# Panel PC 2200 swing arm devices

# **User's manual**

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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 (<a href="https://www.br-automation.com">www.br-automation.com</a>).

## 1.1 Manual history

Version	Date	Comment <sup>1)</sup>
2.00	December 2021	Updated document.
		Updated "B&R Linux 10 (GNU/Linux)" on page 240.
		Updated "Windows 10 IoT Enterprise 2019 LTSC" on page 234.
		<ul> <li>Added VESA consoles "5ACCMA00.0100-000" on page 145 and "5ACCMA00.0101-000" on page 147.</li> </ul>
		Added heat pipe "5ACCHP00.0003-000" on page 269.
		Added swivel-tilt flange "5ACCFL00.0100-000" on page 151.
		Updated "Automation software" on page 243.
		Updated "Block diagram" on page 46.
		Updated "UEFI BIOS options" on page 205.
		Updated "Product information" on page 24.
		Updated "Changing the battery" on page 256.
		EN 60950 replaced by IEC 61010-2-201.
		Cables and USB mass storage device are described in their own documentation starting with this version.
		<ul> <li>Updated the CAN interface description, see sections "Interface options" on page 101 and "Cable data" on page 279.</li> </ul>
1.05	August 2019	Updated section "General information":
		Updated "General safety guidelines" on page 12.
		Updated section "Software" on page 205:
		Updated "UEFI BIOS options" on page 205.
		Updated "OEM features" on page 214.
		Updated "Upgrade information" on page 230.
		Revised "Operating systems" on page 234:
		<ul><li>Added "5SWW10.0559-MUL" on page 237.</li></ul>
		° Added "5SWLIN.0759-MUL" on page 241.
		° Updated Automation Runtime.
		Added "B&R Hypervisor" on page 245 and "mapp Technology" on page 246.
1.00	December 2018	First version.

<sup>1)</sup> Editorial corrections 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 in millimeters.

Unless otherwise specified, the following general tolerances apply:

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

# 2 General safety guidelines

#### 2.1 Intended use

In all cases, it is necessary to observe and comply with applicable national and international standards, regulations and safety measures!

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 network¹))
- · 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.

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

# 3 System overview

#### 3.1 Information about this user's manual

This user's manual contains all the necessary information for a functioning Panel PC 2200 swing arm device. For information about the Automation Panel 5000 swing arm device, see the <u>Automation Panel 5000 user's manual</u>.

#### 3.2 Easy customization

The Automation Panel 5000 can be used as a remote panel or part of a Panel PC. For this, the panel is either equipped with a receiver for Smart Display Link (SDL), SDL3 or SDL4, or a PC unit is attached. The operator panel is always identical.



#### 3.2.1 System units

System units consist of the CPU board and an aluminum housing. All interfaces and the main memory of the PPC2200 are integrated on the system units. An interface option and CFast card can also be connected. The main memory modules are permanently installed on the system unit and cannot be replaced.



If a system unit is installed on a panel, this results in a functional Panel PC 2200.

A system unit without a panel is not functional.

#### **3.2.1.1 Features**

- Intel Atom X processor series (Apollo Lake)
- · Up to quad-core CPU performance
- · Powerful graphics (Intel HD graphics)
- Compact dimensions
- · 2x Gigabit Ethernet
- 2x USB 3.0
- 1x CFast slot
- 1x interface option slot

#### System overview

- Fanless operation
- Real time clock, RTC (battery-backed)
- TPM 2.0 security

#### 3.2.2 AP5000 panels

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



#### 3.2.3 Mounting units

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

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



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



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



#### 3.2.4 Flanges

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





#### 3.2.5 Expansion units

Expansion units can be installed on AP5230 panels with expansion option. It is possible to choose between an expansion cover and an expansion unit.

Expansion covers have cutouts that can be used to install the desired operating elements at a later time.

The operating elements are already integrated in expansion units.





#### 3.2.6 Handles

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



## 3.3 PPC2200 swing arm device - Configuration

The following individual components are mandatory for operation as a Panel PC 2200 swing arm device:

- Panel
- · System unit
- · CFast card
- · Operating system
- Mounting unit: Swing arm or VESA
- Flange (swing arm mounting unit only)
- Expansion unit or expansion cover (5AP5230.xxxx-000 only)

Configuration					·	
Panels						Select 1
		Diagonal	Resolution	Touch screen	Keys	Format
	5120 panels					
	5AP5120.1505-000	15.0"	XGA	Single-touch	No	Landscape
	5AP5120.1906-000	19.0"	SXGA	Single-touch	No	Landscape
	5130 panels					
	5AP5130.156B-000	15.6"	HD	Multi-touch	No	Landscape
A STATE OF THE PARTY OF THE PAR	5AP5130.156C-000	15.6"	FHD	Multi-touch	No	Landscape
7 3	5AP5130.185B-000	18.5"	HD	Multi-touch	No	Landscape
and the second s	5AP5130.185C-000	18.5"	FHD	Multi-touch	No	Landscape
	5AP5130.215C-000	21.5"	FHD	Multi-touch	No	Landscape
	5AP5130.240C-000	24.0"	FHD	Multi-touch	No	Landscape
	5230 panels					
	5AP5230.156B-000	15.6"	HD	Multi-touch	No	Landscape
	5AP5230.156C-000	15.6"	FHD	Multi-touch	No	Landscape
	5AP5230.185B-000	18.5"	HD	Multi-touch	No	Landscape
	5AP5230.185C-000	18.5"	FHD	Multi-touch	No	Landscape
	5AP5230.215C-000	21.5"	FHD	Multi-touch	No	Landscape
	5AP5230.215I-000	21.5"	FHD	Multi-touch	No	Portrait
	5AP5230.240C-000	24.0"	FHD	Multi-touch	No	Landscape
System units						Select 1
	System unit	Processor	Processor	(:nras	Main memory type	Main mem-
			Clock freque	ncy		ory size
	5PPC2200.AL02-000	Intel Atom x5-E3930	1300 MHz		LPDDR4 SDRAM	2 GB
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	5PPC2200.AL04-000	Intel Atom x5-E3930	1300 MHz		LPDDR4 SDRAM	4 GB
	5PPC2200.AL14-000	Intel Atom x5-E3940	1600 MHz		LPDDR4 SDRAM	4 GB
	5PPC2200.AL18-000	Intel Atom x5-E3940	1600 MHz	4	LPDDR4 SDRAM	8 GB
Mounting units						Select 1
Mounting units		ounting unit			ESA mounting unit	
Mounting units	5ACCMA00.00	00-000 (without USB)		5ACCMA00	0100-000 (IP54, with	out USB)
Mounting units	5ACCMA00.00 5ACCMA00.0	00-000 (without USB) 0001-000 (1x USB)		5ACCMA00 5ACCMA	0100-000 (IP54, witho	out USB) : USB)
	5ACCMA00.00 5ACCMA00.0	00-000 (without USB)		5ACCMA00 5ACCMA	0100-000 (IP54, with	out USB) : USB) P10)
	5ACCMA00.00 5ACCMA00.0 5ACCMA00.0	00-000 (without USB) 0001-000 (1x USB)	Onived till fle	5ACCMA00 5ACCMAI 5ACCM	0100-000 (IP54, witho 00.0101-000 (IP54, 1x A01.0100-000 (IP20/II	out USB) USB) P10) Select 1.1)
Mounting units  Flanges	5ACCMA00.00 5ACCMA00.0 5ACCMA00.0 Rotary flange	00-000 (without USB) 0001-000 (1x USB) 0002-000 (2x USB)	Swivel-tilt fla	5ACCMA00 5ACCMA0 5ACCM	0100-000 (IP54, witho 00.0101-000 (IP54, 1x A01.0100-000 (IP20/II	out USB) USB) P10) Select 1.19 adapter
Flanges	5ACCMA00.00 5ACCMA00.0 5ACCMA00.0	00-000 (without USB) 0001-000 (1x USB) 0002-000 (2x USB)	Swivel-tilt fla	5ACCMA00 5ACCMA0 5ACCM	0100-000 (IP54, witho 00.0101-000 (IP54, 1x A01.0100-000 (IP20/II Rittal flange a 5ACCFL00.02	out USB) USB) P10) Select 1.10 adapter
Flanges	5ACCMA00.00 5ACCMA00.0 5ACCMA00.0 Rotary flange	00-000 (without USB) 0001-000 (1x USB) 0002-000 (2x USB)		5ACCMA00 5ACCMA0 5ACCM	0100-000 (IP54, witho 00.0101-000 (IP54, 1x A01.0100-000 (IP20/II Rittal flange a 5ACCFL00.02	out USB) USB) P10) Select 1.1 adapter
Flanges	5ACCMA00.00 5ACCMA00.0 5ACCMA00.0 6ACCMA00.0 Covers	00-000 (without USB) 0001-000 (1x USB) 0002-000 (2x USB)	5ACCFL00.010	5ACCMA00 5ACCMA0 5ACCM 5ACCM 0-000	0100-000 (IP54, witho 00.0101-000 (IP54, 1x A01.0100-000 (IP20/II Rittal flange a 5ACCFL00.02	out USB) USB) P10) Select 1.19 adapter 200-000 Optional, select 1.29
Flanges	5ACCMA00.00 5ACCMA00.0 5ACCMA00.0 5ACCMA00.0  Rotary flange 5ACCFL00.0000-0  Covers 5ACCKP00.156B-000	00-000 (without USB) 0001-000 (1x USB) 0002-000 (2x USB)	5ACCFL00.010	5ACCMA00 5ACCMA0 5ACCM	0100-000 (IP54, witho 00.0101-000 (IP54, 1x A01.0100-000 (IP20/II Rittal flange a 5ACCFL00.02	out USB) USB) P10) Select 1.1 adapter
Flanges Expansion units	5ACCMA00.00 5ACCMA00.1 5ACCMA00.1  Rotary flange 5ACCFL00.0000-0  Covers  5ACCKP00.156B-000 5ACCKP00.240C-000	00-000 (without USB) 0001-000 (1x USB) 0002-000 (2x USB)	5ACCFL00.010	5ACCMA00 5ACCMA0 5ACCM 5ACCM 0-000	0100-000 (IP54, witho 00.0101-000 (IP54, 1x A01.0100-000 (IP20/II Rittal flange a 5ACCFL00.02	out USB) USB) P10) Select 1.10  adapter 200-000  Optional, select 1.20
Flanges	5ACCMA00.00 5ACCMA00.0 5ACCMA00.0 5ACCMA00.0  Rotary flange 5ACCFL00.0000-0  Covers  5ACCKP00.156B-000 5ACCKP00.240C-000  Units	00-000 (without USB) 0001-000 (1x USB) 0002-000 (2x USB) 0000 5 5ACCKP00.185	B-000	5ACCMA00 5ACCMA0 5ACCM 5ACCM nge 0-000	0100-000 (IP54, witho 00.0101-000 (IP54, 1x A01.0100-000 (IP20/II Rittal flange a 5ACCFL00.02	Select 1.10 Select 1.10 Select 1.10 Adapter 200-000 Optional, select 1.20 P00.215I-000
Flanges  Expansion units	5ACCMA00.00 5ACCMA00.1 5ACCMA00.1  Rotary flange 5ACCFL00.0000-0  Covers  5ACCKP00.156B-000 5ACCKP00.240C-000  Units  5ACCKP01.156B-000	00-000 (without USB) 0001-000 (1x USB) 0002-000 (2x USB) 0000 5 5ACCKP00.185	B-000	5ACCMA00 5ACCMA0 5ACCMA0 5ACCM nge 0-000 5ACCKP00.215C-0 5ACCKP04.156B-0	0100-000 (IP54, without 00.0101-000 (IP54, 1x A01.0101-000 (IP54, 1x A01.0100-000 (IP20/II A01.0100-000) (IP20/II A01.0100-000-000-000-000-000-000-0000-00	out USB) (USB) (P10) Select 1.19 adapter (200-000 Optional, select 1.29 (P00.215I-000
Flanges Expansion units	5ACCMA00.00 5ACCMA00.0 5ACCMA00.0 5ACCMA00.0  Rotary flange 5ACCFL00.0000-0  Covers  5ACCKP00.156B-000 5ACCKP00.240C-000  Units  5ACCKP01.156B-000 5ACCKP01.215C-000	00-000 (without USB) 0001-000 (1x USB) 0002-000 (2x USB) 0000 5 5ACCKP00.185	B-000	5ACCMA00 5ACCMA05ACCM 5ACCM nge 0-000 5ACCKP00.215C-1 5ACCKP04.156B- 5ACCKP04.215C-1	0100-000 (IP54, without 00.0101-000 (IP54, 1x A01.0101-000 (IP54, 1x A01.0100-000 (IP20/II A01.0100-000-000 (IP20/II A01.0100-000 (IP20/II A01.0100-000-00	Select 1.10 Select 1.10 Select 1.10 Adapter 200-000 Optional, select 1.20 P00.215I-000
Flanges  Expansion units	5ACCMA00.00 5ACCMA00.0 5ACCMA00.0 5ACCMA00.0  Rotary flange 5ACCFL00.0000-0  Covers  5ACCKP00.156B-000 5ACCKP00.240C-000  Units  5ACCKP01.156B-000 5ACCKP01.215C-000 5ACCKP01.240C-000	00-000 (without USB) 0001-000 (1x USB) 0002-000 (2x USB) 0000 5 5ACCKP00.185	B-000	5ACCMA00 5ACCMA0 5ACCMA0 5ACCM nge 0-000 5ACCKP00.215C-0 5ACCKP04.156B-0	0100-000 (IP54, without 00.0101-000 (IP54, 1x A01.0101-000 (IP54, 1x A01.0100-000 (IP20/II A01.0100-000-000 (IP20/II A01.0100-000 (IP20/II A01.0100-000-00	out USB) (USB) (P10) Select 1.19 adapter (200-000 Optional, select 1.29 (P00.215I-000
Flanges  Expansion units	5ACCMA00.00 5ACCMA00.0 5ACCMA00.0 5ACCMA00.0  Rotary flange 5ACCFL00.0000-0  Covers  5ACCKP00.156B-000 5ACCKP00.240C-000  Units  5ACCKP01.156B-000 5ACCKP01.215C-000 5ACCKP01.240C-000  Units (RFID)	00-000 (without USB) 0001-000 (1x USB) 0002-000 (2x USB) 0000 5 5ACCKP00.185 5ACCKP01.185E 5ACCKP01.215	B-000	5ACCMA00 5ACCMA05ACCM 5ACCM nge 0-000 5ACCKP00.215C- 5ACCKP04.156B- 5ACCKP04.215C- 5ACCKP04.240C-	0100-000 (IP54, without 00.0101-000 (IP54, 1x A01.0101-000 (IP54, 1x A01.0100-000 (IP54, 1x A01.0100-000 (IP20/II A01.0100-000 (IP20	out USB) (USB) (P10) Select 1.19 adapter (200-000 Optional, select 1.29 (P00.215I-000
Flanges  Expansion units	5ACCMA00.00 5ACCMA00.0 5ACCMA00.0 5ACCMA00.0  Rotary flange 5ACCFL00.0000-0  Covers  5ACCKP00.156B-000 5ACCKP00.240C-000  Units  5ACCKP01.156B-000 5ACCKP01.215C-000 5ACCKP01.240C-000  Units (RFID)	00-000 (without USB) 0001-000 (1x USB) 0002-000 (2x USB) 0000 5 5ACCKP00.185 5ACCKP01.185E 5ACCKP01.215	B-000	5ACCMA00 5ACCMA05ACCM 5ACCM nge 0-000 5ACCKP00.215C-1 5ACCKP04.156B- 5ACCKP04.215C- 5ACCKP04.240C-	0100-000 (IP54, without 00.0101-000 (IP54, 1x A01.0101-000 (IP54, 1x A01.0100-000 (IP54, without 00.0100-000 (IP54, without 00.0100-000 (IP54, without 00.0100-000 (IP54, 1x A01.0100-000 (IP54, 1x A01.0100-0	out USB) (USB) (P10) Select 1.1) adapter (200-000 Optional, select 1.2) (P00.215I-000
Flanges  Expansion units	5ACCMA00.00 5ACCMA00.0 5ACCMA00.0 5ACCMA00.0 6ACCMA00.0  Rotary flange 5ACCFL00.0000-0  Covers 5ACCKP00.156B-000 5ACCKP00.240C-000  Units 5ACCKP01.156B-000 5ACCKP01.215C-000 5ACCKP01.240C-000  Units (RFID)  5ACCKI 5ACCKI	000-000 (without USB) 0001-000 (1x USB) 0002-000 (2x USB) 0000 5ACCKP00.185 5ACCKP01.185E 5ACCKP01.215	B-000	5ACCMA00 5ACCMA0 5ACCMM 5ACCMM nge 0-000 5ACCKP00.215C- 5ACCKP04.156B- 5ACCKP04.240C- 5ACCKP04.240C- 5ACCKP04.240C-	0100-000 (IP54, without 00.0101-000 (IP54, 1x A01.0101-000 (IP54, 1x A01.0100-000 (IP54, without IP54, 1x A01.0100-000 (IP54, 1x A01.0100	out USB) (USB) (P10) Select 1.1) adapter (200-000 Optional, select 1.2) (P00.215I-000
Flanges  Expansion units	5ACCMA00.00 5ACCMA00.0 5ACCMA00.0 5ACCMA00.0 6ACCMA00.0  Rotary flange 5ACCFL00.0000-0  Covers 5ACCKP00.156B-000 5ACCKP00.240C-000  Units 5ACCKP01.156B-000 5ACCKP01.215C-000 5ACCKP01.240C-000  Units (RFID)  5ACCKI 5ACCKI	00-000 (without USB) 0001-000 (1x USB) 0002-000 (2x USB) 0000 5 5ACCKP00.185 5ACCKP01.185E 5ACCKP01.215	B-000	5ACCMA00 5ACCMA0 5ACCMM 5ACCMM nge 0-000 5ACCKP00.215C- 5ACCKP04.156B- 5ACCKP04.240C- 5ACCKP04.240C- 5ACCKP04.240C-	0100-000 (IP54, without 00.0101-000 (IP54, 1x A01.0101-000 (IP54, 1x A01.0100-000 (IP54, 1x A01.0100-000 (IP54, 1x A01.0100-000 (IP20/III)  Rittal flange a 5ACCFL00.02  0000 5ACCKI	out USB) (USB) (P10) Select 1.1) adapter (200-000 Optional, select 1.2) (P00.215I-000
Flanges  Expansion units	5ACCMA00.00 5ACCMA00.0 5ACCMA00.0 5ACCMA00.0 5ACCMA00.0  Rotary flange 5ACCFL00.0000-0  Covers 5ACCKP00.156B-000 5ACCKP00.240C-000  Units 5ACCKP01.156B-000 5ACCKP01.215C-000 5ACCKP01.240C-000  Units (RFID)  5ACCKI 5ACCKI	5ACCKP01.185E 5ACCKP01.215 5ACCKP01.215 5ACCKP01.215 5ACCKP01.215	B-000 B-000	5ACCMA00 5ACCMA00 5ACCMA00 5ACCMA000 5ACCMA000 5ACCKP00.215C-1 5ACCKP04.215C-1 5ACCKP04.240C-1 5ACCKP04.240C-1 5ACCKP04.240C-1	0100-000 (IP54, without 00.0101-000 (IP54, 1x A01.0101-000 (IP54, 1x A01.0101-000 (IP54, 1x A01.0100-000 (IP20/II A01.0100-000 (IP20	Dut USB) - USB) - 10) - Select 1.1) - Select 1.1) - Select 1.2) - Select 1.3
Flanges  Expansion units	5ACCMA00.00 5ACCMA00.00 5ACCMA00.0 5ACCMA00.0 5ACCMA00.0  Rotary flange 5ACCFL00.0000-0  Covers  5ACCKP00.156B-000 5ACCKP00.240C-000  Units  5ACCKP01.215C-000 5ACCKP01.240C-000  Units (RFID)  5ACCK 5ACCK 5ACCK 5ACCK 5ACCK	5ACCKP01.185E 5ACCKP01.215 5ACCKP01.215 5ACCKP01.185E 5ACCKP01.215 5ACCKP01.215	B-000  3-000  3-000	5ACCMA00 5ACCMA00 5ACCMA00 5ACCMA000 5ACCMA000 5ACCKP00.215C-0 5ACCKP04.215C-0 5ACCKP04.240C-0 5ACCKP04.240C-0 5ACCKP04.240C-0 5ACCKP04.240C-0 5ACCKP04.240C-0	0100-000 (IP54, without 00.0101-000 (IP54, 1x A01.0101-000 (IP54, 1x A01.0100-000 (IP54, 1x	P04.185B-000  Doptional, select 1.3  Doptional, select 1.3  Doptional, select 1.3  Doptional, select 1.3
Flanges  Expansion units	5ACCMA00.00 5ACCMA00.00 5ACCMA00.0 5ACCMA00.0 5ACCMA00.0  Rotary flange 5ACCFL00.0000-0  Covers  5ACCKP00.156B-000 5ACCKP00.240C-000  Units  5ACCKP01.215C-000 5ACCKP01.240C-000  Units (RFID)  5ACCK 5ACCH	5ACCKP00.185 5ACCKP01.185E 5ACCKP01.215 5ACCKP01.215 5ACCKP01.215 5ACCKP01.215	B-000  B-000  B-000  B-000  B-000  B-000	5ACCMA00 5ACCMA00 5ACCMA00 5ACCMA000 5ACCMA000 5ACCKP00.215C-1 5ACCKP04.215C-1 5ACCKP04.240C-1 5ACCKP04.240C-1 5ACCKP04.240C-1 5ACCKP04.240C-1 5ACCKP04.240C-1 5ACCKP04.240C-1 5ACCKP04.240C-1 5ACCKP04.240C-1 5ACCKP04.240C-1	0100-000 (IP54, without 00.0101-000 (IP54, 1x A01.0101-000 (IP54, 1x A01.0100-000 (IP54, 1x A01.0100-000 (IP20/II A01.0100-000 (IP20/II A01.0100-000 (IP20/II A01.0100-000 (IP20/II A01.0100-000 (IP20/II A01.0100) (IP20/II A	Dut USB) - USB) - 10) - Select 1.10 - Select 1.10 - Select 1.20 - Select
Flanges  Expansion units  Handles	5ACCMA00.00 5ACCMA00.00 5ACCMA00.0 5ACCMA00.0 5ACCMA00.0  Rotary flange 5ACCFL00.0000-0  Covers  5ACCKP00.156B-000 5ACCKP00.240C-000  Units  5ACCKP01.215C-000 5ACCKP01.240C-000  Units (RFID)  5ACCK 5ACCK 5ACCK 5ACCK 5ACCK	5ACCKP01.185E 5ACCKP01.215 5ACCKP01.215 5ACCKP01.185E 5ACCKP01.215 5ACCKP01.215	B-000  B-000  B-000  B-000  B-000  B-000	5ACCMA00 5ACCMA00 5ACCMA00 5ACCMA000 5ACCMA000 5ACCKP00.215C-0 5ACCKP04.215C-0 5ACCKP04.240C-0 5ACCKP04.240C-0 5ACCKP04.240C-0 5ACCKP04.240C-0 5ACCKP04.240C-0	0100-000 (IP54, without 00.0101-000 (IP54, 1x A01.0101-000 (IP54, 1x A01.0100-000 (IP54, 1x A01.0100-000 (IP20/II A01.0100-000 (IP20/II A01.0100-000 (IP20/II A01.0100-000 (IP20/II A01.0100-000 (IP20/II A01.0100) (IP20/II A	Pout USB) Select 1.10 Select 1.10 Select 1.10 Select 1.20 Pour 1.85B-000 Pour 1.85B-000 Pour 1.85B-000 Double 1.85B-000
Flanges  Expansion units	5ACCMA00.00 5ACCMA00.00 5ACCMA00.0 5ACCMA00.0 5ACCMA00.0  Rotary flange 5ACCFL00.0000-0  Covers  5ACCKP00.156B-000 5ACCKP00.240C-000  Units  5ACCKP01.215C-000 5ACCKP01.240C-000  Units (RFID)  5ACCK 5ACCH	00-000 (without USB) 0001-000 (1x USB) 0002-000 (2x USB)  5ACCKP00.185  5ACCKP01.185E 5ACCKP01.215  P03.185B-000 P03.215C-000 P03.240C-000  5ACCHD00.156E 5ACCHD00.190E 5ACCHD00.240E	B-000  B-000  B-000  C-000	5ACCMA00 5ACCMA00 5ACCMA00 5ACCMA00 5ACCMA00 5ACCKP00.215C-1 5ACCKP04.215C-5ACCKP04.240C-55ACCKP04.240C-55ACCKP04.240C-55ACCKP04.240C-55ACCHD01.156B-5ACCHD01.215C-5ACCHD01.240C-5ACCHD01.240C-5ACCHD01.240C-5ACCHD01.240C-	0100-000 (IP54, without 00.0101-000 (IP54, 1x A01.0101-000 (IP54, 1x A01.0100-000 (IP54, 1x A01.0100-000 (IP20/II A01.0100-000 (IP20/II A01.0100-000 (IP20/II A01.0100-000 (IP20/II A01.0100-000 (IP20/II A01.0100) (IP20/II A	Pout USB) Select 1.10 Select 1.10 Select 1.10 Select 1.20 Pour 1.50 Pour 1.5
Flanges  Expansion units  Handles	5ACCMA00.00 5ACCMA00.00 5ACCMA00.0 5ACCMA00.0 5ACCMA00.0  Rotary flange 5ACCFL00.0000-0  Covers  5ACCKP00.156B-000 5ACCKP00.240C-000  Units  5ACCKP01.215C-000 5ACCKP01.240C-000  Units (RFID)  5ACCK 5ACCH	5ACCKP01.185E 5ACCKP01.185E 5ACCKP01.215 5ACCKP01.185E 5ACCKP01.215 5ACCHD00.2400 5ACCHD00.156I 5ACCHD00.1900 5ACCHD00.2400	B-000  B-000	5ACCMA00 5ACCMA00 5ACCMA00 5ACCMA000 5ACCMA000 5ACCKP00.215C-1 5ACCKP04.215C-1 5ACCKP04.240C-1 5ACCKP04.240C-1 5ACCKP04.240C-1 5ACCHD01.156B-1 5ACCHD01.215C-1 5ACCHD01.215C-1 5ACCHD01.215C-1	0100-000 (IP54, without 00.0101-000 (IP54, 1x A01.0101-000 (IP54, 1x A01.0101-000 (IP54, 1x A01.0100-000 (IP20/III A01.0100-000 (IP20/III A01.0100-000 (IP20/III A01.0100-000 (IP20/III A01.0100 (IP20/III	P04.185B-000  Doptional, select 1.3  Doptional, select 1.3  Doptional, select 1.3  Doptional, select 1.3
Flanges  Expansion units  Handles  Heat pipe	5ACCMA00.00 5ACCMA00.00 5ACCMA00.0 5ACCMA00.0 5ACCMA00.0  Rotary flange 5ACCFL00.0000-0  Covers  5ACCKP00.156B-000 5ACCKP00.240C-000  Units  5ACCKP01.215C-000 5ACCKP01.240C-000  Units (RFID)  5ACCK 5ACCH	5ACCKP01.185E 5ACCKP01.185E 5ACCKP01.215 5ACCKP01.185E 5ACCKP01.215 5ACCHD00.2400 5ACCHD00.156I 5ACCHD00.1900 5ACCHD00.2400	B-000  B-000	5ACCMA00 5ACCMA00 5ACCMA00 5ACCMA00 5ACCMA00 5ACCKP00.215C-1 5ACCKP04.215C-5ACCKP04.240C-55ACCKP04.240C-55ACCKP04.240C-55ACCKP04.240C-55ACCHD01.156B-5ACCHD01.215C-5ACCHD01.240C-5ACCHD01.240C-5ACCHD01.240C-5ACCHD01.240C-	0100-000 (IP54, without 00.0101-000 (IP54, 1x A01.0101-000 (IP54, 1x A01.0101-000 (IP54, 1x A01.0100-000 (IP20/III A01.0100-000 (IP20/III A01.0100-000 (IP20/III A01.0100-000 (IP20/III A01.0100 (IP20/III	Pout USB) Select 1.10 Select 1.10 Select 1.10 Select 1.20 Pour 1.2

#### System overview

Mass storage devices						Select 1.
	CFast cards					
2 GB	5CFAST.2048-00 5CFAST.4096-00 5CFAST.8192-00 5CFAST.016G-00 5CFAST.032G-00			5CFAST. 5CFAST. 5CFAST. 5CFAST.	064G-10 128G-10	
Interfaces						
	Interface options				Option	al, select 1
	5ACCIF01.FPCC-00 5ACCIF01.FPLK-00 5ACCIF01.FSS0-00 5ACCIF01.FPLS-00 5ACCIF01.FPLS-00	0 0 0		5ACCIF01.I 5ACCIF01.I 5ACCIF01. 5ACCIF01.I 5ACCIF03.I	FPSC-001 ICAN-000 FPCS-000	
	Battery compartment				Selected auto	omatically <sup>5)</sup>
9 (62.20)		5ACCBT0	1.0000-001			
USB accessories					Optiona	al selection
Performance description (Co.)		5MMUSE	3.2048-01 3.4096-01 3.032G-02			
USB hub					Optiona	al selection
		5ACCUSB	2.0002-000			
Terminal blocks						Select 1
	Power supply connec 0TB103.9 0TB103.91	tors		Terminal bloc 0TB121		
Operating systems			·			Select 1
Linux Automation Runtime	Windows 10 5SWW10.0545-MUL 5SWW10.0559-MUL 5SWW10.0900-MUL	<b>B&amp;R Li</b> 5SWLIN.C <b>B&amp;R L</b> 5SWLIN.C 5SWLIN.C	0845-MUL .inux 9 0745-MUL	Α	utomation Runtime 0TG1000.01 0TG1000.02 1TC4601.06-5 1TG4601.06-5 1TG4601.06-T	

- Must be selected for all 5ACCMA00.000x-000 mounting units.
- Expansion units can only be combined with 5AP5230.xxxx-000 panels. Handles must be installed on site.
- 1) 2) 3) 4) 5)
- If a configuration is created with a mounting unit, the corresponding heat pipe is selected automatically.
- The battery compartment is selected automatically.

## 3.4 Overview

Order number	Short description Accessories	Page
0TB103.9	Connector 24 VDC - 3-pin, female - Screw clamp terminal block 3.31 mm <sup>2</sup>	264
0TB103.91	Connector 24 VDC - 3-pin, female - Cage clamp terminal block 3.31 mm <sup>2</sup>	264
5ACCBT01.0000-001	Battery compartment - Dark gray - Includes battery - For APC2200/PPC2200	139
5ACCUSB2.0002-000	2-port USB hub, passive - For Automation Panel 5000	266
5SWUTI.0001-000	HMI Service Center USB flash drive - Hardware diagnostic software - For APC910/PPC900 - For PPC1200 - For APC2100/PPC2100 - For APC2200/PPC2200 - For APC3100/PPC3100 - For APC mobile - For AP800/AP900 - For AP9x3/AP9xD - For AP1000/AP5000  B&R Linux 10	253
5SWLIN.0845-MUL	B&R Linux 10 - 64-bit - Multilingual - PPC2200 (UEFI boot) - Installation - Only available with a new device  B&R Linux 9	240
5SWLIN.0745-MUL	B&R Linux 9 - 64-bit - Multilingual - PPC2200 (UEFI boot) - Installation - Only available with a new device	241
5SWLIN.0759-MUL	B&R Linux 9 - 64-bit - Multilingual - PPC2200 (Legacy BIOS boot) - Installation - Only available with a new device	241
5ACCKP00.156B-000	Expansion units  AP5000 swing arm expansion option - Expansion cover - For switching elements - 10x cutouts for 22.3 mm	154
5ACCKP00.185B-000	switching elements - For panel 5AP5230.156B/156C-000	
	AP5000 swing arm expansion option - Expansion cover - For switching elements - 11x cutouts for 22.3 mm switching elements - For panel 5AP5230.185B/185C-000	154
5ACCKP00.215C-000	AP5000 swing arm expansion option - Expansion cover - For switching elements - 13x cutouts for 22.3 mm switching elements - For panel 5AP5230.215C-000	154
5ACCKP00.215I-000	AP5000 swing arm expansion option - Expansion cover - For switching elements - 7x cutouts for 22.3 mm switching elements - For panel 5AP5230.215I-000	154
5ACCKP00.240C-000	AP5000 swing arm expansion option - Expansion cover - For switching elements - 14x cutouts for 22.3 mm switching elements - For panel 5AP5230.240C-000	154
5ACCKP01.156B-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.156B/156C-000	156
5ACCKP01.185B-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.185B/185C-000	156
5ACCKP01.215C-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.215C-000	156
5ACCKP01.215I-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.215I-000	156
5ACCKP01.240C-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.240C-000	156
5ACCKP03.185B-000	AP5000 swing arm expansion option - Expansion unit - 1x RFID read/write unit - 1x emergency stop - 2x pushbutton (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.185B/185C-000	158
5ACCKP03.215C-000	AP5000 swing arm expansion option - Expansion unit - 1x RFID read/write unit - 1x emergency stop - 2x push- button (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.215C-000	158
5ACCKP03.240C-000	AP5000 swing arm expansion option - Expansion unit - 1x RFID read/write unit - 1x emergency stop - 2x push- button (red and green) - 1x selector switch - 1x key switch - 1x front USB interface - For panel 5AP5230.240C-000	158
5ACCKP04.156B-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.156B/156C-000	160
5ACCKP04.185B-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.185B/185C-000	160
5ACCKP04.215C-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.215C-000	160
5ACCKP04.215I-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.215I-000	160
5ACCKP04.240C-000	AP5000 swing arm expansion option - Expansion unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.240C-000	160
5ACCKP05.185B-000	AP5000 swing arm expansion option - Expansion unit - 1x RFID read/write unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.185B/185C-000	162
5ACCKP05.215C-000	AP5000 swing arm expansion option - Expansion unit - 1x RFID read/write unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.215C-000	162
5ACCKP05.240C-000	AP5000 swing arm expansion option - Expansion unit - 1x RFID read/write unit - 1x emergency stop - 3x pushbutton (red, green, blue) - 1x key switch - 1x front USB interface - For panel 5AP5230.240C-000	162
5ACCFL00.0000-000	Flanges  ADE000 flange. Swing arm retary flange. For swing arm mounting unit	150
5ACCFL00.0000-000	AP5000 flange - Swing arm rotary flange - For swing arm mounting unit  AP5000 flange - Swivel-tilt flange for swing arm - For swing arm mounting unit	150 151
5ACCFL00.0100-000 5ACCFL00.0200-000	AP5000 flange - Swing arm flange adapter - For Rittal - For swing arm mounting unit	153
54.00UD05 (555 )	Handles	
5ACCHD00.1505-000	AP5000 swing arm handles - For panel 5AP5120.1505-000	165
5ACCHD00.156B-000	AP5000 swing arm handles - For panel 5AP5130.156B/156C-000	165
5ACCHD00.185B-000	AP5000 swing arm handles - For panel 5AP5130.185B/185C-000	165
5ACCHD00.1906-000	AP5000 swing arm handles - For panel 5AP5120.1906-000  AP5000 swing arm handles - For panel 5AP5130.215C-000	165 165
5ACCHD00.215C-000 5ACCHD00.240C-000	AP5000 swing arm handles - For panel 5AP5130.215C-000  AP5000 swing arm handles - For panel 5AP5130.240C-000	165
5ACCHD00.240C-000 5ACCHD01.156B-000	AP5000 swing arm handles - For panel 5AP5130.240C-000  AP5000 swing arm handles - For panel 5AP5230.156B/156C-000	165
5ACCHD01.185B-000	AP5000 swing arm handles - For panel 5AP5230.1568/156C-000  AP5000 swing arm handles - For panel 5AP5230.1858/185C-000	165
5ACCHD01.165B-000 5ACCHD01.215C-000	AP5000 swing arm handles - For panel 5AP5230.1656/1650-000  AP5000 swing arm handles - For panel 5AP5230.215C-000	165
5ACCHD01.215I-000	AP5000 swing arm handles - For panel 5AP5230.2150-000  AP5000 swing arm handles - For panel 5AP5230.2151-000	165
5ACCHD01.215I-000 5ACCHD01.240C-000	AP5000 swing arm handles - For panel 5AP5230.240C-000  AP5000 swing arm handles - For panel 5AP5230.240C-000	165
5, 1301 150 1.2700-000	Heat pipe	100
5ACCHP00.0002-000	AP5000 heat pipe - For PPC2200 - For swing arm mounting unit	269

## System overview

Order number 5ACCHP00.0003-000	Short description  AP5000 heat pipe - For PPC2200 - For VESA mounting unit	Page 269
	Hypervisor	
1TC4700.00	License for B&R Hypervisor (TC). One license per target system is required.	243
	Interface options	
5ACCIF01.FPCC-000	Interface card - 2x CAN interfaces - 1x X2X Link interface - 1x POWERLINK interface - 512 kB nvSRAM - For APC2100/PPC2100/APC2200/PPC2200 - Only available with a new device	101
5ACCIF01.FPCS-000	Interface card - 1x RS485 interface - 1x CAN interface - 1x POWERLINK interface - 32 kB FRAM - For APC2100/ PPC2100/APC2200/PPC2200 - Only available with a new device	107
5ACCIF01.FPLK-000	Interface card - 1x POWERLINK interface - Integrated 2-port hub - 512 kB nvSRAM - For APC2100/PPC2100/ APC2200/PPC2200 - Only available with a new device	111
5ACCIF01.FPLS-000	Interface card - 1x RS232 interface - 1x POWERLINK interface - 32 kB FRAM - For APC2100/PPC2100/ APC2200/PPC2200 - Only available with a new device	114
5ACCIF01.FPLS-001	Interface card - 1x RS232 interface - 1x POWERLINK interface - 512 kB nvSRAM - For APC2100/PPC2100/ APC2200/PPC2200 - Only available with a new device	117
5ACCIF01.FPSC-000	Interface card - 1x RS232 interface - 1x CAN interface - 1x POWERLINK interface - 32 kB FRAM - For APC2100/	120
5ACCIF01.FPSC-001	PPC2100/APC2200/PPC2200 - Only available with a new device Interface card - 1x RS232 interface - 1x CAN interface - 1x XZX Link Interface - 1x POWERLINK interface - 512	124
5ACCIF01.FSS0-000	kB nvSRAM - For APC2100/PPC2100/APC2200/PPC2200 - Only available with a new device  Interface card - 2x RS422/RS485 interface - For APC2100/PPC2100/APC2200/PPC2200 - Only available with	129
5ACCIF01.ICAN-000	a new device  Interface card - 1x CAN interface - For APC2100/PPC2100/APC2200/PPC2200 - Only available with a new	133
5ACCIF03.CETH-000	device   Interface card - 2x ETH 10/100/1000 interface - For APC2200/PPC2200 - Only available with a new device	136
	Mounting units	
5ACCMA00.0000-000	AP5000 swing arm mounting unit	140
5ACCMA00.0001-000	AP5000 swing arm mounting unit - 1x rear USB interface  AP5000 swing arm mounting unit - 2x rear USB interface	141 143
5ACCMA00.0002-000	5 5	
5ACCMA00.0100-000	HMI mounting unit VESA IP54 - Leak tightness is only provided with suitable cable grommets.	145
5ACCMA00.0101-000	HMI mounting unit VESA IP54 w/USB - Leak tightness is only provided with suitable cable grommets.	147
5ACCMA01.0100-000	AP5000 VESA mounting unit IP10/IP20 - IP20 with 5AP5120.*-000 - IP10 with 5AP5130.*-000, 5AP5230.*-000	149
	Other	
5ACCRHMI.0007-000	HMI installation tool for swing arm: - 1x torque wrench ESD 0.3 - 1.2 Nm - 1x torque wrench 1.0 - 25.0 Nm - 1x hex-head bit 3.0, length 89 mm - 1x hex-head bit 5.0, length 89 mm - 1x Torx 10 bit, length 90 mm - 1x Torx 20 bit, length 89 mm - 1x Torx 25 bit, length 89 mm - 1x Torx 30 bit, length 89 mm - 1x quick-change chuck for torque wrench	263
	Panels	
5AP5120.1505-000	Automation Panel 15.0" XGA TFT - 1024 x 768 pixels (4:3) - Single-touch (analog resistive) - Swing arm mounting - Landscape format - For PPC2100 / PPC2200 / link modules	64
5AP5120.1906-000	Automation Panel 19.0" SXGA TFT - 1280 x 1024 pixels (5:4) - Single-touch (analog resistive) - Swing arm mounting - Landscape format - For PPC2100 / PPC2200 / link modules	66
5AP5130.156B-000	Automation Panel 15.6" HD TFT - 1366 x 768 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - For PPC2100 / PPC2200 / link modules	68
5AP5130.156C-000	Automation Panel 15.6" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - For PPC2100 / PPC2200 / link modules	70
5AP5130.185B-000	Automation Panel 18.5" HD TFT - 1366 x 768 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - For PPC2100 / PPC2200 / link modules	72
5AP5130.185C-000	Automation Panel 18.5" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - For PPC2100 / PPC2200 / link modules	74
5AP5130.215C-000	Automation Panel 21.5" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - For PPC2100 / PPC2200 / link modules	76
5AP5130.240C-000	Automation Panel 24.0" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - For PPC2100 / PPC2200 / link modules	78
5AP5230.156B-000	Automation Panel 15.6" HD TFT - 1366 x 768 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - Expansion option - For PPC2100 / PPC2200 / link modules	80
5AP5230.156C-000	Automation Panel 15.6" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - Expansion option - For PPC2100 / PPC2200 / link modules	83
5AP5230.185B-000	Automation Panel 18.5" HD TFT - 1366 x 768 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm	86
5AP5230.185C-000	mounting - Landscape format - Expansion option - For PPC2100 / PPC2200 / link modules  Automation Panel 18.5" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Swing	89
5AP5230.215C-000	arm mounting - Landscape format - Expansion option - For PPC2100 / PPC2200 / link modules  Automation Panel 21.5" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Swing	92
5AP5230.215I-000	arm mounting - Landscape format - Expansion option - For PPC2100 / PPC2200 / link modules  Automation Panel 21.5" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Swing	95
5AP5230.240C-000	arm mounting - Portrait format - Expansion option - For PPC2100 / PPC2200 / link modules  Automation Panel 24.0" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Swing	98
	arm mounting - Landscape format - Expansion option - For PPC2100 / PPC2200 / link modules  Runtime	
1TC4601.06-5	License for Automation Runtime Embedded (TC). One license per target system is required.	243
	System units	
5PPC2200.AL02-000	PPC2200 system unit - Intel Atom E3930 1.30 GHz - Dual core - 2 GB SDRAM	61
5PPC2200.AL04-000	PPC2200 system unit - Intel Atom E3930 1.30 GHz - Dual core - 4 GB SDRAM	61
5PPC2200.AL14-000	PPC2200 system unit - Intel Atom E3940 1.60 GHz - Quad core - 4 GB SDRAM	61
5PPC2200.AL14-000 5PPC2200.AL18-000	PPC2200 system unit - Intel Atom E3940 1.60 GHz - Quad core - 4 GB SDRAM  PPC2200 system unit - Intel Atom E3940 1.60 GHz - Quad core - 8 GB SDRAM	61
JF 1 02200.AL 10-000	,	וס
0.704000.64	Technology Guard	0.10
0TG1000.01	Technology Guard (MSD)	243
0TG1000.02	Technology Guard (HID)	243
0TGF016.01	Technology Guard (MSD) with integrated flash drive, 16 GB (MLC)	243
1TG4601.06-5	Automation Runtime Embedded, TG license	243

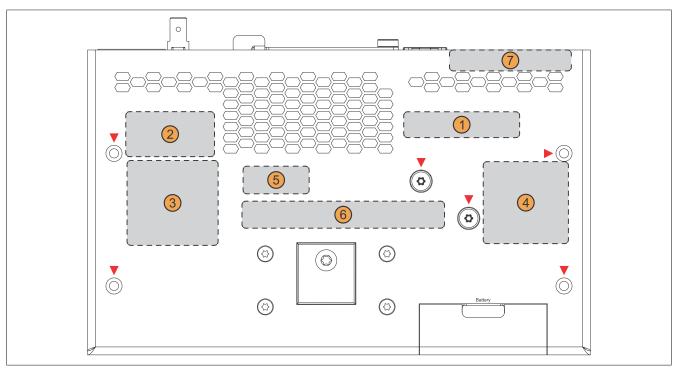
## System overview

Order number	Short description	Page
1TG4601.06-T	Automation Runtime Embedded Terminal TG license	243
1TG4700.00	B&R Hypervisor	243
	Terminal blocks	
0TB1210.3100	Connector 300 VDC - 10-pin female - Cage clamp terminal block - Protected against vibration by the screw flange	265
	Windows 10 IoT Enterprise 2016 LTSB	
5SWW10.0545-MUL	Windows 10 IoT Enterprise 2016 LTSB - 64-bit - Entry - Multilingual - PPC2200 (UEFI boot) - CPU E3930/E3940 - License - Only available with a new device	237
5SWW10.0559-MUL	Windows 10 IoT Enterprise 2016 LTSB - 64-bit - Entry - Multilingual - PPC2200 (Legacy BIOS boot) - CPU E3930/E3940 - License - Only available with a new device	237
	Windows 10 IoT Enterprise 2019 LTSC	
5SWW10.0900-MUL	Windows 10 IoT Enterprise 2019 LTSC: - 64-bit - Entry - Multilingual - License - Only available with a new device	234

# 4 Technical data

## 4.1 Complete system

#### 4.1.1 Product information



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 24
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)
7	Interfaces on interface options (configuration-dependent)
▼	These holes are intended for installing/removing the panel PC on the panel.

#### 4.1.1.1 Identification



The device number can be retrieved from the B&R website (<a href="www.br-automation.com">www.br-automation.com</a>) 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.

#### 4.1.2 Mechanical properties

#### 4.1.2.1 Dimensions

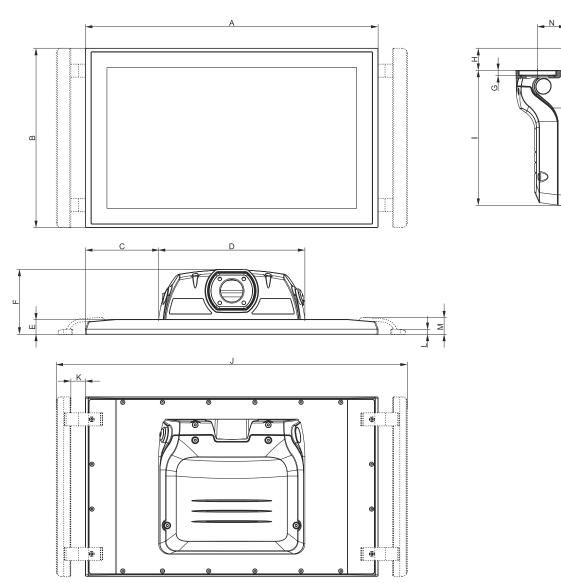
#### Information:

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

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

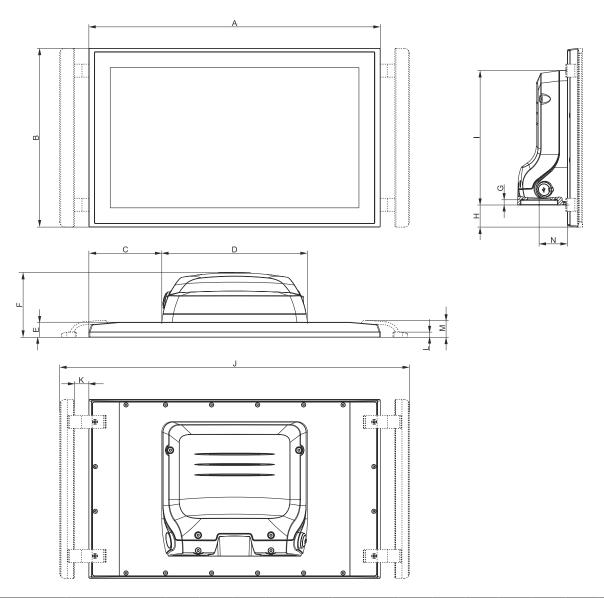
2D and 3D data (DXF and STEP formats) can be downloaded from the B&R website (www.br-automation.com). To do this, search for the order number of the device using the search bar.

#### AP5120/5130 with flange connection on top - Dimensions



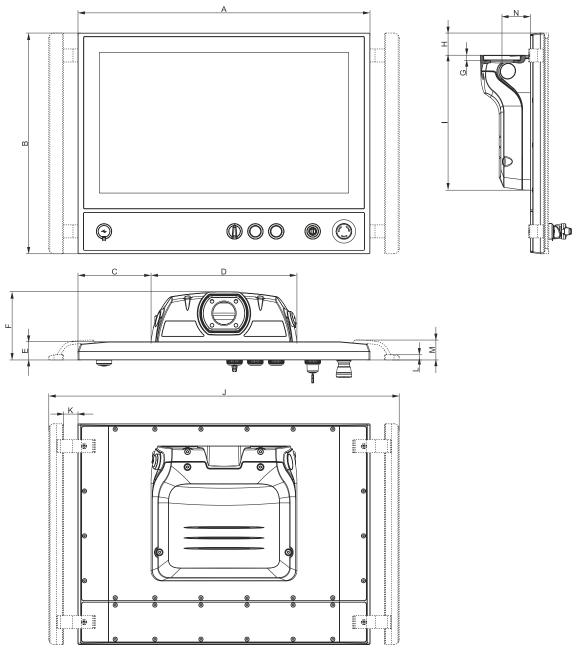
	Panels														
Туре	Model number	Α	В	С	D	E	F	G	Н	I	J	K	L	M	N
15.0" single-touch	5AP5120.1505-000	389	299	54.5	280	28	124	10	20	259	501	28	10	32.2	54.5
15.6" multi-touch	5AP5130.156B-000	433	269.5	76.5	280	29	125	10	5.25	259	545	28	10	32.2	54.5
15.6" multi-touch	5AP5130.156C-000	433	269.5	76.5	280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

## AP5120/5130 with flange connection on bottom - Dimensions



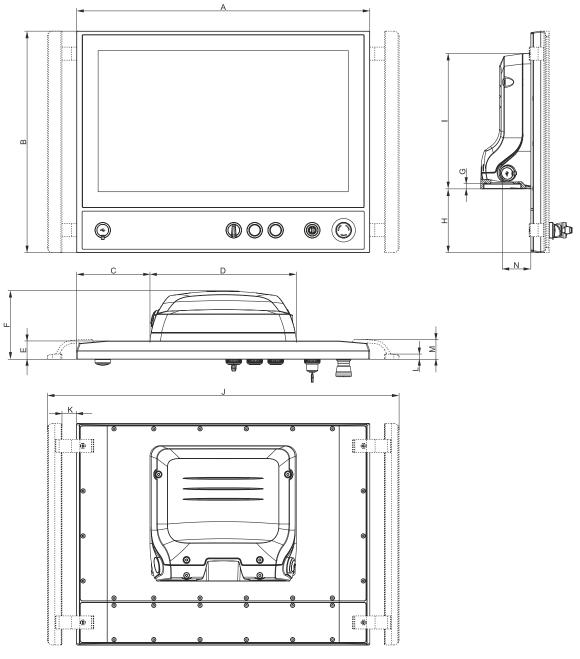
	Panels Panels														
Туре	Model number	Α	В	С	D	E	F	G	Н	I	J	K	L	M	N
15.0" single-touch	5AP5120.1505-000	389	299	54.5	280	28	124	10	20	259	501	28	10	32.2	54.5
15.6" multi-touch	5AP5130.156B-000	433	269.5	76.5	280	29	125	10	5.25	259	545	28	10	32.2	54.5
15.6" multi-touch	5AP5130.156C-000	433	269.5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

## AP5230 with flange connection on top - Dimensions



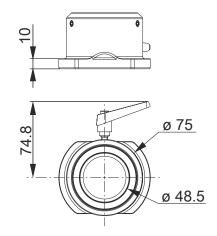
	Panels (with expansion option)														
Туре	Model number	Α	В	С	D	E	F	G	Н	I	J	K	L	M	N
15.6" multi-touch	5AP5230.156B-000	433	349	76.5	280	35	131	10	5.25	259	545	28	10	38.2	54.5
15.6" multi-touch	5AP5230.156C-000	433	349	76.5	280	35	131	10	5.25	259	545	28	10	38.2	54.5
18.5" multi-touch	5AP5230.185B-000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

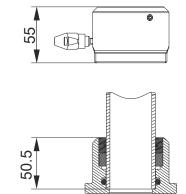
## AP5230 with flange connection on bottom - Dimensions



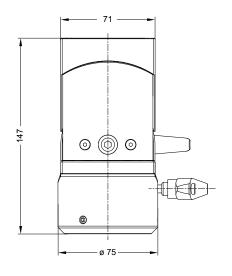
	Panels (with expansion option)														
Туре	Model number	Α	В	С	D	E	F	G	Н	I	J	K	L	M	N
15.6" multi-touch	5AP5230.156B-000	433	349	76.5	280	35	131	10	84.75	259	545	28	10	38.2	54.5
15.6" multi-touch	5AP5230.156C-000	433	349	76.5	280	35	131	10	84.75	259	545	28	10	38.2	54.5
18.5" multi-touch	5AP5230.185B-000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

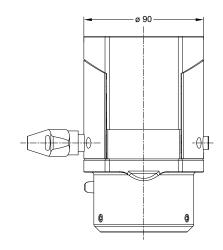
## Rotary flange (5ACCFL00.0000-000) - Dimensions

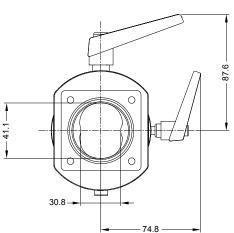


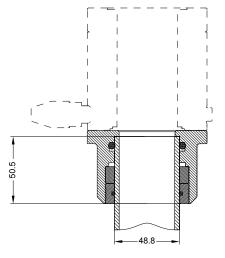


## Swivel-tilt flange (5ACCFL00.0100-000) - Dimensions

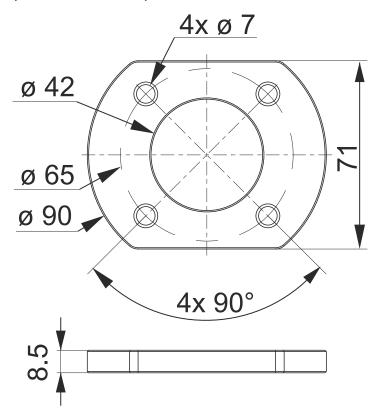




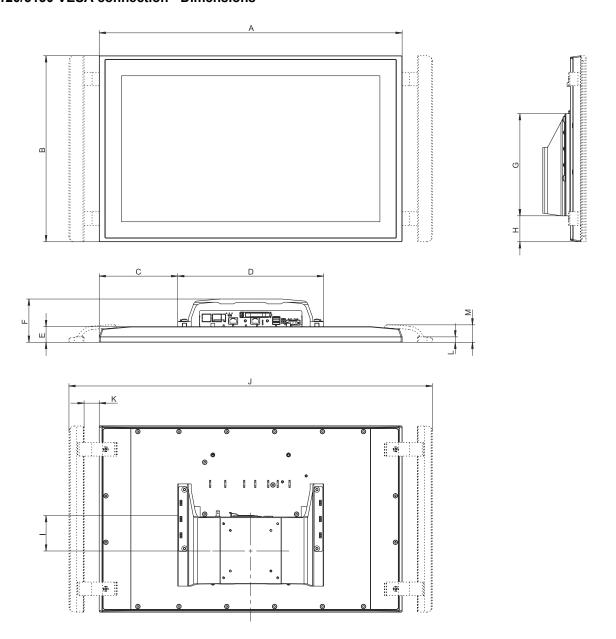




## Adapter for Rittal flange (5ACCFL00.0200-000) - Dimensions

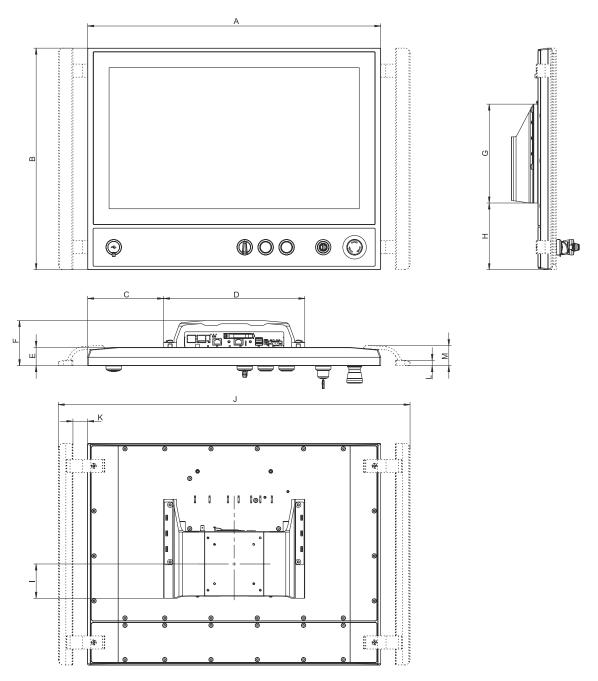


## AP5120/5130 VESA connection - Dimensions



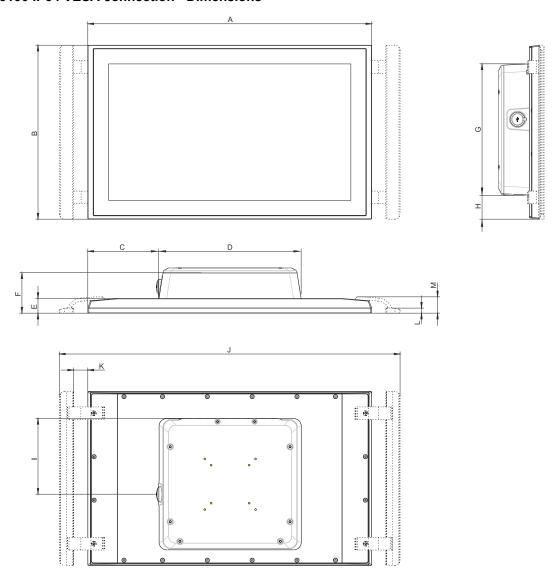
	Panels													
Туре	Model number	Α	В	С	D	E	F	G	Н	I	J	K	L	M
15" single-touch	5AP5120.1505-000	389	299	59.5	270	28	79	189	25.5	65.5	501	28	10	32.2
15.6" multi-touch	5AP5130.156B-000	433	269.5	81.5	270	29	80	189	10.75	65.5	545	28	10	32.2
15.6" multi-touch	5AP5130.156C-000	433	269.5	81.5	270	29	80	189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

## **AP5230 VESA connection - Dimensions**



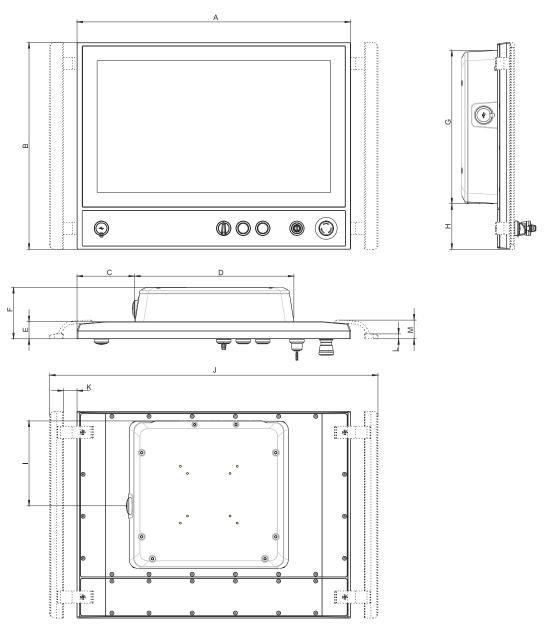
	Panels (with expansion option)													
Туре	Model number	Α	В	С	D	E	F	G	Н	I	J	K	L	M
15.6" multi-touch	5AP5230.156B-000	433	349	81.5	270	35	86	189	90.25	65.5	545	28	10	38.2
15.6" multi-touch	5AP5230.156C-000	433	349	81.5	270	35	86	189	90.25	65.5	545	28	10	38.2
18.5" multi-touch	5AP5230.185B-000	494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

## AP5120/5130 IP54 VESA connection - Dimensions



					Panels	3								
Туре	Order number	Α	В	С	D	E	F	G	Н	I	J	K	L	M
15" single-touch	5AP5120.1505-000	389	299	54.5	280	28	88.3	259	20	149.5	501	28	10	32.2
15.6" multi-touch	5AP5130.156B-000	433	269.5	76.5	280	29	89.3	259	5.3	149.5	545	28	10	32.2
15.6" multi-touch	5AP5130.156C-000	433	269.5	76.5	280	29	89.3	259	5.3	149.5	545	28	10	32.2
18.5" multi-touch	5AP5130.185B-000	494	306	107	280	29	89.3	259	23.5	149.5	606	28	10	32.2
18.5" multi-touch	5AP5130.185C-000	494	306	107	280	29	89.3	259	23.5	149.5	606	28	10	32.2
19" single-touch	5AP5120.1906-000	461.2	372	90.6	280	28	89.3	259	56.5	149.5	573.2	28	10	32.2
21.5" multi-touch	5AP5130.215C-000	560.5	344	140.3	280	29	89.3	259	42.5	149.5	672.5	28	10	32.2
24.0" multi-touch	5AP5130.240C-000	617.5	375	168.8	280	29	89.3	259	58	149.5	729.5	28	10	32.2

## AP5230 IP54 VESA connection - Dimensions



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

#### 4.1.2.2 Mounting orientations

#### Swing arm mounting units

The angle of rotation of the Panel PC (variant with mounting unit 5ACCMA00.000x-000 and flange 5AC-CFL00.0000-000 or 5ACCFL00.0100-000 flange) can be set between -150° and +150° using the locking lever on the attached flange.

The tilt angle of the panel PC (only variant with mounting unit 5ACCMA00.000x-000 and flange 5AC-CFL00.0100-000) can be set between -15° and +15°.

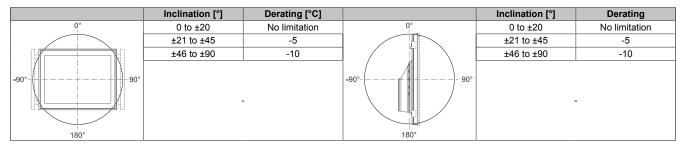
#### Caution!

After setting the rotation and/or tilt angle, the corresponding locking lever must be locked into position. For the maximum tightening torques, see the description of the flange used.

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

#### **VESA** mounting units

The following diagrams show the specified mounting orientations of Panel PC devices with VESA mounting units 5ACCMA01.0100-000 and 5ACCMA00.010x-000. A PPC2200 (AP5000) with VESA mounting units is only permitted to be installed as shown or described below; the figure shows an example image.



## 4.1.2.3 Weight specifications

## AP5000 panels

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

## System units and components

Туре	Model number	Weight [g]
System units	5PPC2200.ALxx-000	577
CFast cards	5CFAST.xxxx-00	10
Crast Calus	5CFAST.xxxx-10	10
	5ACCIF01.FPCC-000	25
	5ACCIF01.FPCS-000	25
	5ACCIF01.FPLK-000	25
	5ACCIF01.FPLS-000	25
Interface options	5ACCIF01.FPLS-001	25
interface options	5ACCIF01.FPSC-000	25
	5ACCIF01.FPSC-001	25
	5ACCIF01.FSS0-000	25
	5ACCIF01.ICAN-000	25
	5ACCIF03.CETH-000	25

## **Mounting units**

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

## **Flanges**

Туре	Model number	Weight [g]
Rotary flange	5ACCFL00.0000-000	530
Swivel-tilt flange	5ACCFL00.0100-000	1666
Rittal flange adapter	5ACCFL00.0200-000	93

## **Expansion units**

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

Type	Model number	Weight [g]
24.0" expansion units	5ACCKP01.240C-000	1100
	5ACCKP03.240C-000	1100
	5ACCKP04.240C-000	1100
	5ACCKP05.240C-000	1100

### Handles

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

### 4.1.3 Environmental properties

### 4.1.3.1 Temperature specifications

Because it is possible to combine different system units with different panels, the following tables provide a component-dependent overview of the maximum, minimum and typical possible ambient temperatures resulting from these combinations.

### Information:

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

#### Information about worst-case conditions

- Power Thermal Utility from Intel for simulating maximum processor utilization (100% CPU, 100% memory, 100% graphics)
- BurnInTest V8.1 Pro from PassMark Software for simulating 100% interface utilization using loopback adapters (100% network and USB interfaces)
- Maximum expansion and power consumption of the system
- 100% display brightness

### 4.1.3.1.1 Maximum ambient temperature for worst-case operation

### Information:

The following values apply to swing arm mounting units and VESA mounting units.

	ations in degrees Celsius a level, non-condensing.	Maximum worst-case ambient temperature (system unit 5PPC2200.ALXX-000)			C2200.ALxx-000)
	nperature is typically derated	5PPC2200.AL02-000	5PPC2200.AL04-000	5PPC2200.AL14-000	5PPC2200.AL18-000
1°C per 1000 meters startir	ng at 500 m above sea level.	(E3930 1.3 GHz)	(E3930 1.3 GHz)	(E3940 1.6 GHz)	(E3940 1.6 GHz)
		55	55	50	50
Maximum ambient temperatu	<del>_ ' _ ' ' '</del>	_	_	_	
	5AP5120.1505-000	<b>√</b>	<b>√</b>	<b>√</b>	<b>√</b>
	5AP5130.156B-000	50	50	45	45
	5AP5130.156C-000	50	50	45	45
	5AP5230.156B-000	50	50	45	45
	5AP5230.156C-000	50	50	45	45
	5AP5130.185B-000	50	50	50	45
	5AP5130.185C-000	50	50	45	45
AP5000 panels	5AP5230.185B-000	50	50	45	45
	5AP5230.185C-000	50	50	45	45
	5AP5120.1906-000	✓	✓	✓	✓
	5AP5130.215C-000	50	50	45	45
	5AP5230.215C-000	50	50	45	45
	5AP5230.215I-000	50	50	45	45
	5AP5130.240C-000	45	45	40	40
	5AP5230.240C-000	45	45	40	40
	5ACCKP01.xxxx-000	✓	✓	✓	<b>√</b>
4 D = 0.00	5ACCKP03.xxxx-000	✓	✓	✓	✓
AP5000 expansion units	5ACCKP04.xxxx-000	✓	✓	✓	<b>√</b>
	5ACCKP05.xxxx-000	✓	✓	✓	<b>√</b>
	5CFAST.xxxx-00 ≥ Rev. E0	1	✓	✓	<b>√</b>
CFast cards	5CFAST.xxxx-10	<b>√</b>	<b>√</b>	<b>√</b>	✓
	5ACCIF01.FPCC-000	50	50	45	45
	5ACCIF01.FPCS-000	50	50	45	45
	5ACCIF01.FPLK-000	50	50	45	45
	5ACCIF01.FPLS-000	50	50	45	45
	5ACCIF01.FPLS-001	50	50	45	45
Interface options	5ACCIF01.FPSC-000	50	50	45	45
	5ACCIF01.FPSC-001	50	50	45	45
	5ACCIF01.FSS0-000	✓ <b>/</b>	<b>√</b>	 ✓	√
	5ACCIF01.ICAN-000	1	<i>'</i>	1	1
	5ACCIF03.CETH-000	1	<i>J</i>	45	45

### 4.1.3.1.2 Minimum ambient temperature for worst-case operation

# Information:

The following values apply to swing arm mounting units and VESA mounting units.

All temperature specifications in degrees Celsius [°C] at 500 m above sea level, <b>non-condensing</b> .		Minimum worst-case ambient temperature (system unit 5PPC2200.ALxx-000)				
		<b>5PPC2200.AL02-000</b> (E3930 1.3 GHz)	<b>5PPC2200.AL04-000</b> (E3930 1.3 GHz)	<b>5PPC2200.AL14-000</b> (E3940 1.6 GHz)	<b>5PPC2200.AL18-000</b> (E3940 1.6 GHz)	
		-25	-25	-25	-25	
Minimum ambient temperatu	re (accessories)					
	5AP5120.1505-000	-20	-20	-20	-20	
	5AP5130.156B-000	-10	-10	-10	-10	
	5AP5130.156C-000	-10	-10	-10	-10	
	5AP5230.156B-000	-10	-10	-10	-10	
	5AP5230.156C-000	-10	-10	-10	-10	
	5AP5130.185B-000	0	0	0	0	
	5AP5130.185C-000	-10	-10	-10	-10	
AP5000 panels	5AP5230.185B-000	0	0	0	0	
	5AP5230.185C-000	-10	-10	-10	-10	
	5AP5120.1906-000	-20	-20	-20	-20	
	5AP5130.215C-000	0	0	0	0	
	5AP5230.215C-000	0	0	0	0	
	5AP5230.215I-000	0	0	0	0	
	5AP5130.240C-000	-10	-10	-10	-10	
	5AP5230.240C-000	-10	-10	-10	-10	
	5ACCKP01.xxxx-000	-20	-20	-20	-20	
A D5000ii	5ACCKP03.xxxx-000	-20	-20	-20	-20	
AP5000 expansion units	5ACCKP04.xxxx-000	-20	-20	-20	-20	
	5ACCKP05.xxxx-000	-20	-20	-20	-20	
CFast cards	5CFAST.xxxx-00 ≥ Rev. E0	✓	✓	✓	✓	
Crast cards	5CFAST.xxxx-10	✓	✓	✓	✓	
	5ACCIF01.FPCC-000	-20	-20	-20	-20	
	5ACCIF01.FPCS-000	-20	-20	-20	-20	
	5ACCIF01.FPLK-000	-20	-20	-20	-20	
	5ACCIF01.FPLS-000	-20	-20	-20	-20	
Interface outland	5ACCIF01.FPLS-001	-20	-20	-20	-20	
Interface options	5ACCIF01.FPSC-000	-20	-20	-20	-20	
	5ACCIF01.FPSC-001	-20	-20	-20	-20	
	5ACCIF01.FSS0-000	-20	-20	-20	-20	
	5ACCIF01.ICAN-000	-20	-20	-20	-20	
	5ACCIF03.CETH-000	-20	-20	-20	-20	

### 4.1.3.1.3 Maximum ambient temperature for typical operation

### Information about typical conditions

- BurnInTest V8.1 Pro from PassMark Software for simulating moderate system and interface utilization using loopback adapters
- No permanent 100% processor utilization and graphics utilization
- 2x Gigabit Ethernet
- The total power of all USB interfaces is limited to 1 W.
- · 80% display brightness
- The power consumption of the complete system is limited to 45 W. For the power consumption of individual components, see "Power calculation" on page 47.

### Information:

The following values apply to swing arm mounting units and VESA mounting units.

All temperature specifications in degrees Celsius [°C] at 500 m above sea level, <b>non-condensing</b> .		Maximum ambient temperature for typical operation (system unit 5PPC2200.ALxx-000)				
	perature is typically derated	5PPC2200.AL02-000	5PPC2200.AL04-000	5PPC2200.AL14-000	5PPC2200.AL18-000	
1°C per 1000 meters startin	g at 500 m above sea level.	(E3930 1.3 GHz)	(E3930 1.3 GHz)	(E3940 1.6 GHz)	(E3940 1.6 GHz)	
		60	60	55	55	
Maximum ambient temperatu						
	5AP5120.1505-000	✓	✓	✓	✓	
	5AP5130.156B-000	55	55	50	50	
	5AP5130.156C-000	55	55	50	50	
	5AP5230.156B-000	55	55	50	50	
	5AP5230.156C-000	55	55	50	50	
	5AP5130.185B-000	55	55	50	45	
	5AP5130.185C-000	55	55	50	45	
AP5000 panels	5AP5230.185B-000	55	55	50	45	
	5AP5230.185C-000	55	55	50	50	
	5AP5120.1906-000	✓	✓	✓	✓	
	5AP5130.215C-000	55	55	50	50	
	5AP5230.215C-000	55	55	50	50	
	5AP5230.215I-000	55	55	50	50	
	5AP5130.240C-000	50	50	45	45	
	5AP5230.240C-000	50	50	45	45	
	5ACCKP01.xxxx-000	✓	✓	✓	✓	
AD5000	5ACCKP03.xxxx-000	✓	✓	✓	✓	
AP5000 expansion units	5ACCKP04.xxxx-000	✓	✓	✓	✓	
	5ACCKP05.xxxx-000	✓	✓	✓	✓	
OF and an add	5CFAST.xxxx-00 ≥ Rev. E0	✓	✓	✓	✓	
CFast cards	5CFAST.xxxx-10	✓	✓	✓	✓	
	5ACCIF01.FPCC-000	50	50	50	50	
	5ACCIF01.FPCS-000	50	50	50	50	
	5ACCIF01.FPLK-000	55	55	50	50	
	5ACCIF01.FPLS-000	50	50	50	50	
1.4. 6	5ACCIF01.FPLS-001	50	50	50	50	
Interface options	5ACCIF01.FPSC-000	50	50	50	50	
	5ACCIF01.FPSC-001	50	50	50	50	
	5ACCIF01.FSS0-000	✓	<b>√</b>	<b>√</b>	<b>√</b>	
	5ACCIF01.ICAN-000	<b>√</b>	<b>√</b>	<b>√</b>	<b>√</b>	
	5ACCIF03.CETH-000	<b>√</b>	<b>√</b>	50	50	

### 4.1.3.1.4 Determining the ambient temperature

- 1. Select the system unit.
- 2. The columns specify the maximum or minimum temperature in worst-case operation or the maximum temperature in typical operation of the complete system depending on the respective system unit.

### Information:

The maximum and typical temperature specifications correspond to a specification at 500 meters above sea level. The respective ambient temperature is derated approx. 1°C per 1000 meters starting at 500 m above sea level.

- 3. If interface options and CFast cards are additionally installed in the PPC2200 system, they may result in a temperature limitation.
  - ° If a "✓" (check mark) is entered for the installed component, it can be operated without any problems.
  - If the installed component has a temperature specification (e.g. "45[°C]"), the ambient temperature of the complete system is not permitted to exceed this value.
- 4. The relevant test and assessment must be carried out individually by the user on site (reading out the temperatures in BIOS or using the ADI Control Center). See section "Information about typical conditions" on page 40.

### 4.1.3.1.5 Temperature during storage and transport

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

### System units and components

Туре	Model number	Storage [°C]	Transport [°C]
System units	5PPC2200.ALxx-000	-25 to 60	-25 to 60
	5CFAST.xxxx-00	-50 to 100	-50 to 100
	5CFAST.032G-10 ≥ Rev. G0	-40 to 85	-40 to 85
	5CFAST.064G-10 ≥ Rev. E0	-40 to 85	-40 to 85
CFast cards	5CFAST.128G-10 ≥ Rev. E0	-40 to 85	-40 to 85
Ci asi caius	5CFAST.032G-10 ≤ Rev. F0	-55 to 95	-55 to 95
	5CFAST.064G-10 ≤ Rev. D0	-55 to 95	-55 to 95
	5CFAST.128G-10 ≤ Rev. D0	-55 to 95	-55 to 95
	5CFAST.256G-10	-40 to 85	-40 to 85
	5ACCIF01.FPCC-000	-20 to 60	-20 to 60
	5ACCIF01.FPCS-000	-20 to 60	-20 to 60
	5ACCIF01.FPLK-000	-20 to 60	-20 to 60
	5ACCIF01.FPLS-000	-20 to 60	-20 to 60
Interface options	5ACCIF01.FPLS-001	-20 to 60	-20 to 60
Interface options	5ACCIF01.FPSC-000	-20 to 60	-20 to 60
	5ACCIF01.FPSC-001	-20 to 60	-20 to 60
	5ACCIF01.FSS0-000	-20 to 60	-20 to 60
	5ACCIF01.ICAN-000	-20 to 60	-20 to 60
	5ACCIF03.CETH-000	-20 to 60	-20 to 60

### **Panels**

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

### **Expansion options**

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

#### 4.1.3.1.6 Temperature monitoring

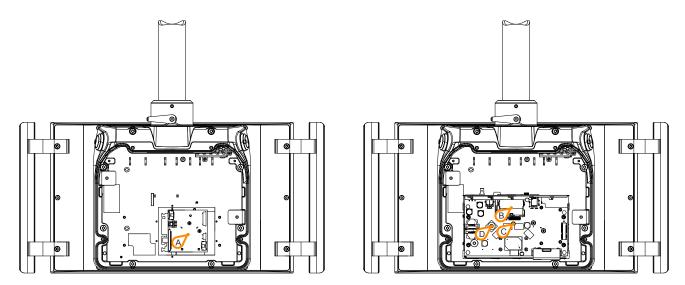
Sensors monitor temperature values at various areas in the xPC2200. For the position of temperature sensors, see section "Temperature sensor positions" on page 43. The values specified there represent the defined maximum temperature at this measuring point. If the temperature is exceeded, no alarm is triggered.

Temperatures<sup>1)</sup> can be read out in different ways in approved operating systems:

- BIOS (see "Baseboard" on page 215)
- ADI Control Center
- ADI Development Kit
- ADI.NET SDK
- B&R HMI Service Center
- · B&R HMI Report
- · ADI OPC UA Server
- Automation Runtime library

The CFast cards available from B&R are equipped with S.M.A.R.T support<sup>2)</sup>. Various parameters (e.g. temperature) can be read out in approved Microsoft Windows or B&R Linux operating systems.

#### 4.1.3.1.7 Temperature sensor positions



ADI sensors	Position	Measuring point for	Measurement	Max. specified [°C]
Panel	A	Display	Temperature of the display (sensor integrated on the panel).	5AP5120.1505-000: 85 5AP5130.156B-000: 75 5AP5130.156C-000: 80 5AP5230.156B-000: 80 5AP5230.156C-000: 80 5AP5130.185B-000: 80 5AP5130.185C-000: 80 5AP5230.185B-000: 80 5AP5230.185B-000: 80 5AP5120.1906-000: 80 5AP5130.215C-000: 80 5AP5230.215C-000: 80 5AP5230.215C-000: 80 5AP5230.215C-000: 80 5AP5230.215C-000: 80 5AP5230.240C-000: 75 5AP5230.240C-000: 75
System unit sensor 1	В	CFast	Temperature of the CFast area (sensor integrated on the CPU board).	95
System unit sensor 2	С	Main memory	Temperature of the main memory area (sensor integrated on the CPU board).	95
System unit sensor 3	D	MTCX	Temperature of the MTCX area (sensor integrated on the CPU board).	95

### 4.1.3.2 Relative humidity

The following tables show the minimum and maximum relative humidity (at 30°C, non-condensing) of the individual components that are relevant for limiting the humidity of the complete system. The smallest or largest value must always be used for this determination. For more detailed information, see technical data or temperature/humidity diagrams of the individual components.

<sup>1)</sup> The measured temperature is a guide value for the immediate ambient temperature, but it may have been influenced by neighboring components.

<sup>&</sup>lt;sup>2)</sup> Self-Monitoring, Analysis and Reporting Technology

# AP5000 panels

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

### System units and components

Component	Order number	Operation [%]	Storage [%]	Transport [%]
System units	5PPC2200.ALxx-000	5 to 90	5 to 95	5 to 95
	5CFAST.xxxx-00	Max. 85% at 85°C	Max. 85% at 85°C	Max. 85% at 85°C
	5CFAST.032G-10 ≥ Rev. G0	Max. 85% at 85°C	Max. 85% at 85°C	Max. 85% at 85°C
	5CFAST.064G-10 ≥ Rev. E0	Max. 85% at 85°C	Max. 85% at 85°C	Max. 85% at 85°C
CFast cards	5CFAST.128G-10 ≥ Rev. E0	Max. 85% at 85°C	Max. 85% at 85°C	Max. 85% at 85°C
Grasi Calus	5CFAST.032G-10 ≤ Rev. F0	10 to 95	10 to 95	10 to 95
	5CFAST.064G-10 ≤ Rev. D0	10 to 95	10 to 95	10 to 95
	5CFAST.128G-10 ≤ Rev. D0	10 to 95	10 to 95	10 to 95
	5CFAST.256G-10	Max. 85% at 85°C	Max. 85% at 85°C	Max. 85% at 85°C
	5ACCIF01.FPCC-000	5 to 90	5 to 95	5 to 95
	5ACCIF01.FPCS-000	5 to 90	5 to 95	5 to 95
	5ACCIF01.FPLK-000	5 to 90	5 to 95	5 to 95
	5ACCIF01.FPLS-000	5 to 90	5 to 95	5 to 95
nterfece entions	5ACCIF01.FPLS-001	5 to 90	5 to 95	5 to 95
Interface options	5ACCIF01.FPSC-000	5 to 90	5 to 95	5 to 95
	5ACCIF01.FPSC-001	5 to 90	5 to 95	5 to 95
	5ACCIF01.FFS0-000	5 to 90	5 to 95	5 to 95
	5ACCIF01.ICAN-000	5 to 90	5 to 95	5 to 95
	5ACCIF03.CETH-000	5 to 90	5 to 95	5 to 95

# **Expansion units**

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

#### 4.1.3.3 Vibration and shock

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

Swing arm mounting unit - Vibration					
PPC2200 (AP5000)	Operation <sup>1)</sup>		Storage <sup>1)3)</sup>	Transport1)3)	
	Continuous	Periodic	Storage	Transport (%)	
With CFast card	2 to 9 Hz: 2 to 9 Hz: 1.75 mm amplitude 3.5 mm amplitude 9 to 200 Hz: 0.5 g 9 to 200 Hz: 1 g		2 to 8 Hz: 7.5 mm amplitude 8 to 200 Hz: 2 g 200 to 500 Hz: 4 g	2 to 8 Hz: 7.5 mm amplitude 8 to 200 Hz: 2 g 200 to 500 Hz: 4 g	
VESA IP20/IP10 mounting units VESA IP54 mounting units - Vibration					
PPC2200 (AP5000)	Operation <sup>1)</sup>		Storage <sup>1)3)</sup>	Transport <sup>1)3)</sup>	
	Contir	nuous	Storage	Transport 199	
With CFast card	2 to 9	9 Hz:	2 to 8 Hz: 7.5 mm amplitude	2 to 8 Hz: 7.5 mm amplitude	
	1.75 mm amplitude 9 to 200 Hz: 0.5 g		8 to 200 Hz: 2 g 200 to 500 Hz: 4 g	8 to 200 Hz: 2 g 200 to 500 Hz: 4 g	
Shock					
PPC2200 (AP5000)	Operation <sup>2)</sup>		Storage <sup>2)3)</sup>	Transport <sup>2)3)</sup>	
With CFast card	15 g,	11 ms	30 g, 6 ms	30 g, 6 ms	

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

#### 4.1.3.4 Degree of protection

Under the following conditions, the Panel PC 2200 swing arm device offers **IP65 protection** on all sides per EN 60529:

- Correct installation of the PPC2200 (see "Panel PC 2200 Installation" on page 169)
- The 5ACCMA00.000x-000 mounting unit is installed correctly.
- · Installation of all covers or components on interfaces and slots
- All ambient conditions are observed.

The Panel PC 2200 swing arm device additionally has "Type 4X indoor use only" per UL 50 under the same conditions.

Under the following conditions, the Panel PC 2200 swing arm device offers **IP54 protection** on all sides per EN 60529:

- Correct installation of the PPC2200 (see "Panel PC 2200 Installation" on page 169)
- Correct installation of mounting unit 5ACCMA00.010x-000
- · Installation of all covers or components on interfaces and slots
- · All ambient conditions are observed.

The Panel PC 2200 swing arm device additionally has "Type 1X indoor use only" per UL 50 under the same conditions.

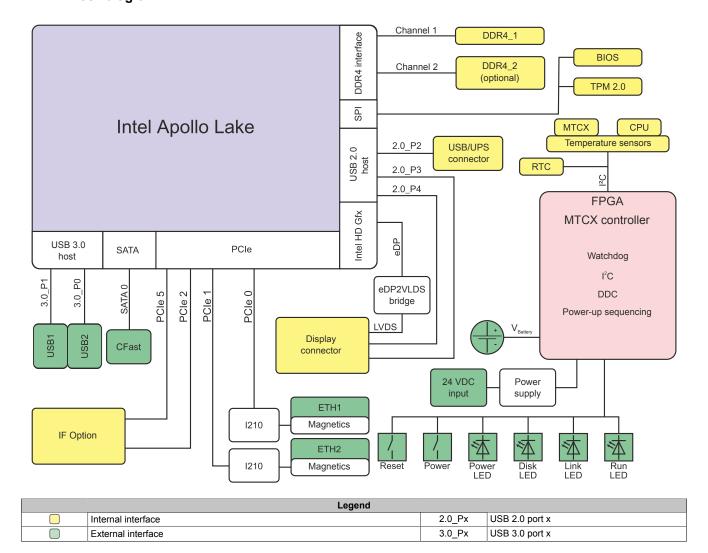
Under the following conditions, the Panel PC 2200 swing arm device offers **IP20 or IP10 protection** on all sides per EN 60529:

- Correct installation of the PPC2200 (see "Panel PC 2200 Installation" on page 169)
- Correct installation of mounting unit 5ACCMA01.0100-000
  - With panel 5AP5120.xxxx-000: IP20 protection
  - ° With panel 5AP5130.xxxx-000 or 5AP5230.xxxx-000: IP10 protection
- Installation of all covers or components on interfaces and slots
- · All ambient conditions are observed.

The Panel PC 2200 swing arm device additionally has "Type 1X indoor use only" per UL 50 under the same conditions.

### 4.1.4 Electrical properties

### 4.1.4.1 Block diagram



#### 4.1.4.2 Power calculation

In order to calculate the total power of the Panel PC 2200 swing arm (AP5000), the power ratings of the system unit used, the panel and all other installed components must be added together.

### Information:

Unless otherwise specified, the following maximum values and additional consumers (e. g. USB devices) are not taken into account.

### System units

Туре	Order number	Total power consumption of the system unit
PPC2200 E3930 2C 1.30 GHz	5PPC2200.AL02-000	15 W (without USB consumer) 25 W (with USB consumer)
PPC2200 E3930 2C 1.30 GHz	5PPC2200.AL04-000	15 W (without USB consumer) 25 W (with USB consumer)
PPC2200 E3940 4C 1.60 GHz	5PPC2200.AL14-000	20 W (without USB consumer) 30 W (with USB consumer)
PPC2200 E3940 4C 1.60 GHz	5PPC2200.AL18-000	20 W (without USB consumer) 30 W (with USB consumer)

### AP5000 panels

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

### **Expansion units**

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

### Interface options

Туре	Order number	+5 V	+ 3.3 V	+12 V	Total power consumption
CAN	5ACCIF01.ICAN-000	0.45 W	0.05 W	-	0.5 W
POWERLINK CAN X2X	5ACCIF01.FPCC-000	0.45 W	1.55 W	-	2 W
POWERLINK RS485 CAN	5ACCIF01.FPCS-000	0.75 W	1 W	-	1.75 W
POWERLINK	5ACCIF01.FPLK-000	-	1.75 W	-	1.75 W
POWERLINK RS232	5ACCIF01.FPLS-000	0.5 W	1 W	-	1.5 W
POWERLINK RS232	5ACCIF01.FPLS-001	-	1.5 W	-	1.5 W
POWERLINK RS232 CAN	5ACCIF01.FPSC-000	0.75 W	1 W	-	1.75 W
POWERLINK RS232 CAN X2X	5ACCIF01.FPSC-001	0.6 W	1.4 W	-	2 W
2x RS422/RS485	5ACCIF01.FSS0-000	0.8 W	0.2 W	-	1 W
2x ETH 10/100/1000	5ACCIF03.CETH-000	-	2 W	-	2 W

### Technical data

### **CFast cards**

Туре	Order number	+5 V	+3.3 V	+12 V	Total
					power consumption
SLC technology	5CFAST.xxxx-00		0.7 W read		0.7 W read
		-	0.7 W write	-	0.7 W write
			0.3 W idle		0.3 W idle
MLC technology	5CFAST.032G-10		1.1 W read		1.1 W read
	5CFAST.064G-10	-	1 W write	-	1 W write
			0.25 W idle		0.25 W idle
	5CFAST.128G-10		1.1 W read		1.1 W read
		-	1.4 W write	-	1.4 W write
			0.25 W idle		0.25 W idle
	5CFAST.256G-10		1.2 W read		1.2 W read
		-	1.9 W write	-	1.9 W write
			0.25 W idle		0.25 W idle

# 4.1.4.2.1 Calculation example

15.6" panel 5AP5230.156B-000	1.8 W + 15.6 W	17.40 W
Expansion unit 5ACCKP01.156B-000	0.5 W + 0.2 W	0.7 W
System unit 5PPC2200.AL14-000	20.00 W (without USB consumers)	20.00 W
POWERLINK interface option 5ACCIF01.FPLK-000	1.75 W	1.75 W
CFast card 5CFAST.256G-10	1.90 W (write)	1.90 W

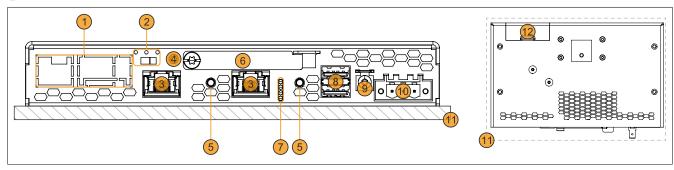
Total max.: 41.75 W

#### 4.1.5 Device interfaces and slots

#### 4.1.5.1 Device interface overview

### Information:

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



	Legend					
1	"IF option slot " on page 54		Interface option - LED status indicators <sup>1)</sup> Interface option - Terminating resistor <sup>1)</sup>			
3	"Ethernet interfaces" on page 50	4	Screw point for cable shield			
5	"Power and reset buttons" on page 52	6	"CFast slot" on page 51			
7	"LED status indicators" on page 53	8	"USB interfaces" on page 51			
9	"Grounding" on page 50	10	"+24 VDC power supply" on page 49			
11	Panel (configuration-dependent)	12	"Battery compartment" on page 55			

Only available with installed interface option (configuration-dependent, see "Interface options" on page 101).

### 4.1.5.2 +24 VDC power supply

# Danger!

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

The necessary 3-pin connector is not included in delivery; for suitable accessories, see "0TB103.9x" on page 264.

The device is protected against overload and reverse polarity by a soldered fuse (15 A, 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	Figure
1	+	
2	Functional ground	
3	-	
<ul><li>Reverse polarity protection</li><li>3-pin</li><li>Male</li></ul>		1 2 3 0
Electrical properties		
Nominal voltage		24 VDC ±25%, SELV1)
Nominal current		Max. 4 A
Overvoltage category per EN 61131-2		II
Inrush current		Typ. 5 A, max. 50 A for < 500 μs
Galvanic isolation		Yes
Uninterruptible power supply		No

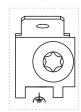
<sup>1)</sup> IEC 61010-2-201 requirements must be observed.

### 4.1.5.2.1 Grounding

### Caution!

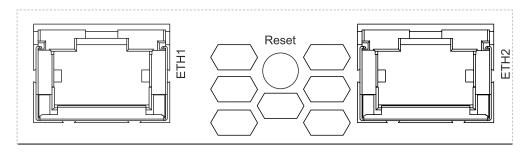
The functional ground (power supply pin 2 and ground connection) must be connected to the central grounding point (e.g. control cabinet or system) via the shortest possible path with the lowest possible resistance and with the largest possible wire cross section. This type of grounding is mandatory for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

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



#### 4.1.5.3 Ethernet interfaces

The Ethernet controller is routed externally via the system unit.



		ETH1, ETH2	
Variant	RJ45,	female	
Controller	Intel	1210	
Wiring	S/STP (	Cat 5e)	
Transfer rate	10/100/10	10/100/1000 Mbit/s <sup>1)</sup>	
Cable length	Max. 100 m (	Max. 100 m (min. Cat 5e)	
LED "Speed" (b)	On	Off	
Green	100 Mbit/s	10 Mbit/s <sup>2)</sup>	
Orange (dark)	1000 Mbit/s	1000 Mbit/s -	
LED "Link" (a)	On Active		
Orange (light)	Link (a connection to an	Blinking (data be-	
	Ethernet network exists)	ing transferred)	

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

### **Driver support**

A special driver is required to operate the Ethernet controller. Drivers for approved operating systems are available for download in the Downloads section of the B&R website (<a href="https://www.br-automation.com">www.br-automation.com</a>).

### Information:

Necessary drivers must be downloaded from the B&R website, not from manufacturer websites.

#### 4.1.5.4 USB interfaces

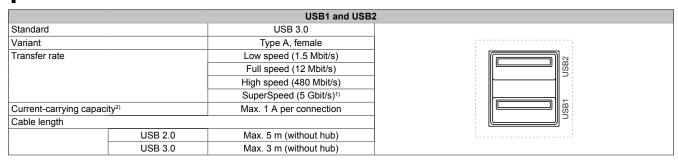
Panel PC 2200 devices are equipped with a Universal Serial Bus 3.0 (USB 3.0) host controller with several USB ports, of which 2 USB 3.0 interfaces are routed externally and freely available to the user.

### Warning!

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

### Caution!

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



- 1) Compatibility with SuperSpeed depends on the operating system used and is only possible with USB 3.0.
- 2) Each USB interface is protected by a maintenance-free "USB current-limiting switch" (max. 1 A).

#### USB interface on mounting unit

For details about the USB interfaces of the mounting units, see section "Mounting units" on page 140.

#### Front USB interface

For details about the USB interfaces of the panels with expansion unit, see section "Expansion units" on page 154.

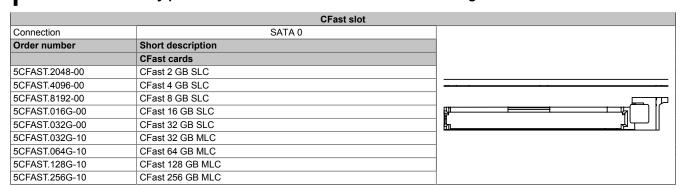
#### 4.1.5.5 CFast slot

The The panel PC offers an easily accessible CFast slot so that the CFast card can also be used as a removable storage medium for data transfer or upgrades.

This CFast slot is internally connected to the chipset via SATA 0 and implemented in version SATA III (SATA 6.0 Gbit/s).

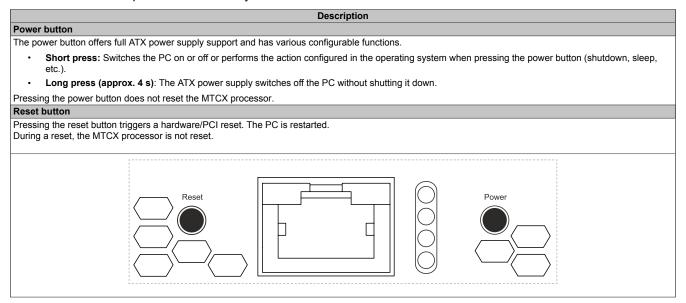
# Warning!

CFast cards are only permitted to be inserted and removed in a voltage-free state!



#### 4.1.5.6 Power and reset buttons

Both buttons can be pressed without any tools.



# Warning!

Switching off the power without shutting down or resetting the system can result in data loss!

### 4.1.5.7 LED status indicators

Assignment	LED	Color	Status	Explanation	LED status indicator <sup>1)</sup>
	Power	Green	On	Power supply OK	
			Blinking	The device is started up; the battery state is "BAD".	
				Information: For additional information, see "Battery comp	artment".
		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). <sup>1)</sup>	
		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) <sup>1)</sup>	
Power (				Faulty or incomplete BIOS, MTCX or I/O FPGA update, battery state BAD, power supply OK	
Disk Link					Faulty or incomplete BIOS, MTCX or I/O FPGA update, battery state BAD, power saving mode (standby) <sup>(1)</sup>
Run				Information: An update must be performed again.	
	Disk	Yellow	On	Indicates drive access (CFast)	
	Link	Reserved	Į.		
	Run	Green	Blinking	Automation Runtime is starting up. Controlled by Automation Runtime (ARemb and ARwin).	
		Green	On	Application running Controlled by Automation Runtime (ARemb and ARwin).	
		Red	On	Application in SERVICE mode Controlled by Automation Runtime (ARemb and ARwin).	
		Orange	Blinking	A license violation has occurred.	

Two columns form 1 interval of 500 ms each.

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

### 4.1.5.8 IF option slot

xPC2200 system units have 1 slot for an interface option.

The following table lists the interface options that can be operated in the IF option slot.

	Interface option slot	
	Interface options	
Order number	Short description	
5ACCIF01.FPCC-000	Interface card - 2x CAN interfaces - 1x X2X Link interface - 1x POWERLINK interface - 512 kB nvSRAM - For APC2100/PPC2100/APC2200/PPC2200	
5ACCIF01.FPCS-000	Interface card - 1x RS485 interface - 1x CAN interface - 1x POWERLINK interface - 32 kB FRAM - For APC2100/PPC2100/APC2200/PPC2200	
5ACCIF01.FPLK-000	Interface card - 1x POWERLINK interface - integrated 2-port hub - 512 kB nvSRAM - For APC2100/PPC2100/APC2200/ PPC2200	
5ACCIF01.FPLS-000	Interface card - 1x RS232 interface - 1x POWERLINK interface - 32 kB FRAM - For APC2100/PPC2100/APC2200/PPC2200	
5ACCIF01.FPLS-001	Interface card - 1x RS232 interface - 1x POWERLINK interface - 512 kB nvSRAM - For APC2100/PPC2100/APC2200/PPC2200	
5ACCIF01.FPSC-000	Interface card - 1x RS232 interface - 1x CAN interface - 1x POWERLINK interface - 32 kB FRAM - For APC2100/PPC2100/APC2200/PPC2200	
5ACCIF01.FPSC-001	Interface card - 1x RS232 interface - 1x CAN interface - 1x X2X Link interface - 1x POWERLINK interface - 512 kB nvSRAM - For APC2100/PPC2100/APC2200/PPC2200	
5ACCIF01.FSS0-000	Interface card - 2x RS422/RS485 interface - For APC2100/ PPC2100/APC2200/PPC2200	
5ACCIF01.ICAN-000	Interface card - 1x CAN interface - For APC2100/PPC2100/ APC2200/PPC2200	
5ACCIF03.CETH-000	Interface card - 2x ETH interface (10/100/1000) - For APC2200/ PPC2200	

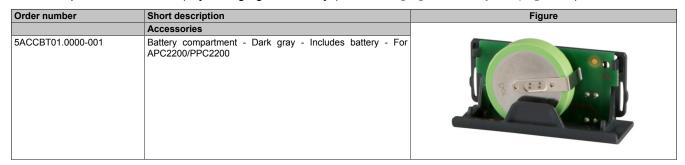
# Information:

Interface options can only be installed and replaced at the B&R factory.

#### 4.1.5.9 Battery compartment

The battery compartment consists of the battery holder and the battery.

The lithium battery (3 V, 1000 mAh) ensures backup power to the internal real-time clock (RTC). It is located on the underside of the device behind the gray cover. The self-discharge time of the battery is at least 8 years (at 50°C, 6 µA for the components being supplied). The battery is subject to wear and should be replaced regularly (at least after the specified service life) by changing the battery (see "Changing the battery" on page 256).



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. The determined battery state is displayed in BIOS (see "Baseboard" on page 215) and the ADI Control Center but can also be read out in a customer application via the ADI library.

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. To avoid data loss during battery replacement, data is retained by a capacitor for approx. 2 minutes.

### 4.1.5.10 Trusted Platform Module (TPM)

A Trusted Platform Module (TPM 2.0) is located on the system unit. A TPM is an additional chip integrated directly into the system hardware that adds important safety functions to the device. In particular, the TPM enables improved protection of the PC against unauthorized tampering by third parties. These safety functions are supported by current operating systems, such as Windows 10.

### **Enabling the Trusted Platform Module**

The TPM is disabled by default and can be enabled in BIOS:

- 1. Parameter TPM availability must be set to Available under Setup utility / Security.
- 2. Apply this setting with **Save and exit**. The change only takes effect after a reboot, which takes place automatically.
- 3. Parameter *Target TPM device* must be set to **dTPM** under **Setup utility / Advanced / Security configuration**.

### Information:

Before enabling the TPM, possible country-specific usage restrictions or regulations must be checked.

### **Using the Trusted Platform Module**

The TPM can be used together with the drive encryption *BitLocker* in Windows 10, for example. To do this, follow the instructions in the operating system.

### Information:

If the password for data encryption is lost, it is not possible to decrypt the data, e.g. after a BIOS update or TPM firmware update. Access to the encrypted drive is lost. Passwords must be carefully stored and protected from unauthorized access.

### 4.1.6 Equipping panels with expansion units

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

- · Expansion cover
- · Expansion unit with operating elements

### Expansion covers (5ACCKP00.xxxx-000)

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

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

Expansion units with operating elements are equipped with a USB interface on the front, green and red pushbuttons, selector switch or blue pushbutton, key switch and emergency stop device or an RFID interface (see "Expansion units" on page 154).



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

### 4.1.6.1 Button/Switching elements

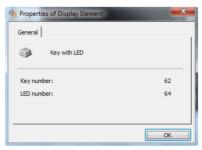
Button/Switch	Actuating element used	Switching element
Selector switch	"Selector switch RAFIX 22 FS+, 1.30.272.102/2200" on page 284	"Switching element RAFIX 22 FS universal, 1.20.126.005/0000" on page 285
Blue pushbutton	"Pushbutton RAFIX 22 FS+, 1.30.270.021/2600" on page 284	"Switching element RAFIX 22 FS universal, 1.20.126.005/0000" on page 285
Green pushbutton	"Pushbutton RAFIX 22 FS+, 1.30.270.021/2500" on page 284	"Switching element RAFIX 22 FS universal, 1.20.126.005/0000" on page 285
Red pushbutton	"Pushbutton RAFIX 22 FS+, 1.30.270.021/2300" on page 284	"Switching element RAFIX 22 FS universal, 1.20.126.005/0000" on page 285
Key switch	"Key switch RAFIX 22 FS+, 1.30.255.222/0000" on page 285	"Switching element RAFIX 22 FS universal, 1.20.126.005/0000" on page 285
Emergency stop	"Emergency stop RAFIX 22 FS+ "Plus 1", 1.30.273.512/0300" on page 285	"Switching element RAFIX 22 FS+ PCB gold, 1.20.126.414/0000" on page 286

### 4.1.6.2 Button, switch and LED configuration

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

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

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



B&R Key Editor

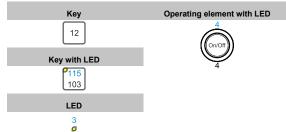


ADI Control Center

### Keys and LEDs in the matrix:

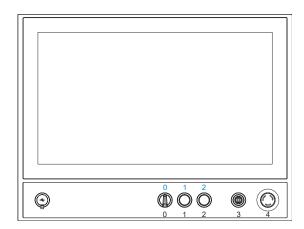
- Hardware numbers of keys are specified in the following with black indexes.
- Hardware numbers of LEDs are specified in the following with blue indexes.

### Illustration examples:



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

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



#### 4.1.6.3 USB interface

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

### Caution!

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

### Warning!

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

### Caution!

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

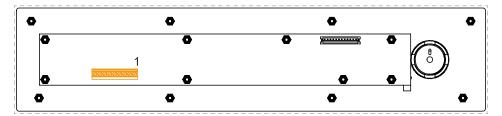
#### **Front USB**

The front USB interface is available to the user for service purposes. For a more detailed description, see "USB interface" on page 157.

#### 4.1.6.4 Button/Switch interface

The button/switch interface can be used to externally wire button and switching elements. It is located inside the panel on the expansion unit. To access, the cover on the back for the expansion option must be removed first (see "Installing the expansion unit/cover" on page 193). Button and switching elements are wired using the 9-pin terminal strip and a screwdriver.

	Description			Figure
Pin	Name	Button/Switch	Contact	
1	T_Select	Selector switch	(normally open contact)	
'	T_Blue	Blue pushbutton	(normally open contact)	
2	T_Green	Green pushbutton	(normally open contact)	
3	T_Red	Red pushbutton	(normally open contact)	
4	T_Key	Key switch	(normally open contact)	<b>↓</b>
5	V_Button		Reference potential for pins 1-4	
6	NH22	Emergency stop	Normally closed contact	8000000
			pair 1 emergency stop	
7	NH21	Emergency stop	Normally closed contact	9 8 7 6 5 4 3 2 1
			pair 1 emergency stop	
8	NH12	Emergency stop	Normally closed contact	
			pair 2 emergency stop	
9	NH11	Emergency stop	Normally closed contact	
			pair 2 emergency stop	



### 4.1.6.5 B&R wireless assembly

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

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

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

### 4.1.6.5.1 Drivers, software and documentation

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

# 4.2 Individual components

### 4.2.1 System units

### 4.2.1.1 5PPC2200.ALxx-000

### 4.2.1.1.1 General information

PPC2200 system units consist of a CPU board, housing and mounting plate. It includes all interfaces; in addition, an interface option can be installed. The main memory is permanently soldered to the CPU board and cannot be replaced or upgraded.

- Intel Atom X processor series
- · Intel Apollo Lake
- · LPDDR4 memory
- · Intel HD Graphics
- 1x CFast slot
- · Slot for 1 interface option

### 4.2.1.1.2 Order data

Order number	Short description	Figure
	System units	5410
5PPC2200.AL02-000	PPC2200 system unit - Intel Atom E3930 1.30 GHz - Dual core - 2 GB SDRAM	
5PPC2200.AL04-000	PPC2200 system unit - Intel Atom E3930 1.30 GHz - Dual core - 4 GB SDRAM	
5PPC2200.AL14-000	PPC2200 system unit - Intel Atom E3940 1.60 GHz - Quad core - 4 GB SDRAM	
5PPC2200.AL18-000	PPC2200 system unit - Intel Atom E3940 1.60 GHz - Quad core - 8 GB SDRAM	
	Required accessories	
	CFast cards	
5CFAST.016G-00	CFast 16 GB SLC	
5CFAST.032G-00	CFast 32 GB SLC	
5CFAST.032G-10	CFast 32 GB MLC	
5CFAST.064G-10	CFast 64 GB MLC	
5CFAST.128G-10	CFast 128 GB MLC	
5CFAST.2048-00	CFast 2 GB SLC	
5CFAST.256G-10	CFast 256 GB MLC	
5CFAST.4096-00	CFast 4 GB SLC	
5CFAST.8192-00	CFast 8 GB SLC	
	Optional accessories	
	Interface options	
5ACCIF01.FPCC-000	Interface card - 2x CAN interfaces - 1x X2X Link interface - 1x POWERLINK interface - 512 kB nvSRAM - For APC2100/PPC2100/APC2200/PPC2200 - Only available with a new device	
5ACCIF01.FPCS-000	Interface card - 1x RS485 interface - 1x CAN interface - 1x POWERLINK interface - 32 kB FRAM - For APC2100/PPC2100/APC2200/PPC2200 - Only available with a new device	
5ACCIF01.FPLK-000	Interface card - 1x POWERLINK interface - Integrated 2-port hub - 512 kB nvSRAM - For APC2100/PPC2100/APC2200/PPC2200 - Only available with a new device	
5ACCIF01.FPLS-000	Interface card - 1x RS232 interface - 1x POWERLINK interface - 32 kB FRAM - For APC2100/PPC2100/APC2200/PPC2200 - Only available with a new device	
5ACCIF01.FPLS-001	Interface card - 1x RS232 interface - 1x POWERLINK interface - 512 kB nvSRAM - For APC2100/PPC2100/APC2200/PPC2200 - Only available with a new device	
5ACCIF01.FPSC-000	Interface card - 1x RS232 interface - 1x CAN interface - 1x POWERLINK interface - 32 kB FRAM - For APC2100/PPC2100/APC2200/PPC2200 - Only available with a new device	
5ACCIF01.FPSC-001	Interface card - 1x RS232 interface - 1x CAN interface - 1x X2X Link Interface - 1x POWERLINK interface - 512 kB nvSRAM - For APC2100/PPC2100/APC2200/PPC2200 - Only available with a new device	
5ACCIF01.FSS0-000	Interface card - 2x RS422/RS485 interface - For APC2100/ PPC2100/APC2200/PPC2200 - Only available with a new de- vice	
5ACCIF01.ICAN-000	Interface card - 1x CAN interface - For APC2100/PPC2100/ APC2200/PPC2200 - Only available with a new device	
5ACCIF03.CETH-000	Interface card - 2x ETH 10/100/1000 interface - For APC2200/ PPC2200 - Only available with a new device	

### 4.2.1.1.3 Technical data

### Information:

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

Order number	5PPC2200.AL02-000	5PPC2200.AL04-000	5PPC2200.AL14-000	5PPC2200.AL18-000
General information				
LEDs		Power, Di	sk, Link, Run	
B&R ID code	0xF0C6	0xF0C7	0xF0C8	0xF0C9
Cooling		Passive	via housing	,
Power button			Yes	
Reset button			Yes	
Buzzer			No	
			NO	
Certifications			V	
CE			Yes	
UL			E115267	
		Industrial co	ntrol equipment	
DNV		-		Temperature: <b>B</b> (0 - 55°C) Humidity: <b>B</b> (up to 100%) Vibration: <b>A</b> (0.7 g) EMC: <b>B</b> (bridge and open deck) <sup>1)</sup>
Controller				
Bootloader		UEF	FIBIOS	
Processor				
Туре	Intel Atom	x5-E3930	Intel Ato	m x5-E3940
Clock frequency	1300	MHz	16	00 MHz
Number of cores	2	)		4
Architecture			4 nm	
Thermal design power (TDP)	6.5			9.5 W
	0.0			9.5 VV
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 Tech- nology			Yes	
Chipset		Intel A	pollo Lake	_
Trusted Platform Module			PM 2.0	
Real-time clock			11.2.0	
Accuracy		At 25°C: Tup, 12 np	m (1 second) per day 2)	_
-				
Battery-backed			Yes	
Power failure logic				
Controller	MTCX 3)			
Buffer time	10 ms			
Memory				
Туре		LPDDF	R4 SDRAM	
Memory size	2 GB	4	I GB	8 GB
Velocity		DDR	4L-2133	
Memory interface width		Single channel		Dual channel
Removable			No	
Graphics				
Controller		Intal I II	) Graphics	_
	550		O Graphics	00 MH I=
Max. dynamic graphics frequency	550			0 MHz
Color depth			c. 32-bit	
DirectX support			12	
OpenGL support			4.3	
Power management		AC	PI 5.0	·
Interfaces				
CFast slot				
Quantity			1	
Type		SATA III /S	ATA 6.0 Gbit/s)	
USB		3A1A111 (3/	(17. O.O Obius)	
			2	
Quantity			2	_
Туре			SB 3.0	
Variant		Ty	уре А	
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) to SuperSpeed (5 Gbit/s) 4)			
		Max. 1 A p		

Order number	5PPC2200.AL02-000	5PPC2200.AL04-000	5PPC2200.AL14-000	5PPC2200.AL18-000
Ethernet				
Quantity			2	
Variant		RJ45, s	shielded	
Transfer rate		10/100/10	000 Mbit/s	
Max. baud rate		1 G	bit/s	
Slots				
Interface option 5)			1	
Electrical properties				
Nominal voltage		24 VDC ±2	5%, SELV <sup>6)</sup>	-
Nominal current		Max	. 4 A	
Inrush current		Typ. 5 A, max. 5	50 A for < 500 μs	
Overvoltage category per EN 61131-2			I	
Galvanic isolation		Ye	es	
Operating conditions	rating conditions			
Pollution degree per EN 61131-2		Pollution	degree 2	
Degree of protection per EN 60529	Back: IP20 (front: depends on the panel used) 7)			
Ambient conditions				
Elevation				
Operation		Max. 3000 m (comp	onent-dependent) 8)	
Mechanical properties				
Dimensions				
Width	190 mm			
Height	115 mm			
Depth	29.7 mm			
Weight		57	7 g	

- 1) Yes, but applies only if all components installed in the complete system have this certification and are listed on the associated DNV certificate for the product family.
- 2) At max. specified ambient temperature: Typ. 58 ppm (5 seconds) worst case 220 ppm (19 seconds).
- 3) Maintenance Controller Extended
- 4) The SuperSpeed transfer rate (5 Gbit/s) is only possible with USB 3.0.
- 5) The interface option cannot be replaced.
- 6) IEC 61010-2-201 requirements must be observed.
- 7) Only if all interface covers are installed.
  - The degree of protection of the complete system depends on the mounting unit used as well as the panel.
- 8) The maximum ambient temperature is typically derated 1°C per 1000 meters starting at 500 m above sea level.

#### 4.2.2 Panels

#### 4.2.2.1 5AP5120.1505-000

#### 4.2.2.1.1 General information

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

#### 4.2.2.1.2 Order data

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

### 4.2.2.1.3 Technical data

# Information:

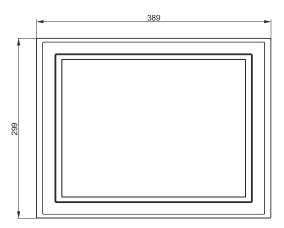
The following specified characteristic data, features and limit values are only valid for these individual components and may differ from those of the complete system. The data specified for the complete system applies to the complete system in which this individual component is used, for example.

Order number	5AP5120.1505-000
General information	
B&R ID code	0xE9CB
Certifications	
CE	Yes
UL	cULus E115267 Industrial control equipment
EAC	Yes
Display	
Туре	TFT color
Diagonal	15.0"
Colors	16.7 million
Resolution	XGA, 1024 x 768 pixels
Contrast	700:1
Viewing angles	
Horizontal	Direction R = 80° / Direction L = 80°
Vertical	Direction U = 70° / Direction D = 70°
Backlight	
Туре	LED
Brightness (dimmable)	Typ. 20 to 400 cd/m²
Half-brightness time 1)	50,000 h

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

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

### **4.2.2.1.4 Dimensions**



### 4.2.2.1.5 Temperature/Humidity diagram

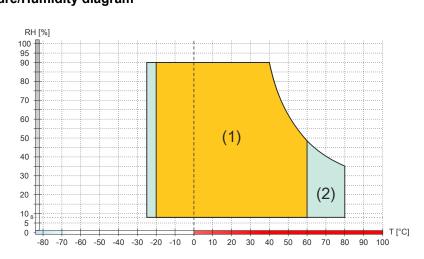


Diagram legend				
(1) Operation T [°C] Temperature in °C				
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and non-condensing	

#### 4.2.2.2 5AP5120.1906-000

#### 4.2.2.2.1 General information

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

#### 4.2.2.2.2 Order data

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

#### 4.2.2.2.3 Technical data

# Information:

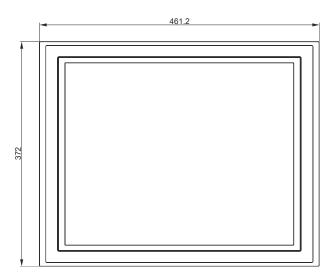
The following specified characteristic data, features and limit values are only valid for these individual components and may differ from those of the complete system. The data specified for the complete system applies to the complete system in which this individual component is used, for example.

Order number	5AP5120.1906-000
General information	
B&R ID code	0xE9CC
Certifications	
CE	Yes
UL	cULus E115267 Industrial control equipment
EAC	Yes
Display	
Туре	TFT color
Diagonal	19.0"
Colors	16.7 million
Resolution	SXGA, 1280 x 1024 pixels
Contrast	1500:1
Viewing angles	
Horizontal	Direction R = 85° / Direction L = 85°
Vertical	Direction U = 85° / Direction D = 85°
Backlight	
Туре	LED
Brightness (dimmable)	Typ. 35 to 350 cd/m <sup>2</sup>
Half-brightness time 1)	70,000 h
Touch screen	
Technology	Analog, resistive
Controller	B&R, serial, 12-bit
Transmittance	81% ±3%

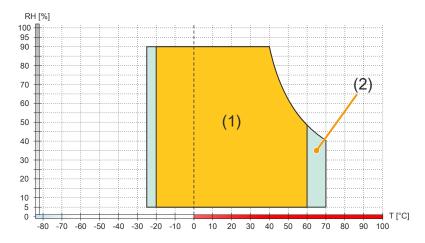
Order number	5AP5120.1906-000	
Operating conditions		
Pollution degree per EN 61131-2	Pollution degree 2	
Degree of protection per EN 60529	IP65 with mounting unit 5ACCMA00.000x-000 IP54 with mounting unit 5ACCMA00.010x-000	
Degree of protection per UL 50	Type 4X indoor with mounting unit 5ACCMA00.000x-000  Type 1 with mounting unit 5ACCMA00.010x-000	
Mechanical properties		
Housing		
Material	Aluminum, coated	
Coating	White aluminum	
Front		
Frame	Aluminum, coated	
Panel overlay		
Material	Polyester	
Dark border color around display	RAL 7024	
Dimensions		
Width	461.2 mm	
Height	372 mm	
Weight	7300 g	

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

### **4.2.2.2.4 Dimensions**



# 4.2.2.5 Temperature/Humidity diagram



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

#### 4.2.2.3 5AP5130.156B-000

#### 4.2.2.3.1 General information

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

#### 4.2.2.3.2 Order data

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

#### 4.2.2.3.3 Technical data

### Information:

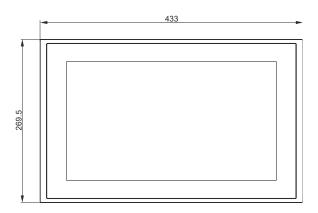
The following specified characteristic data, features and limit values are only valid for these individual components and may differ from those of the complete system. The data specified for the complete system applies to the complete system in which this individual component is used, for example.

Order number	5AP5130.156B-000
General information	
B&R ID code	0xE9C7
Certifications	
CE	Yes
UL	cULus E115267
	Industrial control equipment
EAC	Yes
Display	
Туре	TFT color
Diagonal	15.6"
Colors	16.7 million
Resolution	HD, 1366 x 768 pixels
Contrast	1000:1
Viewing angles	
Horizontal	Direction R = 85° / Direction L = 85°
Vertical	Direction U = 85° / Direction D = 85°
Backlight	
Туре	LED
Brightness (dimmable)	Typ. 40 to 400 cd/m <sup>2</sup>
Half-brightness time 1)	70,000 h
Touch screen	
Technology	Projected capacitive touch (PCT)
Transmittance	>90%

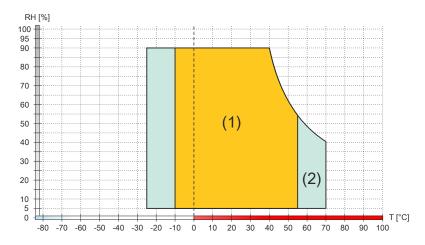
Order number	5AP5130.156B-000
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	IP65 with mounting unit 5ACCMA00.000x-000 IP54 with mounting unit 5ACCMA00.010x-000
Degree of protection per UL 50	Type 4X indoor with mounting unit 5ACCMA00.000x-000  Type 1 with mounting unit 5ACCMA00.010x-000
Mechanical properties	
Housing	
Material	Aluminum, coated
Coating	White aluminum (similar to RAL 9006)
Front	
Frame	Aluminum (similar to RAL 9006), coated
Design	Black
Dimensions	
Width	433 mm
Height	269.5 mm
Weight	4700 g

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

### 4.2.2.3.4 Dimensions



# 4.2.2.3.5 Temperature/Humidity diagram



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

#### 4.2.2.4 5AP5130.156C-000

#### 4.2.2.4.1 General information

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

#### 4.2.2.4.2 Order data

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

#### 4.2.2.4.3 Technical data

### Information:

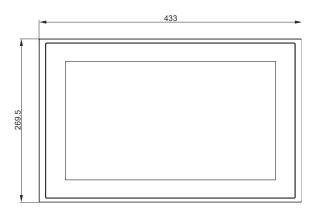
The following specified characteristic data, features and limit values are only valid for these individual components and may differ from those of the complete system. The data specified for the complete system applies to the complete system in which this individual component is used, for example.

Order number	5AP5130.156C-000
General information	
B&R ID code	0XF24A
Certifications	
CE	Yes
UL	cULus E115267 Industrial control equipment
EAC	Yes
Display	
Туре	TFT color
Diagonal	15.6"
Colors	16.7 million
Resolution	FHD, 1920 x 1080
Contrast	Starting with hardware revision F0: 800:1 Up to hardware revision E0: 1500:1
Viewing angles	
Horizontal	Direction R = 85° / Direction L = 85°
Vertical	Direction U = 85° / Direction D = 85°
Backlight	
Туре	LED
Brightness (dimmable)	Starting with hardware revision F0: Typ. 40 to 450 cd/m² Up to hardware revision E0: Typ. 40 to 400 cd/m²
Half-brightness time	Starting with hardware revision F0: ≥50,000 h Up to hardware revision E0: 70,000 h ¹)

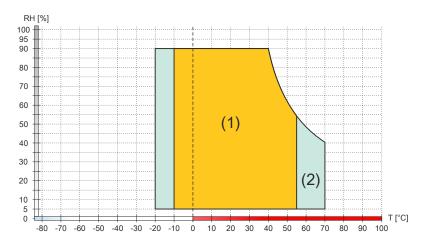
Order number	5AP5130.156C-000
Touch screen	
Technology	Projected capacitive touch (PCT)
Transmittance	>90%
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	IP65 with mounting unit 5ACCMA00.000x-000 IP54 with mounting unit 5ACCMA00.010x-000
Degree of protection per UL 50	Type 4X indoor with mounting unit 5ACCMA00.000x-000 Type 1 with mounting unit 5ACCMA00.010x-000
Mechanical properties	
Housing	
Material	Aluminum, coated
Coating	White aluminum (similar to RAL 9006)
Front	
Frame	Aluminum (similar to RAL 9006), coated
Design	Black
Dimensions	
Width	433 mm
Height	269.5 mm
Weight	4700 g

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

### **4.2.2.4.4 Dimensions**



# 4.2.2.4.5 Temperature/Humidity diagram



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

#### 4.2.2.5 5AP5130.185B-000

#### 4.2.2.5.1 General information

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

#### 4.2.2.5.2 Order data

Order number	Short description
	Panels
5AP5130.185B-000	Automation Panel 18.5" HD TFT - 1366 x 768 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - For PPC2100 / PPC2200 / link modules
	Optional accessories
	Flanges
5ACCFL00.0000-000	AP5000 flange - Swing arm rotary flange - For swing arm mounting unit
5ACCFL00.0100-000	AP5000 flange - Swivel-tilt flange for swing arm - For swing arm mounting unit
5ACCFL00.0200-000	AP5000 flange - Swing arm flange adapter - For Rittal - For swing arm mounting unit
	Handles
5ACCHD00.185B-000	AP5000 swing arm handles - For panel 5AP5130.185B/185C-000
	Mounting units
5ACCMA00.0000-000	AP5000 swing arm mounting unit
5ACCMA00.0001-000	AP5000 swing arm mounting unit - 1x rear USB interface
5ACCMA00.0002-000	AP5000 swing arm mounting unit - 2x rear USB interface
5ACCMA00.0100-000	HMI mounting unit VESA IP54 - Leak tightness is only provided with suitable cable grommets.
5ACCMA00.0101-000	HMI mounting unit VESA IP54 w/USB - Leak tightness is only
o, 1001111 10010 10 1 000	provided with suitable cable grommets.
5ACCMA01.0100-000	AP5000 VESA mounting unit IP10/IP20 - IP20 with 5AP5120.*-000 - IP10 with 5AP5130.*-000, 5AP5230.*-000

#### 4.2.2.5.3 Technical data

### Information:

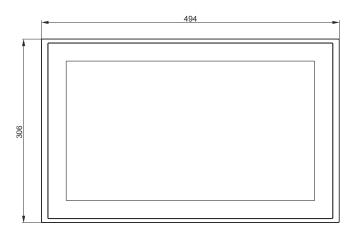
The following specified characteristic data, features and limit values are only valid for these individual components and may differ from those of the complete system. The data specified for the complete system applies to the complete system in which this individual component is used, for example.

Order number	5AP5130.185B-000
General information	
B&R ID code	0xE9C8
Certifications	
CE	Yes
UL	cULus E115267
	Industrial control equipment
EAC	Yes
Display	
Туре	TFT color
Diagonal	18.5"
Colors	16.7 million
Resolution	HD, 1366 x 768 pixels
Contrast	1000:1
Viewing angles	
Horizontal	Direction R = 85° / Direction L = 85°
Vertical	Direction U = 80° / Direction D = 80°
Backlight	
Туре	LED
Brightness (dimmable)	Typ. 15 to 300 cd/m <sup>2</sup>
Half-brightness time 1)	50,000 h
Touch screen	
Technology	Projected capacitive touch (PCT)
Transmittance	>90%

Order number	5AP5130.185B-000	
Operating conditions		
Pollution degree per EN 61131-2	Pollution degree 2	
Degree of protection per EN 60529	IP65 with mounting unit 5ACCMA00.000x-000 IP54 with mounting unit 5ACCMA00.010x-000	
Degree of protection per UL 50	Type 4X indoor with mounting unit 5ACCMA00.000x-000 Type 1 with mounting unit 5ACCMA00.010x-000	
Mechanical properties		
Housing		
Material	Aluminum, coated	
Coating White aluminum (similar to RAL 9006)		
Front		
Frame	Aluminum (similar to RAL 9006), coated	
Design	Black	
Dimensions		
Width	494 mm	
Height	306 mm	
Weight	6700 g	

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

### **4.2.2.5.4 Dimensions**



# 4.2.2.5.5 Temperature/Humidity diagram

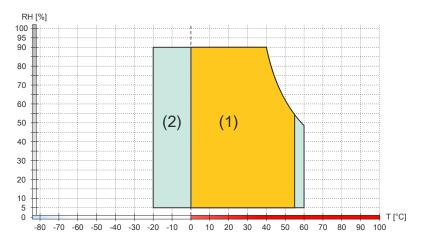


	Diagram legend		
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and non-condensing

### 4.2.2.6 5AP5130.185C-000

### 4.2.2.6.1 General information

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

### 4.2.2.6.2 Order data

Order number	Short description
	Panels
5AP5130.185C-000	Automation Panel 18.5" Full HD TFT - 1920 x 1080 pixels (16:9) - Multi-touch (projected capacitive) - Swing arm mounting - Landscape format - For PPC2100 / PPC2200 / link modules
	Optional accessories
	Flanges
5ACCFL00.0000-000	AP5000 flange - Swing arm rotary flange - For swing arm mounting unit
5ACCFL00.0100-000	AP5000 flange - Swivel-tilt flange for swing arm - For swing arm mounting unit
5ACCFL00.0200-000	AP5000 flange - Swing arm flange adapter - For Rittal - For swing arm mounting unit
	Handles
5ACCHD00.185B-000	AP5000 swing arm handles - For panel 5AP5130.185B/185C-000
	Mounting units
5ACCMA00.0000-000	AP5000 swing arm mounting unit
5ACCMA00.0001-000	AP5000 swing arm mounting unit - 1x rear USB interface
5ACCMA00.0002-000	AP5000 swing arm mounting unit - 2x rear USB interface
5ACCMA00.0100-000	HMI mounting unit VESA IP54 - Leak tightness is only provided with suitable cable grommets.
5ACCMA00.0101-000	HMI mounting unit VESA IP54 w/USB - Leak tightness is only
o, 1001111 10010 10 1 000	provided with suitable cable grommets.
5ACCMA01.0100-000	AP5000 VESA mounting unit IP10/IP20 - IP20 with 5AP5120.*-000 - IP10 with 5AP5130.*-000, 5AP5230.*-000

### 4.2.2.6.3 Technical data

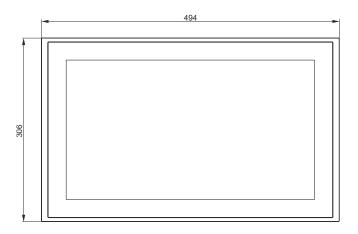
### Information:

Order number	5AP5130.185C-000
General information	
B&R ID code	0xF24C
Certifications	
CE	Yes
UL	cULus E115267
	Industrial control equipment
EAC	Yes
Display	
Туре	TFT color
Diagonal	18.5"
Colors	16.7 million
Resolution	FHD, 1920 x 1080 pixels
Contrast	1500:1
Viewing angles	
Horizontal	Direction R = 85° / Direction L = 85°
Vertical	Direction U = 85° / Direction D = 85°
Backlight	
Туре	LED
Brightness (dimmable)	Typ. 40 to 400 cd/m <sup>2</sup>
Half-brightness time	50,000 h <sup>1)</sup>
Touch screen	
Technology	Projected capacitive touch (PCT)
Transmittance	>90%

Order number	5AP5130.185C-000	
Operating conditions		
Pollution degree per EN 61131-2	Pollution degree 2	
Degree of protection per EN 60529	IP65 with mounting unit 5ACCMAS00.000x-000 IP54 with mounting unit 5ACCMA00.010x-000	
Degree of protection per UL 50	Type 4X indoor with mounting unit 5ACCMAS00.000x-000 Type 1 with mounting unit 5ACCMA00.010x-000	
Mechanical properties		
Housing		
Material	Aluminum, coated	
Coating White aluminum (similar to RAL 9006)		
Front		
Frame	Aluminum (similar to RAL 9006), coated	
Design	Black	
Dimensions		
Width	494 mm	
Height	306 mm	
Weight	6700 g	

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

### **4.2.2.6.4 Dimensions**



# 4.2.2.6.5 Temperature/Humidity diagram

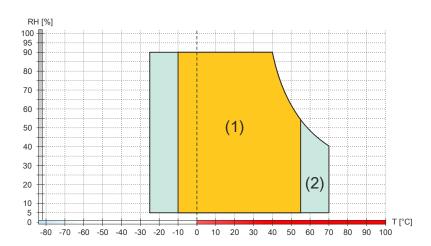


	Diagram legend			
(1)	(1) Operation T [°C] Temperature in °C			
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and non-condensing	

### 4.2.2.7 5AP5130.215C-000

### 4.2.2.7.1 General information

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

### 4.2.2.7.2 Order data

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

### 4.2.2.7.3 Technical data

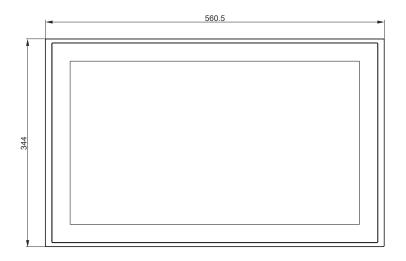
### Information:

Order number	5AP5130.215C-000
General information	
B&R ID code	0xE9C9
Certifications	
CE	Yes
UL	cULus E115267
	Industrial control equipment
EAC	Yes
Display	
Туре	TFT color
Diagonal	21.5"
Colors	16.7 million
Resolution	FHD, 1920 x 1080 pixels
Contrast	5000:1
Viewing angles	
Horizontal	Direction R = 89° / Direction L = 89°
Vertical	Direction U = 89° / Direction D = 89°
Backlight	
Туре	LED
Brightness (dimmable)	Typ. 12.5 to 250 cd/m <sup>2</sup>
Half-brightness time 1)	30,000 h
Touch screen	
Technology	Projected capacitive touch (PCT)
Transmittance	>90%
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2

Order number	5AP5130.215C-000	
Degree of protection per EN 60529	IP65 with mounting unit 5ACCMA00.000x-000 IP54 with mounting unit 5ACCMA00.010x-000	
Degree of protection per UL 50	Type 4X indoor with mounting unit 5ACCMA00.000x-000  Type 1 with mounting unit 5ACCMA00.010x-000	
Mechanical properties		
Housing		
Material	Aluminum, coated	
Coating	White aluminum (similar to RAL 9006)	
Front		
Frame	Aluminum (similar to RAL 9006), coated	
Design	Black	
Dimensions		
Width	560.5 mm	
Height	344 mm	
Weight	7300 g	

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

### **4.2.2.7.4 Dimensions**



# 4.2.2.7.5 Temperature/Humidity diagram

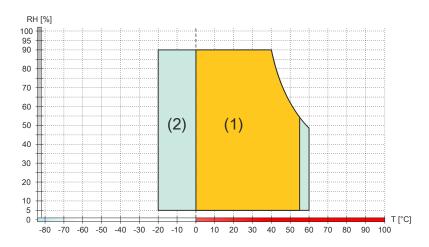


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and non-condensing

### 4.2.2.8 5AP5130.240C-000

### 4.2.2.8.1 General information

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

### 4.2.2.8.2 Order data

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

### 4.2.2.8.3 Technical data

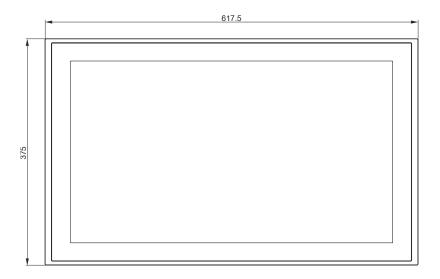
### Information:

Order number	5AP5130.240C-000
General information	
B&R ID code	0xE9CA
Certifications	
CE	Yes
UL	cULus E115267
	Industrial control equipment
EAC	Yes
Display	
Туре	TFT color
Diagonal	24.0"
Colors	16.7 million
Resolution	FHD, 1920 x 1080 pixels
Contrast	5000:1
Viewing angles	
Horizontal	Direction R = 89° / Direction L = 89°
Vertical	Direction U = 89° / Direction D = 89°
Backlight	
Туре	LED
Brightness (dimmable)	Typ. 30 to 300 cd/m <sup>2</sup>
Half-brightness time 1)	50,000 h
Touch screen	
Technology	Projected capacitive touch (PCT)
Transmittance	>90%
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2

Order number	5AP5130.240C-000			
Degree of protection per EN 60529	IP65 with mounting unit 5ACCMA00.000x-000 IP54 with mounting unit 5ACCMA00.010x-000			
Degree of protection per UL 50	Type 4X indoor with mounting unit 5ACCMA00.000x-000 Type 1 with mounting unit 5ACCMA00.010x-000			
Mechanical properties				
Housing				
Material	Aluminum, coated			
Coating	White aluminum (similar to RAL 9006)			
Front				
Frame	Aluminum (similar to RAL 9006), coated			
Design	Black			
Dimensions				
Width	617.5 mm			
Height	375 mm			
/eight 8500 g				

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

### **4.2.2.8.4 Dimensions**



# 4.2.2.8.5 Temperature/Humidity diagram

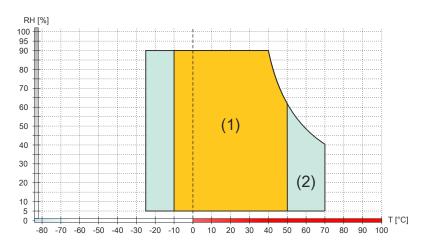


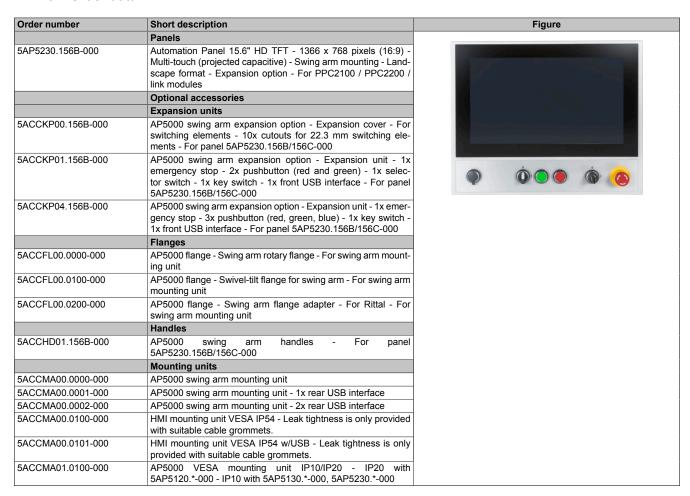
	Diagram legend		n legend	
ſ	(1)	Operation	T [°C]	Temperature in °C
ſ	(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and non-condensing

#### 4.2.2.9 5AP5230.156B-000

#### 4.2.2.9.1 General information

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

#### 4.2.2.9.2 Order data



### 4.2.2.9.3 Technical data

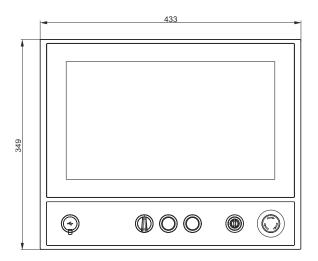
### Information:

Order number	5AP5230.156B-000
General information	
B&R ID code	0xE9F5
Certifications	
CE	Yes
UL	cULus E115267
	Industrial control equipment
EAC	Yes
Display	
Туре	TFT color
Diagonal	15.6"
Colors	16.7 million
Resolution	HD, 1366 x 768 pixels

Order number	5AP5230.156B-000		
Contrast	1000:1		
Viewing angles			
Horizontal	Direction R = 85° / Direction L = 85°		
Vertical	Direction U = 85° / Direction D = 85°		
Backlight			
Туре	LED		
Brightness (dimmable)	Typ. 40 to 400 cd/m <sup>2</sup>		
Half-brightness time 1)	70,000 h		
Touch screen			
Technology	Projected capacitive touch (PCT)		
Transmittance	>90%		
Operating conditions			
Pollution degree per EN 61131-2	Pollution degree 2		
Degree of protection per EN 60529	IP65 with mounting unit 5ACCMA00.000x-000		
	IP54 with mounting unit 5ACCMA00.010x-000		
Degree of protection per UL 50	Type 4X indoor with mounting unit 5ACCMA00.000x-000		
	Type 1 with mounting unit 5ACCMA00.010x-000		
Mechanical properties			
Housing			
Material	Aluminum, coated		
Coating	White aluminum (similar to RAL 9006)		
Front			
Frame	Aluminum (similar to RAL 9006), coated		
Design	Black		
Dimensions			
Width	433 mm		
Height	349 mm		
Weight	6400 g		

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

### 4.2.2.9.4 Dimensions



# 4.2.2.9.5 Temperature/Humidity diagram

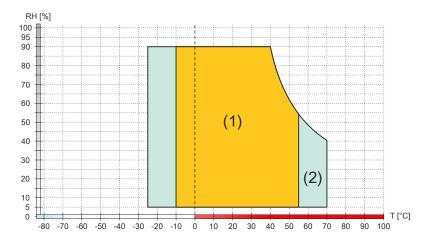


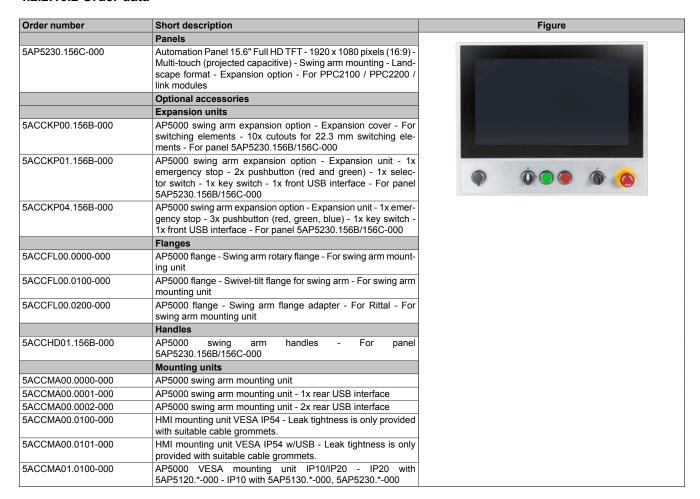
	Diagram legend			
	(1)	Operation	T [°C]	Temperature in °C
ſ	(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and non-condensing

#### 4.2.2.10 5AP5230.156C-000

#### 4.2.2.10.1 General information

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

#### 4.2.2.10.2 Order data



### 4.2.2.10.3 Technical data

### Information:

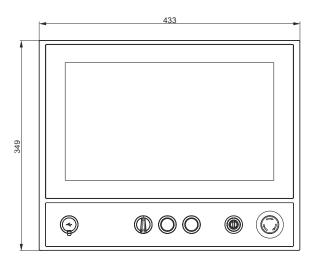
Order number	5AP5230.156C-000
General information	
B&R ID code	0xF24B
Certifications	
CE	Yes
UL	cULus E115267
	Industrial control equipment
EAC	Yes
Display	
Туре	TFT color
Diagonal	15.6"
Colors	16.7 million
Resolution	FHD, 1920 x 1080 pixels

### Technical data

Order number	5AP5230.156C-000
Contrast	1500:1
Viewing angles	
Horizontal	Direction R = 85° / Direction L = 85°
Vertical	Direction U = 85° / Direction D = 85°
Backlight	
Туре	LED
Brightness (dimmable)	Typ. 40 to 400 cd/m <sup>2</sup>
Half-brightness time	70,000 h <sup>1)</sup>
Touch screen	
Technology	Projected capacitive touch (PCT)
Transmittance	>90%
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	IP65 with mounting unit 5ACCMA00.000x-000
	IP54 with mounting unit 5ACCMA00.010x-000
Degree of protection per UL 50	Type 4X indoor with mounting unit 5ACCMA00.000x-000
	Type 1 with mounting unit 5ACCMA00.010x-000
Mechanical properties	
Housing	
Material	Aluminum, coated
Coating	White aluminum (similar to RAL 9006)
Front	
Frame	Aluminum (similar to RAL 9006), coated
Design	Black
Dimensions	
Width	433 mm
Height	349 mm
Weight	6400 g

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

### 4.2.2.10.4 Dimensions



# 4.2.2.10.5 Temperature/Humidity diagram

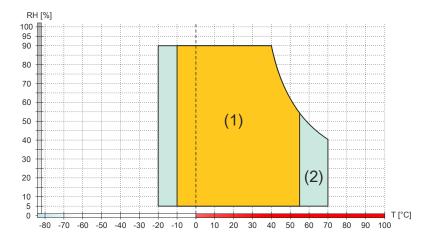


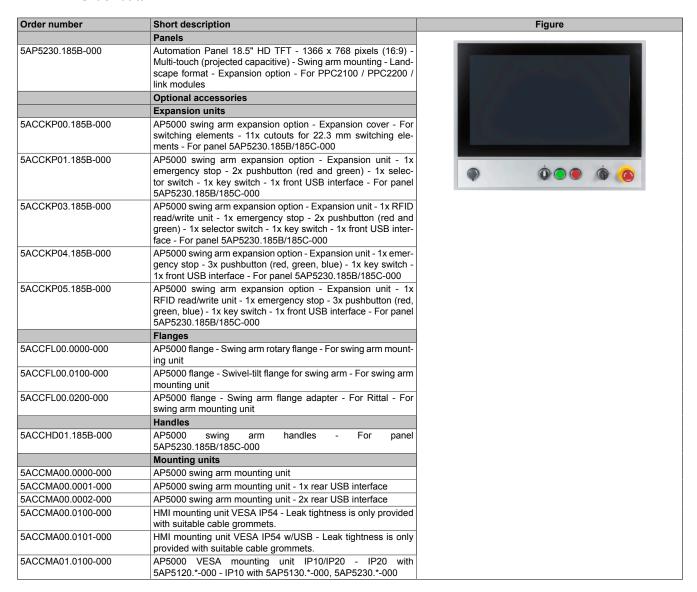
	Diagram legend			
	(1)	Operation	T [°C]	Temperature in °C
Ī	(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and non-condensing

#### 4.2.2.11 5AP5230.185B-000

#### 4.2.2.11.1 General information

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

#### 4.2.2.11.2 Order data



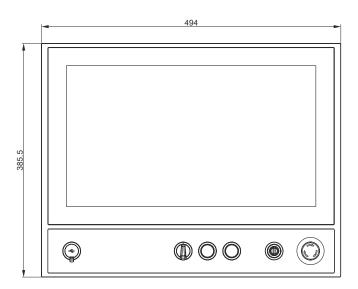
### 4.2.2.11.3 Technical data

### Information:

Order number	5AP5230.185B-000
General information	
B&R ID code	0xE9F6
Certifications	
CE	Yes
UL	cULus E115267
	Industrial control equipment
EAC	Yes
Display	
Туре	TFT color
Diagonal	18.5"
Colors	16.7 million
Resolution	HD, 1366 x 768 pixels
Contrast	1000:1
Viewing angles	
Horizontal	Direction R = 85° / Direction L = 85°
Vertical	Direction U = 80° / Direction D = 80°
Backlight	
Туре	LED
Brightness (dimmable)	Typ. 15 to 300 cd/m <sup>2</sup>
Half-brightness time 1)	50,000 h
Touch screen	
Technology	Projected capacitive touch (PCT)
Transmittance	>90%
Slots	
Expansion unit	Yes
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	IP65 with mounting unit 5ACCMA00.000x-000 IP54 with mounting unit 5ACCMA00.010x-000
Degree of protection per UL 50	Type 4X indoor with mounting unit 5ACCMA00.000x-000 Type 1 with mounting unit 5ACCMA00.010x-000
Mechanical properties	· · · · · · · · · · · · · · · · · · ·
Housing	
Material	Aluminum, coated
Coating	White aluminum (similar to RAL 9006)
Front	
Frame	Aluminum (similar to RAL 9006), coated
Design	Black
Dimensions	
Width	494 mm
Height	385.5 mm
Weight	8300 g

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

### 4.2.2.11.4 Dimensions



# 4.2.2.11.5 Temperature/Humidity diagram

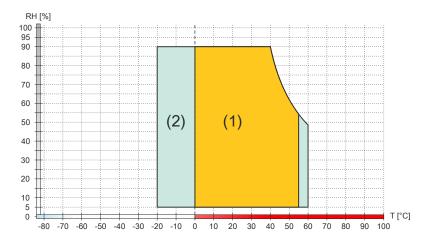


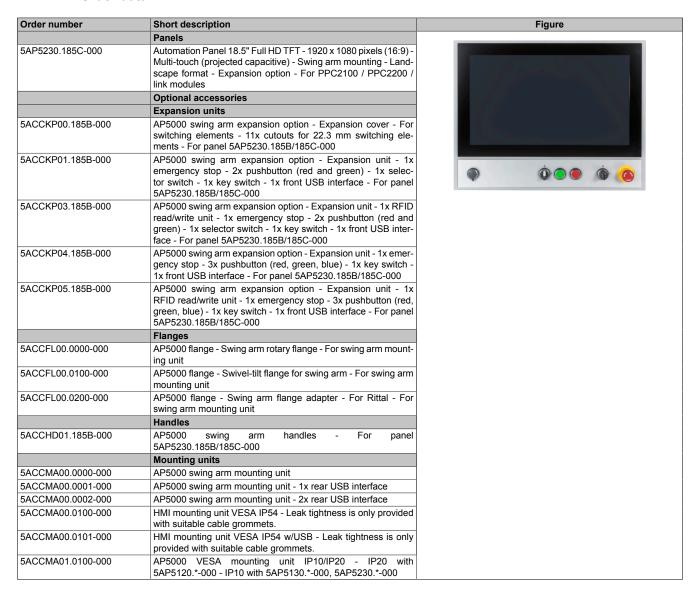
	Diagram legend			
	(1)	Operation	T [°C]	Temperature in °C
ſ	(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and non-condensing

#### 4.2.2.12 5AP5230.185C-000

#### 4.2.2.12.1 General information

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

#### 4.2.2.12.2 Order data



### 4.2.2.12.3 Technical data

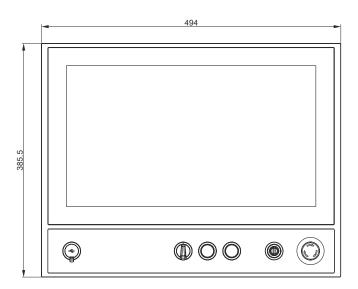
### Information:

### Technical data

Order number	5AP5230.185C-000
General information	
B&R ID code	0xF24D
Certifications	
CE	Yes
UL	cULus E115267
	Industrial control equipment
EAC	Yes
Display	
Туре	TFT color
Diagonal	18.5"
Colors	16.7 million
Resolution	FHD, 1920 x 1080
Contrast	1500:1
Viewing angles	
Horizontal	Direction R = 85° / Direction L = 85°
Vertical	Direction U = 85° / Direction D = 85°
Backlight	
Туре	LED
Brightness (dimmable)	Typ. 40 to 400 cd/m <sup>2</sup>
Half-brightness time	50,000 h <sup>1)</sup>
Touch screen	
Technology	Projected capacitive touch (PCT)
Transmittance	>90%
Slots	
Expansion unit	Yes
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	IP65 with mounting unit 5ACCMA00.000x-000 IP54 with mounting unit 5ACCMA00.010x-000
Degree of protection per UL 50	Type 4X indoor with mounting unit 5ACCMA00.000x-000 Type 1 with mounting unit 5ACCMA00.010x-000
Mechanical properties	
Housing	
Material	Aluminum, coated
Coating	White aluminum (similar to RAL 9006)
Front	
Frame	Aluminum (similar to RAL 9006)
Design	Black
Dimensions	
Width	494 mm
Height	385.5 mm
Weight	8300 g

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

### 4.2.2.12.4 Dimensions



# 4.2.2.12.5 Temperature/Humidity diagram

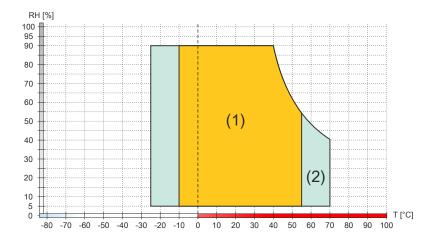


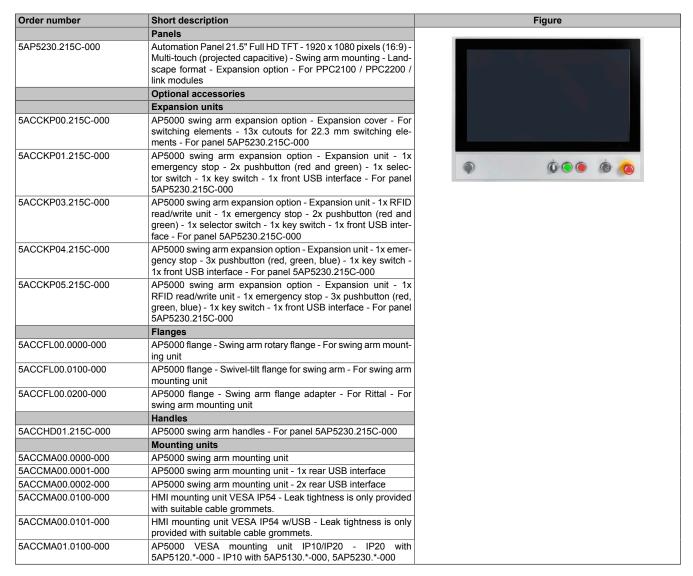
	Diagram legend			
	(1)	Operation	T [°C]	Temperature in °C
Ī	(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and non-condensing

#### 4.2.2.13 5AP5230.215C-000

#### 4.2.2.13.1 General information

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

#### 4.2.2.13.2 Order data



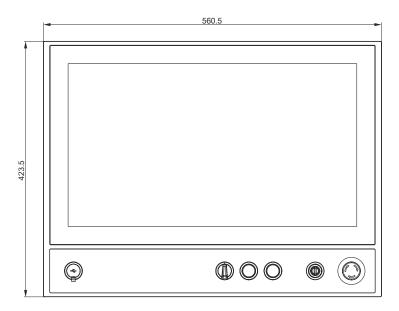
#### 4.2.2.13.3 Technical data

### Information:

Order number	5AP5230.215C-000	
General information		
B&R ID code	0xE9F7	
Certifications		
CE	Yes	
UL	cULus E115267	
	Industrial control equipment	
EAC	Yes	
Display		
Туре	TFT color	
Diagonal	21.5"	
Colors	16.7 million	
Resolution	FHD, 1920 x 1080 pixels	
Contrast	5000:1	
Viewing angles		
Horizontal	Direction R = 89° / Direction L = 89°	
Vertical	Direction U = 89° / Direction D = 89°	
Backlight		
Туре	LED	
Brightness (dimmable)	Typ. 12.5 to 250 cd/m <sup>2</sup>	
Half-brightness time 1)	30,000 h	
Touch screen	·	
Technology	Projected capacitive touch (PCT)	
Transmittance	>90%	
Slots		
Expansion unit	Yes	
Operating conditions		
Pollution degree per EN 61131-2	Pollution degree 2	
Degree of protection per EN 60529	IP65 with mounting unit 5ACCMA00.000x-000 IP54 with mounting unit 5ACCMA00.010x-000	
Degree of protection per UL 50	Type 4X indoor with mounting unit 5ACCMA00.000x-000 Type 1 with mounting unit 5ACCMA00.010x-000	
Mechanical properties		
Housing		
Material	Aluminum, coated	
Coating White aluminum (similar to RAL 9006)		
Front		
Frame	Aluminum (similar to RAL 9006), coated	
Design	Black	
Dimensions		
Width	560.5 mm	
Height	423.5 mm	
Weight	8900 g	

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

### 4.2.2.13.4 Dimensions



# 4.2.2.13.5 Temperature/Humidity diagram

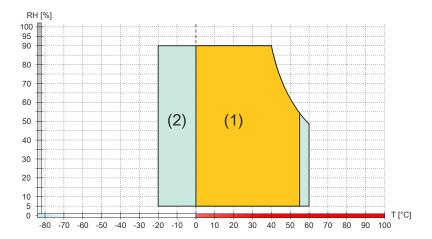


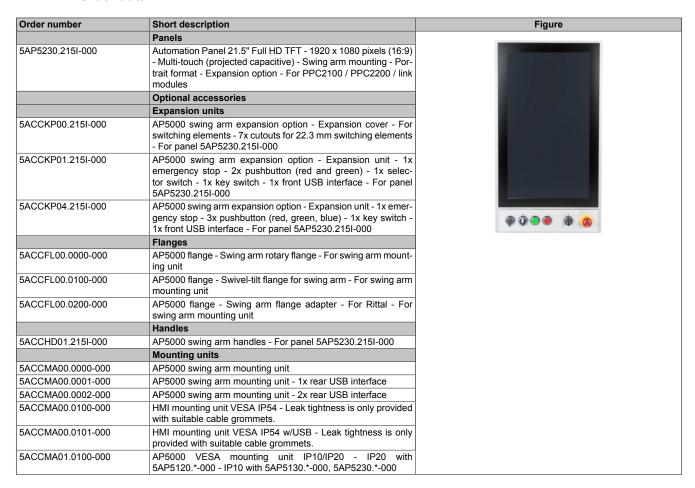
	Diagram legend			
	(1)	Operation	T [°C]	Temperature in °C
Ī	(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and non-condensing

#### 4.2.2.14 5AP5230.215I-000

#### 4.2.2.14.1 General information

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

#### 4.2.2.14.2 Order data



#### 4.2.2.14.3 Technical data

### Information:

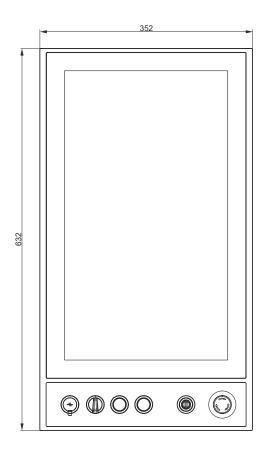
Order number	5AP5230.215I-000		
General information			
B&R ID code	0xE9F8		
Certifications			
CE	Yes		
UL	cULus E115267 Industrial control equipment		
EAC	Yes		
Display			
Туре	TFT color		
Diagonal	21.5"		
Colors	16.7 million		
Resolution	FHD, 1920 × 1080 pixels		

### Technical data

Order number	5AP5230.215I-000	
Contrast	5000:1	
Viewing angles		
Horizontal	Direction R = 89° / Direction L = 89°	
Vertical	Direction U = 89° / Direction D = 89°	
Backlight		
Туре	LED	
Brightness (dimmable)	Typ. 12.5 to 250 cd/m <sup>2</sup>	
Half-brightness time 1)	30,000 h	
Touch screen		
Technology	Projected capacitive touch (PCT)	
Transmittance	>90%	
Operating conditions		
Pollution degree per EN 61131-2	Pollution degree 2	
Degree of protection per EN 60529  IP65 with mounting unit 5ACCMA00.000x-000  IP54 with mounting unit 5ACCMA00.010x-000		
Degree of protection per UL 50	Type 4X indoor with mounting unit 5ACCMA00.000x-000 Type 1 with mounting unit 5ACCMA00.010x-000	
Mechanical properties		
Housing		
Material	Aluminum, coated	
Coating	White aluminum (similar to RAL 9006)	
Front		
Frame	Aluminum (similar to RAL 9006), coated	
Design Black		
Dimensions		
Width	352 mm	
Height	632 mm	
Weight	5400 g	

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

### 4.2.2.14.4 Dimensions



# 4.2.2.14.5 Temperature/Humidity diagram

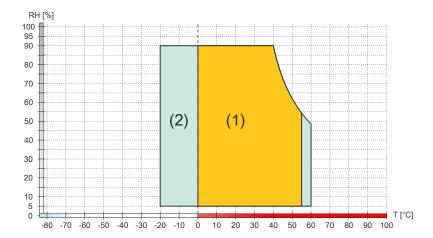


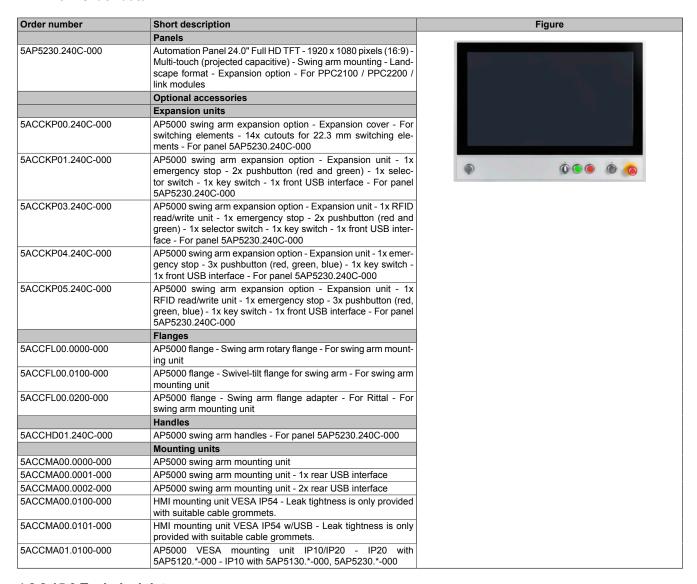
	Diagram legend			
	(1)	Operation	T [°C]	Temperature in °C
Ī	(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and non-condensing

#### 4.2.2.15 5AP5230.240C-000

#### 4.2.2.15.1 General information

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

#### 4.2.2.15.2 Order data



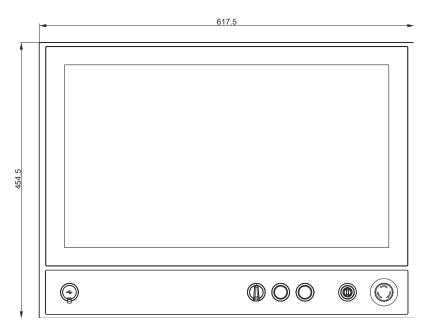
### 4.2.2.15.3 Technical data

### Information:

Order number	5AP5230.240C-000		
General information			
B&R ID code	0xE9F9		
Certifications			
CE	Yes		
UL	cULus E115267		
	Industrial control equipment		
EAC	Yes		
Display			
Туре	TFT color		
Diagonal	24.0"		
Colors	16.7 million		
Resolution	FHD, 1920 x 1080 pixels		
Contrast	5000:1		
Viewing angles			
Horizontal	Direction R = 89° / Direction L = 89°		
Vertical	Direction U = 89° / Direction D = 89°		
Backlight			
Туре	LED		
Brightness (dimmable)	Typ. 30 to 300 cd/m <sup>2</sup>		
Half-brightness time 1)	50,000 h		
Touch screen	,		
Technology	Projected capacitive touch (PCT)		
Transmittance	>90%		
Slots			
Expansion unit	Yes		
Operating conditions			
Pollution degree per EN 61131-2	Pollution degree 2		
Degree of protection per EN 60529	IP65 with mounting unit 5ACCMA00.000x-000 IP54 with mounting unit 5ACCMA00.010x-000		
Degree of protection per UL 50	Type 4X indoor with mounting unit 5ACCMA00.000x-000  Type 1 with mounting unit 5ACCMA00.010x-000		
Mechanical properties			
Housing			
Material	Aluminum, coated		
Coating White aluminum (similar to RAL 9006)			
Front			
Frame Aluminum (similar to RAL 9006), coated			
Design	Black		
Dimensions			
Width	617.5 mm		
Height	454.5 mm		
Weight	10300 g		

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

### 4.2.2.15.4 Dimensions



# 4.2.2.15.5 Temperature/Humidity diagram

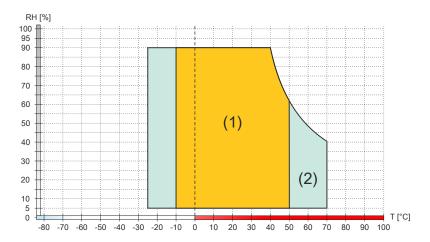


	Diagram legend			
	(1)	Operation	T [°C]	Temperature in °C
Ī	(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and non-condensing

### 4.2.3 Interface options

### Information:

Interface options can only be installed and replaced at the B&R factory.

### 4.2.3.1 5ACCIF01.FPCC-000

#### 4.2.3.1.1 General information

Interface option 5ACCIF01.FPCC-000 is equipped with a POWERLINK interface, 2 CAN bus master interfaces and an X2X Link master interface. In addition, 512 kB nvSRAM is installed.

- 1x POWERLINK interface managing or controlled node
- 2x CAN bus master interfaces
- · 1x X2X Link master interface
- 512 kB nvSRAM
- Compatible with APC2100/PPC2100 and APC2200/PPC2200

This interface option can only be operated with Automation Runtime.

#### 4.2.3.1.2 Order data

Order number	Short description	Figure
	Interface options	
5ACCIF01.FPCC-000	Interface card - 2x CAN interfaces - 1x X2X Link interface - 1x POWERLINK interface - 512 kB nvSRAM - For APC2100/PPC2100/APC2200/PPC2200 - Only available with a new device	Comment of the Commen
	Optional accessories	
	Terminal blocks	
0TB1210.3100	Connector 300 VDC - 10-pin female - Cage clamp terminal block - Protected against vibration by the screw flange	

### 4.2.3.1.3 Technical data

### Information:

Order number	5ACCIF01.FPCC-000		
General information			
LEDs	L1, L2, L3		
B&R ID code	0xE9BD		
Certifications			
CE	Yes		
UL	cULus E115267 Industrial control equipment		
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4 1)		
DNV	Temperature: <b>B</b> (0 - 55°C) Humidity: <b>B</b> (up to 100%) Vibration: <b>A</b> (0.7 g) EMC: <b>B</b> (bridge and open deck) <sup>2)</sup>		
EAC	Product family certification		
Controller			
nvSRAM			
Size	512 kB		
Data retention	20 years		
Read/Write endurance	Min. 1,000,000		
Remanent variables in power failure mode	256 kB (for e.g. Automation Runtime, see Automation Help)		

### Technical data

Order number	5ACCIF01.FPCC-000	
Interfaces		
POWERLINK		
Quantity	1	
Туре	Type 4 <sup>3)</sup>	
Variant	RJ45, shielded	
Transfer rate	100 Mbit/s	
Transfer	100BASE-TX	
Line length	Max. 100 m between two stations (segment length)	
CAN		
Quantity	2	
Variant	10-pin, male 4)	
Transfer rate	Max. 1 Mbit/s	
Terminating resistor		
Туре	Can be switched on and off with slide switch 5)	
Default setting	Each off	
X2X		
Туре	X2X Link master	
Quantity	1	
Variant	10-pin, male, galvanically isolated	
Electrical properties		
Power consumption	2 W	
Operating conditions		
Pollution degree per EN 61131-2	Pollution degree 2	
Ambient conditions		
Temperature		
Operation	-20 to 55°C	
Storage	-20 to 60°C	
Transport	-20 to 60°C	
Relative humidity		
Operation	5 to 90%, non-condensing	
Storage	5 to 95%, non-condensing	
Transport	5 to 95%, non-condensing	
Mechanical properties		
Weight	25 g	

- 1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
- Yes, but applies only if all components installed in the complete system have this certification and are listed on the associated DNV certificate for the product family.
- 3) For additional information, see Automation Help (Communication / POWERLINK / General information / Hardware IF / LS).
- 4) CAN1: Galvanically isolated.
  - CAN2: Not galvanically isolated.
- 5) The terminating resistor can only be switched on/off for the CAN1 interface.

### 4.2.3.1.3.1 POWERLINK interface - Pinout

The POWERLINK interface on the system unit is referred to as "IF1".

POWERLINK - IF1 <sup>1)2)</sup>				
Variant	RJ45, female		1	
Wiring	S/STP (Cat 5e)			
Cable length	Max. 100 m (	(min. Cat 5e)		
LED status indicator (b)	On Off			
Green	see "LED "S/E" (LED "Sta	atus/Error")" on page 281		
LED "Link" (a)	On	Active		
Yellow	Link (a connection to a POW- ERLINK network exists)	Blinking (data be- ing transferred)	a b	

- 1) The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.
- 2) In Automation Studio / Automation Runtime, this interface is referred to as IF1.

### 4.2.3.1.3.2 CAN bus 1 interface - Pinout

The CAN bus 1 interface on the system unit is referred to as "IFx".

A terminating resistor can be switched on or off for the CAN bus 1 interface. LED status indicator "L1" indicates whether the terminating resistor is switched on or off.

CAN bus 1 - IFx <sup>1)2)</sup>			
Variant	10-pin, male		
Galvanic isolation	Yes		
Transfer rate	Max. 1 Mbit/s		
Bus length	Max. 1000 m		
Pin	Pinout		
1	-	1 3 5 7 9	
2	Shield		
3	-		
4	-		
5	CAN H	2 4 6 8 10	
6	CAN L		
7	CAN GND		
8	-		
9	-		
10	-		

<sup>1)</sup> The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.

### **CAN driver settings**

The baud rate can be set either with predefined values or via the bit timing register.

For additional information about CAN interfaces <u>with AS/AR</u> support, see Automation Help. For additional information about CAN interfaces <u>without AS/AR</u> support, see the user's manual for the B&R CAN driver at <u>www.br-automation.com</u>.

Bit timing register 0	Bit timing register 1	Baud rate
00h	14h	1000 kbit/s
80h or 00h	1Ch	500 kbit/s
81h or 01h	1Ch	250 kbit/s
83h or 03h	1Ch	125 kbit/s
84h or 04h	1Ch	100 kbit/s
89h or 09h	1Ch	50 kbit/s

### CAN1 - Bus length and cable type

The type of cable to be used depends largely on the required bus length and number of nodes. The bus length is determined by the transfer rate. Per CiA (CAN in Automation), the maximum bus length is 1000 meters.

The following bus lengths are permitted at a maximum permissible oscillator tolerance of 0.121%:

Bus length <sup>1)</sup>	Transfer rate
≤1000 m	Typ. 50 kbit/s
≤200 m	Typ. 250 kbit/s
≤100 m	Typ. 500 kbit/s
≤20 m <sup>2)</sup>	Typ. 1 Mbit/s
≤15 m <sup>3)</sup>	

<sup>1)</sup> The specified cable length is only valid with the values specified in "CAN driver settings". Cable lengths otherwise depend on the values in the bit timing register, cable quality and number of nodes.

<sup>2)</sup> This interface can only be used in Automation Runtime and is displayed as IF3 in Automation Studio / Automation Runtime. It is not a "PC interface" and therefore not displayed in BIOS.

<sup>2)</sup> For CAN interfaces without galvanic isolation and 5ACCIF01.ICAN-000.

<sup>3)</sup> For CAN interfaces with galvanic isolation.

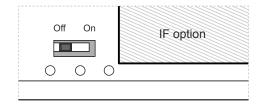
### Technical data

Preferably, the cable material used should have the following properties or deviate only slightly from them in order to achieve an optimal transfer rate.

CAN cable		Property	
Signal line			
Cat	ble cross section	2x 0.25 mm² (24AWG/19), tinned copper stranded wire	
Wir	re insulation	PE	
Cor	nductor resistance	≤82 Ω/km	
Stra	anding	Wires stranded in pairs	
Shi	ield	Pair shielding with aluminum foil	
GND			
Cat	ble cross section	1x 0.34 mm² (22AWG/19), tinned copper stranded wire	
Wir	re insulation	PE	
Cor	nductor resistance	≤59 Ω/km	
Outer jacket			
Mat	terial	PUR compound	
Pro	perties	Halogen-free	
Cat	ble shield	Tinned copper wire	

### **Terminating resistor**

A terminating resistor is integrated on the interface option. A switch is used to switch the terminating resistor for the CAN bus 1 interface on and off. The terminating resistor cannot be switched on and off for the CAN bus 2 interface. LED status indicator "L1" indicates whether the terminating resistor of the CAN bus 1 interface is switched on or off.



· ON: Switched on

· OFF (default): Switched off

#### 4.2.3.1.3.3 CAN bus 2 interface - Pinout

The CAN bus 2 interface on the system unit is referred to as "IFx".

The terminating resistor cannot be switched on and off for the CAN bus 2 interface. A terminating resistor must therefore be taken into account during wiring.

CAN bus 2 - IFx <sup>1)2)</sup>		
Variant	10-pin, male	
Galvanic isolation	No	
Transfer rate	Max. 1 Mbit/s	
Bus length	Max. 1000 m	
Pin	Pinout	
1	-	1 3 5 7 9
2	Shield	
3	-	
4	-	
5	-	2 4 6 8 10
6	-	
7	-	
8	CAN GND	
9	CAN L	
10	CAN H	

<sup>1)</sup> The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.

### **CAN driver settings**

The baud rate can be set either with predefined values or via the bit timing register.

For additional information about CAN interfaces with AS/AR support, see Automation Help. For additional information about CAN interfaces without AS/AR support, see the user's manual for the B&R CAN driver at www.br-automation.com.

<sup>2)</sup> This interface can only be used in Automation Runtime and is displayed as IF4 in Automation Studio / Automation Runtime. It is not a "PC interface" and therefore not displayed in BIOS.

Bit timing register 0	Bit timing register 1	Baud rate
00h	14h	1000 kbit/s
80h or 00h	1Ch	500 kbit/s
81h or 01h	1Ch	250 kbit/s
83h or 03h	1Ch	125 kbit/s
84h or 04h	1Ch	100 kbit/s
89h or 09h	1Ch	50 kbit/s

### CAN2 - Bus length and cable type

The type of cable to be used depends largely on the required bus length and number of nodes. The bus length is determined by the transfer rate. Per CiA (CAN in Automation), the maximum bus length is 1000 meters.

The following bus lengths are permitted at a maximum permissible oscillator tolerance of 0.121%:

Bus length <sup>1)</sup>	Transfer rate
≤1000 m	Typ. 50 kbit/s
≤200 m	Typ. 250 kbit/s
≤100 m	Typ. 500 kbit/s
≤20 m <sup>2)</sup>	Typ. 1 Mbit/s
≤15 m <sup>3)</sup>	

- 1) The specified cable length is only valid with the values specified in "CAN driver settings". Cable lengths otherwise depend on the values in the bit timing register, cable quality and number of nodes.
- 2) For CAN interfaces without galvanic isolation and 5ACCIF01.ICAN-000.
- 3) For CAN interfaces with galvanic isolation.

Preferably, the cable material used should have the following properties or deviate only slightly from them in order to achieve an optimal transfer rate.

CAN cable		Property	
Signal line		<del>,</del>	
(	Cable cross section	2x 0.25 mm² (24AWG/19), tinned copper stranded wire	
V	Vire insulation	PE	
	Conductor resistance	≤82 Ω/km	
5	Stranding	Wires stranded in pairs	
5	Shield Pair shielding with aluminum foil		
GND			
(	Cable cross section	1x 0.34 mm² (22AWG/19), tinned copper stranded wire	
V	Vire insulation	PE	
	Conductor resistance	≤59 Ω/km	
Outer jacket			
N	Material	PUR compound	
F	Properties	Halogen-free	
	Cable shield	Tinned copper wire	

### 4.2.3.1.3.4 X2X Link master interface - Pinout

The X2X Link master interface on the system unit is referred to as "IFx".

X2X Link master - IFx <sup>1/2)</sup>		
Variant	10-pin, male	
Galvanic isolation	Yes	
Pin	Pinout	
1	X2X	
2	Shield	1 3 5 7 9
3	X2X\	
4	X2X⊥	
5	-	
6	-	2 4 6 8 10
7	-	
8	-	
9	-	
10	-	

- The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.
- 2) This interface can only be used in Automation Runtime and is displayed as IF2 in Automation Studio / Automation Runtime. It is not a "PC interface" and therefore not displayed in BIOS.

### 4.2.3.1.3.5 LED status indicators L1, L2, L3

The LEDs of the interface option are located near the ETH1 interface.

			LED status indica
LED	Color	Status	Explanation
L1	Yellow	On	The CAN bus 1 terminating resistor is switched on.
		Off	The CAN bus 1 terminating resistor is switched off.
L2	Green	On	POWERLINK link LED A connection to a POWERLINK network exists.
		Blinking	POWERLINK link LED Data is being transferred.
L3	Green-Red	On	POWERLINK status/error LED See "LED "S/E" (LED "Status/Error")" on page 281.
		Off	POWERLINK status/error LED See "LED "S/E" (LED "Status/Error")" on page 281.

### **POWERLINK commissioning and operation**

For a description of the operating modes, status and node numbers of the POWERLINK interface(s), see "LED "S/E" (LED "Status/Error")" on page 281.

### 4.2.3.1.4 Shielding

For the interfaces on the 10-pin female connector, the shield of the interfaces can be connected to pin *Shield* (pin 2) of the female connector.

In addition, there is a functional ground connection on the interface cover of the system unit and a screw point for cable shields that can also be used for the shielded cables.

### 4.2.3.1.5 Driver support and firmware update

The driver is part of the Automation Runtime and the firmware is part of Automation Studio. The module is automatically brought up to this level.

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

### 4.2.3.2 5ACCIF01.FPCS-000

### 4.2.3.2.1 General information

Interface option 5ACCIF01.FPCS-000 is equipped with a POWERLINK, RS485 and CAN bus master interface. In addition, 32 kB FRAM is installed.

- 1x POWERLINK interface managing or controlled node
- · 1x CAN bus master interface
- 1x RS485 interface
- 32 kB FRAM
- Compatible with APC2100/PPC2100 and APC2200/PPC2200

This interface option can only be operated with Automation Runtime.

### 4.2.3.2.2 Order data

Order number	Short description	Figure
	Interface options	
5ACCIF01.FPCS-000	Interface card - 1x RS485 interface - 1x CAN interface - 1x POWERLINK interface - 32 kB FRAM - For APC2100/PPC2100/APC2200/PPC2200 - Only available with a new device	
	Optional accessories	1 1 m
	Terminal blocks	
0TB1210.3100	Connector 300 VDC - 10-pin female - Cage clamp terminal block - Protected against vibration by the screw flange	

### 4.2.3.2.3 Technical data

### Information:

Order number	5ACCIF01.FPCS-000
General information	
LEDs	L1, L2, L3
B&R ID code	0xED7C
Certifications	
CE	Yes
UL	cULus E115267
	Industrial control equipment
HazLoc	cULus HazLoc E180196
	Industrial control equipment
	for hazardous locations
	Class I, Division 2, Groups ABCD, T4 1)
DNV	Temperature: <b>B</b> (0 - 55°C)
	Humidity: <b>B</b> (up to 100%)
	Vibration: <b>A</b> (0.7 g)
EAC	EMC: <b>B</b> (bridge and open deck) <sup>2)</sup> Product family certification
	Product family certification
Controller	
FRAM	
Size	32 kB
Data retention	10 years
Read/Write endurance	Min. 10 <sup>12</sup> times/byte
Remanent variables in power failure mode	32 kB
	(for e.g. Automation Runtime, see Automation Help)
Interfaces	
COM	
Quantity	1
Туре	RS485, not galvanically isolated
Variant	10-pin, male
UART	16550-compatible, 16-byte FIFO buffer
Max. baud rate	115 kbit/s
POWERLINK	
Quantity	1
Туре	Type 4 <sup>3)</sup>
Variant	RJ45, shielded
Transfer rate	100 Mbit/s
Transfer	100BASE-TX
Line length	Max. 100 m between two stations (segment length)

### Technical data

Order number	5ACCIF01.FPCS-000
CAN	
Quantity	1
Variant	10-pin, male, not galvanically isolated
Transfer rate	Max. 1 Mbit/s
Terminating resistor	
Туре	Can be switched on and off with slide switch
Default setting	Off
Electrical properties	
Power consumption	1.75 W
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Ambient conditions	
Temperature	
Operation	-20 to 55°C
Storage	-20 to 60°C
Transport	-20 to 60°C
Relative humidity	
Operation	5 to 90%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical properties	
Weight	25 g

- 1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
- Yes, but applies only if all components installed in the complete system have this certification and are listed on the associated DNV certificate for the product family.
- 3) For additional information, see Automation Help (Communication / POWERLINK / General information / Hardware IF / LS).

### 4.2.3.2.3.1 POWERLINK interface - Pinout

The POWERLINK interface on the system unit is referred to as "IF1".

POWERLINK - IF1 <sup>1)2)</sup>				
Variant	RJ45, female		1	
Wiring	S/STP (Cat 5e)			
Cable length	Max. 100 m (min. Cat 5e)			
LED status indicator (b)	On	Off		
Green	See status/error LED.			
LED "Link" (a)	On	Active		
Yellow	Link (a connection to a POW- ERLINK network exists)	Blinking (data be- ing transferred)	a	

The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.

#### 4.2.3.2.3.2 Serial interface COM - Pinout

Serial interface COM on the system unit is referred to as "IFx".

Serial interface COM - IFx <sup>1)2)</sup>				
	RS485			
Variant	10-pin, male			
Туре	RS485			
Galvanic isolation No				
UART	16550-compatible, 16-byte FIFO buffer			
Transfer rate	Max. 115 kbit/s			
Bus length	Max. 1200 m	1 3 5 7 9		
Pin	Pinout			
1	-			
2	Shield			
3	-	2 4 6 8 10		
4	-			
5	-			
6	-			
7	-			
8	COM GND			
9	DATA\			
10	DATA			

The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.

<sup>2)</sup> In Automation Studio / Automation Runtime, this interface is referred to as IF1.

<sup>2)</sup> This interface can only be used in Automation Runtime and is displayed as IF7 in Automation Studio / Automation Runtime. It is not a "PC interface" and therefore not displayed in BIOS.

The RTS line must be switched by the driver for each transmission or reception; switching back does not take place automatically.

With long cable lengths, the voltage drop can result in greater potential differences between the bus devices, which can hinder communication. This can be improved by running the ground wire with the others.

#### Cable data

For more detailed information about the transfer rate, bus length or cable requirements for the respective interfaces/buses, see "Cable data" on page 279.

#### 4.2.3.2.3.3 CAN bus interface - Pinout

The CAN bus interface on the system unit is referred to as "IFx".

CAN bus - IFx <sup>1)2)</sup>				
Variant 10-pin, male				
Galvanic isolation	No			
Transfer rate	Max. 1 Mbit/s			
Bus length	Max. 1000 m			
Pin	Pinout			
1	-	1 3 5 7 9		
2	Shield			
3	-			
4	-			
5	CAN H	2 4 6 8 10		
6	CAN L			
7	CAN GND			
8	-			
9	-			
10	-			

<sup>1)</sup> The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.

### **CAN driver settings**

The baud rate can be set either with predefined values or via the bit timing register.

For additional information about CAN interfaces with AS/AR support, see Automation Help. For additional information about CAN interfaces without AS/AR support, see the user's manual for the B&R CAN driver at www.br-automation.com.

Bit timing register 0	Bit timing register 1	Baud rate
00h	14h	1000 kbit/s
80h or 00h	1Ch	500 kbit/s
81h or 01h	1Ch	250 kbit/s
83h or 03h	1Ch	125 kbit/s
84h or 04h	1Ch	100 kbit/s
89h or 09h	1Ch	50 kbit/s

#### Cable data

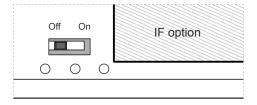
For more detailed information about the transfer rate, bus length or cable requirements for the respective interfaces/buses, see "Cable data" on page 279.

# **Terminating resistor**

A terminating resistor is integrated on the interface option. It is switched on or off for the CAN bus interface with a switch. LED status indicator L1 indicates the current state:

· ON: Activated

· OFF (default): Switched off



<sup>2)</sup> This interface can only be used in Automation Runtime and is displayed as IF3 in Automation Studio / Automation Runtime. It is not a "PC interface" and therefore not displayed in BIOS.

#### 4.2.3.2.3.4 LED status indicators

The LEDs of the interface option are located near the ETH1 interface.

			LED status indica
LED	Color	Status	Explanation
L1	Yellow	On	The CAN bus terminating resistor is switched on.
		Off	The CAN bus terminating resistor is switched off.
L2	Green	On	POWERLINK link LED A connection to a POWERLINK network exists.
		Blinking	POWERLINK link LED Data is being transferred.
L3	Green-Red	On	POWERLINK status/error LED See "LED "S/E" (LED "Status/Error")" on page 281.
		Off	POWERLINK status/error LED See "LED "S/E" (LED "Status/Error")" on page 281.

### **POWERLINK commissioning and operation**

For a description of the operating modes, status and node numbers of the POWERLINK interface(s), see "LED "S/E" (LED "Status/Error")" on page 281.

# 4.2.3.2.4 Shielding

For the interfaces on the 10-pin female connector, the shield of the interfaces can be connected to pin *Shield* (pin 2) of the female connector.

In addition, there is a functional ground connection on the interface cover of the system unit and a screw point for cable shields that can also be used for the shielded cables.

# 4.2.3.2.5 Driver support and firmware update

The driver is part of the Automation Runtime and the firmware is part of Automation Studio. The module is automatically brought up to this level.

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

#### 4.2.3.3 5ACCIF01.FPLK-000

#### 4.2.3.3.1 General information

Interface option 5ACCIF01.FPLK-000 is equipped with 2 female RJ45 connectors; both connectors are connected to an integrated POWERLINK hub. In addition, 512 kB nvSRAM is installed.

With the integrated 2-port hub, a simple tree structure, daisy chain wiring or optional ring redundancy can be easily implemented without additional effort.

With poll-response chaining (PRC), the IF option offers a solution for the highest demands on response time and the shortest cycle times. Especially for central control tasks, poll-response chaining in combination with the B&R control system provides ideal performance.

- 1x POWERLINK interface for real-time communication
- 512 kB nvSRAM
- · Integrated hub for economical wiring
- Configurable ring redundancy
- · Poll-response chaining
- Compatible with APC2100/PPC2100 and APC2200/PPC2200

This interface option can only be operated with Automation Runtime.

# Information:

Ring redundancy in combination with poll-response chaining is not possible at the same time with this IF option.

#### 4.2.3.3.2 Order data

Order number	Short description	Figure
	Interface options	
5ACCIF01.FPLK-000	Interface card - 1x POWERLINK interface - Integrated 2-port hub - 512 kB nvSRAM - For APC2100/PPC2100/APC2200/PPC2200 - Only available with a new device	

## 4.2.3.3.3 Technical data

# Information:

Order number	5ACCIF01.FPLK-000
General information	
LEDs	L1, L2, L3
B&R ID code	0xE9BA
Certifications	
CE	Yes
UL	cULus E115267
	Industrial control equipment
HazLoc	cULus HazLoc E180196
	Industrial control equipment
	for hazardous locations
	Class I, Division 2, Groups ABCD, T4 1)
EAC	Product family certification
Controller	
nvSRAM	
Size	512 kB
Data retention	20 years
Read/Write endurance	Min. 1,000,000
Remanent variables in power failure mode	256 kB (for e.g. Automation Runtime, see Automation Help)

# Technical data

Order number	5ACCIF01.FPLK-000
Interfaces	
POWERLINK	
Quantity	1 (integrated 2-port hub)
Туре	Type 4, redundant 2)
Variant	RJ45, shielded
Transfer rate	100 Mbit/s
Transfer	100BASE-TX
Line length	Max. 100 m between two stations (segment length)
Electrical properties	
Power consumption	1.75 W
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Ambient conditions	
Temperature	
Operation	-20 to 55°C
Storage	-20 to 60°C
Transport	-20 to 60°C
Relative humidity	
Operation	5 to 90%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical properties	
Weight	25 g

<sup>1)</sup> Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.

# 4.2.3.3.3.1 POWERLINK 1 interface - Pinout

The POWERLINK 1 interface on the system unit is referred to as "IF1".

POWERLINK 1 - IF1 <sup>1)</sup>				
Variant	RJ45,	female	1	
Wiring	S/STP (Cat 5e)		1	
Cable length	Max. 100 m (min. Cat 5e)			
LED status indicator (b)	On	Off		
Green	See status/error LED.			
LED "Link" (a)	On	Active		
Yellow	Link (a connection to a POW-	Blinking (data be-		
	ERLINK network exists)	ing transferred)		
			a b	

The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.

### 4.2.3.3.3.2 POWERLINK 2 interface - Pinout

The POWERLINK 2 interface on the system unit is referred to as "IFx".

	POV	WERLINK 2 - IFx1)
Variant	RJ45, fe	emale
Wiring	S/STP (Cat 5e)	
Cable length	Max. 100 m (min. Cat 5e)	
LED status indicator (b)	On Off	
Green	See status/error LED.	
LED "Link" (a)	On Active	
Yellow	Link (a connection to a POW- ERLINK network exists)	Blinking (data be- ing transferred)

<sup>)</sup> The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.

<sup>2)</sup> For additional information, see Automation Help (Communication / POWERLINK / General information / Hardware - IF / LS).

# 4.2.3.3.3.1 LED status indicators L1, L2, L3

The LEDs of the interface option are located near the ETH1 interface.

			LED status indica
LED	Color	Status	Explanation
L1	Green	On	POWERLINK 2 link LED A connection to a POWERLINK network exists.
		Blinking	POWERLINK 2 link LED Data is being transferred.
L2	Green	On	POWERLINK 1 link LED A connection to a POWERLINK network exists.
		Blinking	POWERLINK 1 link LED Data is being transferred.
L3	Green-Red	On	POWERLINK status/error LED See "LED "S/E" (LED "Status/Error")" on page 281.
		Off	POWERLINK status/error LED See "LED "S/E" (LED "Status/Error")" on page 281.

## **POWERLINK commissioning and operation**

For a description of the operating modes, status and node numbers of the POWERLINK interface(s), see "LED "S/E" (LED "Status/Error")" on page 281.

# 4.2.3.3.4 Driver support and firmware update

The driver is part of the Automation Runtime and the firmware is part of Automation Studio. The module is automatically brought up to this level.

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

#### 4.2.3.4 5ACCIF01.FPLS-000

#### 4.2.3.4.1 General information

Interface option 5ACCIF01.FPLS-000 is equipped with a POWERLINK and RS232 interface. In addition, 32 kB FRAM is installed.

- 1x POWERLINK interface managing or controlled node
- 1x RS232 interface
- 32 kB FRAM
- Compatible with APC2100/PPC2100 and APC2200/PPC2200

### 4.2.3.4.2 Order data

Order number	Short description	Figure
	Interface options	
5ACCIF01.FPLS-000	Interface card - 1x RS232 interface - 1x POWERLINK interface - 32 kB FRAM - For APC2100/PPC2100/APC2200/PPC2200 - Only available with a new device	
	Optional accessories	
	Terminal blocks	
0TB1210.3100	Connector 300 VDC - 10-pin female - Cage clamp terminal block	
	- Protected against vibration by the screw flange	

#### 4.2.3.4.3 Technical data

# Information:

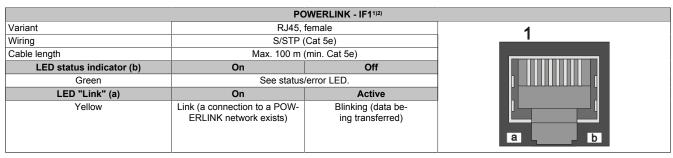
Order number	5ACCIF01.FPLS-000
General information	
LEDs	L2, L3
B&R ID code	0xE540
Certifications	
CE	Yes
UL	cULus E115267
	Industrial control equipment
HazLoc	cULus HazLoc E180196
	Industrial control equipment
	for hazardous locations
DAIN	Class I, Division 2, Groups ABCD, T4 1)
DNV	Temperature: <b>B</b> (0 - 55°C) Humidity: <b>B</b> (up to 100%)
	Vibration: <b>A</b> (0.7 g)
	EMC: <b>B</b> (bridge and open deck) <sup>2)</sup>
EAC	Product family certification
Controller	
FRAM	
Size	32 kB
Data retention	10 years
Read/Write endurance	Min. 10 <sup>12</sup> times/byte
Remanent variables in power failure mode	32 kB (for e.g. Automation Runtime, see Automation Help)
Interfaces	
COM	
Quantity	1
Туре	RS232, modem supported, not galvanically isolated
Variant	10-pin, male
UART	16550-compatible, 16-byte FIFO buffer
Max. baud rate	115 kbit/s
POWERLINK	
Quantity	1
Туре	Type 4 <sup>3)</sup>
Variant	RJ45, shielded
Transfer rate	100 Mbit/s
Transfer	100BASE-TX
Line length	Max. 100 m between two stations (segment length)
Electrical properties	
Power consumption	1.5 W
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2

Order number	5ACCIF01.FPLS-000
Ambient conditions	
Temperature	
Operation	-20 to 55°C
Storage	-20 to 60°C
Transport	-20 to 60°C
Relative humidity	
Operation	5 to 90%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical properties	
Weight	25 g

- 1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
- 2) Yes, but applies only if all components installed in the complete system have this certification and are listed on the associated DNV certificate for the product family.
- 3) For additional information, see Automation Help (Communication / POWERLINK / General information / Hardware IF / LS).

#### 4.2.3.4.3.1 POWERLINK interface - Pinout

The POWERLINK interface on the system unit is referred to as "IF1".



The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.

2) In Automation Studio / Automation Runtime, this interface is referred to as IF1.

### 4.2.3.4.3.2 Serial interface COMA - Pinout

Serial interface COMA on the system unit is referred to as "IFx".

Serial interface COMA - IFx1)2)3)				
	RS232			
Variant	10-pin, male			
Туре	RS232, modem supported			
Galvanic isolation	No			
UART	16550-compatible, 16-byte FIFO buffer			
Transfer rate	Max. 115 kbit/s			
Bus length	Max. 15 m	1 3 5 7 9		
Pin	Pinout			
1	DCD			
2	DSR			
3	RXD	2 4 6 8 10		
4	RTS			
5	TXD			
6	CTS			
7	DTR			
8	RI			
9	GND			
10	Shield			

<sup>1)</sup> The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.

- 2) This interface (if available) is automatically enabled in BIOS as COMA with default addresses I/O:3F8h and IRQ:4.
- In Automation Studio / Automation Runtime, this interface is referred to as IF5.

# Cable data

For more detailed information about the transfer rate, bus length or cable requirements for the respective interfaces/buses, see "Cable data" on page 279.

#### 4.2.3.4.3.3 LED status indicators L2, L3

The LEDs of the interface option are located near the ETH1 interface.

	LED status indicate			ors
LED	Color	Status	Explanation	
L1			Not connected	
L2	Green	On	POWERLINK link LED A connection to a POWERLINK network exists.	
		Blinking	POWERLINK link LED Data is being transferred.	IF option
L3	Green-Red	On	POWERLINK status/error LED See "LED "S/E" (LED "Status/Error")" on page 281.	<b>□</b> L3 <b>□</b> L2 <b>□</b> L1
		Off	POWERLINK status/error LED See "LED "S/E" (LED "Status/Error")" on page 281.	:

#### **POWERLINK commissioning and operation**

For a description of the operating modes, status and node numbers of the POWERLINK interface(s), see "LED "S/E" (LED "Status/Error")" on page 281.

#### 4.2.3.4.4 Shielding

For the interfaces on the 10-pin female connector, the shield of the interfaces can be connected to pin *Shield* (pin 2) of the female connector.

In addition, there is a functional ground connection on the interface cover of the system unit and a screw point for cable shields that can also be used for the shielded cables.

#### 4.2.3.4.5 Driver support and firmware update

Drivers for approved operating systems are available for download in the Downloads section of the B&R website (<a href="https://www.br-automation.com">www.br-automation.com</a>) (if required and not already included in the operating system).

Approved operating systems:

- · Automation Runtime
- B&R Linux
- Windows 10

### Automation Runtime / B&R Hypervisor (RTOS)

The driver is part of the Automation Runtime and the firmware is part of Automation Studio. The module is automatically brought up to this level.

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

All interfaces of the interface option are supported in Automation Runtime / B&R Hypervisor.

### General purpose operating system (GPOS)

If this interface option is used with a GPOS, only operation of the serial port(s) is supported and the firmware update function cannot be used.

#### 4.2.3.5 5ACCIF01.FPLS-001

#### 4.2.3.5.1 General information

Interface option 5ACCIF01.FPLS-001 is equipped with a POWERLINK and RS232 interface. In addition, 512 kB nvSRAM is installed.

- 1x POWERLINK interface managing or controlled node
- 1x RS232 interface
- 512 kB nvSRAM
- Compatible with APC2100/PPC2100 and APC2200/PPC2200

### 4.2.3.5.2 Order data

Order number	Short description	Figure
	Interface options	
5ACCIF01.FPLS-001	Interface card - 1x RS232 interface - 1x POWERLINK interface - 512 kB nvSRAM - For APC2100/PPC2100/APC2200/PPC2200 - Only available with a new device	
	Optional accessories	
	Terminal blocks	
0TB1210.3100	Connector 300 VDC - 10-pin female - Cage clamp terminal block	
	- Protected against vibration by the screw flange	

#### 4.2.3.5.3 Technical data

# Information:

Order number	5ACCIF01.FPLS-001		
General information			
LEDs	L2, L3		
B&R ID code	0xE9B9		
Certifications			
CE	Yes		
UL	cULus E115267		
	Industrial control equipment		
HazLoc	cULus HazLoc E180196		
	Industrial control equipment		
	for hazardous locations		
DANY	Class I, Division 2, Groups ABCD, T4 1)		
DNV	Temperature: <b>B</b> (0 - 55°C) Humidity: <b>B</b> (up to 100%)		
	Vibration: <b>A</b> (0.7 g)		
	EMC: <b>B</b> (bridge and open deck) <sup>2)</sup>		
EAC	Product family certification		
Controller	, , , , , , , , , , , , , , , , , , ,		
nvSRAM			
Size	512 kB		
Data retention	20 years		
Read/Write endurance	Min. 1,000,000		
Remanent variables in power failure mode	256 kB (for e.g. Automation Runtime, see Automation Help)		
Interfaces			
COM			
Quantity	1		
Туре	RS232, modem supported, not galvanically isolated		
Variant	10-pin, male		
UART	16550-compatible, 16-byte FIFO buffer		
Max. baud rate	115 kbit/s		
POWERLINK			
Quantity	1		
Туре	Type 4 3)		
Variant	RJ45, shielded		
Transfer rate	100 Mbit/s		
Transfer	100BASE-TX		
Line length	Max. 100 m between two stations (segment length)		
Electrical properties			
Power consumption	1.5 W		
Operating conditions			
Pollution degree per EN 61131-2	Pollution degree 2		

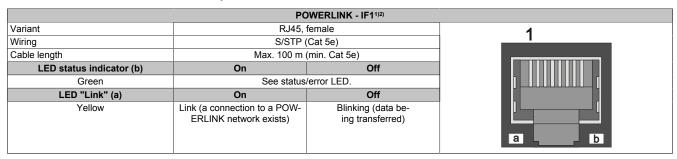
### Technical data

Order number	5ACCIF01.FPLS-001		
Ambient conditions			
Temperature			
Operation	-20 to 55°C		
Storage	-20 to 60°C		
Transport	-20 to 60°C		
Relative humidity			
Operation	5 to 90%, non-condensing		
Storage	5 to 95%, non-condensing		
Transport	5 to 95%, non-condensing		
Mechanical properties			
Weight	25 g		

- 1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
- 2) Yes, but applies only if all components installed in the complete system have this certification and are listed on the associated DNV certificate for the product family.
- 3) For additional information, see Automation Help (Communication / POWERLINK / General information / Hardware IF / LS).

#### 4.2.3.5.3.1 POWERLINK interface - Pinout

The POWERLINK interface on the system unit is referred to as "IF1".



- The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.
- 2) In Automation Studio / Automation Runtime, this interface is referred to as IF1.

### 4.2.3.5.3.2 Serial interface COMA - Pinout

Serial interface COMA on the system unit is referred to as "IFx".

Serial interface COMA - IFx <sup>1/2/3</sup>				
	RS232			
Variant	10-pin, male			
Туре	RS232, modem supported			
Galvanic isolation	No			
UART	16550-compatible, 16-byte FIFO buffer			
Transfer rate	Max. 115 kbit/s			
Bus length	Max. 15 m	1 3 5 7 9		
Pin	Pinout			
1	DCD			
2	DSR			
3	RXD	2 4 6 8 10		
4	RTS			
5	TXD			
6	CTS			
7	DTR			
8	RI			
9	GND			
10	Shield			

- 1) The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.
- 2) This interface (if available) is automatically enabled in BIOS as COMA with default addresses I/O:3F8h and IRQ:4.
- In Automation Studio / Automation Runtime, this interface is referred to as IF5.

# Cable data

For more detailed information about the transfer rate, bus length or cable requirements for the respective interfaces/buses, see "Cable data" on page 279.

#### 4.2.3.5.3.3 LED status indicators L2, L3

The LEDs of the interface option are located near the ETH1 interface.

LED status indicators				ors
LED	Color	Status	Explanation	
L1			Not connected	
L2	Green	On	POWERLINK link LED A connection to a POWERLINK network exists.	
		Blinking	POWERLINK link LED Data is being transferred.	IF option
L3	Green-Red	On	POWERLINK status/error LED See "LED "S/E" (LED "Status/Error")" on page 281.	●L3 ●L2 ●L1
		Off	POWERLINK status/error LED See "LED "S/E" (LED "Status/Error")" on page 281.	<u> </u>

#### **POWERLINK commissioning and operation**

For a description of the operating modes, status and node numbers of the POWERLINK interface(s), see "LED "S/E" (LED "Status/Error")" on page 281.

#### 4.2.3.5.4 Shielding

For the interfaces on the 10-pin female connector, the shield of the interfaces can be connected to pin *Shield* (pin 2) of the female connector.

In addition, there is a functional ground connection on the interface cover of the system unit and a screw point for cable shields that can also be used for the shielded cables.

### 4.2.3.5.5 Driver support and firmware update

Drivers for approved operating systems are available for download in the Downloads section of the B&R website (<a href="https://www.br-automation.com">www.br-automation.com</a>) (if required and not already included in the operating system).

Approved operating systems:

- · Automation Runtime
- B&R Linux
- · Windows 10

### Automation Runtime / B&R Hypervisor (RTOS)

The driver is part of the Automation Runtime and the firmware is part of Automation Studio. The module is automatically brought up to this level.

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

All interfaces of the interface option are supported in Automation Runtime / B&R Hypervisor.

### General purpose operating system (GPOS)

If this interface option is used with a GPOS, only operation of the serial port(s) is supported and the firmware update function cannot be used.

#### 4.2.3.6 5ACCIF01.FPSC-000

#### 4.2.3.6.1 General information

Interface option 5ACCIF01.FPSC-000 is equipped with a POWERLINK, RS232 and CAN bus master interface. In addition, 32 kB FRAM is installed.

- 1x POWERLINK interface managing or controlled node
- · 1x CAN bus master interface
- 1x RS232 interface
- 32 kB FRAM
- Compatible with APC2100/PPC2100 and APC2200/PPC2200

This interface option can only be operated with Automation Runtime.

#### 4.2.3.6.2 Order data

Order number	Short description	Figure
	Interface options	
5ACCIF01.FPSC-000	Interface card - 1x RS232 interface - 1x CAN interface - 1x POWERLINK interface - 32 kB FRAM - For APC2100/PPC2100/APC2200/PPC2200 - Only available with a new device	
	Optional accessories	
	Terminal blocks	
0TB1210.3100	Connector 300 VDC - 10-pin female - Cage clamp terminal block - Protected against vibration by the screw flange	

## 4.2.3.6.3 Technical data

# Information:

Order number 5ACCIF01.FPSC-000		
General information		
LEDs	L1, L2, L3	
B&R ID code	0xE53F	
Certifications		
CE	Yes	
UL	cULus E115267	
	Industrial control equipment	
HazLoc	cULus HazLoc E180196	
	Industrial control equipment	
	for hazardous locations	
DNV	Class I, Division 2, Groups ABCD, T4 1) Temperature: <b>B</b> (0 - 55°C)	
DNV	Humidity: <b>B</b> (up to 100%)	
	Vibration: <b>A</b> (0.7 g)	
	EMC: <b>B</b> (bridge and open deck) <sup>2)</sup>	
EAC	Product family certification	
Controller	·	
FRAM		
Size	32 kB	
Data retention	10 years	
Read/Write endurance	Min. 10 <sup>12</sup> times/byte	
Remanent variables in power failure mode	32 kB	
·	(for e.g. Automation Runtime, see Automation Help)	
Interfaces		
COM		
Quantity	1	
Туре	RS232, modem not supported, not galvanically isolated	
Variant	10-pin, male	
UART	16550-compatible, 16-byte FIFO buffer	
Max. baud rate	115 kbit/s	
POWERLINK		
Quantity	1	
Туре	Type 4 <sup>3)</sup>	
Variant	RJ45, shielded	
Transfer rate	100 Mbit/s	
Transfer	100BASE-TX	
Line length	Max. 100 m between two stations (segment length)	

Order number	5ACCIF01.FPSC-000	
CAN		
Quantity	1	
Variant	10-pin, male, not galvanically isolated	
Transfer rate	Max. 1 Mbit/s	
Terminating resistor		
Туре	Can be switched on and off with slide switch	
Default setting	Off	
Electrical properties		
Power consumption	1.75 W	
Operating conditions		
Pollution degree per EN 61131-2	Pollution degree 2	
Ambient conditions		
Temperature		
Operation	-20 to 55°C	
Storage	-20 to 60°C	
Transport	-20 to 60°C	
Relative humidity		
Operation	5 to 90%, non-condensing	
Storage	5 to 95%, non-condensing	
Transport	5 to 95%, non-condensing	
Mechanical properties		
Weight	25 g	

- 1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
- 2) Yes, but applies only if all components installed in the complete system have this certification and are listed on the associated DNV certificate for the product family.
- 3) For additional information, see Automation Help (Communication / POWERLINK / General information / Hardware IF / LS).

### 4.2.3.6.3.1 POWERLINK interface - Pinout

The POWERLINK interface on the system unit is referred to as "IF1".

POWERLINK - IF1 <sup>1)2)</sup>				
Variant	RJ45, female		1	
Wiring	S/STP (Cat 5e)			
Cable length	Max. 100 m (min. Cat 5e)			
LED status indicator (b)	On Off			
Green	See status/error LED.			
LED "Link" (a)	On Active			
Yellow	Link (a connection to a POW- ERLINK network exists)	Blinking (data be- ing transferred)	a	

The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.

# 4.2.3.6.3.2 Serial interface COM - Pinout

Serial interface COM on the system unit is referred to as "IFx".

Serial interface COM - IFx¹¹²)						
RS232						
Variant	10-pin, male					
Туре	RS232, not modem supported					
Galvanic isolation	No					
UART	16550-compatible, 16-byte FIFO buffer					
Transfer rate	Max. 115 kbit/s					
Bus length	Max. 15 m	1 3 5 7 9				
Pin	Pinout					
1	-					
2	Shield					
3	-	2 4 6 8 10				
4	-					
5	-					
6	-					
7	-					
8	COM GND					
9	RXD					
10	TXD					

The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.

<sup>2)</sup> In Automation Studio / Automation Runtime, this interface is referred to as IF1.

<sup>2)</sup> This interface can only be used in Automation Runtime and is displayed as IF5 in Automation Studio / Automation Runtime. It is not a "PC interface" and therefore not displayed in BIOS.

#### Cable data

For more detailed information about the transfer rate, bus length or cable requirements for the respective interfaces/buses, see "Cable data" on page 279.

### 4.2.3.6.3.3 CAN bus interface - Pinout

The CAN bus interface on the system unit is referred to as "IFx".

	CAN bus - IFx1)2)	
Variant	10-pin, male	
Galvanic isolation	No	
Transfer rate	Max. 1 Mbit/s	
Bus length	Max. 1000 m	
Pin	Pinout	
1	-	1 3 5 7 9
2	Shield	
3	-	
4	-	
5	CAN H	2 4 6 8 10
6	CAN L	
7	CAN GND	
8	-	
9	-	
10	-	

<sup>1)</sup> The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.

# **CAN driver settings**

The baud rate can be set either with predefined values or via the bit timing register.

For additional information about CAN interfaces <u>with AS/AR</u> support, see Automation Help. For additional information about CAN interfaces <u>without AS/AR</u> support, see the user's manual for the B&R CAN driver at <u>www.br-automation.com</u>.

Bit timing register 0	Bit timing register 1	Baud rate
00h	14h	1000 kbit/s
80h or 00h	1Ch	500 kbit/s
81h or 01h	1Ch	250 kbit/s
83h or 03h	1Ch	125 kbit/s
84h or 04h	1Ch	100 kbit/s
89h or 09h	1Ch	50 kbit/s

### Cable data

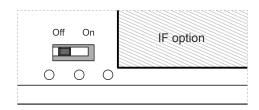
For more detailed information about the transfer rate, bus length or cable requirements for the respective interfaces/buses, see "Cable data" on page 279.

# **Terminating resistor**

A terminating resistor is integrated on the interface option. It is switched on or off for the CAN bus interface with a switch. LED status indicator L1 indicates the current state:

· ON: Activated

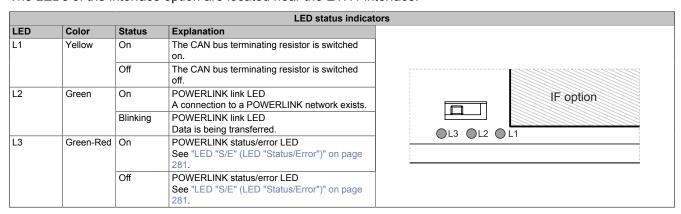
OFF (default): Switched off



<sup>2)</sup> This interface can only be used in Automation Runtime and is displayed as IF3 in Automation Studio / Automation Runtime. It is not a "PC interface" and therefore not displayed in BIOS.

### 4.2.3.6.3.4 LED status indicators L1, L2, L3

The LEDs of the interface option are located near the ETH1 interface.



### **POWERLINK commissioning and operation**

For a description of the operating modes, status and node numbers of the POWERLINK interface(s), see "LED "S/E" (LED "Status/Error")" on page 281.

### 4.2.3.6.4 Shielding

For the interfaces on the 10-pin female connector, the shield of the interfaces can be connected to pin *Shield* (pin 2) of the female connector.

In addition, there is a functional ground connection on the interface cover of the system unit and a screw point for cable shields that can also be used for the shielded cables.

### 4.2.3.6.5 Driver support and firmware update

The driver is part of the Automation Runtime and the firmware is part of Automation Studio. The module is automatically brought up to this level.

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

#### 4.2.3.7 5ACCIF01.FPSC-001

#### 4.2.3.7.1 General information

Interface option 5ACCIF01.FPSC-001 is equipped with a POWERLINK, RS232, CAN bus master and X2X Link master interface. In addition, 512 kB nvSRAM is installed.

- 1x POWERLINK interface managing or controlled node
- · 1x CAN bus master interface
- · 1x X2X Link master interface
- 1x RS232 interface
- 512 kB nvSRAM
- Compatible with APC2100/PC2100 and APC2200/PPC2200

This interface option can only be operated with Automation Runtime.

### 4.2.3.7.2 Order data

Order number	Short description	Figure
	Interface options	
5ACCIF01.FPSC-001	Interface card - 1x RS232 interface - 1x CAN interface - 1x X2X Link Interface - 1x POWERLINK interface - 512 kB nvSRAM - For APC2100/PPC2100/APC2200/PPC2200 - Only available with a new device	Server Vie A
	Optional accessories	
	Terminal blocks	
0TB1210.3100	Connector 300 VDC - 10-pin female - Cage clamp terminal block - Protected against vibration by the screw flange	

### 4.2.3.7.3 Technical data

# Information:

Order number	5ACCIF01.FPSC-001
General information	
LEDs	L1, L2, L3
B&R ID code	0xE9BC
Certifications	
CE	Yes
UL	cULus E115267
	Industrial control equipment
HazLoc	cULus HazLoc E180196
	Industrial control equipment
	for hazardous locations
	Class I, Division 2, Groups ABCD, T4 1)
DNV	Temperature: <b>B</b> (0 - 55°C)
	Humidity: <b>B</b> (up to 100%)
	Vibration: <b>A</b> (0.7 g)
	EMC: <b>B</b> (bridge and open deck) <sup>2)</sup>
EAC	Product family certification
Controller	
nvSRAM	
Size	512 kB
Data retention	20 years
Read/Write endurance	Min. 1,000,000
Remanent variables in power failure mode	256 kB (for e.g. Automation Runtime, see Automation Help)
Interfaces	
COM	
Quantity	1
Туре	RS232, modem not supported, not galvanically isolated
Variant	10-pin, male
UART	16550-compatible, 16-byte FIFO buffer
Max. baud rate	115 kbit/s

Order number	5ACCIF01.FPSC-001
POWERLINK	
Quantity	1
Туре	Type 4 <sup>3)</sup>
Variant	RJ45, shielded
Transfer rate	100 Mbit/s
Transfer	100BASE-TX
Line length	Max. 100 m between two stations (segment length)
CAN	
Quantity	1
Variant	10-pin, male, galvanically isolated
Transfer rate	Max. 1 Mbit/s
Terminating resistor	
Туре	Can be switched on and off with slide switch
Default setting	Off
X2X	
Туре	X2X Link master
Quantity	1
Variant	10-pin, male, galvanically isolated
Electrical properties	
Power consumption	2 W
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Ambient conditions	
Temperature	
Operation	-20 to 55°C
Storage	-20 to 60°C
Transport	-20 to 60°C
Relative humidity	
Operation	5 to 90%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical properties	
Weight	25 g

- 1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
- Yes, but applies only if all components installed in the complete system have this certification and are listed on the associated DNV certificate for the product family.
- 3) For additional information, see Automation Help (Communication / POWERLINK / General information / Hardware IF / LS).

# 4.2.3.7.3.1 POWERLINK interface - Pinout

The POWERLINK interface on the system unit is referred to as "IF1".

	PO	WERLINK - IF11)2)	
Variant	RJ45, f	emale	
Wiring	S/STP (	Cat 5e)	
Cable length	Max. 100 m (	min. Cat 5e)	
LED status indicator (b)	On	Off	
Green	See status/	See status/error LED.	
LED "Link" (a)	On	Active	
Yellow	Link (a connection to a POW- ERLINK network exists)	Blinking (data be- ing transferred)	

- The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.
- 2) In Automation Studio / Automation Runtime, this interface is referred to as IF1.

#### 4.2.3.7.3.2 Serial interface COM - Pinout

Serial interface COM on the system unit is referred to as "IFx".

	Serial interface COM - IFx	
	RS232	
Variant	10-pin, male	]
Туре	RS232, not modem supported	
Galvanic isolation	No	
UART	16550-compatible, 16-byte FIFO buffer	
Transfer rate	Max. 115 kbit/s	
Bus length	Max. 15 m	1 3
Pin	Pinout	
1	-	
2	Shield	
3	-	2 4
4	-	
5	-	
6	-	
7	-	
8	COM GND	
9	RXD	
10	TXD	

<sup>1)</sup> The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.

#### Cable data

For more detailed information about the transfer rate, bus length or cable requirements for the respective interfaces/buses, see "Cable data" on page 279.

#### 4.2.3.7.3.3 CAN bus interface - Pinout

The CAN bus interface on the system unit is referred to as "IFx".

	CAN bus - IFx1)2)	
Variant	10-pin, male	
Galvanic isolation	Yes	
Transfer rate	Max. 1 Mbit/s	
Bus length	Max. 1000 m	
Pin	Pinout	
1	-	1 3 5 7 9
2	Shield	
3	-	
4	-	
5	CAN H	2 4 6 8 10
6	CAN L	
7	CAN GND	
8	-	
9	-	
10	-	

The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.

### **CAN driver settings**

The baud rate can be set either with predefined values or via the bit timing register.

For additional information about CAN interfaces with AS/AR support, see Automation Help. For additional information about CAN interfaces without AS/AR support, see the user's manual for the B&R CAN driver at www.br-automation.com.

Bit timing register 0	Bit timing register 1	Baud rate
00h	14h	1000 kbit/s
80h or 00h	1Ch	500 kbit/s
81h or 01h	1Ch	250 kbit/s
83h or 03h	1Ch	125 kbit/s
84h or 04h	1Ch	100 kbit/s
89h or 09h	1Ch	50 kbit/s

<sup>2)</sup> This interface can only be used in Automation Runtime and is displayed as IF5 in Automation Studio / Automation Runtime. It is not a "PC interface" and therefore not displayed in BIOS.

<sup>2)</sup> This interface can only be used in Automation Runtime and is displayed as IF3 in Automation Studio / Automation Runtime. It is not a "PC interface" and therefore not displayed in BIOS.

#### Cable data

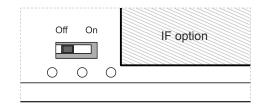
For more detailed information about the transfer rate, bus length or cable requirements for the respective interfaces/buses, see "Cable data" on page 279.

### **Terminating resistor**

A terminating resistor is integrated on the interface option. It is switched on or off for the CAN bus interface with a switch. LED status indicator L1 indicates the current state:

· ON: Activated

· OFF (default): Switched off



#### 4.2.3.7.3.4 X2X Link master interface - Pinout

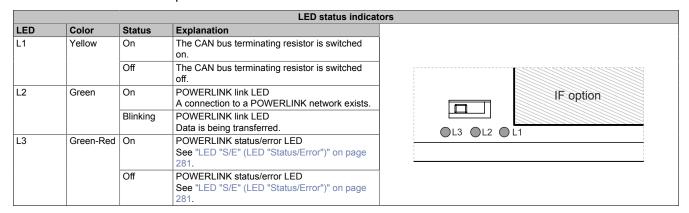
The X2X Link master interface on the system unit is referred to as "IFx".

X2X Link master - IFx¹¹²)		
Variant	10-pin, male	
Galvanic isolation	Yes	
Pin	Pinout	
1	X2X	
2	Shield	1 3 5 7 9
3	X2X\	
4	X2X⊥	
5	-	
6	-	2 4 6 8 10
7	-	
8	-	1
9	-	1
10	-	1

- 1) The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.
- 2) This interface can only be used in Automation Runtime and is displayed as IF2 in Automation Studio / Automation Runtime. It is not a "PC interface" and therefore not displayed in BIOS.

### 4.2.3.7.3.5 LED status indicators L1, L2, L3

The LEDs of the interface option are located near the ETH1 interface.



# **POWERLINK commissioning and operation**

For a description of the operating modes, status and node numbers of the POWERLINK interface(s), see "LED "S/E" (LED "Status/Error")" on page 281.

## 4.2.3.7.4 Shielding

For the interfaces on the 10-pin female connector, the shield of the interfaces can be connected to pin *Shield* (pin 2) of the female connector.

In addition, there is a functional ground connection on the interface cover of the system unit and a screw point for cable shields that can also be used for the shielded cables.

# 4.2.3.7.5 Driver support and firmware update

The driver is part of the Automation Runtime and the firmware is part of Automation Studio. The module is automatically brought up to this level.

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

#### 4.2.3.8 5ACCIF01.FSS0-000

#### 4.2.3.8.1 General information

Interface option 5ACCIF01.FSS0-000 is equipped with 2 RS422/RS485 interfaces.

- 2x RS422/RS485 interfaces
- Compatible with APC2100/PPC2100 and APC2200/PPC2200

#### 4.2.3.8.2 Order data

Order number	Short description	Figure
	Interface options	
5ACCIF01.FSS0-000	Interface card - 2x RS422/RS485 interface - For APC2100/ PPC2100/APC2200/PPC2200 - Only available with a new de- vice	
	Optional accessories	
	Terminal blocks	
0TB1210.3100	Connector 300 VDC - 10-pin female - Cage clamp terminal block - Protected against vibration by the screw flange	

### 4.2.3.8.3 Technical data

# Information:

Order number	5ACCIF01.FSS0-000	
General information		
LEDs	L2, L3	
B&R ID code	0xED7B	
Certifications		
CE	Yes	
UL	cULus E115267	
	Industrial control equipment	
HazLoc	cULus HazLoc E180196	
	Industrial control equipment	
	for hazardous locations	
DANY	Class I, Division 2, Groups ABCD, T4 1)	
DNV	Temperature: <b>B</b> (0 - 55°C) Humidity: <b>B</b> (up to 100%)	
	Vibration: <b>A</b> (0.7 g)	
	EMC: <b>B</b> (bridge and open deck) <sup>2)</sup>	
EAC	Product family certification	
Interfaces	Trouble talling continuation	
COM		
Quantity	2	
Type	RS422/RS485, galvanically isolated	
Variant	10-pin, male	
UART	16550-compatible, 16-byte FIFO buffer	
Max. baud rate	115 kbit/s	
Terminating resistor	110 1000	
Type	Can be switched on and off with slide switch	
Default setting	Off	
Electrical properties		
Power consumption	1W	
Operating conditions	· · · ·	
Pollution degree per EN 61131-2	Pollution degree 2	
Ambient conditions		
Temperature		
Operation	-20 to 60°C <sup>3)</sup>	
Storage	-20 to 60°C	
Transport	-20 to 60°C	
Relative humidity		
Operation	5 to 90%, non-condensing	
Storage	5 to 95%, non-condensing	
Transport	5 to 95%, non-condensing	
Mechanical properties	·	
Weight	25 g	
	a complete system have this certification and the complete system hears the corresponding mark	

- 1) Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.
- Yes, but applies only if all components installed in the complete system have this certification and are listed on the associated DNV certificate for the product family.
- 3) For detailed information, see the temperature tables in the user's manual.

#### 4.2.3.8.3.1 Serial interface COM A - Pinout

Serial interface COM A on the system unit is referred to as "IFx".

	Serial interface COM A
	RS422/RS485
Variant	10-pin, male
Туре	RS422/RS485
Galvanic isolation	Yes
UART	16550-compatible, 16-byte FIFO buffer
Transfer rate	Max. 115 kbit/s
Bus length	Max. 1200 m
Pin	Pinout
1	-
2	-
3	-
4	-
5	-
6	COM GND
7	TXD
8	TXD\
9	RXD
10	RXD\

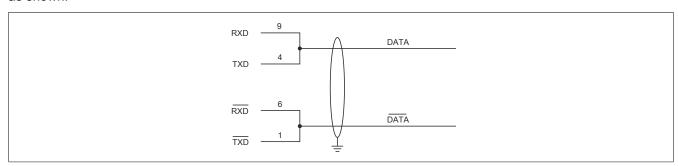
<sup>1)</sup> The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.

#### Cable data

For more detailed information about the transfer rate, bus length or cable requirements for the respective interfaces/buses, see "Cable data" on page 279.

### Operation as RS485 interface

The pins of the RS422 default interface (1, 4, 6 and 9) must be used for operation. To do this, connect the pins as shown.



The RTS line must be switched by the driver for each transmission or reception; switching back does not take place automatically. This cannot be configured in Windows.

With long cable lengths, the voltage drop can result in greater potential differences between the bus devices, which can hinder communication. This can be improved by running the ground wire with the others.

The cable ends of an RS485 bus should be terminated (at least for longer cable lengths or higher transfer rates). Passive termination can normally be used by connecting the signal lines via a 120  $\Omega$  resistor at each of the two bus ends; see "Terminating resistor" for the IF card.

<sup>2)</sup> This interface (if available) is automatically enabled in BIOS as COM A with default addresses I/O:3F8h and IRQ:4.

<sup>3)</sup> This interface is displayed as IF7 in Automation Studio / Automation Runtime.

#### 4.2.3.8.3.2 Serial interface COM D - Pinout

Serial interface COM D on the system unit is referred to as "IFx".

	Serial interface COMD	- IFx <sup>1)2)3)</sup>
	RS422/RS485	
Variant	10-pin, male	
Туре	RS422/RS485	
Galvanic isolation	Yes	
UART	16550-compatible, 16-byte FIFO buffer	
Transfer rate	Max. 115 kbit/s	
Bus length	Max. 1200 m	1 3 5 7 9
Pin	Pinout	
1	RXD	
2	RXD\	
3	TXD	2 4 6 8 10
4	TXD\	
5	COM GND	
6	-	
7	-	
8	-	
9	-	
10	-	

<sup>1)</sup> The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.

### Operating COM D as an RS485 interface

The pins of the RS422 default interface (1, 2, 3 and 4) must be used for operation. To do this, connect the pins as shown.

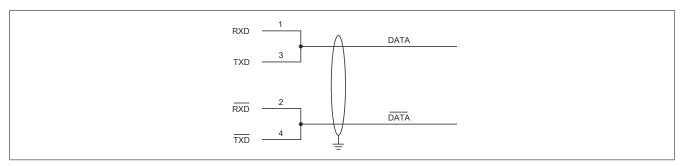


Figure 1: RS232/RS422/RS485 interface - COM D operation in RS485 mode

The RTS line must be switched by the driver for each transmission or reception; switching back does not take place automatically. This cannot be configured in Windows.

With long cable lengths, the voltage drop can result in greater potential differences between the bus devices, which can hinder communication. This can be improved by running the ground wire with the others.

The cable ends of an RS485 bus should be terminated (at least for longer cable lengths or higher transfer rates). Passive termination can normally be used by connecting the signal lines via a 120  $\Omega$  resistor at each of the two bus ends; see "Terminating resistor" for the IF card.

# 4.2.3.8.3.3 LED status indicators L2, L3

The LEDs of the interface option are located near the ETH1 interface.

	LED status indicators			
LED	Color	Status	Explanation	
L1			Not connected	
L2	Yellow	On	The COM D terminating resistor is switched on.	IF option
		Off	The COM D terminating resistor is switched off.	
L3	Yellow	On	The COM A terminating resistor is switched on.	
		Off	The COM A terminating resistor is switched off.	OL3 OL2 OL1

<sup>2)</sup> This interface (if available) is automatically enabled in BIOS as COM D with default addresses I/O:2E8h and IRQ:5.

<sup>3)</sup> This interface is displayed as IF8 in Automation Studio / Automation Runtime.

### 4.2.3.8.3.4 Terminating resistor

One terminating resistor per COM is integrated on the interface option; they are located to the left and right of the RS422/RS485 interface. Both can be switched on or off with a switch. LED status indicators L2 and L3 (see "LED status indicators L2, L3" on page 131) indicate the state of the assigned terminating resistor:



· ON: Switched on

· OFF (default): Switched off

### 4.2.3.8.4 Shielding

The shields of the cables connected to the female 10-pin connector can be connected to the screw point for cable shields, see, as an alternative to the functional ground connection of the interface cover of the system unit.

# 4.2.3.8.5 Driver support

Drivers for approved operating systems are available for download in the Downloads section of the B&R website (<a href="https://www.br-automation.com">www.br-automation.com</a>) (if required and not already included in the operating system).

Approved operating systems:

- · Automation Runtime
- B&R Linux
- Windows 10

#### 4.2.3.9 5ACCIF01.ICAN-000

#### 4.2.3.9.1 General information

Interface option 5ACCIF01.ICAN-000 is equipped with a CAN bus master interface.

- 1x CAN bus master interface
- Compatible with APC2100/PPC2100 and APC2200/PPC2200

#### 4.2.3.9.2 Order data

Order number	Short description	Figure
	Interface options	
5ACCIF01.ICAN-000	Interface card - 1x CAN interface - For APC2100/PPC2100/ APC2200/PPC2200 - Only available with a new device	The same of the sa
	Optional accessories	
	Terminal blocks	0.5
0TB1210.3100	Connector 300 VDC - 10-pin female - Cage clamp terminal block - Protected against vibration by the screw flange	

# 4.2.3.9.3 Technical data

# Information:

Order number	5ACCIF01.ICAN-000	
General information		
LEDs	L1	
B&R ID code	0xE9BB	
Certifications		
CE	Yes	
UL	cULus E115267 Industrial control equipment	
HazLoc	cULus HazLoc E180196 Industrial control equipment for hazardous locations Class I, Division 2, Groups ABCD, T4 1)	
EAC	Product family certification	
Interfaces		
CAN		
Quantity	1	
Controller	Bosch CC770 (compatible with Intel 82527 CAN controller)	
Variant	10-pin, male, galvanically isolated	
Transfer rate	Max. 1 Mbit/s	
Terminating resistor		
Туре	Can be switched on and off with slide switch	
Default setting	Off	
Electrical properties		
Power consumption	0.5 W	
Operating conditions		
Pollution degree per EN 61131-2	Pollution degree 2	
Ambient conditions		
Temperature		
Operation	-20 to 60°C <sup>2)</sup>	
Storage	-20 to 60°C	
Transport	-20 to 60°C	
Relative humidity		
Operation	5 to 90%, non-condensing	
Storage	5 to 95%, non-condensing	
Transport	5 to 95%, non-condensing	
Mechanical properties		
Weight	25 g	

<sup>1)</sup> Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.

<sup>2)</sup> For detailed information, see the temperature tables in the user's manual.

#### 4.2.3.9.3.1 CAN bus interface - Pinout

The CAN bus interface on the system unit is referred to as "IFx".

	CAN bus - IFx1)2)	
Variant	10-pin, male	
Galvanic isolation	Yes	
Transfer rate	Max. 1 Mbit/s	
Bus length	Max. 1000 m	
Pin	Pinout	
1	-	1 3 5 7 9
2	CAN shield	
3	-	
4	-	
5	CAN H	2 4 6 8 10
6	CAN L	
7	CAN GND	
8	-	
9	-	
10	-	

The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.

#### I/O address and IRQ

Resource	Default setting	Function
I/O address	384h (address register)	Defines the register number to be accessed.
	385h (data register)	Access to the register defined in the address register.
IRQ	IRQ:10	Interrupt

## **CAN driver settings**

The baud rate can be set either with predefined values or via the bit timing register.

For additional information about CAN interfaces <u>with AS/AR</u> support, see Automation Help. For additional information about CAN interfaces <u>without AS/AR</u> support, see the user's manual for the B&R CAN driver at <u>www.br-automation.com</u>.

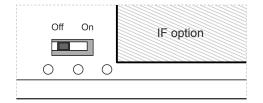
Bit timing register 0	Bit timing register 1	Baud rate
00h	14h	1000 kbit/s
80h or 00h	1Ch	500 kbit/s
81h or 01h	1Ch	250 kbit/s
83h or 03h	1Ch	125 kbit/s
84h or 04h	1Ch	100 kbit/s
89h or 09h	1Ch	50 kbit/s

### **Terminating resistor**

A terminating resistor is integrated on the interface option. It is switched on or off for the CAN bus interface with a switch. LED status indicator L1 indicates the current state:

· ON: Activated

· OFF (default): Switched off



### 4.2.3.9.3.2 LED status indicator L1

The LEDs of the interface option are located near the ETH1 interface.

Color	Status		
	Status	Explanation	
Yellow	On	The CAN bus terminating resistor is switched	
		on.	IF option
	Off	The CAN bus terminating resistor is switched	
		off.	
L2 Not connected		Not connected	□L3 □L2 □L1
Not connected		Not connected	G =
		-	
	Yellow		on.  Off The CAN bus terminating resistor is switched off.  Not connected

<sup>2)</sup> This interface (if available) is automatically enabled in BIOS as CAN with default addresses I/O:384h/385h and IRQ:10.

# 4.2.3.9.4 Shielding

For the interfaces on the 10-pin female connector, the shield of the interfaces can be connected to pin *Shield* (pin 2) of the female connector.

In addition, there is a functional ground connection on the interface cover of the system unit and a screw point for cable shields that can also be used for the shielded cables.

# 4.2.3.9.5 Driver support

Drivers for approved operating systems are available for download in the Downloads section of the B&R website (<a href="https://www.br-automation.com">www.br-automation.com</a>) (if required and not already included in the operating system).

Approved operating systems:

- · Automation Runtime
- B&R Linux
- · Windows 10

#### 4.2.3.10 5ACCIF03.CETH-000

#### 4.2.3.10.1 General information

Interface option 5ACCIF03.CETH-000 is equipped with 2 10/100/1000BASE-T Ethernet interfaces.

- 2x 10/100/1000BASE-T Ethernet interface
- Compatible with APC2200/PPC2200

### 4.2.3.10.2 Order data

Order number	Short description	Figure
	Interface options	
5ACCIF03.CETH-000	Interface card - 2x ETH 10/100/1000 interface - For APC2200/ PPC2200 - Only available with a new device	

#### 4.2.3.10.3 Technical data

# Information:

Order number	5ACCIF03.CETH-000	
General information		
B&R ID code	0xF1A8	
Diagnostics		
Data transfer	Yes, using LED status indicator	
Certifications		
CE	Yes	
UL	cULus E115267 Industrial control equipment	
DNV	Temperature: <b>B</b> (0 - 55°C) Humidity: <b>B</b> (up to 100%) Vibration: <b>A</b> (0.7 g) EMC: <b>B</b> (bridge and open deck) <sup>1)</sup>	
Interfaces		
Ethernet		
Quantity	2	
Controller	Intel I210	
Variant	RJ45, shielded	
Transfer rate	10/100/1000 Mbit/s <sup>2)</sup>	
Line length	Max. 100 m between two stations (segment length)	
Electrical properties		
Power consumption	2 W	
Operating conditions		
Pollution degree per EN 61131-2	Pollution degree 2	
Ambient conditions		
Temperature		
Operation	0 to 60°C 3)	
Storage	-20 to 60°C	
Transport	-20 to 60°C	
Relative humidity		
Operation	5 to 90%, non-condensing	
Storage	5 to 95%, non-condensing	
Transport	5 to 95%, non-condensing	
Mechanical properties		
Weight	Approx. 25 g	

<sup>1)</sup> Yes, but applies only if all components installed in the complete system have this certification and are listed on the associated DNV certificate for the product family.

<sup>2)</sup> Switching takes place automatically.

<sup>3)</sup> For detailed information, see the temperature tables in the user's manual.

#### 4.2.3.10.3.1 ETH3 and ETH4 - Pinout

LEDs are integrated on the interface option. The ETH interfaces on the system unit are referred to as IF options.

		Ethernet interfaces (ETH3	and ETH4) <sup>1)</sup>
Variant	RJ45, female		
Controller	Intel	I210	] - ETH4 ETH3
Wiring	S/STP (	(Cat 5e)	
Transfer rate	10/100/1000 Mbit/s <sup>2)</sup>		
Cable length	Max. 100 m (min. Cat 5e)		│ ╟─╢ ╟─╢ ╟─╢ I
LED "Speed" (b)	On	Off	
Green	100 Mbit/s	10 Mbit/s <sup>3)</sup>	]
Orange (dark)	1000 Mbit/s	-	
LED "Link" (a)	On	Active	
Orange (light)	Link (a connection to an	Blinking (data be-	
	Ethernet network exists)	ing transferred)	

<sup>1)</sup> The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.

# 4.2.3.10.4 Driver support

Drivers for approved operating systems are available for download in the Downloads section of the B&R website (<a href="https://www.br-automation.com">www.br-automation.com</a>) (if required and not already included in the operating system).

Approved operating systems:

- B&R Linux
- Windows 10

# Information:

Necessary drivers must be downloaded from the B&R website, not from manufacturer websites.

Wake-on-LAN (WoL) and PXE boot are not supported.

<sup>2)</sup> Switching takes place automatically.

The 10 Mbit/s transfer rate / connection is only available if LED "Link" is active at the same time.

# Technical data

# 4.2.4 CFast cards

For detailed information about compatible CFast cards, see the <u>aggregate data sheet for CFast cards</u> on the B&R website.

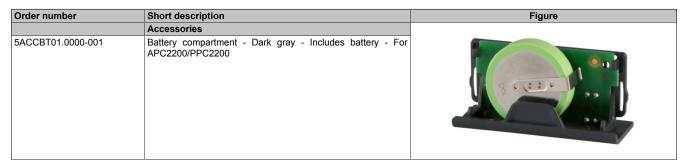
# 4.2.5 Battery compartment

#### 4.2.5.1 General information

The lithium battery is needed to retain BIOS CMOS data and to back up the real-time clock (RTC).

The battery is subject to wear and must be replaced if the battery capacity is insufficient (state "Bad").

#### 4.2.5.2 Order data



For the battery compartment replacement part, see "5ACCRPC2.0003-000" on page 262.

### 4.2.5.3 Technical data

# Information:

Order number	5ACCBT01.0000-001
General information	
Battery	
Туре	Panasonic 1000 mAh
Nominal voltage	3 V
Service life	8 years 1)
Removable	No <sup>2)</sup>
Variant	Lithium
Certifications	
CE	Yes
UL	cULus E115267
	Industrial control equipment
DNV	Temperature: <b>B</b> (0 - 55°C)
	Humidity: <b>B</b> (up to 100%)
	Vibration: A (0.7 g)
	EMC: <b>B</b> (bridge and open deck) <sup>3)</sup>
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 gray (similar to Pantone 432C) plastic
Weight	Approx. 13 g

At 50°C, 6 μA for the components being supplied.

<sup>2)</sup> The battery is permanently installed in the battery compartment and cannot be replaced. The entire battery compartment must always be replaced, see section "Accessories".

<sup>3)</sup> Yes, but applies only if all components installed in the complete system have this certification and are listed on the associated DNV certificate for the product family.

# 4.2.6 Mounting units

#### 4.2.6.1 5ACCMA00.0000-000

#### 4.2.6.1.1 General information

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

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

#### 4.2.6.1.2 Order data

Order number	Short description	Figure
	Mounting units	100
5ACCMA00.0000-000	AP5000 swing arm mounting unit	
	Optional accessories	
	Flanges	[ S
5ACCFL00.0000-000	AP5000 flange - Swing arm rotary flange - For swing arm mount-	
	ing unit	- Control of the Cont
5ACCFL00.0100-000	AP5000 flange - Swivel-tilt flange for swing arm - For swing arm	
	mounting unit	
5ACCFL00.0200-000	AP5000 flange - Swing arm flange adapter - For Rittal - For	
	swing arm mounting unit	

#### 4.2.6.1.3 Technical data

# Information:

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

<sup>1)</sup> Only with proper installation on the panel and proper installation on the swing arm.

#### 4.2.6.2 5ACCMA00.0001-000

#### 4.2.6.2.1 General information

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

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

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

#### 4.2.6.2.2 Order data

Order number	Short description	Figure
	Mounting units	
5ACCMA00.0001-000	AP5000 swing arm mounting unit - 1x rear USB interface	
	Optional accessories	
	Flanges	
5ACCFL00.0000-000	AP5000 flange - Swing arm rotary flange - For swing arm mount-	A Section 18
	ing unit	
5ACCFL00.0100-000	AP5000 flange - Swivel-tilt flange for swing arm - For swing arm	
	mounting unit	
5ACCFL00.0200-000	AP5000 flange - Swing arm flange adapter - For Rittal - For	
	swing arm mounting unit	

### 4.2.6.2.3 Technical data

# Information:

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

<sup>1)</sup> Only with proper installation on the panel and proper installation on the swing arm.

#### 4.2.6.2.4 USB interface

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

# Caution!

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

# Warning!

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

# Caution!

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

### **USB** on mounting unit

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

# Information:

In the default configuration, the USB interface is the USB1 interface on the system unit; this can vary depending on the defined configuration.

	USB on mounting	unit
Standard	USB 2.0	
Variant	Type A, female	
Transfer rate	Low speed (1.5 Mbit/s)	
	Full speed (12 Mbit/s)	
	High speed (480 Mbit/s)1)	
Current-carrying capacity <sup>2)</sup>	Max. 0.5 A	7 W L <u>4HH-1</u> L W N
Cable length		
USB 2.0	<3 m (without hub)	
	-	
		***************************************

In SDL operation without USB cable (mode 1), the USB transfer rate is limited to USB 1.1.
 In SDL3 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (30 Mbit/s)
 In SDL4 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (150 Mbit/s)

<sup>2)</sup> The USB interface is protected by a maintenance-free "USB current-limiting switch" (max. 0.5 A).

#### 4.2.6.3 5ACCMA00.0002-000

#### 4.2.6.3.1 General information

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

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

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

#### 4.2.6.3.2 Order data

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

### 4.2.6.3.3 Technical data

# Information:

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

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

#### 4.2.6.3.4 USB interface

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

# Caution!

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

# Warning!

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

# Caution!

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

# **USB** on mounting unit

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

### Information:

In the default configuration, the USB interfaces are the USB1 and USB 2 interfaces on the system unit, though this can vary depending on the defined configuration.

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

In SDL operation without USB cable (mode 1), the USB transfer rate is limited to USB 1.1.
 In SDL3 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (30 Mbit/s)
 In SDL4 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (150 Mbit/s)

<sup>2)</sup> The USB interface is protected by a maintenance-free "USB current-limiting switch" (max. 0.5 A).

### 4.2.6.4 5ACCMA00.0100-000

### 4.2.6.4.1 General information

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

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

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

AP5000 with system unit	5ACCMA00.010x-000
5PPC2200.ALxx-000 with heat pipe 5ACCHP00.0003-000	✓

# Notice!

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

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

### 4.2.6.4.2 Order data

Order number	Short description	Figure
	Mounting units	
5ACCMA00.0100-000	HMI mounting unit VESA IP54 - Leak tightness is only provided with suitable cable grommets.	0
	Required accessories	
	Cable grommets	
5ACCCG00.0000-000	Cable grommet lens	
5ACCCG00.0304-000	Cable grommet 3-4 mm	
5ACCCG00.0405-000	Cable grommet 4-5 mm	
5ACCCG00.0506-000	Cable grommet 5-6 mm	· 518
5ACCCG00.0607-000	Cable grommet 6-7 mm	
5ACCCG00.0708-000	Cable grommet 7-8 mm	0
5ACCCG00.0809-000	Cable grommet 8-9 mm	
5ACCCG00.0910-000	Cable grommet 9-10 mm	
5ACCCG00.1011-000	Cable grommet 10-11 mm	
5ACCCG00.1112-000	Cable grommet 11-12 mm	
5ACCCG00.1213-000	Cable grommet 12-13 mm	
5ACCCG00.1314-000	Cable grommet 13-14 mm	
5ACCCG00.1415-000	Cable grommet 14-15 mm	
	Optional accessories	
	Heat pipe	
5ACCHP00.0004-000	AP5000 heat pipe - For PPC2100 (5PPC2100.BYxx-002) - For VESA mounting unit	

# 4.2.6.4.3 Technical data

# Information:

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

# Technical data

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

<sup>1)</sup> Only with proper installation on the panel.

### 4.2.6.5 5ACCMA00.0101-000

### 4.2.6.5.1 General information

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

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

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

AP5000 with system unit	5ACCMA00.010x-000
5PPC2200.ALxx-000 with heat pipe 5ACCHP00.0003-000	✓

# Notice!

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

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

#### 4.2.6.5.2 Order data

Order number	Short description	Figure
	Mounting units	
5ACCMA00.0101-000	HMI mounting unit VESA IP54 w/USB - Leak tightness is only provided with suitable cable grommets.	0
	Required accessories	0
	Cable grommets	
5ACCCG00.0000-000	Cable grommet lens	
5ACCCG00.0304-000	Cable grommet 3-4 mm	U
5ACCCG00.0405-000	Cable grommet 4-5 mm	. 10
5ACCCG00.0506-000	Cable grommet 5-6 mm	0
5ACCCG00.0607-000	Cable grommet 6-7 mm	0
5ACCCG00.0708-000	Cable grommet 7-8 mm	
5ACCCG00.0809-000	Cable grommet 8-9 mm	
5ACCCG00.0910-000	Cable grommet 9-10 mm	
5ACCCG00.1011-000	Cable grommet 10-11 mm	
5ACCCG00.1112-000	Cable grommet 11-12 mm	
5ACCCG00.1213-000	Cable grommet 12-13 mm	
5ACCCG00.1314-000	Cable grommet 13-14 mm	
5ACCCG00.1415-000	Cable grommet 14-15 mm	
	Optional accessories	
	Heat pipe	
5ACCHP00.0004-000	AP5000 heat pipe - For PPC2100 (5PPC2100.BYxx-002) - For VESA mounting unit	

### 4.2.6.5.3 Technical data

# Information:

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

### Technical data

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

<sup>1)</sup> Only with proper installation on the panel.

#### 4.2.6.5.4 USB interface

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

# Caution!

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

# Warning!

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

# Caution!

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

### **USB** on mounting unit

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

# Information:

In the default configuration, the USB interface is the USB1 interface on the system unit; this can vary depending on the defined configuration.

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

In SDL operation without USB cable (mode 1), the USB transfer rate is limited to USB 1.1.
 In SDL3 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (30 Mbit/s)
 In SDL4 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (150 Mbit/s)

The USB interface is protected by a maintenance-free "USB current-limiting switch" (max. 0.5 A).

### 4.2.6.6 5ACCMA01.0100-000

### 4.2.6.6.1 General information

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

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

# 4.2.6.6.2 Order data

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

### 4.2.6.6.3 Technical data

# Information:

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

<sup>1)</sup> Only with proper installation on the panel.

# 4.2.7 Flanges

### 4.2.7.1 5ACCFL00.0000-000

### 4.2.7.1.1 General information

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

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

### 4.2.7.1.2 Order data

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

### 4.2.7.1.3 Technical data

# Information:

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

#### 4.2.7.2 5ACCFL00.0100-000

### 4.2.7.2.1 General information

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

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

# Warning!

The swivel-tilt flange is generally compatible with all panel sizes.

Use in conjunction with panels in portrait format is not recommended since the range of rotation and tilt cannot be fully utilized.

# Caution!

After adjusting the rotation and/or tilt angle, the corresponding locking lever must be fixed in position (see above for the maximum tightening torques).

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

### 4.2.7.2.2 Order data

Short description	Figure
Flanges	
AP5000 flange - Swivel-tilt flange for swing arm - For swing arm mounting unit	
	Flanges AP5000 flange - Swivel-tilt flange for swing arm - For swing arm

### 4.2.7.2.3 Technical data

# Information:

Order number	5ACCFL00.0100-000
General information	
Certifications	
CE	Yes
UL	cULus E115267
	Industrial control equipment
EAC	Product family certification
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Mechanical properties	
Material	Anodized aluminum E6/C0

# Technical data

Order number	5ACCFL00.0100-000
Dimensions	
Height	147 mm
Diameter	90 mm
Weight	1666 g

# Danger!

+24 VDC power supply

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

### 4.2.7.3 5ACCFL00.0200-000

### 4.2.7.3.1 General information

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

· Adapter for Rittal coupling CP40 (steel)

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

### 4.2.7.3.2 Order data

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

### 4.2.7.3.3 Technical data

# Information:

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

# 4.2.8 Expansion units

For more information regarding expansion units and operating elements, see section "Equipping panels with expansion units" on page 57.

### 4.2.8.1 5ACCKP00.xxxx-000

#### 4.2.8.1.1 General information

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

For specifications regarding the operating and switching elements used by B&R, see section "Features" under "5ACCSE00.000x-00x" on page 287.

# Information:

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

#### 4.2.8.1.2 Order data

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

# 4.2.8.1.3 Technical data

# Information:

Order number	5ACCKP00.156B-000	5ACCKP00.185B-000	5ACCKP00.215C-000	5ACCKP00.215I-000	5ACCKP00.240C-000	
General information						
Certifications						
CE			Yes			
UL		cULus E115267				
	Industrial control equipment					
EAC		Product family certification				
Features						
Optional operating elements						
Quantity	10	11	13	7	14	

# Technical data

Order number	5ACCKP00.156B-000	5ACCKP00.185B-000	5ACCKP00.215C-000	5ACCKP00.215I-000	5ACCKP00.240C-000
Operating conditions					
Pollution degree per EN 61131-2	Pollution degree 2				
Mechanical properties					
Material	Steel sheet				
Weight	60	0 g	800 g	500 g	900 g

### 4.2.8.2 5ACCKP01.xxxx-000

### 4.2.8.2.1 General information

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

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

### 4.2.8.2.2 Order data

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

### 4.2.8.2.3 Technical data

# Information:

Order number	5ACCKP01.156B-000	5ACCKP01.185B-000 5A0	CCKP01.215C-000	5ACCKP01.215I-000	5ACCKP01.240C-000
General information					
Certifications					
CE			Yes		
UL		-	cULus E115267		
		Indust	trial control equipmer	nt	
EAC		Produ	uct family certification	1	
Interfaces					
USB					
Quantity			1		
Туре			USB 2.0		
Variant			Type A		
Transfer rate		Low speed (1.5 Mbit/s), full s	speed (12 Mbit/s) to h	nigh speed (480 Mbit/s)	
Current-carrying capacity			500 mA		
Features					
Pushbuttons					
Quantity			2 (green, red)		
Туре		RAFIX 22 FS+, 1.30.270.0	021/2500 (green), 1.3	0.270.021/2300 (red)	
Contact element			Momentary		
Selector switch					
Quantity			1		
Туре		RAFIX 22 FS+, 1.30.272.102/2200			
Contact element		Maintained			
Key switch					
Quantity			1		
Туре		RAFIX 22 FS 1.30.255.222/0000			
Contact element			Maintained		

Order number	5ACCKP01.156B-000	5ACCKP01.185B-000	5ACCKP01.215C-000	5ACCKP01.215I-000	5ACCKP01.240C-000
Emergency stop					
Quantity			1		
Туре		RAFIX 2	2 FS+, Plus 1, 1.30.273.	512/0300	
Contact element	Maintained				
Operating conditions					
Pollution degree per EN 61131-2		Pollution degree 2			
Mechanical properties					
Material	Steel sheet				
Weight	800 g	900 g	1000 g	700 g	1100 g

### 4.2.8.2.4 USB interface

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

# Caution!

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

# Warning!

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

# Caution!

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

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

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

<sup>1)</sup> The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.

<sup>2)</sup> In SDL operation without USB cable (mode 1), the USB transfer rate is limited to USB 1.1. In SDL3 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (30 Mbit/s) In SDL4 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (150 Mbit/s)

The USB interface is protected by a maintenance-free "USB current-limiting switch" (max. 0.5 A).

### 4.2.8.3 5ACCKP03.xxxx-000

### 4.2.8.3.1 General information

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

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

### 4.2.8.3.2 Order data

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

# 4.2.8.3.3 Technical data

# Information:

Order number	5ACCKP03.185B-000	5ACCKP03.215C-000	5ACCKP03.240C-000
General information			
Certifications			
CE		Yes	
UL		cULus E115267	
		Industrial control equipment	
FCC		Contains FCC ID: 2ADFV-RFM-2-NF	=
IC		Contains IC: 12444A-RFM2NF	
Interfaces			
USB			
Quantity		1	
Туре		USB 2.0	
Variant		Type A	
Transfer rate	Low speed (1.5 N	lbit/s), full speed (12 Mbit/s) to high s	speed (480 Mbit/s)
Current-carrying capacity		500 mA	
RFID read/write transponder unit			
Variant		RFM-2-NF	
Туре		ELATEC TWN4 MultiTech Nano	
Frequency	Short range device (SRD) 13.56 MHz		
Output power	Max. 8.13 dB μA/m @10 m		
Standard	ISO14443A/B, ISO15693, ISO18092 / ECMA-340 (NFC)		
Read/Write range in air		Up to 2 cm (depends on transponder	)
Features	·		
Pushbuttons			
Quantity		2 (green, red)	
Туре	RAFIX 22 FS+,	1.30.270.021/2500 (green), 1.30.270	0.021/2300 (red)
Contact element		Momentary	
Selector switch			
Quantity		1	
Туре	RAFIX 22 FS+, 1.30.272.102/2200		
Contact element		Maintained	

Order number	5ACCKP03.185B-000	5ACCKP03.215C-000	5ACCKP03.240C-000	
Key switch				
Quantity		1		
Туре		RAFIX 22 FS 1.30.255.222/0000		
Contact element		Maintained		
Emergency stop				
Quantity		1		
Туре	R	RAFIX 22 FS+, Plus 1, 1.30.273.512/0300		
Contact element		Maintained		
Operating conditions				
Pollution degree per EN 61131-2		Pollution degree 2		
Mechanical properties				
Material		Steel sheet		
Weight	900 g	1000 g	1100 g	

### 4.2.8.3.4 B&R wireless assembly

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

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

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

### 4.2.8.3.4.1 Drivers, software and documentation

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

#### 4.2.8.3.5 USB interface

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

### Caution!

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

# Warning!

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

### Caution!

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

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

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

The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.

<sup>2)</sup> In SDL operation without USB cable (mode 1), the USB transfer rate is limited to USB 1.1. In SDL3 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (30 Mbit/s) In SDL4 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (150 Mbit/s)

<sup>3)</sup> The USB interface is protected by a maintenance-free "USB current-limiting switch" (max. 0.5 A).

### 4.2.8.4 5ACCKP04.xxxx-000

### 4.2.8.4.1 General information

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

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

# 4.2.8.4.2 Order data

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

# 4.2.8.4.3 Technical data

# Information:

Order number	5ACCKP04.156B-000	5ACCKP04.185B-000	5ACCKP04.215C-000	5ACCKP04.215I-000	5ACCKP04.240C-000
General information					
Certifications					
CE			Yes		
UL			cULus E115267		
		In	dustrial control equipme	nt	
EAC		F	Product family certification	n	
Interfaces					
USB					
Quantity			1		
Туре			USB 2.0		
Variant			Type A		
Transfer rate		Low speed (1.5 Mbit/s),	full speed (12 Mbit/s) to	high speed (480 Mbit/s)	
Current-carrying capacity			500 mA		
Features					
Pushbuttons					
Quantity	3 (blue, green, red)				
Туре	RAFIX 22 FS+, 1.30.270.021/2600 (blue), 1.30.270.021/2500 (green), 1.30.270.021/2300 (red)			1/2300 (red)	
Contact element			Momentary		
Key switch					
Quantity	1				
Туре		RAF	IX 22 FS 1.30.255.222/0	0000	
Contact element			Maintained		
Emergency stop		-			_
Quantity			1		
Туре	RAFIX 22 FS+, Plus 1, 1.30.273.512/0300				
Contact element	Maintained				
Operating conditions					
Pollution degree per EN 61131-2	Pollution degree 2				
Mechanical properties					
Material	Steel sheet				
Weight	800 g	900 g	1000 g	700 g	1100 g

#### 4.2.8.4.4 USB interface

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

# Caution!

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

# Warning!

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

# Caution!

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

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

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

The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.

<sup>2)</sup> In SDL operation without USB cable (mode 1), the USB transfer rate is limited to USB 1.1. In SDL3 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (30 Mbit/s) In SDL4 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (150 Mbit/s)

<sup>3)</sup> The USB interface is protected by a maintenance-free "USB current-limiting switch" (max. 0.5 A).

### 4.2.8.5 5ACCKP05.xxxx-000

### 4.2.8.5.1 General information

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

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

### 4.2.8.5.2 Order data

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

### 4.2.8.5.3 Technical data

# Information:

Order number	5ACCKP05.185B-000	5ACCKP05.215C-000	5ACCKP05.240C-000	
General information				
Certifications				
CE		Yes		
UL		cULus E115267		
		Industrial control equipment		
FCC		Contains FCC ID: 2ADFV-RFM-2-NF	=	
IC		Contains IC: 12444A-RFM2NF		
Interfaces				
USB				
Quantity		1		
Туре		USB 2.0		
Variant		Type A		
Transfer rate	Low speed (1.5 N	lbit/s), full speed (12 Mbit/s) to high s	speed (480 Mbit/s)	
Current-carrying capacity		500 mA		
RFID read/write transponder unit				
Variant		RFM-2-NF		
Туре		ELATEC TWN4 MultiTech Nano		
Frequency		Short range device (SRD) 13.56 MHz		
Output power		Max. 8.13 dB μA/m @10 m		
Standard	ISO14443	BA/B, ISO15693, ISO18092 / ECMA-	340 (NFC)	
Read/Write range in air		Up to 2 cm (depends on transponder	)	
Features				
Pushbuttons				
Quantity		3 (blue, green, red)		
Туре	RAFIX 22 FS+, 1.30.270.021	/2600 (blue), 1.30.270.021/2500 (gre	een), 1.30.270.021/2300 (red)	
Contact element		Momentary		
Key switch				
Quantity	1			
Туре		RAFIX 22 FS 1.30.255.222/0000		
Contact element		Maintained		

Order number	5ACCKP05.185B-000	5ACCKP05.215C-000	5ACCKP05.240C-000	
Emergency stop			-	
Quantity		1		
Туре	RA	FIX 22 FS+, Plus 1, 1.30.273.512/0	300	
Contact element		Maintained		
Operating conditions				
Pollution degree per EN 61131-2	Pollution degree 2			
Mechanical properties				
Material		Steel sheet		
Weight	900 g	1000 g	1100 g	

### 4.2.8.5.4 B&R wireless assembly

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

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

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

### 4.2.8.5.4.1 Drivers, software and documentation

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

#### 4.2.8.5.5 USB interface

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

### Caution!

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

# Warning!

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

### Caution!

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

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

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

The interfaces, etc. available on the device or module have been numbered for the purpose of clear differentiation. This numbering may deviate from the numbering used by the respective operating system, however.

<sup>2)</sup> In SDL operation without USB cable (mode 1), the USB transfer rate is limited to USB 1.1. In SDL3 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (30 Mbit/s) In SDL4 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (150 Mbit/s)

<sup>3)</sup> The USB interface is protected by a maintenance-free "USB current-limiting switch" (max. 0.5 A).

# 4.2.8.6 5ACCKPSx.xxxx-xxx

Safe variants of expansion units are also available. For details, see <a href="https://www.br-automation.com">www.br-automation.com</a>.

### 4.2.9 Handles

# 4.2.9.1 5ACCHD0x.xxxx-000

### 4.2.9.1.1 General information

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

Handles are not factory-installed and must be mounted after delivery. For information about installation, see section "Installing the handles" on page 190.

### 4.2.9.1.2 Order data

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

### 4.2.9.1.3 Technical data

# Information:

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

### 5ACCHD00.xxxx-000

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

### 5ACCHD01.xxxx-000

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

# 4.2.9.1.4 Content of delivery

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



# 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 12 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. Builtin or connected peripheral devices (e.g. USB hubs) are not permitted to introduce any voltage into the device.

### Installation

# Information:

Optional sets are available that contain all necessary tools for installation. For additional information about tool sets, see section "Installation accessories" on page 263.

# **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 plate 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 and ambient conditions must be taken into account see "Environmental properties" on page 38.

#### **General installation instructions**

- The device must be installed in such a way that it can be optimally viewed by the user.
- The device must be installed in such a way that reflections on the screen are avoided as far as possible.
- When connecting installed or connected peripherals, follow the instructions in the peripheral device's documentation.

# Information about leak tightness

# Warning!

# Failure to follow instructions can result in damage to property.

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

### Transport and storage

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.

#### 5.1.1 Panel PC 2200 - Installation

The Panel PC is installed on a swing arm system using a rotary flange.

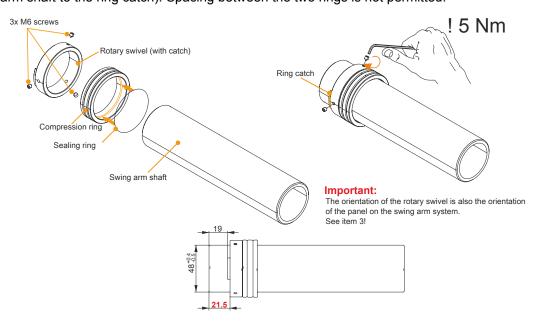
### 5.1.1.1 Installation with flange

## Information:

Before installing the Panel PC on a swing arm system, it must be checked as to whether the sealing ring is installed on the flange. In addition, only the flange must be installed on the Panel PC. For the defined procedure, see section "Installing the 5ACCFL00.0000-000 rotary flange" on page 175.

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

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



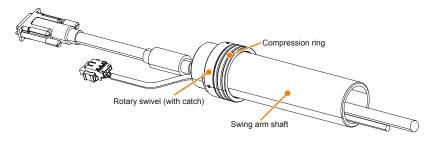
# Warning!

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

# Warning!

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

2. Feed the necessary cables through the swing arm shaft.



### Installation and wiring

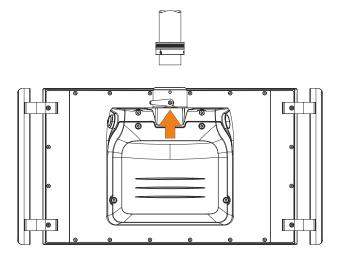
3. Connect the Panel PC to the swing arm system. The rings must be installed in such a way that the ring catch of the rotary swivel points forward towards the panel. The Panel PC has been installed correctly if the upper ring is flush with the flange. Fasten the assembly to the swing arm shaft using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

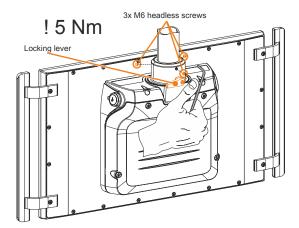
Installation on a swing arm system is possible from the top or bottom depending on how the mounting unit is installed on the panel and the resulting position of the flange output.

# Caution!

After setting the rotation and/or tilt angle, the corresponding locking lever must be locked into position. For the maximum tightening torques, see the description of the flange used.

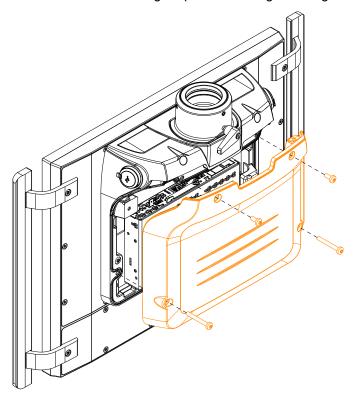
The screw in the locking lever is not permitted to be tightened. Fixing must be carried out exclusively with the locking lever.





# 5.1.2 Removing the mounting unit cover

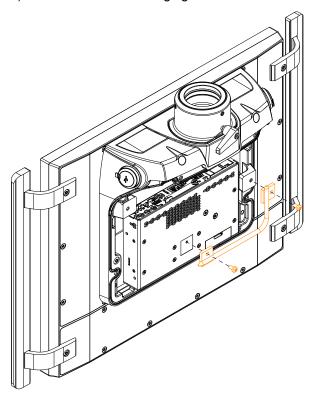
- 1. Disconnect the power supply cable to the Panel PC (disconnect the power cable!). Disconnect from all sources and poles!
- 2. Carry out electrostatic discharge at the ground connection.
- 3. Remove the Torx screws (T25) indicated in the following figure. Insert a flat-blade screwdriver into the slot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



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

# 5.1.3 Disassembling the heat pipe

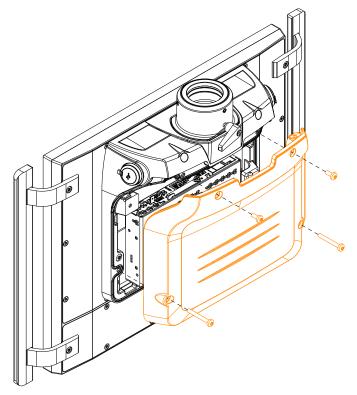
- 1. Disconnect the power supply cable to the Panel PC (disconnect the power cable!). Disconnect from all sources and poles!
- 2. Carry out electrostatic discharge at the ground connection.
- 3. Remove the mounting unit cover, see "Removing the mounting unit cover" on page 171.
- 4. Disconnect all connected cables.
- 5. Disconnect the Panel PC from the swing arm system by following the steps provided in section "Panel PC 2200 Installation" on page 169 in reverse order.
- 6. Remove the Torx screws (T20) indicated in the following figure.



- 7. Heat pipe .0002-000 or 5ACCHP00.0003-000 can be removed.
- 8. The heat pipe is installed by performing these steps in reverse order. The max. tightening torque of the Torx screws (T20) is 1.24 Nm.
- 9. Replace the mounting unit cover with the 4 Torx screws (T25) removed earlier (tightening torque of the M5x12 screws: 3.5 Nm, for the M5x40 screws: 9.75 Nm). The mounting unit cover must be installed correctly to ensure IP65 protection.

# 5.1.4 Disassembling the system unit

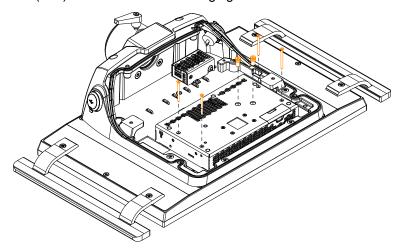
- 1. Disconnect the power supply cable to the Panel PC (disconnect the power cable!). Disconnect from all sources and poles!
- 2. Carry out electrostatic discharge at the ground connection.
- 3. Remove the Torx screws (T25) indicated in the following figure. Insert a flat-blade screwdriver into the slot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



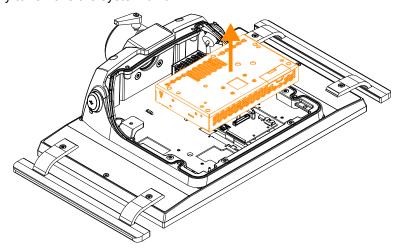
- 4. Disconnect all connected cables.
- 5. Disconnect the Panel PC from the swing arm system by performing the steps provided in section "Panel PC 2200 Installation" on page 169 in reverse order.
- 6. Place the Panel PC on a clean, flat surface.

The following steps can only be performed after the heat pipe has been removed as described in section "Disassembling the heat pipe" on page 172.

7. Remove the Torx screws (T10) indicated in the following figure.



8. Pull firmly and evenly to remove the system unit.



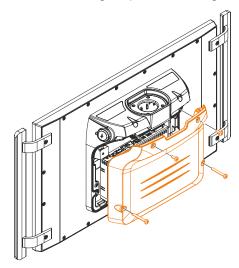
- 9. The system unit can be reinstalled in reverse order. The max. tightening torque of the Torx screws (T10) is 0.5 Nm.
- 10.Replace the mounting unit cover with the 4 Torx screws removed earlier (tightening torque of the M5x12 screws: 3.5 Nm, for the M5x40 screws: 9.75 Nm). The cover must be installed correctly to ensure IP65 protection.

# 5.1.5 Installing accessories

# 5.1.5.1 Installing the 5ACCFL00.0000-000 rotary flange

The following requirements must be met:

- · All connected cables must be disconnected.
- · The Panel PC must no longer be installed on the VESA or swing arm system.
- 1. Disconnect the power supply cable to the Panel PC (disconnect the power cable!). Disconnect from all sources and poles!
- 2. Carry out electrostatic discharge at the ground connection.
- 3. Place the Panel PC on a clean, flat surface.
- 4. Remove the Torx screws (T25) indicated in the following figure. Insert a flat-blade screwdriver into the slot from the side and remove the cover. Avoid causing irreparable damage to the gasket.



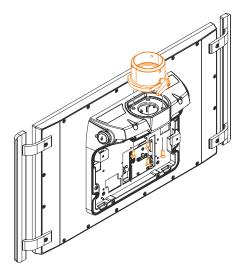
- 5. The heat pipe and system unit must be removed in that order before the rotary flange can be installed. For the defined procedure, see section "Disassembling the system unit" on page 173.
- 6. Check whether the sealing ring is inserted in the rotary flange. If the sealing ring is not installed in the rotary flange, it must be inserted into the sealing recess.





# Installation and wiring

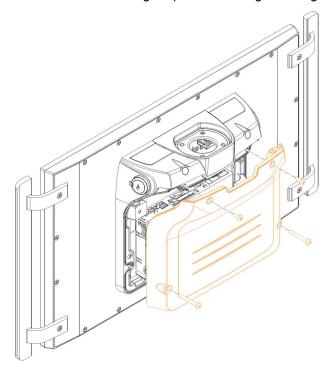
7. Place the rotary flange in the intended opening on the mounting unit with the locking lever pointing towards the mounting unit. Fasten it to the mounting unit using the 4 provided Torx screws (T30) with a tightening torque of 7.2 Nm.



### 5.1.5.2 Installing the 5ACCFL00.0100-000 swivel-tilt flange

The following requirements must be met:

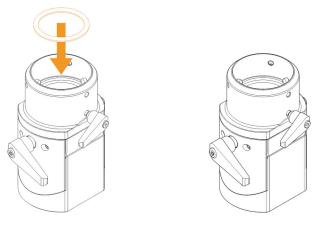
- All connected cables must be disconnected.
- · The Panel PC must no longer be installed on the VESA or swing arm system.
- 1. Disconnect the power supply cable to the Panel PC (disconnect the power cable!). Disconnect from all sources and poles!
- 2. Carry out electrostatic discharge at the ground connection.
- 3. Place the Panel PC on a clean, flat surface.
- 4. Loosen the Torx screws (T25) indicated in the following figure. Insert a flat-blade screwdriver into the slot from the side and remove the cover. Avoid causing irreparable damage to the gasket.



# Notice!

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

- 5. The heat pipe and system unit must be removed in that order before the swivel-tilt flange can be installed. For the defined procedure, see section "Disassembling the system unit" on page 173.
- 6. Check whether the sealing ring is inserted in the swivel-tilt flange. If the sealing ring is not installed in the swivel-tilt flange, it must be inserted into the sealing recess.



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

# Information:

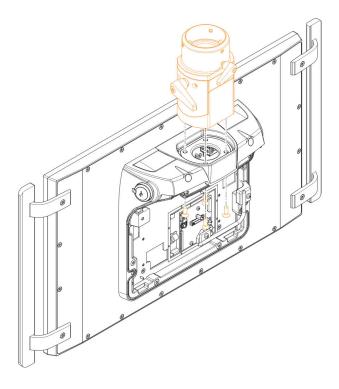
Due to the geometry of the sealing hose, wider connections such as a DVI connection only fit in one direction through the swivel-tilt flange. It is important to ensure that these are guided through the hose at the appropriate angle.

Failure to do so can result in damage to property.

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

### Note:

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



# Warning!

The following tightening torques must be observed:

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

Failure to do so can result in damage to property.

### 5.1.5.3 Removing the swing arm mounting unit

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

The following requirements must be met:

- · All connected cables must be disconnected.
- The Panel PC must no longer be installed on the VESA or swing arm system.
- 1. Disconnect the power supply cable to the Panel PC (disconnect the power cable!). Disconnect from all sources and poles!
- 2. Carry out electrostatic discharge at the ground connection.
- 3. Place the Panel PC on a clean, flat surface.
- 4. Remove the mounting unit cover by following the steps provided in section "Removing the mounting unit cover" on page 171.

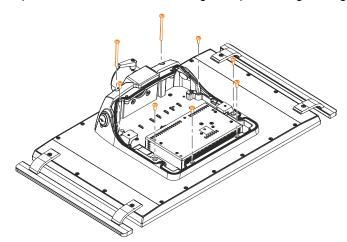
The following steps can only be performed after the heat pipe has been removed as described in section "Disassembling the heat pipe" on page 172.

5. Remove the 8 Torx screws used to fasten the mounting unit to the Automation Panel (T25: 2x M5x65, 6x M5x12).

# Warning!

Failure to follow instructions can result in damage to property.

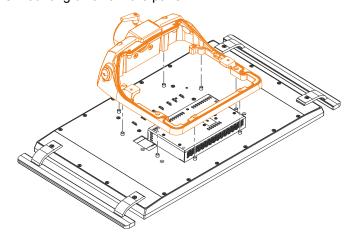
- The gasket must be inspected before installation or reinstallation and at regular intervals according to the requirements of the operating environment.
- ° Replace the entire device if inspection reveals visible scratches, cracks, dirt deposits or excessive wear.
- ° Do not stretch the gasket unnecessarily.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



# Warning!

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

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

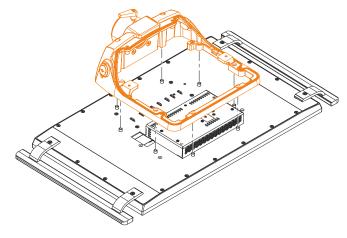


#### 5.1.5.4 Installing the swing arm mounting unit

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

The following requirements must be met:

- · All connected cables must be disconnected.
- The Panel PC must no longer be installed on the VESA or swing arm system.
- 1. Disconnect the power supply cable to the Panel PC (disconnect the power cable!). Disconnect from all sources and poles!
- 2. Carry out electrostatic discharge at the ground connection.
- 3. Place the Panel PC on a clean, flat surface.
- 4. Place the mounting unit on the panel. The openings in the mounting unit must be lined up with the mounting pins on the panel.

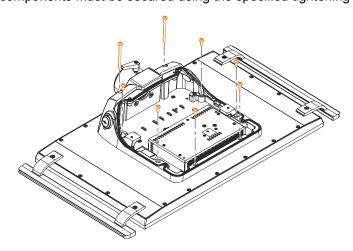


5. Install the mounting unit on the panel using the 8 provided Torx screws (T25: 2x M5x65, 6x M5x12). The tightening torque for each is 2.5 Nm.

# Warning!

Failure to follow instructions can result in damage to property.

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



# Warning!

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

- 6. Install the heat pipe by performing the steps provided in section "Disassembling the heat pipe" on page 172 in reverse order.
- 7. Install the cover for the mounting unit by performing the steps provided in section "Removing the mounting unit cover" on page 171 in reverse order.

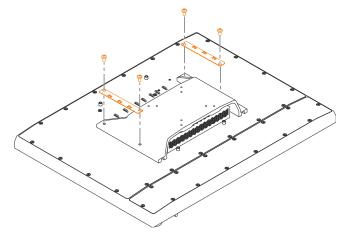
### 5.1.5.5 Removing the VESA mounting unit

The following requirements must be met:

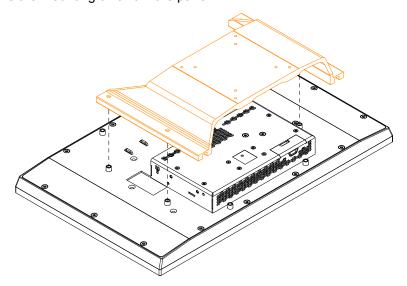
- · All connected cables must be disconnected.
- The Panel PC must no longer be installed on the VESA or swing arm system.
- 1. Disconnect the power supply cable to the Panel PC (disconnect the power cable!). Disconnect from all sources and poles!
- 2. Carry out electrostatic discharge at the ground connection.
- 3. Place the Panel PC on a clean, flat surface.

The following steps can only be performed after the heat pipe has been removed as described in section "Disassembling the heat pipe" on page 172.

4. Remove the 4 Torx screws (T25: 4x M5x10) and 2 metal pieces (designed for the cable strain relief clip) used to install the mounting unit on the panel.



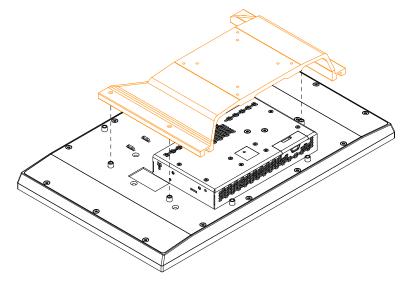
5. Pull evenly to remove the mounting unit from the panel.



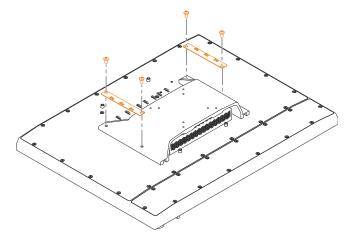
### 5.1.5.6 Installing the VESA mounting unit

The following requirements must be met:

- · All connected cables must be disconnected.
- The Panel PC must no longer be installed on the VESA or swing arm system.
- 1. Disconnect the power supply cable to the Panel PC (disconnect the power cable!). Disconnect from all sources and poles!
- 2. Carry out electrostatic discharge at the ground connection.
- 3. Place the on a clean, flat surface.
- 4. Place the mounting unit on the panel. The openings in the mounting unit must be lined up with the mounting pins on the panel.



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



- 6. Install the heat pipe by performing the steps provided in section "Disassembling the heat pipe" on page 172 in reverse order.
- 7. 4 Torx screws (T20: 4x M4x10) and 6 cable ties are supplied for fastening the Panel PC to a VESA bracket. Observer the installation notes from the manufacturer.

# 5.1.5.7 Uninstalling the IP54 VESA mounting unit

# Notice!

The following note must be observed when using a PPC2200:

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

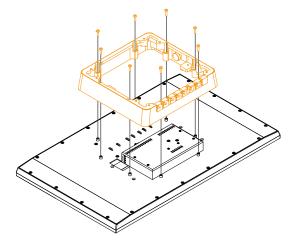
The following requirements must be met:

- · All connected cables must be disconnected.
- The Panel PC must no longer be installed on the VESA or swing arm system.
- 1. To uninstall the IP54 VESA mounting unit, perform the installation in reverse order (see "Installing the IP54 VESA mounting unit" on page 186).

### 5.1.5.8 Installing the IP54 VESA mounting unit

The following requirements must be met:

- All connected cables must be disconnected.
- The Panel PC must no longer be installed on the VESA or swing arm system.
- 1. Disconnect the power supply cable to the Automation Panel (disconnect the power cable). Disconnect from all sources and poles!
- 2. Carry out electrostatic discharge at the ground connection.
- 3. Place the mounting unit frame on the panel. The openings in the frame must be lined up with the mounting pins on the panel.

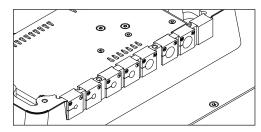


- 4. Install the frame on the panel using the 8 provided Torx screws (T25: 8x M5x20). The tightening torque for each is 2.5 Nm.
- 5. Secure the cable grommets with the flat side facing upwards.

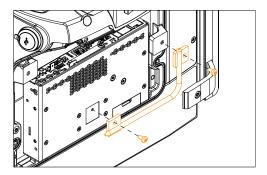
## Notice!

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

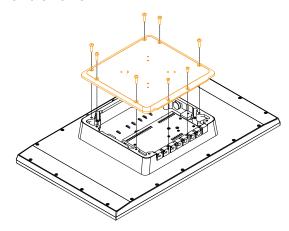
Failure to follow this instruction can result in damage to property.



6. If the mounting unit is used in conjunction with a PPC2200, the heat pipe including heat pipe cover must also be installed. The following figure symbolically displays the heat pipe installation.



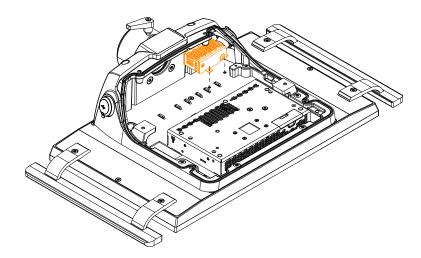
7. Place the mounting unit cover on the frame.



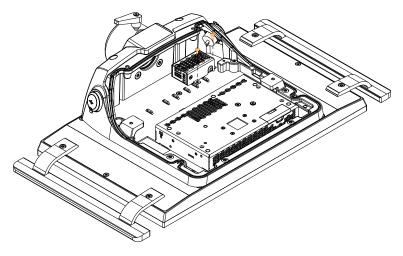
8. Install the cover using the 8 provided Torx screws (T25: 6x M5x20 and T20: 2x M4x12). Tightening torque: 2.5 Nm for M5, 1.24 Nm for M4.

## 5.1.5.9 Installing the USB hub

- 1. Disconnect the power supply cable to the Panel PC (disconnect the power cable!). Disconnect from all sources and poles!
- 2. Carry out electrostatic discharge at the ground connection.
- 3. Remove the mounting unit cover, see "Removing the mounting unit cover" on page 171.
- 4. Disconnect all connected cables.
- 5. Disconnect the Panel PC from the swing arm system by following the steps provided in section "Panel PC 2200 Installation" on page 169 in reverse order.
- 6. Place the Panel PC on a clean, flat surface.
- 7. Place the USB hub on the panel. The screw openings on the hub must be lined up with the openings on the panel.



8. Install the USB hub on the panel using the 2 Torx screws (T10) indicated in the following figure. The tightening torque is 0.55 Nm for each. Connect the upstream cable from the hub to an available USB port on the system unit.

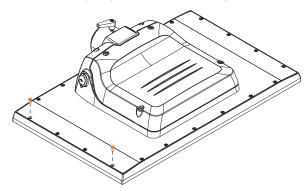


- 9. The USB hub can be removed by following these steps in reverse order. The max. tightening torque of the Torx screws (T10) is 0.55 Nm.
- 10. Replace the mounting unit cover with the 4 Torx screws (T25) removed earlier (tightening torque of the M5x12 screws: 3.5 Nm, for the M5x40 screws: 9.75 Nm). The mounting unit cover must be installed correctly to ensure IP65 protection.

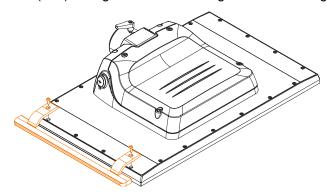
## 5.1.5.10 Installing the handles

The following requirements must be met:

- · All connected cables must be disconnected.
- The Panel PC must no longer be installed on the VESA or swing arm system.
- 1. Disconnect the power supply cable to the Panel PC (disconnect the power cable!). Disconnect from all sources and poles!
- 2. Carry out electrostatic discharge at the ground connection.
- 3. Place the Panel PC on a clean, flat surface.
- 4. Remove the top and bottom Torx screws (T20) on the side of the panel.



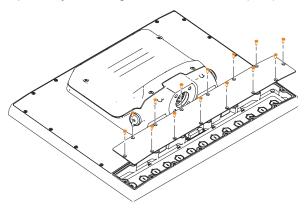
5. Insert the provided Torx screws (T20) through the handle and tighten with max. tightening torque of 1.24 Nm.



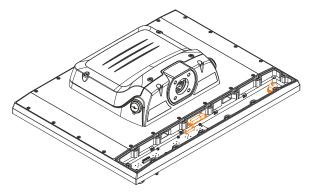
#### 5.1.5.11 Removing the expansion unit/cover

The following requirements must be met:

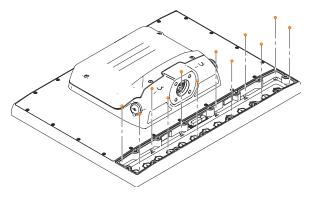
- All connected cables must be disconnected.
- · The Panel PC must no longer be installed on the VESA or swing arm system.
- 1. Disconnect the power supply cable to the Panel PC (disconnect the power cable!). Disconnect from all sources and poles!
- 2. Carry out electrostatic discharge at the ground connection.
- 3. Place the Panel PC on a clean, flat surface.
- 4. Remove the back cover of the panel by removing the 14 Torx screws (T20).



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



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



### Information about leak tightness

# Warning!

Failure to follow instructions can result in damage to property.

- The gasket must be inspected before installation or reinstallation and at regular intervals according to the requirements of the operating environment.
- · Replace the entire device if inspection reveals visible scratches, cracks, dirt deposits or excessive wear.

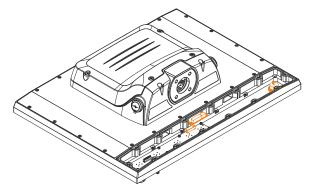
# Installation and wiring

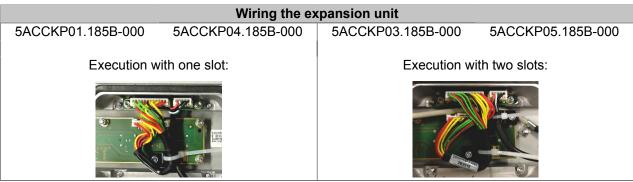
- Do not stretch the gasket unnecessarily.
- It is important to ensure that the gasket is correctly seated all around.
- The housing components must be secured using the specified tightening torque.

### 5.1.5.12 Installing the expansion unit/cover

The following requirements must be met:

- · All connected cables must be disconnected.
- The Panel PC must no longer be installed on the VESA or swing arm system.
- 1. Disconnect the power supply cable to the Panel PC (disconnect the power cable!). Disconnect from all sources and poles!
- 2. Carry out electrostatic discharge at the ground connection.
- 3. Place the Panel PC on a clean, flat surface.
- 4. Insert the front of the expansion unit / expansion cover into the panel. Secure to the back with the 12 nuts (M3). The tightening torque for each is 0.55 Nm.
- 5. Connect the cables for the circuit board and front USB interface to the terminal strips on the panel's circuit board.

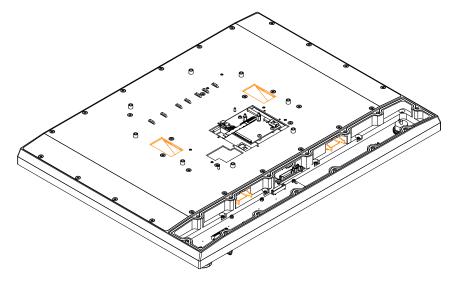




# Warning!

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

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



### Installation and wiring

7. If required, wire the operating elements.

For information about wiring operating elements on the expansion unit, see section "Button/Switch interface" on page 60.

For information about wiring or installing operating elements on the expansion cover, see section "Installing operating elements on the expansion cover" on page 195.

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

## Information about leak tightness

# Warning!

Failure to follow instructions can result in damage to property.

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

#### 5.1.5.13 Installing operating elements on the expansion cover

The following requirements must be met:

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

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

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

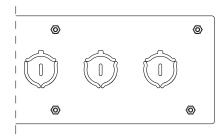
The corresponding manufacturer specifications must be observed when installing operating elements.

- 1. Disconnect the power supply cable to the device (disconnect the power cable!). Disconnect from all sources and poles!
- 2. Carry out electrostatic discharge at the ground connection.
- 3. Place the Panel PC on a clean, flat surface.
- 4. If an expansion unit is installed, it must first be removed. To do so, follow the instructions in section "Removing the expansion unit/cover" on page 191.
- 5. If an expansion cover is not installed, then one must be installed. To do so, follow the instructions in section "Installing the expansion unit/cover" on page 193.

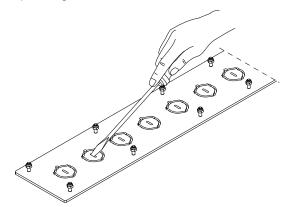
# Information:

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

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



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



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

For more information about operating and switching elements, see section "Features" on page 284.

# 5.1.5.14 Replacing colored lenses

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

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





# 5.2 Connecting to the power grid

# Danger!

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

### 5.2.1 Installing the DC power cable

# Danger!

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

### 5.2.1.1 Wiring

## Caution!

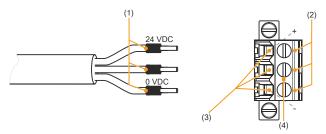
The pinout of the power supply interface must be observed!

The DC power cable must be implemented with a wire cross section of 0.75 mm<sup>2</sup> to 1.5 mm<sup>2</sup> and wire end sleeves.

Conductors of the power cable	Terminal connection symbol
+24 VDC	+
GND	<b>\$</b>
0 VDC	-

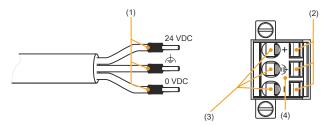
#### Installing screw clamp terminal block 0TB103.9

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



### Installing cage clamp terminal block 0TB103.91

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

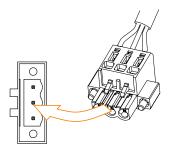


### 5.2.2 Connecting the power supply to a B&R device

# Danger!

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

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



## 5.2.3 Grounding concept - Functional ground

Functional ground is a current path of low impedance between circuits and ground. It is used to improve immunity to interference, for example, and not as a protective measure. It serves only to divert interference, not to protect against contact with persons.

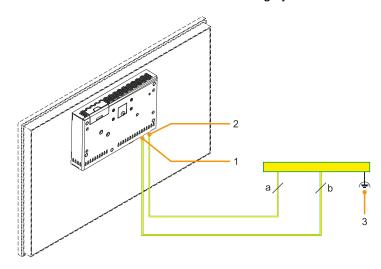
The device is equipped with the following functional ground connections:

- Functional ground connection of the power supply
- · Ground connection

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

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

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



	Legend				
1	Ground connection 🚖	2	Power supply connection +24 VDC pin 2	3	Central grounding point
а	At least 1.5 mm²	b	At least 2.5 mm <sup>2</sup>		-

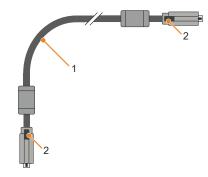
# 5.3 Connecting cables

# Information:

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

When connecting or installing cables, the bend radius specification must be observed. For this specification, see the technical data of the respective cable.

The maximum tightening torque of the locating screws is 0.5 Nm.



- Bend radius
- 2) Locating screws

# 6 Commissioning

### 6.1 Basic 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.

# 6.2 Switching on the device for the first time

## 6.2.1 General information before switching on the device

#### Checklist

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

- Have the installation instructions been observed as described in "Installation and wiring" on page 167?
- Have the permissible ambient conditions and environmental conditions for the device been taken into account?
- · Is the power supply connected correctly and have the values been checked?
- Is the ground cable correctly connected to the ground connection?
- Before installing additional hardware, the device must have been started up.

### 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.

#### Requirements

The following criteria must be met before switching on the device for the first time:

- The functional ground connections are as short as possible and connected to the central grounding point using the largest possible wire cross section.
- All connection cables are connected correctly.
- A USB keyboard and USB mouse are connected (optional).

#### 6.2.2 Switching on the device

### **Procedure**

- 1. Connect the power supply and switch it on (e.g. power supply unit).
- 2. The device is operating and boots; LED Power lights up.

### 6.3 Touch screen calibration

## 6.3.1 Single-touch (analog resistive)

#### 6.3.1.1 Windows 10 IoT Enterprise

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

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

## 6.3.2 Multi-touch (projected capacitive - PCT)

#### 6.3.2.1 Windows 10 IoT Enterprise

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

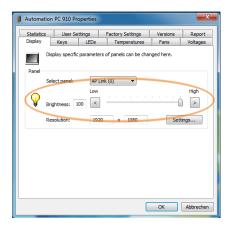
# 6.4 Display brightness control

- 1. Open the ADI Control Center in the Control Panel.
- 2. Select tab "Display".
- 3. Select a panel from the list. Only the local display (PP Link) and connected panels are displayed in the list.
- 4. Set the desired brightness using the slider (the figure is symbolic).

## Information:

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

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



# 6.5 General instructions for the temperature test procedure

The purpose of these instructions is to explain the general procedure for application-specific temperature tests with B&R industrial PCs or Power Panels. These instructions are only guidelines, however.

### 6.5.1 Procedure

In order to obtain meaningful results, the test conditions should correspond to conditions in the field. This means that during the temperature tests, for example, the target application should be running and the PC should be installed in the control cabinet housing that will be used later.

In addition, a temperature sensor should be installed for the device being tested in order to continuously monitor the ambient temperature. To obtain correct values, it must be installed at a distance of approx. 5 to 10 cm from the B&R industrial PC near the air inlet (not near the air outlet).

Every B&R industrial PC or Power Panel is equipped with internal temperature sensors. Depending on the device family, these are installed in different positions. The number and temperature limits vary depending on the device family.

For position specifications of the temperature sensors and their maximum specified temperatures, see section "Temperature sensor positions" on page 43.

A minimum test time of 8 hours is recommended for to optimally determine and assess the temperature situation.

### 6.5.2 Evaluating temperatures in Windows operating systems

#### 6.5.2.1 Evaluating with the B&R Control Center

The *ADI Control Center* can be used to evaluate temperatures. The temperatures can be viewed in tab **Temperatures**. The ADI Control Center can be downloaded from the B&R website (<a href="www.br-automation.com">www.br-automation.com</a>) at no cost and uses the ADI (Automation Device Interface).

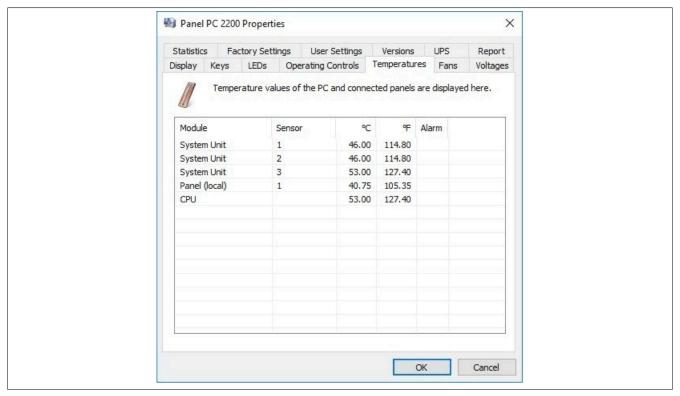


Figure 2: Evaluating with the B&R Control Center using a PPC2200 without IF options

If historical recording of the data is necessary, a separate application can be created.

# Information:

There are downloads such as the ADI .NET SDK available on the B&R website (www.br-automation.com) that can be used to create a separate application.

#### 6.5.2.2 Evaluation with BurnInTest from PassMark

If a separate application is not created or used for temperature evaluation, B&R recommends using the BurnInTest software tool from PassMark.

The BurnInTest software tool is available in standard and professional versions. In addition to the software package, various loopback adapters (serial, parallel, USB, etc.) and test CDs or DVDs are also available. Depending on the expansion level of the software and available loopback adapters, a correspondingly high system and peripheral load can be generated.

## Information:

Loopback adapters are also available from PassMark. For additional information, see <a href="https://www.pass-mark.com">www.pass-mark.com</a>.

The following screenshots refer to PassMark BurnInTest Pro V8.1 using a PPC2200 without IF options.

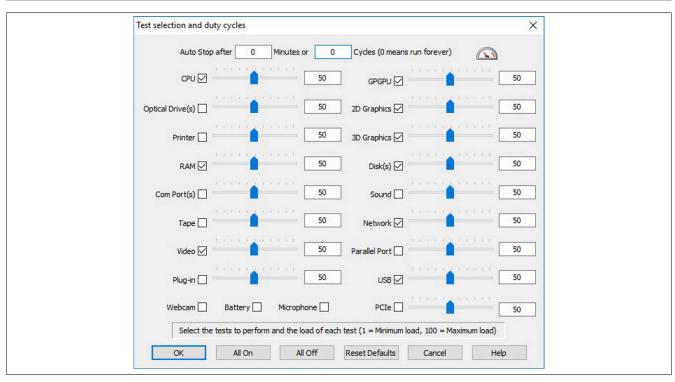


Figure 3: Settings for PassMark BurnInTest Pro V8.1 using a PPC2200 without IF options

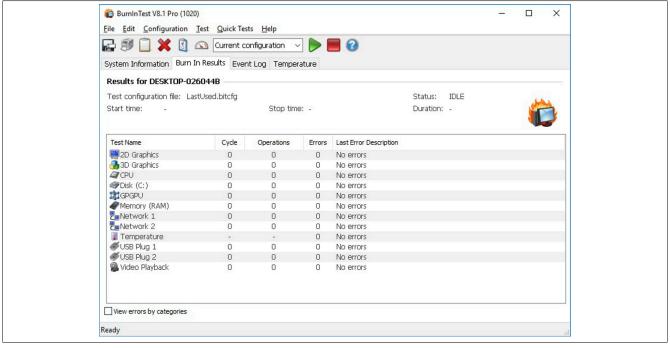


Figure 4: Test overview of a PPC2200 without IF options

Depending on the availability of the loopback adapters and DVDs, appropriate fine tuning must be carried out in the respective test properties.

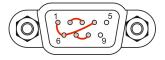
## Information:

If no USB loopback adapters are available, USB flash drives can also be used. The USB flash drives must be available in Windows as formatted drives. Option "USB" must then be deselected in the test configuration, and the USB flash drives must be configured as test devices in the disk properties.



## Information:

Serial loopback adapters can be created relatively easily by yourself. Just connect some pins with wires on the serial interface.



### 6.5.3 Evaluating the measurement results

The recorded maximum temperature value of each individual sensor is not permitted to exceed the temperature limit specified in the user's manuals.

If the temperature tests cannot be carried out in a climate chamber, they can be carried out in an office environment, for example. It is necessary to record the ambient temperature, however. Based on experience gained at B&R, the measured temperature values can be extrapolated linearly to the ambient temperature for passive systems (systems without a fan kit). In order to also be able to extrapolate the temperature values for systems with a fan kit, the fans must be running. The speed, etc. must also be taken into account.

If the temperature tests are carried out in a controlled climate chamber with a fan, the devices to be tested are cooled by this fan and thus the measurement results are distorted. With passive devices, the measurement results are therefore unusable. In order to be able to carry out temperature tests in climate chambers with fans without distorting the measurement results, however, the fan of the climate chamber must be switched off and a correspondingly long lead time (several hours) must be observed.

# 6.6 Known problems / Characteristics

• If problems occur with the ETH1 or ETH2 interface (connection abort, slow data transfer, etc.), the Energy-Efficient Ethernet feature can be disabled in the driver as a possible solution.

# 7 Software

# 7.1 UEFI BIOS options

#### 7.1.1 General information

The Unified Extensible Firmware Interface (UEFI) and its predecessor Extensible Firmware Interface (EFI) establish the basic standardized connection between the user and the system (hardware and firmware), the individual components of a computer and the operating system. This B&R industrial PC uses UEFI BIOS from Insyde Software.

The UEFI BIOS Setup Utility makes it possible to modify basic system configuration settings. These settings are stored in a flash block.

### Information:

The following BIOS settings are system-optimized. Changes to these settings should only be made by system experts who are aware of the effects of the modification.

### 7.1.1.1 Adaptation for touch operation

The BIOS used for the APC2200/PPC2200 was developed with touch screen systems in mind. Compared to other or older B&R systems, the user interface, especially buttons and selection fields, is therefore larger. In addition, the setting and configuration options are divided into separate submenu structures.

The APC2200/PPC2200 can still be used with ordinary displays and operator panels without any limitation on usability, however.

## 7.1.1.1.1 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 simultaneously; the system automatically displays 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.

#### 7.1.1.2 Overview of BIOS description

## Information:

This description is for the full extent of version 1.23.

Selection and setting options as well as the menu structure and display may differ slightly depending on the device series, system configuration, BIOS version and BIOS settings that have already been made. The figures in the following section are symbolic.

For simplification purposes, only setting option **[Enter]** is explicitly listed below. All settings can also be made via mouse click or touch screen.

These figures are only excerpts from the respective menus. A complete list of all parameters and menus is available in a table in each section.

Depending on the display system used, it is possible to navigate to all menus on the device using the slide bar or mouse and keyboard input.

Variables written in italics (*n*) are used to maintain clarity and to summarize different menus that have the same setting options. When first mentioned, their range of values is defined and, if necessary, further notes are listed. *n* within a certain range of values of a certain BIOS setting is only valid for this parameter. Each combination of "[BIOS parameter]" and "*n*" is defined independently.

Entries outside a specified range of values are not applied.

Default values are marked bold and italic in column "Input options" in tables. Submenus are bold in column "BIOS parameter" in tables.

# Software

<b>BIOS</b> paramet	er	Input options	Description
BIOS parameter 1		Enable(d)	Disables/Enables BIOS parameter 1
BIOS paramete	er 1 value	UINT Default: 42	Defines the value of BIOS parameter 1 Range: 0 to 65535 Resolution: 3
BIOS paramete	er 2	-	Displays BIOS parameter 2
	BIOS parameter 2.1	a1	Selects mode of BIOS parameter 2.1
		b	
	BIOS s	ubpa- <b>Disable(d)</b>	Disables/Enables BIOS subparameter 2.1
	rameter value	2.1 Enable(d)	
BIOS parameter n 1)		Disable(d)	Disables BIOS parameter n or selects option
		(Various)2)	
Hardware com	nponents	Enter	Opens submenu "Hardware components" on page xyz

Table 87: Main menu - Menu - Submenu(s)

- The 16 possible parameters are indexed from 0 to 15. Setting option "(Various)" combines different values/modes with different dependencies. 1) 2)

## 7.1.2 BIOS Setup and startup procedure

UEFI BIOS is enabled immediately after switching on the B&R industrial PC. A check takes place as to whether the setup data from the FLASH block is OK. If it is OK, the boot procedure is started. If it is not OK, the setup default settings are loaded and the boot procedure is continued.

UEFI BIOS reads the system configuration information, checks the system and configures it through the power-on self-test (POST).

UEFI BIOS then searches the data storage media in the system (CFast cards, USB mass storage devices, SSD, HDD, etc.) for an operating system. UEFI BIOS starts the operating system and transfers to it control over system operations.

To enter UEFI BIOS Setup, **[Esc]**, **[Del]** or **[F2]** must be pressed after initializing the USB controller when the following message appears on the screen (during POST): *Press ESC / DEL / F2 to enter Setup*.

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



### 7.1.2.1 Input options

#### Power-on self-test (POST)

The following keys are enabled during POST:

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

## Information:

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

#### **Boot menu**

The following keys are enabled during POST:

Key	Function
F1	Help
ESC	Exits the help documentation
Cursor keys $(\leftarrow, \uparrow, \downarrow, \rightarrow)$	Navigation in the boot menu
Enter	Opens the selected submenu

### **BIOS Setup**

The following keys can be used after entering BIOS Setup:

Key	Function
F1	Help
ESC	Exits
Cursor keys $(\leftarrow, \uparrow, \downarrow, \rightarrow)$	Navigation in the menu
Page ↑, Page ↓	Press once: Cursor jumps to first/last line in the display area Press twice: Cursor jumps to first/last item in the menu
F5	Changes a value (step back)
F6	Changes a value (step forward)

# Software

Key	Function
F9	Loads the default settings <sup>1)</sup>
F10	Saves and closes
Enter	Opens the selected submenu/parameter
Alphanumeric keys	Defines manual values for parameters that permit this

<sup>1)</sup> Save and close to restore the default values.

# Information:

All manual changes are overwritten if the default values are loaded and saved.

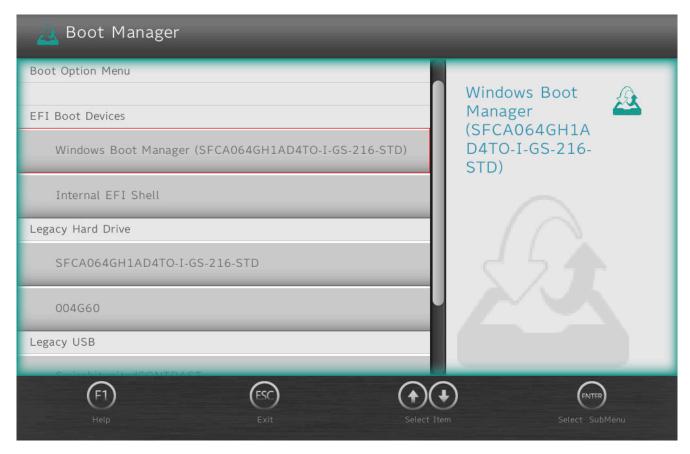
# 7.1.3 Boot menu



Boot menu option	Description
Continue	Resumes the boot process.
Boot manager	Lists all detected and bootable media.
	See "Boot manager" on page 209.
Device management	Lists all supported and enabled devices (e.g. Ethernet).
·	See "Device manager" on page 210.
Boot from file	Selects a bootable file to boot from.
	Depending on the boot configuration, the files can also be stored on external storage media.
Administer Secure Boot	For a detailed description of this option, see the user documentation from the operating system manufacturer.
Setup utility	Performs advanced configurations.
	See "Setup utility" on page 211.

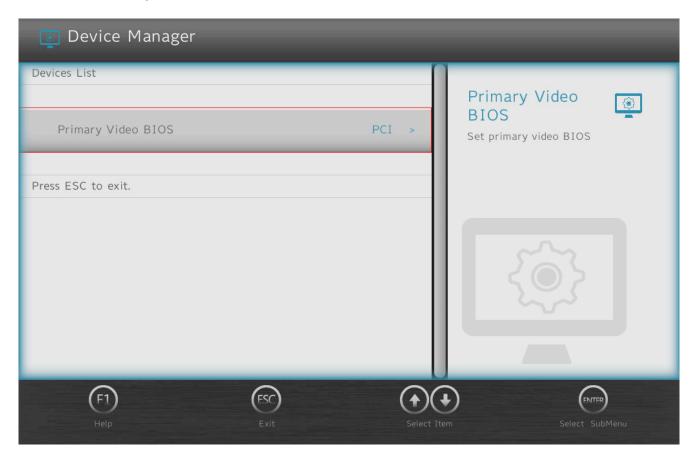
Table 88: Boot menu

# 7.1.4 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.

# 7.1.5 Device manager



The device manager lists all compatible and enabled devices.

BIOS parameter	Setting options	Description
Primary video BIOS	PCI	Selects the primary video BIOS
	AGP	

# 7.1.6 Setup utility

Settings can be made in the boot menu under Setup utility.

Submenu	Setting options	Description
Main	Enter	Opens submenu "Main" on page 212 Basic system information is displayed and the system time can be set here.
Advanced	Enter	Opens submenu "Advanced" on page 213 Changes to system settings can be made here.
Security	Enter	Opens submenu "Security" on page 223 Changes to the Trusted Platform Module can be made here. Passwords for storage media can be created and managed here.
Power	Enter	Opens submenu "Power" on page 224 Changes that affect the power consumption of the system can be made here.
Boot	Enter	Opens submenu "Boot" on page 226 Changes to the boot modes and boot sequence can be made here.
Exit	Enter	Opens submenu "Exit" on page 229 Changes can be discarded or saved here. User-specific default values can be saved and loaded here or system-optimized default values from B&R can be restored.

Table 89: Boot menu - Setup utility

#### 7.1.6.1 Main



BIOS parameter	Setting options	Description
BIOS version	-	Displays the BIOS version
Processor type	-	Displays the processor type
System bus speed	-	Displays the bus speed
System memory speed	-	Displays the memory speed
Cache RAM	-	Displays the processor cache
Total memory	-	Displays the total memory
Channel A - DIMM 0	-	Displays the amount of memory for channel A
Channel B - DIMM 0	-	Displays the amount of memory for channel B
Channel C - SODIMM 0	-	Displays the amount of memory for channel C
Channel D - SODIMM 0	-	Displays the amount of memory for channel D
BXT SOC	-	Displays SOC stepping
Microcode	-	Displays the microcode revision
TXE FW	-	Displays the TXE version
IGD VBIOS version	-	Displays the VBIOS version of the internal graphics device
System time	INT	Adjusts the system time in the format hh:mm:ss
System date	INT	Adjusts the system date in the format yyyy:mm:dd
About this software	Enter	Displays the copyright disclaimer

Table 90: Main

### **7.1.6.2 Advanced**



BIOS parameter	Setting options	Description
OEM features	Enter	Opens submenu "OEM features" on page 214
Graphics configuration	Enter	Opens submenu "Graphics configuration" on page 218
IO configuration	Enter	Opens submenu "IO configuration" on page 219
Security configuration	Enter	Opens submenu "Security configuration" on page 222
ACPI settings	Enter	Opens submenu "ACPI settings" on page 222

Table 91: Advanced

#### 7.1.6.2.1 **OEM** features



BIOS parameter	Setting options	Description
BIOS version	-	Displays the BIOS version
MTCX version	-	Displays the MTCX version
Realtime environment	Disabled	Disables/Enables the real-time environment
	Enabled	This must be enabled for real-time operating systems such as Automation Runtime.
Hypervisor environment	Disabled	Disables/Enables the hypervisor environment
	Enabled	Enabling is necessary for hypervisor operation.  Parameters "VT-d" and "Intel Virtualization Technology" on page 224 are enabled and cannot be changed during hypervisor operation.
Automatic firmware update	Disabled	Disables/Enables automatic firmware updates for the mainboard, SDL and SDL4 cards
	Enabled	
Super IO	Enter	Opens submenu "Super IO" on page 214
H2OUVE	Enter	Opens submenu "H2OUVE" on page 215
Baseboard	Enter	Opens submenu "Baseboard" on page 215
Interface slot n <sup>1)2)</sup>	Enter	Opens submenu "Interface slot n " on page 216
Panel settings	Enter	Opens submenu "Panel settings" on page 216
SSD monitoring service	Enter	Opens submenu "SSD monitoring services" on page 216
Custom boot logo	Enter	Opens submenu "Custom boot logo" on page 217

Table 92: Advanced - OEM features

- 1) A total of 2 interface option slots are available. Slot IF option 2 (label: Monitor/Panel) is reserved for graphic interfaces.
- 2) Unused IF option slots are not displayed.

## 7.1.6.2.1.1 Super IO

<b>BIOS</b> paramet	ter	Setting options	Description
CAN device		-	Indicates whether a CAN interface (IF option) is installed The CAN interface uses I/O addresses 0x384 - 0x385 and IRQ 10.
COM A		Disable	Disables/Enables COM A (IF option 1)
		Enable	
	Base I/O address	0x2E8	Selects the I/O address for COM A
		0x2F8	
		0x338	
		0x378	
		0x3E8	
		0x3F8	

Table 93: Advanced - OEM features - Super IO

BIOS parar		Setting options	Description
Interrupt	IRQ3	Selects the interrupt for COM A	
		IRQ4	
	IRQ5		
	IRQ7		
	IRQ11		
COM B	COM B	Disable	Disables/Enables COM B (LFP touch screen)
		Enable	
	Base I/O address	0x2E8	Selects the I/O address for COM B
		0x2F8	
		0x338	
		0x378	
		0x3E8	
		0x3F8	
	Interrupt	IRQ3	Selects the interrupt for COM B
		IRQ4	
		IRQ5	
		IRQ7	
		IRQ11	
COM C	COM C	Disable	Disables/Enables COM C (SDL touch screen option)
		Enable	
	Base I/O address	0x2E8	Selects the I/O address for COM C
		0x2F8	
		0x338	
		0x378	
		0x3E8	
		0x3F8	
	Interrupt	IRQ3	Selects the interrupt for COM C
		IRQ4	
		IRQ5	
		IRQ7	
		IRQ11	
COM D		Disable	Disables/Enables COM D (IF option 1)
		Enable	
	Base I/O address	0x2E8	Selects the I/O address for COM D
		0x2F8	
		0x338	
		0x378	
		0x3E8	
		0x3F8	
	Interrupt	IRQ3	Selects the interrupt for COM D
		IRQ4	
		IRQ5	
		IRQ7	
	IRQ11		
MTCX interrupt		Automatic	Disables the MTCX interrupt or assigns it automatically if permitted by the system con-
		Disable	figuration (at least 1 IRQ free).

Table 93: Advanced - OEM features - Super IO

# 7.1.6.2.1.2 H2OUVE

BIOS parameter	Setting options	Description
H2OUVE support	Disabled	Disables/Enables H2OUVE support
	Enabled	

Table 94: Advanced - OEM features - H2OUVE

## 7.1.6.2.1.3 Baseboard

BIOS parameter	Setting options	Description
Product name	-	Displays the B&R order number of the mainboard
Serial number	-	Displays the B&R serial number of the mainboard
Device ID	-	Displays the device ID of the mainboard
Vendor ID	-	Displays the vendor ID of the mainboard
Compatibility ID	-	Displays the compatibility ID of the mainboard
HW revision	-	Displays the hardware revision of the mainboard
Parent device ID	-	Displays the parent device ID of the mainboard
Parent comp. ID	-	Displays the parent compatibility of the mainboard
ETH1 MAC address	-	Displays the ETH1 MAC address
ETH2 MAC address	-	Displays the ETH2 MAC address
Power on cycles <sup>1)</sup>	-	Displays the power-on cycles of the mainboard
Power on hours	-	Displays the operating time [h] of the mainboard
Battery voltage	-	Displays the battery voltage [V]

Table 95: Advanced - OEM features - Baseboard

## Software

BIOS parameter	Setting options	Description
Battery state	-	Displays the battery state
Temperature 1	-	Displays the current temperature at sensor 1 [°C and °F]
Temperature 2	-	Displays the current temperature at sensor 2 [°C and °F]
Temperature 3	-	Displays the current temperature at sensor 3 [°C and °F]

Table 95: Advanced - OEM features - Baseboard

1) Each start/restart increases the value by 1.

### 7.1.6.2.1.4 Interface slot *n*

A total of 1 interface option slots is available.

BIOS parameter	Setting options	Description
Product name	-	Displays the B&R order number of IF option <i>n</i>
Serial number	-	Displays the B&R serial number of IF option <i>n</i>
Device ID	-	Displays the device ID of IF option <i>n</i>
Vendor ID	-	Displays the vendor ID of IF option <i>n</i>
Compatibility ID	-	Displays the compatibility ID of IF option <i>n</i>
HW revision	-	Displays the hardware revision of IF option <i>n</i>
FW version	-	Displays the firmware version of IF option <i>n</i>
Parent device ID	-	Displays the parent device ID of IF option <i>n</i>
Parent comp. ID	-	Displays the parent compatibility ID of IF option <i>n</i>
Power on cycles <sup>1)</sup>	-	Displays the power-on cycles of IF option <i>n</i>
Power on hours	-	Displays the operating time [h] of IF option n
Temperature q <sup>2)</sup>	-	Displays the temperature at sensor <i>q</i> [°C and °F]

Table 96: Advanced - OEM features - Interface slot n

- 1) Each start/restart increases the value by 1.
- 2) The number of temperature sensors varies depending on the interface option. If no temperature sensor is available, the parameter is not displayed.

### **7.1.6.2.1.5 Panel settings**

BIOS parameter	Setting options	Description
Panel n	Enter	Opens menu "Panel n" on page 216

Table 97: Advanced - OEM features - Panel settings

# Panel n

The panel of the Panel PC is indexed as panel 15.

BIOS parameter	Setting options	Description
Product name	-	Displays the B&R order number of the panel
Serial number	-	Displays the B&R serial number of the panel
Device ID	-	Displays the device ID of the panel
Vendor ID	-	Displays the vendor ID of the panel
Compatibility ID	-	Displays the panel's compatibility ID
HW revision	-	Displays the hardware revision of the panel
Parent device ID	-	Displays the parent device ID of the panel
Parent compat. ID	-	Displays the parent compatibility ID of the panel
Backlight on cycles1)	-	Displays the backlight-on cycles of the panel
Backlight on hours	-	Displays the operating time of the backlight [h] for the panel
Power on cycles <sup>2)</sup>	-	Displays the power-on cycles of the panel
Power on hours	-	Displays the operating time [h] of the panel
Brightness	INT	Screen brightness of the panel [%]
	Default: 100	Range: 0 to 100
		Resolution: 1%

Table 98: Advanced - OEM features - Panel settings - Panel n

- 1) Each time the backlight is switched on increases the value by 1.
- 2) Each start/restart increases the value by 1.

## 7.1.6.2.1.6 SSD monitoring services

BIOS parameter	Setting options	Description
CFast		
Product name	-	Displays the name of the CFast card
Serial number	-	Displays the manufacturer serial number of the CFast card
Firmware version	-	Displays the firmware version of the CFast card
SMART <sup>1)</sup> status	-	Displays the S.M.A.R.T. status of the CFast card
WAF <sup>2)</sup>	-	Displays the WAF of the CFast card
Average erase count	-	Displays the average number of erase operations on a block of the CFast card

Table 99: Advanced - OEM features - SSD monitoring service

BIOS parameter	Setting options	Description
Remaining life	-	Displays the remaining service life of the CFast card [%]
NVMe onboard		
Product name	-	Displays the product ID of the memory module
Serial number	-	Displays the manufacturer's serial number of the memory module
Percentage used	-	Displays the <u>used</u> (expected) lifetime of the memory module [%]
Power on hours	-	Displays the operating hours [h] of the memory module up until now
Critical warning	-	Displays an error code (S.M.A.R.T. status); see the S.M.A.R.T. specifications or manu-
		facturer documentation.
		0x00 signalizes operation without critical error.

Table 99: Advanced - OEM features - SSD monitoring service

- 1) Self-Monitoring, Analysis and Reporting Technology
- 2) Write amplification factor

# 7.1.6.2.1.7 Custom boot logo

BIOS parameter	Setting options	Description
Custom boot logo	- Displays whether a user-specific logo is being used	
Add custom boot logo		Selects a customized boot logo A JPG graphic with a maximum size of 40 kB and filename "XPCLGO" must be used. The target file for the boot logo must be stored in folder "XPCLGO" in the root directory of the target media ( ./XPCLGO/XPCLGO.jpg ).
Delete custom boot logo	Enter	Deletes customized boot logos <sup>1)</sup>

Table 100: Advanced - OEM Features - Custom boot logo

1) If no customized boot logo is available, the B&R boot logo is used by default.

### 7.1.6.2.1.8 Backup settings

BIOS parameter	Setting options	Description
Backup settings	Disabled	Disables/Enables backup of BIOS settings during the next reboot
	Enabled	Folder "XPCSET" (./XPCSET/) must exist in the root directory of the target medium as
		the target for the backup.
Recover settings	Disabled	Disables/Enables restoring BIOS settings from a backup during the next reboot
	Enabled	The backup file must be stored in folder "XPCSET" (./XPCSET/) in the root directory of
		the target medium.

Table 101: Advanced - OEM features - Backup settings

# 7.1.6.2.2 Graphics configuration

BIOS parameter	Setting options	Description
Rotate screen	Disabled	Disables or selects rotation of the screen content
	90° clockwise	Rotation takes place clockwise.
	270° clockwise	
Integrated graphics device	Disabled	Disables/Enables the integrated graphics device (IGD or GPU)
	Enabled	
RC6 (render standby)	Disabled	Disable/Enables RC6 (render standby)
	Enabled	Permits the GPU to go into standby.
GTT <sup>1)</sup> size	2 MB	Selects the GTT size [MB]
	4 MB	
	8 MB	
Aperture size	256 MB	Selects reserved RAM [MB]  If the graphics memory is full, the defined amount of memory is made available.
DVMT <sup>2)</sup> total Gfx mem	128M	Selects the memory size [MB] that can be used by the IGD.
	256M	MAX uses the entire available main memory.
	MAX	
GT PM support	Disabled	Disables/Enable GT PM support
	Enabled	
PAVP enable	Disabled	Disables/Enables "Force protected audio video path"
	Enabled	
Panel scaling	Auto	Selects automatic, centered or stretched panel scaling
	Centering	
	Stretching	

Table 102: Advanced - Graphics configuration

- 1) Graphics translation table (cf. graphics aperture/address remapping table (GART))
- 2) Dynamic video memory technology

# 7.1.6.2.3 IO configuration

BIOS parameter	Setting options	Description
PCI Express configuration	Enter	Opens submenu "PCI Express configuration" on page 219
SATA configuration	Enter	Opens submenu "SATA configuration" on page 220
USB configuration	Enter	Opens submenu "USB configuration" on page 221
Miscellaneous configuration	Enter	Opens submenu "Miscellaneous configuration" on page 221

Table 103: Advanced - IO configuration

# 7.1.6.2.3.1 PCI Express configuration

BIOS parameter	Setting options	Description
PCI Express clock gating	Disabled	Disables/Enables PCI Express clock gating for root ports
	Enabled	
Port8xh decode	Disabled	Disables/Enables Port8xh decoding
	Enabled	
Peer memory write enable	Disabled	Disables/Enables peer memory write enable
	Enabled	
Compliance mode	Disabled	Disables/Enables compliance mode
	Enabled	
PCI Express root port 2 (IF1)	Enter	
PCI Express root port 3 (ETH1)	Enter	Opens submenu "PCI Express root port n" on page 2191)
PCI Express root port 4 (ETH2)	Enter	Opens subment. For Express root port if on page 219.9
PCI Express root port 5 (IF1)	Enter	

Table 104: Advanced - IO configuration - PCI Express configuration

# PCI Express root port n

<b>BIOS</b> parameter		Setting options	Description	
PCI Express root	port n1)	Auto	Disables/Enables PCI	Express root port n manually or automatically
		Disabled	In mode "Auto", unallocated interfaces are automatically disabled and allocated in faces are enabled.	
		Enabled		
ASPM		Auto	Selects PCIe Active St	tate Power Management manually/automatically or disables it
		Disabled		
		L0sL1		
		L0s		
		L1		
L1 substates		Disabled	Selects or disables L1	substates
		L1.1		
		L1.2		
		L1.1 & L1.2		
A	CS	Disabled	Disables/Enables acce	ess control services extended capabilities
		Enabled		
U	RR	Disabled	Disables/Enables unsu	upported request reporting
		Enabled	Notification of unsuppo	orted requests
F	ER	Disabled	Disables/Enables fatal	error reporting
		Enabled	Notification of fatal errors <sup>2)</sup>	
N	FER	Disabled	Disables/Enables non-fatal error reporting	
	Enabled Notification of non-fatal errors <sup>2)</sup>		al errors <sup>2)</sup>	
С	ER	Disabled	Disable/Enable correctable error reporting	
		Enabled	Notification of correctable errors <sup>2)</sup>	
C.	TO	Disabled	Disables/Enables PCIe completion timer timeout	
		Enabled		
SI	EFE	Disabled	Disables/Enables syste	em error on fatal error <sup>3)</sup>
		Enabled		
SI	ENFE	Disabled	Disables/Enables syste	em error on non-fatal error <sup>3)</sup>
		Enabled		
SI	ECE	Disabled	Disables/Enables syste	em error on correctable error <sup>3)</sup>
		Enabled		
PI	ME SCI	Disabled	Disables/Enables syste	em control interrupt on a power management event
		Enabled		
He	ot plug	Disabled	Disables/Enables hot p	olugging
		Enabled		
PCIe speed		Auto	-	Selects the PCle transfer rate [gigatransfers per second (GT/s)]
			Gen1: Max. 2.5 GT/s	automatically or manually
		Gen2	Gen2: Max. 5.0 GT/s	
		Gen3	Gen3: Max. 8.0 GT/s	
Tr	ransmitter half swing	Disabled	Disables/Enables trans	•
		Enabled	Signals are transferred with a half-swing.	

Table 105: Advanced - PCH-IO configuration - PCI Express root port n

<sup>1)</sup> Each parameter opens its own menu. Since the included options are the same, schematic menu "PCI Express root port n" is described here.

### Software

BIOS parameter			Setting options	Description
Extra bus reserv	Extra bus reserved		INT Default: 0	Defines the extra bus reserved for bridges after this root bridge Range: 0 to 7
Reserved memo	Reserved memory		INT Default: 10	Defines reserved memory [MB] for this bridge Range: 0 to 20
Reserved I/O			INT Default: <b>4</b>	Defines the reserved I/O range for this bridge Range: 4 to 20 kB Resolution: 4 kB
PCH PCIE LTR			Disabled	Disables/Enables PCIe latency reporting
			Enabled	
	Snoop latency of	verride	Auto	Disables the snoop latency override or selects manual or automatic mode
			Disabled	
			Manual	
		Snoop latency value	INT Default: 60	Defines the snoop latency value Range: 0 to 1023
		Snoop latency	1 ns	Defines the snoop latency multiplier value [ns]
		multiplier	32 ns	
			1024 ns	
			32768 ns	
			1048576 ns	
			33554432 ns	
	Non-snoop later	ncy override	Auto	Disables the non-snoop latency override or selects manual or automatic mode
			Disabled	
			Manual	
			INT	Defines the non-snoop latency value
		tency value	Default: 60	Range: 0 to 1023
		Non-snoop la-		Defines the non-snoop latency multiplier value [ns]
		tency multipli-	32 ns	
		er	1024 ns	
		32768 ns		
			1048576 ns	
			33554432 ns	
PCIE1 LTR lock			Disabled	Disables/Enables the PCIe1 LTR lock function
			Enabled	
PCIe selectable	PCIe selectable de-emphasis Disabled		Disabled	Disables/Enables PCIe selectable de-emphasis
			Enabled	

Table 105: Advanced - PCH-IO configuration - PCI Express root port *n* 

- 1) PCI Express root port *n* must be enabled in order to make further configurations.
- With a multifunction device, all functions within the device are monitored.
   For the root port, the error occurs within the root complex.
- 3) Generates a system error if an error of this category is reported by a root port or device on a root port.

# 7.1.6.2.3.2 SATA configuration

BIOS parameter		Setting options	Description	
Chipset SATA		Disabled	Disables/Enables the SATA controller	
		Enabled		
SATA interface speed		Gen1	Max. 1.5 Gbit/s	Selects the SATA speed
		Gen2	Max. 3 Gbit/s	
		Gen3	Max. 6 Gbit/s	
SATA test mode		Disabled	Disables/Enables th	ne test function
		Enabled	This is only used fo	r control measurements.
Aggressive LPM support		Disabled	Disables/Enables A	ggressive Link Power Management
		Enabled	The host controller	can change to a low-power state in the idle phase of the SATA device.
SATA port	0	-	Displays the name	and capacity of the SATA device
Software pr	reserve	-	Displays support fo	r the software preserve
SATA port	0	Disabled	Disables/Enables SATA port 0	
		Enabled		
SATA Port	0 hot plug capability	Disabled	Disables/Enables hot plugging	
		Enabled		
SATA port	0 DevSlp	Disabled	Disables/Enables device sleep	
		Enabled		
DITO config	guration	Disabled	Disables/Enables device sleep idle timeout	
		Enabled		
DITO value	;	INT	Defines the DITO value [ms]	
		Default: 625	Range: 0 to 1024	
DM value		INT Default: 15	Defines the DITO n	nultiplier
			Range: 0 to 15	

Table 106: Advanced - IO configuration - SATA configuration

# 7.1.6.2.3.3 USB configuration

<b>BIOS</b> parame	eter	Setting options	Description
USB BIOS su	pport	Disabled	Disables USB support in BIOS or enables USB support (UEFI only) or USB support (UEFI
		Enabled	and Legacy Mode)
		UEFI only	
XHCI disable	compliance mode	False	Selects XHCI disable compliance mode
		True	
USB port disa	ble override	Disabled	Manually disables/enables USB ports or enables all ports
		Select per-port	Disable this parameter to enable all ports, or enable it to disable/enable each port manually.
	USB1 3.0 connector	Disabled	Disables/Enables the interface USB1 3.0 connector
		Enabled	
	USB2 3.0 connector	Disabled	Disables/Enables the interface USB2 3.0 connector
		Enabled	
	USB1 2.0 connector	Disabled	Disables/Enables the interface USB1 2.0 connector
		Enabled	
	USB2 2.0 connector	Disabled	Disables/Enables the interface USB2 2.0 connector
		Enabled	
	USB 2.0 USV	Disabled	Disables/Enables the USB 2.0 interface on the UPS
		Enabled	
	USB1 2.0 onboard panel	Disabled	Disables/Enables the USB1 2.0 interface on the onboard panel
		Enabled	
USB2 2.0 onboard panel	Disabled	Disables/Enables the USB2 2.0 interface on the onboard panel	
		Enabled	
	USB 2.0 IF option	Disabled	Disables/Enables the USB 2.0 interface on the IF option
		Enabled	

Table 107: Advanced - IO configuration - USB configuration

# 7.1.6.2.3.4 Miscellaneous configuration

BIOS parameter	Setting options	Description	
8254 clock gating	Disabled	Disables/Enables 8254 clock g	ating
	Enabled		
State after G3	S0 state	Working	Selects the state after G3
	S5 state	Soft off	Defines how to proceed after "mechanical off" (G3).
	Last state	State previous to G3	S0/S5 after G3 or restores the state before G3
BIOS lock	Disabled	Disables/Enables the PCH BIO	S lock function
	Enabled	The BIOS lock function must be	e enabled for SMM¹).
RTC lock	Disabled	Disables/Enables lock bytes 0x	38h to 0x3Fh of RTC RAM
	Enabled		
TCO lock	Disabled	Disables/Enables the TCO lock	(
	Enabled		
Win7 keyboard/mouse support	Disabled	Disables/Enables Windows 7 keyboard/mouse support	
, , , , , , , , , , , , , , , , , , , ,	Enabled		
Wake on USB from S5	Disabled	Disables/Enables wake on USB from S5	
	Enabled		
Numlock	Off	Disables/Enables the numeric I	keypad during booting
	On	Enables BIOS input via the nur	meric keypad of a keyboard.
Real time option	RT Disabled	Disables Intel real-time option	or enables it with IDI agent real-time mask bits set (RT
	RT enabled, agent IDI1	enabled, agent IDI1) or not set	(RT enabled, agent disabled)
	RT enabled, agent disabled		
Shell startup script delay	INT	Defines the shell startup script	delay time [s]
	Default: 3	Range: 0 to 10	
Block boot fail pop-up	Disabled		pop-up (e.g. for UEFI PXE). The device tries to boot from
	Enabled	the next boot device automatically.	

Table 108: Advanced - IO configuration - Miscellaneous configuration

1) System Management Mode

# 7.1.6.2.4 Security configuration

BIOS parameter	Setting options	Description	
TXE1) FW version	-	Displays the TXE firmware version	
TXE FW capabilities	-	Displays the TXE firmware capabilities	
TXE FW features	-	Displays the TXE firmware features	
TXE FW OEM tag	-	Displays the TXE firmware OEM tag	
TXE firmware mode	-	Displays the TXE firmware mode	
Target TPM device	fTPM	Selects the target TPM device	
	dTPM	fTPM: Firmware/CPU TPM dTPM: Dedicated/Hardware TPM	

Table 109: Advanced - Security configuration

1) Intel Trusted Execution Engine

# 7.1.6.2.5 ACPI settings

BIOS parameter	Setting options	Description	
ACPI settings	Enter	Opens submenu "ACPI settings" on page 222	
FACP - RTC S4 wakeup	Disabled Disables/Enables S4 wakeup via RTC		
	Enabled		
APIC¹) - IO APIC mode	Disabled	Disables/Enables IO APIC mode	
	Enabled		

Table 110: Advanced - ACPI settings

1) Advanced Programmable Interrupt Controller

# 7.1.6.2.5.1 ACPI settings

BIOS parameter	Setting options	Description
Native PCIE enable	Disabled	Native operating system PCI Express support
	Enabled	
Native ASPM¹)	Disabled	Disables native ASPM (BIOS controls ASPM) or enables it (operating system controls
	Enabled	ASPM)
Low power S0 idle capability	Disabled	Disables/Enables low power S0 idle capability
	Enabled	

Table 111: Advanced - ACPI settings - ACPI settings

1) Active State Power Management

### **7.1.6.3 Security**

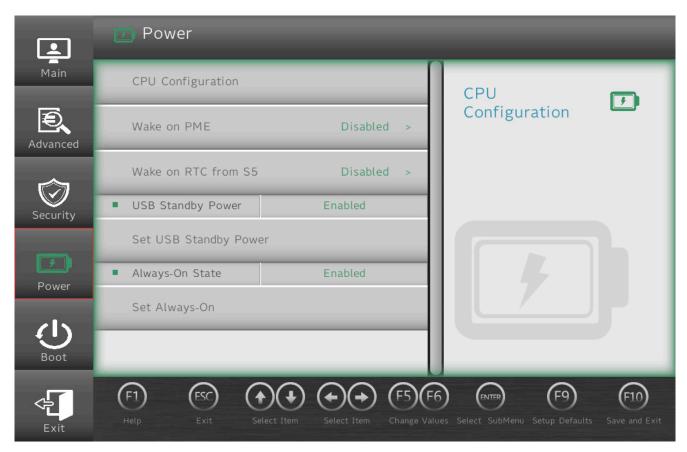


BIOS parameter	Setting options	Description	
Current TPM¹) device	-	Displays the current TPM device	
TPM active PCR hash algorithm	-	Displays the current PCR hash algorithm	
TPM hardware supported hash algorithm	-	Displays the hash algorithms supported by the hardware	
TrEE protocol version	1.0	Selects the TrEE protocol version	
	1.1		
TPM availability	Hidden	TPM invisible/visible for the operating system	
	Available		
Clear TPM	Disabled	Starts clearing TPM by enabling it	
	Enabled		
Supervisor password	-	Displays whether a supervisor password has been created	
Set supervisor password	String	Sets or changes the supervisor password	

Table 112: Security

1) Trusted Platform Module

### 7.1.6.4 Power



BIOS parameter		Setting options	Description
CPU configuration Enter Opens submenu "CF		Enter	Opens submenu "CPU configuration" on page 224
Wake on PME		Disabled	Disables/Enables wake on PME
		Enabled	
Wake on RTC from S5		Disabled	Disables wake from S5, daily, on a certain day of the month, after a certain sleep time
		By every day	or by operating system utility
		By day of month	The configuration for <i>By OS Utility</i> must be made in the operating system.
		By sleep time	
		By OS utility	
Wal	ke on S5 hour	INT	Defines the time for wake from S5 By Every Day or By Day of Month [hh:mm:ss]
Wal	ke on S5 minute	INT	[hh] range: 0 to 23
Wal	ke on S5 seconds	INT	Range [mm]: 0 to 59 Range [ss]: 0 to 59
Day	of month	INT	Defines the time for wake from S5 By Day of Month [d @ hh:mm:ss]
		Default: 1	Range [d]: 1 to 31
	ke from S5 after		Defines the timer for waking from S5 By Sleep Time [s]
(sec	conds)	Default: 5	Range: 5 to 255
USB standby power		-	Displays the USB standby power state
Set USB standby power		Disabled	Disables/Enables or does not set USB standby power
		Enabled	
Always-on	Always-on		Displays the always-on state
Set always-on		Disabled	Disables/Enables or does not set always-on
		Enabled	

Table 113: Power

# 7.1.6.4.1 CPU configuration

BIOS parameter	Setting options	Description
Intel Virtualization Technology	Disabled	Enables/Disables Intel Virtualization Technology (VTX-2)
	Enabled	
VT-d	Disabled	Disables/Enables Intel Virtualization Technology for Directed I/O
	Enabled	
TM1	Disabled	Disables/Enables thermal monitoring 1
	Enabled	CPU utilization is reduced by additional idle cycles to control the CPU temperature.
AES-NI	Disabled	Disables/Enables the Advanced Encryption Standard
	Enabled	

Table 114: Power - CPU configuration

BIOS parameter	Setting options	Description	
Thermal monitor	Disabled	Disables/Enables temperature monitoring (DTS)	
	Enabled		
Active processor cores	Disabled	Disables/Enables active processor cores	
	Enabled	If this parameter is disabled, all processor cores are used. Enabling makes it possible to configure individual processor cores.	
Core 0	-	This processor core must always be active.	
Core 1	Disabled	Disables/Enables processor core 1	
	Enabled		
Core 2	Disabled	Disables/Enables processor core 2	
	Enabled		
Core 3	Disabled	Disables/Enables processor core 3	
	Enabled		
Intel Hyper-Threading Technology	-	Anzeige ob Hyper-Threading unterstützt wird	
Monitor Mwait	Auto	Disables/Enables Monitor/Mwait or selects it automatically depending on the operating	
	Disabled	system and hardware	
	Enabled		
CPU power management	Enter	Opens submenu "CPU power management" on page 225	

Table 114: Power - CPU configuration

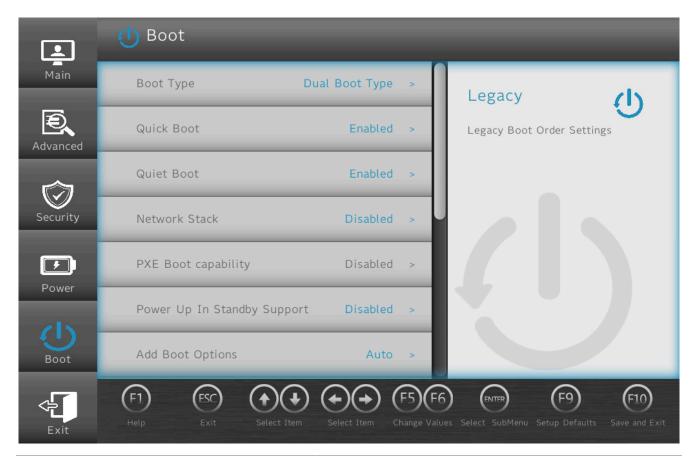
# 7.1.6.4.1.1 CPU power management

<b>BIOS</b> param	eter	Setting options	Description	
Boot perform	ance mode	Max performance		timized performance or energy optimization
		Max battery	BIOS starts in the selected mode and t	transfers this configuration to the operating system.
Intel SpeedS	tep	Disabled	Disables/Enables Intel SpeedStep	
		Enabled	Enable if more than 2 frequency ranges should be supported.	
Turbo mode		Disabled	Disables/Enables turbo mode	
		Enabled		
	Power limit 1	-	Displays power limit 1 [W]	
	Power limit 2	-	Displays power limit 2 [W]	
	Power limit 1 enable	Disabled	Disables/Enables power limit 1 (PL1)	
		Enabled		
_	Power limit 1 clamp mode	Disabled	Disables/Enables PL1 clamp mode	
		Enabled	sor core temperature.	oot the base clock frequency to control the proces-
	Power limit 1 power	Auto		es it automatically based on the processor
		(Various)	Range: 6 to 25	
	Power limit 1 time window Auto Selects the P			fines it automatically based on the processor
		(Various)	Range: 1 to 128	
C-states		Disabled	Disables/Enables processor C-states	
		Enabled		
	Enhanced C-states	Disabled	Disables/Enables enhanced C-states (C1E)	
		Enabled	Enabling allows the CPU to switch to the lowest speed if all processor cores chan a C-state.	
	Max package C state	S0ix default	Intel SoC idle standby power states	Selects the max. package C-state
		PC2	Handle QPI/PCIe traffic	
		C0	Executing and not idle	
	Max core C state	Fused value	-	Selects limiting for core C-states (CC-states),
		Core C10	C9 optimized VR1) off	no limiting or a preset value (fused value)
		Core C9	C8 + VR off	
		Core C8	C7 + PCH off	
		Core C7	Deeper power down	
		Core C6	Deep power down	
		Core C1	Halt	
	Unlimited	No limiting for CC-states		
	C-state auto demotion	Disabled	-	Disables/Enables C-state auto demotion
		C1	Halt	Can be used to prevent unnecessary changing of C-states
	C-state un-demotion	Disabled		Disables/Enables C-state un-demotion
		C1	Halt	
T-states	·	Disabled	Disables/Enables T-states	·
		Enabled		

Table 115: Power - CPU configuration - CPU power management

1) Voltage regulator (module)

### 7.1.6.5 Boot



BIOS parameter	Setting options	Description
Boot type	Dual boot type	Selects the boot type
	Legacy boot type	In dual boot mode, both UEFI and Legacy boot are possible and the CSM¹) is enabled.
	UEFI boot type	In Legacy boot mode, the CSM is enabled.
Out als hand	Disabled	In UEFI boot mode, the CSM is disabled.
Quick boot		Disables/Enables quick boot  If quick boot is enabled, certain tests are not performed so the boot procedure is faster.
0.111.11	Enabled	
Quiet boot	Disabled	Disables/Enables booting in text mode
	Enabled	B: 11 (5 11 11 11 11 11 11 11 11 11 11 11 11 11
Network stack	Disabled	Disables/Enables the network stack
	Enabled	Enabling makes ETH booting possible.
PXE boot capability	Disabled	Disables PXE boot or selects the mode
	UEFI:IPV4	
	UEFI:IPV6	
	UEFI:IPV4/IVP6	
	Legacy	
Power up in standby support	Disabled	Disables/Enables power up in standby support
	Enabled	
Add boot options	Auto	Selects or changes the mode of arrangement in the boot sequence for newly added
	First	devices
	Manual	Manual mode is not fully UEFI compatible.
	Last	
ACPI selection <sup>2)</sup>	Acpi1.0B	Selects the ACPI mode
	Acpi3.0	
	Acpi4.0	
	Acpi5.0	
	Acpi6.0	
	Acpi6.1	
USB boot	Disabled	Disables/Enables USB boot
	Enabled	
EFI device first	Disabled	Disables/Enables EFI device first
	Enabled	Enable to boot EFI devices before legacy devices. Disable to boot legacy devices before EFI devices. <sup>2)</sup>
Timeout	INT Default: <b>0</b>	Delay time until the boot list is processed [s] Range: 0 to 99

Table 116: Boot

BIOS parameter	Setting options	Description
Automatic failover	Disabled	Disables/Enables automatic failover
	Enabled	
EFI	Enter	Opens submenu "EFI" on page 227
Legacy	Enter	Opens submenu "Legacy" on page 228

Table 116: Boot

- Compatibility support module When changing the ACPI version, make sure that the operating system used is compatible.

### 7.1.6.5.1 EFI

BIOS parameter	Setting options	Description	
EFI	Enter	Opens submenu "EFI" on page 227	
1st device	CFast	Selects this device as first in the boot sequence	
	eMMC		
	USB device		
	Internal EFI shell		
	ETH1 IPv4		
	ETH1 IPv6		
	ETH2 IPv4		
	ETH2 IPv6		
	USB CD-ROM		
	Other		
	Disabled		
2nd device <sup>1)</sup>	eMMC	Selects this device as second in the boot sequence	
3rd device	USB device	Selects this device as third in the boot sequence	
4th Device	Internal EFI shell	Selects this device as fourth in the boot sequence	
5th device	ETH1 IPv4	Selects this device as fifth in the boot sequence	
6th device	ETH1 IPv6	Selects this device as sixth in the boot sequence	
7th device	ETH2 IPv4	Selects this device as seventh in the boot sequence	
8th device	ETH2 IPv6	Selects this device as eighth in the boot sequence	

Table 117: Boot - EFI

### 7.1.6.5.1.1 EFI

BIOS parameter	Setting options	Description
EFI	Enter, then:	Defines the boot sequence
	► Keyboard: F5/F6	
	► Touch screen: Move items at the gray arrows	

Table 118: Boot - EFI - EFI

Starting with the 2nd device, only the respective default values are specified.

# 7.1.6.5.2 Legacy

BIOS parameter	Setting options	Description
Normal boot menu	Normal	Selects the boot sequence type
	Advanced	
Boot type order	Enter	Opens submenu "Boot type order" on page 228
Other	Enter	Onone authmonus
Floppy disk	Enter	Opens submenu <sup>1)</sup>
Hard disk drive	Enter	Opens submenu "Hard disk drive" on page 228
CD/DVD-ROM drive	Enter	Opens submenu <sup>1)</sup>
USB	Enter	Opens submenu 7
Legacy	Enter, then:	Defines the boot sequence
	► Keyboard: F5/F6	
	► Touch screen: Move items a the gray arrows	t

Table 119: Boot - Legacy

These submenus are only available if at least one corresponding device is available.
 Their structure corresponds to that of submenu Hard disk drive.

# 7.1.6.5.2.1 Boot type order

BIOS parameter	Setting options	Description
Boot type order	Enter, then:	Defines the boot sequence
	► Keyboard: F5/F6	
	► Touch screen: Move items at the gray arrows	

Table 120: Boot - Legacy - Boot type order - Boot type order

### 7.1.6.5.2.2 Hard disk drive

BIOS parameter	Setting options	Description
Hard disk drive	Enter	Opens submenu "Hard disk drive" on page 228

Table 121: Boot - Legacy - Hard disk drive

# Hard disk drive

BIOS parameter	Setting options	Description
Hard disk drive	Enter, then:	Defines the boot sequence
	► Keyboard: F5/F6	
	► Touch screen: Move items at the gray arrows	

Table 122: Boot - Legacy - Hard disk drive - Hard disk drive

### 7.1.6.6 Exit



BIOS parameter	Setting options	Description
Exit saving changes	Enter	Saves changes and restarts
Save changes without exit	Enter	Saves changes
		Some settings only take effect after a restart.
Exit discarding changes	Enter	Discards changes and exits
Load optimal defaults	Enter	Loads system-optimized default values
Load custom defaults	Enter	Loads user-specific default values
Save custom defaults	Enter	Saves user-specific default values
Discard changes	Enter	Discards changes

Table 123: Exit

# 7.2 Upgrade information

# Warning!

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

### Information:

The following notes must be observed for BIOS upgrades:

- With version 1.10 and later, it is no longer possible to downgrade to versions < 1.10.</li>
- Upgrades to versions > 1.10 must be made via version 1.10!<sup>3)</sup>
- With version 1.21 and later, it is no longer possible to downgrade to versions < 1.21.
- Upgrades to versions > 1.21 must be made via version 1.21!4)

### 7.2.1 UEFI BIOS upgrade

An upgrade may be necessary for making updated or new functions available.

For a detailed description of changes, see file *Readme.txt* or *Liesmich.txt*, which is included in every upgrade archive (ZIP).

# Information:

Individually saved setup settings are deleted during a UEFI BIOS upgrade.

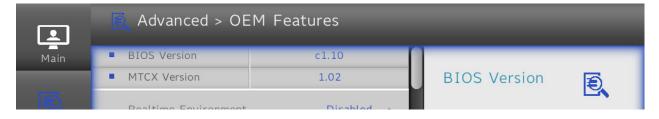
### 7.2.1.1 BIOS upgrade

The installed software versions should be determined before an upgrade is started.

### 7.2.1.1.1 Displaying firmware and BIOS version information

Information about the BIOS version and firmware is available in BIOS menu OEM features:

- 1. After switching on the xPC2200, open BIOS Setup with [Esc], [Del] or [F2].
- 2. The installed versions are displayed under Setup utility / Advanced / OEM features, see figure (symbolic).



<sup>3)</sup> Starting from version 1.0x, version 1.10 must first be installed before a version > 1.10 can be installed.

<sup>4)</sup> Starting from version 1.1x, version 1.21 must first be installed before a version > 1.21 can be installed.

#### 7.2.1.2 Procedure in the EFI shell

### Caution!

## The PC is not permitted to be switched off or reset while performing an upgrade!

- 1. Download the ZIP file from the B&R website (www.br-automation.com).
- 2. Unzip the ZIP file and copy the files to a USB flash drive formatted in *FAT16* or *FAT32*. Alternatively, a CFast card can also be used.
- 3. Reboot the PC, open the boot menu with [Esc], [Del] or [F2] and select Internal EFI shell as the boot device.
- 4. After booting the EFI shell, startup.nsh is executed and the UEFI BIOS upgrade is started.

### Information:

With an "Extended" update (e.g. Intel ME firmware), several reboots are necessary. The instructions during the update process must be followed until the upgrade installation is completed with the message "BIOS update done".

- 5. After a successful upgrade, the system must be switched off and on again for the upgrade to take effect. Call the boot menu with **[Esc]**, **[Del]** or **[F2]** during the following boot procedure and load the setup defaults and accept them with *Save changes and exit*.
- ✓ The upgrade is installed and in effect.

# 7.2.2 Firmware upgrade

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

### Caution!

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

#### 7.2.2.1 Procedure in Windows (ADI Control Center)

- 1. Download the ZIP file from the B&R website (www.br-automation.com).
- 2. Open the ADI Control Center in the Control Panel.
- 3. Open tab Versions.
- 4. Click on the desired update under PC firmware or Panel firmware. The dialog box opens.
- 5. Enter the name of the firmware file or select a file under "Filename".
- 6. Execute file with Open.
- 7. After a successful upgrade, the system must be switched off and on again for the upgrade to take effect.
- ✓ The upgrade is installed and in effect.

The transfer can be canceled by clicking on **Cancel** in dialog box "Download". This is disabled while writing to flash memory.

Erasing the data in flash memory can take several seconds depending on the memory module used. During this time, the progress indicator is not updated.

### Information:

For more detailed information about saving and updating the firmware, see the ADI driver user's manual. This is available for download at <a href="https://www.br-automation.com">www.br-automation.com</a>.

#### 7.2.2.2 Procedure in the EFI shell

- 1. Download the ZIP file from the B&R website (www.br-automation.com).
- 2. Unzip the ZIP file and copy the files to a USB flash drive formatted in *FAT16* or *FAT32*. Alternatively, a CFast card can also be used.
- 3. Reboot the PC, open the boot menu with [Esc], [Del] or [F2] and select Internal shell as the boot device.
- 4. After booting the EFI shell, *startup.nsh* is executed and the MTCX upgrade is started.
- 5. After a successful upgrade, the system must be switched off and on again for the upgrade to take effect.
- ✓ The upgrade is installed and in effect.

#### 7.2.2.3 Automatic firmware upgrade

With the APC2200/PPC2200, it is possible to perform updates automatically.

For this, parameter **Automatic firmware update** must be enabled in BIOS (see "Advanced - OEM features" on page 214).

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

Upgrades are provided as a ZIP file and include a readme file (TXT file) that provides additional information.

For automatic upgrades, the upgrade files must be stored in a directory named "XPC2200FWU" that is located in the root directory of a data storage medium formatted in *FAT32* (e.g. CFast card or USB flash drive). The following figure shows the view of a suitable data storage medium with an upgrade.

```
JEFI Interactive Shell v2.1
EDK 11
UEF1 v2.50 (INSYDE Corp., 0x57301018)
 apping table
      FSO: Alias(s):HD21i0b:;BLK1:
     BLKO: Alias(s):
          PciRoot(0x0)/Pci(0x15,0x0)/USB(0x8,0x0)
 ress ESC in 2 seconds to skip startup.nsh or any other key to continue.
 $0:\> cd XPC2200FWU
$0:\XPC2200FWU\> dir
09/27/2018 14:17 <DIR>
04/13/2018 11:06
                                3, 145, 861 61609_0. fw
04/13/2018
04/13/2018
                               3, 145, 861 61612_0. fw
3, 145, 861 61638_0. fw
04/13/2018
                                3, 145, 861 61639_0. fw
04/13/2018
04/13/2018
04/12/2018
                                3, 145, 861 61641_0. fw
             15:11
                                3, 145, 864 62020_0. fp
 14/13/2018
04/13/2018
                                    1,002 MTCXxPC2200
5,813 Readme.txt
             11:10
 4/13/2018
 14/13/2018
                                  655, 495 59062_0. fp
 08/31/2016 09:16
         16 File(s) 29,394,168 bytes
  0:\XPC2200FWU\>
```

# Information:

The automatic update only takes place if the installed firmware version differs from the upgrade version.

Automatic downgrades are possible!

### 7.3 Multi-touch drivers

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

- Windows 10 IoT Enterprise 2019 LTSC
- Windows 10 IoT Enterprise 2016 LTSB
- B&R Linux 10
- B&R Linux 9

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

# 7.4 Operating systems

### 7.4.1 Windows 10 IoT Enterprise 2019 LTSC

#### 7.4.1.1 General information

Windows 10 IoT Enterprise 2019 LTSC is a special version of Windows 10 Enterprise for industrial use (Long-Term Servicing Channel) that provides a high level of protection for applications through additional lockdown functions.

## Information:

For detailed information, see the user's manual of the operating system. This is available for download on the B&R website (<a href="https://www.br-automation.com">www.br-automation.com</a>).

#### 7.4.1.2 Order data

Order number	Short description	Figure
	Windows 10 IoT Enterprise 2019 LTSC	
5SWW10.0900-MUL	Windows 10 IoT Enterprise 2019 LTSC: - 64-bit - Entry - Multi- lingual - License - Only available with a new device	Windows 10

#### 7.4.1.3 Overview

Order number	5SWW10.0900-MUL
Operating system	
Target systems	
Industrial PC	APC2200, PPC2200
Processor	Atom
Chipset	Apollo Lake
License class	Entry
Architecture	64-bit (UEFI boot)
Language	Multilingual
Minimum size of RAM	2 GB <sup>1)</sup>
Minimum size of data storage medium	20 GB <sup>2)</sup>

<sup>)</sup> The specified memory size is a minimum requirement according to Microsoft. B&R recommends using 4 GB RAM or more for 64-bit operating systems.

#### **7.4.1.4 Features**

Windows 10 IoT Enterprise 2019 LTSC supports the following Microsoft features:

Features	Windows 10 IoT Enterprise 2019 LTSC	
Range of functions in Windows 10 Enterprise	✓	
Internet Explorer 11 (including Enterprise Mode)	✓	
Windows Touch	✓	
Multilingual support	With language packs (default: English)	
Page file	Configurable (default: disabled by UWF)	
Hibernate file	Configurable (default: disabled)	
System restore		
SuperFetch	Configurable (default, disabled by LIME)	
File indexing service	Configurable (default: disabled by UWF)	
Fast boot		
Defragmentation service	√ (disabled when enabling the UWF)	
Additional lockdown features (excerpt)		
Assigned access	Configurable	
AppLocker	Configurable	
Shell Launcher	Configurable	
Unified Write Filter	✓	
Keyboard Filter	Configurable	

The following are some differences from standard Windows 10 Enterprise:

- Windows 10 IoT Enterprise 2019 LTSC does not include Cortana, the Microsoft Edge browser or the Microsoft Store.
- The LTSC version is based on build 17763 of Windows 10 and does not receive any feature updates.
- The version installed by B&R contains optimized settings for operation in an industrial environment.

These are described in detail in the **Windows 10 IoT Enterprise 2019 LTSC working guide**. This contains information about installing languages, enabling lockdown and other features.

<sup>2)</sup> The specified minimum size of the data storage medium does not take into account the memory requirements of additional language packages.

# Information:

These settings, as well as all features not included in the LTSC version, result in different behavior compared to a standard Windows 10 Enterprise installation.

#### 7.4.1.5 Installation

B&R installs and activates Windows 10 IoT Enterprise 2019 LTSC on a suitable data storage medium. After the system has been switched on for the first time, it runs through the out-of-box experience (OOBE), which allows the user to make various settings (e.g. language, region, keyboard, computer name, username).

The operating system is now only installed in UEFI mode.

The data storage medium containing the Windows partition is formatted as a GUID Partition Table (GPT) file system in UEFI mode. For other drives, it is possible to use either the GPT or Master Boot Record (MBR) file format. A GPT drive can have up to 128 partitions.

### Notice!

It is important to note that when installing in UEFI mode, the GPT file system must be supported by the software being used when backing up and restoring the installation.

#### 7.4.1.6 Drivers

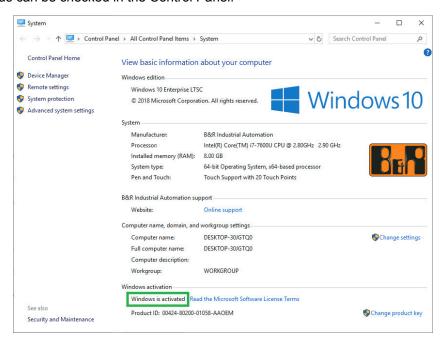
The operating system contains all drivers necessary for operation. If an older driver version is installed, the latest version can be downloaded and installed from the B&R website (<a href="www.br-automation.com">www.br-automation.com</a>). It is important to ensure that "Unified Write Filter (UWF)" is disabled.

### Information:

Necessary drivers must be downloaded from the B&R website, not from manufacturer websites.

#### 7.4.1.7 Activation

Windows 10 IoT Enterprise 2019 LTSC must be activated like its predecessor version. This takes place at B&R. The activation status can be checked in the Control Panel:



The activation carried out by B&R is supported by special B&R extensions in the operating system and is not lost when the hardware is changed (e.g. replacement of components in the event of repair) or when the system is reinstalled (Microsoft reserves the right to make technical changes without notice).

### 7.4.1.8 Supported display resolutions

Windows requires SVGA resolution (800 x 600) or higher per Microsoft requirements to activate full operation of the Windows interface (e.g. with system dialog boxes). A lower resolution can be selected for applications.

# 7.4.2 Windows 10 IoT Enterprise 2016 LTSB

#### 7.4.2.1 General information

Windows 10 IoT Enterprise 2016 LTSB is a version of Windows 10 Enterprise specifically developed for use in industrial applications (Long-Term Servicing Branch).

# Information:

For detailed information, see the user's manual of the operating system. This is available for download on the B&R website (<a href="https://www.br-automation.com">www.br-automation.com</a>).

#### 7.4.2.2 Order data

Order number	Short description	Figure
	Windows 10 IoT Enterprise 2016 LTSB	
5SWW10.0545-MUL	Windows 10 IoT Enterprise 2016 LTSB - 64-bit - Entry - Multi- lingual - PPC2200 (UEFI boot) - CPU E3930/E3940 - License - Only available with a new device	Windows 10
5SWW10.0559-MUL	Windows 10 IoT Enterprise 2016 LTSB - 64-bit - Entry - Multi- lingual - PPC2200 (Legacy BIOS boot) - CPU E3930/E3940 - License - Only available with a new device	
	Optional accessories	
	Windows 10 IoT Enterprise 2016 LTSB	
5SWW10.0800-MUL	Windows 10 IoT Enterprise 2016 LTSB - 64-bit - Language Pack DVD	

#### 7.4.2.3 Overview

Order number	5SWW10.0545-MUL	5SWW10.0559-MUL
Operating system		
Target systems		
Industrial PC	PPC	2200
Processor	x5-E3930, x5-E3940	
Chipset	Apollo Lake	
Edition	Enterprise LTSB - Entry	
Architecture	64-bit (UEFI boot) 64-bit (legacy BIOS boot)	
Language	Multilingual	
Minimum size of RAM	2 GB <sup>1)</sup>	
Minimum size of data storage medium	20 GB <sup>2)</sup>	

- 1) The specified memory size is a minimum requirement according to Microsoft. B&R recommends using 4 GB RAM or more for 64-bit operating systems.
- 2) The specified minimum size of the data storage medium does not take into account the memory requirements of additional language packages.

#### **7.4.2.4 Features**

The feature list shows the most important device functions in Windows 10 IoT Enterprise 2016 LTSB.

Function	Windows 10 IoT Enterprise 2016 LTSB	
Range of functions in Windows 10 Enterprise	✓	
Internet Explorer 11 including Enterprise Mode	✓	
Multi-touch support	✓	
Multilingual support	Can be installed via Language Pack DVDs (default language is English)	
Page file	Configurable (disabled by default in the image by the UWF)	
Hibernate file	Configurable (disabled by default in the image)	
System restore	Configurable (disabled by default in the image by the UWF)	
SuperFetch	Configurable (disabled by default in the image by the UWF)	
File indexing service	Configurable (disabled by default in the image by the UWF)	
Fast boot	Configurable (disabled by default in the image by the UWF)	
Defragmentation service	√ (Disabled when enabling the UWF)	
Additional embedded lockdown functions		
Assigned access	Configurable	
AppLocker	Configurable	
Shell Launcher	Configurable	
Unified Write Filter	<b>√</b>	
Keyboard Filter	Configurable	

Table 128: Device functions in Windows 10 IoT Enterprise 2016 LTSB

#### 7.4.2.5 Installation

Windows 10 IoT Enterprise 2016 LTSB is preinstalled by B&R on a suitable data storage medium (64-bit: at least 20 GB). After the system has been switched on for the first time, it runs through the out-of-box experience (OOBE), which allows different settings to be made (e.g. language, region, keyboard, computer name, username).

Windows 10 IoT Enterprise 2016 LTSB can be installed in UEFI or Legacy BIOS mode. In UEFI mode, the data storage medium containing the Windows partition is formatted with a GUID Partition Table (GPT) file system. A GPT drive can have up to 128 partitions.

When backing up and restoring the installation, note that the GPT file system must be supported by the software used.

#### 7.4.2.6 Drivers

The operating system contains all drivers necessary for operation. If an older driver version is installed, the latest version can be downloaded and installed from the B&R website (<a href="www.br-automation.com">www.br-automation.com</a>). It is important to ensure that "Unified Write Filter (UWF)" is disabled.

### Information:

Necessary drivers must be downloaded from the B&R website, not from manufacturer websites.

#### 7.4.2.7 Activation

Windows 10 IoT Enterprise 2016 LTSB must be activated like its predecessor Windows 10 IoT Enterprise 2015 LTSB. This takes place at B&R.

The activation status can be checked in the Control Panel:

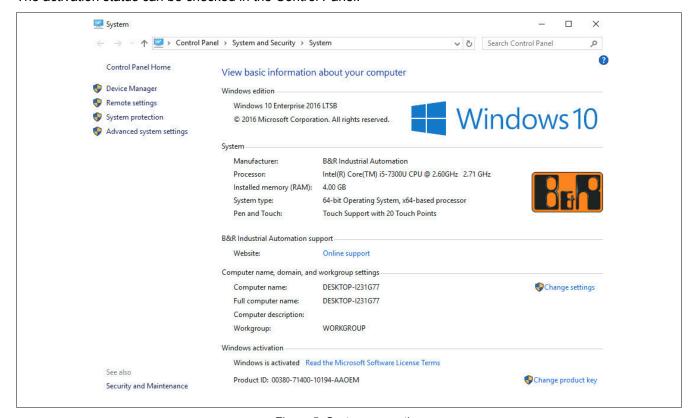


Figure 5: System properties

Activation carried out by B&R is supported by special B&R extensions in the operating system and theoretically not lost when the hardware is changed (e.g. replacement of components in the event of repair) or when the system is reinstalled, unlike Windows 10 IoT Enterprise 2015 LTSB (Microsoft reserves the right to make technical changes without notice).

### Information:

It is not required to enter a product key for activation.

#### 7.4.2.8 Characteristics, limitations

- Unlike standard Windows 10 Enterprise, Windows 10 IoT Enterprise 2016 LTSB does not include Cortana, the Microsoft Edge browser or the Microsoft Store, for example.
- The LTSB version is based on build 14393 of Windows 10 and does not receive any feature updates.

The version installed by B&R contains optimized settings for operation in an industrial environment. These are described in detail in a manual for Windows 10 IoT Enterprise 2016 LTSB. This can be downloaded at no cost from the Downloads section of the B&R website (<a href="https://www.br-automation.com">www.br-automation.com</a>) (login required).

### Information:

These settings as well as the features not included in the LTSB version cause different behavior compared to a standard Windows 10 Enterprise installation.

### 7.4.2.9 Supported display resolutions

Windows requires SVGA resolution (800 x 600) or higher per Microsoft requirements to activate full operation of the Windows interface (e.g. with system dialog boxes). A lower resolution can be selected for applications.

### **7.4.3 B&R Linux 10 (GNU/Linux)**

#### 7.4.3.1 General information

B&R supports Linux in the form of modified images based on Debian GNU / Linux 10 (codename "buster").

With B&R Linux, B&R offers a variant of Debian optimized for B&R industrial PCs that already includes all B&R-specific modifications and offers the broadest possible basis for various applications.

Reasons for Debian:

- · High stability
- · Large package selection
- Wide distribution of Debian and various derivatives (e.g. Ubuntu, Linux Mint)

For additional information, see the Debian website (https://www.debian.org/).

### Information:

For detailed information, see the user's manual of the operating system. This is available for download on the B&R website (<a href="https://www.br-automation.com">www.br-automation.com</a>).

#### 7.4.3.2 Order data

Order number	Short description	Figure
	B&R Linux 10	
5SWLIN.0845-MUL	B&R Linux 10 - 64-bit - Multilingual - PPC2200 (UEFI boot) - Installation - Only available with a new device	т
	Optional accessories	
	CFast cards	
5CFAST.016G-00	CFast 16 GB SLC	
5CFAST.032G-00	CFast 32 GB SLC	
5CFAST.032G-10	CFast 32 GB MLC	
5CFAST.064G-10	CFast 64 GB MLC	
5CFAST.128G-10	CFast 128 GB MLC	
5CFAST.256G-10	CFast 256 GB MLC	
5CFAST.8192-00	CFast 8 GB SLC	

### 7.4.3.3 Overview

Order number	5SWLIN.0845-MUL
Operating system	
Target systems	
Industrial PC	PPC2200
Chipset	Apollo Lake
Architecture	64-bit (UEFI boot)
Language	Multilingual
Minimum size of RAM	2 GB
Minimum size of data storage medium	8 GB

#### **7.4.3.4 Features**

B&R Linux 10 contains a selection of predefined software package groups. Additional packages can be installed later with an existing Internet connection.

Appropriate modifications have been made and certain features provided using custom packages in order to use Debian on B&R Automation Panels and Panel PCs. Most of these packages are already included in B&R Linux and/or available for download on the B&R website (<a href="https://www.br-automation.com">www.br-automation.com</a>).

### 7.4.3.5 Installation

B&R Linux 10 is preinstalled at B&R on the desired data storage medium (e.g. CFast card).

#### **7.4.3.6 Drivers**

The operating system contains all drivers necessary for operation.

The current version of B&R-specific drivers can be downloaded and installed from the B&R website (www.br-automation.com).

# 7.4.4 B&R Linux 9 (GNU/Linux)

#### 7.4.4.1 General information

B&R supports Linux in the form of modified images based on Debian GNU / Linux 9 ("Stretch").

With B&R Linux, B&R offers a variant of Debian optimized for B&R industrial PCs that already includes all B&R-specific modifications and offers the broadest possible basis for various applications.

Reasons for Debian:

- · High stability
- · Large package selection
- Wide distribution of Debian and various derivatives (e.g. Ubuntu, Linux Mint)

For additional information, see the Debian website (https://www.debian.org/).

# Information:

For detailed information, see the user's manual of the operating system. This is available for download on the B&R website (<a href="https://www.br-automation.com">www.br-automation.com</a>).

#### 7.4.4.2 Order data

Order number	Short description	Figure	
	B&R Linux 9		
5SWLIN.0745-MUL	B&R Linux 9 - 64-bit - Multilingual - PPC2200 (UEFI boot) - In-	<u> </u>	
	stallation - Only available with a new device		
5SWLIN.0759-MUL	B&R Linux 9 - 64-bit - Multilingual - PPC2200 (Legacy BIOS boot) - Installation - Only available with a new device		
	Optional accessories		
	CFast cards		
5CFAST.016G-00	CFast 16 GB SLC		
5CFAST.032G-00	CFast 32 GB SLC		
5CFAST.032G-10	CFast 32 GB MLC		
5CFAST.064G-10	CFast 64 GB MLC		
5CFAST.128G-10	CFast 128 GB MLC		
5CFAST.256G-10	CFast 256 GB MLC		
5CFAST.4096-00	CFast 4 GB SLC		
5CFAST.8192-00	CFast 8 GB SLC		

### 7.4.4.3 Overview

Order number	5SWLIN.0745-MUL	5SWLIN.0759-MUL					
Operating system							
Target systems							
Industrial PC	PPC	22200					
Chipset	Apollo Lake						
Architecture	64-bit (UEFI boot)	64-bit (Legacy BIOS boot)					
Language	Multilingual						
Minimum size of RAM	2 GB						
Minimum size of data storage medium	4 GB						

### **7.4.4.4 Features**

- · LXDE desktop
- · Touch screen support
- · MTCX driver
- ADI library
- Tool for right-click support via touch screen
- · Virtual keyboard

Detailed instructions about B&R Linux 9 for B&R devices can be downloaded from the Downloads section of the B&R website (<a href="www.br-automation.com">www.br-automation.com</a>).

#### 7.4.4.5 Installation

B&R Linux 9 is preinstalled at B&R on the desired data storage medium (e. g. CFast card).

# Software

### 7.4.4.6 Drivers

The operating system contains all drivers necessary for operation.

The current version of B&R-specific drivers can be downloaded and installed from the B&R website (www.br-automation.com).

### 7.5 Automation software

### 7.5.1 Licensing

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

It is possible to choose between the following licensing types:

### **Technology Guarding (TG)**

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

### Information:

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

### Terms and conditions (TC)

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

# Information:

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

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

#### 7.5.2 Order data

#### Hardware-based licensing (Technology Guard)

Order number	Short description	Figure	
	Technology Guard		
0TG1000.01	Technology Guard (MSD)	A3334	
0TG1000.02	Technology Guard (HID)	Tech Guard	
0TGF016.01	Technology Guard (MSD) with integrated flash drive, 16 GB (MLC)		
1TG4601.06-5	Automation Runtime Embedded, TG license		
1TG4601.06-T	Automation Runtime Embedded Terminal TG license		
1TG4700.00	B&R Hypervisor	<b>OBN</b>	

#### Contract-based licensing (terms and conditions)

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

### 7.5.3.1 Support

The following table provides an overview of which Automation Runtime software components are supported by the device.

Target system	B&R Hypervisor	ARemb	ARemb Terminal (TG only)
PPC2200	Yes	Yes	Yes

#### 7.5.4 Automation Runtime

#### 7.5.4.1 General information

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

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

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

#### 7.5.4.2 Minimum versions

# 7.5.4.2.1 Automation Runtime Embedded (ARemb)

#### System requirements

The following software versions (or higher) are required to operate Automation Runtime Embedded on a Panel PC 2200:

- ARemb upgrade AR A4.63
- Automation Studio V4.6.2
- Visual Components Runtime (VC) V4.62
- Automation software license (TG or TC)

### Information:

In order to use Automation Runtime Embedded (ARemb), BIOS setting Advanced - OEM features - Realtime environment must be set to Enabled.

# Information:

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

### 7.5.5 B&R Hypervisor

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

### Intelligent distribution of CPU resources

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



#### Virtual network

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

### **Maximum flexibility**

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

#### System requirements

The following minimum software versions are required to operate B&R Hypervisor on the Panel PC 2200:

- ARemb upgrade AR A4.63
- Automation Studio V4.6.2
- xPC2200 BIOS V1.05
- xPC2200 MTCX V1.02

### Information:

The following settings must be made to operate B&R Hypervisor:

- Advanced OEM features Realtime environment must be enabled.
- Advanced OEM features Hypervisor environment must be enabled.
- Boot EFI device first:

Legacy boot

Boot - EFI device first must be disabled.

**UEFI** boot

o Boot - EFI device first must be enabled (default).

### Information:

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

# 7.5.6 mapp Technology



mapp is revolutionizing the creation of software for industrial machinery and equipment. mapp components – mapps for short – are as easy to use as smartphone apps. Rather than write lines and lines of code to build a user management system, alarm system or motion control sequence from the ground up, developers of machine software simply configure the ready-made mapps with a few clicks of the mouse. Complex algorithms are easy to master. Programmers can focus entirely on the machine process.

# Information:

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

# 7.6 Automation Device Interface (ADI)

The Automation Device Interface (ADI) enables access to specific functions of B&R devices.

#### 7.6.1 ADI driver

#### 7.6.1.1 Installation

The ADI driver is included in most B&R Windows operating systems or can be installed on request.

The ADI driver (also includes the ADI Control Center) and user documentation can be downloaded at no cost from the Downloads section of the B&R website (<a href="https://www.br-automation.com">www.br-automation.com</a>). If a more recent version is available, it can be installed later.

### Information:

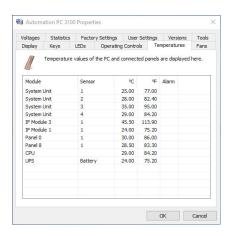
The Write filter must be disabled during installation.

#### 7.6.1.2 ADI Control Center

The settings of B&R devices can be read out and changed in Windows using the ADI Control Center in the Control Panel. The figure shown is a symbolic image; the representation may vary depending on the device.

### Information:

The displayed temperature and voltage values (e.g. CPU temperature, core voltage, battery voltage) represent uncalibrated information values. No conclusions about possible alarms or hardware malfunctions can be drawn from this. The hardware components used have automatic diagnostic functions in the event of error.



#### 7.6.1.2.1 Functions

The ADI Control Center offers the following functions, for example:

- · Changing display-specific parameters
- · Reading out device-specific keys
- · Updating the key configuration
- · Testing keys or device-specific LEDs of a membrane keypad
- Reading out control devices (e.g. key switch, handwheel)
- · Reading out temperatures, fan speeds and statistical data
- Reading out operating hours (power-on hours)
- · Reading user settings and factory settings
- · Reading out software versions
- Updating and backing up firmware
- Creating reports for the current system (support)
- · Setting the SDL equalizer value for the SDL cable adjustment
- · Changing the user serial ID

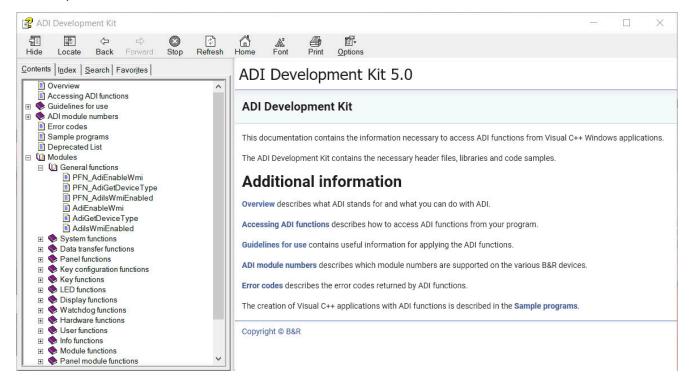
For a detailed description, see the user documentation for the ADI driver.

### Information:

The functions available in the ADI Control Center depend on the device family.

### 7.6.2 ADI Development Kit

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



#### Features:

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

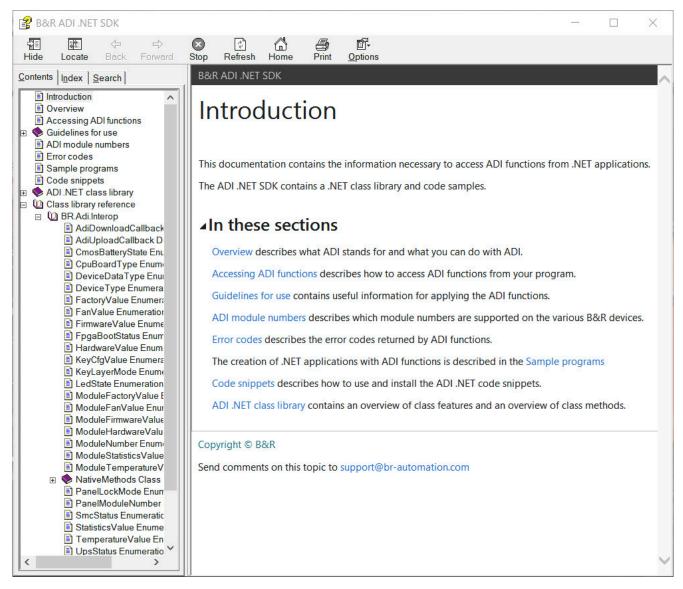
The appropriate ADI driver must be installed for the device. The ADI driver is already included in B&R images of embedded operating systems.

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

The ADI Development Kit can be downloaded at no cost from the Downloads section of the B&R website (<a href="https://www.br-automation.com">www.br-automation.com</a>).

#### **7.6.3 ADI.NET SDK**

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



#### Features:

- · ADI .NET class library
- · Help files (in English)
- Sample projects and code snippets
- ADI DLL: For testing applications if no ADI driver is installed.

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

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

The ADI .NET SDK can be downloaded at no cost from the Downloads section of the B&R website (<a href="https://www.br-automation.com">www.br-automation.com</a>).

# 7.6.4 ADI OPC UA Server

ADI OPC UA Server provides the functions and information about Automation Device Interface (ADI) as OPC UA variables.

OPC UA stands for **O**pen **P**latform **C**ommunications **U**nified **A**rchitecture and is an international standard for secure, reliable, manufacturer and platform-independent information exchange in industrial communication.

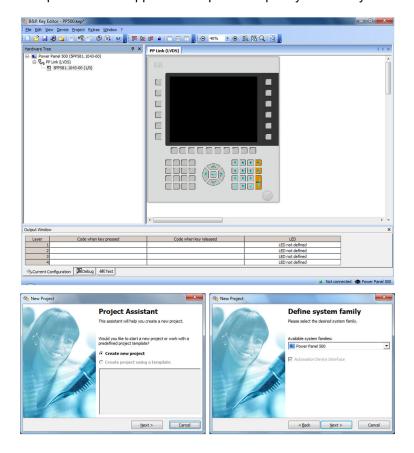
OPC UA is based on the client-server principle and, in the case of ADI OPC UA Server, enables temperatures and device information to be read from B&R devices, for example.

Additional information is available on the OPC Foundation (www.opcfoundation.org) website, for example.

The ADI OPC UA Server and user documentation can be downloaded at no cost from the Downloads section of the B&R website (<a href="https://www.br-automation.com">www.br-automation.com</a>).

# 7.7 Key Editor

A frequently occurring requirement for panels is adapting function keys and LEDs to the application software. With the Key Editor, individual adaptation to the application is possible quickly and easily.



## Features:

- Configuration of normal keys like on a keyboard (A, B, C, etc.)
- · Keyboard shortcuts (CTRL+C, SHIFT+DEL, etc.) on one key
- · Special key functions (change brightness, etc.)
- Assignment of LED functions (HDD access, power, etc.)
- 4 assignments possible per key (using layers)
- Configuration of the panel lock time when connecting several Automation Panel devices to Automation PCs and Panel PCs

For detailed instructions about configuring keys and LEDs and installing the key configuration on the target system, see the help documentation for the Key Editor. The Key Editor and help documentation can be downloaded at no cost from the Downloads section of the B&R website (<a href="https://www.br-automation.com">www.br-automation.com</a>).

### 7.8 KCF Editor

The KCF Editor can be used as a simple alternative to the Key Editor. It can also be used to adapt function keys and LEDs to the application software. In contrast to the Key Editor, operation does not take place using a graphical representation of the device, but via a simple Windows dialog box. The KCF Editor can therefore also be used for devices that are not yet supported in the Key Editor. The KCF Editor is a "portable" application and can be started directly from a USB flash drive without installation on the target device, for example.

An installed ADI driver is required for the full range of functions.



#### Features:

- Configuration of normal keys like on a keyboard (A, B, C, etc.)
- Special key functions (change brightness, etc.)
- · Assignment of LED functions (HDD access, power, etc.)
- 4 assignments possible per key (using layers)
- Configuration of the panel lock time when connecting several Automation Panel devices to B&R PCs.
- Export and import of the configuration (via INI files)
- Save configuration as report (text file)

If the KCF Editor is running on the target device and the ADI driver is installed, the following additional features are available:

- · Panel and key detection
- LED test
- Download/Upload the configuration

For detailed instructions about configuring keys and LEDs and installing the key configuration on the target system, see the user documentation for the KCF editor. The KCF editor and user documentation can be downloaded at no cost from the Downloads section of the B&R website (www.br-automation.com).

## 7.9 HMI Service Center

#### 7.9.1 General information

The HMI Service Center is software for testing B&R industrial PCs and Automation Panels. Testing covers different categories such as COM, network and SRAM.

The test system consists of a USB flash drive with installed Windows PE operating system and the HMI Service Center.

For details about the HMI Service Center, see the HMI Service Center user's manual. This can be downloaded at no cost from the B&R website (<u>www.br-automation.com</u>).

#### 7.9.2 Order data

Order number	Short description	Figure
	Accessories	
5SWUTI.0001-000	HMI Service Center USB flash drive - Hardware diagnostic software - For APC910/PPC900 - For PPC1200 - For APC2100/PPC2100 - For APC2100/PPC2100 - For APC3100/PPC3100 - For APC mobile - For AP800/AP900 - For AP9x3/AP9xD - For AP1000/AP5000	Perfection in Automation

The following limitations regarding supported hardware revisions must be observed:

Devices	Starting with D0	Up to E0	Starting with E0
Automation Panel 1000	•		
Automation Panel 5000	•		
Automation PC 3100	•		
Automation PC 3100 mobile			•
Automation PC 2200	•		
Automation PC 810		•	
Automation PC 511		•	
Automation PC 510		•	
Panel PC 3100	•		
Panel PC 2200	•		
Panel PC 1200			•
Panel PC 800		•	
Power Panel 500		•	

# 8 Maintenance

The following chapter describes the maintenance work that can be carried out by a qualified and trained end user.

# Information:

Only components approved by B&R are permitted to be used for maintenance work.

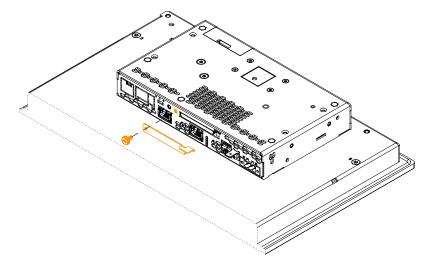
# 8.1 Replacing CFast cards

# Caution!

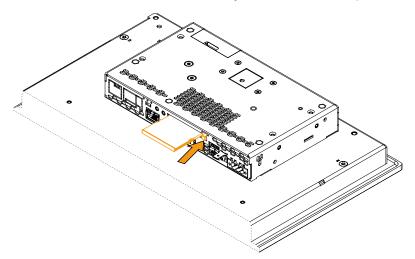
The CFast card is only permitted to be replaced in a voltage-free state.

Improper handling of the ejection lever (e.g. applying a large amount of force) can result in a defect in the ejector mechanism.

- 1. Disconnect the power supply cable to the B&R industrial PC (disconnect the power cable).
- 2. Loosen the Torx screw (T10) of the cover plate and remove the cover plate.



3. Press the ejector next to the card slot. The CFast card is ejected and can be replaced.



4. After replacing, re-secure the cover of the CFast card slot. The max. tightening torque of the screw is 0.55 Nm.

## 8.2 Changing the battery

## Warning!

The battery compartment is only permitted to be replaced by B&R battery compartment 5ACCBT01.0000-001 or 5ACCRPC2.0003-000. 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.

The lithium battery ensures the retention of the internal real-time clock (RTC) and CMOS data.

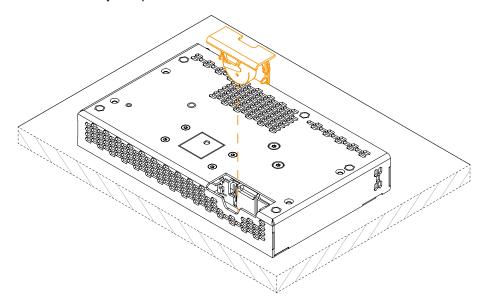
Note the following when changing the battery:

- 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 since this data is lost during the change.

#### 8.2.1 Changing the battery

The following instructions apply to battery compartments 5ACCBT01.0000-001 and 5ACCRPC2.0003-000.

- 1. Disconnect the power supply cable to the B&R industrial PC (disconnect the power cable).
- 2. Carry out electrostatic discharge on the housing or ground connection.
- 3. Pull out and remove the battery compartment.



- 4. Insert the new battery compartment.
- 5. Reapply power to the B&R industrial PC (connect the power cable).
- 6. Reset the date and time.

# Warning!

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

# 8.3 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.

## Information:

Displays with a touch screen should be cleaned at regular intervals.

#### 8.4 Pixel errors

#### Information:

Displays can contain faulty pixels (pixel errors) due to the manufacturing process. They are not grounds for initiating a complaint or warranty claim.

## 8.5 User tips for increasing the service life of the display

#### 8.5.1 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.

#### 8.5.1.1 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%.

#### 8.5.1.2 How can the service life of backlights be extended?

- · Set the display brightness to the lowest value comfortable for the eyes.
- Use dark images.
- Reducing the brightness by 50% can increase the half-brightness time by approximately 50%.

#### 8.5.2 Image persistence

Image persistence refers to the "burning in" of a static image on a display after being displayed for a long time. It does not only occur with static images, however. Image persistence is also referred to in the technical literature as screen burn-in, image retention, memory effect, memory sticking or ghost image.

There are 2 different types:

- Area type: This type can be seen in a dark gray image. The effect disappears if the display is switched
  off for a long time.
- · Line type: This can result in permanent damage.

#### 8.5.2.1 What causes image persistence?

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

#### 8.5.2.2 How can image persistence be reduced?

- Switch continuously between static and dynamic images.
- Prevent excessive differences in brightness between foreground and background elements.
- · Use colors with similar brightness.
- · Use complementary colors for subsequent images.
- Use screensavers.

# 8.6 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 (<a href="https://www.br-automation.com">www.br-automation.com</a>).

# 9 International and national certifications

## 9.1 Directives and declarations

#### 9.1.1 CE marking



All directives applicable to the respective product and their harmonized EN standards are met.

#### 9.1.2 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 in-

dustrial environments

EN 61000-6-4:2007 Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission stan-

dard for industrial environments

## Information:

The declarations of conformity are available on the B&R website under <u>Declarations of conformity</u>.

#### 9.2 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.

#### 9.2.1 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 under <u>Downloads - Certificates</u> - UL.

#### 9.2.2 EAC



Products with this mark are tested by an accredited test laboratory and permitted to be imported into the Eurasian Customs Union (based on EU conformity).

#### 9.2.3 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).

#### 9.2.4 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 facilitates the certification of your machines and systems in this economic area (based on EU conformity).

# 10 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.

#### 10.1 General information

The following products can be used in the event of loss or for conversion or retrofitting.

#### 10.1.1 Order data

Material number	Description
5ACCRHMI.0000-000	HMI grounding clip
5ACCRHMI.0001-000	Retaining clips 16 mm - 14 pcs. with 16 mm setscrews - For AP1000 and AP9x3
5ACCRHMI.0002-000	Retaining clips 20 mm - 14 pcs. with 20 mm setscrews - For AP1000 and AP9x3
5ACCRHMI.0003-000	Retaining clips 25 mm - 12 pcs. with 25 mm setscrews - For AP1000 and AP9x3
5ACCRHMI.0004-000	Rafi replacement key - 1 pc.
5ACCRHMI.0004-C00	Schlegel replacement key - 2 pcs.
5ACCRPC2.0000-000	PPC2100/2200 mounting screws kit - 4x screw M3x34 mm - 2x special screw for PPC2100
5ACCRPC2.0001-000	xPC2100/2200 interface covers - 1x cover set
5ACCRPC2.0002-000	xPC2200 CFast cover
5ACCRPC2.0003-000	xPC2200 battery compartment - 1x battery holder for xPC2200 - 1x battery including circuit board
5ACCRPC2.0007-000	APC2100/2200 front cover - Orange - With logo
5ACCRPC2.0008-000	APC2100/APC2200 front cover - Gray - With logo

#### 10.1.1.1 5ACCRPC2.0003-000 - Technical data

#### Information:

Order number	5ACCRPC2.0003-000
General information	
Battery	
Туре	Panasonic 1000 mAh
Nominal voltage	3 V
Service life	8 years 1)
Removable	No <sup>2)</sup>
Variant	Lithium
Certifications	
CE	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 gray (similar to Pantone 432C) plastic
Weight	Approx. 13 g

- 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.

# 10.2 Installation accessories

Suitable tool sets can be ordered to easily install B&R swing arm devices.

- Screwdriver with quick-change chuck
- Consisting of:

#### 5ACCRHMI.0007-000

- ° 1x torque screwdriver: 0.3 to 1.2 Nm, ESD-protected
- ° 1x torque wrench: 1 to 25 Nm
- $^{\circ}$   $\,$  1x bit set (6 pieces): Hex recess (3.0 mm, 5.0 mm), Torx (T10, T20, T25, T30)  $\,$
- ° 1x quick-change chuck for torque wrench

#### 10.2.1 Order data

Order number	Short description	Figure
	Other	
5ACCRHMI.0007-000	HMI installation tool for swing arm: - 1x torque wrench ESD 0.3 - 1.2 Nm - 1x torque wrench 1.0 - 25.0 Nm - 1x hex-head bit 3.0, length 89 mm - 1x hex-head bit 5.0, length 89 mm - 1x Torx 10 bit, length 90 mm - 1x Torx 20 bit, length 89 mm - 1x Torx 25 bit, length 89 mm - 1x Torx 30 bit, length 89 mm - 1x quick-change chuck for torque wrench	

# 10.3 Terminal block power supply

#### 10.3.1 0TB103.9x

#### 10.3.1.1 General information

1-row 3-pin terminal block 0TB103 is used for the power supply.

#### 10.3.1.2 Order data

Order number	Short description	Figure
	Accessories	
0TB103.9	Connector 24 VDC - 3-pin, female - Screw clamp terminal block 3.31 mm <sup>2</sup>	
0TB103.91	Connector 24 VDC - 3-pin, female - Cage clamp terminal block 3.31 mm <sup>2</sup>	

#### 10.3.1.3 Technical data

# Information:

Order number	0TB103.9	0TB103.91
General information		
Certifications		
CE	Ye	es
UL	cULus E	115267
	Industrial cont	rol equipment
HazLoc	cULus HazL	
	Industrial cont	
	for hazardou Class I, Division 2, 0	
DNV	Temperature:	•
DIVV	Humidity: <b>B</b> (	
	Vibration:	
	EMC: <b>B</b> (bridge a	ind open deck) 2)
KR	Ye	es
EAC	Ye	es
Terminal block		
Note	Protected against vibration by the screw flange	
	Nominal data per UL	
Number of pins	3 (female)	
Type of terminal block	Screw clamp terminal block variant	Cage clamp terminal block variant 3)
Cable type	Only copper wires (no aluminum wires!)	
Pitch	5.08 mm	
Connection cross section		
AWG wire	26 to 14 AWG	26 to 12 AWG
Wire end sleeves with plastic covering	0.20 to 1.50 mm <sup>2</sup>	
Solid wires	0.20 to 2.50 mm <sup>2</sup>	
Fine-stranded wires	0.20 to 1.50 mm <sup>2</sup>	0.20 to 2.50 mm <sup>2</sup>
With wire end sleeves	0.20 to 1.50 mm <sup>2</sup>	
Tightening torque	0.4 Nm	-
Electrical properties		
Nominal voltage	300 V	
Nominal current 4)	10 A / contact	
Contact resistance	≤5 r	mΩ
Operating conditions		
Pollution degree per EN 61131-2	Pollution	degree 2

<sup>1)</sup> Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.

<sup>2)</sup> Yes, but applies only if all components installed in the complete system have this certification and are listed on the associated DNV certificate for the product family

<sup>3)</sup> The cage clamp terminal block cannot be used side by side.

<sup>4)</sup> The respective limit data of the I/O modules must be taken into account!

# 10.4 Terminal block for IF options

#### 10.4.1 0TB1210.3100

#### 10.4.1.1 General information

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

#### 10.4.1.2 Order data

Order number	Short description	Figure
	Terminal blocks	
OTB1210.3100	Connector 300 VDC - 10-pin female - Cage clamp terminal block - Protected against vibration by the screw flange	ग्राम्य

#### 10.4.1.3 Technical data

## Information:

Order number	0TB1210.3100
General information	
Certifications	
CE	Yes
UL	cULus E115267
	Industrial control equipment
HazLoc	cULus HazLoc E180196
	Industrial control equipment
	for hazardous locations Class I, Division 2, Groups ABCD, T4 1)
DNV	Temperature: <b>B</b> (0 - 55°C)
DINV	Humidity: <b>B</b> (up to 100%)
	Vibration: <b>A</b> (0.7 g)
	EMC: <b>B</b> (bridge and open deck) <sup>2)</sup>
KR	Yes
EAC	Yes
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 mm <sup>2</sup>
Solid wires	0.14 to 1.5 mm <sup>2</sup>
Fine-stranded wires	0.14 to 1.5 mm <sup>2</sup>
With wire end sleeves	0.14 to 1.5 mm <sup>2</sup>
Electrical properties	
Nominal voltage	300 V
Nominal current 3)	10 A
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2

<sup>1)</sup> Yes, but applies only if all components installed in the complete system have this certification and the complete system bears the corresponding mark.

<sup>2)</sup> Yes, but applies only if all components installed in the complete system have this certification and are listed on the associated DNV certificate for the product

<sup>3)</sup> The respective limit data of the I/O modules must be taken into account!

#### **10.5 USB hub**

#### 10.5.1 5ACCUSB2.0002-000

#### 10.5.1.1 General information

- · 2x USB 2.0 interfaces
- Compatible with PPC2100 swing arm device (AP5000) and PPC2200 swing arm device (AP5000)

#### 10.5.1.2 Order data

Order number	Short description	Figure
	Accessories	
5ACCUSB2.0002-000	2-port USB hub, passive - For Automation Panel 5000	

#### 10.5.1.3 Technical data

# Warning!

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

## Caution!

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

#### Information:

Order number	5ACCUSB2.0002-000
General information	
B&R ID code	0xEAB8
Certifications	
CE	Yes
UL	cULus E115267
	Industrial control equipment
EAC	Product family certification
Interfaces	
USB	
Quantity	2
Туре	USB 2.0
Variant	Type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (480 Mbit/s)
Current-carrying capacity	Total max. 1 A (sum of all 2 ports)
Operating conditions	
Pollution degree per EN 61131-2	Pollution degree 2
Degree of protection per EN 60529	IP20 <sup>1)</sup>
Ambient conditions	
Temperature	
Operation	0 to 55°C <sup>2)</sup>
Storage	-10 to 70°C
Transport	-10 to 70°C
Relative humidity	
Operation	5 to 90%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Elevation	
Operation	Max. 3000 m <sup>2)</sup>

Order number	5ACCUSB2.0002-000
Mechanical properties	
Housing	
Material	Aluminum, coated
Coating	Anthracite gray
Dimensions	
Width	34 mm
Height	23 mm
Depth	57 mm
Weight	70 g

Only if all interface covers are installed.

#### 10.5.1.3.1 USB interfaces

The 2-port USB hub is equipped with a USB 2.0 (Universal Serial Bus) host controller with several USB ports, of which two USB 2.0 interfaces are routed externally and freely available to the user. The USB hub takes up the USB2 interface on the system unit in the standard configuration.

# Warning!

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

# Caution!

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

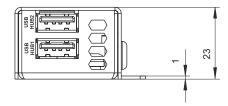
#### **USB HUB 1 - USB HUB 2**

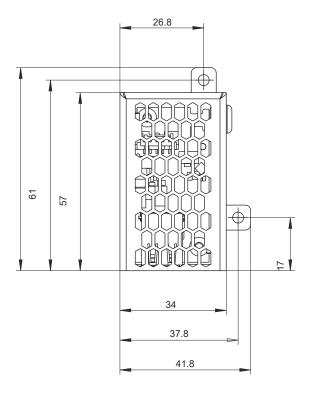
	IUB 2	
Standard	USB 2.0	
/ariant	Type A, female	
Quantity	2	
ransfer rate	Low speed (1.5 Mbit/s)	
	Full speed (12 Mbit/s)	
	High speed (480 Mbit/s)	
urrent-carrying capacity1)	Total max. 1 A (sum of all 2 ports)	
able length		
USB 2.0	Max. 5 m	
	-	1

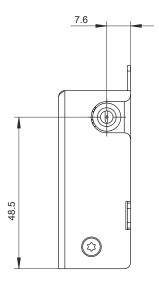
<sup>1)</sup> The USB hub is protected by a maintenance-free "USB current-limiting switch" (max. 1 A).

<sup>2)</sup> The maximum ambient temperature is typically derated 1°C per 1000 meters starting at 500 m above sea level.

# 10.5.1.4 Dimensions







# 10.6 Heat pipes

#### 10.6.1 5ACCHP00.0002-000

#### 10.6.1.1 General information

Heat pipe 5ACCHP00.0002-000 is used to improve heat dissipation. It is used only in conjunction with PPC2200 system units and swing arm mounting unit.

#### 10.6.1.2 Order data

Order number	Short description	Figure
	Heat pipe	0
5ACCHP00.0002-000	AP5000 heat pipe - For PPC2200 - For swing arm mounting unit	

#### 10.6.2 5ACCHP00.0003-000

#### 10.6.2.1 General information

Heat pipe 5ACCHP00.0003-000 is used to improve heat dissipation. It is used only in conjunction with PPC2200 system units and VESA IP54 mounting unit.

#### 10.6.2.2 Order data

Order number	Short description	Figure
	Heat pipe	
5ACCHP00.0003-000	AP5000 heat pipe - For PPC2200 - For VESA mounting unit	
		P *
		And the second section of the second

#### 10.7 Cables

For additional information about compatible cables, see the B&R website (HMI cable manual).

## 10.8 USB mass storage device

For additional information about compatible USB mass storage devices, see the B&R website (USB mass storage devices).

# 11 Environmentally friendly disposal

All programmable logic controllers, operating and monitoring devices and uninterruptible power supplies from B&R are designed to have as little impact on the environment as possible.

# 11.1 Separation of materials

To ensure that devices can be recycled in an environmentally friendly manner, it is necessary to separate out the different materials.

Component	Disposal
Programmable logic controllers Operating and monitoring devices Uninterruptible power supplies Batteries and rechargeable batteries Cables	Electronics recycling
Paper/Cardboard packaging	Paper/Cardboard recycling
Plastic packaging material	Plastic recycling

Disposal must be carried out in accordance with applicable legal regulations.

# **Appendix A Abbreviations**

Abbreviations used in the document are explained here.

Abbreviation	Stands for	Description
NC	Normally closed	Stands for a normally closed relay contact.
	Not connected	Used in pinout descriptions if a terminal or pin is not connected on the module side.
ND	Not defined	Stands for an undefined value in technical data tables. This may be because the cable manufacturer has not provided a value for certain technical data.
NO	Normally open	Stands for a normally open relay contact.
TBD	To be defined	Used in technical data tables if there is currently no value for specific technical data. The value will be supplied later.
MTBF	Mean time between failures	The expected value of the operating time between two consecutive failures.

# **Appendix B MTCX**

The MTCX controller (FPGA processor) is located on the mainboard (component of every system unit) of the xPC2200:



The MTCX is responsible for the following monitoring and control functions:

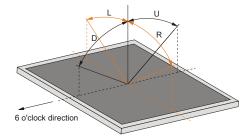
- · Power failure logic and power on logic (power OK sequencing)
- Handling of watchdog (handling of NMI/reset)
- · Temperature monitoring and fan control
- Handling/Coordination of keys and LEDs (matrix keyboard of B&R panels)
- Advanced desktop operation (buttons, USB forwarding)
- Daisy chain display operation (touch screen, USB forwarding)
- Panel locking mechanism (configurable via the ADI Control Center)
- · Backlight control of a connected B&R display
- Calculating statistical data: Power-on cycles, power-on hours and fan hours (resolution: 15 min)
- SDL data transfer (display, matrix keyboard, touch screen, service data, USB)
- · LED status indicators (Power, Disk, Link, Run)
- Optimal (default) BIOS settings are reported to BIOS by the MTCX depending on the existing hardware.

The functions of the MTCX can be extended by upgrading its firmware<sup>5)</sup>. The version can be read in BIOS or in approved Microsoft Windows operating systems using the ADI Control Center.

<sup>5)</sup> Can be downloaded from the Downloads section of the B&R website (<u>www.br-automation.com</u>).

# **Appendix C Viewing angles**

For viewing angle specifications (R, L, U, D) of the display types, see the technical data of the individual components.

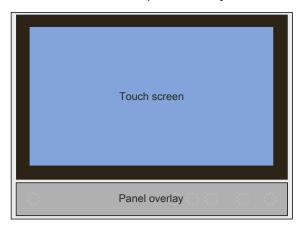


# **Appendix D Chemical resistance**

All panels are made of a coated aluminum support frame.

## Single-touch panels

• Single-touch panels are manufactured with Autotex panel overlay:



## Multi-touch panels

• Multi-touch panels are manufactured with a continuous glass surface.

# D.1 Autotex panel overlay (polyester)

Unless otherwise specified, the panel overlay is resistant to the following chemicals per DIN 42115 Part 2 when exposed for up to 24 hours without visible changes:

- Acetaldehyde
- Acetone
- Acetonitrile
- · Aliphatic hydrocarbons
- · Alkali carbonate
- Formic acid < 50%</li>
- Ammonia < 40%</li>
- · Amyl acetate
- Ethanol
- Ether
- Gasoline
- Bichromate
- Potassium
- Cutting oil
- · Brake fluid
- Butyl CELLOSOLVE (2-Butoxyethanol)
- Sodium hypochlorite < 20%
- Cyclohexanol
- Cyclohexanone
- Decon
- · Diacetone alcohol
- Dibutyl phthalate

- Diese
- Diethyl ether
- · Diethyl phthalate
- Dioxan
- · Dowandol DRM/PM
- Iron II chloride (FeCl<sub>2</sub>)
- Iron III chloride (FeCl<sub>3</sub>)
- Acetic acid < 50%</li>
- · Butyl acetate
- · Ethyl acetate
- Linseed oil
- · Aviation fuel
- Formaldehyde 37 to 42%
- · Glycerine
- Glycol
- Isophorone
- Isopropanol
- · Potassium hydroxide
- · Potassium carbonate
- Methanol
- Methylisobutylketone (MIBK)
- · Sodium bisulphate

- Sodium carbonate
- Caustic soda < 40%</li>
- Paraffin oil
- Phosphoric acid < 30%</li>
- Blown castor oil
- Nitric acid < 10%</li>
- Hydrochloric acid < 36%</li>
- · Sea water
- Sulphuric acid < 10%</li>
- Silicon oil
- Tenside
- Turpentine oil substitute
- Toluene
- Triacetin
- Trichloracetic acid < 50%</li>
- Trichloroethane
- · Thinner (white spirit)
- · Washing agents
- Water
- Hydrogen peroxide < 25%</li>
- · Fabric conditioner
- Xylene

Per DIN 42115 Part 2, the panel overlay is resistant to exposure to glacial acetic acid for less than one hour without visible damage.

#### D.2 Coated aluminum front

Unless otherwise specified, the coated aluminum front is resistant to the following chemicals per DIN 42115 Part 2 when exposed for up to 24 hours without visible changes:

- Formic acid <50%</li>
- Ammonia <40%</li>
- · Brake fluid
- Hydrogen chloride <10%
- Diesel
- · Acetic acid <50%

- · Gear oil
- · Lactic acid <10%
- Isopropanol
- Coolant <4%</li>
- Sodium hydroxide <40%</li>
- Petroleum

- Phosphoric acid <25%</li>
- Saline <10%</li>
- Sulphuric acid <25%</li>
- Sidolin
- Skydrol

The coated aluminum front is not resistant to the following chemicals:

- Acetone
- Ethyl acetate

#### **D.3 Touch screen**

#### 5-wire touch screen (single-touch)

Unless otherwise specified, the touch screen is resistant to the following chemicals when exposed for up to 1 hour (at 25°C) with no visible changes:

- Acetone
- Beer
- Unleaded gasoline
- Chemical cleaning agents
- Hydrogen chloride < 6%</li>
- · Coca-Cola
- · Diesel
- · Dimethylbenzene
- Vinegar
- Ethanol

- · Antifreeze
- · Gear oil
- · Ammonia-based glass cleaner
- · Household detergents
- Hexane
- n-hexane
- Isopropanol
- · Coffee
- · Methylbenzene
- · Methylene chloride

- Methyl ethyl ketone
- · Mineral spirits
- · Motor oil
- Nitric acid < 70%</li>
- Saline solution < 5%</li>
- Tea
- Turpentine
- Lubricants
- Sulphuric acid < 40%</li>
- · Cooking oil

## Touch screen generation 2 and 3 (multi-touch)

Unless otherwise specified, the touch screen is resistant to the following chemicals per ASTM D 1308-02 and ASTM F 1598-95 when exposed for up to 24 hours without visible changes:

- Acetone
- Ammonia < 5%
- Gasoline
- Beer
- Lead
- · Brake fluid
- Hydrogen chloride < 6%</li>
- · Coca-Cola
- Dimethylbenzene
- Ethanol

- · Rubber cement
- Isopropanol
- Coffee
- Ink
- Lipstick
- Lysol
- Methylbenzene
- · Methyl ethyl ketone
- Naphtha
- Nitric acid < 70%

- Lubricants
- Sulphuric acid < 40%</li>
- Stamping ink
- Tea
- Trichloroethylene
- Water
- White wine vinegar
- Windex Original

# **Appendix E Touch screen**

# E.1 5-wire touch screen (single-touch)

#### E.1.1 Technical data

## Information:

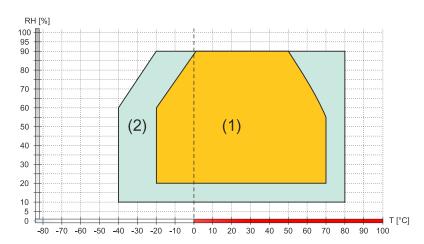
The following specified characteristic data, features and limit values are only valid for these individual components and may differ from those of the complete system. The data specified for the complete system applies to the complete system in which this individual component is used, for example.

#### Note:

Drivers for this touch screen for approved operating systems are available for download in the Downloads section of the B&R website (www.br-automation.com).

Order number	Touchscreen 5-Draht
General information	
Technology	Analog, resistive
Release pressure	<1 N
Light transmission	80% ±3%
Service life	10,000,000 touch operations at the same position (release pressure: 250 g, interval: 0.25 s)
Operating conditions	
Activation Finger, stylus, credit card, glove	
Ambient conditions	
Temperature	
Operation	-20 to 70°C
Storage	-40 to 80°C
Transport	-40 to 80°C
Relative humidity	
Operation	90% at max. 50°C
Storage	90% RH at max. 60°C for 504 hours
Transport	90% RH at max. 60°C for 504 hours

## E.1.2 Temperature/Humidity diagram



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

# E.2 Touch screen (multi-touch generation 3)

## E.2.1 Technical data

## Information:

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

Order number	Touchscreen
General information	
Technology	Projected capacitive touch (PCT)
Light transmission	>90%
Anti-glare coating	Optical/Gloss = 80
Operating conditions	
Activation	Finger, thin glove
Ambient conditions	
Temperature	
Operation	-10 to 70°C
Storage	-40 to 70°C
Transport	-40 to 70°C
Relative humidity	
Operation	Up to 90% at max. 35°C, see diagram for > 35°C.
Storage	Up to 90% at max. 35°C, see diagram for > 35°C.
Transport	Up to 90% at max. 35°C, see diagram for > 35°C.

## E.2.2 Temperature/Humidity diagram

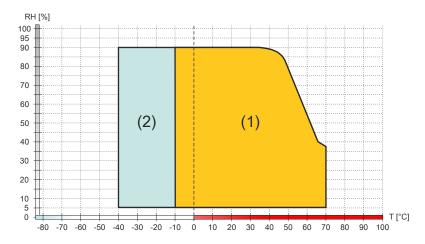


Diagram legend			
(1) Operation T [°C] Temperature in °C			
(2) Storage and transport RH [%] Relative humidity (RH) in percent and <b>non-condensing</b>			

# **Appendix F Cable data**

Signal		Signal	
RS232	"RS232 - Bus length and cable type" on page 279	RS422	"RS422 - Bus length and cable type" on page 279
RS485	"RS485 - Bus length and cable type" on page 280	CAN	"CAN - Bus length and cable type" on page 280

# F.1 RS232 - Bus length and cable type

The maximum transfer rate of 115 kbit/s depends on the cable length and type of cable used.

Bus length	Transfer rate
≤15 m	Typ. 64 kbit/s
≤10 m	Typ. 115 kbit/s
≤5 m	Typ. 115 kbit/s

Preferably, the cable material used should have the following properties or deviate only slightly from them in order to achieve an optimal transfer rate.

RS232 ca	ables	Property
Signal lin	пе	
	Cable cross section	4x 0.16 mm² (26 AWG), tinned copper stranded wire
	Wire insulation	PE
	Conductor resistance	≤82 Ω/km
	Stranding	Wires stranded in pairs
	Shield	Pair shielding with aluminum foil
GND		
	Cable cross section	1x 0.34 mm <sup>2</sup> (22AWG/19), tinned copper stranded wire
	Wire insulation PE	
	Conductor resistance	≤59 Ω/km
Outer jac	cket	
	Material	PUR compound
	Properties	Halogen-free
	Cable shield	Tinned copper wire

# F.2 RS422 - Bus length and cable type

The RTS line must be switched on to activate the transmitter.

The maximum transfer rate of 115 kbit/s depends on the cable length and type of cable used.

Bus length	Transfer rate	
1200 m	Typ. 115 kbit/s	

Preferably, the cable material used should have the following properties or deviate only slightly from them in order to achieve an optimal transfer rate.

RS422 cables		Property	
Signal line	Signal line		
	Cable cross section	4x 0.25 mm² (24AWG/19), tinned copper stranded wire	
	Wire insulation	PE	
	Conductor resistance	≤82 Ω/km	
	Stranding	Wires stranded in pairs	
	Shield Pair shielding with aluminum foil		
GND			
	Cable cross section	1x 0.34 mm² (22AWG/19), tinned copper stranded wire	
	Wire insulation	PE	
	Conductor resistance	≤59 Ω/km	
Outer jacket	uter jacket		
	Material PUR compound		
	Properties	Halogen-free	
	Cable shield Tinned copper wire		

# F.3 RS485 - Bus length and cable type

The maximum transfer rate of 115 kbit/s depends on the cable length and type of cable used.

Bus length	Transfer rate	
1200 m	Typ. 115 kbit/s	

Preferably, the cable material used should have the following properties or deviate only slightly from them in order to achieve an optimal transfer rate.

RS485 cables		Property	
Signal line			
	Cable cross section	4x 0.25 mm² (24AWG/19), tinned copper stranded wire PE	
	Wire insulation		
	Conductor resistance	≤82 Ω/km	
	Stranding	Wires stranded in pairs	
Shield Pair shielding with aluminum foil		Pair shielding with aluminum foil	
GND			
	Cable cross section	1x 0.34 mm² (22AWG/19), tinned copper stranded wire  PE  ≤59 Ω/km	
	Wire insulation		
	Conductor resistance		
Outer jacket			
	Material PUR compound		
	Properties	Halogen-free	
	Cable shield	Tinned copper wire	

# F.4 CAN - Bus length and cable type

The type of cable to be used depends largely on the required bus length and number of nodes. The bus length is determined by the transfer rate. Per CiA (CAN in Automation), the maximum bus length is 1000 meters.

The following bus lengths are permitted at a maximum permissible oscillator tolerance of 0.121%:

Bus length <sup>1)</sup>	Transfer rate
≤1000 m	Typ. 50 kbit/s
≤200 m	Typ. 250 kbit/s
≤100 m	Typ. 500 kbit/s
≤20 m <sup>2)</sup>	Typ. 1 Mbit/s
≤15 m³)	

- 1) The specified cable length is only valid with the values specified in "CAN driver settings". Cable lengths otherwise depend on the values in the bit timing register, cable quality and number of nodes.
- 2) For CAN interfaces without galvanic isolation and 5ACCIF01.ICAN-000.
- 3) For CAN interfaces with galvanic isolation.

Preferably, the cable material used should have the following properties or deviate only slightly from them in order to achieve an optimal transfer rate.

CAN cable		Property	
Signal line			
	Cable cross section	2x 0.25 mm² (24AWG/19), tinned copper stranded wire	
	Wire insulation	PE	
	Conductor resistance	≤82 Ω/km	
	Stranding	Wires stranded in pairs	
	Shield Pair shielding with aluminum foil		
GND			
	Cable cross section	1x 0.34 mm² (22AWG/19), tinned copper stranded wire	
	Wire insulation PE		
	Conductor resistance	≤59 Ω/km	
Outer jacket	uter jacket		
	Material PUR compound		
	Properties Halogen-free  Cable shield Tinned copper wire		

# **Appendix G POWERLINK**

# G.1 LED "S/E" (LED "Status/Error")

This LED is a green/red dual LED and indicates the state of the POWERLINK interface. The LED states have a different meaning depending on the operating mode of the POWERLINK interface.

#### **G.1.1 Ethernet mode**

In this mode, the interface is operated as an Ethernet interface.

LED "S/E"		
Green	Red	Description
On	Off	The interface is operated as an Ethernet interface.

Table: LED "S/E": Interface in Ethernet mode

#### G.1.2 POWERLINK V2 mode

#### **Error message**

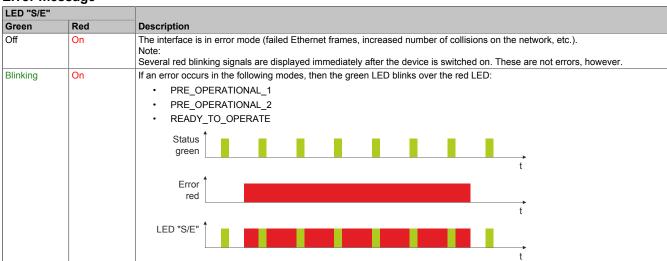


Table: LED "S/E" - Error message (interface in POWERLINK mode)

#### Interface status

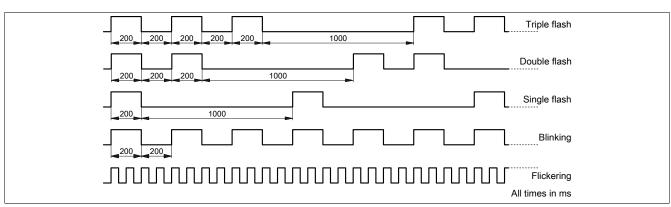
LED "S/E"			
Green	Red	Description	
Off	Off	Mode: NOT_ACTIVE The interface is either in mode NOT_ACTIVE or one of the following modes or errors is present:	
		The device is switched off.	
		The device is in the startup phase.	
		The interface or device is not configured correctly in Automation Studio.	
		The interface or device is defective.	
		Managing node (MN) The network is monitored for POWERLINK frames. If a frame is not received within the configured time window (timeout), the interface immediately enters mode PRE_OPERATIONAL_1. If POWERLINK communication is detected before the time has elapsed, however, the MN is not started.	
		Controlled node (CN) The network is monitored for POWERLINK frames. If a frame is not received within the configured time window (timeout), the interface immediately enters mode BASIC_ETHERNET. If POWERLINK communication is detected before this time expires, however, the interface immediately enters mode PRE_OPERATIONAL_1.	

Table: LED "S/E" - Interface state (interface in POWERLINK mode)

LED "S/E"			
Green	Red	Description	
Flickering	Off	Mode: BASIC_ETHERNET	
(approx. 10 Hz)		The interface is in mode BASIC_ETHERNET. The interface is operated in Ethernet mode.	
,		Managing node (MN)	
		This mode can only be exited by resetting the controller.	
		Controlled node (CN)	
		If POWERLINK communication is detected during this mode, the interface enters mode PRE_OPERATIONAL_1.	
Single flash	Off	Mode: PRE_OPERATIONAL_1	
(approx. 1 Hz)		The interface is in mode PRE_OPERATIONAL_1.	
		Managing node (MN)	
		The MN is in "reduced cycle" mode. The CNs are configured in this mode.	
		Cyclic communication is not yet taking place.	
		Controlled node (CN)	
		The CN can be configured by the MN in this mode. The CN waits until it receives an SoC frame and then switches to mode	
		PRE_OPERATIONAL_2.	
	On	Controlled node (CN)	
		If the red LED lights up in this mode, this means that the MN has failed.	
Double flash	Off	Mode: PRE_OPERATIONAL_2	
(approx. 1 Hz)		The interface is in mode PRE_OPERATIONAL_2.	
		Managing node (MN)	
		The MN starts cyclic communication (cyclic input data is not yet evaluated).	
		The CNs are configured in this mode.	
		Controlled node (CN)	
		The CN can be configured by the MN in this mode. A command then switches the mode to READY TO OPERATE.	
	On	Controlled node (CN)	
		If the red LED lights up in this mode, this means that the MN has failed.	
Triple flash	Off	Mode: READY_TO_OPERATE	
(approx. 1 Hz)		The interface is in mode READY_TO_OPERATE.	
		Managing node (MN)	
		Cyclic and asynchronous communication. Received PDO data is ignored.	
		Controlled node (CN)	
		The configuration of the CN is completed. Normal cyclic and asynchronous communication. The transmitted PDO data corre-	
		sponds to the PDO mapping. However, cyclic data is not yet evaluated.	
	On	Controlled node (CN)  If the red LED lights up in this mode, this means that the MN has failed.	
On	Off	Mode: OPERATIONAL	
011		The interface is in mode OPERATIONAL. PDO mapping is active and cyclic data is evaluated.	
Blinking	Off	Mode: STOPPED	
(approx.		The interface is in mode STOPPED.	
2.5 Hz)			
		Managing node (MN)	
		This mode does not occur for the MN.	
		Controlled node (CN)	
		Output data is not being output, and no input data is being provided. This mode can only be reached and exited by a corre-	
		sponding command from the MN.	

Table: LED "S/E" - Interface state (interface in POWERLINK mode)

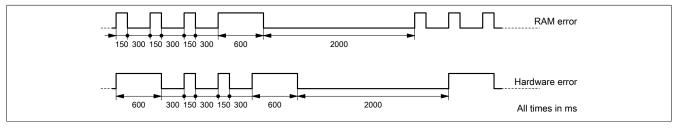
## **Blink times**



## G.1.3 System stop error codes

A system stop error can occur due to incorrect configuration or defective hardware.

The error code is indicated by LED "S/E" blinking red. The blinking signal of the error code consists of 4 switch-on phases with short (150 ms) or long (600 ms) duration. The error code is repeated every 2 seconds.



Error	Error description
RAM error	The device is defective and must be replaced.
Hardware error	The device or a system component is defective and must be replaced.

#### **G.1.4 POWERLINK V2**

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.

# **Appendix H Features**

# H.1 Pushbutton RAFIX 22 FS+, 1.30.270.021/2300

Pushbutton 1.30.270.021/2300				
Manufacturer	RAFI			
Туре	RAFIX 22 FS+	F		
Manufacturer number	1.30.270.021/2300	Example image		
Quantity	1			
Illumination	Red			
Contact function	Momentary			
Service life (switching cycles)	1,000,000			
B10 value (switching cycles)	1,300,000			
Actuation travel	4 mm			
Stop strength	Max. 100 N			

Table 148: Pushbutton 1.30.270.021/2300

# H.2 Pushbutton RAFIX 22 FS+, 1.30.270.021/2500

Pushbutton 1.30.270.021/2500		
Manufacturer	RAFI	
Туре	RAFIX 22 FS+	Example image
Manufacturer number	1.30.270.021/2500	
Illumination	Green	
Contact function	Momentary	
Service life (switching cycles)	1,000,000	
B10 value (switching cycles)	1,300,000	
Actuation travel	4 mm	
Stop strength	Max. 100 N	

Table 149: Pushbutton 1.30.270.021/2500

# H.3 Pushbutton RAFIX 22 FS+, 1.30.270.021/2600

Pushbutton 1.30.270.021/2600		
Manufacturer	RAFI	Evernle image
Туре	RAFIX 22 FS+	Example image
Manufacturer number	1.30.270.021/2600	
Quantity	1	
Illumination	Blue	
Contact function	Momentary	
Service life (switching cycles)	1,000,000	
B10 value (switching cycles)	1,300,000	

Table 150: Pushbutton 1.30.270.021/2600

# H.4 Selector switch RAFIX 22 FS+, 1.30.272.102/2200

Selector switch 1.30.272.102/2200		
Manufacturer	RAFI	Example image
Туре	RAFIX 22 FS+	
Manufacturer number	1.30.272.102/2200	
Illumination	White	
Contact function	Maintained	
Angle of rotation	1 x 90°, L form	
Service life (switching cycles)	300,000	
B10 value (switching cycles)	400,000	
Actuation torque	Max. 1.5 Nm	09 89

Table 151: Selector switch 1.30.272.102/2200

# H.5 Key switch RAFIX 22 FS+, 1.30.255.222/0000

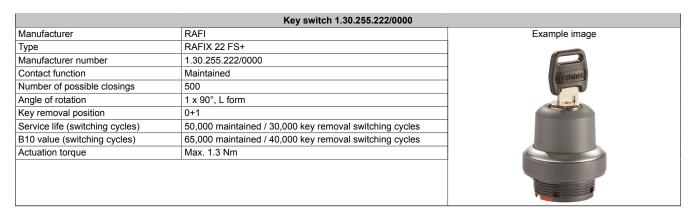


Table 152: Key switch 1.30.255.222/0000

#### H.5.1 Replacement key for key switch RAFIX 22 FS+ 5.58.007.001/0000

Replacement key 5.58.007.001/0000		
ROHS-compliant	Yes	Example image
REACH-compliant	Yes	

# H.6 Emergency stop RAFIX 22 FS+ "Plus 1", 1.30.273.512/0300

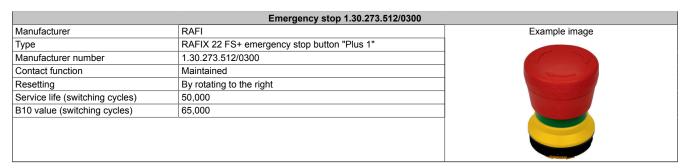


Table 153: Emergency stop 1.30.273.512/0300

# H.7 Switching element RAFIX 22 FS universal, 1.20.126.005/0000

Switching element 1.20.126.005/0000		
Manufacturer	RAFI	
Туре	RAFIX 22 FS+ - universal, 2 S	
Manufacturer number	1.20.126.005/0000	
Contact system	Self-cleaning bridge contact	Example image
Contact material	Au	
Contacts	2 normally open contacts	
Connection	THT soldered connection with anti-rotation element	
Service life (switching cycles)	1,000,000 at 10 mA / 24 VDC	
B10 value (switching cycles)	1,300,000	
AC/DC operating voltage	Min. 1 V	
AC/DC operating voltage	Max. 35 V	
AC/DC operating current	Min. 1 mA	
AC/DC operating current	Max. 100 mA	
Switching capacity	Max. 250 mW	

Table 154: Switching element 1.20.126.005/0000

# H.8 Switching element RAFIX 22 FS+ PCB gold, 1.20.126.414/0000

Switching element 1.20.126.414/0000		
Manufacturer	RAFI	
Туре	RAFIX 22 FS+ - PCB gold, emergency stop "Plus 1"	
Manufacturer number	1.20.126.414/0000	
Contact system	Self-cleaning bridge contact	
Contact material	Au	Example image
Contacts	2 normally closed contacts + 1 alarm contact 1)	
Normally closed contact with positive separation per IEC 60947-5-1	Yes	
Connection	THT soldered connection with anti-rotation element	
Service life (switching cycles)	50,000 at 10 mA / 24 VDC	
B10 value (switching cycles)	65,000	
AC/DC operating voltage	Min. 1 V	
AC/DC operating voltage	Max. 35 V	
AC/DC operating current	Min. 1 mA	
AC/DC operating current	Max. 100 mA	
Switching capacity	Max. 250 mW	

Table 155: Switching element 1.20.126.414/0000

1) The alarm contact is only momentary and not designed as a maintained contact.

#### H.9 5ACCSE00.000x-00x

B&R recommends RAFIX operating and switching elements with model number 5ACCSE00.000x-00x for use on expansion covers.

RAFIX operating and switching elements with model number 5ACCSE00.000x-00x must be ordered separately.

#### H.9.1 5ACCSE00.0000-000

#### **General information**

- 1x pushbutton
- 1x colored lens (no color, red, yellow, green, blue)
- 1x switching element
- 1x LED

#### H.9.1.1 Pushbutton RAFIX 22 FS+, 1.30.270.921/2200

Pushbutton 1.30.270.921/2200		
Manufacturer	RAFI	
Туре	RAFIX 22 FS+	Example image
Manufacturer number	1.30.270.921/2200	
Quantity	1	
Form of lens	Flat lens	
Contact function	Momentary	
Service life (switching cycles)	1,000,000	
B10 value (switching cycles)	1,300,000	

Table 156: Pushbutton 1.30.270.921/2200

#### H.9.1.2 Colored lens RAFIX 22 FS+, 5.49.263.062/1000

Colored lens 5.49.263.062/1000		
Manufacturer	RAFI	Evernale image
Туре	RAFIX 22 FS+	Example image
Manufacturer number	5.49.263.062/1000	
Quantity	1	(4)
Form of lens	Flat lens	
Lens color	Colorless	

Table 157: Colored lens 5.49.263.062/1000

#### H.9.1.3 Colored lens RAFIX 22 FS+, 5.49.263.062/1300

Colored lens 5.49.263.062/1300		
Manufacturer	RAFI	Evample image
Type	RAFIX 22 FS+	Example image
Manufacturer number	5.49.263.062/1300	
Quantity	1	(a)
Form of lens	Flat lens	
Lens color	Red	

Table 158: Colored lens 5.49.263.062/1300

#### H.9.1.4 Colored lens RAFIX 22 FS+, 5.49.263.062/1400

Colored lens 5.49.263.062/1400		
Manufacturer	RAFI	EI. i
Туре	RAFIX 22 FS+	Example image
Manufacturer number	5.49.263.062/1400	
Quantity	1	
Form of lens	Flat lens	
Lens color	Yellow	

Table 159: Colored lens 5.49.263.062/1400

# H.9.1.5 Colored lens RAFIX 22 FS+, 5.49.263.062/1500

Colored lens 5.49.263.062/1500		
Manufacturer	RAFI	Example image
Туре	RAFIX 22 FS+	Example image
Manufacturer number	5.49.263.062/1500	
Quantity	1	6-
Form of lens	Flat lens	
Lens color	Green	

Table 160: Colored lens 5.49.263.062/1500

## H.9.1.6 Colored lens RAFIX 22 FS+, 5.49.263.062/1600

Colored lens 5.49.263.062/1600		
Manufacturer	RAFI	Evample image
Туре	RAFIX 22 FS+	Example image
Manufacturer number	5.49.263.062/1600	
Quantity	1	<b>d</b> )
Form of lens	Flat lens	
Lens color	Blue	

Table 161: Colored lens 5.49.263.062/1600

# H.9.1.7 Switching element RAFIX FS, 1.20.126.102/9000

Switching element 1.20.126.102/9000		
Manufacturer	RAFI	
Туре	RAFIX FS	
Manufacturer number	1.20.126.102/9000	
Quantity	1	Example image
Contact system	Self-cleaning bridge contact	Example image
Contacts	1 normally open contact	
Normally closed contact with direct opening action per IEC 947-5-1	Yes	
Connection	Connector 2.8x0.8 mm	
Lamp	LED clip	
Service life (switching cycles)	1,000,000	3
B10 value (switching cycles)	1,300,000	£ 13 V
Min. AC/DC operating voltage	5 V	
Max. AC/DC operating voltage	35 V	
Min. AC/DC operating current	1 mA	
Max. AC/DC operating current	100 mA	
Max. switching capacity	250 mW	

Table 162: Switching element 1.20.126.102/9000

#### H.9.2 5ACCSE00.0000-001

#### **General information**

- 1x pushbutton
- 1x colored lens (no color, red, yellow, green, blue)
- 1x switching element
- 1x LED

## H.9.2.1 Pushbutton RAFIX 22 FS+, 1.30.270.921/2200

Pushbutton 1.30.270.921/2200		
Manufacturer	RAFI	
Туре	RAFIX 22 FS+	Example image
Manufacturer number	1.30.270.921/2200	
Quantity	1	
Form of lens	Flat lens	
Contact function	Momentary	
Service life (switching cycles)	1,000,000	
B10 value (switching cycles)	1,300,000	

Table 163: Pushbutton 1.30.270.921/2200

#### H.9.2.2 Colored lens RAFIX 22 FS+, 5.49.263.062/1000

Colored lens 5.49.263.062/1000		
Manufacturer	RAFI	Evample image
Туре	RAFIX 22 FS+	Example image
Manufacturer number	5.49.263.062/1000	
Quantity	1	
Form of lens	Flat lens	
Lens color	Colorless	

Table 164: Colored lens 5.49.263.062/1000

#### H.9.2.3 Colored lens RAFIX 22 FS+, 5.49.263.062/1300

Colored lens 5.49.263.062/1300		
Manufacturer	RAFI	Evample image
Туре	RAFIX 22 FS+	Example image
Manufacturer number	5.49.263.062/1300	
Quantity	1	a
Form of lens	Flat lens	
Lens color	Red	

Table 165: Colored lens 5.49.263.062/1300

## H.9.2.4 Colored lens RAFIX 22 FS+, 5.49.263.062/1400

Colored lens 5.49.263.062/1400		
Manufacturer	RAFI	
Type	RAFIX 22 FS+	Example image
Manufacturer number	5.49.263.062/1400	
Quantity	1	
Form of lens	Flat lens	
Lens color	Yellow	

Table 166: Colored lens 5.49.263.062/1400

## H.9.2.5 Colored lens RAFIX 22 FS+, 5.49.263.062/1500

Colored lens 5.49.263.062/1500		
Manufacturer	RAFI	Evample image
Туре	RAFIX 22 FS+	Example image
Manufacturer number	5.49.263.062/1500	
Quantity	1	e de la companya de l
Form of lens	Flat lens	
Lens color	Green	

Table 167: Colored lens 5.49.263.062/1500

#### H.9.2.6 Colored lens RAFIX 22 FS+, 5.49.263.062/1600

Colored lens 5.49.263.062/1600		
Manufacturer	RAFI	Evample image
Туре	RAFIX 22 FS+	Example image
Manufacturer number	5.49.263.062/1600	
Quantity	1	<b>a</b>
Form of lens	Flat lens	
Lens color	Blue	

Table 168: Colored lens 5.49.263.062/1600

## H.9.2.7 Switching element RAFIX FS, 1.20.126.101/9000

Switching element 1.20.126.101/9000		
Manufacturer	RAFI	
Туре	RAFIX FS	
Manufacturer number	1.20.126.101/9000	
Quantity	1	Example image
Contact system	Self-cleaning bridge contact	Example image
Contacts	1 normally closed contact	
Normally closed contact with direct opening action per IEC 947-5-1	Yes	
Connection	Connector 2.8x0.8 mm	
Lamp	LED clip	
Service life (switching cycles)	1,000,000	3
B10 value (switching cycles)	1,300,000	\$ 13 °
Min. AC/DC operating voltage	5 V	
Max. AC/DC operating voltage	35 V	
Min. AC/DC operating current	1 mA	
Max. AC/DC operating current	100 mA	
Max. switching capacity	250 mW	

Table 169: Switching element 1.20.126.101/9000

#### H.9.3 5ACCSE00.0000-002

#### **General information**

- 1x pushbutton
- 1x colored lens (no color, red, yellow, green, blue)
- 1x switching element
- 1x LED

#### H.9.3.1 Pushbutton RAFIX 22 FS+, 1.30.270.921/2200

Pushbutton 1.30.270.921/2200		
Manufacturer	RAFI	
Туре	RAFIX 22 FS+	Example image
Manufacturer number	1.30.270.921/2200	
Quantity	1	
Form of lens	Flat lens	
Contact function	Momentary	
Service life (switching cycles)	1,000,000	
B10 value (switching cycles)	1,300,000	

Table 170: Pushbutton 1.30.270.921/2200

## H.9.3.2 Colored lens RAFIX 22 FS+, 5.49.263.062/1000

Colored lens 5.49.263.062/1000		
Manufacturer	RAFI	Evample image
Туре	RAFIX 22 FS+	Example image
Manufacturer number	5.49.263.062/1000	
Quantity	1	4
Form of lens	Flat lens	
Lens color	Colorless	

Table 171: Colored lens 5.49.263.062/1000

#### H.9.3.3 Colored lens RAFIX 22 FS+, 5.49.263.062/1300

Colored lens 5.49.263.062/1300		
Manufacturer	RAFI	Example image
Туре	RAFIX 22 FS+	Example image
Manufacturer number	5.49.263.062/1300	
Quantity	1	(a)
Form of lens	Flat lens	
Lens color	Red	

Table 172: Colored lens 5.49.263.062/1300

#### H.9.3.4 Colored lens RAFIX 22 FS+, 5.49.263.062/1400

Colored lens 5.49.263.062/1400		
Manufacturer	RAFI	F
Туре	RAFIX 22 FS+	Example image
Manufacturer number	5.49.263.062/1400	
Quantity	1	-
Form of lens	Flat lens	
Lens color	Yellow	

Table 173: Colored lens 5.49.263.062/1400

## H.9.3.5 Colored lens RAFIX 22 FS+, 5.49.263.062/1500

Colored lens 5.49.263.062/1500		
Manufacturer	RAFI	Evample image
Туре	RAFIX 22 FS+	Example image
Manufacturer number	5.49.263.062/1500	
Quantity	1	6- Carlotte (1997)
Form of lens	Flat lens	
Lens color	Green	

Table 174: Colored lens 5.49.263.062/1500

#### H.9.3.6 Colored lens RAFIX 22 FS+, 5.49.263.062/1600

Colored lens 5.49.263.062/1600		
Manufacturer	RAFI	Evample image
Туре	RAFIX 22 FS+	Example image
Manufacturer number	5.49.263.062/1600	
Quantity	1	<b>4</b>
Form of lens	Flat lens	
Lens color	Blue	

Table 175: Colored lens 5.49.263.062/1600

## H.9.3.7 Switching element RAFIX 22 FS, 1.20.126.103/9000

Switching element 1.20.126.103/9000		
Manufacturer	RAFI	
Туре	RAFIX 22 FS	Evernle image
Manufacturer number	1.20.126.103/9000	Example image
Quantity	1	
Contact system	Self-cleaning bridge contact	
Contacts	1 normally closed contact + 1 normally open contact	
Connection	Connector 2.8x0.8 mm	
Service life (switching cycles)	1,000,000 at 10 mA / 24 VDC	
Min. AC/DC operating voltage	5 V	
Max. AC/DC operating voltage	42 V	100
Min. AC/DC operating current	1 mA	
Max. AC/DC operating current	100 mA	
Max. switching capacity	250 mW	

Table 176: Switching element 1.20.126.103/9000

## H.9.4 5ACCSE00.0001-000

#### **General information**

- 1x emergency stop button
- 1x switching element

# H.9.4.1 Emergency stop RAFIX 22 FS+ "Plus 1", 1.30.273.512/0300

Emergency stop 1.30.273.512/0300		
Manufacturer	RAFI	Example image
Туре	RAFIX 22 FS+ emergency stop button "Plus 1"	
Manufacturer number	1.30.273.512/0300	
Quantity	1	
Contact function	Maintained	
Resetting	By rotating to the right	
Service life (switching cycles)	50,000	
B10 value (switching cycles)	65,000	

Table 177: Emergency stop 1.30.273.512/0300

# H.9.4.2 Switching element RAFIX 22 FS+ "Plus 1", 1.20.126.514/0000

Switching element 1.20.126.514/0000		
Manufacturer	RAFI	
Туре	RAFIX 22 FS+ "Plus 1"	
Manufacturer number	1.20.126.514/0000	
Quantity	1	Example image
Contact system	Self-cleaning bridge contact	
Contacts	2 normally closed contact + 1 normally open contact	
Normally closed contact with positive separation per IEC 60947-5-1	Yes	
Connection	Connector 2.8x0.8 mm	
Service life (switching cycles)	50,000 at 10 mA / 24 VDC	
B10 value (switching cycles)	65,000	1 1 2
Min. AC/DC operating voltage	5 V	
Max. AC/DC operating voltage	42 V	
Min. AC/DC operating current	1 mA	
Max. AC/DC operating current	100 mA	
Max. switching capacity	250 mW	

Table 178: Switching element 1.20.126.514/0000

#### H.9.5 5ACCSE00.0002-000

#### **General information**

- 1x key switch
- 1x switching element

# H.9.5.1 Key switch RAFIX 22 FS+, 1.30.255.432/0000

Key switch 1.30.255.432/0000		
Manufacturer	RAFI	
Туре	RAFIX 22 FS+	
Manufacturer number	1.30.255.432/0000	
Quantity	1	
Contact function	Maintained	
Number of possible closings	500	
Angle of rotation	2x 90°	
Key removal position	0+1+2	
Service life	50,000 maintained / 30,000 key removal switching cycles	
B10 value	65,000 maintained / 40,000 key removal switching cycles	

Table 179: Key switch 1.30.255.432/0000

# H.9.5.1.1 Replacement key for key switch RAFIX 22 FS+ 5.58.007.001/0000

Replacement key 5.58.007.001/0000		
ROHS-compliant	Yes	Example image
REACH-compliant	Yes	

## H.9.5.2 Switching element RAFIX 22 FS, 1.20.126.105/9000

Switching element 1.20.126.105/9000		
Manufacturer	RAFI	
Туре	RAFIX 22 FS	
Manufacturer number	1.20.126.105/9000	Example image
Quantity	1	
Contact system	Self-cleaning bridge contact	
Contacts	2 normally open contacts	
Normally closed contact with direct opening action per IEC 947-5-1	Yes	
Connection	Connector 2.8x0.8 mm	
Service life (switching cycles)	1,000,000	
Min. AC/DC operating voltage	5 V	
Max. AC/DC operating voltage	35 V	113
Min. AC/DC operating current	1 mA	
Max. AC/DC operating current	100 mA	
Max. switching capacity	250 mW	

Table 180: Switching element 1.20.126.105/9000

#### H.9.6 5ACCSE00.0003-000

- 1x key switch
- 1x switching element

# H.9.6.1 Key switch RAFIX 22 FS+, 1.30.255.222/0000

Key switch 1.30.255.222/0000		
Manufacturer	RAFI	Example image
Туре	RAFIX 22 FS+	
Manufacturer number	1.30.255.222/0000	
Contact function	Maintained	Openmed
Number of possible closings	500	
Angle of rotation	1 x 90°, L form	
Key removal position	0+1	
Service life (switching cycles)	50,000 maintained / 30,000 key removal switching cycles	
B10 value (switching cycles)	65,000 maintained / 40,000 key removal switching cycles	
Actuation torque	Max. 1.3 Nm	

Table 181: Key switch 1.30.255.222/0000

# H.9.6.1.1 Replacement key for key switch RAFIX 22 FS+ 5.58.007.001/0000

Replacement key 5.58.007.001/0000		
ROHS-compliant	Yes	Example image
REACH-compliant	Yes	

## H.9.6.2 Switching element RAFIX 22 FS, 1.20.126.103/9000

Switching element 1.20.126.103/9000		
Manufacturer	RAFI	
Туре	RAFIX 22 FS	Example image
Manufacturer number	1.20.126.103/9000	Example image
Quantity	1	
Contact system	Self-cleaning bridge contact	
Contacts	1 normally closed contact + 1 normally open contact	
Connection	Connector 2.8x0.8 mm	
Service life (switching cycles)	1,000,000 at 10 mA / 24 VDC	
Min. AC/DC operating voltage	5 V	
Max. AC/DC operating voltage	42 V	8,00
Min. AC/DC operating current	1 mA	
Max. AC/DC operating current	100 mA	•
Max. switching capacity	250 mW	

Table 182: Switching element 1.20.126.103/9000

## H.9.7 5ACCSE00.0004-000

#### **General information**

- 1x selector switch
- 1x switching element

# H.9.7.1 Selector switch RAFIX 22 FS+, 1.30.272.102/2200

Selector switch 1.30.272.102/2200		
Manufacturer	RAFI	Example image
Туре	RAFIX 22 FS+	
Manufacturer number	1.30.272.102/2200	
Illumination	White	
Contact function	Maintained	
Angle of rotation	1 x 90°, L form	
Service life (switching cycles)	300,000	
B10 value (switching cycles)	400,000	
Actuation torque	Max. 1.5 Nm	0.96

Table 183: Selector switch 1.30.272.102/2200

# H.9.7.2 Switching element RAFIX FS, 1.20.126.102/9000

Switching element 1.20.126.102/9000		
Manufacturer	RAFI	
Туре	RAFIX FS	
Manufacturer number	1.20.126.102/9000	
Quantity	1	Example image
Contact system	Self-cleaning bridge contact	Example image
Contacts	1 normally open contact	
Normally closed contact with direct opening action per IEC 947-5-1	Yes	
Connection	Connector 2.8x0.8 mm	
Lamp	LED clip	
Service life (switching cycles)	1,000,000	3
B10 value (switching cycles)	1,300,000	\$ 13 P
Min. AC/DC operating voltage	5 V	
Max. AC/DC operating voltage	35 V	
Min. AC/DC operating current	1 mA	
Max. AC/DC operating current	100 mA	
Max. switching capacity	250 mW	

Table 184: Switching element 1.20.126.102/9000

#### H.9.8 5ACCSE00.0005-000

#### H.9.8.1 USB extension RAFIX 22 FS+, 9.30.279.003/0700

## Caution!

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

# Caution!

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

USB extension 9.30.279.003/0700		
Manufacturer	RAFI	
Туре	RAFIX 22 FS+	
Manufacturer number	9.30.279.003/0700	
Standard	USB 2.0	
Variant	Type A, female	
Transfer rate	Low speed (1.5 Mbit/s)	
	Full speed (12 Mbit/s)	
	High speed (480 Mbit/s) <sup>1)</sup>	
Current-carrying capacity <sup>2)</sup>	Max. 500 mA	
Cable length		
USB 2.0	400 mm	

Table 185: USB extension 9.30.279.003/0700

- In SDL operation without USB cable (mode 1), the USB transfer rate is limited to USB 1.1.
   In SDL3 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (30 Mbit/s)
   In SDL4 operation: Low speed (1.5 Mbit/s), full speed (12 Mbit/s) to high speed (150 Mbit/s)
- 2) The USB interface is protected by a maintenance-free "USB current-limiting switch" (max. 500 mA).