Power Panel C80

User's manual

Version: **1.06 (December 2024)**
Order no.: **MAPPC80-EN**

Translation of the original documentation

Publishing information

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1 Introduction

Information:

B&R makes every effort to keep documents as current as possible. The most current versions can be downloaded from the B&R website (www.br-automation.com).

1.1 Manual history

Version	Date	Comment[1)]
1.06	December 2024	Updated the following sections: • "UL overview of certifications" on page 83
1.05	July 2024	Updated the following sections: • "UL overview of certifications" on page 83 Updated the following sections: • "Ethernet interface (IF2)" on page 35 • "International and national certifications" on page 81
1.04	March 2024	Updated the following sections: • "Gesture" on page 54 • Information in chapter "Updating/Installing the C80 system" on page 63 • Options in chapter "Web" on page 55 • "Information about display properties" on page 75 Updated the following sections: • "Boot options" on page 60 • "Power supply" on page 31 • "UL certification" on page 82 • "Interface overview" on page 31 • "VNC" on page 57: Default port • Starting with this version, the "Order number key " is described in its own documentation.
1.03	September 2021	Updated the following chapters: • Grounding and Securing the connecting cables (line cross section) • Added storage health data in chapter "Technical data" on page 15. • Updated figure in chapter "LED status indicators" on page 33. • Added note to chapter "Interface overview" on page 31. • Added section in chapter "Updating/Installing the C80 system" on page 63 (checking the terminal OS version). • "Automation software" on page 48 • "Boot options" on page 60 (checking the boot image version)
1.02	April 2021	Updated the following chapters: • Boot options • Updating/Installing the C80 system Updated the following chapters: • License information for the Terminal OS • Network information
1.01	April 2021	Editorial adjustments. Updated the following chapters: • "Order number key " on page 12 (added customized coding) • "Dependencies to hardware upgrades and Automation Runtime" on page 19 (more detailed listing) • "LED status indicators" on page 33 (color/description correction) • "Fieldbus interfaces" on page 34
1.00	March 2021	First version

1) Editorial changes are not listed.

1.2 Information about this document

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.

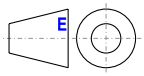
Signal word	Description
Danger!	Failure to observe these safety guidelines and notices will result in death, severe injury or substantial damage to property.
Warning!	Failure to observe these safety guidelines and notices can result in death, severe injury or substantial damage to property.
Caution!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

All dimensions, 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

1.2.3 Software-specific information

Information:

Graphics and paths to menu commands and help topics contained in this document refer to a specific Automation Studio version. There may be differences in display and path specifications when using a different version.

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 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 Order number key

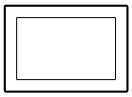
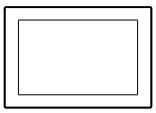
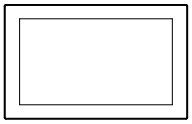
Information:

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 > Power Panel T-Series and C-Series > Power Panel C80

3.2 System characteristics

3.2.1 Type overview

Panel size	5.7"	7.0"	10.1"	12.1"	15.6"
Order number	4PPC80.0573-1xx	4PPC80.0702-1xx	4PPC80.101E-1xx	4PPC80.121E-1xx	4PPC80.156B-1xx
					
Format/Resolution	**Landscape/Portrait format**				
Resolution	VGA 640 x 480	WVGA 800 x 480	WXGA 1280 x 800	WXGA 1280 x 800	HD 1366 x 768
Order number	0573	0702	101E	121E	156B
	4PPC80.xxxx-xxx				
Technology					
Order number	TFT color + multi-touch PCT (glass)				
	4PPC80.xxxx-1xx				

The following interface variants are available for the five display sizes:

Interfaces	4PPC80.xxxx-x0x			
	0	1	2	3
IF1: POWERLINK	•	•	•	•
IF2: Ethernet	•	•	•	•
IF4: USB	•	•	•	•
IF5: USB	•	•	•	•
IF6: X2X	•	•	•	•
IF7: CAN bus		•	•	•
IF8: CAN bus		•		
IF9: RS232			•	
IF10: RS485				•

The following display variants are available for the panels:

Order number	4PPC80.xxxx-xxA	4PPC80.xxxx-xxB
General information		
Light transmission	70%	-
Display		
Touch screen		
Surface	Glass, chemically hardened (6H), anti-glare	Glass, chemically hardened (6H)

3.3 Overview

Order number	Short description	Page
	Accessories	
5ACCRHMI.0018-000	HMI C80/PPC1200 battery compartment - 1x battery holder C80/PPC1200 - 1x battery including circuit board	79
	Other	
6ACCRPP3.0001-000	Installation kit for PPC80/PPC1200 variants: 9x retaining clips with torque limiting, 1x 2-pin cage clamp terminal block, 1x 10-pin cage clamp terminal block	80
	Technology Guard	
0TG1000.01	Technology Guard (MSD)	48
0TG1000.02	Technology Guard (HID)	48
0TGF016.01	Technology Guard (MSD) with integrated flash drive, 16 GB (MLC)	48
	Terminal blocks	
0TB1210.3100	Connector 300 VDC - 10-pin female - Cage clamp terminal block - Protected against vibration by the screw flange	78
0TB6102.3000-00	2-pin accessory screw clamp terminal block (3.81)	77
0TB6102.3100-00	Accessory 2-pin cage clamp terminal block (3.81)	77

4 Device description

4.1 Order overview

Order number	Display	Front	IF7	IF8	IF9	IF10
4PPC80.0573-10A	5.7"	Glass, chemically hardened (6H), anti-glare				
4PPC80.0573-10B	5.7"	Glass, chemically hardened (6H)				
4PPC80.0573-11A	5.7"	Glass, chemically hardened (6H), anti-glare	CAN bus	CAN bus		
4PPC80.0573-11B	5.7"	Glass, chemically hardened (6H)	CAN bus	CAN bus		
4PPC80.0573-12A	5.7"	Glass, chemically hardened (6H), anti-glare	CAN bus		RS232	
4PPC80.0573-12B	5.7"	Glass, chemically hardened (6H)	CAN bus		RS232	
4PPC80.0573-13A	5.7"	Glass, chemically hardened (6H), anti-glare	CAN bus			RS485
4PPC80.0573-13B	5.7"	Glass, chemically hardened (6H)	CAN bus			RS485
4PPC80.0702-10A	7.0"	Glass, chemically hardened (6H), anti-glare				
4PPC80.0702-10B	7.0"	Glass, chemically hardened (6H)				
4PPC80.0702-11A	7.0"	Glass, chemically hardened (6H), anti-glare	CAN bus	CAN bus		
4PPC80.0702-11B	7.0"	Glass, chemically hardened (6H)	CAN bus	CAN bus		
4PPC80.0702-12A	7.0"	Glass, chemically hardened (6H), anti-glare	CAN bus		RS232	
4PPC80.0702-12B	7.0"	Glass, chemically hardened (6H)	CAN bus		RS232	
4PPC80.0702-13A	7.0"	Glass, chemically hardened (6H), anti-glare	CAN bus			RS485
4PPC80.0702-13B	7.0"	Glass, chemically hardened (6H)	CAN bus			RS485
4PPC80.101E-10A	10.1"	Glass, chemically hardened (6H), anti-glare				
4PPC80.101E-10B	10.1"	Glass, chemically hardened (6H)				
4PPC80.101E-11A	10.1"	Glass, chemically hardened (6H), anti-glare	CAN bus	CAN bus		
4PPC80.101E-11B	10.1"	Glass, chemically hardened (6H)	CAN bus	CAN bus		
4PPC80.101E-12A	10.1"	Glass, chemically hardened (6H), anti-glare	CAN bus		RS232	
4PPC80.101E-12B	10.1"	Glass, chemically hardened (6H)	CAN bus		RS232	
4PPC80.101E-13A	10.1"	Glass, chemically hardened (6H), anti-glare	CAN bus			RS485
4PPC80.101E-13B	10.1"	Glass, chemically hardened (6H)	CAN bus			RS485
4PPC80.121E-10A	12.1"	Glass, chemically hardened (6H), anti-glare				
4PPC80.121E-10B	12.1"	Glass, chemically hardened (6H)				
4PPC80.121E-11A	12.1"	Glass, chemically hardened (6H), anti-glare	CAN bus	CAN bus		
4PPC80.121E-11B	12.1"	Glass, chemically hardened (6H)	CAN bus	CAN bus		
4PPC80.121E-12A	12.1"	Glass, chemically hardened (6H), anti-glare	CAN bus		RS232	
4PPC80.121E-12B	12.1"	Glass, chemically hardened (6H)	CAN bus		RS232	
4PPC80.121E-13A	12.1"	Glass, chemically hardened (6H), anti-glare	CAN bus			RS485
4PPC80.121E-13B	12.1"	Glass, chemically hardened (6H)	CAN bus			RS485
4PPC80.156B-10A	15.6"	Glass, chemically hardened (6H), anti-glare				
4PPC80.156B-10B	15.6"	Glass, chemically hardened (6H)				
4PPC80.156B-11A	15.6"	Glass, chemically hardened (6H), anti-glare	CAN bus	CAN bus		
4PPC80.156B-11B	15.6"	Glass, chemically hardened (6H)	CAN bus	CAN bus		
4PPC80.156B-12A	15.6"	Glass, chemically hardened (6H), anti-glare	CAN bus		RS232	
4PPC80.156B-12B	15.6"	Glass, chemically hardened (6H)	CAN bus		RS232	
4PPC80.156B-13A	15.6"	Glass, chemically hardened (6H), anti-glare	CAN bus			RS485
4PPC80.156B-13B	15.6"	Glass, chemically hardened (6H)	CAN bus			RS485

4.1.1 Content of delivery

Order number	Description
0TB6102.3100-00	Accessory terminal block, 2-pin (3.81), cage clamp terminal block, 1.5 mm²
0TB1210.3100	Accessory terminal block, 10-pin (3.5), cage clamp terminal block, 1.5 mm²
Retaining clips	Accessory set of retaining clips for mounting the panel
Accessory plate	Plate for securing / strain relief of the connection lines and connecting the shield

4.1.2 Optional accessories

Order number	Description
0TB6102.3000-00	Accessory terminal block, 2-pin (3.81), screw clamp terminal block, 1.5 mm²

4.2 Technical data

General technical data

Order number	4PPC80.xxxx-xxx
General information	
Cooling	Passive
Power button	No
Reset button	Yes
Status indicators	Operating state, terminating resistor LEDs, interface status
Buzzer	No
Support	
mapp View	Yes
Controller redundancy	No
Visual Components support	Yes
Controller	
Real-time clock [1]	Nonvolatile, resolution 1 s
Processor	
Type	Intel Atom x5-E3940
Clock frequency	1600 MHz
Number of cores	4
Architecture	14 nm
Thermal design power (TDP)	9.5 W
L1 cache	
Data code	32 kB
Program code	32 kB
L2 cache	2 MB
Intel 64 architecture	Yes
Intel Hyper-Threading Technology	No
Intel vPro Technology	No
Intel Virtualization Technology (VT-x)	Yes
Intel Virtualization Technology for Directed I/O (VT-d)	Yes
Enhanced Intel SpeedStep Technology	Yes
Mode/Node switches	No
Remanent variables	64 kB FRAM, retention >10 years [2]
Shortest task class cycle time	0.4 ms
Typical instruction cycle time	0.01 µs
Chipset	Apollo Lake
Real-time clock	
Accuracy	At 25°C: Typ. 12 ppm (1 second) per day [3]
Retention time	Approx. 8 years
Battery-backed	Yes
Memory	
Type	LPDDR4 SDRAM
Memory size	4 GB
Velocity	DDR4L-2133
Memory interface width	Dual channel
Removable	No
Graphics	
Controller	Intel HD Graphics
Max. dynamic graphics frequency	600 MHz
Color depth	Max. 32-bit
DirectX support	12
OpenGL support	4.3
Application memory	
Type	Flash memory 5 GB NVMe pSLC
Data retention	10 years
Writable data amount	
Theoretical	150 TBW
Client workload	90 TBW [4]
Error-correcting code (ECC)	Yes
Power management	ACPI 5.0
Interfaces	
Interface IF1	
Fieldbus	POWERLINK V2 managing or controlled node
Type	Type 4 [5]
Variant	1x RJ45 shielded
Line length	Max. 100 m between 2 nodes (segment length)
Max. transfer rate	100 Mbit/s

Order number	4PPC80.xxxx-xxx
Interface IF2	
Type	Ethernet
Variant	1x RJ45 shielded
Line length	Max. 100 m between 2 nodes (segment length)
Max. transfer rate	10/100/1000 Mbit/s
Transfer	
Physical layer	10BASE-T/100BASE-TX/1000BASE-T
Half-duplex	Yes
Full-duplex	Yes
Autonegotiation	Yes
Auto-MDI/MDIX	Yes
Interface IF3	
Variant	Internal Ethernet interface
Interface IF4	
Type	USB 3.0
Variant	Type A
Current-carrying capacity	1 A
Interface IF5	
Fieldbus	USB 3.0
Variant	Type A
Current-carrying capacity	1 A
Interface IF6	
Fieldbus	X2X Link master
Max. distance	Max. 100 m between 2 nodes (segment length)
Endurance	
Storage health data support [6]	Yes
Operating conditions	
Permissible mounting orientations [7]	
Standard mounting orientation	Vertical
Rotation	In 90° increments (portrait/landscape)
Degree of protection per EN 60529 [8]	Front: IP55, Back: IP20
Ambient conditions	
Elevation	
Operation	Max. 3000 m [9]
Mechanical properties	
Front	
Design	Black

1) The real-time clock is backed up by a battery.
2) The memory size for remanent variables is configurable in Automation Studio. Permanent variables are not supported.
3) At max. specified ambient temperature: Typ. 58 ppm (5 seconds) - worst case 220 ppm (19 seconds).
4) TBW = Terabytes written
5) See section "Communication → POWERLINK → General information → Hardware - IF/LS" in Automation Help
6) For details about *storage health data*, see Automation Help.
7) For details, see section "Installation and wiring".
8) Not assessed by UL.
9) The maximum ambient temperature is typically derated 1°C per 1000 meters starting at 500 m above sea level. UL/CSA: Max. 5000 m

Ambient conditions

Order number	4PPC80.0573-xxx	4PPC80.0702-xxx	4PPC80.101E-xxx	4PPC80.121E-xxx	4PPC80.156B-xxx
Ambient conditions					
Temperature					
Operation		-20 to 60°C [1]			
Storage		-20 to 80°C			-20 to 70°C
Transport		-20 to 80°C			-20 to 70°C
Relative humidity		See section "Temperature/Humidity diagrams".			

1) The maximum ambient temperature is typically derated 1°C per 1000 meters starting at 500 m above sea level.

ID codes

Product	B&R ID code
4PPC80.0573-10A	0xA406
4PPC80.0573-10B	0xE9EC
4PPC80.0573-11A	0xA408
4PPC80.0573-11B	0xA415
4PPC80.0573-12A	0xA416
4PPC80.0573-12B	0xA417
4PPC80.0573-13A	0xA418
4PPC80.0573-13B	0xA419
4PPC80.0702-10A	0xF9D8
4PPC80.0702-10B	0xF9D5
4PPC80.0702-11A	0xA41A
4PPC80.0702-11B	0xA41B
4PPC80.0702-12A	0xF9D9
4PPC80.0702-12B	0xF9D6

Product	B&R ID code
4PPC80.0702-13A	0xF9DA
4PPC80.0702-13B	0xF9D7
4PPC80.101E-10A	0xF9DE
4PPC80.101E-10B	0xF9DB
4PPC80.101E-11A	0xA41C
4PPC80.101E-11B	0xA42E
4PPC80.101E-12A	0xF9DF
4PPC80.101E-12B	0xF9DC
4PPC80.101E-13A	0xF9E0
4PPC80.101E-13B	0xF9DD
4PPC80.121E-10A	0xF9E4
4PPC80.121E-10B	0xF9E1
4PPC80.121E-11A	0xA42F
4PPC80.121E-11B	0xA430
4PPC80.121E-12A	0xF9EF
4PPC80.121E-12B	0xF9E2
4PPC80.121E-13A	0xF9F0
4PPC80.121E-13B	0xF9E3
4PPC80.156B-10A	0xF9F4
4PPC80.156B-10B	0xF9F1
4PPC80.156B-11A	0xA431
4PPC80.156B-11B	0xA447
4PPC80.156B-12A	0xF9F5
4PPC80.156B-12B	0xF9F2
4PPC80.156B-13A	0xF9F6
4PPC80.156B-13B	0xF9F3

4.2.1 Technical data of the display variants

Order number	4PPC80.0573-xxx	4PPC80.0702-xxx	4PPC80.101E-xxx	4PPC80.121E-xxx	4PPC80.156B-xxx
Display					
Type	TFT color				
Diagonal	5.7"	7.0"	10.1"	12.1"	15.6"
Colors	16.7 million LVDS				
Resolution	VGA 640 x 480 px	WVGA 800 x 480 px	WXGA 1280 x 800 px		HD 1366 x 768 px
Contrast	Typ. 900:1	Typ. 800:1			Typ. 1000:1
Viewing angles					
Horizontal	Direction L / Direction R = Typ. 80°	Direction L / Direction R = Typ. 70°	Direction L / Direction R = Typ. 85°	Direction L / Direction R = Typ. 80°	Direction L / Direction R = Typ. 85°
Vertical	Direction U / Direction D = Typ. 80°	Direction U / Direction D = Typ. 60°	Direction U / Direction D = Typ. 85°	Direction U = Typ. 80° / Direction D = Typ. 65°	Direction U / Direction D = Typ. 85°
Backlight					
Type	LED				
Brightness	Typ. 550 cd/m²	Typ. 500 cd/m²		Typ. 400 cd/m²	
Half-brightness time [1]	50,000 h				70,000 h
Filter glass					
Transmittance	≥85%				
Touch screen					
Type	Multi-touch				
Technology	PCT (projected capacitive touch)				
Screen rotation	Yes [2]				
Electrical properties					
Nominal voltage	24 VDC, SELV/PELV [3]				
Nominal current	1.2 A		1.4 A	1.8 A	1.7 A
Operating voltage	24 VDC ±25%				
Inrush current	Typ. 5 A, max. 100 A for < 50 µs				
Power consumption [4]	28.8 W		33.6 W	43.2 W	40.8 W
Fuse	10 A fast, internal [5]				
Reverse polarity protection	Yes				
Galvanic isolation	No				
Electrical isolation	POWERLINK (IF1), Ethernet (IF2), X2X Link (IF6) and CAN (IF7) to each other, to other interfaces and to the base device				
Mechanical properties					
Dimensions					
Width	203 mm	209 mm	279 mm	324 mm	414 mm
Height	145 mm	153 mm	191 mm	221.5 mm	258.5 mm
Depth	44.7 mm	41.5 mm	41.2 mm	43.2 mm	
Weight	1 kg	1.1 kg	1.6 kg	2.3 kg	3.3 kg

1) At 25°C ambient temperature. Reducing the brightness by 50% can typically result in an approximately 50% increase in the half-brightness time.
2) Can be set via software.
3) IEC 61010-2-201 requirements must be observed; see section "+24 VDC power supply" in the user's manual.
4) Power consumption including all interfaces.
5) The internal fuse cannot be replaced by the user or reset.

4.2.2 Technical data of the interface variants

IF7: CAN bus interface, galvanically isolated

Order number	4PPC80.xxxx-x1x, 4PPC80.xxxx-x2x, 4PPC80.xxxx-x3x
Interfaces	
Interface IF7	
Type	CAN bus
Variant	3 pins of the 10-pin multipoint connector Galvanically isolated
Max. transfer rate	
Bus length ≤25 m	1 Mbit/s
Bus length ≤60 m	500 kbit/s
Bus length ≤200 m	250 kbit/s
Bus length ≤1000 m	50 kbit/s

IF8: CAN bus interface

Order number	4PPC80.xxxx-x1x
Interfaces	
Interface IF8	
Type	CAN bus
Variant	3 pins of the 10-pin multipoint connector
Max. transfer rate	
Bus length ≤25 m	1 Mbit/s
Bus length ≤60 m	500 kbit/s
Bus length ≤200 m	250 kbit/s
Bus length ≤1000 m	50 kbit/s

IF9: RS232 interface

Order number	4PPC80.xxxx-x2x
Interfaces	
Interface IF9	
Type	RS232
Variant	3 pins of the 10-pin multipoint connector
Transfer rate	Max. 115.2 kbit/s

IF10: RS485 interface

Order number	4PPC80.xxxx-x3x
Interfaces	
Interface IF10	
Type	RS485
Variant	3 pins of the 10-pin multipoint connector
Transfer rate	Max. 115.2 kbit/s

4.3 Technical information

4.3.1 Dependencies to hardware upgrades and Automation Runtime

Interchangeability of Power Panel C80:

Certain Power Panel variants can be replaced without changing the Automation Studio project if the following features are identical:

- Quantity and type of interfaces
- Display size and resolution
- Display orientation

This means: Power Panel variants can be replaced by each other if they differ only by the device color (coating) or glass variant (anti-glare / not anti-glare, glass print, front panel overlays).

This way, a Power Panel can be replaced with a corresponding panel overlay variant (including customized panel overlay variant) without having to change the Automation Studio project.

4.3.2 Practical example of writing load in an application

200 kB of data (e.g. position data) can be written to internal memory every minute over a period of more than 20 years without reaching its end of life. It must be taken into account in this example that there are no other cyclic write operations by the system and/or the application to the mass storage device.

In Automation Studio version 4.9 and later, the new "Disk health data" function is also available. This makes it possible to monitor the service life of the mass storage device and to optimally adjust the write load from the application to the Power Panel C80.

4.3.3 Projected capacitive touch (PCT)

Operation	
Number of fingers	10
Glove operation	Yes
Passive stylus pens	Yes
Active stylus pens	No
Error detection	
Ball of hand	Yes
Water	Yes
Front	
Hardened front glass	Yes

Operation with gloves

Projected capacitive touch screens (PCT) are suitable for operation with or without gloves.

A large number of gloves (rubber gloves, light/heavy leather gloves, disposable latex gloves, etc.) are supported.

Due to the variety of commercially available gloves, however, B&R cannot guarantee all types.

Support for stylus pens

Passive stylus pens:
In principle, the Power Panel supports passive stylus pens. Due to the large number of passive stylus pens available on the market, there may be functional differences. For this reason, B&R cannot comprehensively guarantee their functionality.

Active stylus pens are not supported!

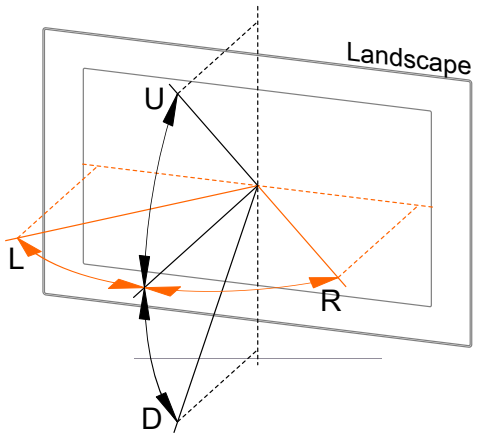
Touch actions during cleaning

Touch actions can be triggered during cleaning of the PCT touch screen. If this is not desired, this behavior must be taken into account in the application.

Touch actions can be triggered while cleaning the PCT touch screen. Cleaning is therefore only permitted to take place when the power is switched off, see "Cleaning" on page 75.

4.3.4 Viewing angles

For the viewing angles values (U, D, R, L) of the display types, see the technical data of the respective device.



Legend	Display viewing angle
U	From top
D	From bottom
L	From left
R	From right

The viewing angles are specified for the horizontal (L, R) and vertical (U, D) axes in reference to the vertical axis of the display. The specified viewing angles above always refer to the standard mounting orientation of the respective Power Panel.

4.3.5 Surface resistance

Chemical resistance of the front glass per ASTM D 1308-02 and ASTM F 1598-95 for an exposure time of 24 hours without visible changes:

- Acetone
- Alkaline cleaning agents
- Ammonia 5%
- Gasoline (unleaded)
- Beer
- Brake fluid
- Chlorine-alkaline cleaning and disinfecting agents (pH value min. 11) 1.5%
- Hydrogen chloride 6%
- Coca-Cola
- Diesel
- Diesel oil
- Dimethylbenzene
- Vinegar
- Ethanol
- Grease
- Ammonia-based glass cleaners
- Sidolin glass cleaner
- Graphite
- Hydraulic fluid (Skydrol)
- Isopropanol
- Coffee
- Ink
- Lysol
- Methylbenzene
- Methyl ethyl ketone
- Naphtha
- Caustic soda 5%
- Nitric acid 70%
- Hydrochloric acid 5%
- Lubricants
- Sulphuric acid 40%
- Suntan oil and UV radiation
- Cooking oil
- Stamping ink
- Tea
- Turpentine
- Turpentine oil replacement (thinner)
- Trichloroethylene

4.4 Temperature/Humidity diagrams

5.7" variants

The maximum permissible humidity for UL applications is 90%.

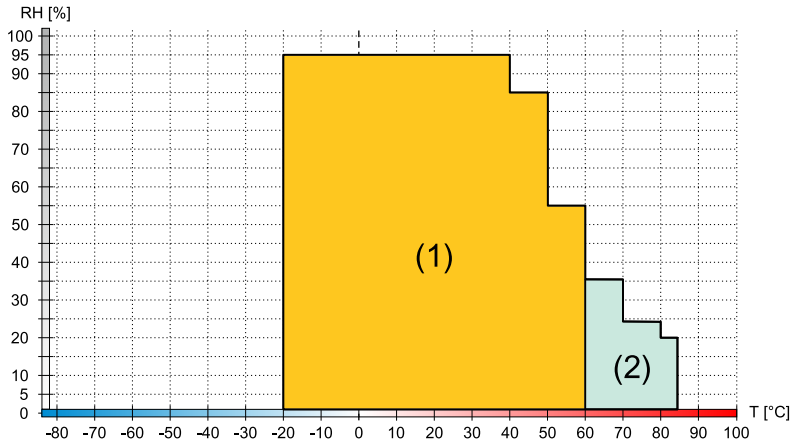


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

7.0" variants

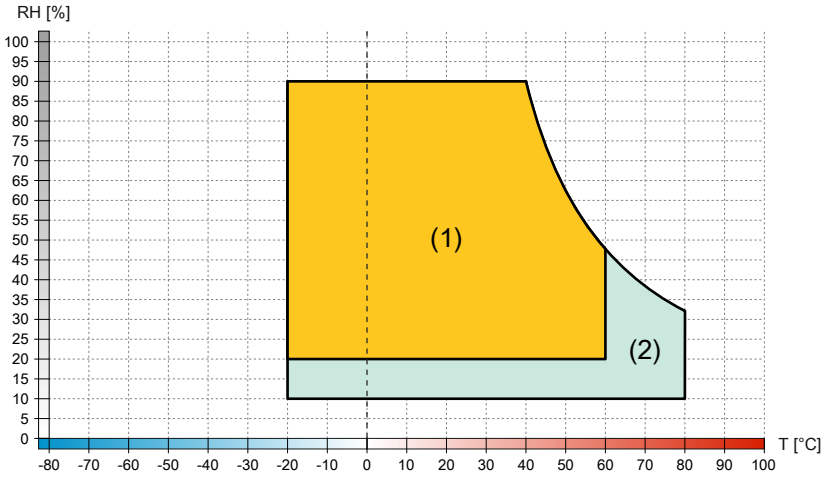


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

10.1" variants

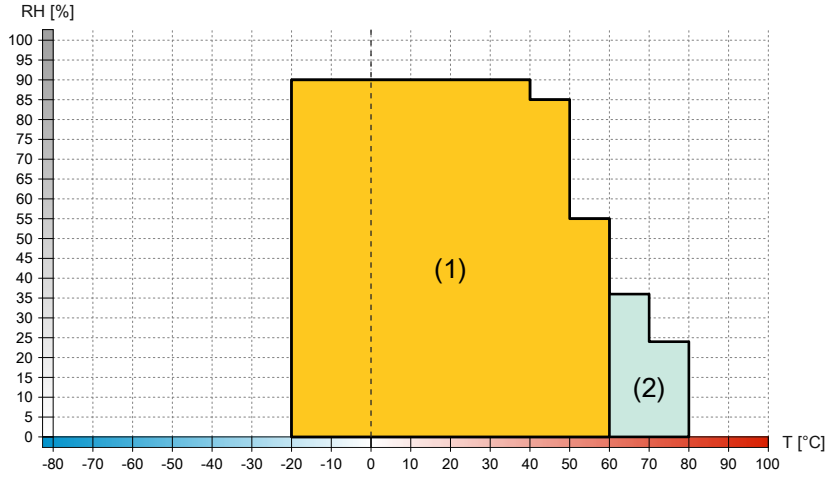


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

12.1" variants

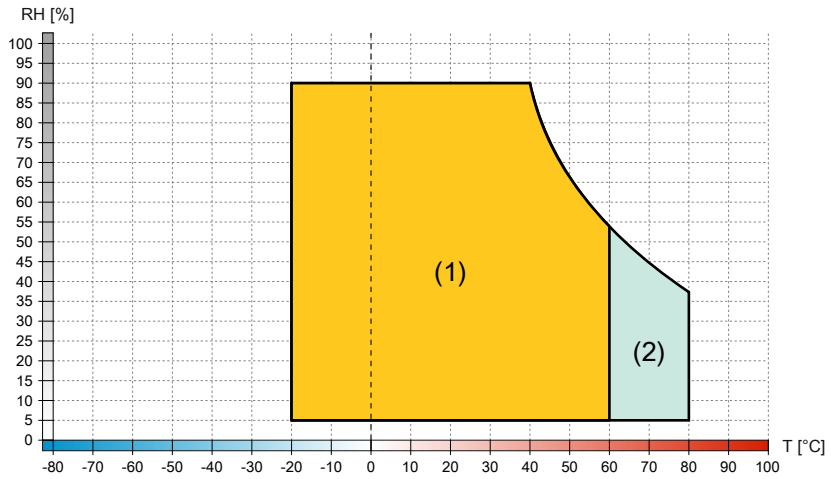


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

15.6" variants

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

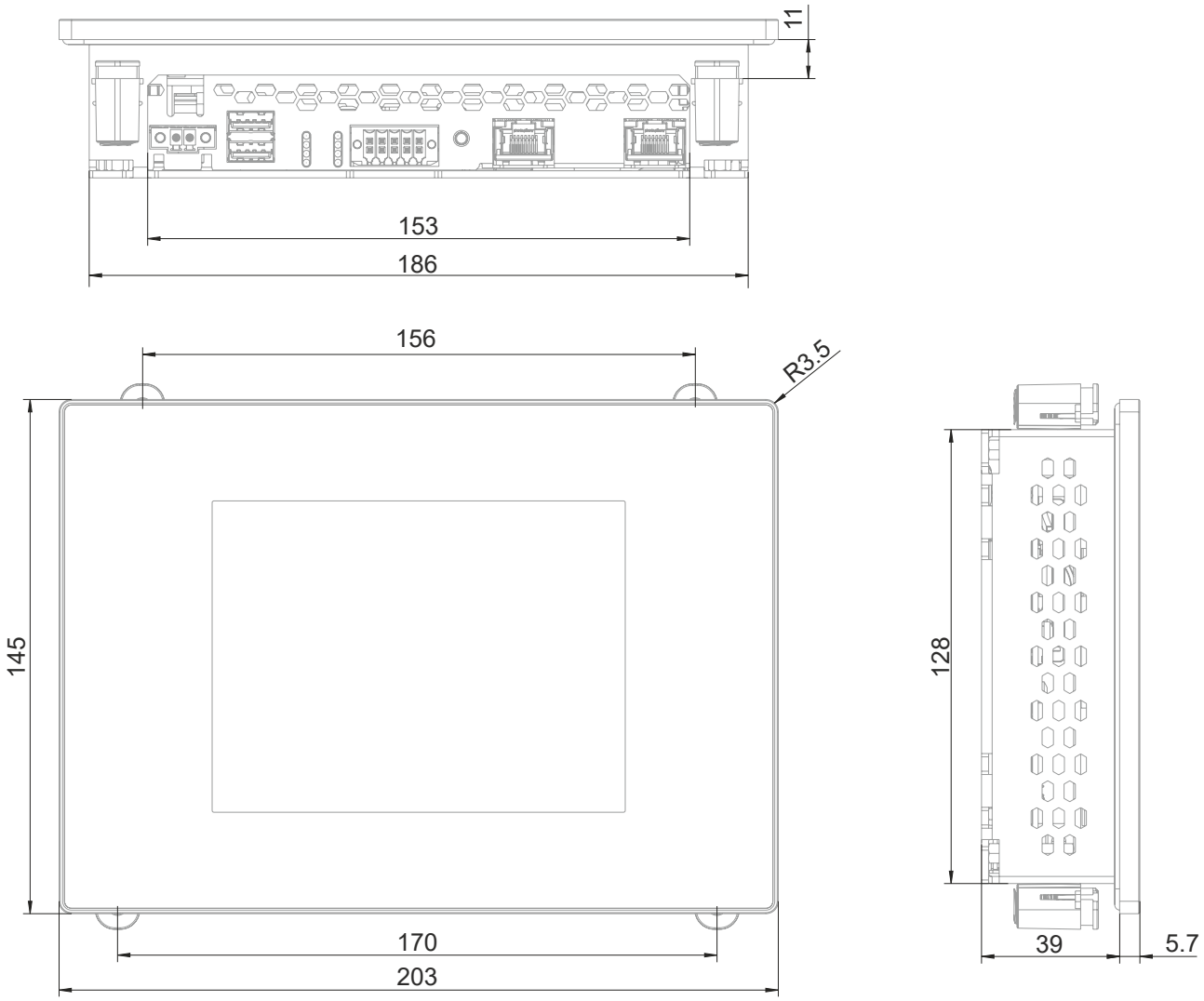
4.5 Dimensions

Information:

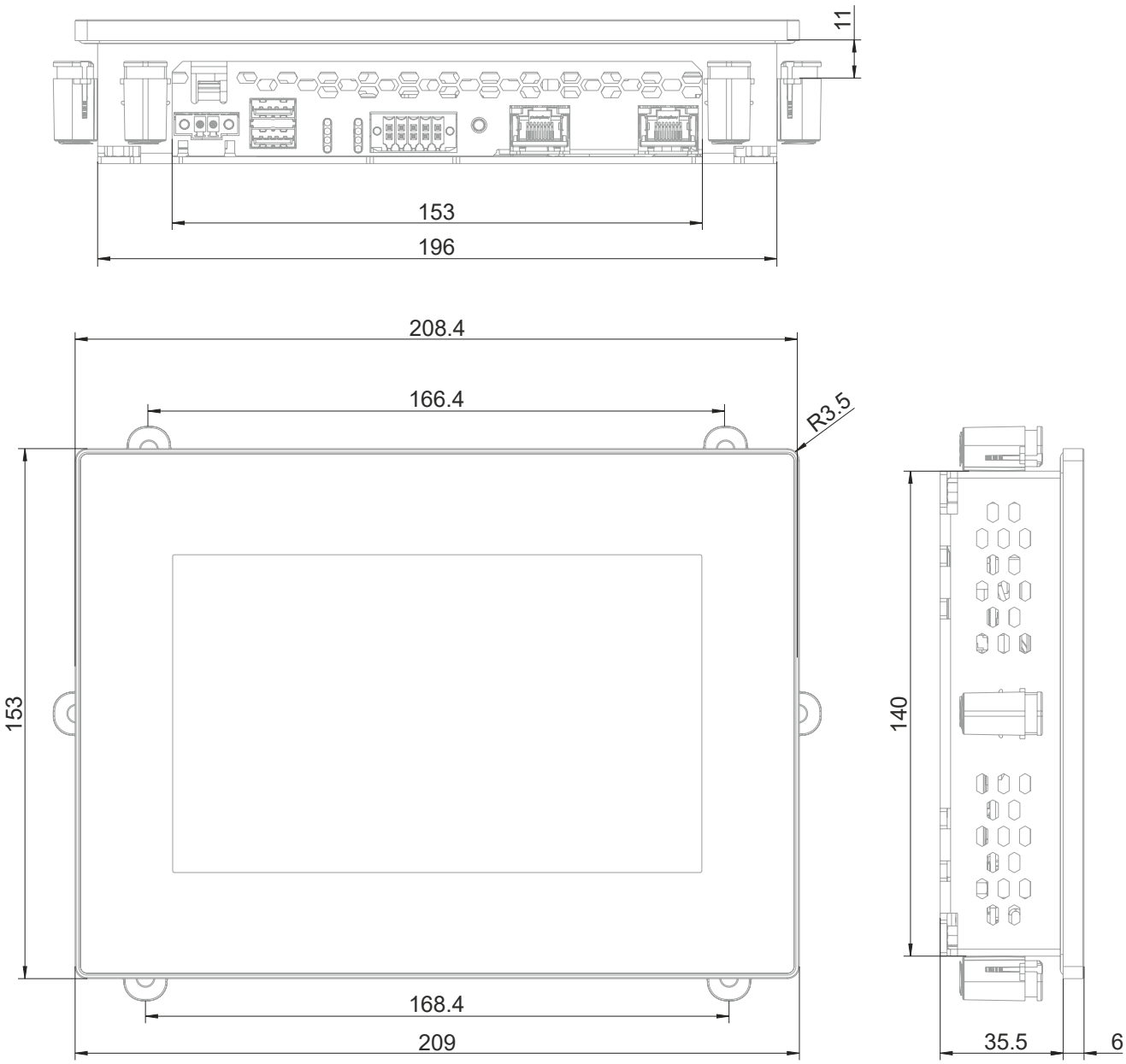
All dimensions, specifications in dimension diagrams and associated tables are in millimeters [mm].

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.

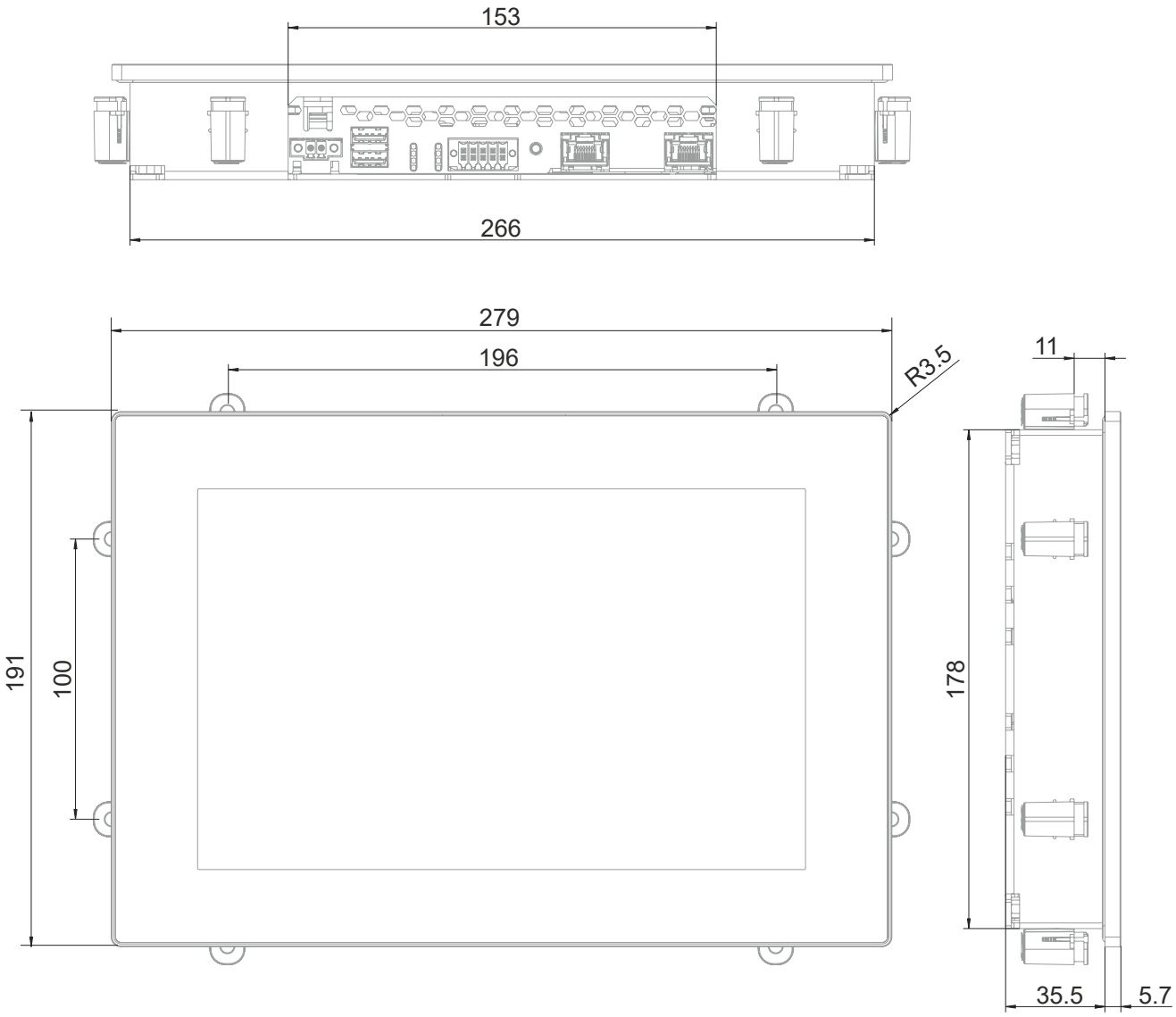
4.5.1 5.7" variants



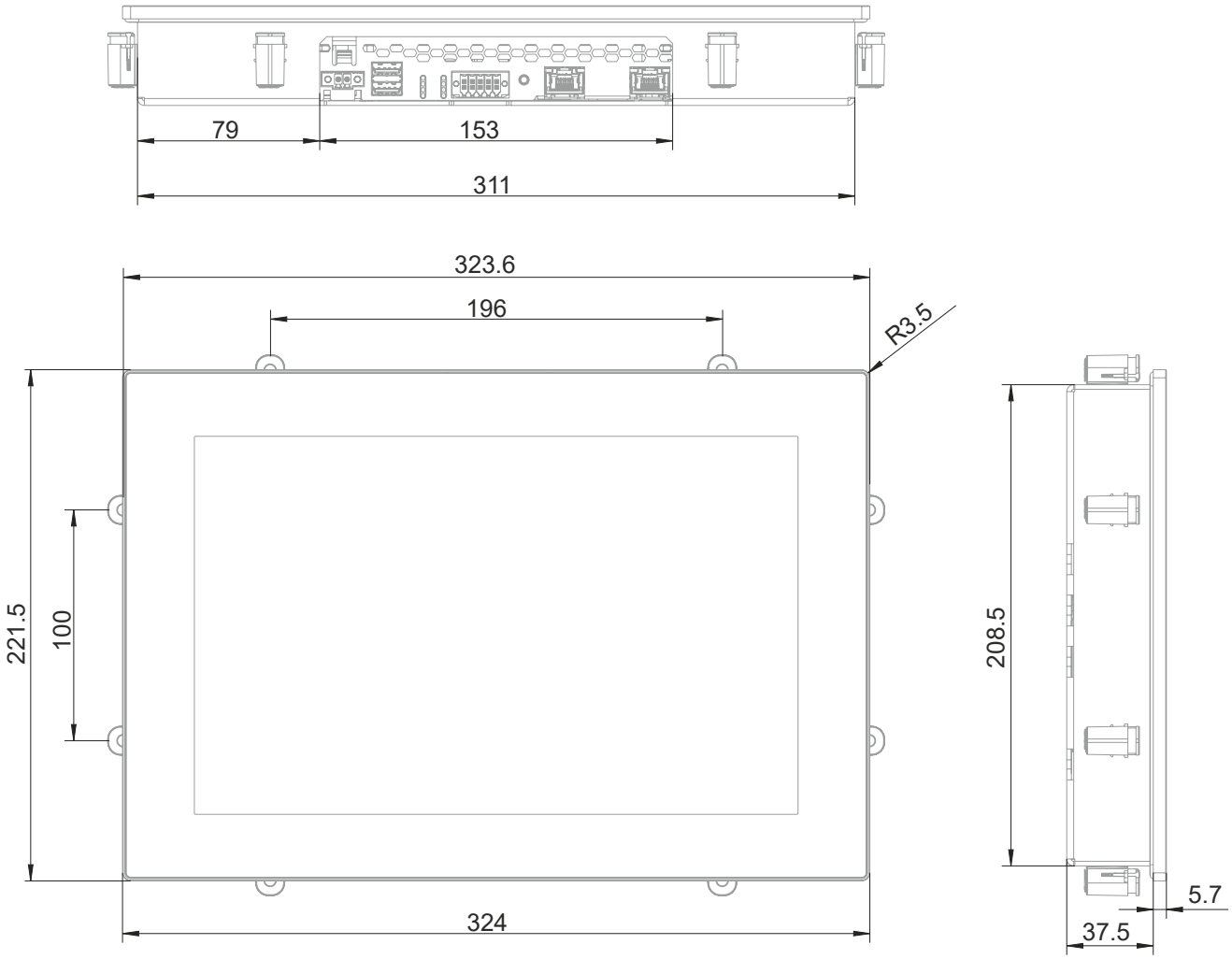
4.5.2 7.0" variants



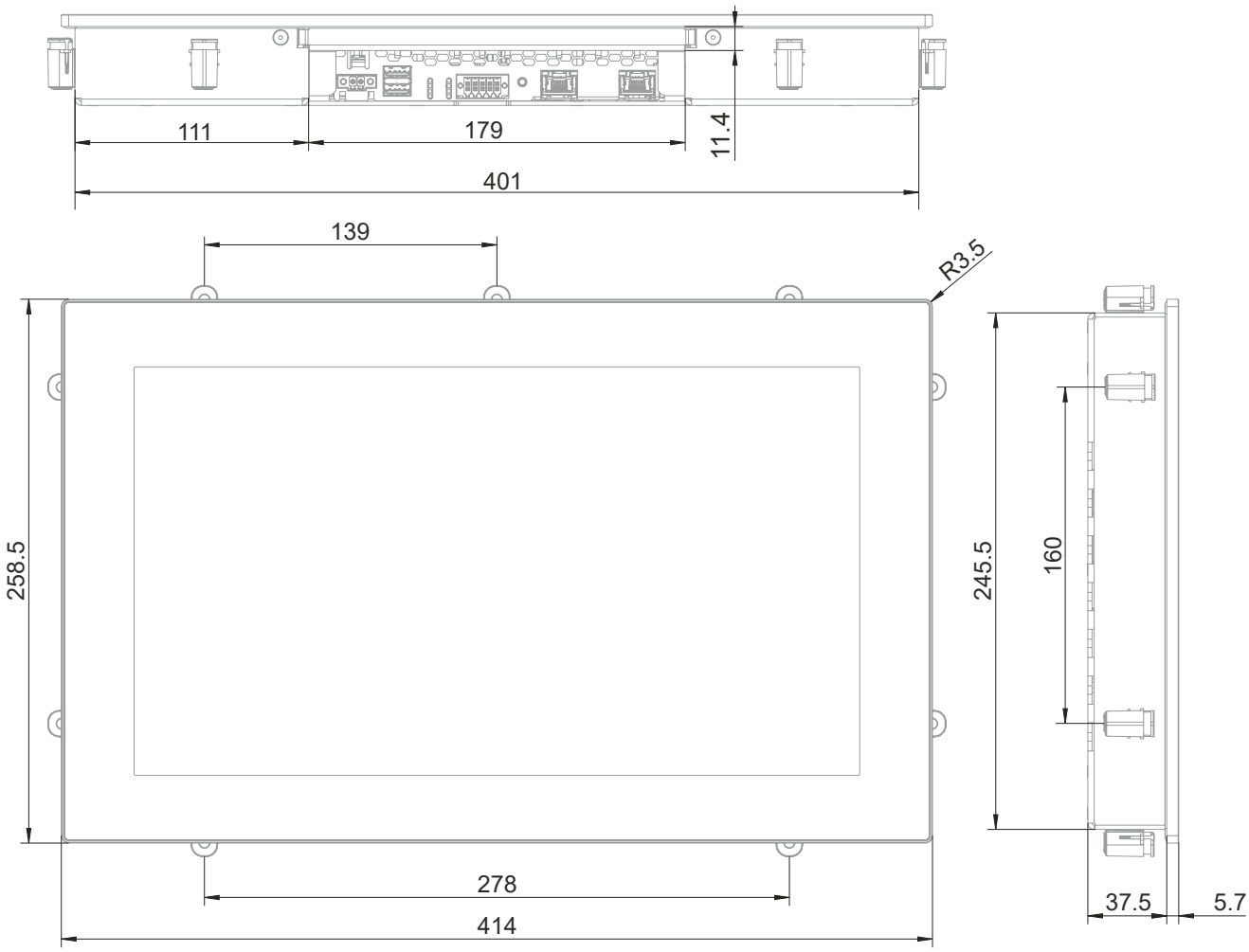
4.5.3 10.1" variants



4.5.4 12.1" variants



4.5.5 15.6" variants



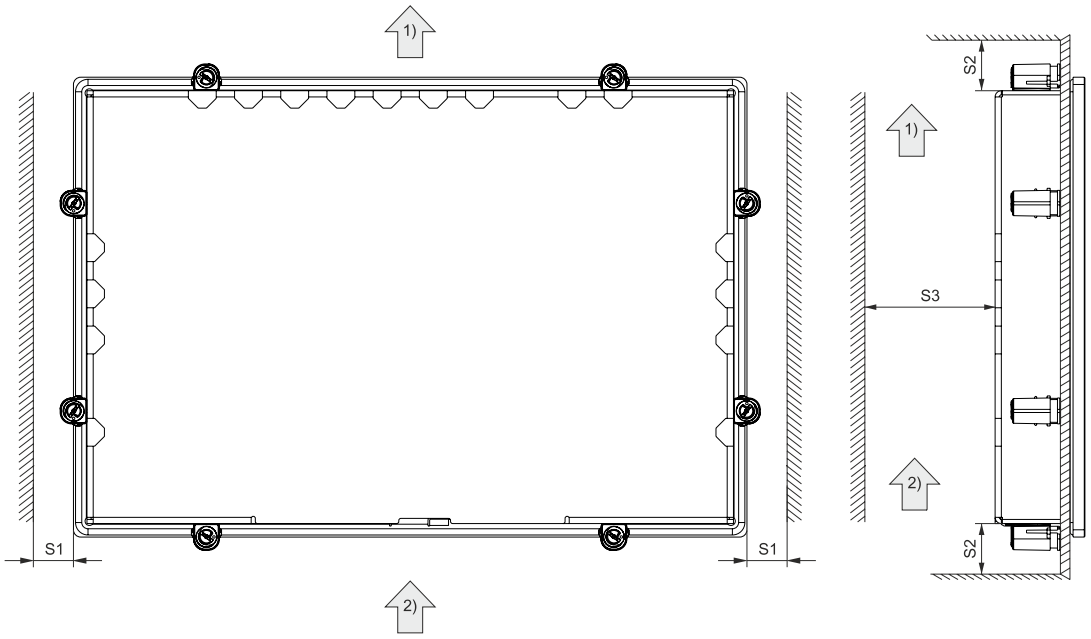
4.6 Environmental properties

4.6.1 Spacing for air circulation

To ensure sufficient air circulation, a specified clearance must be provided above, below, to the side and behind the device. For the minimum specified clearance, see the following diagrams. This is valid for all variants.

> **Information:**
>
> **The following figure and table exclusively show the thermal view of the complete system. If additional space is required for operating or servicing the device, this must be taken into account during installation.**

The air inlet and air outlet are shown in the following figure.

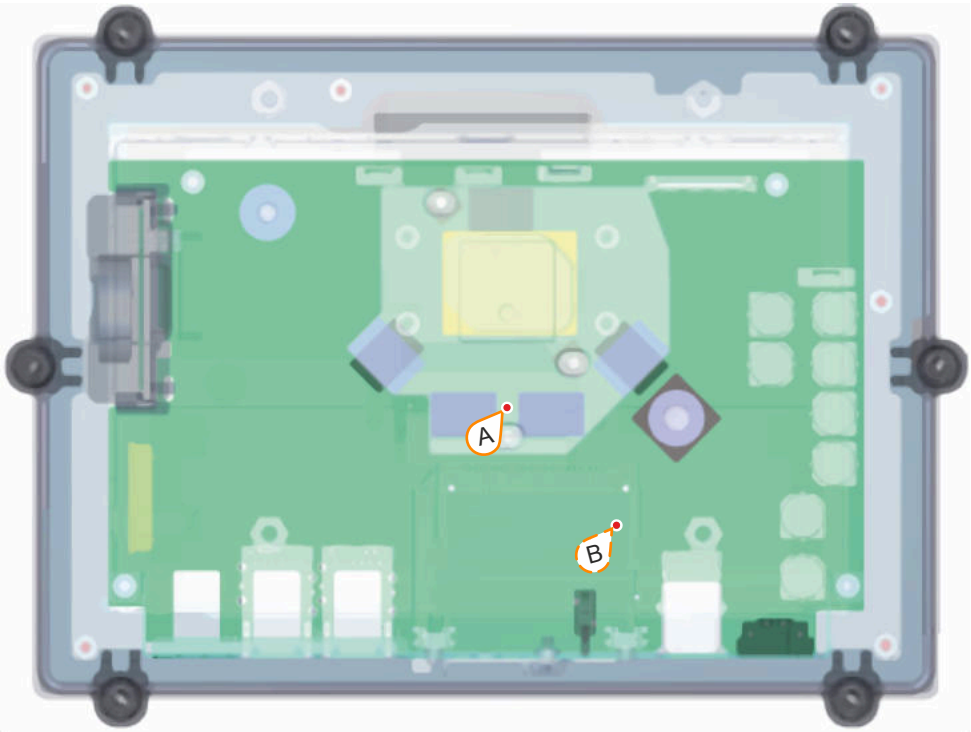


Legend			
1)	Air outlet	2)	Air inlet

Name	Minimum spacing [mm]	Name	Minimum spacing [mm]
S1	≥ 20	S2	≥ 100
S3	≥ 50		-

> **Caution!**
>
> **The specified spacing for air circulation applies at the maximum specified ambient temperature. The maximum specified ambient temperature is not permitted to be exceeded!**
>
> **If the specified spacing for air circulation cannot be maintained, the maximum specified temperatures of the temperature sensors (see "Temperature sensor positions" on page 30) must be monitored in the application and appropriate measures taken if these values are exceeded.**

4.6.2 Temperature sensor positions



ADI sensors	Position	Measuring point for	Measurement	Max. specified [°C]
System unit sensor 1	A	CPU/RAM	Temperature of the processor area	4PPC80.0573-xxx: 90 4PPC80.0702-xxx: 95 4PPC80.101E-xxx: 90 4PPC80.121E-xxx: 90 4PPC80.156B-xxx: 85
System unit sensor 2	B	Fieldbuses	Temperature of the fieldbus 1 area	4PPC80.0573-xxx: 95 4PPC80.0702-xxx: 95 4PPC80.101E-xxx: 90 4PPC80.121E-xxx: 90 4PPC80.156B-xxx: 90

4.6.3 Derating the ambient temperature

If the device is installed outside the corresponding specifications, derating the maximum permissible ambient temperature must be taken into account (see "Ambient conditions" on page 16). Depending on the display size, derating must be taken into account under the following conditions:

- Spacing for air circulation is not observed (see Spacing for air circulation).
- Permissible mounting orientations are not observed (see "Mounting orientations" on page 43).

The following derating must be taken into account during commissioning:

	Display size				
Condition for derating	**5.7"**	**7.0"**	**10.1"**	**12.1"**	**15.6"**
Spacing for air circulation not observed	10°C	10°C	10°C	10°C	10°C
Deviation from permissible mounting orientations (e.g. horizontal)	5°C[1)]	5°C[1)]	-	-	-
Installation cutout: Wall thickness >4 mm	5°C	5°C	5°C	5°C	5°C
High display brightness	-	-	-	-	-
Max. derating (all conditions apply)	20°C	20°C	15°C	15°C	15°C

1) With horizontal mounting orientation

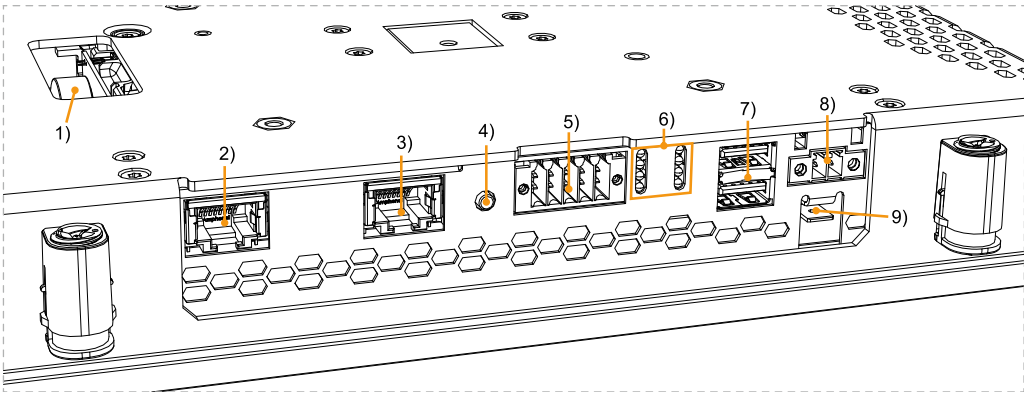
If one or more of the above conditions apply, the device is permitted to be derated up to the maximum operating temperature (see ambient conditions in the technical data) minus the specified derating temperatures.

If several conditions apply, the individual derating values must be added together.

4.7 Device interfaces and slots

4.7.1 Interface overview

For all connections, only connections within a building are permitted, taking into account maximum lengths.



No.	Interface name	Chapter	No.	Interface name	Chapter
1	Battery	"Battery"	6	LED status indicators	"LED status indicators"
2	POWERLINK	"POWERLINK interface"	7	USB interfaces	"USB interfaces"
3	Ethernet	"Ethernet interfaces"	8	Power supply	"Power supply"
4	Reset button	Reset button	9	Grounding	Grounding
5	Fieldbus	Fieldbus interfaces	-		

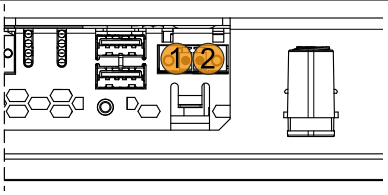
4.7.2 Power supply

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 required 2-pin connector is included in delivery (see "TB6102" on page 77).

The device is protected against overload and reverse polarity by a soldered fuse (10 A, very fast-acting). 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	Symbol	Figure
1	24 VDC	+	
2	GND	-	

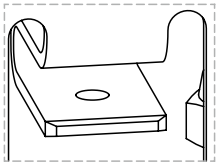
- Reverse polarity protection
- 2-pin
- Male

Electrical properties	
Operating voltage	24 VDC ±25%
Nominal voltage	24 VDC
Overvoltage category per EN 61131-2	II
Inrush current	Typ. 5 A, max. 100 A for < 50 µs
Galvanic isolation	No

4.7.3 Grounding

Caution!

The functional ground (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 line cross section should be as large as possible (at least 2.5 mm²).

4.7.4 USB interfaces

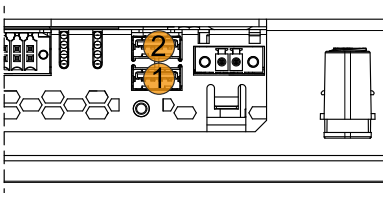
Notice!

Possible damage to USB interfaces or USB devices!

- **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.**
- **Due to the general PC specification, these USB interfaces must be handled with the utmost care with regard to EMC, cable routing, etc.**

The Power Panel has a USB 3.0 host controller with 2 USB interfaces:

USB interfaces	
Standard	USB 3.0
Variant	Type A, female
Quantity	2
Transfer rate	Low speed (1.5 Mbit/s)
	Full speed (12 Mbit/s)
	High speed (480 Mbit/s)
	SuperSpeed (5 Gbit/s)
Current-carrying capacity[1)]	Max. 1 A per interface
Cable length	
USB 2.0	Max. 5 m (without hub)
USB 3.0	Max. 3 m (without hub)
-	



1) USB interface IF4
2) USB interface IF5

1) Each USB interface is protected by a maintenance-free USB current-limiting switch (max. 1 A).

Assigning the USB interfaces

The USB interfaces can be independently assigned to either the controller or terminal:

Interface	Default assignment	Alternative assignment
IF4	AR Embedded (controller)	Terminal
IF5	Terminal	AR Embedded (controller)

Using the USB interfaces

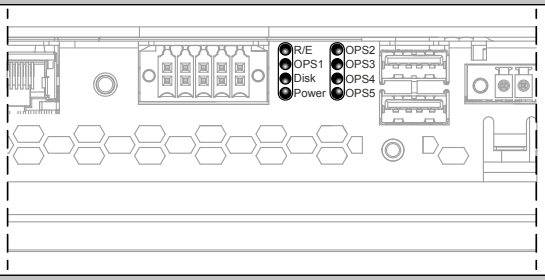
Depending on the assignment, the USB interfaces can be used as follows:

Assignment	Usage
AR Embedded (controller)	Technology Guard
	USB storage medium (e.g. flash drive)
Terminal	USB storage medium with system image for updating the terminal system (see "Update " on page 58).
	USB keyboard[1)]
	USB mouse[1)]

1) USB keyboard and/or USB mouse are automatically recognized by the terminal.

4.7.5 LED status indicators

Assignment



LED	Color	Status	Explanation	LED status indicator (500 ms per interval: 1 2 1 2)
Power	Green	On	Power supply OK	
		Blinking	The device is started up; the battery state is "BAD".	
			Information: **For additional information, see "Battery" on page 36.**	
	Red	On	The system is in power saving mode (standby).[1)]	
		Blinking	The MTCX is running; the battery state is "BAD". The system is in power saving mode (standby).[1)]	
	Red-Green	Blinking	Faulty or incomplete BIOS, MTCX or I/O FPGA update, battery state OK, power supply OK	
			Faulty or incomplete BIOS, MTCX or I/O FPGA update, battery state OK, power saving mode (standby)[1)]	
			Faulty or incomplete BIOS, MTCX or I/O FPGA update, battery state BAD, power supply OK	
			Faulty or incomplete BIOS, MTCX or I/O FPGA update, battery state BAD, power saving mode (standby)[1)]	
			Information: **An update must be performed again.**	
OPS1	For a description, see the following chapter.			
OPS2				
OPS3				
OPS4				
OPS5				
R/E	Green	Blinking	System initializing.	
		On	System in run and application running.	
	Red	On	System in service/diagnostics mode.	
	Orange	Blinking	A license violation has occurred.	
Disk	Yellow	On	Indicates access to NVMe storage	

1) S5: Soft-off
S4: Hibernate (suspend-to-disk)

4.7.5.1 Description of OPS LEDs

Variant without fieldbus interfaces

LEDs "OPS1" to "OPS5" do not have a function for Power Panel variants without optional fieldbus interface (4PPC80.xxxx-10x).

Variant with 2x CAN bus

LED	Color	Status	Description	Interface
OPS1	-	-	Reserved.	-
OPS2	Yellow	On	TxD/RxD: Data is being transmitted or received.	IF7: CAN bus
OPS3	Yellow	Off	Terminating resistor not switched on.	
		On	Terminating resistor switched on.	
OPS4	Yellow	On	TxD/RxD: Data is being transmitted or received.	IF8: CAN bus
OPS5	Yellow	Off	Terminating resistor not switched on.	
		On	Terminating resistor switched on.	

Variant with 1x CAN bus and 1x RS232

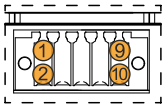
LED	Color	Status	Description	Interface
OPS1	-	-	Reserved.	-
OPS2	Yellow	On	TxD/RxD: Data is being transmitted or received.	IF7: CAN bus
OPS3	Yellow	Off	Terminating resistor not switched on.	
		On	Terminating resistor switched on.	
OPS4	Yellow	On	TxD/RxD: Data is being transmitted or received.	IF9: RS232
OPS5	-	-	Reserved	-

Variant with 1x CAN bus and 1x RS485

LED	Color	Status	Description	Interface
OPS1	-	-	Reserved.	-
OPS2	Yellow	On	TxD/RxD: Data is being transmitted or received.	IF7: CAN bus
OPS3	Yellow	Off	Terminating resistor not switched on.	
		On	Terminating resistor switched on.	
OPS4	Yellow	On	TxD/RxD: Data is being transmitted or received.	IF10: RS485
OPS5	Yellow	Off	Terminating resistor not switched on.	
		On	Terminating resistor switched on.	

4.7.6 Fieldbus interfaces

Pinout

Figure


Terminal	Description	
	X2X Link	
1	X2X	X2X data
2	SHLD	Shield
3	X2X\	X2X data inverted
4	X2X⊥	X2X ground
	CAN bus	
5	CAN_H	CAN High
6	CAN_L	CAN Low
7	GND	Ground
	CAN bus	
8	GND	Ground
9	CAN_L	CAN Low
10	CAN_H	CAN High
	RS232	
8	GND	Ground
9	RxD	Receive signal
10	TxD	Transmit signal
	RS485	
8	GND	Ground
9	DATA\	Data inverted
10	DATA	Data
Required accessories		
0TB1210.3100		Connector 300 VDC - 10-pin female - Cage clamp terminal block - Protected against vibration by the screw flange

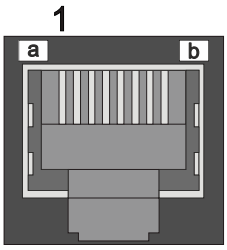
Interface	Maximum transfer length
X2X Link	100 m between 2 nodes (segment length)
CAN	Bus length up to 25 m: 1 Mbit/s
	Bus length up to 60 m: 500 kbit/s
	Bus length up to 200 m: 250 kbit/s
	Bus length up to 1000 m: 50 kbit/s
RS232	Bus length up to 5 m: 115.2 kbit/s
	Bus length up to 10 m: 115.2 kbit/s
	Bus length up to 15 m: 64 kbit/s
RS485	Bus length of 1200 m: 115.2 kbit/s

4.7.7 Reset button

The device is set to mode SERVICE mode with the reset button by default. This setting can be changed in Automation Studio.

4.7.8 Ethernet interface (IF2)

ETH1		
Variant	RJ45, female	
Controller	Intel I210	
Wiring	S/STP (Cat 5e)	
Transfer rate	10/100/1000 Mbit/s[1)]	
TSN support	Yes	
Cable length	Max. 100 m (min. Cat 5e)	
LED "Speed" (a)	**On**	**Off**
Green	100 Mbit/s	10 Mbit/s[2)]
Orange (dark)	1000 Mbit/s	-
LED "Link" (b)	**On**	**Active**
Orange (light)	Link (a connection to an Ethernet network exists)	Blinking (data being transferred)



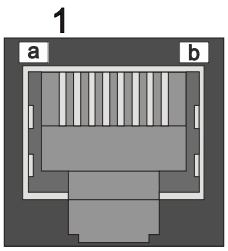
1) Switching takes place automatically.
2) The 10 Mbit/s transfer rate / connection is only available if LED "Link" is active at the same time.

Information:

This Ethernet interface (IF2) is not suitable for POWERLINK.

4.7.9 POWERLINK interface (IF1)

Figure	Pinout		
	Terminal	**Ethernet**	
	1	RXD	Receive data
	2	RXD\	Receive data\
	3	TXD	Transmit data
	4	Termination	
	5	Termination	
	6	TXD\	Transmit data\
	7	Termination	
	8	Termination	
	Diagnostic LED status indicators		
	LED	**Color**	**Status**	**Description**
	LNK (a)	Link		
		Green	On	Link established to an Ethernet network.
	ACT (b)	Activity		
		Orange	On	No Ethernet activity taking place.
			Blinking	Ethernet activity taking place (data being transferred).



POWERLINK V2 mode

By default, the POWERLINK interface is operated as a managing node (MN). In the managing node, the node number is set to a fixed value of 240.

If the POWERLINK node is operated as a controlled node (CN), a node number from 1 to 239 can be set in the POWERLINK configuration in Automation Studio.

Ethernet mode

In this mode, the interface is operated as an Ethernet interface. The INA2000 station number is set using the Automation Studio software.

Information:

If interface IF1 is operated in Ethernet mode, then this interface receives its own IP address and works independently of Ethernet interface IF2.

4.7.10 Battery

The lithium battery (3 V, 1000 mAh) ensures retention of the internal real-time clock (RTC), CMOS data and remanent data of IF options with SRAM. It is located as a battery insert on the bottom of the device. The battery has a service life of at least 8 years[2)]. The battery is subject to wear and should be replaced regularly (at least after the specified service life) by changing the battery.

The battery state is determined by the system immediately after the device is switched on and subsequently every 24 hours. During the measurement, the battery is subjected to a brief load (approx. 1 second) and then assessed.

Battery state	Explanation
N/A	The hardware or firmware used is too old and does not support readout.
GOOD	Data retention is ensured.
BAD	As soon as the battery capacity is recognized as BAD (insufficient), the battery compartment must be replaced.

As soon as the battery capacity is recognized as insufficient, the battery compartment must be replaced with replacement part "5ACCRHMI.0018-000", see "Changing the battery" on page 73.
Data is retained by a capacitor in order to avoid data loss during battery replacement.

Information:

The retention time when changing the battery is approx. 2 minutes.

[2)] At 50°C, 8.5 µA for the components being supplied and self-discharge of 40%.

4.8 Product information

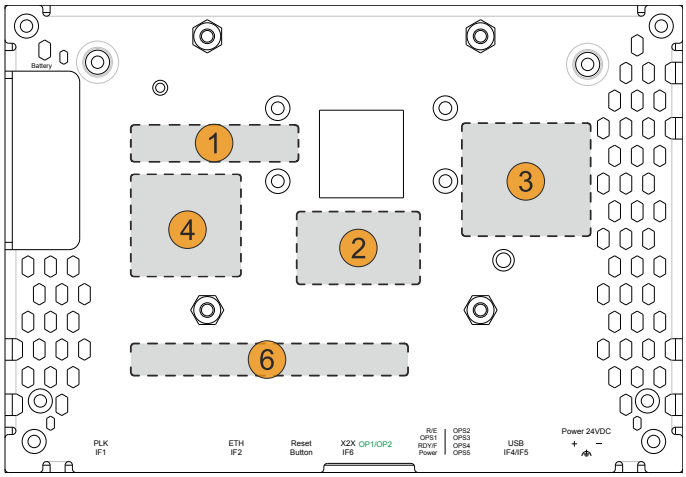


Figure 1: Product information for a 5.7" device

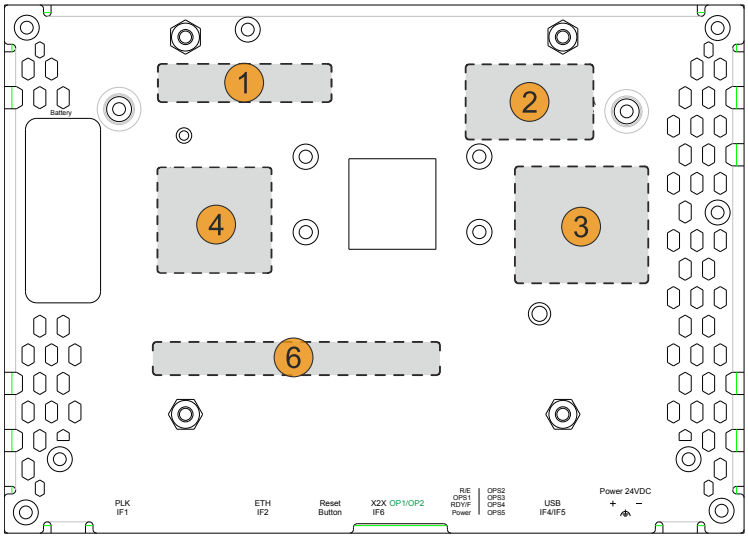


Figure 2: Product information for 7", 10.4", 12.1" and 15.6" devices

Position	Description
1	Specifications for the device family and electrical properties
2	Device-specific specifications, serial numbers and MAC addresses, see Identification.
3	Valid test and conformity ID for the product, see section "Technical data" on page 15
4	Safety notices, warnings and information about the product
5	License adhesive label for operating systems (configuration-dependent)
6	Space for individual customer information (configuration-dependent)

4.8.1 Identification

Figure (symbolic)	Identification	
1 2 Made in Austria B&R I 5142 Eggelsberg I AUSTRIA 3	1	Device number
	2	Serial number
	3	MAC addresses
	-	

The device number can be retrieved on the B&R website (www.br-automation.com) using the serial number of the device (login required). Information (serial number, material number, revision, delivery date and end of warranty) about all components installed in the system can be retrieved using the device number.

5 Installation and wiring

5.1 Basic 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 8 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

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 29.

General installation instructions

- When installing the device, the permissible mounting orientations must be observed - see "Mounting orientations" on page 43.
- When connecting installed or connected peripherals, follow the instructions in the peripheral device's documentation.

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 Requirements for the installation cutout

When installing the Power Panel, it is important to ensure that the surface and wall thickness meet the following conditions:

Installation cutout property	Value
Permissible deviation from evenness **Note:** This condition must also be observed when the device is installed.	≤0.5 mm
Permissible surface roughness in the area of the gasket	≤120 µm (Rz 120)
Min. wall thickness	2 mm
Max. wall thickness	6 mm[1)]

1) A derating of the ambient temperature of 5°C must be taken into account for all mounting orientations and diagonals starting at a wall thickness greater than 4 mm (see "Derating the ambient temperature" on page 30).

Notice!

The degree of protection provided by the device (see technical data) can only be maintained if it is installed in an appropriate housing that has at least the same degree of protection and in accordance with the above requirements.

Notice!

The device must ultimately be installed in a protective housing with sufficient rigidity (per UL 61010-1 and UL 61010-2-201).

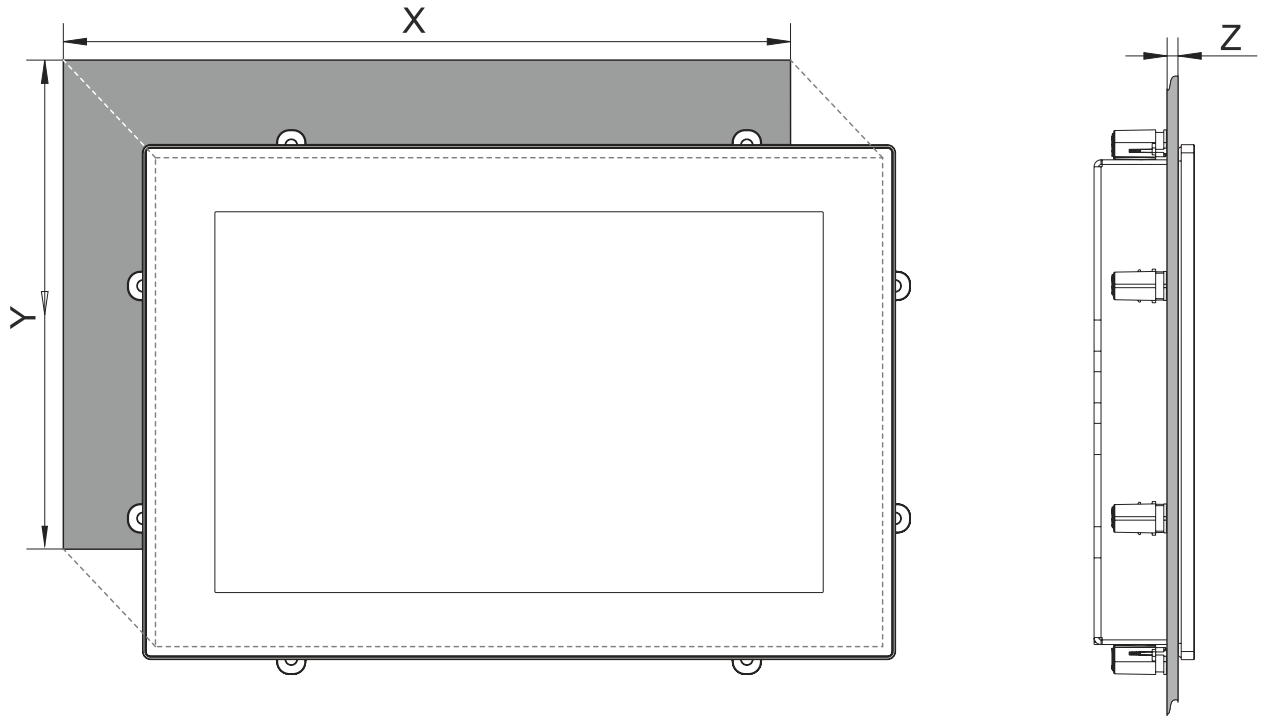
5.2.1 Installation cutout

Information:

When installing, spacing for air circulation and additional free space for operating and servicing the device must be taken into account.

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

Coutout tolerance: +0 mm / -0.5 mm.



Panels					
Type	**Order number**	**X**	**Y**	**Z (wall thickness)**	**Number of retaining clips**
5.7"	4PPC80.0573-1xx	188	130	2 to 6[1)]	4
7.0"	4PPC80.0702-1xx	199	143		6
10.1"	4PPC80.101E-1xx	268	180		8
12.1"	4PPC80.121E-1xx	313	210.5		8
15.6"	4PPC80.156B-1xx	403	247.5		9

1) A derating of the ambient temperature of 5°C must be taken into account for all mounting orientations and diagonals starting at a wall thickness greater than 4 mm (see "Derating the ambient temperature" on page 30).

Information:

A minimum circumferential distance of 30 mm must be maintained in order to enable installation with retaining clips.

5.3 Installing with retaining clips

Figure: Retaining clips (symbolic)

The retaining clips are designed for a certain thickness of the material to be clamped (max. 6 mm, min. 2 mm).

A large flat-blade screwdriver is needed to tighten and loosen the screw.

The device must be installed on a flat, clean and burr-free surface since tightening screws on an uneven area can result in damage to the display or the ingress of dust and water.

See also: "Requirements for the installation cutout" on page 39.

Procedure

1. Insert the device into the front of the prepared, burr-free and flat installation cutout. For the dimensions of the installation cutout, see section "Dimensions" for the individual devices.
2. Install the retaining clips on the device. To do this, insert the clips into the openings on the sides of the device (indicated by the orange circles). The number of openings may vary depending on the size of the device.

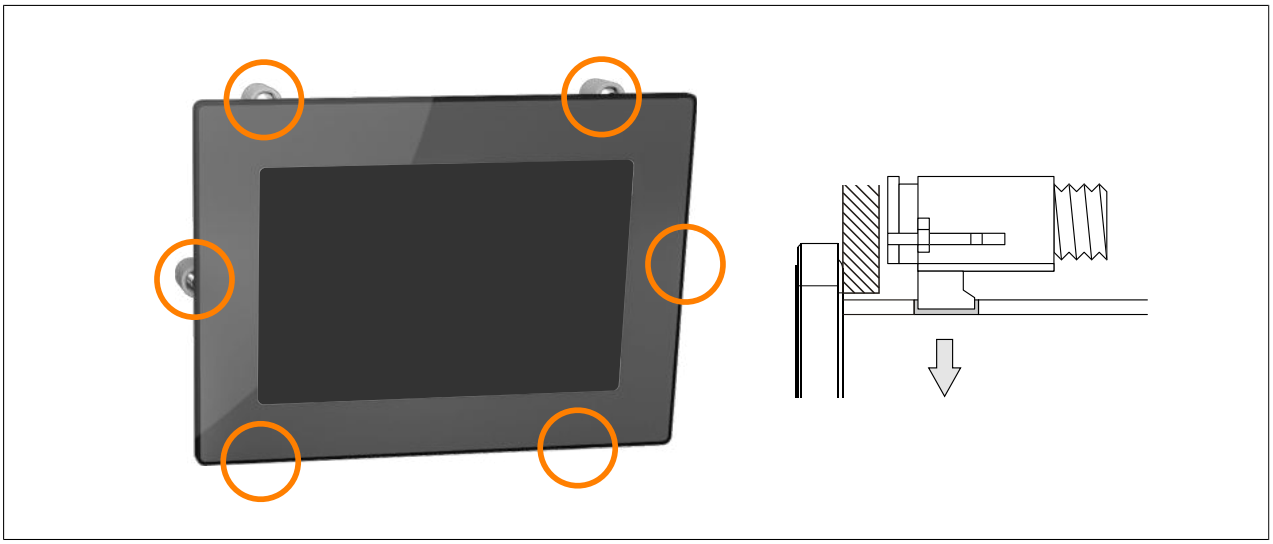


Figure: Inserting the retaining clips

3. Slide the retaining clips all the way to the back of the openings.

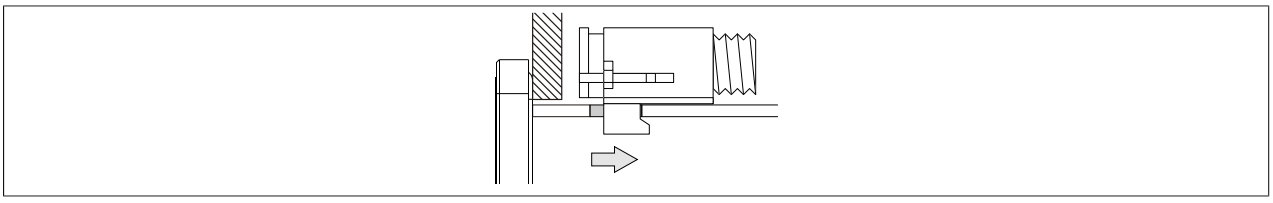


Figure: Sliding the retaining clips back

4. Secure the retaining clips to the wall or control cabinet panel by tightening the mounting screws with a flat-blade screwdriver.

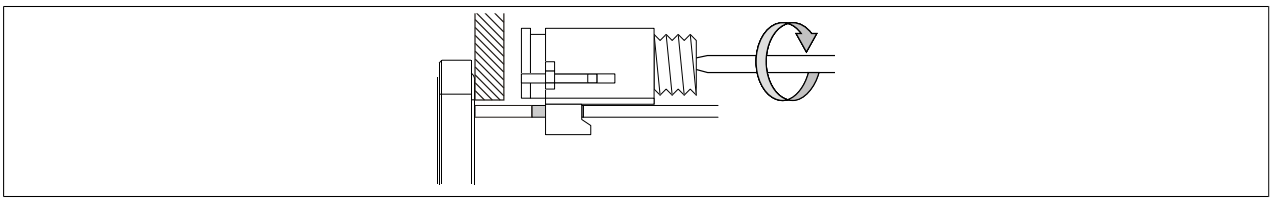


Figure: Securing the retaining clips

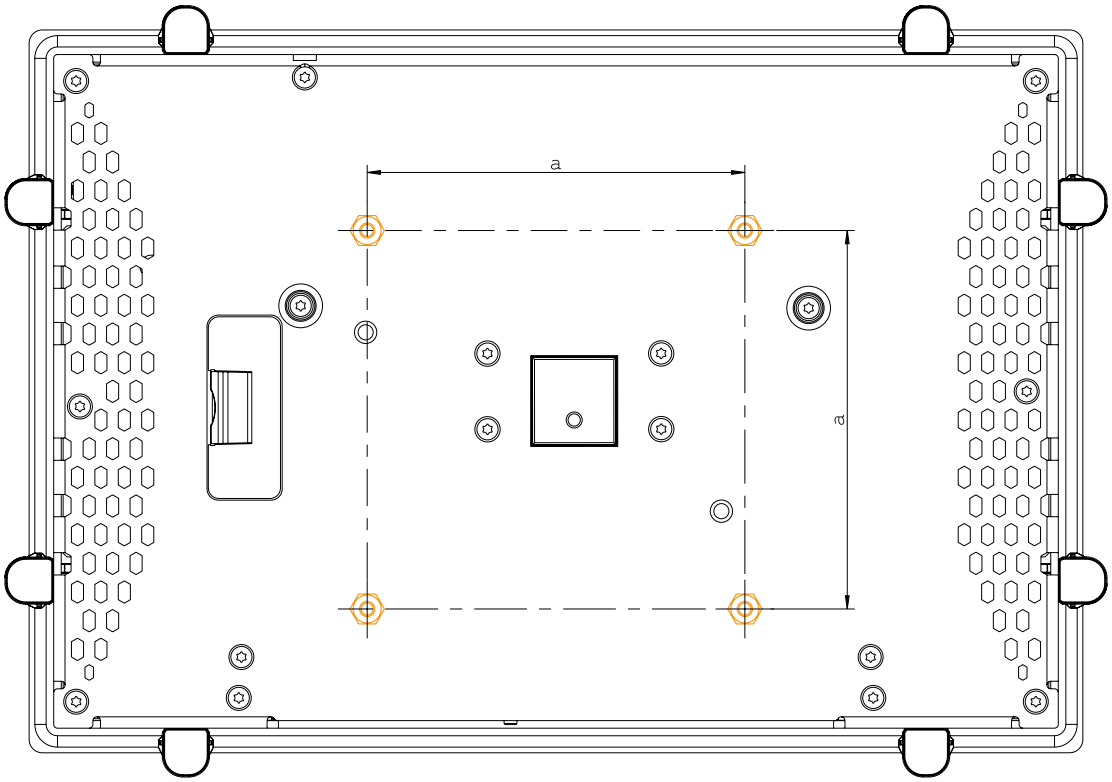
Torque limiting is built into the retaining clips.

✓ The retaining clip is secured correctly if the following conditions apply:

- As soon as torque limiting takes effect, the blade of the screwdriver is pushed out of the screw drive.
- The screwdriver can no longer grip and further tightening is no longer possible.

5.4 Installing with a VESA bracket

C80 devices are equipped with 4 threaded inserts for installing with a VESA bracket.[3)]



	4PPC80.0573-xxx	4PPC80.0702-xxx	4PPC80.101E-xxx	4PPC80.121E-xxx	4PPC80.156B-xxx
Hole pattern (a)	VESA 75 x 75	VESA 100 x 100	VESA 100 x 100	VESA 100 x 100	VESA 100 x 100

Notice!

The following points must be observed to avoid damaging the device:

- **Select suitable screws (M4) according to the application.**
- **Screw-in depth: Max. 8 mm**

When installing a VESA bracket, a maximum degree of protection of IP20 (front and back) is possible.

[3)] Usage with a VESA mount has not been evaluated and is therefore not approved by UL/CSA.

5.5 Mounting orientations

Notice!

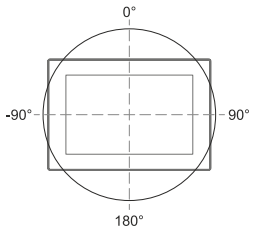
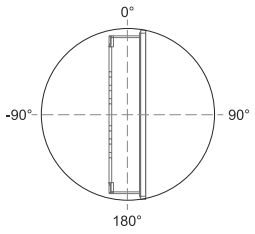
Possible damage to the device!

- **Excessively high ambient temperature can result in damage to the device or malfunctions.**
- **For the maximum permissible ambient temperature, see the technical data for the respective device.**

The following drawings show the specified mounting orientations of Power Panel C80 devices. These are only permitted to be installed as specified.

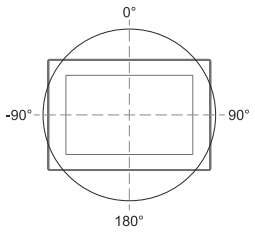
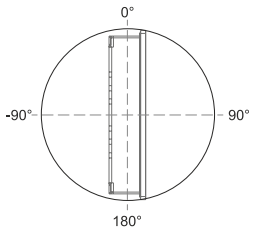
During installation, it is important to make sure that the spacing as described in section "Spacing for air circulation" on page 29 is observed in order to achieve natural air circulation.

Typical application

			Derating [°C]			
	Inclination [°]	**4PPC80.0573-xxx**[1]	**4PPC80.0702-xxx**[1]	**4PPC80.101E-xxx**[1]	**4PPC80.121E-xxx**[1]	**4PPC80.156B-xxx**[1]
	0	No limitation	No limitation	No limitation	No limitation	No limitation
	Up to ±90	No limitation	No limitation	No limitation	No limitation	No limitation
	Up to ±180	No limitation	No limitation	No limitation	No limitation	No limitation
		-				
	Inclination [°]	**4PPC80.0573-xxx**[1]	**4PPC80.0702-xxx**[1]	**4PPC80.101E-xxx**[1]	**4PPC80.121E-xxx**[1]	**4PPC80.156B-xxx**[1]
	0	No limitation	No limitation	No limitation	No limitation	No limitation
	Up to ±45	No limitation	No limitation	No limitation	No limitation	No limitation
	From -46 to -90	No limitation	No limitation	No limitation	No limitation	No limitation
		-				

1) Max. operating temperature: 60°C

Worst-case application

			Derating [°C]			
	Inclination [°]	**4PPC80.0573-xxx**[1]	**4PPC80.0702-xxx**[1]	**4PPC80.101E-xxx**[1]	**4PPC80.121E-xxx**[1]	**4PPC80.156B-xxx**[1]
	0	No limitation	No limitation	No limitation	No limitation	No limitation
	Up to ±90	No limitation	No limitation	No limitation	No limitation	No limitation
	Up to ±180	No limitation	No limitation	No limitation	No limitation	No limitation
		-				
	Inclination [°]	**4PPC80.0573-xxx**[1]	**4PPC80.0702-xxx**[1]	**4PPC80.101E-xxx**[1]	**4PPC80.121E-xxx**[1]	**4PPC80.156B-xxx**[1]
	0	No limitation	No limitation	No limitation	No limitation	No limitation
	Up to ±45	No limitation	No limitation	No limitation	No limitation	No limitation
	From -46 to -90	-5	-5	-5	-5	No limitation
		-				

1) Max. operating temperature: 60°C

5.6 Grounding (functional ground)

Interference is effectively dissipated via a grounding clip. For additional information about electromagnetic compatibility, see the **INSTALLATIONS / EMC GUIDE** user's manual (MAEMV-ENG on the B&R website www.br-automation.com).

Notice!

Possible malfunction of interfaces and touch screen!

If functional ground is not present, faults in interface communication and touch screen functionality can occur.

The device is only permitted to be operated if properly grounded.

Grounding concept

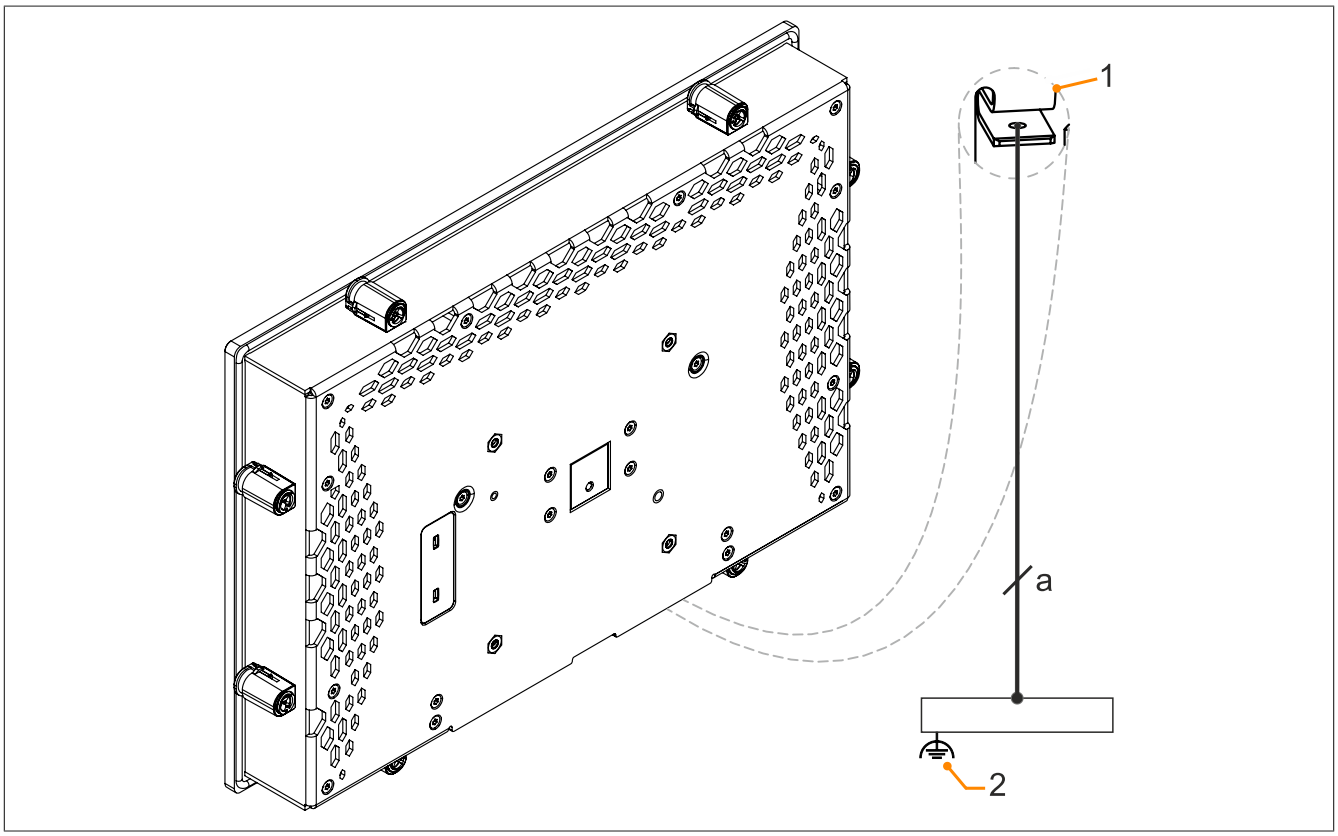


Figure 3: Grounding in the control cabinet

Legend			
1	Ground connection ⏚	2	Central grounding point
a	At least 2.5 mm²	-	

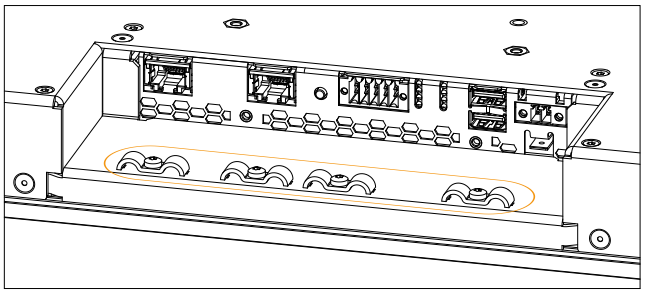
Notice!

The ground connection of the device must be low impedance and connected to ground (e.g. grounding rail in the control cabinet) using a short path.

5.7 Securing the connecting cables

Display size 15.6"

On Power Panel variants with 15.6" display size, cables can be relieved of tensile stress using the cable clamps provided on the back of the device.

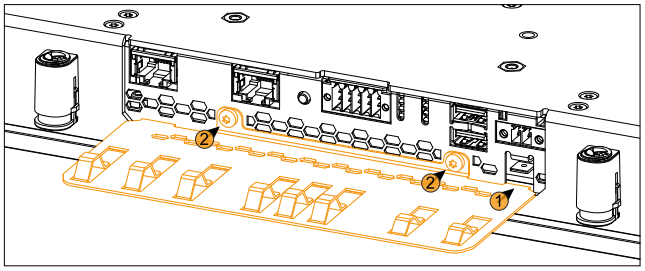


Display size 12.1" and smaller

For display sizes between 5.7" and 12.1", accessories for installing and protecting the attachment cables from tensile stress are included in delivery.

Required accessories from the content of delivery:

- 2x M3x5 screws (max. tightening torque 0.55 Nm)
- Accessory plate for securing the cables



1. Attach the accessory plate (1) to the back of the device.
2. Secure the accessory plate with the mounting screws (2).

✓ The attachment cables can now be secured to the accessory plate using cable ties.

Securing the cables to the grounding plate

1) **Ground conductor**
   The connection to ground potential must be as short as possible and sufficiently strong (at least 2.5 mm²) over the intended blade terminal (Faston 6.3 mm).
2) **Unshielded cables**
   All unshielded cables must be relieved of tensile stress at the grounding plate using cable ties.
3) **Shielded cables**
   A central ground connection is available to effectively deflect interference. All cable shields must be connected to the grounding plate with good conductivity using cable ties or by other means.

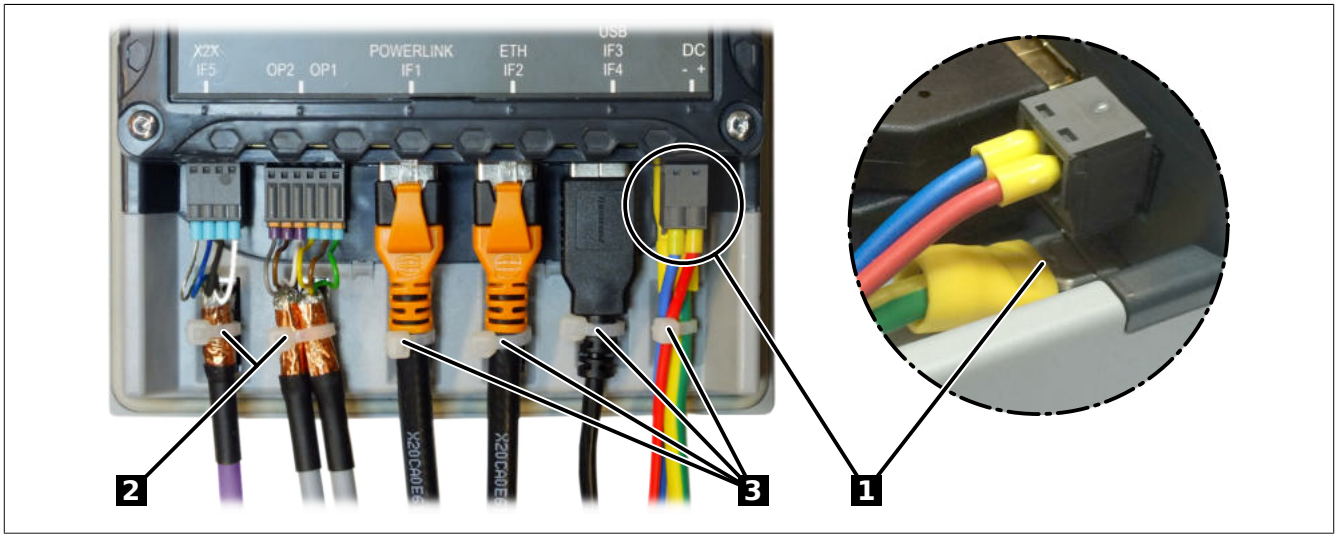


Figure 4: (symbolic image)

5.8 Requirements for the cables used

Notice!

To meet the UL certification requirements, copper cables must be used that are designed for an operating temperature >70°C.

6 Software

This chapter describes the following software-specific topics and information:

- Automation software
- Configuration in Automation Studio
- Boot options
- Updating/Installing the C80 system
- License information for the Terminal OS
- Network information
- Information about the web browser
- File format

6.1 Automation software

6.1.1 Licensing

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

The licenses required to operate Automation Runtime and B&R Hypervisor are included in delivery. Additional licenses (e.g. mapp Technology) are available separately.

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**).

6.1.2 Order data

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)	

6.1.3 Automation Runtime

6.1.3.1 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.

6.1.3.2 Minimum versions

6.1.3.2.1 Automation Runtime Embedded (ARemb)

System requirements

The following software versions (or higher) are required to operate Automation Runtime Embedded:

- ARemb upgrade AR D4.90
- Automation Studio V4.9.3

Information:

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

6.1.4 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

With B&R Hypervisor, embedded Linux is executed in parallel with Automation Runtime. Either a browser or VNC viewer is used for the HMI application depending on the configuration in Automation Studio.

System requirements

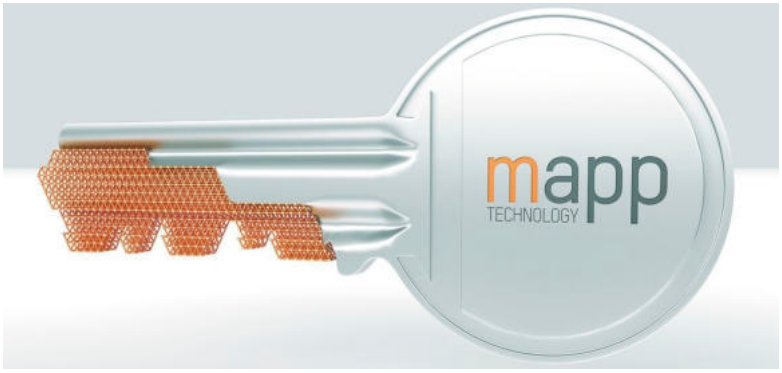
The following minimum software versions are required to operate B&R Hypervisor on the PPC80:

- ARemb upgrade AR D4.90
- Automation Studio V4.9.3

Information:

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

6.1.5 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).

6.2 Configuration in Automation Studio

6.2.1 Standard options

Standard options

The standard options for configuring the Power Panel C80 in Automation Studio are described in Automation Help:

⇨ Programming / Editors / Configuration editors / Hardware configuration / CPU configuration / SG4

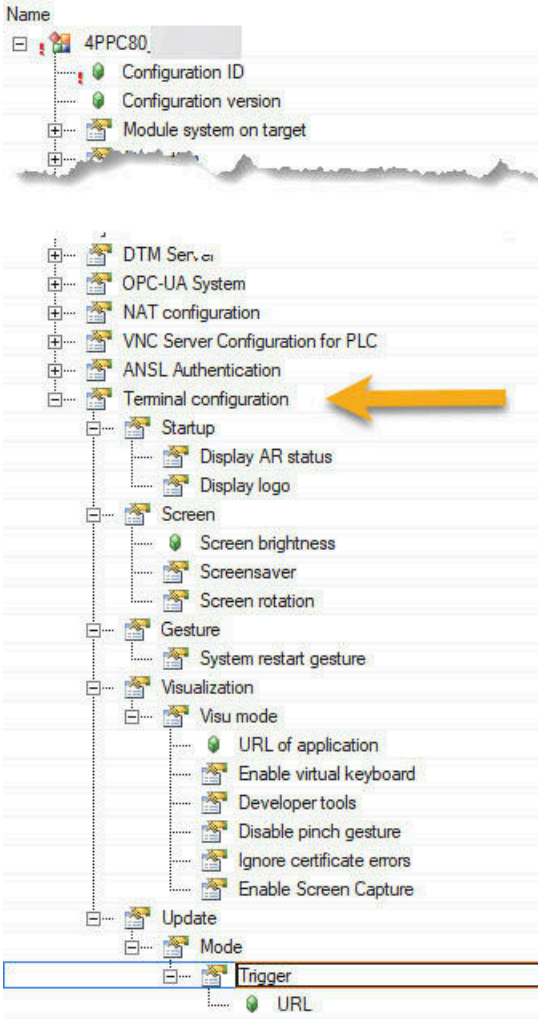
Advanced options

There are advanced options available for configuring the Power Panel C80 in Automation Studio. The libraries are described under the following path in Automation Help:

⇨ Programming \ Libraries \ Configuration, system information, runtime control

Library	Description
ArScreen	This library contains function blocks for operating the screen settings on Power Panel C50 and C80 devices.
AsARCfg	Library AsARCfg is used to read and write Automation Runtime configuration settings.

6.2.2 Terminal configuration



The terminal (for mapp View or VC4-based HMI applications) is also configured within the CPU configuration in Automation Studio:

6.2.2.1 Startup

The behavior during device startup is defined with the options in group "Terminal configuration / Startup":

Parameter	Setting/Description
Display AR status	Default setting: On The terminal can display the status of the controller (Automation Runtime) on the screen during startup: **Selection** / **Description** Off[4] / The AR status is not displayed. On / The AR status is displayed. If the controller does not switch to mode RUN after starting, button "System Diagnostics Manager" (SDM) is displayed at the bottom right of the screen. This is also displayed if AR is in mode RUN but something is missing or incorrect in the configuration of the terminal. For additional information about "System Diagnostics Manager", see Automation Help.
Display logo	Default setting: Off This option defines whether a boot logo (static and/or animated) is displayed while establishing the connection between the terminal and web server (address specified under Web with option "URL of the HMI application"): **Selection** / **Description** Off / A logo is not displayed. On / A logo is displayed.

Information:

To transfer logos from Automation Runtime to the terminal, the TFTP server must be enabled in the CPU configuration.

6.2.2.1.1 Static boot logo

Parameter	Setting/Description
Logo	Default setting: None Selects the boot logo: **Selection** / **Description** None / No boot logo selected. [Filename].bmp / Boot logo "[Filename].bmp" selected. A static boot logo for the Power Panel can be selected here that will be displayed during device startup and when establishing the connection to the web server. Information about the boot logo: "Boot logo" on page 70

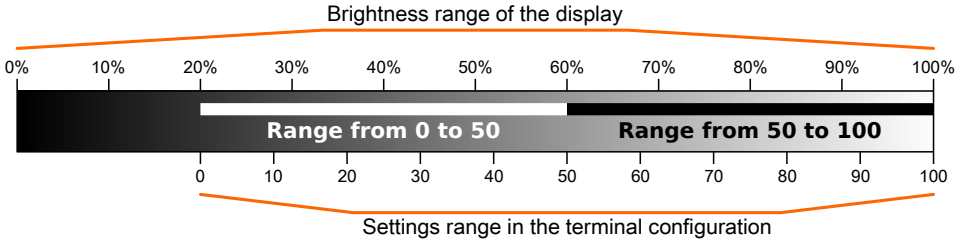
6.2.2.1.2 Boot animation

Parameter	Setting/Description
Animation	Default setting: None Selects the boot animation **Selection** / **Description** None / No boot animation selected. [Filename].gif / Bool animation "[Filename].gif" selected. An animated boot logo for the Power Panel can be selected here that will be displayed during device startup and when establishing the connection to the web server. This will be placed on top of the static boot logo if necessary. Information about the boot animation: "Boot animation" on page 70
X-offset [pixels]	Defines the distance from an existing boot animation to the left edge of the display.
Y-offset [pixels]	Defines the distance from an existing boot animation to the top edge of the display.
Delay [ms]	Delay in milliseconds between individual images in the GIF animation. The individual values have the following effect: **Value [ms]** / **Description** 0 / In this case, the delay defined in the GIF file will be used. If no delay is defined in the GIF file, 100 ms is used. >0 / Applies the set delay time. It may not be possible to achieve small values due to the power limits of the device. In this case, the animation is displayed slower than the value specified.

[4] It is important to note that the AR status is not displayed even in the event of error.

6.2.2.2 Screen

Some settings for the display can be changed with the following parameters.

Parameter	Setting/Description
Screen brightness	Default setting: 50 Input range: 0 to 100 Unit: % This value configures the basic setting of the display. Setting 0% in the terminal configuration corresponds to a residual display brightness of 20%: 
Screensaver	Default setting: Off This option disables or enables the screensaver: **Selection** / **Description** Off / The screensaver is disabled. On / The screensaver is enabled. Options for the enabled screensaver are described in section "Screensaver settings".
Screen rotation	Default setting: 0° Input range: 0°, 90°, 180°, 270° (in 90° steps) The angle of rotation of the display is set here. This setting affects how screen content is output. After selection, the display content is rotated clockwise according to the specified angle.

6.2.2.2.1 Screensaver settings

If the screensaver is enabled, additional parameters are displayed:

Parameter	Setting/Description
Delay time for screensaver	Default setting: 15 Unit: Minutes If there is no touch screen activity for the specified duration, the screensaver is started. Touching the screen exits the screensaver and the last active screen contents are shown.
Type of screensaver	Default setting: Backlight off If the screensaver is active after the configured time, the display changes to the selected mode: **Selection** / **Description** Black screen / The display is dark. The backlight remains on. Backlight off / The display is dark. The backlight is switched off (result: lower power consumption).

6.2.2.3 Gesture

This parameter can be used to define whether the gesture is triggered to restart the system.

Parameter	Setting/Description
System restart gesture	Default setting: Off **Selector** / **Description** Off / The gesture is disabled. On / The gesture is enabled. If the setting is enabled, the gesture is triggered by simultaneously pressing the bottom left and top right corners of the touch area for at least 5 seconds. The dialog box for confirming the system restart is opened. If no confirmation is received, the dialog box closes automatically after about 10 seconds.

6.2.2.4 HMI application

Different configuration options are available depending on the configured "Visu mode":

Visu mode: VNC

Visu mode: Web

6.2.2.4.1 Web

The terminal of the Power Panel works as a web client. A web browser in full screen mode represents an HMI or other application running on a web server (e.g. mapp View).

The following parameters can be configured:

Parameter	Setting/Description
URL of the HMI application	Default setting: `localhost:81/index.html` To use the terminal as a web client, a complete URL must be entered. The following URLs are accepted by the terminal: • `[Server]/Path/HMIApplication` In this case, "http://" is automatically added as the protocol. • `http://[Server]/Path/HMIApplication` • `http://[Server]:8080/Path/HMIApplication` • `https://[Server]/Path/HMIApplication` If the URL does not include a port number, port 80 is used by default. If web server `[Server]` is available on a different port, the port must be specified explicitly together with the IP address or hostname: **Syntax** / **Example** / **Description** `[IP address]:Port` / `10.23.20.17:8080` / A connection to IP address `10.23.20.17` is established on port `8080`. `[Hostname]:Port` / `webserver1:8081` / A connection to host `webserver1` is established on port `8081`. If the HMI application (mapp View or web server) is provided by the Power Panel C80 controller, `localhost` can be used as the hostname. This specific hostname is then automatically replaced by the IP address of the controller.
Enable virtual keyboard	Default setting: Off **Off**: The virtual keyboard for the web page is automatically displayed if a text input field in the web browser has the focus. This functionality must be made available by the web server. **On**: The virtual keyboard is automatically displayed on the screen if a text input field in the web browser has the focus (see "Keyboard" on page 69). Input can also be made at any time using a connected USB keyboard. **Information:** **The virtual keyboard is generated by the terminal's operating system. If the web application (e.g. mapp View) contains its own on-screen keyboard, the virtual keyboard should be disabled in the terminal configuration.**
Developer tools	Default setting: Off **Off**: Developer tools are disabled. **On**: The next time the web browser is started, the developer tools are enabled. See: "Using the developer tools" on page 68 **Information:** ***Safety notice!*** **This option is for development purposes only while creating an HTML-based HMI application.** **When using this option, it should be noted that the functions enabled in this way can be misused; it is therefore recommended to handle the developer tools with appropriate care.** After enabling this parameter, it is possible to change the port used:
Port number	Default setting: 9222 This setting defines the port used for the developer tools (see "Using the developer tools").

<table>
<tr><th>Parameter</th><th>Setting/Description</th></tr>
<tr><td>Disable zoom gesture</td><td>Default setting: Off
<table><tr><td>Off</td><td>The browser recognizes the well-known two-finger gesture (pinch-to-zoom) and allows zooming of the browser content.</td></tr><tr><td>On</td><td>The two-finger gesture for zooming the browser content is disabled. Zooming the entire HMI application is prevented.
However, zoom is supported in some mapp View widgets (e.g. LineChart).</td></tr></table></td></tr>
<tr><td>Ignore server certificate errors</td><td>Default setting: Disabled
If the web browser detects an error in the server certificate when establishing the connection to the web server, then the web browser displays a corresponding warning message that the user must acknowledge. If this option is enabled, such warning messages will be suppressed.
Use case:
If a self-signed server certificate is used during testing or development, it may be helpful to enable this option.</td></tr>
<tr><td>Enable Screen Capture</td><td>Default setting: Disabled
This option enables the screen capture API of the built-in browser.
If this option is enabled, the HTML application can use the browser's screen capture API to create screen captures of the HMI application. Both individual and video recordings are possible.
If this option is enabled, option Suppress Screen Capture security warning can also be enabled.</td></tr>
<tr><td>Suppress Screen Capture security warning</td><td>Default setting: Disabled
By default, the browser displays a security warning when the HTML application starts a screen capture using the screen capture API. The user is prompted to permit or deny the screen capture.
This option can be used to disable this security warning.</td></tr>
</table>

6.2.2.4.2 VNC

The terminal of the Power Panel is configured as a VNC client. The VNC client displays HMI applications provided by a VNC server (e.g. VC4 Visual Components application developed in Automation Studio running on the Power Panel controller).

The following parameters can be configured:

<table>
<tr><th>Parameter</th><th>Setting/Description</th></tr>
<tr><td>URL of the HMI application</td><td>Default setting: <code>localhost</code>
A hostname or IP address for the VNC server must be entered in order to use the Power Panel as a VNC client.
At this point, it is possible to include several servers in one list. This is done by entering the hostname or IP address and then clicking on the [+] symbol.
To use a specific VNC server from this list, it must be selected in the server list (via touch screen or mouse click). The currently selected VNC server is displayed in input field Server.
If the URL does not include a port number, port 5900 is used by default.
If the VNC-based HMI application is available on a different port, the port must be specified explicitly together with the IP address or hostname:
<table>
<tr><th>Syntax</th><th>Example</th><th>Description</th></tr>
<tr><td><code>[IP address]:Port</code></td><td><code>10.23.20.17:5907</code></td><td>Establishes a connection to IP address <code>10.23.20.17</code> on port <code>5907</code>.</td></tr>
<tr><td><code>[Hostname]:Port</code></td><td><code>vncserver1:5908</code></td><td>Establishes a connection to host <code>vncserver1</code> on port <code>5908</code>.</td></tr>
</table>
If the HMI application is provided by the Power Panel C80 controller, <code>localhost</code> can be used as the hostname. This specific hostname is automatically replaced by the IP address of the controller.

If the entered IP address is incomplete or if there is no VNC server for the IP address or entered hostname, then a corresponding message is output in the event of a failed connection attempt in VNC mode.

The error message is only displayed if option Show boot logo is disabled for start mode VNC.</td></tr>
<tr><td>Password</td><td>Default setting: EMPTY (no password entered)
Input area: Max. 100 characters
Note: Only one password can be entered, which is only used for the currently selected VNC server.
If a password has been entered, then the VNC client (Power Panel) is connected to the VNC server without an additional password query.
If no password has been entered, then the password will be queried on the Power Panel each time a connection to the VNC server is established.
The password is stored on the device in configuration file Config.xml .</td></tr>
<tr><td>Local window scaling</td><td>Default setting: Disabled
<table>
<tr><td>Enabled</td><td>Scales the VNC application to the display size of the Power Panel.</td></tr>
<tr><td>Disabled</td><td>Displays the VNC application in its original size on the Power Panel display.</td></tr>
</table>
Enabling option Enable local window scaling reduces the performance of the Power Panel because of increased demands on computing power.</td></tr>
<tr><td>Background color</td><td>Default setting: EMPTY
This setting can be used to set the background color of the VNC client on this Power Panel. If the VNC-based HMI application is smaller than the size of the Power Panel display, the background of the display (border around the HMI application) is shown with the defined background color.
<table>
<tr><th>Value</th><th>Background color</th></tr>
<tr><td>RGB color value[1)]</td><td>The RGB color value is noted as a three-digit (#rgb) or six-digit (#rrggbb) hexadecimal number, with the value preceded by the # character. The color value is composed of the red, green and blue values.</td></tr>
<tr><td>HTML/CSS color name[1)]</td><td>The color name corresponds to a specific RGB color value.</td></tr>
<tr><td>EMPTY</td><td>Light gray.</td></tr>
<tr><td>Invalid values</td><td>Black.</td></tr>
</table>
1) For the syntax of the RGB color value and valid HTML/CSS color names, see the HTML/CSS standard.

Examples of color values and color names:
<table>
<tr><th><code>#rrggbb</code></th><th><code>#rgb</code></th><th>HTML/CSS color name</th><th>Color display</th></tr>
<tr><td><code>#ffffff</code></td><td><code>#fff</code></td><td><code>white</code></td><td></td></tr>
<tr><td><code>#ff0000</code></td><td><code>#f00</code></td><td><code>red</code></td><td></td></tr>
<tr><td><code>#00ff00</code></td><td><code>#0f0</code></td><td><code>lime</code></td><td></td></tr>
<tr><td><code>#008000</code></td><td>-</td><td><code>green</code></td><td></td></tr>
<tr><td><code>#ffff00</code></td><td><code>#ff0</code></td><td><code>yellow</code></td><td></td></tr>
<tr><td><code>#ff8800</code></td><td><code>#f80</code></td><td>-</td><td></td></tr>
<tr><td><code>#0000ff</code></td><td><code>#00f</code></td><td><code>blue</code></td><td></td></tr>
<tr><td><code>#000000</code></td><td><code>#000</code></td><td><code>black</code></td><td></td></tr>
</table></td></tr>
</table>

6.2.2.5 Update

In order to apply function enhancements, security fixes and other error corrections to the terminal, the Terminal OS (operating system of the terminal) must be updated.

The following options are available to update the Terminal OS (operating system of the terminal):

Parameter	Setting/Description
Mode	Default setting: User-defined update server The following modes can be selected: **User-defined update server** – Specifies a URL used to search for a Terminal OS image. **In preparation** – Future extensions in planning.

6.2.2.5.1 User-defined update server

The following options are available for configuring the update server:

Parameter	Setting/Description
Trigger	Default setting: Automatic The following triggers can be selected: **Application** – No automatic update. **Automatic** – On device startup (after a power failure or restart), a valid Terminal OS image of a terminal OS is searched for automatically (see Automatic update of the Terminal OS in the following section).

URL	Default setting: EMPTY
	The URL specifies the path on the network where a valid Terminal OS image is searched for:
	Example URL / Remark
	`servername/path/to/system/image`
	Specifies the server name and path.
	The "`http://`" protocol is updated automatically.
	`http://servername/path/to/system/image`
	Specification including HTTP protocol, server name and path.

Automatic update of the Terminal OS

If an automatic update is configured, the following search is performed during the restart:

1) If a URL for the update server is stored in the terminal configuration, the specified URL is searched for a valid Terminal OS image that differs from the current Terminal OS.
   If this is the case, no further search is performed and the update procedure is started.
2) A valid Terminal OS image different from the current Terminal OS is searched for on connected USB storage media.
   If this is the case, the update procedure is started.

> **Notice!**
>
> **The USB storage medium must be connected to a USB interface that is assigned to the terminal. A USB interface is assigned to the terminal in the interface configuration in Automation Studio. The default setting is that USB interface IF5 is assigned to the terminal.**

3) If a valid Terminal OS image was not found, the current system is started.

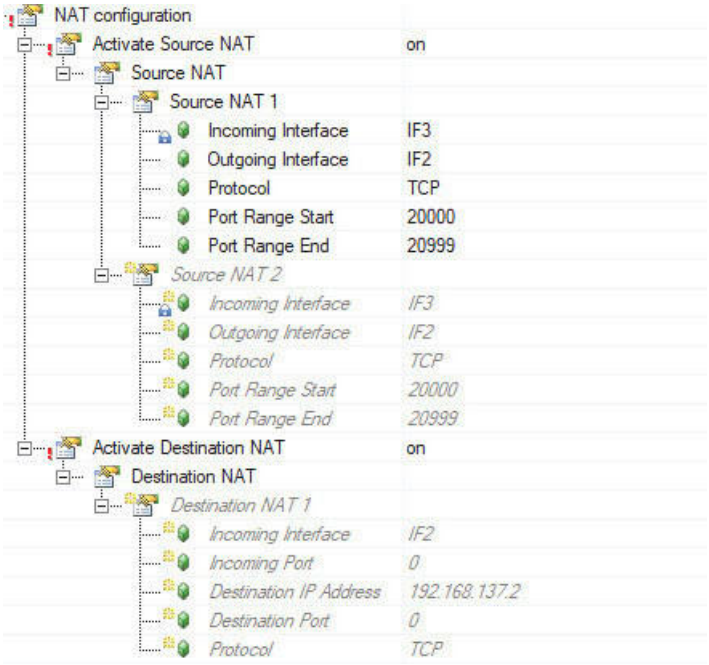
Valid PPT image for updating the terminal OS

A Terminal OS image (in a network or on a USB storage medium) is valid if it meets the following conditions:

- The Terminal OS image consists of the following three files:
  - PPC80Image.img.gz
  - PPC80Image.info
  - PPC80Image.img.gz.sig
- The plausibility check using file PPC80Image.info does not return any errors.
- Verification of signature PPC80Image.img.gz.sig indicates that the system comes from a trusted source.

6.2.3 NAT configuration

The settings under "NAT configuration" can be used to set the access rights of and on the Power Panel C80.



Source NAT

Using "Source NAT" permits the panel to communicate externally. There are three typical use cases for this:

- Accessing external sources
- HMI applications
- External update server

Destination NAT

Using "Destination NAT" makes it possible to access the panel externally and make appropriate configurations.

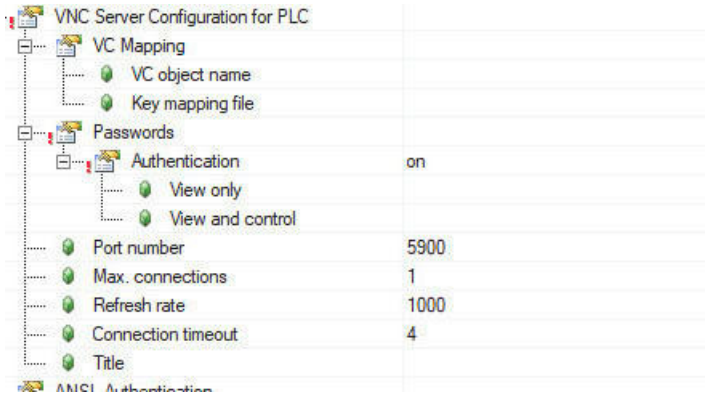
Configurable IP addresses:

- 192.168.137.1: AR
- 192.168.137.2: Linux

Information:

It is important to note that the destination port must match the port in the developer tools.

6.2.4 VNC server configuration for PLC



VNC must be set under *Visualization / Visu mode* to use the configuration options in this menu.

6.3 Boot options

6.3.1 Startup procedure

To access the Boot Manager of the Power Panel C80, **[Esc]**, **[Del]** or **[F2]** must be pressed after the USB controller is initialized.

If a B&R panel with touch sensor is used during device configuration, Setup can be opened by tapping the upper edge of the touch area.

It is important to note that the upper edge of the touch screen area is always on the front side, opposite the connection side. This is independent of the rotation direction of the software.

Startup timeout setting

This parameter can be used to define the delay time in seconds while waiting for boot manager access via the touch screen.

<table>
<tr><th>Parameter</th><th>Setting/Description</th></tr>
<tr><td>setpcttimeout
See "Checking the boot image version".</td><td>Default value: 0 sec
<table><tr><th>Selector</th><th>Description</th></tr><tr><td>0 to 60 sec</td><td>Value setting in seconds.</td></tr></table>The time (boot duration in seconds) until the startup procedure can be defined In the EFI shell.</td></tr>
</table>

Operation

During touch operation, the system does not display a mouse pointer. If operation is carried out using an external operating device, the mouse pointer is displayed. Both input methods can be used in parallel. The system automatically shows or hides the mouse pointer. If keyboard entry is required, a keyboard appears on the display that can be operated via touch screen or mouse. All keyboard entries can also be made with an external keyboard.

Input options

Power-on self-test (POST)

Information:

The key signals of the USB keyboard are only processed after the USB controller in initialized.

The following keys are enabled during POST:

Keys	Function
Esc, Del, F2	Accesses the BIOS Setup menu or boot manager.
<Pause>	The POST can be stopped with the <Pause> button. POST resumes after pressing any other key.

Boot menu / Boot manager

The following keys are enabled during POST:

Key	Function
F1	Help documentation
ESC	Exits the help documentation
Cursor keys (←, ↑, ↓, →)	Navigation in the boot menu
Enter	Opens the selected submenu

6.3.2 Boot menu

Boot menu option	Description
Continue	Resumes the boot process.
Boot manager	List of all detected and bootable media (see "Boot manager" on page 62).

6.3.3 Boot manager

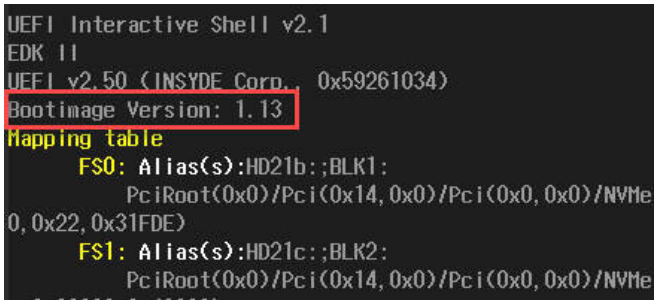
The boot manager lists all detected and bootable legacy or UEFI media. It is possible to select the media from which the boot procedure should be performed.

Checking the boot image version

The firmware version of the Power Panel C80 boot image can be read out using the boot manager in two ways:

1. Start the boot manager (see Boot options).
2. The boot image version can be read in the top left-hand corner.

1. Start the boot manager (see Boot options).
2. Select the internal EFI shell as the boot medium.
3. The boot image version is displayed when the internal EFI shell is started.



6.4 Updating/Installing the C80 system

When updating the Power Panel with a USB flash drive, it is important to note that the drive must have a capacity of at least 256 MB. In addition, an industrial-grade USB flash drive must be used.

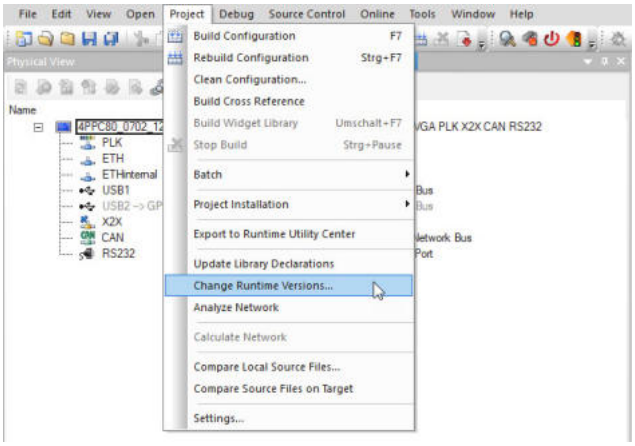
For technical data and additional information about storage media, see the corresponding documentation. This can be located and downloaded by searching for the data storage device's order number at www.br-automation.com.

6.4.1 B&R Hypervisor system

For general information about Automation Studio (e.g. operation, upgrades and creating projects as well as requirements, configuring or installing B&R Hypervisor), see Automation Help.

Updating/Installing with Automation Studio

1. Create a corresponding project in Automation Studio with the hardware used.
2. Select the desired Automation Runtime, Visual Components, mapp versions, etc.



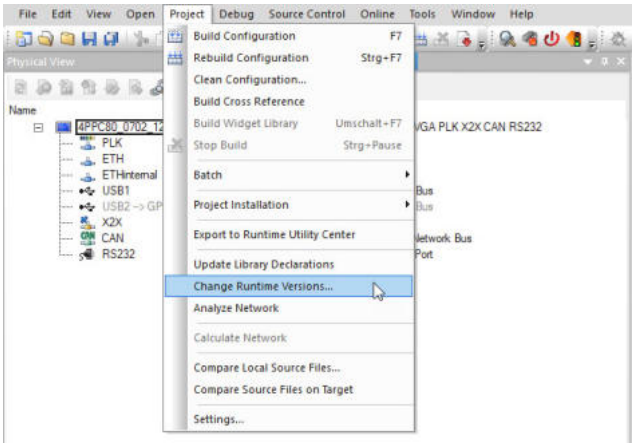
3. Establish an online connection to the target system.
4. Rebuild/Build the configuration and download the project.

Information:

An online project transfer, which requires the user memory to be repartitioned, is not possible. An update/installation must be performed with Automation Studio and USB flash drive.

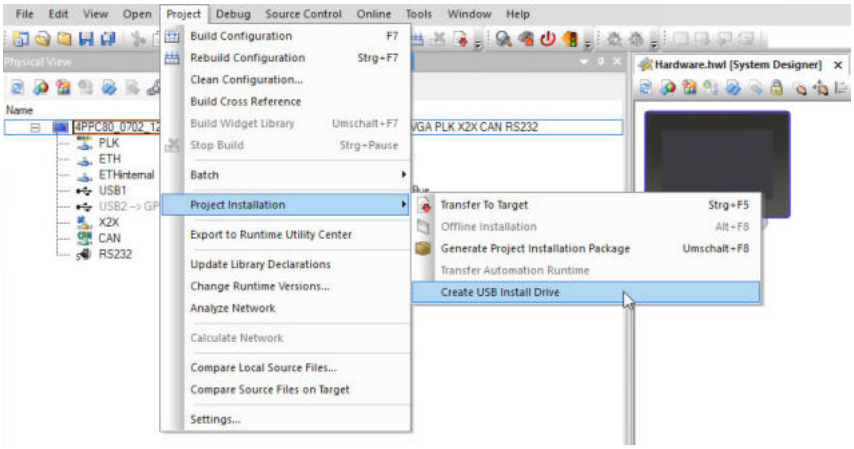
Updating/Installing with Automation Studio and USB flash drive

1. Create a corresponding project in Automation Studio with the hardware used.
2. Select the desired Automation Runtime, Visual Components, mapp versions, etc.



3. Rebuild/Build the configuration of the project.

4. Connect a USB flash drive to the computer and create a bootable USB flash drive via **Project installation / Create USB install drive**.



5. Connect the created USB flash drive to the Power Panel and reboot it.
6. Start the boot manager (see "Boot manager" on page 60).
7. Select the USB flash drive (UEFI) as the boot medium and follow the instructions.
8. After a successful update/installation, the system is restarted and the USB flash drive can be removed again.

6.4.2 Terminal OS (embedded Linux) system

For general information/requirements about the terminal OS update, see "Update " on page 58.

Updating with Automation Studio and USB flash drive

1. In Automation Studio, upgrade the PPC image (Linux image) of the Power Panel.
2. The installed upgrade is typically located in the local folder:
   C:\BrAutomation\AS\[PanelSeries]\[PanelVariant]\V[Terminal OS ImageVersion]

   [PanelSeries]: E.g. PPC, PPT, PMT or PFT
   [PanelVariant]: E.g. 30, 50 or 80
   [Terminal-OS ImageVersion]: Version of the Linux image (not the version of the hardware upgrade)
3. Connect a USB flash drive to the computer and copy all of the files of the installed upgrade directly to the root directory of the USB flash drive.

> **Information:**
>
> **The USB flash drive used must be formatted using FAT32.**

4. Connect the USB flash drive to the USB port of the Power Panel assigned to the GPOS (terminal OS) and reboot it.
5. After the Power Panel successfully boots, a plausibility check is performed and the update of the terminal OS is started.
6. After a successful update, the system is rebooted and the version of the terminal OS image can be read out in SDM under *Terminal*.

Updating by downloading from the website and USB flash drive

Updated versions of the Power Panel system are made available on the B&R website in the form of an upgrade package that includes a PPC image. The following steps must be performed to update the Power Panel system using the upgrade package:

1. Download the Power Panel C-Series upgrade package from the B&R website (www.br-automation.com). It is important to ensure that this is downloaded in ZIP format.

   There are several ways to find an upgrade package on the website: either on the product page (possible to search for the order number) under *Downloads / PPC upgrades* or on the Downloads page under **Software / Automation Studio / Automation Studio 4.9** (or higher) in section *PPC upgrade*.

2. Unpack the ZIP file with the following content directly to the root directory of a USB flash drive:
    - PPC80Image.img.gz
    - PPC80Image.img.gz.sig
    - PPC80Image.info
    - Readme.txt
    - licenses.zip

> **Information:**
>
> **The USB flash drive used must be formatted using FAT32.**

3. Connect the USB flash drive to the USB port of the Power Panel assigned to the GPOS (terminal OS) and reboot it.
4. After the Power Panel successfully boots, a plausibility check is performed and the update of the terminal OS is started.
5. After a successful update, the system is rebooted and the version of the terminal OS image can be read out in SDM under *Terminal*.

Checking the terminal OS version

The firmware version of the terminal OS can be read out in System Diagnostics Manager.

1. Open menu option **Hardware** in SDM.
2. Click on **Terminal** in the *hardware tree*.
3. The *firmware version* is displayed under *Module details*.

Figure 5: Example image

6.4.3 Firmware upgrade with Automation Runtime

The MTCX firmware is part of Automation Studio. The system is automatically updated to this status by Automation Runtime.

To update the firmware contained in Automation Studio, a hardware upgrade must be performed (see **Project management / Workspace / Upgrades** in Automation Help).

6.5 License information for the Terminal OS

License information in ZIP archive *license.zip*

ZIP archive *license.zip* contains file *license.manifest*, which contains an overview of software components being used with name, version and license information. In addition, the ZIP archive also contains detailed version information for each individual software component.

Information: When unpacking the ZIP archive, note that for technical reasons files with the same name may be included.

ZIP archive *license.zip* is included in the following image packages:

Type of Terminal OS image[1)]	Description
Automation Studio upgrade	Executable file for installation in Automation Studio[2)] **Location of *license.zip* after installation:** • Typically in the local installation directory for Automation Studio: *C:\BrAutomation\AS\[PanelSeries]\[PanelVariant]\V[ImageVersion]* • *[PanelSeries]*: e.g. PPC, PPT, PMT or PFT • *[PanelVariant]*: e.g. 30, 50 or 80 • *[ImageVersion]*: Linux image version[3)]
ZIP archive	ZIP archive that, in addition to the Linux image, also contains file `license.zip`.

1) The Terminal OS image is a Linux image. This image is an image of the Terminal OS (see "Terminal OS image" on page 70) that is required to install or update it.
For installing/updating the Linux image, see "Update " on page 58.
2) See Automation Help for information about the download and installation in Automation Studio.
3) The Linux image version is not identical to the version from the hardware upgrade.

Information:

The license information in *license.zip* always refers to a specific image version.

6.6 Network information

The device has an external POWERLINK interface (IF1) and Ethernet interface (IF2). An internal Ethernet interface (IF3) is available in the device.

Interface	Description
POWERLINK interface (IF1)	This interface is permanently assigned to Automation Runtime.
Ethernet interface (IF2)	This interface is permanently assigned to Automation Runtime.
Ethernet interface (IF3)	This interface is used for internal communication between Automation Runtime and the terminal OS.

6.6.1 MAC addresses

The MAC addresses of the POWERLINK or Ethernet interfaces are located on the product label on the back of the device. The MAC addresses are printed below the serial number in the following format:

Printed MAC address	Interface
IF1: DD-DD-DD-DD-DD-DD	POWERLINK interface
IF2: 11-22-33-44-55-66	Ethernet interface

6.7 Information about the web browser

The implemented web browser of the terminal offers full JavaScript support!

The following features are not supported, however:

- Java
- Flash

6.7.1 Supported fonts

System fonts

Fonts are installed in the Terminal OS that are used by the browser to display HTML-based HMI applications (mapp View):

	Installed starting with Terminal OS
Font	1.0.0
Arial	✓
Arial Unicode	✓
DejaVu Sans	✓
DejaVu Sans Mono	✓
Verdana	✓

Substitute fonts (font mapping)

If the HTML-based HMI application (mapp View) contains fonts that do not exist on the Terminal OS, the following system fonts are used instead:

	Substitute font starting with Terminal OS
Font	1.0.0
serif	Arial, Regular
sans-serif	DejaVu Sans, Book
monospace	DejaVu Sans Mono, Book
Arial	Arial, Regular
Helvetica	Arial, Regular
Verdana	Verdana, Regular
Times New Roman	Arial, Regular
Courier New	DejaVu Sans Mono, Book

*) "serif", "sans-serif" and "monospace" are referred to as generic fonts.

The default font size is set to 16 px.

6.7.2 Supported video formats

Videos can be displayed in the HMI application. The following container formats are supported for embedding videos in the web-based HMI application:

- WebM
- MP4 (H.264)

6.7.3 User agent

For identification purposes, each web browser transmits various information (e.g. browser name, version, operating system) to the web server providing the HTML page.

As part of the HTTP header, a web browser identifies itself as a user agent. The web browser transmits additional information with the HTTP header:

Example:	`User-Agent: Mozilla/5.0 ... BRPanel/1.0 (PPT50;landscape;1280x800;6PPT50.101E-16B;)`

Description of the information:

Identification := BRPanel/<Version> (<Type>;<Orientation>;<Resolution>;<OrderId>)		
BRPanel	Identification as a B&R panel.	
<Version>	Version number of the comment (expression in parentheses), which is primarily used to evaluate the information within the parentheses correctly. **Format of <Version>:** `<Number>.<Number>`	
<Type>	Name of the device family: `PPT50`, `PPC50`, `PPC3100`, etc.	
<Orientation>	The orientation screen display contains one of the following two values:	
	`landscape`	Landscape format
	`portrait`	Portrait format
<Resolution>	Resolution of the device in the format "WIDTHxHEIGHT". **Format of <Resolution>:** `WIDTHxHEIGHT`	
	`WIDTH`	Width of the display in pixels.
	`HEIGHT`	Height of the display in pixels.
	The width and height of the display are output according to the orientation: • Example for landscape format: `1280x800` • Example for portrait format: `800x1280`	
<OrderId>	Order number of the device	

6.7.4 Using the developer tools

The developer tools make it possible to access the browser from any remote computer over the network. The developer tools can help to edit pages on the fly and diagnose problems quickly.

Information:

To be able to use the developer tools, one of the two browsers Google Chrome or Chromium is required on the remote computer.

Information about the functionality and use of the developer tools: Chrome DevTools

Enabling remote developer tools

1. Enable parameter Developer tools in the terminal configuration.
2. Set a valid free port (Port number).
3. Compile the project in Automation Studio and transfer it to the Power Panel.

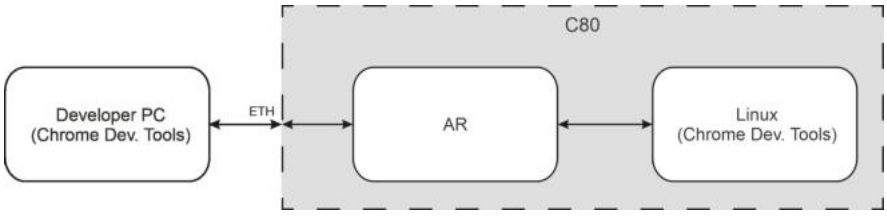
✓ The web browser is launched with the corresponding settings and the developer tools enabled.

To use the remote developer tools, the following conditions must also be met:

- The device is accessible via the Ethernet network.
- Communication is permitted for the network and the computer being used.
- A browser that supports the developer tools is required on the remote computer.

Adjusting the NAT configuration

Routing must be configured accordingly to be able to use the developer tools of the PPC80. Two different constellations are possible depending on whether the ports of the developer PC, Automation Runtime (AR) and Linux from the PPC80 match or not.



Constellation A	Constellation B
1. Developer PC: Port 9222	1. Developer PC: Port 9333
2. AR: Destination NAT 1 - Incoming port: 9222	2. AR: Destination NAT 1 - Incoming port: 9333
3. AR: Destination NAT 1 - Destination port: 9222	3. AR: Destination NAT 1 - Destination port: 9222
4. Linux: Terminal configuration: Port number 9222	4. Linux: Terminal configuration: Port number 9222

Routing example for AR and Linux on the PPC80

Setting *Activate source NAT* must be enabled in order for Linux on the PPC80 to communicate externally, for example to access updates or PDF files. Additional configurations, such as the protocol to be used (e.g. TCP), can be made here.

Launching the developer tools

If the developer tools have been enabled and the web browser has been started, the developer tools for the browser can be opened from the remote computer using the following URL:

⇨ With IP address: `http://IP address:Port`

`IP address`	IP address of the terminal. If DNS is enabled and a hostname is specified for the terminal, the IP address of the terminal can be determined using appropriate network tools (e.g. nslookup).
`port`	The port was configured in the corresponding parameter (default setting: 9222).

Other functions

If the web browser is running with the developer tools enabled, the following functions are also enabled:

⇨ When using a USB mouse, a shortcut menu is opened with the right mouse button.

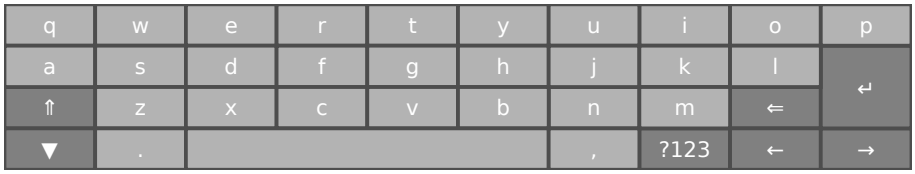
⇨ When using a USB keyboard, the following keys are also enabled:

[F5]	**Refresh:** Reloads the current browser window.
[Alt]+[Left]	**One page back:** Opens the previous page in the browser history.
[Alt]+[Right]	**One page forward:** Opens the next page in the browser history.

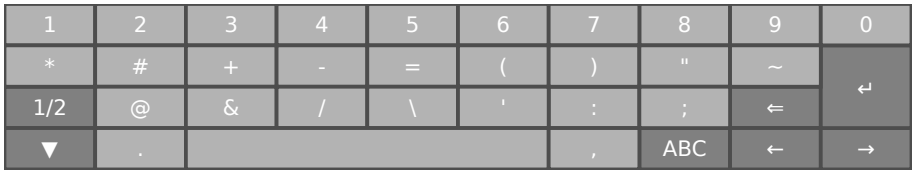
6.7.5 Keyboard

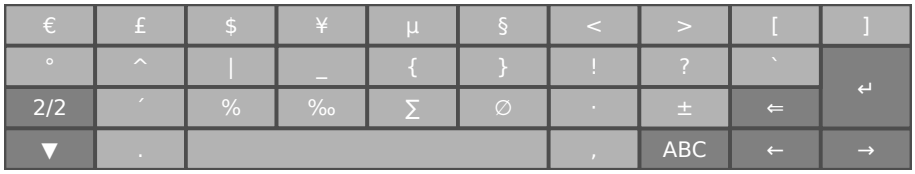
Text can be entered via a USB keyboard or virtual keyboard.

The virtual keyboard is displayed as soon as the focus (flashing text input cursor "|") is in an input field. The dependency of the terminal setting must be taken into account (see Enabling the virtual keyboard).



Additional keyboard layouts can be opened using the keys [**?123**], [**ABC**], [**1/2**] and [**2/2**]:





6.8 File format

6.8.1 Terminal OS image

The Terminal OS image is a compressed image of the Terminal OS (operating system of the terminal). The Terminal OS image is a package and consists of the following files:

File	Description
PPC80Image.img.gz	Compressed image of the Terminal OS.
PPC80Image.img.gz.sig	Signature of the image.
PPC80Image.info	Information about the image (MD5 checksum, image version, etc.).

Information:

This Power Panel supports signed images. During an update, the Power Panel uses the supplied signature to check whether the image comes from a trusted source.

During an update, the MD5 checksum is used to check whether the PPT image is error-free.

6.8.2 Boot logo

The boot logo is displayed during the startup phase of the device.

The boot logo must meet the following requirements:

File format	Only the BMP (Windows bitmap) format is permitted as the file format for the boot logo.
Size	The size of the graphic used must correspond to the size of the display in full screen mode. For the display size of the Power Panel, see section "Technical data".
Name	The boot logo can be added in Automation Studio with any name.
Color depth	The color depth is limited to 24-bit.

6.8.3 Boot animation

The boot animation must meet the following requirements:

File format	Only the GIF (Graphics Interchange Format) format is permitted as the file format for the boot animation.
Size	The size of the boot animation is only permitted to be less than or equal to the size of the display used in full screen mode.
Name	The boot animation can be added in Automation Studio with any name.
Position	When specifying the position of the boot animation (see "Configuration in Automation Studio" on page 52) it is important to ensure that the **entire** boot animation can still be shown on the display.
Application	The boot animation is superimposed over an existing static boot logo. The boot animation is only displayed while the terminal is establishing a connection to the HMI application (web application). It is not displayed while the device is booting.

7 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.

7.1 Calibration

Notice!

The PPC80 calibrates the touch screen each time it is started.

To guarantee an optimal display calibration there must not be any element or surface touching the front side of the panel when it is being powered on. Other influences (e.g. lying down the device) must also be avoided.

7.2 Operating the Power Panel

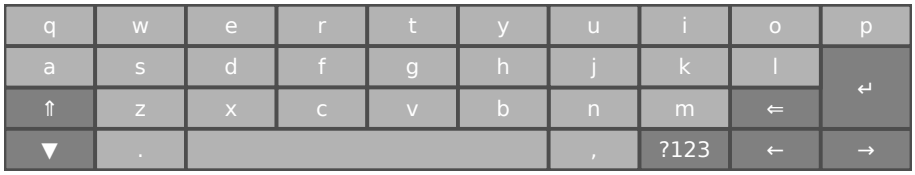
The following input methods can be used individually or together to operate the Power Panel:

- Touch screen
- USB keyboard

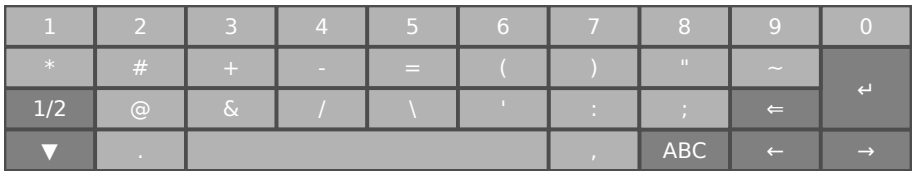
7.2.1 Keyboard

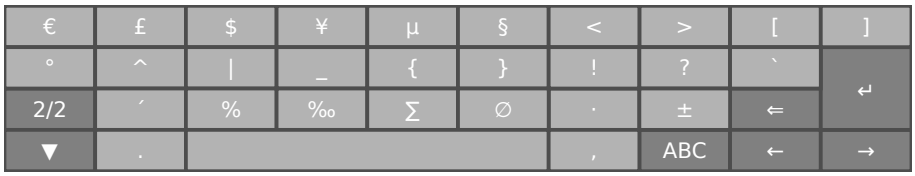
Text can be entered via a USB keyboard or virtual keyboard.

The virtual keyboard is displayed as soon as the focus (flashing text input cursor "|") is in an input field. The dependency of the terminal setting must be taken into account (see Enabling the virtual keyboard).



Additional keyboard layouts can be opened using the keys [**?123**], [**ABC**], [**1/2**] and [**2/2**]:





7.2.2 Mouse

If a USB mouse is connected, the mouse cursor appears.

If the left and right mouse buttons are pressed simultaneously for more than 2 seconds, the device navigates to the service pages.

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 Changing the battery

> **Warning!**
>
> **The battery compartment is only permitted to be replaced by B&R battery compartment 5ACCRHMI.0018-000. The battery is permanently installed and cannot be replaced. The entire battery compartment must always be replaced.**
>
> **The use of any other battery may present a risk of fire or explosion.**
>
> **The battery can explode if handled improperly. Do not recharge, disassemble or dispose of the battery in fire.**

> **Information:**
>
> **The self-discharge time when changing the battery is approx. 2 minutes.**

Note the following when changing the battery:

- The product design allows the battery to be changed when the PLC is in a voltage-free state as well as when the B&R device is switched on. In some countries, changing under operating voltage is not permitted, however; local regulations must be observed!
- The battery is only permitted to be changed by qualified personnel.
- When changing the battery in a voltage-free state, any BIOS settings made are retained (stored in voltage-safe EEPROM). The date and time must be set again, and remanent data in the battery-backed SRAM of IF options must be backed up since this data can be lost when the battery is changed. For details about the stored data, see the following section:

"Device interface - Battery" on page 36

System unit	Max. retention time during battery change [min]
C80	2

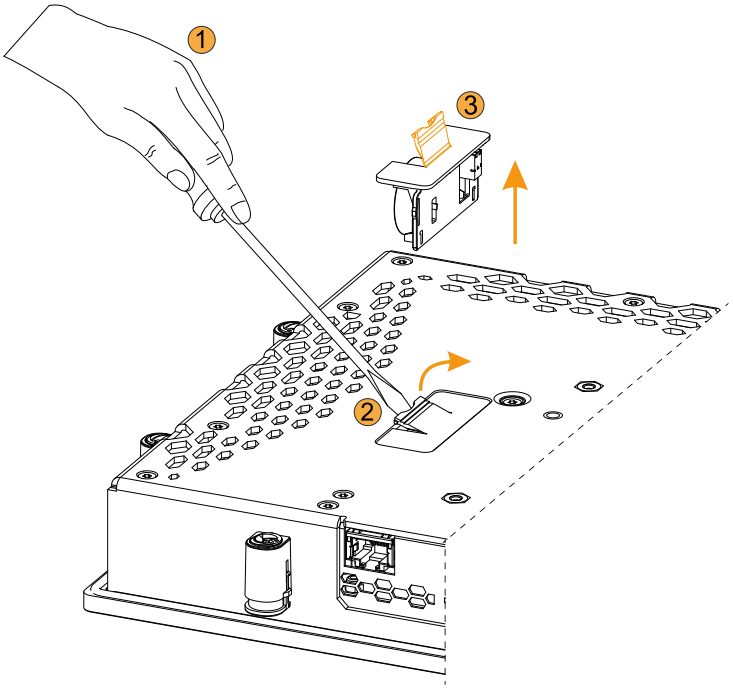
Required tools

- Flat-blade screwdriver

Procedure

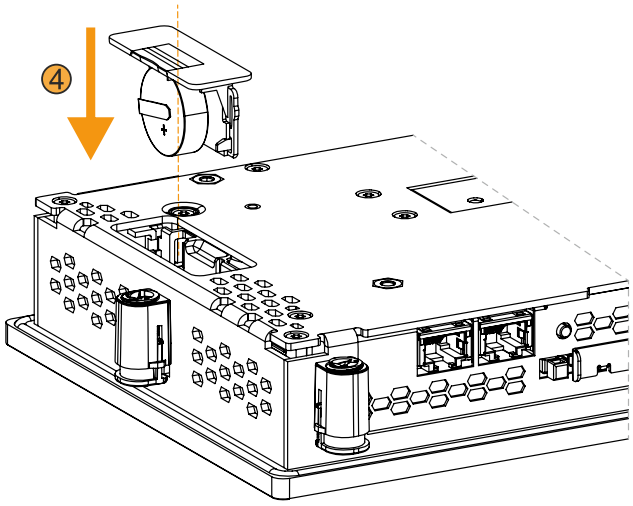
1. Disconnect the power supply cable to the Power Panel (disconnect the power cable).
2. Carry out electrostatic discharge on the housing or at the ground connection.

3. Carefully open the tab of the battery holder with a flat-blade screwdriver (1) and fully straighten the tab until it forms a 90° angle with the device (2).
4. Pull the battery holder out of the device by the tab (3).



5. Insert the new battery holder completely into the device (4). The tab of the spare battery holder must be closed for this.

> **Note:**
>
> **When reinserting, pay attention to the polarity.**



6. Reapply power to the Power Panel (connect the power cable).
7. Set the date and time in BIOS again.

✓ The battery change is completed and the device is ready for operation.

> **Warning!**
>
> **Lithium batteries are hazardous waste! Used batteries must be disposed of in accordance with local regulations.**

8.2 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.

8.3 User tips for increasing the display's service life

8.3.1 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.

8.3.1.1 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%.

8.3.2 Screen burn-in

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.

What causes image persistence?

- Static images
- No screensaver
- Sharp transitions in contrast (e.g. black/white)
- High ambient temperatures
- Operation outside of specifications

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.

8.4 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.

8.5 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

The following accessories have undergone functional testing by B&R in connection with the device used and can be operated with this device. Possible limitations regarding operation with individual components other than the complete system must be taken into account, however. All individual specifications of the components must be observed when operating the complete system.

All components listed in this manual have undergone intensive system and compatibility testing and been approved accordingly. B&R cannot assume any functional warranty for accessories that have not been approved.

9.1 0TB6102 2-pin power supply connector

This single-row, 2-pin terminal block is required for connecting the power supply.

9.1.1 Order data

Order number	Short description	Figure
	Terminal blocks	
0TB6102.3000-00	2-pin accessory screw clamp terminal block (3.81)	
0TB6102.3100-00	Accessory 2-pin cage clamp terminal block (3.81)	

9.1.2 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.

Order number	0TB6102.3000-00	0TB6102.3100-00
General information		
Certifications		
CE	Yes	
UKCA	Yes	
UL	In preparation	
Terminal block		
Number of pins	2 (female)	
Type of terminal block	Screw clamp terminal block variant	Cage clamp terminal block variant
Cable type	Only copper wires (no aluminum wires!)	
Pitch	3.81 mm	
Connection cross section		
AWG wire	28 to 16	
Wire end sleeves with plastic covering	0.2 to 1.5 mm²	0.25 to 0.5 mm²
With wire end sleeves	0.2 to 1.5 mm²	0.25 to 1.5 mm²
Flexible	0.2 to 1.5 mm²	0.14 to 1.5 mm²
Inflexible	0.2 to 1.5 mm²	0.14 to 1.5 mm²
Tightening torque	0.20 to 0.25 Nm	0.22 to 0.25 Nm
Electrical properties		
Nominal voltage	300 V	
Nominal current [1)]	8 A	

1) The respective limit values of the Power Panel or Panel PC must be taken into account!

9.2 0TB1210.3100

9.2.1 General information

Two-row 10-pin terminal block 0TB1210.3100 is used to connect to the interfaces of various interface options.

9.2.2 Order data

Order number	Short description	Figure
	Terminal blocks	
0TB1210.3100	Connector 300 VDC - 10-pin female - Cage clamp terminal block - Protected against vibration by the screw flange	

9.2.3 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 an accessory is used.**

Order number	0TB1210.3100
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	Nominal data per UL
Number of pins	10 (female)
Type of terminal block	Push-in spring connection
Cable type	Only copper wires (no aluminum wires!)
Pitch	3.5 mm
Connection cross section	
AWG wire	26 to 16 AWG
Wire end sleeves with plastic covering	0.14 to 1 mm²
Single-wire	0.14 to 1.5 mm²
Fine-stranded wires	0.14 to 1.5 mm²
With wire end sleeves	0.14 to 1.5 mm²
Electrical properties	
Nominal voltage	300 V
Nominal current [1)]	10 A
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2

1) The respective limit data of the I/O modules must be taken into account!

9.3 Replacement parts

The following replacement parts are available for the B&R Power Panel C80.

9.3.1 5ACCRHMI.0018-000

Battery compartment for Power Panel C80 and Panel PC 1200

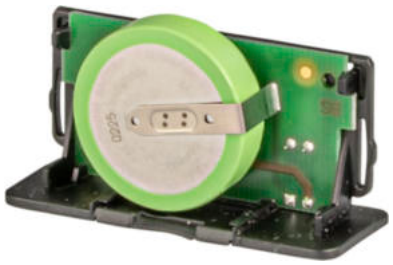
This battery compartment contains the following replacement parts:

- Battery holder for C80/PPC1200 (incl. battery)

This battery compartment is suitable for the following Power Panels and Panel PCs:

- Power Panel C80
- Panel PC 1200

9.3.1.1 Order data

Order number	Short description	Figure
	Accessories	
5ACCRHMI.0018-000	HMI C80/PPC1200 battery compartment - 1x battery holder C80/PPC1200 - 1x battery including circuit board	

9.3.1.2 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 an accessory is used.**

Order number	5ACCRHMI.0018-000
General information	
Battery	
Type	Panasonic 1000 mAh
Nominal voltage	3 V
Service life	8 years [1]
Removable	No [2]
Variant	Lithium
Certifications	
CE	Yes
UKCA	Yes
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Ambient conditions	
Temperature	
Operation	-25 to 60°C
Storage	-25 to 60°C
Transport	-25 to 60°C
Relative humidity	
Operation	5 to 90%
Storage	5 to 95%
Transport	5 to 95%
Mechanical properties	
Housing	
Material	Dyed plastic (RAL 9005)
Weight	Approx. 13 g

1) At 50°C, 6 µA for the components being supplied.
2) The battery is permanently installed in the battery compartment and cannot be replaced. The entire battery compartment must always be replaced.

9.3.2 6ACCRPP3.0001-000

Installation kit for Power Panel C-Series and Panel PCs

This installation kit contains the following replacement parts:

- 9 retaining clips with torque limiting
- 1x 2-pin cage clamp terminal block
- 1x 10-pin cage clamp terminal block

This installation kit is suitable for the following Power Panel / Panel PC:

- Power Panel C80
- Panel PC 1200

9.3.2.1 Order data

Order number	Short description	Figure
	Other	
6ACCRPP3.0001-000	Installation kit for PPC80/PPC1200 variants: 9x retaining clips with torque limiting, 1x 2-pin cage clamp terminal block, 1x 10-pin cage clamp terminal block	

9.3.2.2 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.

Order number	6ACCRPP3.0001-000
Short description	
Accessories	Installation kit for Power Panel C80 and Panel PC 1200: 9 retaining clips with torque limiting, 1x 2-pin cage clamp terminal block (0TB6102.3100-00), 1x 10-pin cage clamp terminal block (0TB1210.3100-00)
General information	
Note	Suitable for Power Panel C80 and Panel PC 1200.
Certifications	
CE	Yes
UKCA	Yes

9.4 Cables

For technical data and additional information about the cable, see the corresponding documentation. This is located under the purchase order number of the cable on the B&R website (www.br-automation.com) and can be downloaded from there.

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 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:

Declarations of conformity are available on the B&R website under Downloads > Certificates > 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 facilitates the certification of your machines and systems in this economic area.

Underwriters Laboratories (UL) per standards UL 61010-1 and UL 61010-2-201
Canadian (CSA) standard per C22.2 No. 61010-1-12 and CSA C22.2 No. 61010-2-201:14

The UL certificates are available on the B&R website (Downloads > Certificates > UL).

The device is classified as "open type" for use in the area of "Industrial control Equipment" sector in accordance with UL 61010-1 / UL 61010-2-201. The prerequisite for certification or operation per UL 61010-1 / UL 61010-2-201 is therefore the installation of the device in an appropriate protective housing.

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 61010-1 and 61010-2-201.**
- **The secondary circuit used to supply the device must be derived from the MAINS CIRCUITS of OVERVOLTAGE CATEGORY II up to 300 V.**
- **The final safety enclosure in which the module is installed must have adequate rigidity and meet fire propagation requirements.**
- **Minimum temperature rating of the cables to be connected to the field wiring terminals: 80°C, AWG (Sol. / Str.) 26-16 / 26-16 (power supply). Use copper conductors only.**

Attention !

- **Les circuits externes à connecter à cet appareil doivent être séparés de l'alimentation SECTEUR ou des tensions dangereuses par une isolation double ou renforcée et satisfaire les exigences relatives aux circuits TBTS/TBTP (Classe III) spécifiées dans UL/CSA 61010-1 et 61010-2-201.**
- **Le circuit secondaire utilisé pour alimenter l'appareil doit être dérivé des CIRCUITS SECTEUR en CATÉGORIE DE SURTENSION II jusqu'à 300 V.**
- **L'enceinte de protection finale dans laquelle le module est installé doit présenter une rigidité appropriée et satisfaire les exigences relatives à la propagation du feu.**
- **Température minimale des câbles à connecter aux bornes de câblage sur site : 80°C, AWG (Sol. / Str.) 26-16 / 26-16 (alimentation). Utiliser des conducteurs en cuivre uniquement.**

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.**
- **For all POWERLINK and Ethernet connections, only connections within a building are permitted, taking into account maximum lengths.**

Operating conditions:

- Degree of protection: type 1 indoor use only[5)]

Usage with a VESA mount has not been evaluated and is therefore not approved.

10.2.1.2 UL overview of certifications

Starting with the revision listed below, the individual components have UL certification.

Order number	Short description	UL starting with Rev.
4PPC80.0573-10A	C80 5.7 TFT VGA AG PLK X2X	H0
4PPC80.0573-10B	C80 5.7 TFT VGA PLK X2X	H0
4PPC80.0573-11A	C80 5.7 TFT VGA AG PLK X2X 2xCAN	I0
4PPC80.0573-11B	C80 5.7 TFT VGA PLK X2X 2xCAN	I0
4PPC80.0573-12A	C80 5.7 TFT VGA AG PLK X2X CAN RS232	H0
4PPC80.0573-12B	C80 5.7 TFT VGA PLK X2X CAN RS232	H0
4PPC80.0573-13A	C80 5.7 TFT VGA AG PLK X2X CAN RS485	H0
4PPC80.0573-13B	C80 5.7 TFT VGA PLK X2X CAN RS485	H0
4PPC80.0702-10A	C80 7.0 TFT WVGA AG PLK X2X	H0
4PPC80.0702-10B	C80 7.0 TFT WVGA PLK X2X	H0
4PPC80.0702-11A	C80 7.0 TFT WVGA AG PLK X2X 2xCAN	I0
4PPC80.0702-11B	C80 7.0 TFT WVGA PLK X2X 2xCAN	I0
4PPC80.0702-12A	C80 7.0 TFT WVGA AG PLK X2X CAN RS232	H0
4PPC80.0702-12B	C80 7.0 TFT WVGA PLK X2X CAN RS232	H0
4PPC80.0702-13A	C80 7.0 TFT WVGA AG PLK X2X CAN RS485	H0
4PPC80.0702-13B	C80 7.0 TFT WVGA PLK X2X CAN RS485	H0
4PPC80.101E-10A	C80 10.1 TFT WXGA AG PLK X2X	H0
4PPC80.101E-10B	C80 10.1 TFT WXGA PLK X2X	J0
4PPC80.101E-11A	C80 10.1 TFT WXGA AG PLK X2X 2xCAN	H0
4PPC80.101E-11B	C80 10.1 TFT WXGA PLK X2X 2xCAN	K0
4PPC80.101E-12A	C80 10.1 TFT WXGA AG PLK X2X CAN RS232	H0
4PPC80.101E-12B	C80 10.1 TFT WXGA PLK X2X CAN RS232	J0
4PPC80.101E-13A	C80 10.1 TFT WXGA AG PLK X2X CAN RS485	H0
4PPC80.101E-13B	C80 10.1 TFT WXGA PLK X2X CAN RS485	J0
4PPC80.121E-10A	C80 12.1 TFT WXGA AG PLK X2X	H0
4PPC80.121E-10B	C80 12.1 TFT WXGA PLK X2X	H0
4PPC80.121E-11A	C80 12.1 TFT WXGA AG PLK X2X 2xCAN	I0
4PPC80.121E-11B	C80 12.1 TFT WXGA PLK X2X 2xCAN	J0
4PPC80.121E-12A	C80 12.1 TFT WXGA AG PLK X2X CAN RS232	H0
4PPC80.121E-12B	C80 12.1 TFT WXGA PLK X2X CAN RS232	H0
4PPC80.121E-13A	C80 12.1 TFT WXGA AG PLK X2X CAN RS485	H0
4PPC80.121E-13B	C80 12.1 TFT WXGA PLK X2X CAN RS485	H0
4PPC80.156B-10A	C80 15.6 TFT HD AG PLK X2X	H0
4PPC80.156B-10B	C80 15.6 TFT HD PLK X2X	I0
4PPC80.156B-11A	C80 15.6 TFT HD AG PLK X2X 2xCAN	I0
4PPC80.156B-11B	C80 15.6 TFT HD PLK X2X 2xCAN	J0
4PPC80.156B-12A	C80 15.6 TFT HD AG PLK X2X CAN RS232	H0
4PPC80.156B-12B	C80 15.6 TFT HD PLK X2X CAN RS232	H0
4PPC80.156B-13A	C80 15.6 TFT HD AG PLK X2X CAN RS485	G0
4PPC80.156B-13B	C80 15.6 TFT HD PLK X2X CAN RS485	G0

5) When used in the area of "Industrial control equipment" per UL61010-1/UL61010-2-201, the device must therefore be installed in an appropriate protective housing.

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).

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.