clamp terminal block 0TB103.9

Secure the conductors with wire end sleeves ① in the terminal contacts ③ as shown in the figure below and tighten the screw clamp terminals ④ with a screwdriver (max. tightening torque 0.4 Nm). It is important to pay attention to the label on the spring clamp terminal ②.



Installing cage clamp terminal block 0TB103.91

Insert a screwdriver into the cage clamp terminals ③ and secure the conductors with wire end sleeves ① in the terminal contacts ② as shown in the figure below. Close the terminal contact by removing the screwdriver. It is important to pay attention to the label on the spring clamp terminal ④.

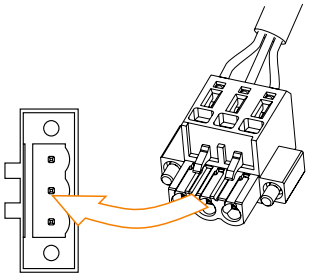


5.6.2 Connecting the power supply to a B&R device

Danger!

The entire power supply to the B&R device must be interrupted. Before connecting the power cable, it must be checked whether it has been disconnected from the voltage source (e.g. power supply unit).

1. Carry out electrostatic discharge on the housing or at the ground connection.
2. Connect the power supply connector to the B&R device and tighten the mounting screws (max. tightening torque 0.5 Nm).



5.6.3 Grounding concept - Functional ground

Functional ground is a low impedance current path between circuits and ground. It is used for equipotential bonding and thus for improving immunity to interference.

Notice!

Functional grounding does not meet the requirements of protective ground!
Suitable measures for electrical safety in the event of operation and faults must be provided separately.

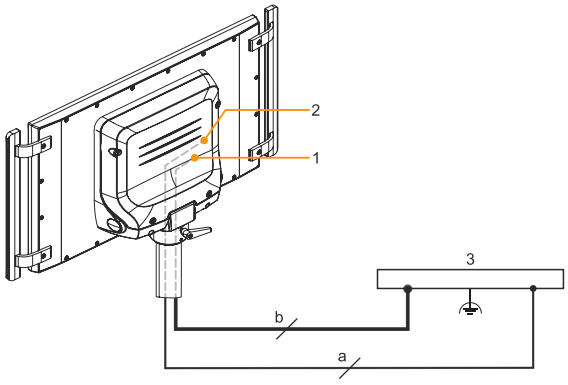
The device is equipped with the following functional ground connections:

- Functional ground connection of the power supply
- Ground connection

The functional ground on the B&R device is marked with the following symbol: ⏚

The following points must be observed to ensure that electrical interference is safely diverted:

- Connect the device to the central grounding point (e.g. the control cabinet or the system) using the shortest possible low-resistance path.
- Cable design with at least 2.5 mm² per connection. If a cable with wire end sleeve is used with terminal block 0TB103.9 or 0TB103.91, a cable with a maximum of 1.5 mm² per connection is possible.
- Observe the shielding concept of the conductors. All data cables connected to the device must be implemented using shielded lines.



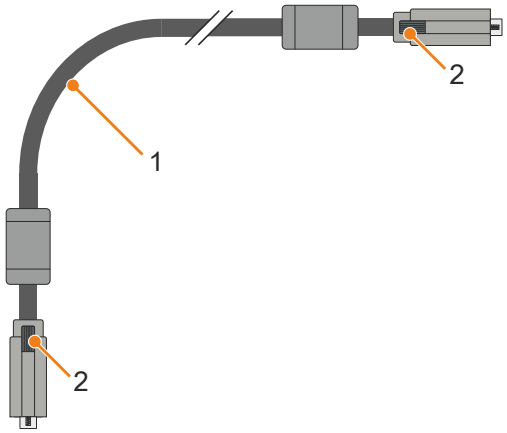
Legend					
1	Ground connection ⏚	2	Power supply connection +24 VDC pin 2	3	Central grounding point
a	At least 1.5 mm²	b	At least 2.5 mm²	-	

5.7 Connecting cables

Information:

B&R generally recommends connecting swing arm devices to the Automation PC via SDL4 instead of SDL. The Cat 6 / Cat 7 cables used with SDL4 are much easier to install and connect.

When connecting or installing cables, the bend radius specification must be observed. For this specification, see the technical data of the respective cable.
The maximum tightening torque of the locating screws is 0.5 Nm.



1) Bend radius
2) Locating screws

5.7.1 Wiring with SDL cables

It is possible to use 5CASDL.0xxx-00 SDL cables, 5CASDL.0xxx-01 SDL cables with 45° connector and 5CASDL.0xxx-03 SDL flex cables for the Automation Panel 5000 with SDL receiver.

6 Commissioning

Caution!

Before the device is started up, it must be gradually adapted to room temperature! Exposure to direct heat radiation is not permitted.

When transporting at low temperatures or in the event of large temperature fluctuations, the collection of moisture in or on the device is not permitted.

Moisture can cause short circuits in electrical circuits and damage the device.

6.1 Switching on the device for the first time

Before the device is started up for the first time, the following points must be checked:

- Have the installation instructions been observed as described in "Installation and wiring" on page 146?
- Have the permissible ambient conditions and environmental conditions for the device been taken into account?
- Is the power supply connected correctly and have the values been checked?
- Is the ground cable correctly connected to the ground connection?
- Before installing additional hardware, the device must have been started up.

Requirements

- The protective film has been removed from the panel.
- The functional ground connections are as short as possible and connected to the central grounding point using the largest possible wire cross section.
- All connection cables are connected correctly.
- A USB keyboard and USB mouse are connected (optional).
- An Automation PC or Panel PC is connected (via DVI, SDL, SDL3 or SDL4).

Procedure

1. Connect the power supply and switch it on.
2. The device is operating.

6.2 Touch screen calibration

B&R panels are hardware-calibrated at the factory. This means that recalibration is not usually necessary.

6.2.1 Single-touch (analog resistive)

Recalibration is generally not necessary. Nevertheless, B&R recommends recalibration in order to best adapt the touch screen to the user's needs.

6.2.1.1 Windows 10 IoT Enterprise 2021 LTSC

After starting Windows 10 IoT Enterprise 2021 LTSC on a Panel PC for the first time, the appropriate touch screen driver is installed automatically.

On all other devices, the touch screen driver must be subsequently installed to operate the touch screen. The appropriate driver is available for download in the Downloads section of the B&R website (www.br-automation.com).

6.2.1.2 Windows 10 IoT Enterprise 2019 LTSC

After starting Windows 10 IoT Enterprise 2019 LTSC on a Panel PC for the first time, the appropriate touch screen driver is installed automatically.

On all other devices, the touch screen driver must be subsequently installed to operate the touch screen. The appropriate driver is available for download in the Downloads section of the B&R website (www.br-automation.com).

6.2.1.3 Windows 10 IoT Enterprise 2016 LTSB

After starting Windows 10 IoT Enterprise 2016 LTSB on a Panel PC for the first time, the appropriate touch screen driver is installed automatically.

On all other devices, the touch screen driver must be subsequently installed to operate the touch screen. The appropriate driver is available for download in the Downloads section of the B&R website (www.br-automation.com).

6.2.1.4 Windows 10 IoT Enterprise 2015 LTSB

After starting Windows 10 IoT Enterprise 2015 LTSB on a Panel PC for the first time, the appropriate touch screen driver is installed automatically.

On all other devices, the touch screen driver must be subsequently installed to operate the touch screen. The appropriate driver is available for download in the Downloads section of the B&R website (www.br-automation.com).

6.2.1.5 Windows Embedded 8.1 Industry Pro

After starting Windows Embedded 8.1 Industry Pro on the Panel PC for the first time, the corresponding touch screen driver is installed automatically.

On all other devices, the touch screen driver must be subsequently installed to operate the touch screen. The appropriate driver is available for download in the Downloads section of the B&R website (www.br-automation.com).

6.2.1.6 Windows 7 Professional / Ultimate

After installing Windows 7 on the device, the touch screen driver must be installed in order to operate the touch screen. The appropriate driver is available for download in the Downloads section of the B&R website (www.br-automation.com).

6.2.1.7 Windows Embedded Standard 7 Embedded / Premium

A touch screen driver will be installed automatically if a touch controller is detected during the Windows Embedded Standard 7 installation.

The touch screen driver must be installed manually if a touch screen controller was not detected when installing Windows Embedded Standard 7 or if an Automation Panel has been connected after installation. The appropriate driver is available for download in the Downloads section of the B&R website (www.br-automation.com).

6.2.1.8 Windows XP Professional

After installing Windows XP Professional on the device, the touch screen driver must be installed in order to operate the touch screen. The appropriate driver is available for download in the Downloads section of the B&R website (www.br-automation.com).

6.2.1.9 Windows Embedded Standard 2009

After starting Windows Embedded Standard 2009 on the Panel PC or Power Panel for the first time (first boot agent), the corresponding touch screen driver is installed automatically.

On all other devices, the touch screen driver must be subsequently installed to operate the touch screen. The appropriate driver is available for download in the Downloads section of the B&R website (www.br-automation.com).

6.2.2 Multi-touch (projected capacitive - PCT)

6.2.2.1 Windows 10 IoT Enterprise 2021 LTSC

After starting Windows 10 IoT Enterprise 2021 LTSC on a Panel PC for the first time, the appropriate touch screen driver is installed automatically.

On all other devices, the touch screen driver must be subsequently installed to operate the touch screen. The appropriate driver is available for download in the Downloads section of the B&R website (www.br-automation.com).

6.2.2.2 Windows 10 IoT Enterprise 2019 LTSC

Microsoft multi-touch drivers are installed on the device during installation of Windows 10 IoT Enterprise 2019 LTSC. After successful installation of Windows 10 IoT Enterprise 2019 LTSC, the device is immediately ready for operation.

6.2.2.3 Windows 10 IoT Enterprise 2016 LTSB

Microsoft multi-touch drivers are installed on the device during installation of Windows 10 IoT Enterprise 2016 LTSB. After successful installation of Windows 10 IoT Enterprise 2016 LTSB, the device is immediately ready for operation.

6.2.2.4 Windows 10 IoT Enterprise 2015 LTSB

Microsoft multi-touch drivers are installed on the device during installation of Windows 10 IoT Enterprise 2015 LTSB. After successful installation of Windows 10 IoT Enterprise 2015 LTSB, the device is immediately ready for operation.

6.2.2.5 Windows Embedded 8.1 Industry Pro

Microsoft multi-touch drivers are installed on the device during installation of Windows Embedded 8.1 Industry Pro. After successful installation of Windows Embedded 8.1 Industry Pro, the device is immediately ready for operation.

6.2.2.6 Windows 7 Professional / Ultimate

Microsoft multi-touch drivers are installed on the device during installation of Windows 7. After successful installation of Windows 7, the device is immediately ready for operation.

6.2.2.7 Windows Embedded Standard 7 Premium

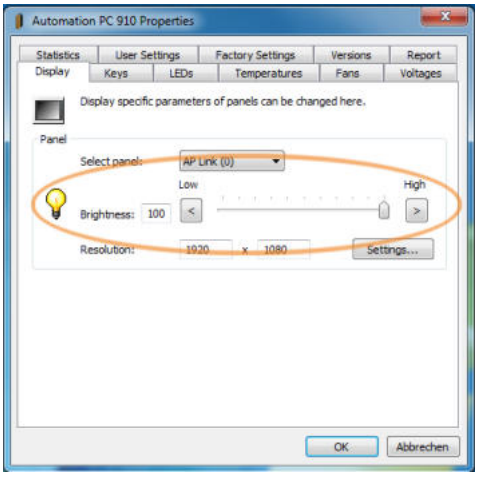
Microsoft multi-touch drivers are installed on the device during installation of Windows Embedded Standard 7 Premium. After successful installation of Windows Embedded Standard 7 Premium, the device is immediately ready for operation.

6.3 Display brightness control

In SDL, SDL3 or SDL4 operation, the brightness of the display can be configured using the B&R Control Center on the connected B&R industrial PC, for example. In DVI operation, the brightness can only be controlled using the two brightness controls provided on the SDL/DVI receiver. In the DP receiver use case, the display brightness can be adjusted via the OSD menu.

6.3.1 Adjusting in SDL / SDL3 / SDL4 mode

1. Open **Control Center** in the Control Panel.
2. Select the **Display** tab.
3. Select the Automation Panel from the list.
4. Set the desired brightness using the slider.



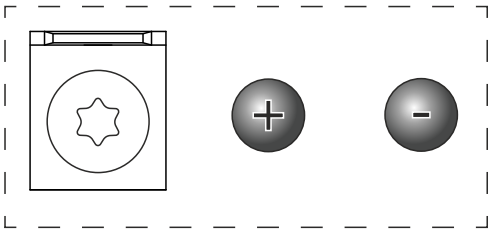
Information:

The changed settings are displayed online but only applied by the system (and used after the next restart) if the Control Center is exited with OK**.**

The configured brightness is independent of the value configured in BIOS Setup, i.e. the value set in BIOS is used until Windows boots. The value set in BIOS is only applied the first time the Control Center is launched.

6.3.2 Adjusting in DVI operation

1. Use the two brightness controls on the SDL/DVI receiver to set the brightness (for additional information, see "SDL/DVI receiver (5DLSDL.1001-00)" on page 60).



6.3.3 Adjusting in DP operation

Adjusting the display brightness is described in "Sets - Brightness setting" on page 59.

7 Software

7.1 Upgrade information

Warning!

The BIOS and firmware on B&R devices must always be kept up to date. Current versions can be downloaded from the B&R website (www.br-automation.com).

7.1.1 Automation Panel firmware upgrade

With Firmware upgrade (Automation Panel, SDL3 Converter, SLD4 converter), it is possible to update the firmware of several controllers (SDLR, SDL3R, SDL4R, SDL3 Converter, SDL4 Converter) depending on the variant of the system.

A current firmware upgrade can be downloaded directly from the Downloads section of the B&R website (www.br-automation.com).

Caution!

The Automation Panel is not permitted to be switched off or reset while performing an upgrade!

7.2 Multi-touch drivers

Multi-touch panels are approved as human-interface devices (i.e. multi-touch support from the operating system) for the following operating systems:

- Windows 10 IoT Enterprise 2021 LTSC
- Windows 10 IoT Enterprise 2019 LTSC
- Windows 10 IoT Enterprise 2016 LTSB
- Windows 10 IoT Enterprise 2015 LTSB
- Windows Embedded 8.1 Industry Pro
- Windows 7 Professional/Ultimate
- Windows Embedded Standard 7 Premium
- Linux for B&R 12
- Linux for B&R 10
- Linux for B&R 9
- Linux for B&R 8

No guarantee can be given for multi-touch or single-touch operation, compatibility and functionality for operation with other operating systems and/or individual touch screen drivers.

7.3 Automation software

7.3.1 Licensing

B&R Automation Runtime software components (e.g. Automation Runtime, B&R Hypervisor, mapp Technology) require a license.

It is possible to choose between the following licensing types:

Technology Guarding (TG)

Technology Guarding is license protection used for individual software components. The Technology Guard (hardware dongle) serves as the license container; this is connected to an available USB interface on the target system.

Information:

Licensing via TG is required for Automation Studio V4.1 or later and Automation Runtime V4.08 or later. No TG is necessary in earlier versions.

Terms and conditions (TC)

No Technology Guard is necessary; licensing takes place via a license agreement. Licenses are supplied with the sales receipt. The user is responsible for complying with the license conditions. B&R is protected by the terms of the EULA.

Information:

Licensing via TC is possible for Automation Studio V4.9 or later as well as Automation Runtime V4.90 or later.

For detailed information about licensing, see Automation Help (**Automation software / Licensing**).

7.3.2 Order data

Hardware-based licensing (Technology Guard)

Order number	Short description	Figure
	Technology Guard	
0TG1000.01	Technology Guard (MSD)	
0TG1000.02	Technology Guard (HID)	
0TGF016.01	Technology Guard (MSD) with integrated flash drive, 16 GB (MLC)	
1TG4601.06-5	Automation Runtime Embedded, TG license	
1TG4601.06-T	Automation Runtime Embedded Terminal TG license	
1TG4700.00	B&R Hypervisor	

Contract-based licensing (terms and conditions)

Order number	Short description	Figure
	Runtime	
1TC4601.06-5	License for Automation Runtime Embedded (TC). One license per target system is required. This license is supported starting with version 4.9.	
	Hypervisor	
1TC4700.00	License for B&R Hypervisor (TC). One license per target system is required. This license is supported starting with version 4.9.	

7.3.3 Automation Runtime

7.3.3.1 General information

The real-time operating system Automation Runtime is an integral part of Automation Studio. This real-time operating system forms the software core for running applications on a target system.

- Guarantees the highest possible performance of the hardware being used
- Runs on all B&R target systems
- Makes the application hardware-independent
- Easy portability of applications between B&R target systems
- Guaranteed determinism through cyclic system
- Configurable jitter tolerance in all task classes
- Support for all relevant programming languages, such as IEC 61131-3 languages and C
- Rich function library per IEC 61131-3 as well as the extended B&R automation library
- Integrated in Automation NET. Access to all networks and bus systems via function calls or by configuration in Automation Studio

B&R Automation Runtime is fully embedded in the corresponding target system (hardware on which Automation Runtime is installed). It thus enables application programs to access I/O systems (also via the fieldbus) and other devices such as interfaces and networks.

7.3.3.2 Minimum versions

The following software versions (or higher) are required to operate Automation Runtime (ARemb and ARwin) with an Automation Panel 5000:

- ARemb upgrade AR K4.10 and Automation Studio V4.2.5

Information:

For detailed information, see Automation Help or the B&R website (www.br-automation.com).

7.3.4 B&R Hypervisor

B&R Hypervisor allows multiple operating systems to operate simultaneously on a single device. The operating systems can communicate with each other via a virtual network.

Intelligent distribution of CPU resources

B&R Hypervisor allows Windows or Linux to run simultaneously with Automation Runtime. This makes it possible to combine a controller and HMI PC in one device. With B&R Hypervisor, an industrial PC can also be used as an edge controller. This serves as a controller and simultaneously transmits preprocessed data to higher-level systems in the cloud via OPC UA.

Virtual network

The hypervisor provides a virtual network connection that allows applications to exchange data between operating systems. Similar to an ordinary Ethernet interface, standard network protocols are used. In place of a cable, there is a reserved memory area that is not allocated to either operating system.

Maximum flexibility

The user configures the hypervisor and allocates hardware resources in the B&R Automation Studio software development environment. The system configurations are determined individually. This makes the assignment of resources to the respective operating system flexible. Whereas previous simultaneous solutions were tailored to a specific Windows version, B&R Hypervisor is completely independent of the version of the operating systems used.

Information:

For detailed information, see Automation Help or the B&R website (www.br-automation.com).

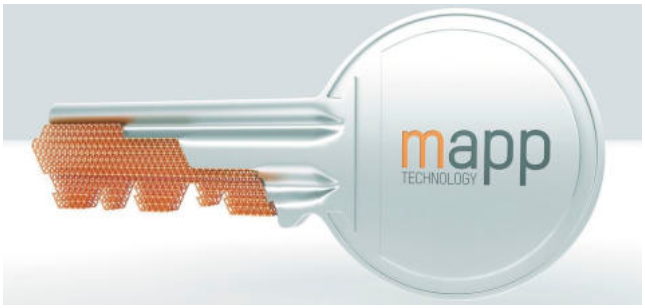
7.3.4.1 DP receiver in operation with B&R Hypervisor

When using the DP receiver in a B&R Hypervisor configuration, it is important to note that the assignment to an operating system is made via the USB interface of the connected B&R industrial PC in Automation Studio.[2)] All USB interfaces of the DisplayPort receiver, multi-touch panel and other additional devices are then assigned to the selected operating system.

[2)] Automation Runtime / Method of operation / B&R Hypervisor / Installation and configuration / Configuration in Automation Studio / Adjusting the interface assignment

7.3.5 mapp Technology

mapp Technology is revolutionizing the creation of machine and plant software. "mapps" are as easy to use as smartphone apps. Instead of programming user/role systems, alarm systems or the control of axes line by line, the machine software developer simply configures the finished mapps. Complex algorithms are easy to master. The programmer can concentrate fully on the machine process.



Information:

For detailed information, see Automation Help or the B&R website (www.br-automation.com).

7.4 Automation Device Interface (ADI)

The Automation Device Interface (ADI) allows access to specific functions of B&R devices in Windows and Linux.

7.4.1 ADI driver (Windows)

Information:

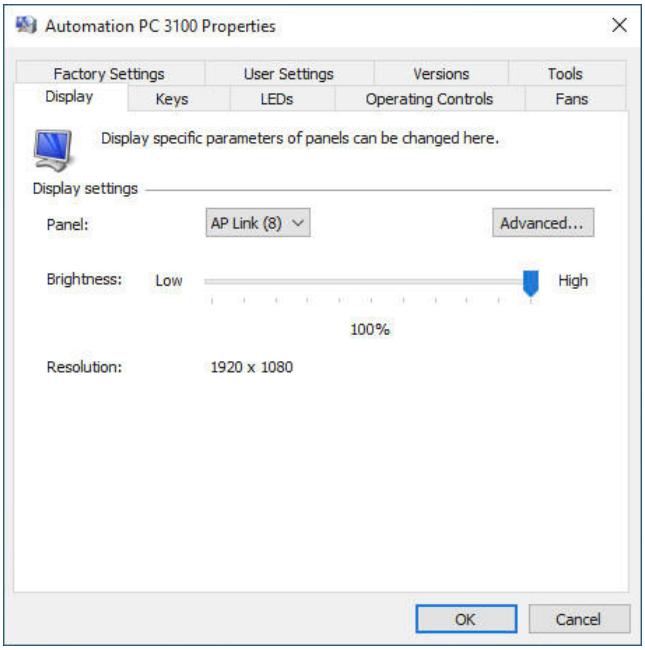
Basic functionalities and components of the ADI driver are explained below. For more detailed information, the ADI driver user's manual can be downloaded from the B&R website (www.br-automation.com).

7.4.1.1 Control Center

The Control Center is used to change and display settings for a B&R industrial PC and Automation Panels. It can be opened from the Control Panel or Start menu.

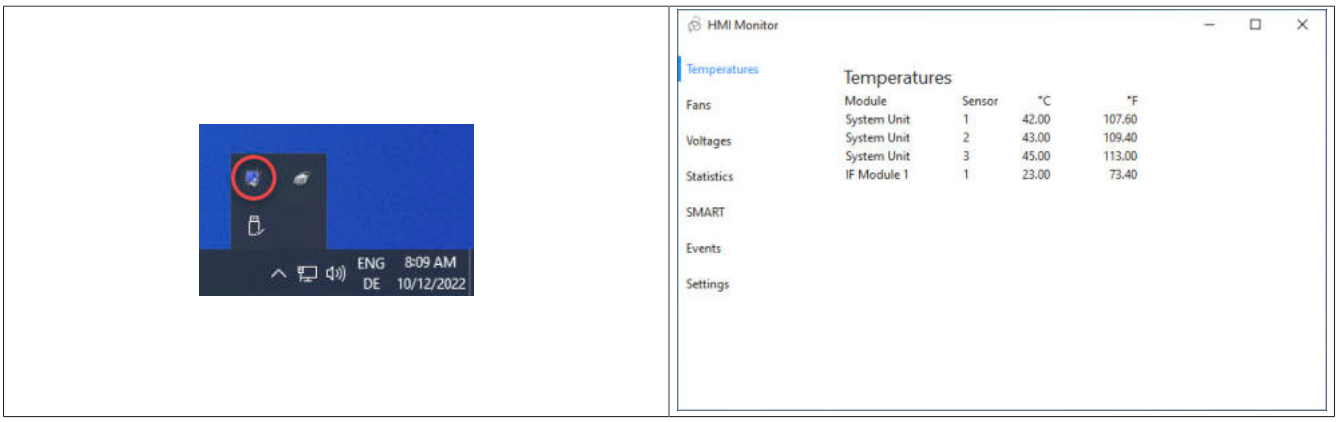
The following chapters describe the setting options in the Control Center tabs. Tabs:

- Display
- Keys
- LEDs
- Operating elements
- Fans
- Factory settings
- User settings
- Versions
- Tools



7.4.1.2 HMI Monitor

Allows display of fan, SMART, voltage, statistical and temperature values. HMI Monitor can be opened via a symbol in the taskbar or from the Start menu.



HMI Monitor displays alarms (e.g. temperature or SMART alarm), errors and warnings from the ADI System Service in the symbol in the notification area. The icon will be hidden after reinstallation, but it can be displayed using drag-and-drop or via the Windows settings.

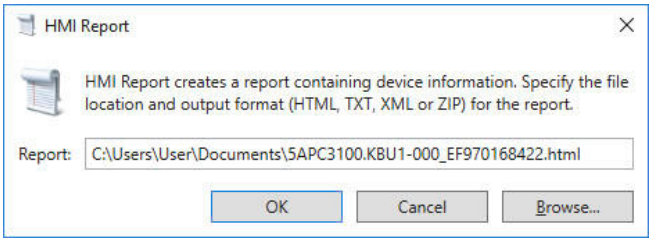
The icon can be disabled in the Windows Task Manager under tab Autostart.

The following menu options are available in HMI Monitor and described in more detail below:

- Temperatures
- Fans
- Voltages
- Statistics
- SMART
- Events
- Settings

7.4.1.3 HMI Report

HMI Report can be used to create a report with device-specific information. This report can then be used for support purposes or system documentation. The program is opened via the Start menu.



The following output formats are available:

- HTML Report (HTML) - Report in HTML format for display in the browser.
- Text Report (TXT) - Report in text format for display in the text editor.
- XML Report (XML) - Report in XML format for display in the browser.
- Diagnostic package (ZIP) - The diagnostic package contains a text report and log files for troubleshooting by B&R.

The following settings can also be made:

- **Report**:
  Specifies the storage location, filename and output format for the report. Alternatively, the file dialog box can be used with **Browse**.

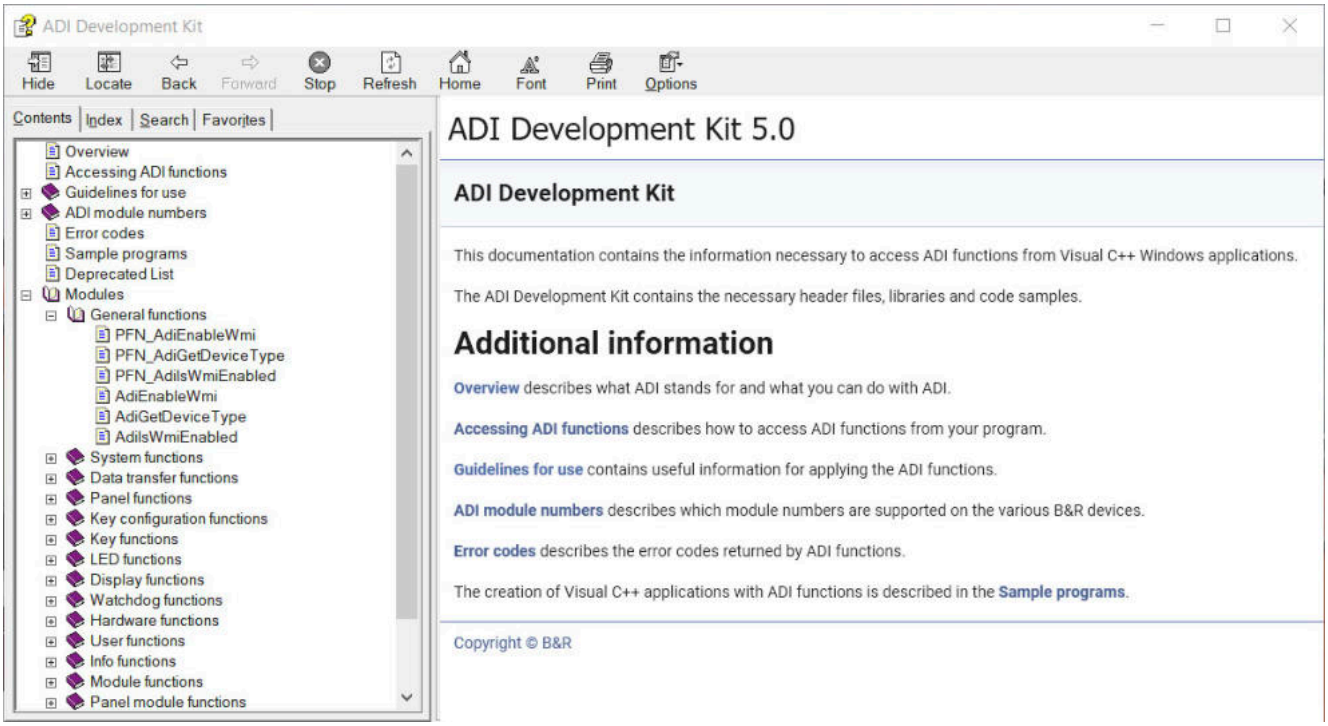
Alternatively, the report can be created from the **command line** with the following command:

```
C:\Programme\BrAutomation\Adi\System\HmiReport\BnR.Hmi.Report.Cli.exe <Dateiname>
```

If no filename is specified, a text report is created with filename "<Material number>_<Serial number>.txt".

7.4.2 ADI Development Kit (Windows)

This software allows ADI functions to be accessed from Windows applications created with Microsoft Visual Studio, for example:



Features:

- Header files and import libraries
- Help files (in English)
- Example projects
- ADI DLL: For testing applications if no ADI driver is installed.

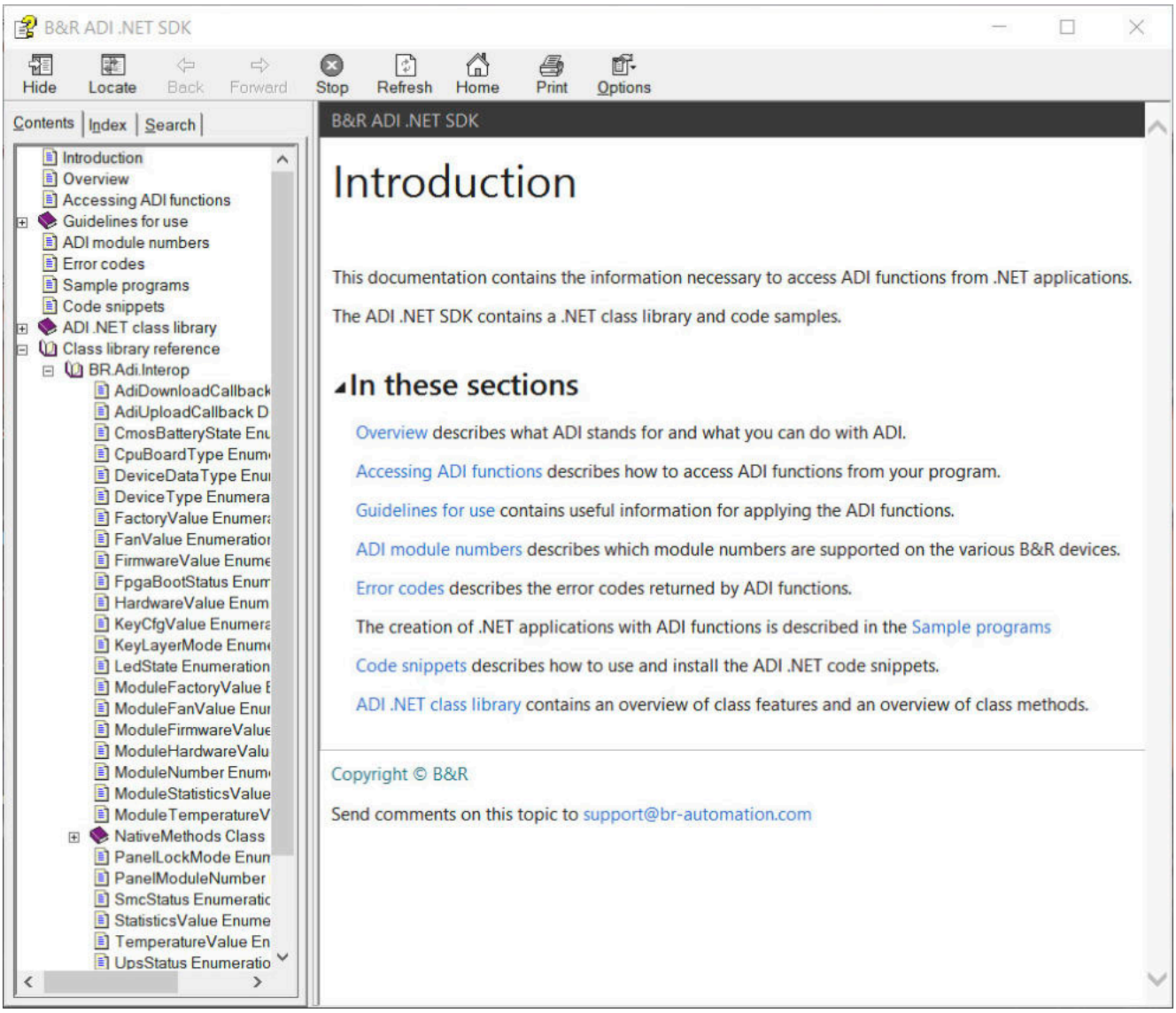
The appropriate ADI driver must be installed for the device. The ADI driver is already included in B&R images of embedded operating systems.

For a detailed description of how to use ADI functions, see Automation Help.

The ADI Development Kit can be downloaded at no cost from the Downloads section of the B&R website (www.br-automation.com).

7.4.3 ADI .NET SDK (Windows)

This software allows ADI functions to be accessed from .NET applications created with Microsoft Visual Studio.



Features:

- ADI .NET class library
- Help files (in English)
- Example projects
- ADI DLL: For testing applications if no ADI driver is installed.

The appropriate ADI driver must be installed for the device. The ADI driver is already included in B&R images of embedded operating systems.

For a detailed description of how to use ADI functions, see Automation Help.

The ADI .NET SDK can be downloaded at no cost from the Downloads section of the B&R website (www.br-automation.com).

7.4.4 ADI OPC UA Server

This document contains technical information about B&R Automation Device Interface OPC UA Server (B&R ADI OPC UA Server).

The descriptions and figures refer to B&R ADI OPC UA Server V2.0.0 and later.

ADI OPC UA Server provides the functions and information of the Automation Device Interface (ADI) as OPC UA variables. OPC UA stands for **O**pen **P**latform **C**ommunications **U**nified **A**rchitecture and is an international standard for secure, reliable, manufacturer- and platform-independent information exchange in industrial communication.

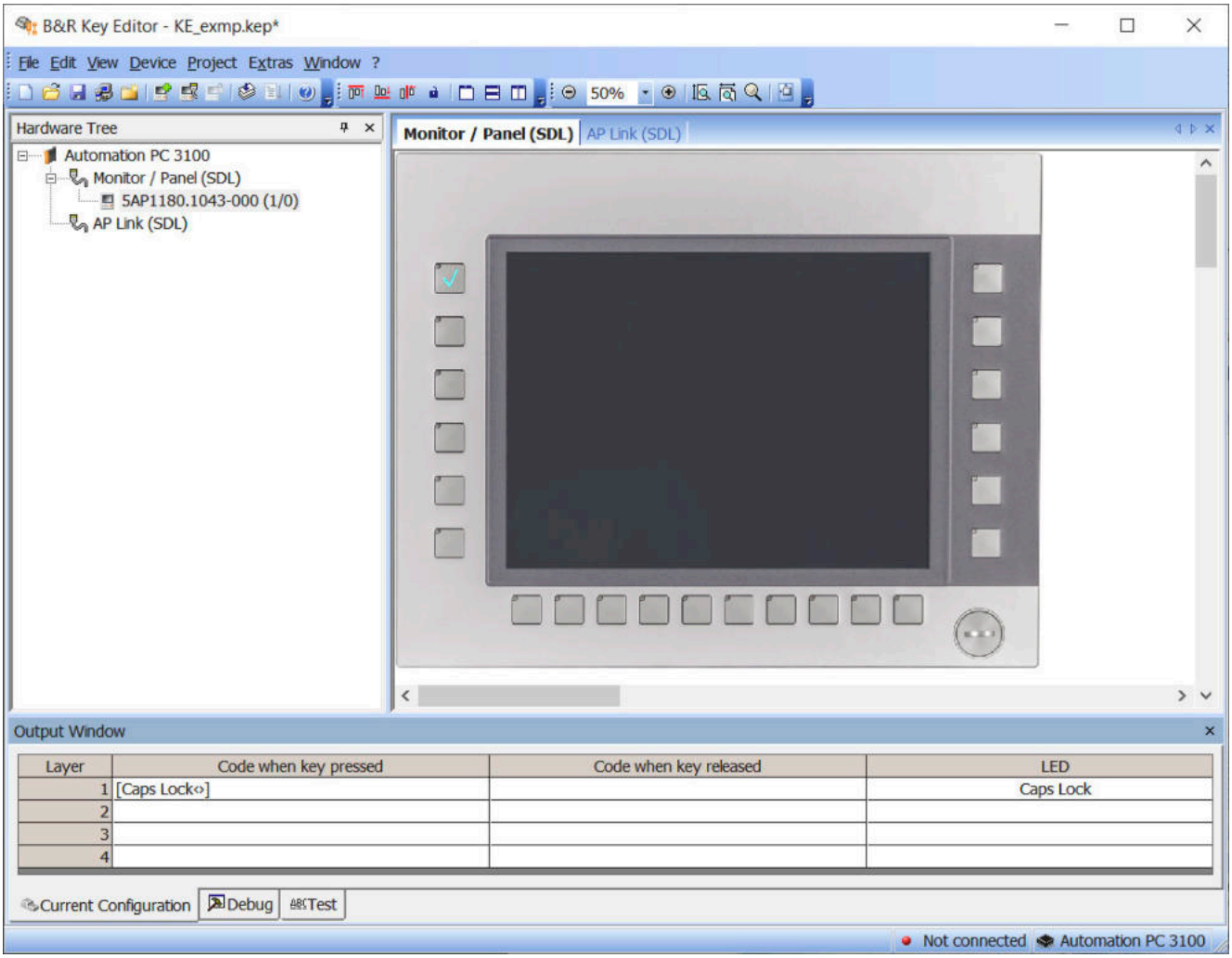
OPC UA is based on the client-server principle and, in the case of ADI OPC UA Server, enables temperatures and device information to be read from B&R devices, for example.

Additional information is available on the OPC Foundation (www.opcfoundation.org) website, for example.

The ADI OPC UA Server and user documentation can be downloaded at no cost from the Downloads section of the B&R website (www.br-automation.com).

7.5 Key Editor

A frequently occurring requirement for panels is adapting function keys and LEDs to the application software. With the Key Editor, individual adaptation to the application is possible quickly and easily.



Features:

- Configuration of normal keys like on a keyboard (A, B, C, etc.)
- Keyboard shortcuts (CTRL+C, SHIFT+DEL, etc.) on one key
- Special key functions (change brightness, etc.)
- Assignment of LED functions (HDD access, power, etc.)

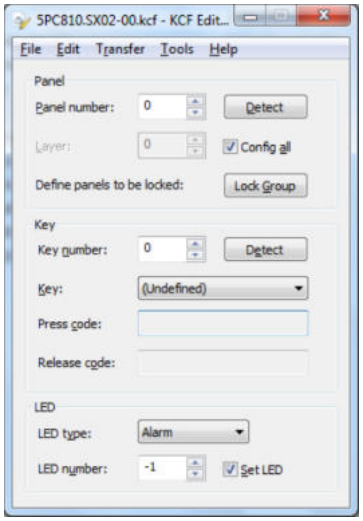
- 4 assignments possible per key (using layers)
- Configuration of the panel lock time when connecting several Automation Panel devices to Automation PCs and Panel PCs

For detailed instructions about configuring keys and LEDs and installing the key configuration on the target system, see the help documentation for the Key Editor. The Key Editor and help documentation can be downloaded at no cost from the Downloads section of the B&R website (www.br-automation.com).

7.6 KCF Editor

The KCF Editor can be used as a simple alternative to the Key Editor. It can also be used to adapt function keys and LEDs to the application software. In contrast to the Key Editor, operation does not take place using a graphical representation of the device, but via a simple Windows dialog box. The KCF Editor can therefore also be used for devices that are not yet supported in the Key Editor. The KCF Editor is a "portable" application and can be started directly from a USB flash drive without installation on the target device, for example.

An installed ADI driver is required for the full range of functions.



Features:

- Configuration of normal keys like on a keyboard (A, B, C, etc.)
- Special key functions (change brightness, etc.)
- Assignment of LED functions (HDD access, power, etc.)
- 4 assignments possible per key (using layers)
- Configuration of the panel lock time when connecting several Automation Panel devices to B&R PCs.
- Export and import of the configuration (via INI files)
- Save configuration as report (text file)

If the KCF Editor is running on the target device and the ADI driver is installed, the following additional features are available:

- Panel and key detection
- LED test
- Download/Upload the configuration

For detailed instructions about configuring keys and LEDs and installing the key configuration on the target system, see the user documentation for the KCF Editor. The KCF Editor and user documentation can be downloaded at no cost from the Downloads section of the B&R website (www.br-automation.com).

7.7 HMI Service Center

The HMI Service Center is software for testing B&R industrial PCs and Automation Panels. Testing covers different categories such as COM, network and SRAM.

Up to version 2.0.0, the HMI Service Center was a paid product and could be ordered with material number 5SWUTI.0001-000. The HMI Service Center was delivered preinstalled on a USB flash drive.

Since version 3.0.0, the HMI Service Center is available as a download at no cost and can be installed on any USB flash drive with the HMI Service Center Maintenance tool.

For more detailed information, the HMI Service Center user's manual can be downloaded from the B&R website (https://www.br-automation.com).

7.7.1 Order data

Order number	Short description	Figure
	Accessories	
5SWUTI.0001-000	HMI Service Center USB flash drive - Hardware diagnostic software - For APC910/PPC900 - For PPC1200 - For APC2100/PPC2100 - For APC2200/PPC2200 - For APC3100/PPC3100 - For APC mobile - For AP800/AP900 - For AP9x3/AP9xD - For AP1000/AP5000	

The following limitations regarding supported hardware revisions must be observed:

Devices	Starting with D0	Up to E0	Starting with E0
Automation Panel 1000	•		
Automation Panel 5000	•		
Automation PC 3100	•		
Automation PC 3100 mobile			•
Automation PC 2200	•		
Automation PC 810		•	
Automation PC 511		•	
Automation PC 510		•	
Panel PC 3100	•		
Panel PC 2200	•		
Panel PC 1200			•
Panel PC 800		•	
Power Panel 500		•	

8 Maintenance

The following chapter describes maintenance work that can be carried out by qualified and trained end users themselves.

Information:

Only components approved by B&R are permitted to be used for maintenance work.

8.1 Cleaning

Danger!

In order to prevent unintentional operation (by touching the touch screen or keys), the device is only permitted to be cleaned when the power is switched off.

- Use a cloth moistened with dishwashing detergent, screen cleaner or alcohol (ethanol) to clean the device.
- The cleaning agent is not permitted to be applied directly to the device.
  Abrasive cleaners, aggressive solvents and chemicals, compressed air or steam cleaners are not permitted to be used.
- When cleaning, areas with adhesive labels and product information should be left out to avoid damage.

Information:

Displays with a touch screen should be cleaned at regular intervals.

8.2 User tips for increasing the service life of the display

8.2.1 Backlight

The service life of the backlight is specified by its "half-brightness time". An operating time of 50,000 hours would mean that the display brightness would still be 50% after this time.

8.2.1.1 Measures to maintain backlight service life

- The display brightness can be set to the lowest level that is comfortable for the user's eyes.
- Bright images should be avoided as far as possible.
- A 50% reduction in brightness can increase the half-brightness time by about 50%.

8.2.2 Image persistence

Image persistence refers to the "burning in" of a static image on a display after being displayed for a long time. It does not only occur with static images, however. Image persistence is also referred to in the technical literature as screen burn-in, image retention, memory effect, memory sticking or ghost image.

There are 2 different types:

- Area type: This type can be seen in a dark gray image. The effect disappears if the display is switched off for a long time.
- Line type: This can result in permanent damage.

8.2.2.1 What causes image persistence?

- Static images
- No screensaver
- Sharp transitions in contrast (e.g. black/white)
- High ambient temperatures
- Operation outside of specifications

8.2.2.2 How can image persistence be reduced?

- Switch continuously between static and dynamic images.
- Prevent excessive differences in brightness between foreground and background elements.
- Use colors with similar brightness.
- Use complementary colors for subsequent images.
- Use screensavers.

8.3 Information about display properties

The following limitations result from the current state of the technology and do not constitute any claims or warranty.

Pixel errors:

Displays can contain faulty pixels (pixel errors) due to the manufacturing process.

Color variation:

Displays can display colors or color ranges differently due to the manufacturing process, the properties of the components used, environmental influences and aging. This cannot be completely ruled out even with two similar devices of the same revision.

8.4 Repairs/Complaints and replacement parts

Danger!

Unauthorized opening or repair of a device may result in personal injury and/or serious damage to property. Repairs are therefore only permitted to be carried out by authorized qualified personnel at the manufacturer's premises.

To process a repair/complaint, a repair order or complaint must be created via the B&R Material Return Portal on the B&R website (www.br-automation.com).

9 Accessories

Information:

The following specified characteristic data, features and limit values are only valid for this accessory and may differ from those of the complete system. The data specified for the complete system applies to the complete system in which an accessory is used.

The following accessories have undergone functional testing by B&R in connection with the device used and approved for operation. B&R cannot assume any functional warranty for accessories that have not been approved.

9.1 General information

The following products can be used in the event of loss or for conversion or retrofitting.

9.1.1 Order data

Material number	Description
5ACCRHMI.0000-000	HMI grounding clip
5ACCRHMI.0004-000	Rafi replacement key - 1 pc.
5ACCRHMI.0004-C00	Schlegel replacement key - 2 pcs.

9.2 Installation accessories

Suitable tool sets can be ordered to easily install B&R swing arm devices.

- Consisting of:

  5ACCRHMI.0007-000
  - 1x torque screwdriver: 0.4 to 2.0 Nm
  - 1x torque wrench: 2.0 to 10.0 Nm
  - 1x bit set (6 pieces): Hex recess (3.0 mm, 5.0 mm), Torx (T10, T20, T25, T30)

9.2.1 Order data

Order number	Short description	Figure
	Other	
5ACCRHMI.0007-000	HMI installation tool for swing arm: - 1x torque wrench 0.4 - 2.0 Nm - 1x torque wrench 2.0 - 10.0 Nm - 1x hex head bit 3.0, length 89 mm - 1x hex head bit 5.0, length 89 mm - 1x Torx 10 bit, length 90 mm - 1x Torx 20 bit, length 89 mm - 1x Torx 25 bit, length 89 mm - 1x Torx 30 bit, length 89 mm	

9.3 Terminal block power supply

9.3.1 0TB103.9x

9.3.1.1 General information

One-row 3-pin terminal block 0TB103.9x is used for the power supply.

9.3.1.2 Order data

Order number	Short description	Figure
	Accessories	
0TB103.9	Connector 24 VDC - 3-pin, female - Screw clamp terminal block 3.31 mm²	
0TB103.91	Connector 24 VDC - 3-pin, female - Cage clamp terminal block 3.31 mm²	

9.3.1.3 Technical data

Order number	0TB103.9	0TB103.91
General information		
Certifications		
CE	Yes	
UKCA	Yes	
UL	cULus E115267 Industrial control equipment	
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4	
DNV	Temperature: **B** (0 to 55°C) Humidity: **B** (up to 100%) Vibration: **A** (0.7 g) EMC: **B** (bridge and open deck)	
LR	ENV3	
KR	Yes	
ABS	Yes	
BV	**EC31B** Temperature: 5 - 55°C Vibration: 0.7 g EMC: Bridge and open deck	
Terminal block		
Note	Protected against vibration by the screw flange Nominal data per UL	
Number of pins	3 (female)	
Type of terminal block	Screw clamp terminal block variant	Cage clamp terminal block variant [1]
Cable type	Only copper wires (no aluminum wires!)	
Pitch	5.08 mm	
Connection cross section		
AWG wire	26 to 14 AWG	26 to 12 AWG
Wire end sleeves with plastic covering	0.20 to 1.50 mm²	
Single-wire	0.20 to 2.50 mm²	
Fine-stranded wires	0.20 to 1.50 mm²	0.20 to 2.50 mm²
With wire end sleeves	0.20 to 1.50 mm²	
Tightening torque	0.4 Nm	-
Electrical properties		
Nominal voltage	150 V	
Nominal current [2]	13 A / contact	15 A / contact
Contact resistance	≤5 mΩ	
Operating conditions		
Pollution degree per EN 61131-2	Pollution degree 2	

1) The cage clamp terminal block cannot be used side by side.
2) The respective limit data of the I/O modules must be taken into account!

9.4 USB flash drives

9.4.1 5MMUSB.xxxx-01

9.4.1.1 General information

USB flash drives are easily replaceable storage media. Due to the fast data transfer (USB 2.0), USB flash drives offer optimal values for use as portable storage media. Without additional drivers, the USB flash drive immediately reports itself as another drive from which data can be read or to which data can be written (hot plugging).

Information:

Due to the large number of USB flash drives available on the market and their short lifecycles, we reserve the right to supply alternative products. It may therefore be necessary to take the following measures in order to also boot from these USB flash drives:

- **The USB flash drive must be reformatted or, in some cases, repartitioned (set partition as active).**
- **The USB flash drive must be in the first position in the boot sequence; alternatively, the IDE controllers can be disabled in BIOS. In most cases, this can be avoided by running "fdisk / mbr" on the USB flash drive.**

9.4.1.2 Order data

Order number	Short description	Figure
	USB accessories	
5MMUSB.2048-01	USB 2.0 flash drive 2048 MB B&R	
5MMUSB.4096-01	USB 2.0 flash drive 4096 MB B&R	

9.4.1.3 Technical data

Information:

The following specified characteristic data, features and limit values are only valid for this accessory and may differ from those of the complete system. The data specified for the complete system applies to the complete system in which this accessory is installed, for example.

Order number	5MMUSB.2048-01	5MMUSB.4096-01
General information		
Capacity	2 GB	4 GB
LEDs	1 LED (green) [1]	
MTBF	>3,000,000 hours	
Servicing	None	
Default file system	FAT32	
Certifications		
CE	Yes	
Interfaces		
USB		
Type	USB 2.0, USB 1.1	
Connection	To any USB type A interface	
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (480 Mbit/s)	
Sequential reading	Full speed: Max. 1 MB/s High speed: Max. 32 MB/s	
Sequential writing	Full speed: Max. 0.9 MB/s High speed: Max. 23 MB/s	
Endurance		
SLC flash memory	Yes	
Data retention	>10 years	
Data reliability	<1 unrecoverable error per 10^{14} bits read	
Mating cycles	>1500	

Order number	5MMUSB.2048-01	5MMUSB.4096-01
Support		
Operating systems		
Windows 10 IoT Enterprise LTSB 64-bit	Yes	
Windows Embedded 8.1 Industry Pro 32-bit	Yes	
Windows Embedded 8.1 Industry Pro 64-bit	Yes	
Windows 7 32-bit	Yes	
Windows 7 64-bit	Yes	
Windows Embedded Standard 7 32-bit	Yes	
Windows Embedded Standard 7 64-bit	Yes	
Windows XP Professional	Yes	
Windows XP Embedded	Yes	
Windows 2000	Yes	
Windows CE 5.0	Yes	
Windows CE 4.2	Yes	
B&R Linux 9	Yes	
B&R Linux 8	Yes	
Electrical properties		
Current consumption	Max. 0.60 W (In sleep mode: Max. 0.01 W)	
Ambient conditions		
Temperature		
Operation	0 to 70°C [2]	0 to 70°C [2]
Storage	-50 to 100°C	
Transport	-50 to 100°C	
Relative humidity		
Operation	85%, non-condensing	
Storage	85%, non-condensing	
Transport	85%, non-condensing	
Vibration		
Operation	20 to 2000 Hz: 20 g (peak)	
Storage	20 to 2000 Hz: 20 g (peak)	
Transport	20 to 2000 Hz: 20 g (peak)	
Shock		
Operation	Max. 1500 g (peak)	
Storage	Max. 1500 g (peak)	
Transport	Max. 1500 g (peak)	
Mechanical properties		
Dimensions		
Width	17.97 mm	
Length	67.85 mm	
Height	8.35 mm	

1) Indicates data transfer (transmitting and receiving).
2) The maximum ambient temperature is typically derated 1°C per 1000 meters starting at 500 m above sea level.

9.4.1.4 Temperature/Humidity diagram

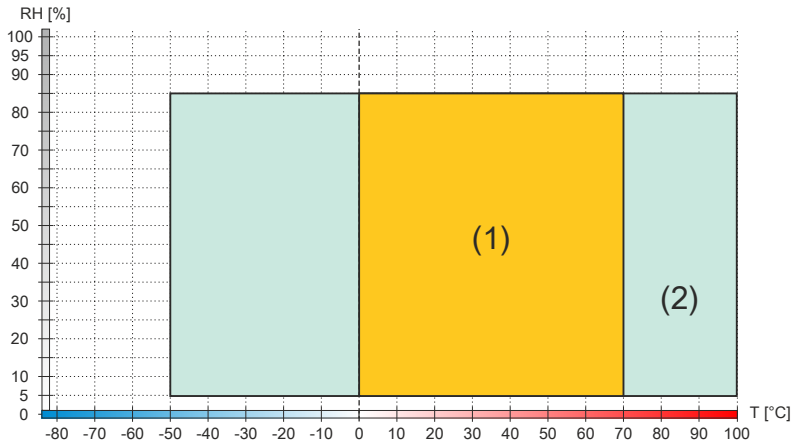


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

9.4.2 5MMUSB.032G-02

9.4.2.1 General information

USB flash drives are easily replaceable storage media. Due to the fast data transfer (USB 3.0), USB flash drives offer optimal values for use as portable storage media. Without additional drivers, the USB flash drive immediately reports itself as another drive from which data can be read or to which data can be written (hot plugging). USB 3.0 (XHCI) is supported in Windows 7 and later (USB 3.0 driver required).

Information:

Due to the large number of USB flash drives available on the market and their short lifecycles, we reserve the right to supply alternative products. It may therefore be necessary to take the following measures in order to also boot from these USB flash drives:

- **The USB flash drive must be reformatted or, in some cases, repartitioned (set partition as active).**
- **The USB flash drive must be in the first position in the boot sequence; alternatively, the IDE controllers can be disabled in BIOS. In most cases, this can be avoided by running "fdisk / mbr" on the USB flash drive.**

9.4.2.2 Order data

Order number	Short description	Figure
	USB accessories	
5MMUSB.032G-02	USB 3.0 flash drive 32 GB MLC	

9.4.2.3 Technical data

Information:

The following specified characteristic data, features and limit values are only valid for this accessory and may differ from those of the complete system. The data specified for the complete system applies to the complete system in which this accessory is installed, for example.

Order number	5MMUSB.032G-02
General information	
Capacity	32 GB
LEDs	1 LED (green) [1]
MTBF	>3,000,000 hours
Type	USB 2.0, USB 3.0
Servicing	None
Certifications	
CE	Yes
Interfaces	
USB	
Type	USB 2.0, USB 3.0
Connection	To any USB type A interface
Transfer rate	High speed (480 Mbit/s) to SuperSpeed (4 Gbit/s)
Sequential reading	USB 3.0 max. 100 MB/s
Sequential writing	USB 3.0 max. 50 MB/s
Endurance	
MLC flash memory	Yes
Data reliability	<1 unrecoverable error per 10^{14} bits read
Mating cycles	>1500
Electrical properties	
Current consumption	Max. 67 mA in sleep mode, max. 122 mA read, max. 141 mA write
Ambient conditions	
Temperature	
Operation	0 to 70°C [2]
Storage	-55 to 95°C
Transport	-55 to 95°C

Order number	5MMUSB.032G-02
Relative humidity	
Operation	10 to 95%, non-condensing
Storage	10 to 95%, non-condensing
Transport	10 to 95%, non-condensing
Vibration	
Operation	7 to 2000 Hz: 20 g
Storage	7 to 2000 Hz: 20 g
Transport	7 to 2000 Hz: 20 g
Shock	
Operation	1500 g, 0.5 ms
Storage	1500 g, 0.5 ms
Transport	1500 g, 0.5 ms
Elevation	
Operation	Max. 3048 m [2)]
Storage	Max. 12192 m
Transport	Max. 12192 m
Mechanical properties	
Dimensions	
Width	16.58 mm
Length	48.30 mm
Height	7.60 mm
Weight	10 g
Vendor information	
Manufacturer	Innodisk
Manufacturer's product ID	DEUA1-32GI61BCH88 (USB Drive 3ME)

1) Signals data transfer (reception and transmission).
2) The maximum ambient temperature is typically derated 1°C per 1000 meters starting at 500 m above sea level.

9.4.2.4 Temperature/Humidity diagram

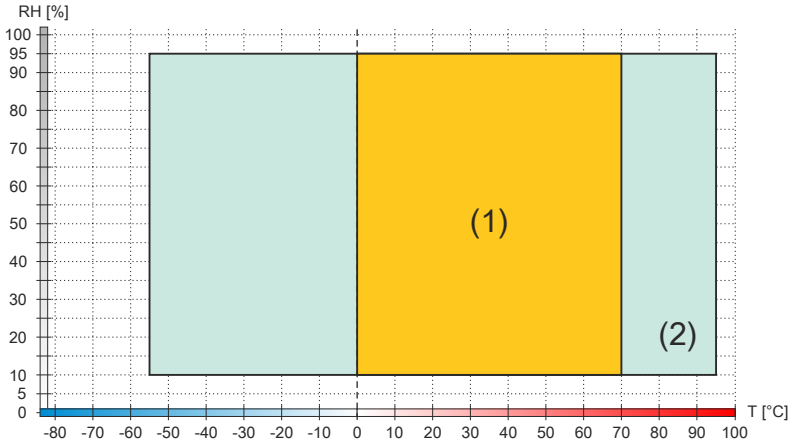


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

9.5 Cables

For additional information about compatible cables, see the B&R website (HMI cable manual).

9.6 Heat pipes

9.6.1 5ACCHP00.0002-000

9.6.1.1 General information

Heat pipe 5ACCHP00.0002-000 is used to improve heat dissipation. It is used only in conjunction with PPC2200 system units and swing arm mounting unit.

9.6.1.2 Order data

Order number	Short description	Figure
	Heat pipe	
5ACCHP00.0002-000	AP5000 heat pipe - For PPC2200 - For swing arm mounting unit	

Table 83: 5ACCHP00.0002-000 - Order data

9.6.2 5ACCHP00.0003-000

9.6.2.1 General information

Heat pipe 5ACCHP00.0003-000 is used to improve heat dissipation. It is used only in conjunction with PPC2200 system units and VESA IP54 mounting unit.

9.6.2.2 Order data

Order number	Short description	Figure
	Heat pipe	
5ACCHP00.0003-000	AP5000 heat pipe - For PPC2200 - For VESA mounting unit	

9.6.3 5ACCHP00.0004-000

Heat pipe 5ACCHP00.0004-000 is used to improve heat dissipation. It is used only in conjunction with PPC2100 system units and VESA IP54 mounting unit.

9.6.3.1 Order data

Order number	Short description	Figure
	Heat pipe	
5ACCHP00.0004-000	AP5000 heat pipe - For PPC2100 (5PPC2100.BYxx-002) - For VESA mounting unit	

10 International and national certifications

10.1 Directives and declarations

10.1.1 CE marking

All directives applicable to the respective product and their harmonized EN standards are met.

10.1.2 Radio Equipment Directive (RED)

These products meet the requirements of EU directive "Radio Equipment Directive 2014/53/EU" and are designed for industrial use:

EN 61131-2:2007	Programmable controllers - Part 2: Equipment requirements and tests
EN 61000-6-2:2005	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
EN 61000-6-4:2007	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments
EN 300 328 V2.2.2	Data transmission equipment operating in the 2.4 GHz ISM band and using wide band modulation techniques
EN 300 330 V2.1.1	Short range devices (SRD) - Radio equipment in the frequency range 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz
EN 301 489-3 V2.1.1	Electromagnetic compatibility (EMC) standard for radio equipment and services - Part 3: Specific conditions for short-range devices (SRD) operating on frequencies between 9 kHz and 246 GHz
EN 301 489-17 V3.1.1	Electromagnetic compatibility (EMC) standard for radio equipment and services - Part 17: Specific conditions for broadband data transmission systems
EN 60950-1:2013	Information technology equipment - Safety - Part 1: General requirements
EN 62479:2010	Assessment of the compliance of low power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)
EN 50364:2010	Limitation of human exposure to electromagnetic fields from devices operating in the frequency range 0 Hz to 300 GHz, used in electronic article surveillance (EAS), radio frequency identification (RFID) and similar applications
EN 62369-1:2010	Evaluation of human exposure to electromagnetic fields from short-range devices (SRDs) in various applications over the frequency range 0 GHz to 300 GHz - Part 1: Fields produced by devices used for electronic article surveillance, radio frequency identification and similar systems

10.1.3 EMC Directive

The products meet the requirements of EU directive "Electromagnetic compatibility 2014/30/EU" and are designed for industrial applications:

EN 61131-2:2007	Programmable controllers - Part 2: Equipment requirements and tests
EN 61000-6-2:2005	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
EN 61000-6-4:2007	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments

Information:

The declarations of conformity are available on the B&R website under Declarations of conformity.

10.2 Certifications

Danger!

A complete system can only receive certification if all individual components installed and connected in it have the corresponding certifications. If an individual component is used that does not have the corresponding certification, the complete system will also not be certified.

B&R products and services comply with applicable standards. These are international standards from organizations such as ISO, IEC and CENELEC, as well as national standards from organizations such as UL, CSA, FCC, VDE, ÖVE, etc. We pay special attention to the reliability of our products in the industrial sector.

Information:

The certifications valid for the respective product are available on the website and in the user's manual under the technical data in section "Certifications" or in the associated certificates.

10.2.1 UL certification

Ind. Cont. Eq.
E115267

Products with this mark are tested by Underwriters Laboratories and listed as "industrial control equipment". The mark is valid for the USA and Canada and simplifies the certification of your machines and systems in this economic area.

Underwriters Laboratories (UL) per standard UL 508, or
Underwriters Laboratories (UL) per standards UL 61010-1 and UL 61010-2-201

Canadian (CSA) standard per C22.2 no. 142-M1987, or
Canadian (CSA) standard per C22.2 No. 61010-1-12 and CSA C22.2 No. 61010-2-201:14

For additional information, see UL Product iQ database.

10.2.1.1 UL requirements

Caution!

- **The external circuits to be connected to this device must be separated from the MAINS supply or hazardous live voltage by reinforced or double insulation and meet the requirements of a SELV/PELV (Class III) circuit per UL/CSA/IEC 61010-1 and 61010-2-201.**
- **The final safety enclosure in which the module is installed must have adequate rigidity (per UL 61010-1 and UL 61010-2-201) and meet fire propagation requirements.**
- **Minimum temperature rating of the cables to be connected to the field wiring terminals: 90°C, AWG (Sol. / Str.) 22-12 / 22-12 (power supply). Use copper conductors only.**

Attention !

- **Les circuits externes à connecter à cet appareil doivent être séparés de l'alimentation secteur ou de la tension dangereuse par une isolation renforcée ou double et répondre aux exigences d'un circuit TBTS/TBTP (classe III) selon UL/CSA/IEC 61010-1 et 61010-2-201.**
- **L'enceinte de sécurité finale dans laquelle le module est installé doit être suffisamment rigide (conformément aux normes UL 61010-1 et UL 61010-2-201) et répondre aux exigences relative à la propagation du feu.**
- **Classe de température minimale des câbles à connecter aux borniers de raccordement 90°C, AWG (Sol. / Str.) 22-12 / 22-12 (alimentation). Utiliser uniquement des conducteurs en cuivre.**

The following instructions must be followed in order to install the device in accordance with UL/CSA standards.

Information:

- **The protection provided by the equipment may be impaired if the equipment is not used as specified.**

Operating conditions:

10.2.2 KC

Products with this mark are tested by an accredited test laboratory and permitted to be introduced into the Korean market (based on EU conformity).

10.2.3 RCM

Products with this mark are tested by an accredited test laboratory and certified by the ACMA. The mark is valid for Australia/Oceania and simplifies the certification of your machines and systems in this economic area (based on EU conformity).

10.3 Notes for the manual pursuant to radio approval

RF exposure statement	Complies with FCC and IC certifications
CE conformity	Additional to the Low voltage and EMC directive the complete end-device must be conform to the radio equipment directive.
FCC and IC	B&R products satisfy EMC requirements for operation in the USA and Canada and are compliant with FCC and IC regulations. This has to be verified with every device in which this B&R wireless board “RFM-2-NF and RFM-3-BTW” should be installed. Corresponding "Radio Frequency Interference Statements" for the USA and Canada:

USA:
Federal Communications Commission (FCC)

This device complies with Part 15 of the FCC rules. Operation is subjected to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
NOTE: This equipment has been tested and found comply with the limits of Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a resident area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Canada:
Industry Canada (IC)

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Israel:
Ministry of Communications

מספר אישור התאמה אלחוטי של משרד התקשורת הוא 51-80526
.אסור להחליף את האנטנה המקורית של המכשיר ולא לעשות בו כל שינוי טכני אחר

México:
Instituto Federal de Telecomunicaciones (IFETEL)

La operación de este equipo está sujeta a las siguientes dos condiciones: (1) es posible que este equipo o dispositivo no cause interferencia perjudicial y (2) este equipo o dispositivo debe aceptar cualquier interferencia, incluyendo la que pueda causar su operación no deseada.

Taiwan:
根據NCC低功率電波輻射性電機管理辦法 規定:

第十二條: 經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。
第十四條: 低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。 前項合法通信，指依電信法規定作業之無線電通信。 低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。
此模組於取得認證後將依規定於模組本體標示審驗合格標籤，並要求平台廠商於平台上標示『內含發射器模組:

RFM-2-NF	RFM-3-BTW
CCAM19LP1280T1	CCAM19LP1270T1

Products with RFM-3-BTW and/or RFM-2-NF boards are approved for use in the USA and Canada. The types can be identified by an adhesive label bearing the appropriate marks - identifiable by the information "Contains FCC ID:" and "Contains IC:".

11 Environmentally friendly disposal

All programmable logic controllers, operating and monitoring devices and uninterruptible power supplies from B&R are designed to have as little impact on the environment as possible.

11.1 Separation of materials

To ensure that devices can be recycled in an environmentally friendly manner, it is necessary to separate out the different materials.

Component	Disposal
Programmable logic controllers Operating and monitoring devices Uninterruptible power supplies Batteries and rechargeable batteries Cables	Electronics recycling
Paper/Cardboard packaging	Paper/Cardboard recycling
Plastic packaging material	Plastic recycling

Disposal must be carried out in accordance with applicable legal regulations.

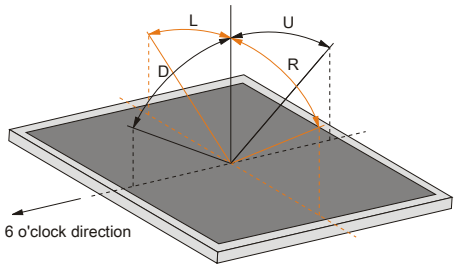
Appendix A Abbreviations

Abbreviations used in the document are explained here.

Abbreviation	Stands for	Description
NC	Normally closed	Stands for a normally closed relay contact.
	Not connected	Used in pinout descriptions if a terminal or pin is not connected on the module side.
ND	Not defined	Stands for an undefined value in technical data tables. This may be because the cable manufacturer has not provided a value for certain technical data.
NO	Normally open	Stands for a normally open relay contact.
TBD	To be defined	Used in technical data tables if there is currently no value for specific technical data. The value will be supplied later.
B_{10D}	-	Number of cycles until 10% of the components fail dangerously (per channel).
MTBF	Mean time between failures	The expected value of the operating time between two consecutive failures.
$MTTF_D$	Mean time to dangerous failure	Mean time to dangerous failure (per channel).
DC	Diagnostic coverage	Degree of diagnostic coverage
PL	Performance level	Discrete level specifying the ability of safety-related devices to perform a safety function under foreseeable conditions.
PFH	Probability of failure per hour	Probability of a failure per hour.
SIL	Safety integrity level	Safety integrity level

Appendix B Viewing angles

For viewing angle specifications (R, L, U, D) of the display types, see the technical data of the individual components.

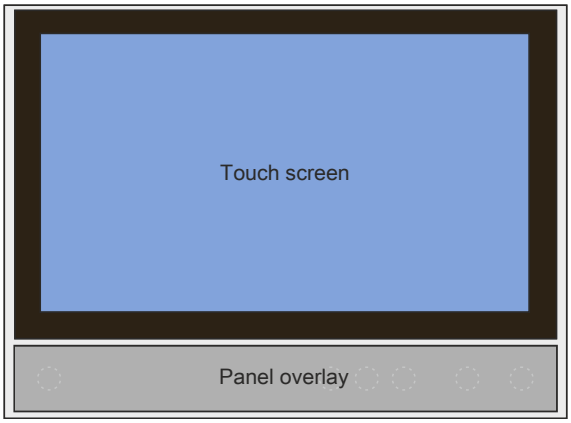


Appendix C Chemical resistance

All panels are made of a coated aluminum support frame.

Single-touch panels

- Single-touch panels are manufactured with Autotex panel overlay:



Multi-touch panels

- Multi-touch panels are manufactured with a continuous glass surface.

C.1 Autotex panel overlay (polyester)

Unless otherwise specified, the panel overlay is resistant to the following chemicals, materials and substances per DIN 42115 Part 2 when exposed for up to 24 hours without visible changes:

- Acetaldehyde
- Acetone
- Acetonitrile
- Aliphatic hydrocarbons
- Alkali carbonate
- Formic acid <50%
- Ammonia <40%
- Amyl acetate
- Ethanol
- Ether
- Gasoline
- Bichromate
- Potassium
- Cutting oil
- Brake fluid
- Butyl CELLOSOLVE (2-Butoxyethanol)
- Sodium hypochlorite <20%
- Cyclohexanol
- Cyclohexanone
- Decon
- Diacetone alcohol
- Dibutyl phthalate
- Diesel
- Diethyl ether
- Diethyl phthalate
- Dioxan
- Dowandol DRM/PM
- Iron II chloride ($FeCl_2$)
- Iron III chloride ($FeCl_3$)
- Acetic acid <50%
- Butyl acetate
- Ethyl acetate
- Linseed oil
- Aviation fuel
- Formaldehyde 37 to 42%
- Glycerine
- Glycol
- Isophorone
- Isopropanol
- Potassium hydroxide
- Potassium carbonate
- Methanol
- Methylisobutylketone (MIBK)
- Sodium bisulphate
- Sodium carbonate
- Caustic soda <40%
- Paraffin oil
- Phosphoric acid <30%
- Blown castor oil
- Nitric acid <10%
- Hydrochloric acid <36%
- Sea water
- Sulphuric acid <10%
- Silicon oil
- Tenside
- Turpentine oil substitute
- Toluene
- Triacetin
- Trichloracetic acid < 50%
- Trichloroethane
- Thinner (white spirit)
- Washing agents
- Water
- Hydrogen peroxide <25%
- Fabric conditioner
- Xylene

Per DIN 42115 Part 2, the panel overlay is resistant to exposure to glacial acetic acid for less than one hour without visible damage.

C.2 Coated aluminum front

Unless otherwise specified, the coated aluminum front is resistant to the following chemicals, materials and substances per DIN 42115 Part 2 when exposed for up to 24 hours without visible changes:

- Formic acid <50%
- Ammonia <40%
- Brake fluid
- Hydrogen chloride <10%
- Diesel
- Acetic acid <50%
- Gear oil
- Lactic acid <10%
- Isopropanol
- Coolant <4%
- Sodium hydroxide <40%
- Petroleum
- Phosphoric acid <25%
- Saline <10%
- Sulphuric acid <25%
- Sidolin
- Skydrol

The coated aluminum front is not resistant to the following chemicals:

- Acetone
- Ethyl acetate

C.3 Touch screen

5-wire touch screen (single-touch)

Unless otherwise specified, the touch screen is resistant to the following chemicals, materials and substances when exposed for up to 1 hour (at 25°C) with no visible changes:

- Acetone
- Beer
- Unleaded gasoline
- Chemical cleaning agents
- Hydrogen chloride <6%
- Coca-Cola
- Diesel
- Dimethylbenzene
- Vinegar
- Ethanol
- Antifreeze
- Gear oil
- Ammonia-based glass cleaner
- Household detergents
- Hexane
- n-hexane
- Isopropanol
- Coffee
- Methylbenzene
- Methylene chloride
- Methyl ethyl ketone
- Mineral spirits
- Motor oil
- Nitric acid <70%
- Saline solution <5%
- Tea
- Turpentine
- Lubricants
- Sulphuric acid <40%
- Cooking oil

Touch screen generation 2 and 3 (multi-touch)

Unless otherwise specified, the touch screen is resistant to the following chemicals, materials and substances per ASTM D 1308-02 and ASTM F 1598-95 when exposed for up to 24 hours without visible changes:

- Acetone
- Ammonia <5%
- Gasoline
- Beer
- Lead
- Brake fluid
- Hydrogen chloride <6%
- Coca-Cola
- Dimethylbenzene
- Ethanol
- Rubber cement
- Isopropanol
- Coffee
- Ink
- Lipstick
- Lysol
- Methylbenzene
- Methyl ethyl ketone
- Naphtha
- Nitric acid <70%
- Lubricants
- Sulphuric acid <40%
- Stamping ink
- Tea
- Trichloroethylene
- Water
- White wine vinegar
- Windex Original

Appendix D Features

D.1 Pushbutton RAFIX 22 FS+, 1.30.270.021/2300

Pushbutton 1.30.270.021/2300		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+	
Manufacturer number	1.30.270.021/2300	
Quantity	1	
Illumination	Red	
Contact function	Momentary	
Service life (switching cycles)	1,000,000	
B10 value (switching cycles)	1,300,000	
Actuation travel	4 mm	
Stop strength	Max. 100 N	

Table 86: Pushbutton 1.30.270.021/2300

D.2 Pushbutton RAFIX 22 FS+, 1.30.270.021/2500

Pushbutton 1.30.270.021/2500		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+	
Manufacturer number	1.30.270.021/2500	
Illumination	Green	
Contact function	Momentary	
Service life (switching cycles)	1,000,000	
B10 value (switching cycles)	1,300,000	
Actuation travel	4 mm	
Stop strength	Max. 100 N	

Table 87: Pushbutton 1.30.270.021/2500

D.3 Pushbutton RAFIX 22 FS+, 1.30.270.021/2600

Pushbutton 1.30.270.021/2600		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+	
Manufacturer number	1.30.270.021/2600	
Quantity	1	
Illumination	Blue	
Contact function	Momentary	
Service life (switching cycles)	1,000,000	
B10 value (switching cycles)	1,300,000	

Table 88: Pushbutton 1.30.270.021/2600

D.4 Selector switch RAFIX 22 FS+, 1.30.272.102/2200

Selector switch 1.30.272.102/2200		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+	
Manufacturer number	1.30.272.102/2200	
Illumination	White	
Contact function	Maintained	
Angle of rotation	1 x 90°, L form	
Service life (switching cycles)	300,000	
B10 value (switching cycles)	400,000	
Actuation torque	Max. 1.5 Nm	

Table 89: Selector switch 1.30.272.102/2200

D.5 Key switch RAFIX 22 FS+, 1.30.275.222/0000

Key switch 1.30.275.222/0000		
Manufacturer	RAFI	Symbolic image, see www.rafi.de
Type	RAFIX 22 FS+	
Manufacturer number	1.30.275.222/0000	
Contact function	Maintained	
Angle of rotation	1 x 90°, L form	
Key removal position	0+1	
Service life	50,000 cycles	
B10 value	65,000 cycles	
Actuation torque	Max. 1.3 Nm	

D.6 Emergency stop RAFIX 22 FS+ "Plus 1", 1.30.273.512/0300

Emergency stop 1.30.273.512/0300		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+ emergency stop button "Plus 1"	
Manufacturer number	1.30.273.512/0300	
Contact function	Maintained	
Resetting	By rotating to the right	
Service life (switching cycles)	50,000	
B10 value (switching cycles)	65,000	

Table 91: Emergency stop 1.30.273.512/0300

D.7 Switching element RAFIX 22 FS universal, 1.20.126.005/0000

The switching element is used for the pushbuttons, the selector switch and the key switch.

Switching element 1.20.126.005/0000		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+ - universal, 2 S	
Manufacturer number	1.20.126.005/0000	
Contact system	Self-cleaning bridge contact	
Contact material	Au	
Contacts	2 normally open contacts	
Connection	THT soldered connection with anti-rotation element	
Service life (switching cycles)	1,000,000 at 10 mA / 24 VDC	
B10 value (switching cycles)	1,300,000	
AC/DC operating voltage	Min. 1 V	
AC/DC operating voltage	Max. 35 V	
AC/DC operating current	Min. 1 mA	
AC/DC operating current	Max. 100 mA	
Switching capacity	Max. 250 mW	

Table 92: Switching element 1.20.126.005/0000

D.8 Switching element RAFIX 22 FS+ PCB gold, 1.20.126.414/0000

The switching element is used for the emergency stop.

Switching element 1.20.126.414/0000		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+ - PCB gold, emergency stop "Plus 1"	
Manufacturer number	1.20.126.414/0000	
Contact system	Self-cleaning bridge contact	
Contact material	Au	
Contacts	2 normally closed contacts + 1 alarm contact[1)]	
Normally closed contact with positive separation per IEC 60947-5-1	Yes	
Connection	THT soldered connection with anti-rotation element	
Service life (switching cycles)	50,000 at 10 mA / 24 VDC	
B10 value (switching cycles)	65,000	
AC/DC operating voltage	Min. 1 V	
AC/DC operating voltage	Max. 35 V	
AC/DC operating current	Min. 1 mA	
AC/DC operating current	Max. 100 mA	
Switching capacity	Max. 250 mW	

Table 93: Switching element 1.20.126.414/0000

1) The alarm contact is designed as a pulse-generating normally open contact and not intended as a maintained contact.

D.9 5ACCSE00.000x-00x

B&R recommends RAFIX operating and switching elements with model number 5ACCSE00.000x-00x for use on expansion covers.

RAFIX operating and switching elements with model number 5ACCSE00.000x-00x must be ordered separately.

D.9.1 5ACCSE00.0000-000

General information

- 1x pushbutton
- 1x colored lens (no color, red, yellow, green, blue)
- 1x switching element
- 1x LED

D.9.1.1 Pushbutton RAFIX 22 FS+, 1.30.270.921/2200

Pushbutton 1.30.270.921/2200		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+	
Manufacturer number	1.30.270.921/2200	
Quantity	1	
Form of lens	Flat lens	
Contact function	Momentary	
Service life (switching cycles)	1,000,000	
B10 value (switching cycles)	1,300,000	

Table 94: Pushbutton 1.30.270.921/2200

D.9.1.2 Colored lens RAFIX 22 FS+, 5.49.263.062/1000

Colored lens 5.49.263.062/1000		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+	
Manufacturer number	5.49.263.062/1000	
Quantity	1	
Form of lens	Flat lens	
Lens color	Colorless	

Table 95: Colored lens 5.49.263.062/1000

D.9.1.3 Colored lens RAFIX 22 FS+, 5.49.263.062/1300

Colored lens 5.49.263.062/1300		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+	
Manufacturer number	5.49.263.062/1300	
Quantity	1	
Form of lens	Flat lens	
Lens color	Red	

Table 96: Colored lens 5.49.263.062/1300

D.9.1.4 Colored lens RAFIX 22 FS+, 5.49.263.062/1400

Colored lens 5.49.263.062/1400		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+	
Manufacturer number	5.49.263.062/1400	
Quantity	1	
Form of lens	Flat lens	
Lens color	Yellow	

Table 97: Colored lens 5.49.263.062/1400

D.9.1.5 Colored lens RAFIX 22 FS+, 5.49.263.062/1500

Colored lens 5.49.263.062/1500		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+	
Manufacturer number	5.49.263.062/1500	
Quantity	1	
Form of lens	Flat lens	
Lens color	Green	

Table 98: Colored lens 5.49.263.062/1500

D.9.1.6 Colored lens RAFIX 22 FS+, 5.49.263.062/1600

Colored lens 5.49.263.062/1600		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+	
Manufacturer number	5.49.263.062/1600	
Quantity	1	
Form of lens	Flat lens	
Lens color	Blue	

Table 99: Colored lens 5.49.263.062/1600

D.9.1.7 Switching element RAFIX FS, 1.20.126.102/9000

Switching element 1.20.126.102/9000		
Manufacturer	RAFI	Example image
Type	RAFIX FS	
Manufacturer number	1.20.126.102/9000	
Quantity	1	
Contact system	Self-cleaning bridge contact	
Contacts	1 normally open contact	
Normally closed contact with direct opening action per IEC 947-5-1	Yes	
Connection	Connector 2.8x0.8 mm	
Lamp	LED clip	
Service life (switching cycles)	1,000,000	
B10 value (switching cycles)	1,300,000	
Min. AC/DC operating voltage	5 V	
Max. AC/DC operating voltage	35 V	
Min. AC/DC operating current	1 mA	
Max. AC/DC operating current	100 mA	
Max. switching capacity	250 mW	

Table 100: Switching element 1.20.126.102/9000

D.9.2 5ACCSE00.0000-001

General information

- 1x pushbutton
- 1x colored lens (no color, red, yellow, green, blue)
- 1x switching element
- 1x LED

D.9.2.1 Pushbutton RAFIX 22 FS+, 1.30.270.921/2200

Pushbutton 1.30.270.921/2200		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+	
Manufacturer number	1.30.270.921/2200	
Quantity	1	
Form of lens	Flat lens	
Contact function	Momentary	
Service life (switching cycles)	1,000,000	
B10 value (switching cycles)	1,300,000	

Table 101: Pushbutton 1.30.270.921/2200

D.9.2.2 Colored lens RAFIX 22 FS+, 5.49.263.062/1000

Colored lens 5.49.263.062/1000		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+	
Manufacturer number	5.49.263.062/1000	
Quantity	1	
Form of lens	Flat lens	
Lens color	Colorless	

Table 102: Colored lens 5.49.263.062/1000

D.9.2.3 Colored lens RAFIX 22 FS+, 5.49.263.062/1300

Colored lens 5.49.263.062/1300		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+	
Manufacturer number	5.49.263.062/1300	
Quantity	1	
Form of lens	Flat lens	
Lens color	Red	

Table 103: Colored lens 5.49.263.062/1300

D.9.2.4 Colored lens RAFIX 22 FS+, 5.49.263.062/1400

Colored lens 5.49.263.062/1400		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+	
Manufacturer number	5.49.263.062/1400	
Quantity	1	
Form of lens	Flat lens	
Lens color	Yellow	

Table 104: Colored lens 5.49.263.062/1400

D.9.2.5 Colored lens RAFIX 22 FS+, 5.49.263.062/1500

Colored lens 5.49.263.062/1500		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+	
Manufacturer number	5.49.263.062/1500	
Quantity	1	
Form of lens	Flat lens	
Lens color	Green	

Table 105: Colored lens 5.49.263.062/1500

D.9.2.6 Colored lens RAFIX 22 FS+, 5.49.263.062/1600

Colored lens 5.49.263.062/1600		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+	
Manufacturer number	5.49.263.062/1600	
Quantity	1	
Form of lens	Flat lens	
Lens color	Blue	

Table 106: Colored lens 5.49.263.062/1600

D.9.2.7 Switching element RAFIX FS, 1.20.126.101/9000

Switching element 1.20.126.101/9000		
Manufacturer	RAFI	Example image
Type	RAFIX FS	
Manufacturer number	1.20.126.101/9000	
Quantity	1	
Contact system	Self-cleaning bridge contact	
Contacts	1 normally closed contact	
Normally closed contact with direct opening action per IEC 947-5-1	Yes	
Connection	Connector 2.8x0.8 mm	
Lamp	LED clip	
Service life (switching cycles)	1,000,000	
B10 value (switching cycles)	1,300,000	
Min. AC/DC operating voltage	5 V	
Max. AC/DC operating voltage	35 V	
Min. AC/DC operating current	1 mA	
Max. AC/DC operating current	100 mA	
Max. switching capacity	250 mW	

Table 107: Switching element 1.20.126.101/9000

D.9.3 5ACCSE00.0000-002

General information

- 1x pushbutton
- 1x colored lens (no color, red, yellow, green, blue)
- 1x switching element
- 1x LED

D.9.3.1 Pushbutton RAFIX 22 FS+, 1.30.270.921/2200

Pushbutton 1.30.270.921/2200		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+	
Manufacturer number	1.30.270.921/2200	
Quantity	1	
Form of lens	Flat lens	
Contact function	Momentary	
Service life (switching cycles)	1,000,000	
B10 value (switching cycles)	1,300,000	

Table 108: Pushbutton 1.30.270.921/2200

D.9.3.2 Colored lens RAFIX 22 FS+, 5.49.263.062/1000

Colored lens 5.49.263.062/1000		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+	
Manufacturer number	5.49.263.062/1000	
Quantity	1	
Form of lens	Flat lens	
Lens color	Colorless	

Table 109: Colored lens 5.49.263.062/1000

D.9.3.3 Colored lens RAFIX 22 FS+, 5.49.263.062/1300

Colored lens 5.49.263.062/1300		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+	
Manufacturer number	5.49.263.062/1300	
Quantity	1	
Form of lens	Flat lens	
Lens color	Red	

Table 110: Colored lens 5.49.263.062/1300

D.9.3.4 Colored lens RAFIX 22 FS+, 5.49.263.062/1400

Colored lens 5.49.263.062/1400		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+	
Manufacturer number	5.49.263.062/1400	
Quantity	1	
Form of lens	Flat lens	
Lens color	Yellow	

Table 111: Colored lens 5.49.263.062/1400

D.9.3.5 Colored lens RAFIX 22 FS+, 5.49.263.062/1500

Colored lens 5.49.263.062/1500		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+	
Manufacturer number	5.49.263.062/1500	
Quantity	1	
Form of lens	Flat lens	
Lens color	Green	

Table 112: Colored lens 5.49.263.062/1500

D.9.3.6 Colored lens RAFIX 22 FS+, 5.49.263.062/1600

Colored lens 5.49.263.062/1600		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+	
Manufacturer number	5.49.263.062/1600	
Quantity	1	
Form of lens	Flat lens	
Lens color	Blue	

Table 113: Colored lens 5.49.263.062/1600

D.9.3.7 Switching element RAFIX 22 FS, 1.20.126.103/9000

Switching element 1.20.126.103/9000		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS	
Manufacturer number	1.20.126.103/9000	
Quantity	1	
Contact system	Self-cleaning bridge contact	
Contacts	1 normally closed contact + 1 normally open contact	
Connection	Connector 2.8x0.8 mm	
Service life (switching cycles)	1,000,000 at 10 mA / 24 VDC	
Min. AC/DC operating voltage	5 V	
Max. AC/DC operating voltage	42 V	
Min. AC/DC operating current	1 mA	
Max. AC/DC operating current	100 mA	
Max. switching capacity	250 mW	

Table 114: Switching element 1.20.126.103/9000

D.9.4 5ACCSE00.0001-000

General information

- 1x emergency stop button
- 1x switching element

D.9.4.1 Emergency stop RAFIX 22 FS+ "Plus 1", 1.30.273.512/0300

Emergency stop 1.30.273.512/0300		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+ emergency stop button "Plus 1"	
Manufacturer number	1.30.273.512/0300	
Quantity	1	
Contact function	Maintained	
Resetting	By rotating to the right	
Service life (switching cycles)	50,000	
B10 value (switching cycles)	65,000	

Table 115: Emergency stop 1.30.273.512/0300

D.9.4.2 Switching element RAFIX 22 FS+ "Plus 1", 1.20.126.514/0000

Switching element 1.20.126.514/0000		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+ "Plus 1"	
Manufacturer number	1.20.126.514/0000	
Quantity	1	
Contact system	Self-cleaning bridge contact	
Contacts	2 normally closed contacts + 1 alarm contact[1)]	
Normally closed contact with positive separation per IEC 60947-5-1	Yes	
Connection	Connector 2.8x0.8 mm	
Service life (switching cycles)	50,000 at 10 mA / 24 VDC	
B10 value (switching cycles)	65,000	
Min. AC/DC operating voltage	5 V	
Max. AC/DC operating voltage	42 V	
Min. AC/DC operating current	1 mA	
Max. AC/DC operating current	100 mA	
Max. switching capacity	250 mW	

Table 116: Switching element 1.20.126.514/0000

1) The alarm contact is designed as a pulse-generating normally open contact and not intended as a maintained contact.

D.9.5 5ACCSE00.0002-000

General information

- 1x key switch
- 1x switching element

D.9.5.1 Key switch 1.30.275.431/0800

Key switch 1.30.275.431/0800		
Manufacturer	RAFI	Symbolic image, see www.rafi.de
Type	RAFIX 22 FS+	
Manufacturer number	1.30.275.431/0800	
Contact function	Maintained	
Angle of rotation	2 x 90°,	
Key removal position	0+1+2	
Service life	50,000 cycles	
B10 value	65,000 cycles	
Actuation torque	Max. 1.3 Nm	

D.9.5.2 Switching element RAFIX 22 FS, 1.20.126.105/9000

Switching element 1.20.126.105/9000		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS	
Manufacturer number	1.20.126.105/9000	
Quantity	1	
Contact system	Self-cleaning bridge contact	
Contacts	2 normally open contacts	
Normally closed contact with direct opening action per IEC 947-5-1	Yes	
Connection	Connector 2.8x0.8 mm	
Service life (switching cycles)	1,000,000	
Min. AC/DC operating voltage	5 V	
Max. AC/DC operating voltage	35 V	
Min. AC/DC operating current	1 mA	
Max. AC/DC operating current	100 mA	
Max. switching capacity	250 mW	

Table 118: Switching element 1.20.126.105/9000

D.9.6 5ACCSE00.0003-000

- 1x key switch
- 1x switching element

D.9.6.1 Key switch RAFIX 22 FS+, 1.30.275.222/0000

Key switch 1.30.275.222/0000		
Manufacturer	RAFI	Symbolic image, see www.rafi.de
Type	RAFIX 22 FS+	
Manufacturer number	1.30.275.222/0000	
Contact function	Maintained	
Angle of rotation	1 x 90°, L form	
Key removal position	0+1	
Service life	50,000 cycles	
B10 value	65,000 cycles	
Actuation torque	Max. 1.3 Nm	

D.9.6.2 Switching element RAFIX 22 FS, 1.20.126.103/9000

Switching element 1.20.126.103/9000		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS	
Manufacturer number	1.20.126.103/9000	
Quantity	1	
Contact system	Self-cleaning bridge contact	
Contacts	1 normally closed contact + 1 normally open contact	
Connection	Connector 2.8x0.8 mm	
Service life (switching cycles)	1,000,000 at 10 mA / 24 VDC	
Min. AC/DC operating voltage	5 V	
Max. AC/DC operating voltage	42 V	
Min. AC/DC operating current	1 mA	
Max. AC/DC operating current	100 mA	
Max. switching capacity	250 mW	

Table 120: Switching element 1.20.126.103/9000

D.9.7 5ACCSE00.0004-000

General information

- 1x selector switch
- 1x switching element

D.9.7.1 Selector switch RAFIX 22 FS+, 1.30.272.102/2200

Selector switch 1.30.272.102/2200		
Manufacturer	RAFI	Example image
Type	RAFIX 22 FS+	
Manufacturer number	1.30.272.102/2200	
Illumination	White	
Contact function	Maintained	
Angle of rotation	1 x 90°, L form	
Service life (switching cycles)	300,000	
B10 value (switching cycles)	400,000	
Actuation torque	Max. 1.5 Nm	

Table 121: Selector switch 1.30.272.102/2200

D.9.7.2 Switching element RAFIX FS, 1.20.126.102/9000

Switching element 1.20.126.102/9000		
Manufacturer	RAFI	
Type	RAFIX FS	
Manufacturer number	1.20.126.102/9000	
Quantity	1	Example image
Contact system	Self-cleaning bridge contact	
Contacts	1 normally open contact	
Normally closed contact with direct opening action per IEC 947-5-1	Yes	
Connection	Connector 2.8x0.8 mm	
Lamp	LED clip	
Service life (switching cycles)	1,000,000	
B10 value (switching cycles)	1,300,000	
Min. AC/DC operating voltage	5 V	
Max. AC/DC operating voltage	35 V	
Min. AC/DC operating current	1 mA	
Max. AC/DC operating current	100 mA	
Max. switching capacity	250 mW	

Table 122: Switching element 1.20.126.102/9000

D.9.8 5ACCSE00.0005-000

D.9.8.1 USB extension RAFIX 22 FS+, 9.30.279.003/0700

Caution!

IP65 protection can only be achieved if the USB protective cover is properly installed.

Caution!

Due to the general PC specification, this interface must be handled with the utmost care with regard to EMC, cable routing, etc.

USB extension 9.30.279.003/0700			
Manufacturer		RAFI	
Type		RAFIX 22 FS+	
Manufacturer number		9.30.279.003/0700	
Standard		USB 2.0	
Variant		Type A, female	
Transfer rate		Low speed (1.5 Mbit/s)	
		Full speed (12 Mbit/s)	
		High speed (480 Mbit/s)[1]	
Current-carrying capacity[2]		Max. 500 mA	
Cable length			
	USB 2.0	400 mm	

Table 123: USB extension 9.30.279.003/0700

1) In SDL operation without USB cable (mode 1), the USB transfer rate is limited to USB 1.1.
In SDL3 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (30 Mbit/s)
In SDL4 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (150 Mbit/s)

2) The USB interface is protected by a maintenance-free "USB current-limiting switch" (max. 500 mA).

Appendix E Touch screen

E.1 5-wire touch screen (single-touch)

E.1.1 Technical data

Information:

The following specified characteristic data, features and limit values are only valid for these individual components and may differ from those of the complete system. The data specified for the complete system applies to the complete system in which an individual component is used.

Note:

Drivers for this touch screen for approved operating systems are available for download in the Downloads section of the B&R website (www.br-automation.com).

Order number	Touchscreen 5-Draht
General information	
Technology	Analog, resistive
Actuating force	<1 N
Light transmission	80% ±3%
Service life	10,000,000 touch operations at the same position (actuating force: 250 g, interval: 0.25 s)
Operating conditions	
Activation	Finger, stylus, credit card, glove
Ambient conditions	
Temperature	
Operation	-20 to 70°C
Storage	-40 to 80°C
Transport	-40 to 80°C
Relative humidity	
Operation	90% at max. 50°C
Storage	90% RH at max. 60°C for 504 hours
Transport	90% RH at max. 60°C for 504 hours

E.1.2 Temperature/Humidity diagram

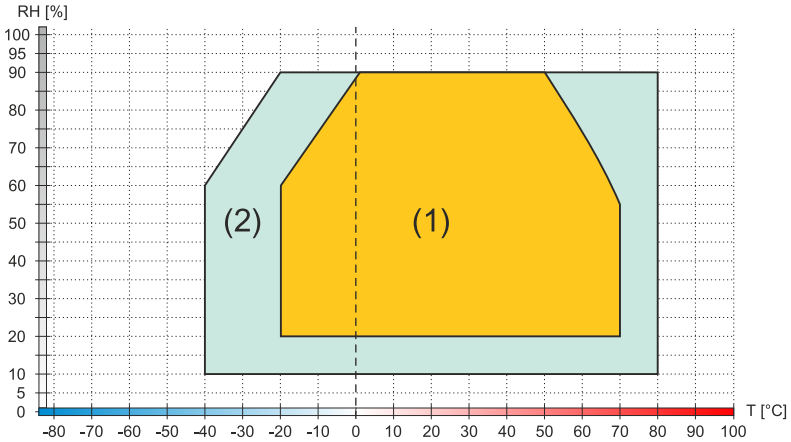


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

E.2 Touch screen (multi-touch generation 3)

E.2.1 Technical data

Information:

The following specified characteristic data, features and limit values are only valid for these individual components and may differ from those of the complete system. The data specified for the complete system applies to the complete system in which this individual component is used, for example.

Order number	Touchscreen
General information	
Technology	Projected capacitive touch (PCT)
Light transmission	>90%
Anti-glare coating	Optical/Gloss = 80
Operating conditions	
Activation	Finger, thin glove
Ambient conditions	
Temperature	
Operation	-10 to 70°C
Storage	-40 to 70°C
Transport	-40 to 70°C
Relative humidity	
Operation	Up to 90% at max. 35°C, see diagram for > 35°C.
Storage	Up to 90% at max. 35°C, see diagram for > 35°C.
Transport	Up to 90% at max. 35°C, see diagram for > 35°C.

E.2.2 Temperature/Humidity diagram

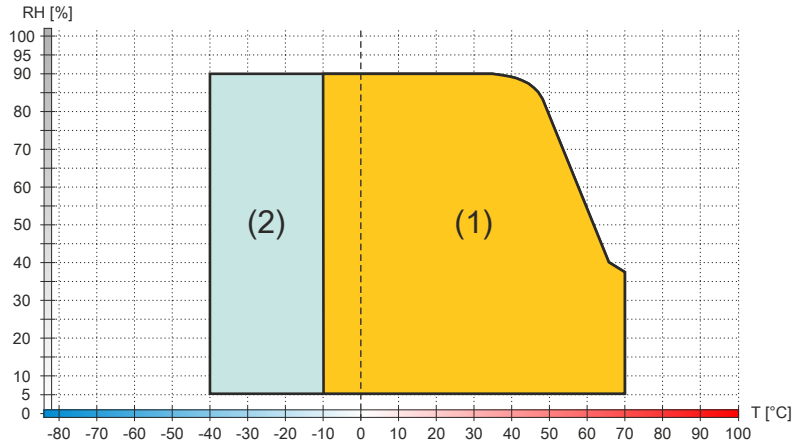


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**