Panel PC 1200 panel mount device

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 (www.br-automation.com).

1.1 Manual history

Version	Date	Changes
1.08	November 2021	Dokument aktualisiert. • Updated ground connection requirements, see Grounding, Grounding concept - Functional ground and Securing the connecting cables. • "Changing the battery" on page 96 aktualisiert. • "Ethernet interfaces" on page 40 aktualisiert. • "UEFI BIOS options" on page 56 aktualisiert. • "Derating the ambient temperature" on page 35 aktualisiert. ° "Mounting orientations" on page 29 aktualisiert.
1.05	April 2021	Updated document, editorial changes. • Added "Installation cutout" on page 47 and updated "Requirements for the installation cutout" on page 46. • Updated "Technical data - 10.1" variants" on page 17 and "Technical data - 15.6" variants" on page 21. • Updated "Derating the ambient temperature" on page 35. ° Updated "Mounting orientations" on page 29.
1.00	December 2020	First official version

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.

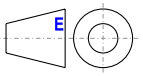
Signal word	Description
Danger!	Failure to observe these safety guidelines and notices will result in death, severe injury or substantial damage to property.
Warning!	Failure to observe these safety guidelines and notices can result in death, severe injury or substantial damage to property.
Caution!	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 network[1)])
- Use of firewalls
- Use of authentication mechanisms
- Encryption of data
- Use of anti-malware software

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

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

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

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

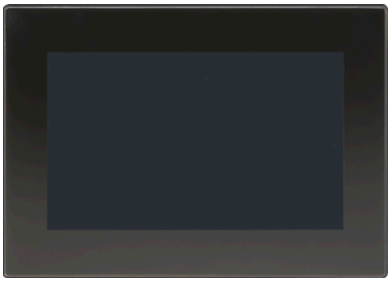
3 System overview

3.1 General information

With the Panel PC 1200, B&R offers an all-in-one PC family as part of the product portfolio. Its compact design allows installation in almost any control cabinet. By using removable mass storage devices that can be expanded up to 256 GB, the Panel PC 1200 is ideal for installing Windows or Linux operating systems. Four different display diagonals with projected capacitive multi-touch screens make the Panel PC 1200 an optimal solution for a variety of applications – even in harsh industrial environments.

- Compact and robust design
- Powerful with Intel Atom x5-E3940 1.6 GHz quad-core processor and 4 GB LPDDR4 RAM
- Widescreen variants from 7.0" to 15.6" with PCT multi-touch
- Installation dimensions compatible with Automation Panel 1000
- Installing with retaining clips or with VESA bracket
- Low installation depth
- Low maintenance with fanless operation
- 2x USB 3.0
- 2x Gigabit Ethernet
- 1x CFast slot
- Real time clock, RTC (battery-backed)
- TPM 2.0 security
- 5PPC1200.xxxx-xx**A**: Anti-glare display
- 5PPC1200.xxxx-xx**B**: Clear glass display

3.2 Order data

Order number	Short description	Figure
	Display variants	
5PPC1200.0702-10A	Panel PC 1200, 7", glass front. CPU and memory: Intel Atom E3940 1.6 GHz, quad core, 4 GB LPDDR4 RAM. Display and touch screen: 7", 800 x 480 pixels (WVGA) widescreen, multi-touch (projected capacitive), control cabinet installation, landscape format, anti-glare. Interfaces: 2x Ethernet 10/100/1000 Mbit/s, 2x USB 3.0.	
5PPC1200.0702-10B	Panel PC 1200, 7", glass front. CPU and memory: Intel Atom E3940 1.6 GHz, quad core, 4 GB LPDDR4 RAM. Display and touch screen: 7", 800 x 480 pixels (WVGA) widescreen, multi-touch (projected capacitive), control cabinet installation, landscape format, clear glass. Interfaces: 2x Ethernet 10/100/1000 Mbit/s, 2x USB 3.0.	
5PPC1200.101E-10A	Panel PC 1200, 10.1", glass front. CPU and memory: Intel Atom E3940 1.6 GHz, quad core, 4 GB LPDDR4 RAM. Display and touch screen: 10.1", 1280 x 800 pixels (WXGA) widescreen, multi-touch (projected capacitive), control cabinet installation, landscape format, anti-glare. Interfaces: 2x Ethernet 10/100/1000 Mbit/s, 2x USB 3.0.	
5PPC1200.101E-10B	Panel PC 1200, 10.1", glass front. CPU and memory: Intel Atom E3940 1.6 GHz, quad core, 4 GB LPDDR4 RAM. Display and touch screen: 10.1", 1280 x 800 pixels (WXGA) widescreen, multi-touch (projected capacitive), control cabinet installation, landscape format, clear glass. Interfaces: 2x Ethernet 10/100/1000 Mbit/s, 2x USB 3.0.	
5PPC1200.121E-10A	Panel PC 1200, 12.1", glass front. CPU and memory: Intel Atom E3940 1.6 GHz, quad core, 4 GB LPDDR4 RAM. Display and touch screen: 12.1", 1280 x 800 pixels (WXGA) widescreen, multi-touch (projected capacitive), control cabinet installation, landscape format, anti-glare. Interfaces: 2x Ethernet 10/100/1000 Mbit/s, 2x USB 3.0.	
5PPC1200.121E-10B	Panel PC 1200, 12.1", glass front. CPU and memory: Intel Atom E3940 1.6 GHz, quad core, 4 GB LPDDR4 RAM. Display and touch screen: 12.1", 1280 x 800 pixels (WXGA) widescreen, multi-touch (projected capacitive), control cabinet installation, landscape format, clear glass. Interfaces: 2x Ethernet 10/100/1000 Mbit/s, 2x USB 3.0.	
5PPC1200.156B-10A	Panel PC 1200, 15.6", glass front. CPU and memory: Intel Atom E3940 1.6 GHz, quad core, 4 GB LPDDR4 RAM. Display and touch screen: 15.6", 1366 x 768 pixels (HD) widescreen, multi-touch (projected capacitive), control cabinet installation, landscape format, anti-glare. Interfaces: 2x Ethernet 10/100/1000 Mbit/s, 2x USB 3.0.	
5PPC1200.156B-10B	Panel PC 1200, 15.6", glass front. CPU and memory: Intel Atom E3940 1.6 GHz, quad core, 4 GB LPDDR4 RAM. Display and touch screen: 15.6", 1366 x 768 pixels (HD) widescreen, multi-touch (projected capacitive), control cabinet installation, landscape format, clear glass. Interfaces: 2x Ethernet 10/100/1000 Mbit/s, 2x USB 3.0.	
	Optional accessories	
	Accessories	
5ACCRRPC1.0000-000	Montagesatz für Varianten des PPC1200: 9x Halteklammer mit Drehmomentbegrenzung, 1x 2-polige Federzugklemme, 1x 2-polige Schraubklemme	
	CFast cards	
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	
	Terminal blocks	
0TB6102.3000-00	2-pin accessory screw clamp terminal block (3.81)	
0TB6102.3100-00	Accessory 2-pin cage clamp terminal block (3.81)	

3.3 Overview

Order number	Short description	Page
	Accessories	
5ACCRHMI.0018-000	HMI C80/PPC1200 battery compartment - 1x battery holder C80/PPC1200 - 1x battery including circuit board	101
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	93
	B&R Linux 10	
5SWLIN.0865-MUL	B&R Linux 10 - 64-bit - Multilingual - PPC1200 (UEFI boot) - Installation - Only available with a new device	87
	Display variants	
5PPC1200.0702-10A	Panel PC 1200, 7", glass front. CPU and memory: Intel Atom E3940 1.6 GHz, quad core, 4 GB LPDDR4 RAM. Display and touch screen: 7", 800 x 480 pixels (WVGA) widescreen, multi-touch (projected capacitive), control cabinet installation, landscape format, anti-glare. Interfaces: 2x Ethernet 10/100/1000 Mbit/s, 2x USB 3.0.	13
5PPC1200.0702-10B	Panel PC 1200, 7", glass front. CPU and memory: Intel Atom E3940 1.6 GHz, quad core, 4 GB LPDDR4 RAM. Display and touch screen: 7", 800 x 480 pixels (WVGA) widescreen, multi-touch (projected capacitive), control cabinet installation, landscape format, clear glass. Interfaces: 2x Ethernet 10/100/1000 Mbit/s, 2x USB 3.0.	13
5PPC1200.101E-10A	Panel PC 1200, 10.1", glass front. CPU and memory: Intel Atom E3940 1.6 GHz, quad core, 4 GB LPDDR4 RAM. Display and touch screen: 10.1", 1280 x 800 pixels (WXGA) widescreen, multi-touch (projected capacitive), control cabinet installation, landscape format, anti-glare. Interfaces: 2x Ethernet 10/100/1000 Mbit/s, 2x USB 3.0.	13
5PPC1200.101E-10B	Panel PC 1200, 10.1", glass front. CPU and memory: Intel Atom E3940 1.6 GHz, quad core, 4 GB LPDDR4 RAM. Display and touch screen: 10.1", 1280 x 800 pixels (WXGA) widescreen, multi-touch (projected capacitive), control cabinet installation, landscape format, clear glass. Interfaces: 2x Ethernet 10/100/1000 Mbit/s, 2x USB 3.0.	13
5PPC1200.121E-10A	Panel PC 1200, 12.1", glass front. CPU and memory: Intel Atom E3940 1.6 GHz, quad core, 4 GB LPDDR4 RAM. Display and touch screen: 12.1", 1280 x 800 pixels (WXGA) widescreen, multi-touch (projected capacitive), control cabinet installation, landscape format, anti-glare. Interfaces: 2x Ethernet 10/100/1000 Mbit/s, 2x USB 3.0.	13
5PPC1200.121E-10B	Panel PC 1200, 12.1", glass front. CPU and memory: Intel Atom E3940 1.6 GHz, quad core, 4 GB LPDDR4 RAM. Display and touch screen: 12.1", 1280 x 800 pixels (WXGA) widescreen, multi-touch (projected capacitive), control cabinet installation, landscape format, clear glass. Interfaces: 2x Ethernet 10/100/1000 Mbit/s, 2x USB 3.0.	13
5PPC1200.156B-10A	Panel PC 1200, 15.6", glass front. CPU and memory: Intel Atom E3940 1.6 GHz, quad core, 4 GB LPDDR4 RAM. Display and touch screen: 15.6", 1366 x 768 pixels (HD) widescreen, multi-touch (projected capacitive), control cabinet installation, landscape format, anti-glare. Interfaces: 2x Ethernet 10/100/1000 Mbit/s, 2x USB 3.0.	13
5PPC1200.156B-10B	Panel PC 1200, 15.6", glass front. CPU and memory: Intel Atom E3940 1.6 GHz, quad core, 4 GB LPDDR4 RAM. Display and touch screen: 15.6", 1366 x 768 pixels (HD) widescreen, multi-touch (projected capacitive), control cabinet installation, landscape format, clear glass. Interfaces: 2x Ethernet 10/100/1000 Mbit/s, 2x USB 3.0.	13
	Terminal blocks	
0TB6102.3000-00	2-pin accessory screw clamp terminal block (3.81)	100
0TB6102.3100-00	Accessory 2-pin cage clamp terminal block (3.81)	100
	Windows 10 IoT Enterprise 2019 LTSC	
5SWW10.0965-MUL	Windows 10 IoT Enterprise 2019 LTSC - 64-bit - Entry - Multilingual - PPC1200 (UEFI boot) - License - Only available with a new device	84

4 Technical data

4.1 System data

4.1.1 Technical data - 7.0" variants

> **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	5PPC1200.0702-10A	5PPC1200.0702-10B
General information		
LEDs	Power, Disk	
B&R ID code	0xA69C	0xA6BB
Cooling	Passive	
Power button	Yes	
Reset button	Yes	
Type	All-in-one PC	
Certifications		
CE	Yes	
UL	In preparation	
Controller		
Bootloader	UEFI BIOS	
Processor		
Type	Intel Atom x5-E3940	
Clock frequency	1600 MHz	
Number of cores	4	
Architecture	14 nm	
Thermal design power (TDP)	9.5 W	
L2 cache	2 MB	
Intel 64 architecture	Yes	
Intel Hyper-Threading Technology	No	
Intel vPro Technology	No	
Intel Virtualization Technology (VT-x)	Yes	
Intel Virtualization Technology for Directed I/O (VT-d)	Yes	
Enhanced Intel SpeedStep Technology	Yes	
Chipset	Apollo Lake	
Trusted Platform Module	TPM 2.0	
Real-time clock		
Accuracy	At 25 °C: Typ. 12 ppm (1 second) per day [1)]	
Self-discharge time	Approx. 8 years	
Battery-backed	Yes	
Memory		
Type	LPDDR4 SDRAM	
Memory size	4 GB	
Velocity	DDR4L-2133	
Memory interface width	Dual channel	
Removable	No	
Graphics		
Controller	Intel HD Graphics	
Max. dynamic graphics frequency	600 MHz	
Color depth	Max. 32-bit	
DirectX support	12	
OpenGL support	4.3	
Power management	ACPI 5.0	
Display		
Type	TFT color	
Diagonal	7.0"	
Colors	16.7 million	
Resolution	WVGA, 800 x 480 px	
Contrast	Typ. 800:1	
Viewing angles		
Horizontal	Direction L / Direction R = Typ. 89°, min. 80°	
Vertical	Direction U / Direction D = Typ. 89°, min. 80°	

Order number	5PPC1200.0702-10A	5PPC1200.0702-10B
Backlight		
Type	LED	
Brightness (dimmable)	Typ. 25 to 500 cd/m²	
Half-brightness time	50,000 h	
Filter glass		
Transmittance	≥85%	
Anti-glare coating	Optical/Gloss = 70	No
Touch screen		
Type	Multi-touch	
Technology	PCT (projected capacitive touch)	
Interfaces		
CFast slot		
Quantity	1	
Type	SATA III (SATA 6.0 Gbit/s)	
USB		
Quantity	2	
Type	USB 3.0	
Variant	Type A	
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) to SuperSpeed (5 Gbit/s) [2]	
Current-carrying capacity	Max. 1 A per connection	
Ethernet		
Quantity	2	
Variant	RJ45, shielded	
Transfer rate	10/100/1000 Mbit/s	
Electrical properties		
Nominal voltage	24 VDC ±25%, SELV/PELV [3]	
Nominal current	Max. 1.5 A	
Inrush current	Typ. 5 A, max. 100 A for < 50 µs	
Power consumption [4]	36 W	
Overvoltage category per EN 61131-2	II	
Galvanic isolation	No	
Operating conditions		
Pollution degree per EN 61131-2	Pollution degree 2	
Degree of protection per EN 60529	Back: IP20 Front: IP55	
Ambient conditions		
Temperature		
Operation	-20 to 60°C [5]	
Storage	-20 to 80 °C	
Transport	-20 to 80 °C	
Relative humidity	See section "Temperature/Humidity diagrams".	
Elevation		
Operation	Max. 3000 m [5]	
Mechanical properties		
Front		
Design	Black	
Dimensions		
Width	209 mm	
Height	153 mm	
Depth	41.5 mm	
Weight	Approx. 1130 g	

1) At max. specified ambient temperature: Typ. 58 ppm (5 seconds) - worst case 220 ppm (19 seconds).
2) The SuperSpeed transfer rate (5 Gbit/s) is only possible with USB 3.0.
3) IEC 61010-2-201 requirements must be observed.
4) Power consumption including all interfaces.
5) The temperature specifications correspond to a specification at 500 meters above sea level. The max. ambient temperature is typically derated 1 °C per 1000 meters starting at 500 m above sea level.

4.1.2 Technical data - 10.1" variants

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	5PPC1200.101E-10A	5PPC1200.101E-10B
General information		
LEDs	Power, Disk	
B&R ID code	0xA6EE	0xA6EF
Cooling	Passive	
Power button	Yes	
Reset button	Yes	
Type	All-in-one PC	
Certifications		
CE	Yes	
UL	In preparation	
Controller		
Bootloader	UEFI BIOS	
Processor		
Type	Intel Atom x5-E3940	
Clock frequency	1600 MHz	
Number of cores	4	
Architecture	14 nm	
Thermal design power (TDP)	9.5 W	
L2 cache	2 MB	
Intel 64 architecture	Yes	
Intel Hyper-Threading Technology	No	
Intel vPro Technology	No	
Intel Virtualization Technology (VT-x)	Yes	
Intel Virtualization Technology for Directed I/O (VT-d)	Yes	
Enhanced Intel SpeedStep Technology	Yes	
Chipset	Apollo Lake	
Trusted Platform Module	TPM 2.0	
Real-time clock		
Accuracy	At 25 °C: Typ. 12 ppm (1 second) per day [1)]	
Self-discharge time	Approx. 8 years	
Battery-backed	Yes	
Memory		
Type	LPDDR4 SDRAM	
Memory size	4 GB	
Velocity	DDR4L-2133	
Memory interface width	Dual channel	
Removable	No	
Graphics		
Controller	Intel HD Graphics	
Max. dynamic graphics frequency	600 MHz	
Color depth	Max. 32-bit	
DirectX support	12	
OpenGL support	4.3	
Power management	ACPI 5.0	
Display		
Type	TFT color	
Diagonal	10.1"	
Colors	16.7 million	
Resolution	WXGA, 1280 x 800 px	
Contrast	Typ. 800:1	
Viewing angles		
Horizontal	Direction L / Direction R = Typ. 85°	
Vertical	Direction U / Direction D = Typ. 85°	
Backlight		
Type	LED	
Brightness (dimmable)	Typ. 25 to 500 cd/m²	
Half-brightness time	50,000 h	
Filter glass		
Transmittance	≥85%	
Anti-glare coating	Optical/Gloss = 70	No
Touch screen		
Type	Multi-touch	
Technology	PCT (projected capacitive touch)	

Order number	5PPC1200.101E-10A	5PPC1200.101E-10B
Interfaces		
CFast slot		
Quantity	1	
Type	SATA III (SATA 6.0 Gbit/s)	
USB		
Quantity	2	
Type	USB 3.0	
Variant	Type A	
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) to SuperSpeed (5 Gbit/s) [2]	
Current-carrying capacity	Max. 1 A per connection	
Ethernet		
Quantity	2	
Variant	RJ45, shielded	
Transfer rate	10/100/1000 Mbit/s	
Electrical properties		
Nominal voltage	24 VDC ±25%, SELV/PELV [3]	
Nominal current	Max. 1.6 A	
Inrush current	Typ. 5 A, max. 100 A for < 50 µs	
Power consumption [4]	38.4 W	
Overvoltage category per EN 61131-2	II	
Galvanic isolation	No	
Operating conditions		
Pollution degree per EN 61131-2	Pollution degree 2	
Degree of protection per EN 60529	Back: IP20 Front: IP55	
Ambient conditions		
Temperature		
Operation	Rev. B2 and later: -20 to 60°C Up to Rev. B1: -20 to 55°C [5]	
Storage	-20 to 80 °C	
Transport	-20 to 80 °C	
Relative humidity	See section "Temperature/Humidity diagrams".	
Elevation		
Operation	Max. 3000 m [5]	
Mechanical properties		
Front		
Design	Black	
Dimensions		
Width	279 mm	
Height	191 mm	
Depth	41.2 mm	
Weight	Approx. 1680 g	

1) At max. specified ambient temperature: Typ. 58 ppm (5 seconds) - worst case 220 ppm (19 seconds).
2) The SuperSpeed transfer rate (5 Gbit/s) is only possible with USB 3.0.
3) IEC 61010-2-201 requirements must be observed.
4) Power consumption including all interfaces.
5) The temperature specifications correspond to a specification at 500 meters above sea level. The max. ambient temperature is typically derated 1 °C per 1000 meters starting at 500 m above sea level.

4.1.3 Technical data - 12.1" variants

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	5PPC1200.121E-10A	5PPC1200.121E-10B
General information		
LEDs	Power, Disk	
B&R ID code	0xA6F0	0xA6F1
Cooling	Passive	
Power button	Yes	
Reset button	Yes	
Type	All-in-one PC	
Certifications		
CE	Yes	
UL	In preparation	
Controller		
Bootloader	UEFI BIOS	
Processor		
Type	Intel Atom x5-E3940	
Clock frequency	1600 MHz	
Number of cores	4	
Architecture	14 nm	
Thermal design power (TDP)	9.5 W	
L2 cache	2 MB	
Intel 64 architecture	Yes	
Intel Hyper-Threading Technology	No	
Intel vPro Technology	No	
Intel Virtualization Technology (VT-x)	Yes	
Intel Virtualization Technology for Directed I/O (VT-d)	Yes	
Enhanced Intel SpeedStep Technology	Yes	
Chipset	Apollo Lake	
Trusted Platform Module	TPM 2.0	
Real-time clock		
Accuracy	At 25°C: Typ. 12 ppm (1 second) per day [1)]	
Self-discharge time	Approx. 8 years	
Battery-backed	Yes	
Memory		
Type	LPDDR4 SDRAM	
Memory size	4 GB	
Velocity	DDR4L-2133	
Memory interface width	Dual channel	
Removable	No	
Graphics		
Controller	Intel HD Graphics	
Max. dynamic graphics frequency	600 MHz	
Color depth	Max. 32-bit	
DirectX support	12	
OpenGL support	4.3	
Power management	ACPI 5.0	
Display		
Type	TFT color	
Diagonal	12.1"	
Colors	16.7 million	
Resolution	WXGA, 1280 x 800 px	
Contrast	Typ. 800:1	
Viewing angles		
Horizontal	Direction L / Direction R = Typ. 80°	
Vertical	Direction U = Typ. 80° / Direction D = Typ. 65°	
Backlight		
Type	LED	
Brightness (dimmable)	Typ. 40 to 400 cd/m²	
Half-brightness time	50,000 h	
Filter glass		
Transmittance	≥85%	
Anti-glare coating	Optical/Gloss = 70	No
Touch screen		
Type	Multi-touch	
Technology	PCT (projected capacitive touch)	

Order number	5PPC1200.121E-10A	5PPC1200.121E-10B
Interfaces		
CFast slot		
Quantity	1	
Type	SATA III (SATA 6.0 Gbit/s)	
USB		
Quantity	2	
Type	USB 3.0	
Variant	Type A	
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) to SuperSpeed (5 Gbit/s) [2]	
Current-carrying capacity	Max. 1 A per connection	
Ethernet		
Quantity	2	
Variant	RJ45, shielded	
Transfer rate	10/100/1000 Mbit/s	
Electrical properties		
Nominal voltage	24 VDC ±25%, SELV/PELV [3]	
Nominal current	Max. 2.2 A	
Inrush current	Typ. 5 A, max. 100 A for < 50 µs	
Power consumption [4]	52.8 W	
Overvoltage category per EN 61131-2	II	
Galvanic isolation	No	
Operating conditions		
Pollution degree per EN 61131-2	Pollution degree 2	
Degree of protection per EN 60529	Back: IP20 Front: IP55	
Ambient conditions		
Temperature		
Operation	-20 to 60°C [5]	
Storage	-20 to 80°C	
Transport	-20 to 80°C	
Relative humidity	See section "Temperature/Humidity diagrams".	
Elevation		
Operation	Max. 3000 m [5]	
Mechanical properties		
Front		
Design	Black	
Dimensions		
Width	324 mm	
Height	221.5 mm	
Depth	43.2 mm	
Weight	Approx. 2230 g	

1) At max. specified ambient temperature: Typ. 58 ppm (5 seconds) - worst case 220 ppm (19 seconds).
2) The SuperSpeed transfer rate (5 Gbit/s) is only possible with USB 3.0.
3) IEC 61010-2-201 requirements must be observed.
4) Power consumption including all interfaces.
5) The temperature specifications correspond to a specification at 500 meters above sea level. The max. ambient temperature is typically derated 1°C per 1000 meters starting at 500 m above sea level.

4.1.4 Technical data - 15.6" variants

Information:

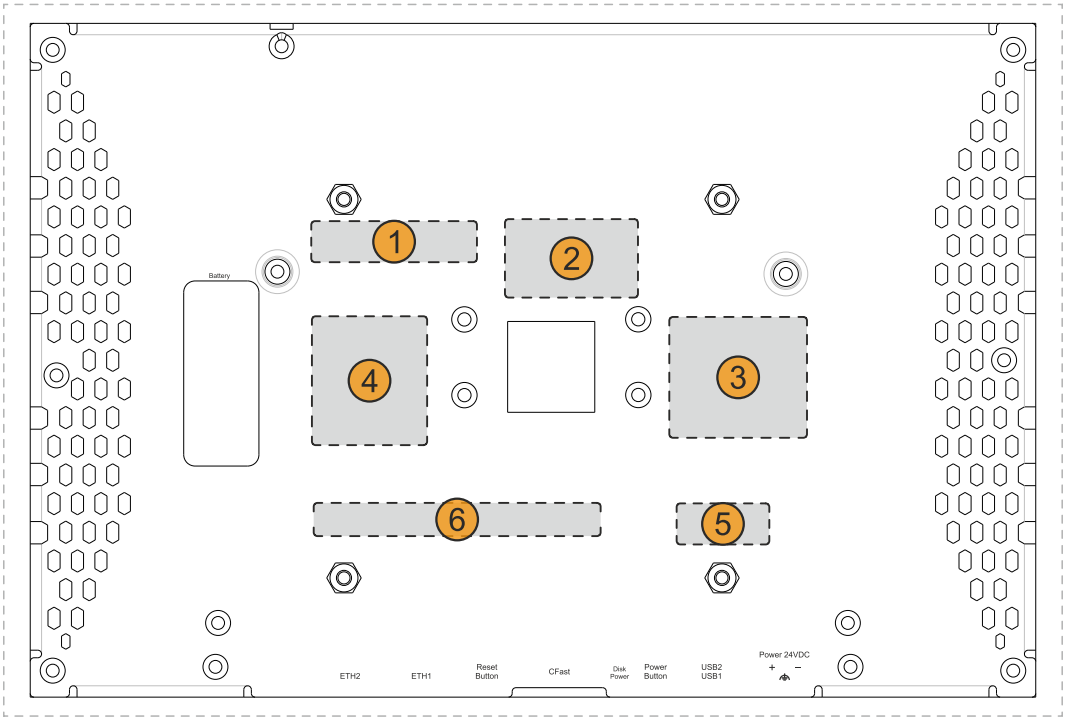
The following specified characteristic data, features and limit values are only valid for these individual components and may differ from those of the complete system. The data specified for the complete system applies to the complete system in which this individual component is used, for example.

Order number	5PPC1200.156B-10A	5PPC1200.156B-10B
General information		
LEDs	Power, Disk	
B&R ID code	0xA6F2	0xA6F3
Cooling	Passive	
Power button	Yes	
Reset button	Yes	
Type	All-in-one PC	
Certifications		
CE	Yes	
UL	In preparation	
Controller		
Bootloader	UEFI BIOS	
Processor		
Type	Intel Atom x5-E3940	
Clock frequency	1600 MHz	
Number of cores	4	
Architecture	14 nm	
Thermal design power (TDP)	9.5 W	
L2 cache	2 MB	
Intel 64 architecture	Yes	
Intel Hyper-Threading Technology	No	
Intel vPro Technology	No	
Intel Virtualization Technology (VT-x)	Yes	
Intel Virtualization Technology for Directed I/O (VT-d)	Yes	
Enhanced Intel SpeedStep Technology	Yes	
Chipset	Apollo Lake	
Trusted Platform Module	TPM 2.0	
Real-time clock		
Accuracy	At 25°C: Typ. 12 ppm (1 second) per day [1)]	
Self-discharge time	Approx. 8 years	
Battery-backed	Yes	
Memory		
Type	LPDDR4 SDRAM	
Memory size	4 GB	
Velocity	DDR4L-2133	
Memory interface width	Dual channel	
Removable	No	
Graphics		
Controller	Intel HD Graphics	
Max. dynamic graphics frequency	600 MHz	
Color depth	Max. 32-bit	
DirectX support	12	
OpenGL support	4.3	
Power management	ACPI 5.0	
Display		
Type	TFT color	
Diagonal	15.6"	
Colors	16.7 million	
Resolution	HD, 1366 x 768 px	
Contrast	Typ. 1000:1	
Viewing angles		
Horizontal	Direction L / Direction R = Typ. 85°	
Vertical	Direction U / Direction D = Typ. 85°	
Backlight		
Type	LED	
Brightness (dimmable)	Typ. 40 to 400 cd/m²	
Half-brightness time	70,000 h	
Filter glass		
Transmittance	≥85%	
Anti-glare coating	Optical/Gloss = 70	No
Touch screen		
Type	Multi-touch	
Technology	PCT (projected capacitive touch)	

Order number	5PPC1200.156B-10A	5PPC1200.156B-10B
Interfaces		
CFast slot		
Quantity	1	
Type	SATA III (SATA 6.0 Gbit/s)	
USB		
Quantity	2	
Type	USB 3.0	
Variant	Type A	
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) to SuperSpeed (5 Gbit/s) [2]	
Current-carrying capacity	Max. 1 A per connection	
Ethernet		
Quantity	2	
Variant	RJ45, shielded	
Transfer rate	10/100/1000 Mbit/s	
Electrical properties		
Nominal voltage	24 VDC ±25%, SELV/PELV [3]	
Nominal current	Max. 2.5 A	
Inrush current	Typ. 5 A, max. 100 A for < 50 µs	
Power consumption [4]	60 W	
Overvoltage category per EN 61131-2	II	
Galvanic isolation	No	
Operating conditions		
Pollution degree per EN 61131-2	Pollution degree 2	
Degree of protection per EN 60529	Back: IP20 Front: IP55	
Ambient conditions		
Temperature		
Operation [5]	Rev. B2 and later: -20 to 60°C Up to Rev. B1: -20 to 55°C [5][6]	
Storage	-20 to 70°C	
Transport	-20 to 70°C	
Relative humidity	See section "Temperature/Humidity diagrams".	
Elevation		
Operation	Max. 3000 m [6]	
Mechanical properties		
Front		
Design	Black	
Dimensions		
Width	414 mm	
Height	258.5 mm	
Depth	43.2 mm	
Weight	Approx. 3290 g	

1) At max. specified ambient temperature: Typ. 58 ppm (5 seconds) - worst case 220 ppm (19 seconds).
2) The SuperSpeed transfer rate (5 Gbit/s) is only possible with USB 3.0.
3) IEC 61010-2-201 requirements must be observed.
4) Power consumption including all interfaces.
5) Derating the display brightness 5% per °C must be taken into account starting at an ambient temperature of 50°C.
6) The temperature specifications correspond to a specification at 500 meters above sea level. The max. ambient temperature is typically derated 1°C per 1000 meters starting at 500 m above sea level.

4.2 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 15
4	Safety notices, warnings and information about the product
5	License adhesive label for operating systems (configuration-dependent)
6	Space for individual customer information (configuration-dependent)

4.2.1 Identification

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

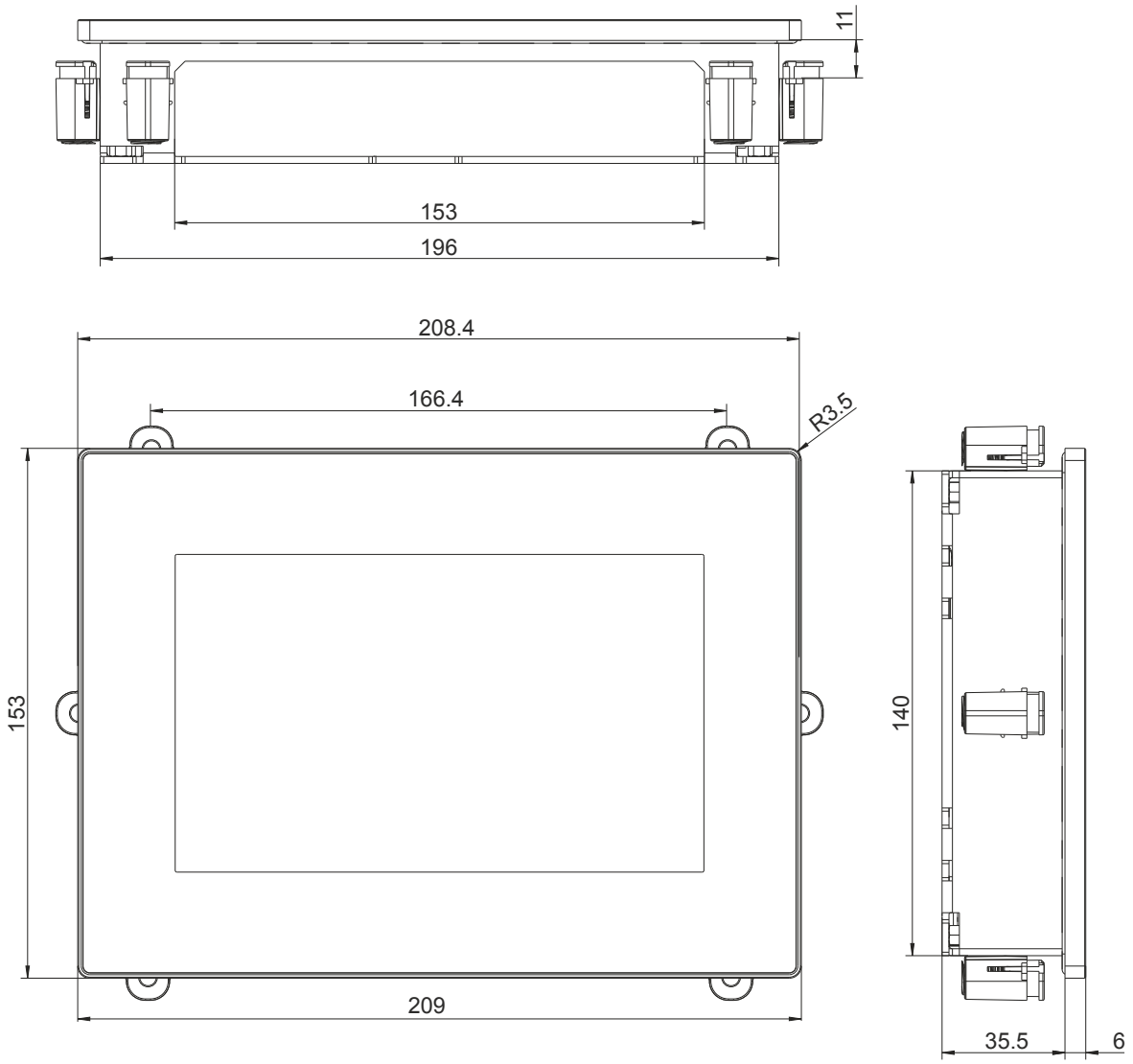
The device number can be retrieved from the B&R website (www.br-automation.com) using the serial number of the device (login required). Information (serial number, material number, revision, delivery date and end of warranty) about all components installed in the system can be retrieved using the device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

4.3 Mechanical properties

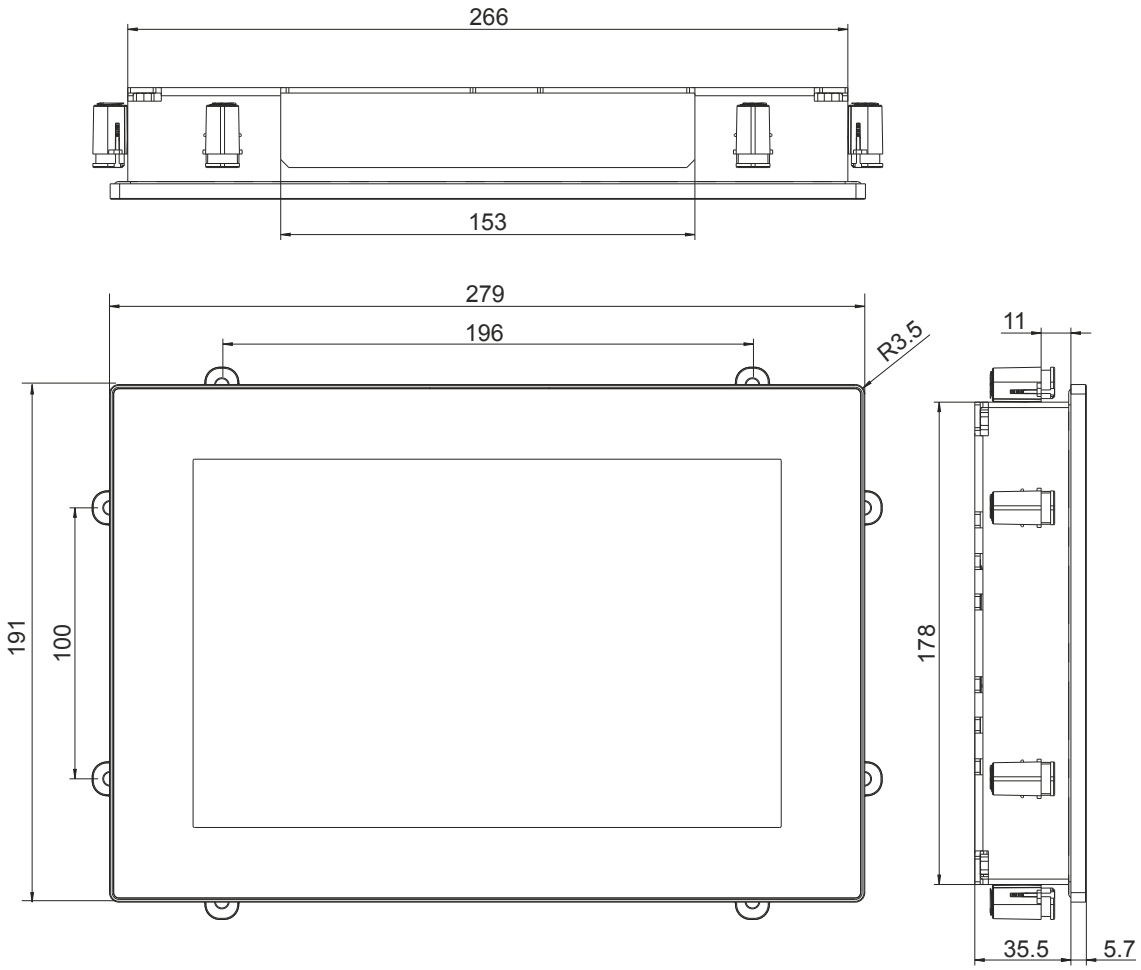
4.3.1 Dimensions

> **Information:**
>
> **All specifications in dimension diagrams and associated tables are in millimeters [mm].**
>
> **The following diagrams are symbolic and only meant to illustrate how the dimension tables should be read.**
>
> **2D and 3D diagrams (DXF and STEP formats) can be downloaded from the B&R website (www.br-automation.com).**

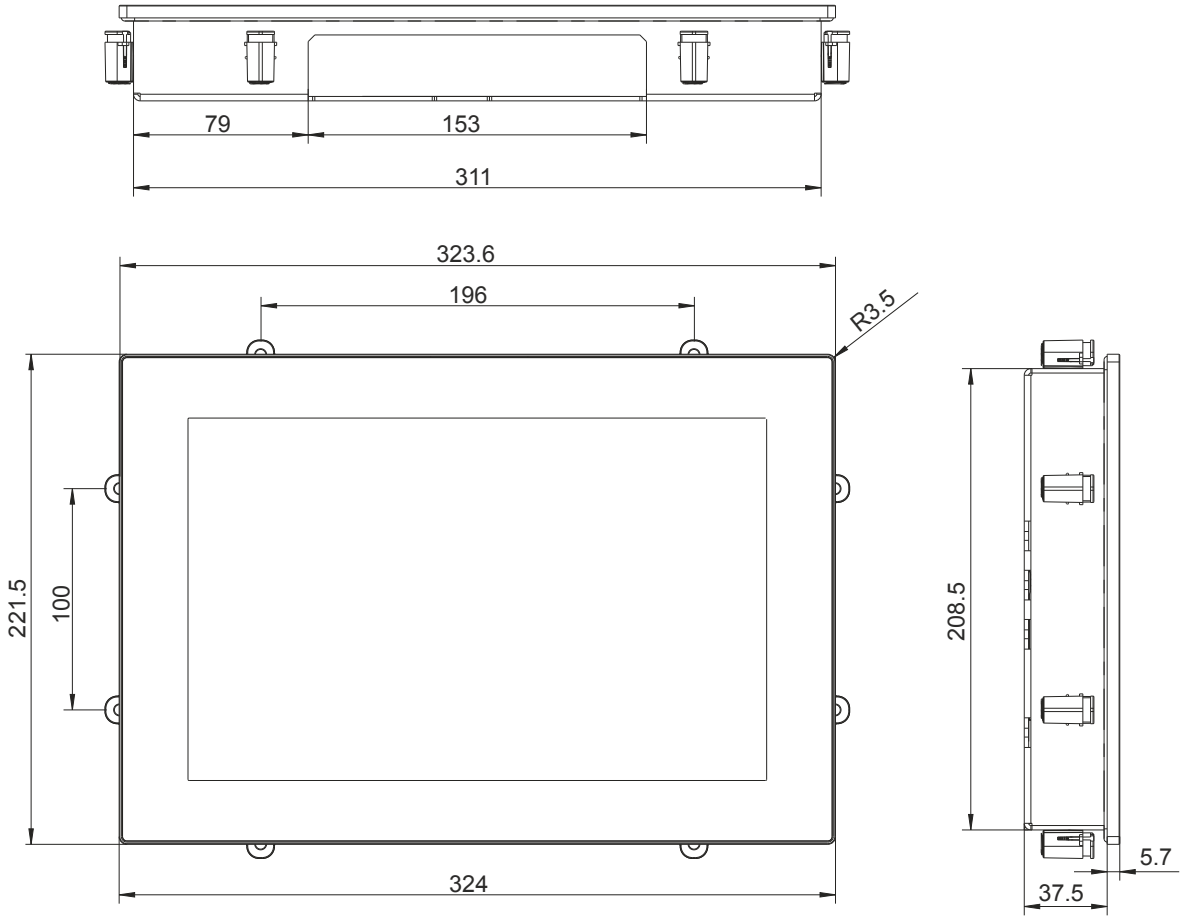
4.3.1.1 7.0" variants



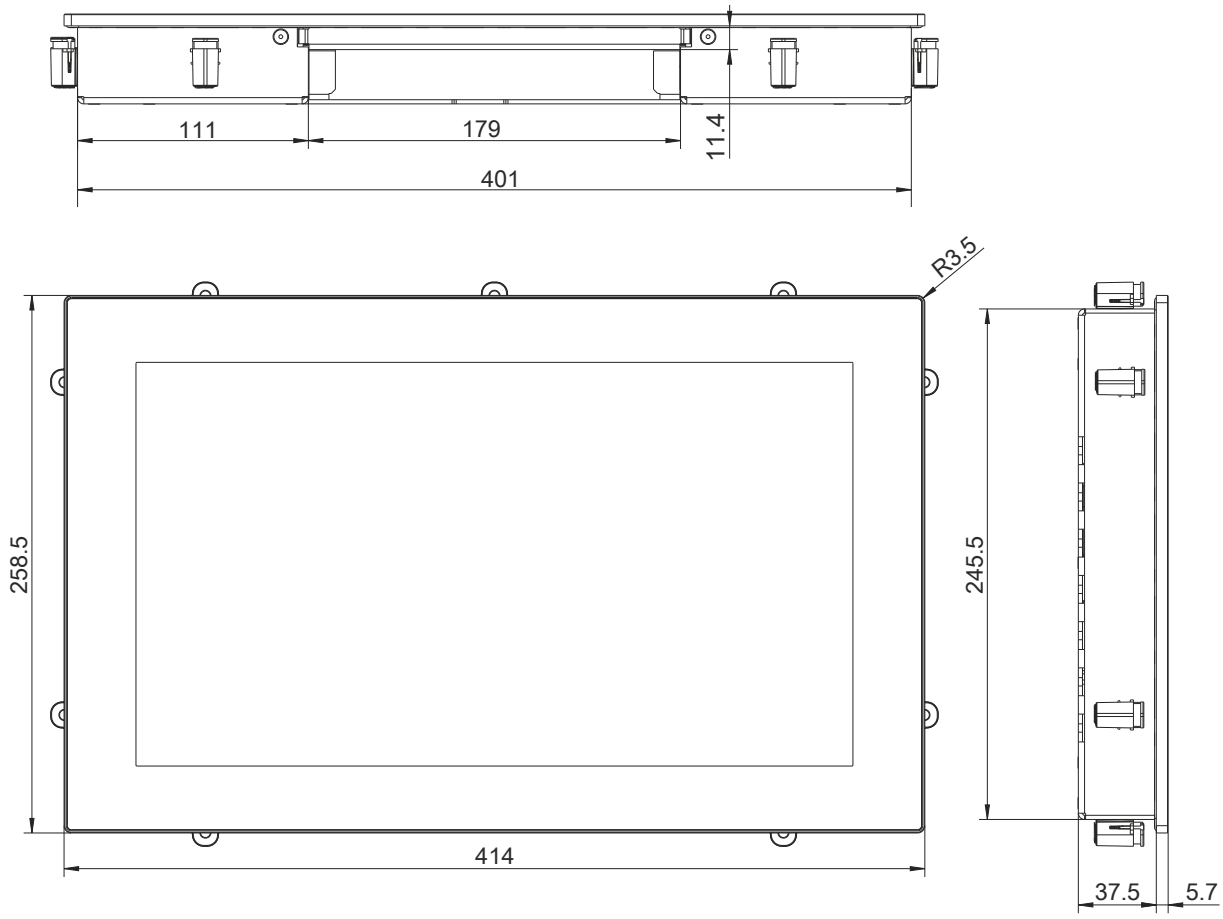
4.3.1.2 10.1" variants



4.3.1.3 12.1" variants



4.3.1.4 15.6" variants



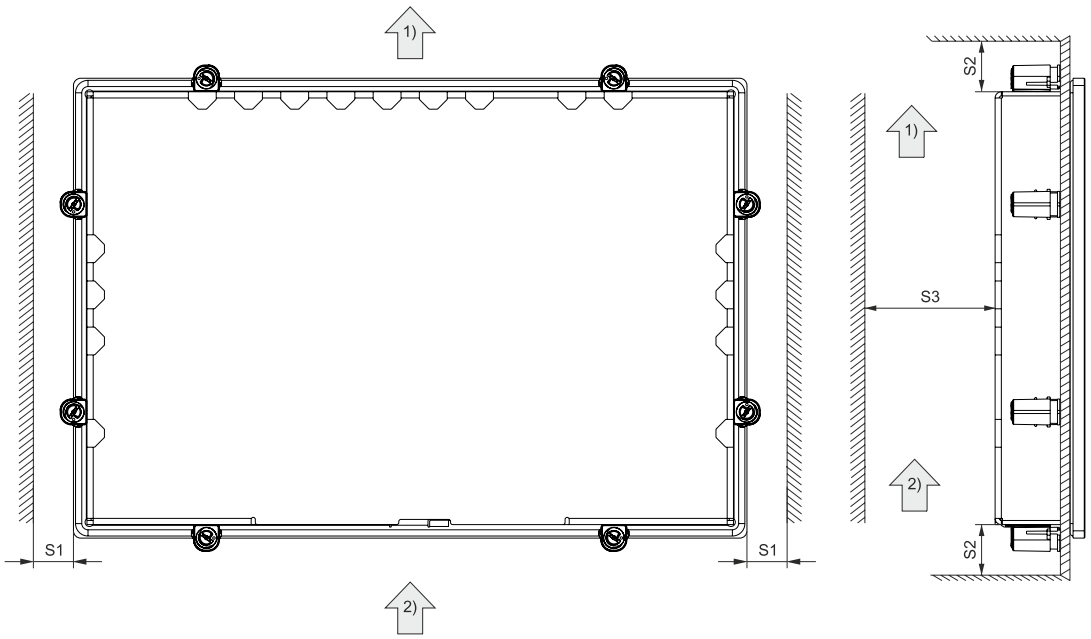
4.3.2 Spacing for air circulation

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

Information:

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

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



Legend			
1)	Air outlet	2)	Air inlet

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

Caution!

The specified spacing for air circulation applies at the maximum specified ambient temperature. The maximum specified ambient temperature is not permitted to be exceeded!

If the specified spacing for air circulation cannot be maintained, the maximum specified temperatures of the temperature sensors (see "Temperature sensor positions" on page 32) must be monitored in the application and appropriate measures taken if these values are exceeded.

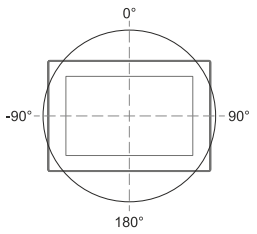
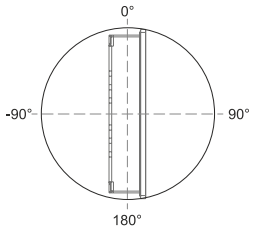
4.3.3 Mounting orientations

The following diagrams show the specified mounting orientations of PPC1200 devices. These are only permitted to be installed as specified below. The PPC1200 is installed as standard with the connection side (interfaces) facing downwards.

During installation, it is important to make sure that the spacing as described in section "Spacing for air circulation" on page 28 is observed in order to achieve natural air circulation.

For details about the use cases, see section "Information about the use cases" on page 36.

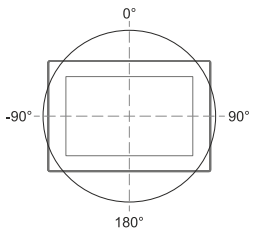
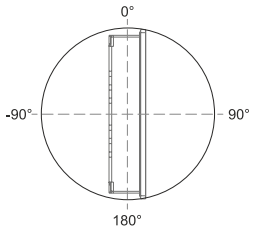
4.3.3.1 Typical application

		Derating [°C]			
Horizontal	**Inclination [°]**	**5PPC1200.0702-xxx**[1]	**5PPC1200.101E-xxx**[2]	**5PPC1200.121E-xxx**[1]	**5PPC1200.156B-xxx**[2]
	0	No limitation	No limitation	No limitation	No limitation
	Up to ±90	No limitation	No limitation	No limitation	No limitation
	Up to 180	No limitation	Rev. B2 and later: No limitation Up to Rev. B1: -5	No limitation	No limitation
	-				
Vertical	**Inclination [°]**	**5PPC1200.0702-xxx**[1]	**5PPC1200.101E-xxx**[2]	**5PPC1200.121E-xxx**[1]	**5PPC1200.156B-xxx**[2]
	0	No limitation	No limitation	No limitation	No limitation
	Up to ±45	No limitation	Rev. B2 and later: No limitation Up to Rev. B1: -5	No limitation	No limitation
	From -46 to -90	No limitation	Rev. B2 and later: No limitation Up to Rev. B1: -5	No limitation	No limitation
	-				

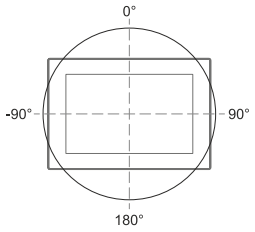
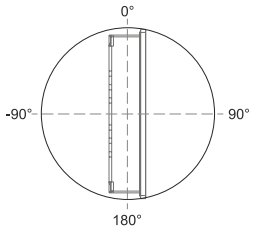
1) Max. operating temperature: 60°C
2) Max. operating temperature: 60°C starting with Rev. B2 (up to Rev. B1: 55°C)

4.3.3.2 Worst-case application

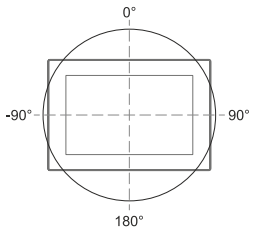
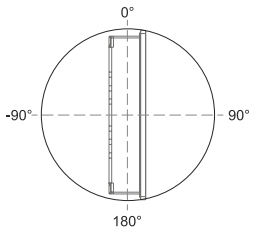
Rev. B2 and later:

7.0" variants 5PPC1200.0702-xxx[1]		Derating [°C]			
Horizontal	**Inclination [°]**	**5CFAST.032G-10**	**5CFAST.064G-10**	**5CFAST.128G-10**	**5CFAST.256G-10**
	0	No limitation	-10	-10	-10
	Up to ±90	No limitation	-10	-10	-10
	Up to 180	No limitation	-20	-20	-20
	-				
Vertical	**Inclination [°]**	**5CFAST.032G-10**	**5CFAST.064G-10**	**5CFAST.128G-10**	**5CFAST.256G-10**
	0	No limitation	-10	-10	-10
	Up to ±45	-5	-20	-20	-20
	From -46 to -90	-5	-20	-20	-20
	-				

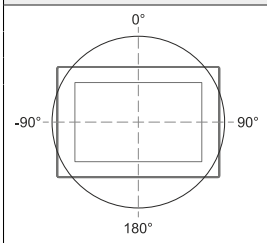
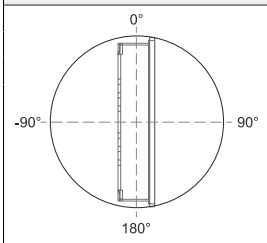
1) Max. operating temperature: 60°C

10.1" variants 5PPC1200.101E-xxx[1]		Derating [°C]			
Horizontal	**Inclination [°]**	**5CFAST.032G-10**	**5CFAST.064G-10**	**5CFAST.128G-10**	**5CFAST.256G-10**
	0	-5	-10	-10	-10
	Up to ±90	-5	-10	-10	-10
	Up to 180	-5	-15	-15	-15
	-				
Vertical	**Inclination [°]**	**5CFAST.032G-10**	**5CFAST.064G-10**	**5CFAST.128G-10**	**5CFAST.256G-10**
	0	-5	-10	-10	-10
	Up to ±45	-5	-15	-15	-15
	From -46 to -90	-5	-15	-15	-15
	-				

1) Max. operating temperature: 60°C starting with Rev. B2 (up to Rev. B1: 55°C)

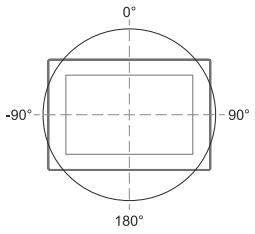
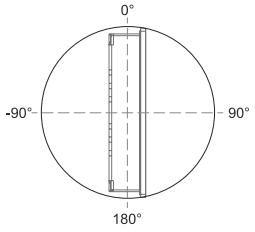
12.1" variants 5PPC1200.121E-xxx[1]		Derating [°C]			
Horizontal	**Inclination [°]**	**5CFAST.032G-10**	**5CFAST.064G-10**	**5CFAST.128G-10**	**5CFAST.256G-10**
	0	No limitation	-10	-10	-10
	Up to ±90	No limitation	-10	-10	-10
	Up to 180	No limitation	-15	-15	-15
	-				
Vertical	**Inclination [°]**	**5CFAST.032G-10**	**5CFAST.064G-10**	**5CFAST.128G-10**	**5CFAST.256G-10**
	0	No limitation	-10	-10	-10
	Up to ±45	No limitation	-15	-15	-15
	From -46 to -90	No limitation	-15	-15	-15
	-				

1) Max. operating temperature: 60°C

15.6" variants 5PPC1200.156B-xxx[1]		Derating [°C]			
Horizontal	**Inclination [°]**	**5CFAST.032G-10**	**5CFAST.064G-10**	**5CFAST.128G-10**	**5CFAST.256G-10**
	0	No limitation	-10	-10	-10
	Up to ±90	No limitation	-10	-10	-10
	Up to 180	No limitation	-15	-15	-15
	-				
Vertical	**Inclination [°]**	**5CFAST.032G-10**	**5CFAST.064G-10**	**5CFAST.128G-10**	**5CFAST.256G-10**
	0	No limitation	-10	-10	-10
	Up to ±45	No limitation	-15	-15	-15
	From -46 to -90	No limitation	-15	-15	-15
	-				

1) Max. operating temperature: 60°C starting with Rev. B2 (up to Rev. B1: 55°C)

Up to Rev. B1:

		Derating [°C]			
Horizontal	**Inclination [°]**	**5PPC1200.0702-xxx**[1]	**5PPC1200.101E-xxx**[2]	**5PPC1200.121E-xxx**[1]	**5PPC1200.156B-xxx**[2]
	0	-5	-5	-5	No limitation
	Up to ±90	-5	-5	-5	No limitation
	Up to 180	-5	-5	-5	No limitation
	-				
Vertical	**Inclination [°]**	**5PPC1200.0702-xxx**[1]	**5PPC1200.101E-xxx**[2]	**5PPC1200.121E-xxx**[1]	**5PPC1200.156B-xxx**[2]
	0	-5	-5	-5	No limitation
	Up to ±45	-10	-5	-5	No limitation
	From -46 to -90	-10	-5	-10	No limitation
	-				

1) Max. operating temperature: 60°C
2) Max. operating temperature: 55°C

4.4 Environmental properties

4.4.1 Temperature monitoring

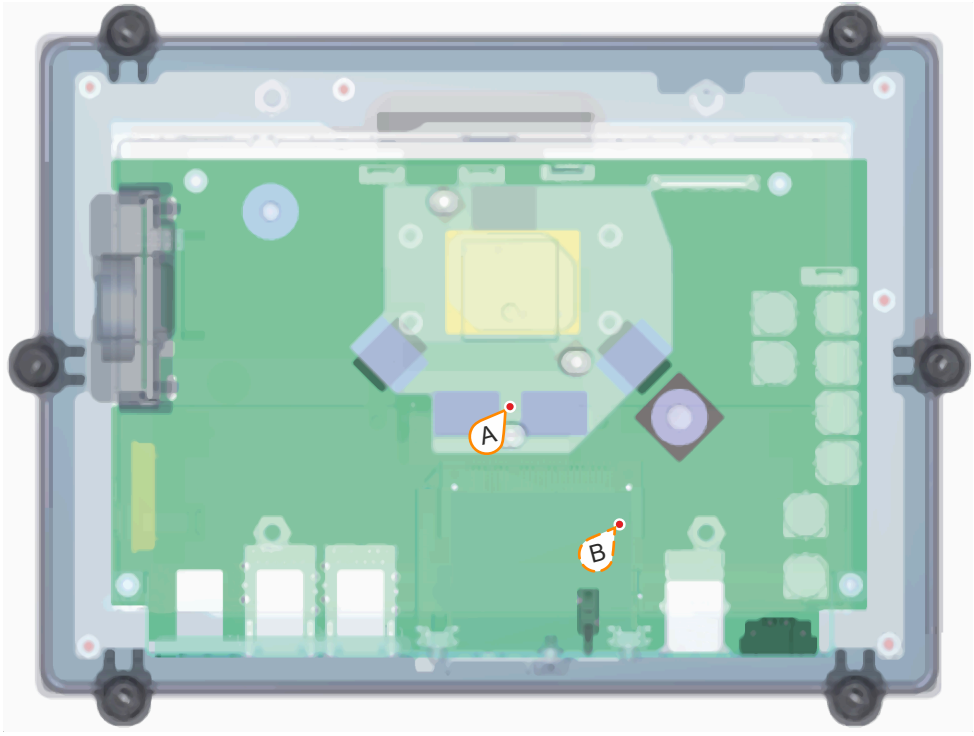
Sensors monitor temperature values at various areas in the PPC1200. For the position of temperature sensors, see section "Temperature sensor positions" on page 32. The values specified there represent the defined maximum temperature at this measuring point. If the temperature is exceeded, no alarm is triggered.

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

- BIOS (see "Baseboard" on page 67)
- ADI Control Center
- ADI Development Kit
- ADI .NET SDK
- B&R HMI Service Center
- B&R HMI Report

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

4.4.2 Temperature sensor positions



ADI sensors	Position	Measuring point for	Measurement	Max. specified [°C]
System unit sensor 1	A	CPU/RAM	Temperature of the processor area	5PPC1200.0702-xxx: 100 5PPC1200.101E-xxx: 95 5PPC1200.121E-xxx: 95 5PPC1200.156B-xxx: 95
System unit sensor 2	B	CFast	Temperature of the CFast area	5PPC1200.0702-xxx: 100 5PPC1200.101E-xxx: 95 5PPC1200.121E-xxx: 95 5PPC1200.156B-xxx: 95

1) The measured temperature is a guide value for the immediate ambient temperature, but it may have been influenced by neighboring components.
2) Self-Monitoring, Analysis and Reporting Technology

4.4.3 Temperature/Humidity diagrams

7.0" variants

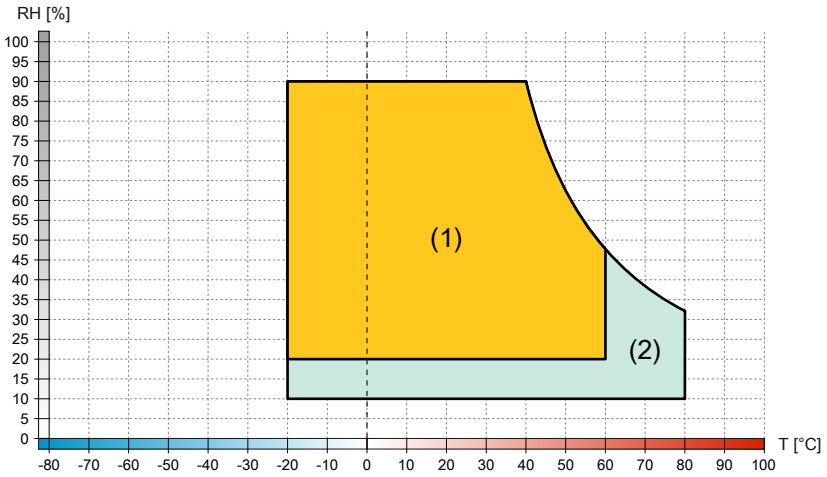


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

10.1" variants

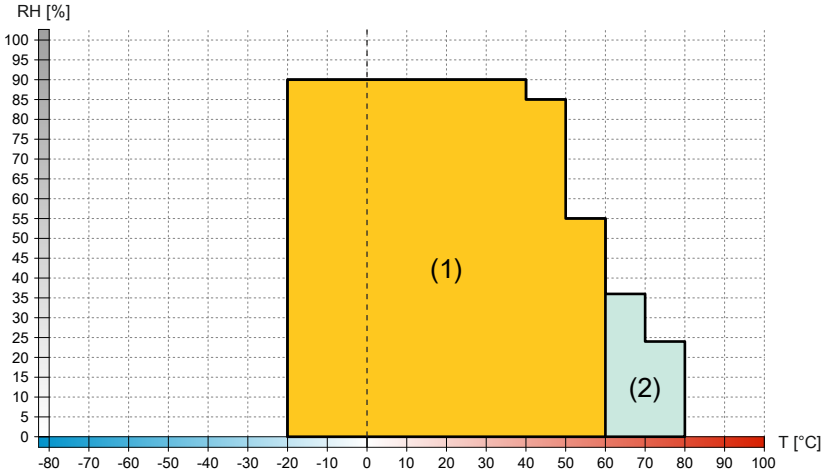


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

12.1" variants

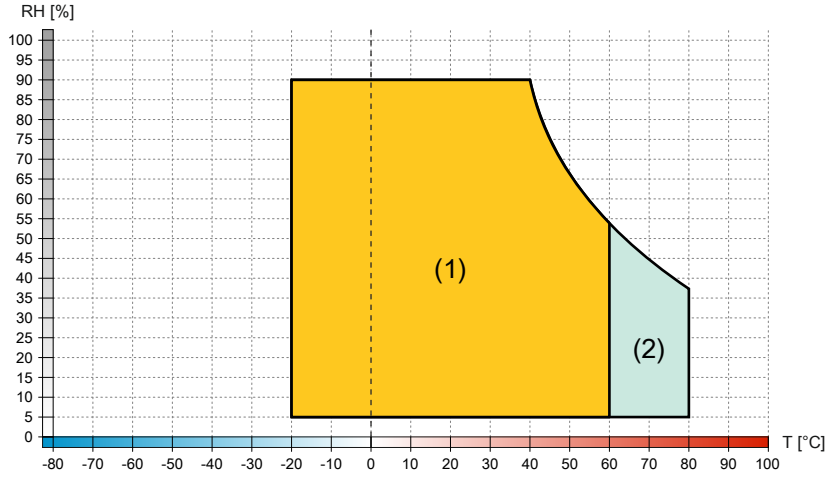


Diagram legend			
(1)	Operation	T [°C]	Temperature in °C
(2)	Storage and transport	RH [%]	Relative humidity (RH) in percent and **non-condensing**

15.6" variants

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

4.4.4 Derating the ambient temperature

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

- Spacing for air circulation is not observed (see "Spacing for air circulation" on page 28).
- Specified mounting orientation with limitation (see "Mounting orientations" on page 29)
- Wall thickness of the installation cutout > 4 mm (see "Installation cutout" on page 47)

If one or more of the above conditions apply, the device is permitted to be derated up to the maximum operating temperature[3)] minus the total derating.

If more than one applicable derating condition exists, the total derating must be calculated as follows:

1) For combined mounting orientations (horizontal and vertical inclination), use the higher derating; see calculation example A.
2) For a mounting orientation with limitation, 100% display brightness (15.6" variant only) and wall thickness >4 mm, the derating values must be added; for combined mounting orientations (horizontal and vertical inclination), proceed as described above in point 1); see calculation example B or C.
3) In the event of a mounting orientation with limitation, wall thickness >4 mm and undershooting of the spacing for air circulation, the temperatures during operation must be monitored continuously in addition to the derating values from item 1) or 2).

Caution!

The specified spacing for air circulation applies at the maximum specified ambient temperature. The maximum specified ambient temperature is not permitted to be exceeded!

If the specified spacing for air circulation cannot be maintained, the maximum specified temperatures of the temperature sensors (see "Temperature sensor positions" on page 32) must be monitored in the application and appropriate measures taken if these values are exceeded.

4.4.4.1 Calculation example A (worst-case application)

12.1" device 5PPC1200.121E-10B	Max. ambient temperature during operation	60°C
Operation with 5CFAST.128G-10 (90° horizontal and 45° vertical inclination)	Derating Horizontal: -10°C Vertical: -15°C **The higher value must be used for the calculation!**	-15°C
Max. ambient temperature in the application example (worst case)		**45°C**

4.4.4.2 Calculation example B (worst-case application)

12.1" device 5PPC1200.101E-10B	Max. ambient temperature during operation	60°C
Operation with 5CFAST.032G-10 (0° horizontal and vertical inclination)	Derating	-5°C
Wall thickness 5 mm	Derating	-5°C
Max. ambient temperature in the application example (worst case)		**50°C**

4.4.4.3 Calculation example C (worst-case application)

12.1" device 5PPC1200.0702-10A	Max. ambient temperature during operation	60°C
Operation with 5CFAST.032G-10 (90° horizontal and 15° vertical inclination)	Derating Horizontal: No limitation Vertical: -5°C **The higher value must be used for the calculation!**	-5°C
Wall thickness 5 mm	Derating	-5°C
Max. ambient temperature in the application example (worst case)		**50°C**

4.4.4.4 Calculation example D (worst-case application)

15.6" device 5PPC1200.156B-10B	Max. ambient temperature during operation	60°C
Operation with 5CFAST.032G-10 (standard mounting orientation)	No limitation	-
Operation with 100% display brightness	Derating	-10°C
Wall thickness 5 mm	Derating	-5°C
Max. ambient temperature in the application example (worst case)		**45°C**

[3)] See ambient conditions in the technical data.

4.4.4.5 Information about the use cases

Typical application

- BurnInTest Pro V8.1 from PassMark Software for simulating 50% system load:
  - 50% each for CPU, RAM, mass storage (CFast card) and graphics.
  - 2x 100 Mbit Ethernet.
  - 2x USB 2.0.
- 80% display brightness.

Worst-case application

- Power Thermal Utility from Intel for simulating 100% processor utilization:
  - 100% each for CPU, memory and graphics.
- BurnInTest Pro V8.1 from PassMark Software for simulating 100% memory utilization:
  - Mass storage (CFast card).
- Maximum power consumption of the 2 USB interfaces.
- 2x 1 Mbit Ethernet.
- 100% display brightness.

4.4.5 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.

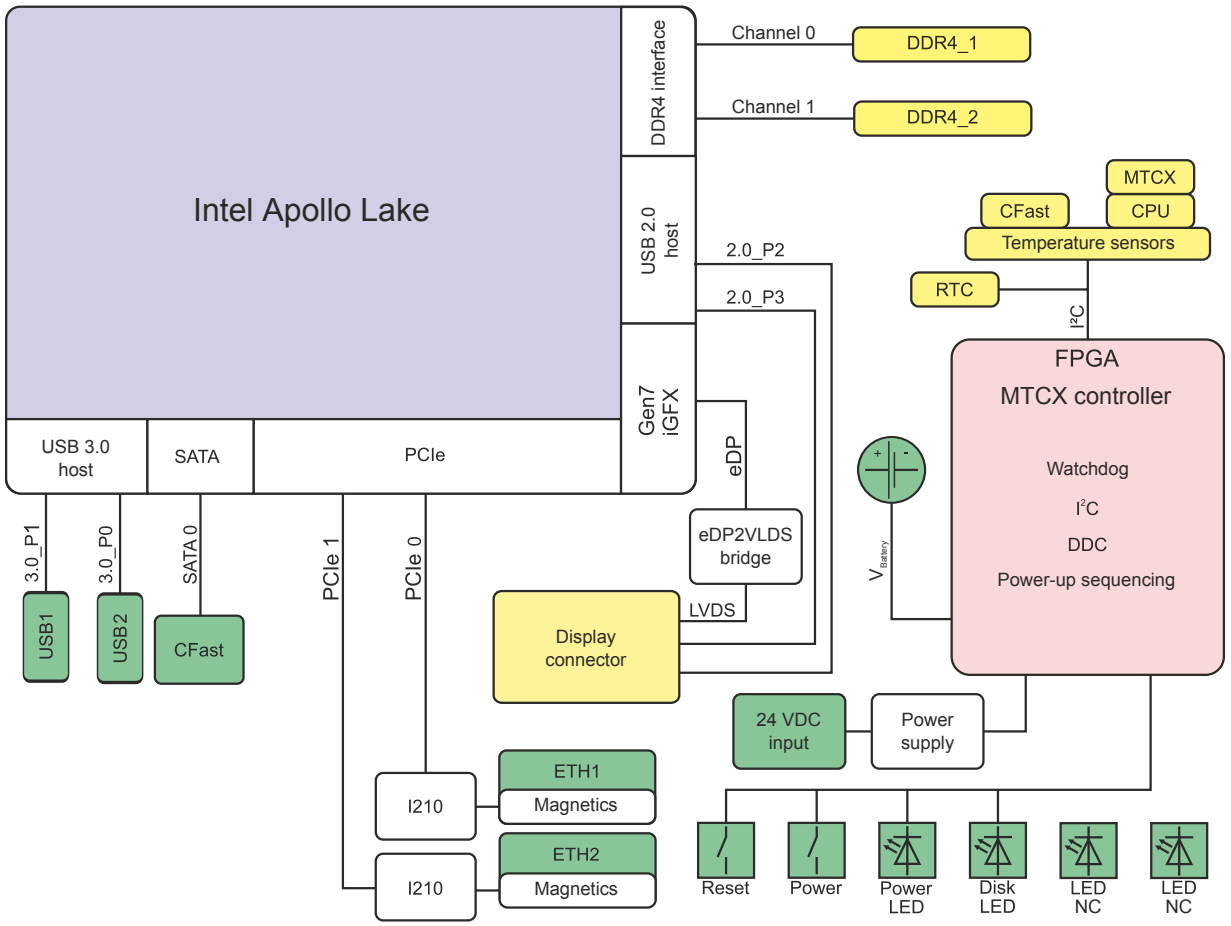
Vibration				
Panel PC	Operation[1)]		Storage[1)3)]	Transport[1)3)]
	Continuous	Periodic		
With CFast card	2 to 9 Hz: 1.75 mm amplitude 9 to 200 Hz: 0.5 g	2 to 9 Hz: 3.5 mm amplitude 9 to 200 Hz: 1 g	2 to 8 Hz: 7.5 mm amplitude 8 to 200 Hz: 2 g 200 to 500 Hz: 4 g	2 to 8 Hz: 7.5 mm amplitude 8 to 200 Hz: 2 g 200 to 500 Hz: 4 g
Shock				
Panel PC	Operation[2)]		Storage[2)3)]	Transport[2)3)]
With CFast card	15 g, 11 ms		30 g, 6 ms	30 g, 6 ms

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

The specifications for vibration and shock **during operation** apply equally to installation with retaining clips and using a VESA bracket.

4.5 Electrical properties

4.5.1 Block diagram



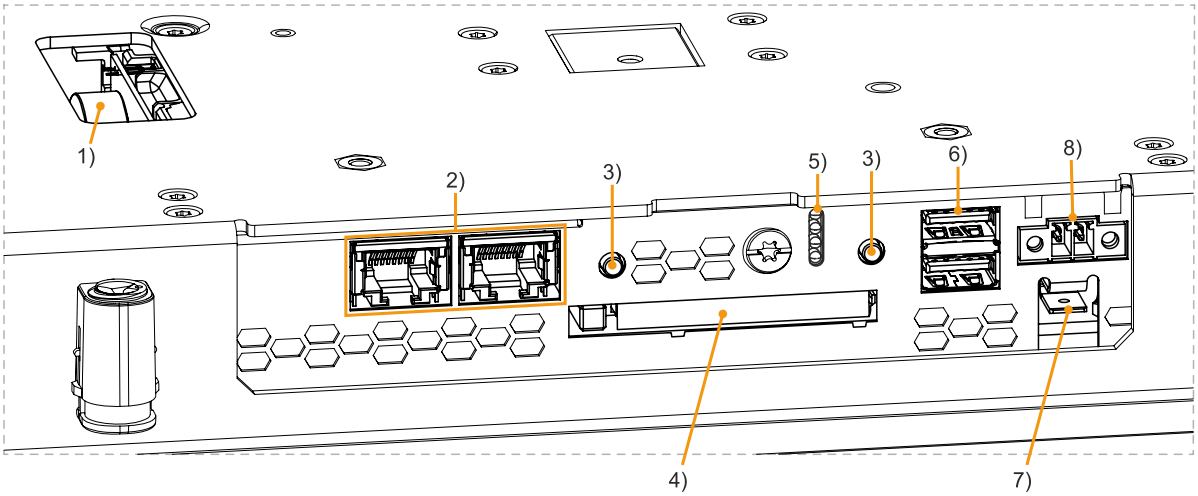
Legend			
	Internal interface	2.0_Px	USB 2.0 port x
	External interface	3.0_Px	USB 3.0 port x

4.6 Device interfaces and slots

4.6.1 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	"Battery" on page 43	2	"Ethernet interfaces" on page 40
3	"Power and reset buttons" on page 42	4	"CFast slot" on page 41
5	"LED status indicators" on page 42	6	"USB interfaces" on page 41
7	"Grounding" on page 40	8	"24 VDC power supply" on page 39

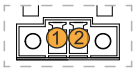
4.6.1.1 24 VDC power supply

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 2-pin connector is not included in delivery; for suitable accessories, see "TB6102" on page 100.

The device is protected against overload and reverse polarity by a soldered fuse (10 A, very fast-acting). If the fuse is defective (e.g. due to overload), the device must be sent to B&R for repairs. If the polarity is reversed, it is not necessary to replace the fuse.

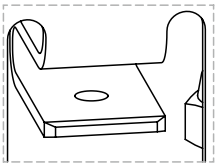
Pin	Description	Symbol	Figure
1	24 VDC	+	
2	GND	-	
• Reverse polarity protection • 2-pin • Male			
Electrical properties			
Nominal voltage			24 VDC ±25%, SELV/PELV[1)]
Overvoltage category per EN 61131-2			II
Inrush current			Typ. 5 A, max. 100 A for < 50 µs
Galvanic isolation			No

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

4.6.1.2 Grounding

Caution!

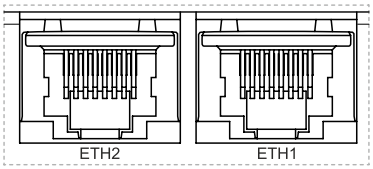
The functional ground (ground connection) must be connected to the central grounding point (e.g. control cabinet or system) via the shortest possible path with the lowest possible resistance and with the largest possible wire cross section. This type of grounding is mandatory for proper functionality.



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

4.6.1.3 Ethernet interfaces

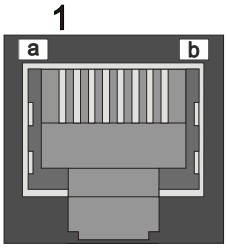
The PPC1200 is equipped with 2 externally routed Ethernet interfaces.



Information:

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

ETH1, ETH2		
Variant	RJ45, female	
Controller	Intel I210	
Wiring	S/STP (Cat 5e)	
Transfer rate	10/100/1000 Mbit/s[1)]	
Cable length	Max. 100 m (min. Cat 5e)	
LED "Speed" (a)	**On**	**Off**
Green	100 Mbit/s	10 Mbit/s[2)]
Orange (dark)	1000 Mbit/s	-
LED "Link" (b)	**On**	**Active**
Orange (light)	Link (a connection to an Ethernet network exists)	Blinking (data being transferred)



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

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 (www.br-automation.com) (if required and not already included in the operating system).

Information:

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

4.6.1.4 USB interfaces

PPC1200 devices are equipped with a Universal Serial Bus 3.0 (USB 3.0) host controller with 2 USB ports that are routed externally and freely available to the user.

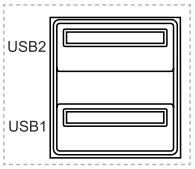
Warning!

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

Caution!

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

USB1, USB2	
Standard	USB 3.0
Variant	Type A, female
Quantity	2
Transfer rate	Low speed (1.5 Mbit/s)
	Full speed (12 Mbit/s)
	High speed (480 Mbit/s)
	SuperSpeed (5 Gbit/s)
Current-carrying capacity[1)]	Max. 1 A per interface
Cable length	
USB 2.0	Max. 5 m (without hub)
USB 3.0	Max. 3 m (without hub)
-	



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

4.6.1.5 CFast slot

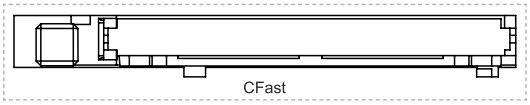
The Panel PC 1200 offers an easy-to-access CFast slot so that a CFast card can also be used as a removable storage medium for transferring data or performing upgrades.

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

Warning!

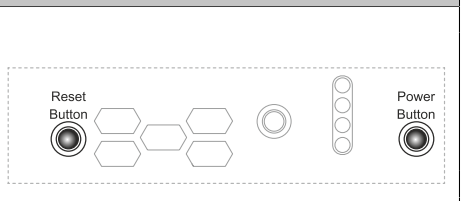
CFast cards are only permitted to be connected and disconnected in a voltage-free state!

CFast slot	
Connection	
CFast slot 1	SATA 0
Order number	**Short description**
	CFast cards
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



4.6.1.6 Power and reset buttons

Both buttons can be pressed without any tools.

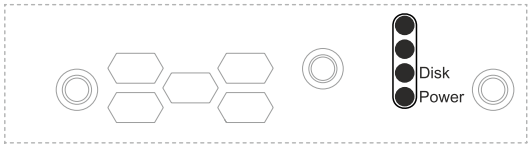
Description	
Power button	
The power button offers full ATX power supply support and has various configurable functions. • **Short press:** Switches the PC on or off or performs the action configured in the operating system when pressing the power button (shutdown, sleep, etc.). • **Long press (approx. 4 s)**: The ATX power supply switches off the PC without shutting it down. Pressing the power button does not reset the MTCX processor.	
Reset button	
Pressing the reset button triggers a hardware/PCI reset. The PC is restarted. During a reset, the MTCX processor is not reset.	

Warning!

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

4.6.1.7 LED status indicators

Assignment



LED	Color	Status	Explanation	LED status indicator (500 ms per interval: 1 2 1 2)
Power	Green	On	Power supply OK	
		Blinking	The device is started up; the battery state is "BAD".	
			Information: **For additional information, see "Battery" on page 43.**	
	Red	On	The system is in power saving mode (standby).[1)]	
		Blinking	The MTCX is running; the battery state is "BAD". The system is in power saving mode (standby).[1)]	
	Red-Green	Blinking	Faulty or incomplete BIOS, MTCX or I/O FPGA update, battery state OK, power supply OK	
			Faulty or incomplete BIOS, MTCX or I/O FPGA update, battery state OK, power saving mode (standby)[1)]	
			Faulty or incomplete BIOS, MTCX or I/O FPGA update, battery state BAD, power supply OK	
			Faulty or incomplete BIOS, MTCX or I/O FPGA update, battery state BAD, power saving mode (standby)[1)]	
			Information: **An update must be performed again.**	
Disk	Yellow	On	Indicates access to the CFast card	
LED2	No function			
LED1	No function			

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

4.6.1.8 Battery

A lithium battery (3 V, 1000 mAh) ensures the retention of the internal real-time clock (RTC) and is located on the bottom of the device as a battery tray. The self-discharge time of the battery is at least 8 years [4)]. The battery is subject to wear and should be replaced regularly (at least after the specified service life) by changing the battery.

The battery state is determined by the system immediately after the device is switched on and subsequently every 24 hours. During the measurement, the battery is subjected to a brief load (approx. 1 second) and then assessed. The determined battery state is displayed on the BIOS Setup screens (Advanced / OEM features / "Baseboard" on page 67) and in 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 with replacement part "5ACCRHMI.0018-000", see "Changing the battery" on page 96.
Data is retained by a capacitor in order to avoid data loss during battery replacement.

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

4.6.1.9 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

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

4.7 Individual components

4.7.1 CFast cards

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

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 9 must be observed for unpacked devices and components.
- Keep the original packaging for further transport.

Power supply

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

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

Caution!

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

Installation

Before installation

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

- Allow sufficient space for installation, operation and maintenance of the device.
- The device must be installed on a flat, clean and burr-free surface.
- The wall or control cabinet 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 32.

General installation instructions

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

Transport and storage

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 Requirements for the installation cutout

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

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

1) A derating of the ambient temperature of 5°C must be taken into account for all mounting orientations and diagonals starting at a wall thickness greater than 4 mm (see "Derating the ambient temperature" on page 35).

Notice!

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

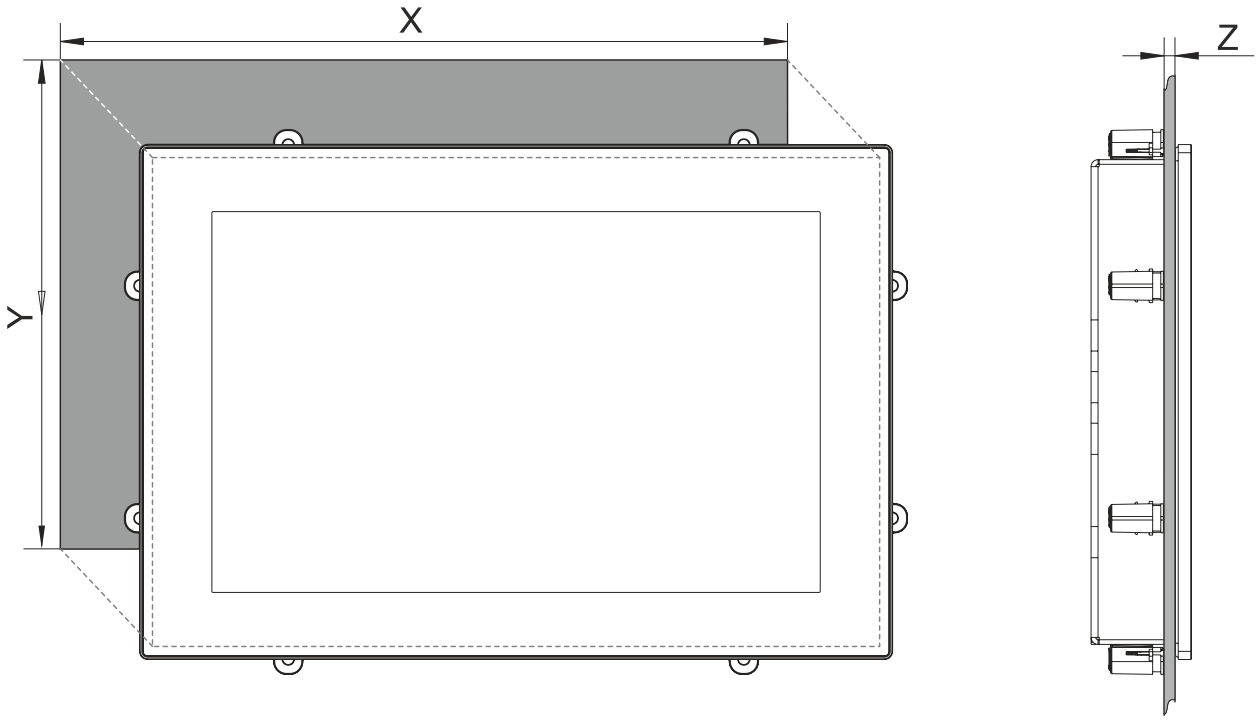
Notice!

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

5.1.1.1 Installation cutout

Information:

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



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

Coutout tolerance: +0 mm / -0.5 mm.

Panels					
Type	**Order number**	**X**	**Y**	**Z (wall thickness)**	**Number of retaining clips**
7.0"	5PPC1200.0702-10x	199	143	2 to 6[1)]	6
10.1"	5PPC1200.101E-10x	268	180		8
12.1"	5PPC1200.121E-10x	313	210.5		8
15.6"	5PPC1200.156B-10x	403	247.5		9

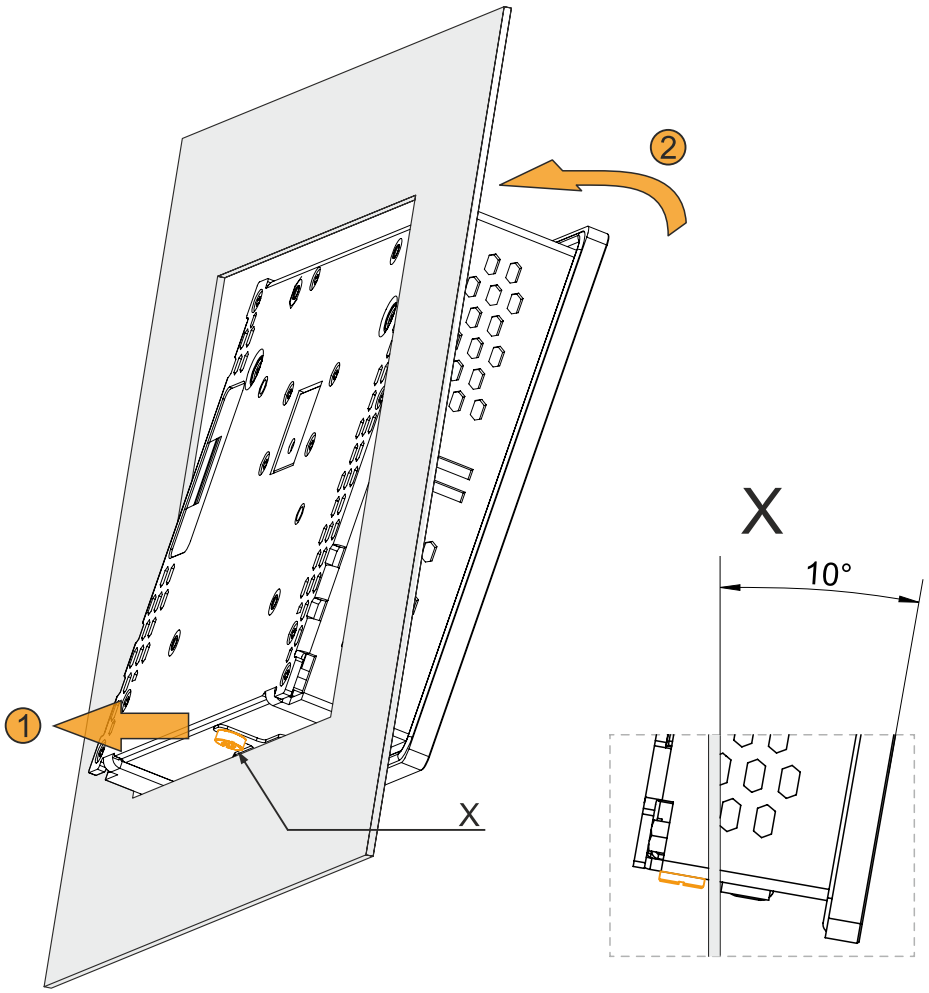
1) A derating of the ambient temperature of 5°C must be taken into account for all mounting orientations and diagonals starting at a wall thickness greater than 4 mm, see "Derating the ambient temperature" on page 35.

Information:

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

5.2 Installation for mounting with retaining clips

For easy and gentle installation of the PPC1200, it should be inserted into the installation cutout with the bottom side first at an angle of approx. 10° (1).
If the CFast cover is entirely in the installation housing or control cabinet, the PPC1200 can be placed completely in the installation cutout (2).



5.2.1 Installing with retaining clips

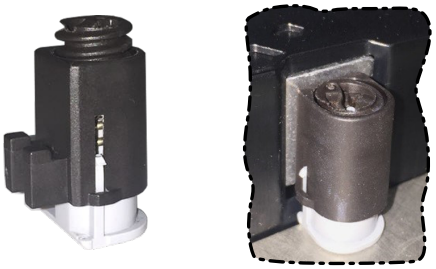


Figure: Retaining clips

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

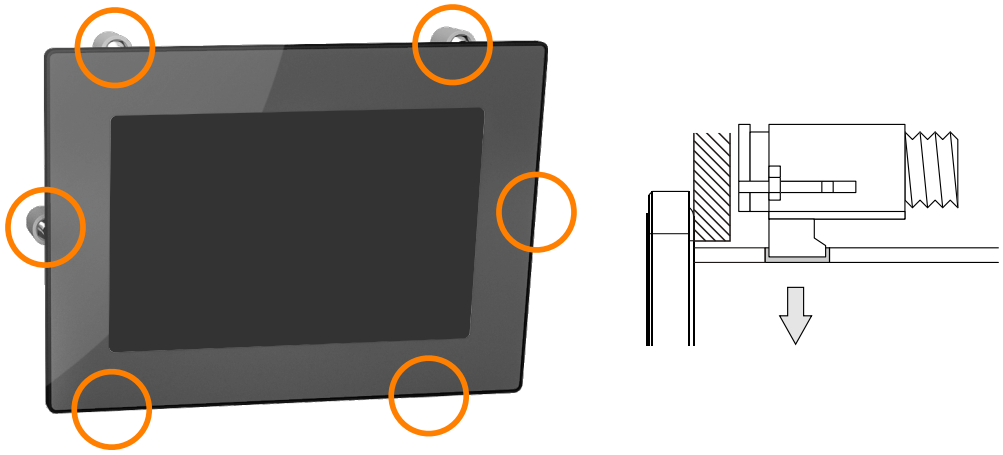
A large flat-blade screwdriver is needed to tighten and loosen the screw.

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

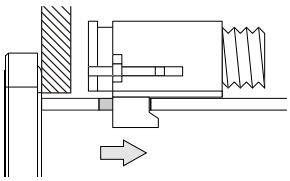
See also: "Requirements for the installation cutout" on page 46.

Procedure

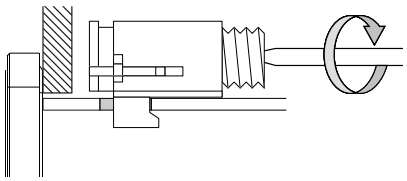
1. Insert the device into the front of the prepared, burr-free and flat installation cutout. For the dimensions of the installation cutout, see section "Dimensions" for the individual devices.
2. Install the retaining clips on the device. To do this, insert the clips into the openings on the sides of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



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



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



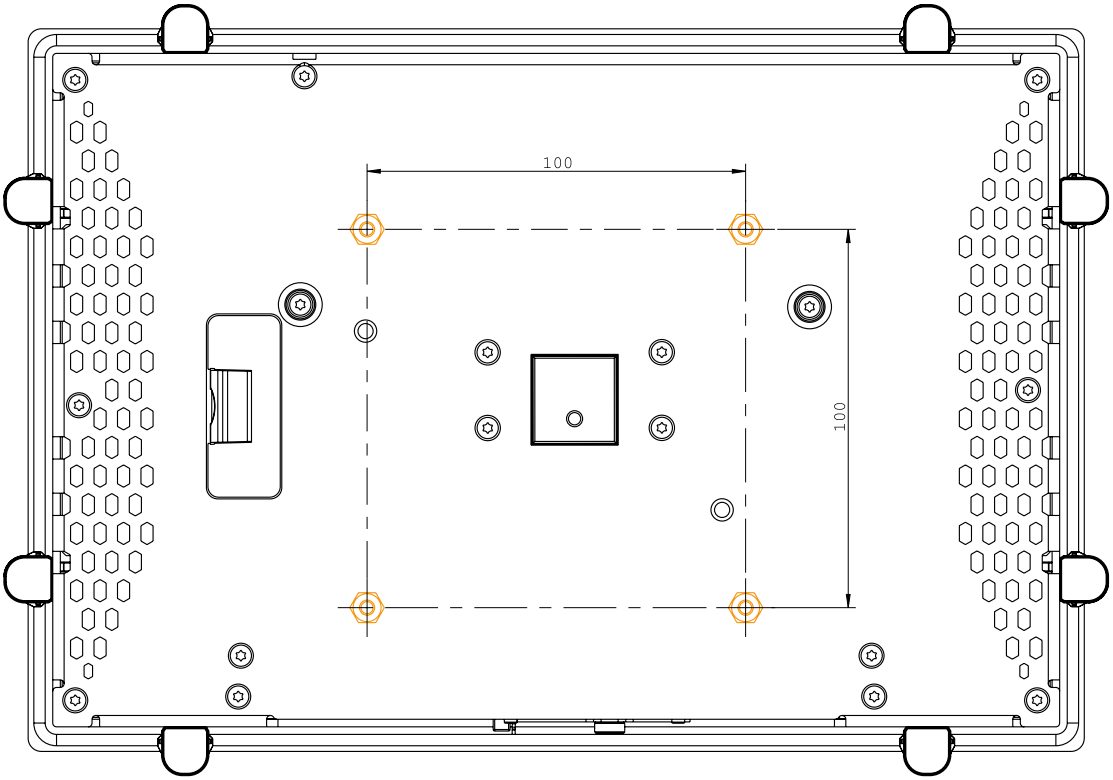
Torque limiting is built into the retaining clips.

Notice!

All the included retaining clips must be used during installation. Failure to do so can result in damage to property due to loss of leak tightness between the device and housing (pollution) or mechanical stress.

5.3 Installing with a VESA bracket

PPC1200 devices are equipped with 4 threaded inserts for installing with a VESA bracket.



5PPC1200.0702-xxx	5PPC1200.101E-xxx	5PPC1200.121E-xxx	5PPC1200.156B-xxx
VESA 100 x 100	VESA 100 x 100	VESA 100 x 100	VESA 100 x 100

Notice!

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

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

5.4 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.

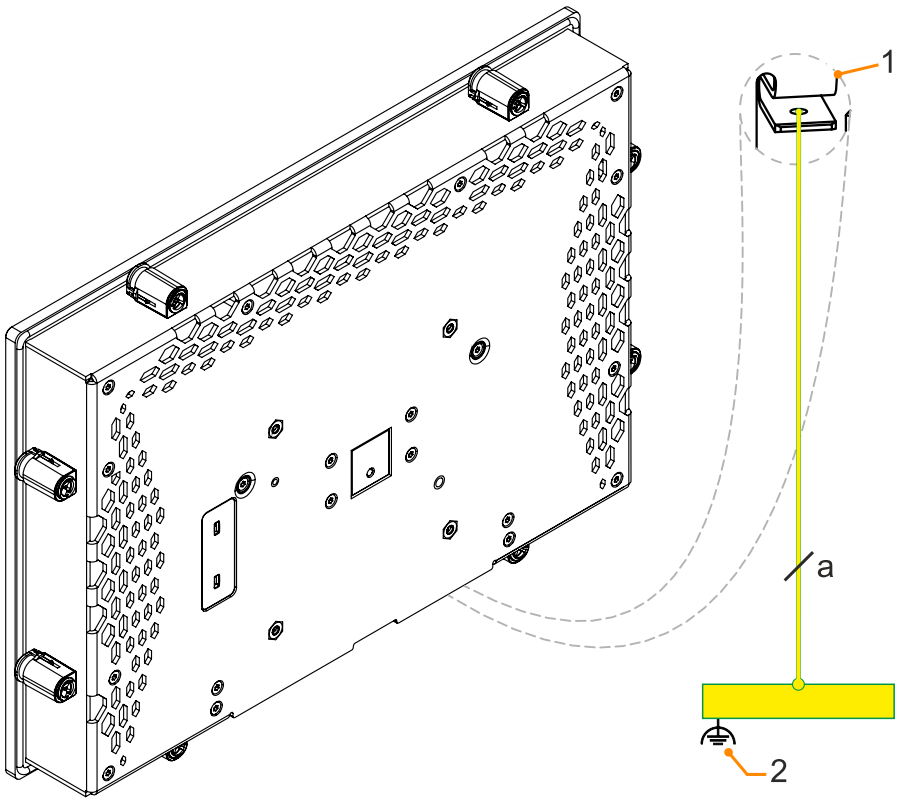
The device is equipped with the following functional ground connections:

- 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 via the blade terminal provided (Faston 6.3 mm).
- 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: ⏚

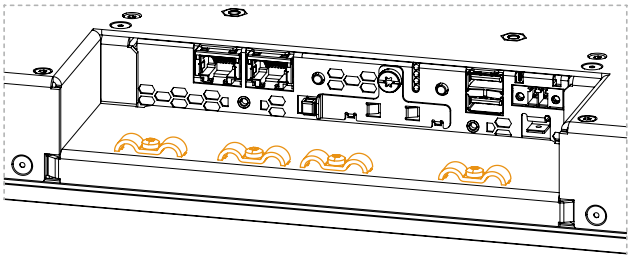


Legend			
1	Ground connection ⏚	2	Central grounding point
a	At least 2.5 mm²	-	

5.5 Securing the connecting cables

Display size 15.6"

On PPC1200 variants with 15.6" display size, cables can be relieved of tensile stress using the cable clamps provided on the back of the device.

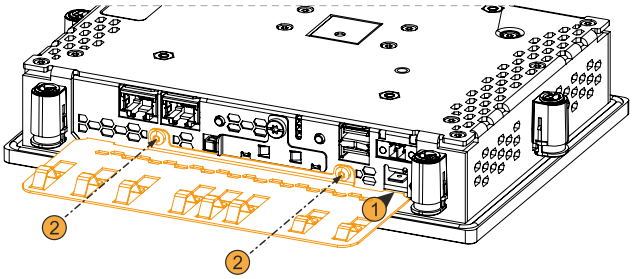


Display size 12.1" and smaller

For display sizes between 7.0" and 12.1", accessories for installing and protecting the attachment cables from tensile stress are included in delivery.

Required accessories from the content of delivery:

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



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

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

Securing the cables to the grounding plate

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

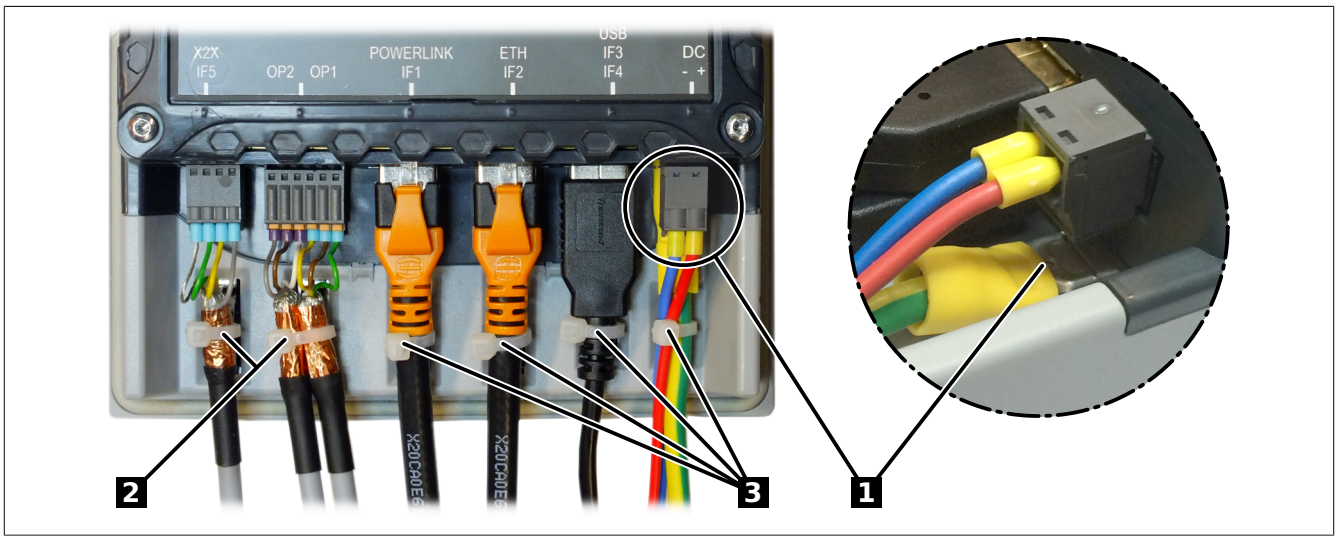


Figure 1: (symbolic image)

6 Commissioning

6.1 Basic information

Before the device is started up, it must be gradually adapted to 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 45?
- 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

These devices come already pre-calibrated from the factory. Recalibration is usually no longer necessary.

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).

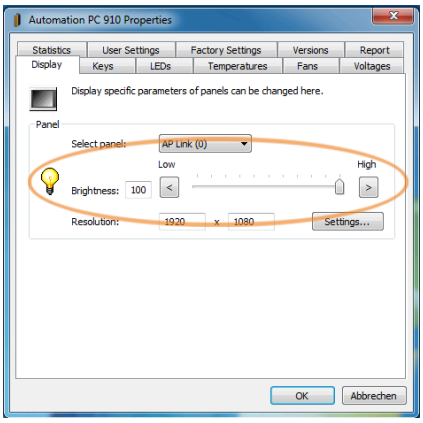


Figure 2: Adjusting the display brightness

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 32.

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 ADI 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 (www.br-automation.com) at no cost and uses the ADI (Automation Device Interface).

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 www.passmark.com.**

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.

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 PPC1200 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 PPC1200 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 1.04.

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.

BIOS parameter			Input options	Description
BIOS parameter 1			***Enable(d)***	Disables/Enables BIOS parameter 1
			Disable(d)	
BIOS parameter 1 value			UINT Default: ***42***	Defines the value of BIOS parameter 1 Range: 0 to 65535 Resolution: 3
BIOS parameter 2			-	Displays BIOS parameter 2
	BIOS parameter 2.1		a1	Selects mode of BIOS parameter 2.1
			a2	
			b	
		BIOS subparameter 2.1 value	***Disable(d)***	Disables/Enables BIOS subparameter 2.1
			Enable(d)	
BIOS parameter *n* [1]			***Disable(d)***	Disables BIOS parameter *n* or selects option
			(Various)[2]	
Hardware components			Enter	Opens submenu "Hardware components" on page xyz

Table 6: Main menu - Menu - Submenu(s)

1) The 16 possible parameters are indexed from 0 to 15.
2) Setting option "(Various)" combines different values/modes with different dependencies.

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.

Figure 3: Boot screen

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>	The POST can be stopped with the <Pause> button. POST resumes after pressing any other key.

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 (←, ↑, ↓, →)	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 (←, ↑, ↓, →)	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)

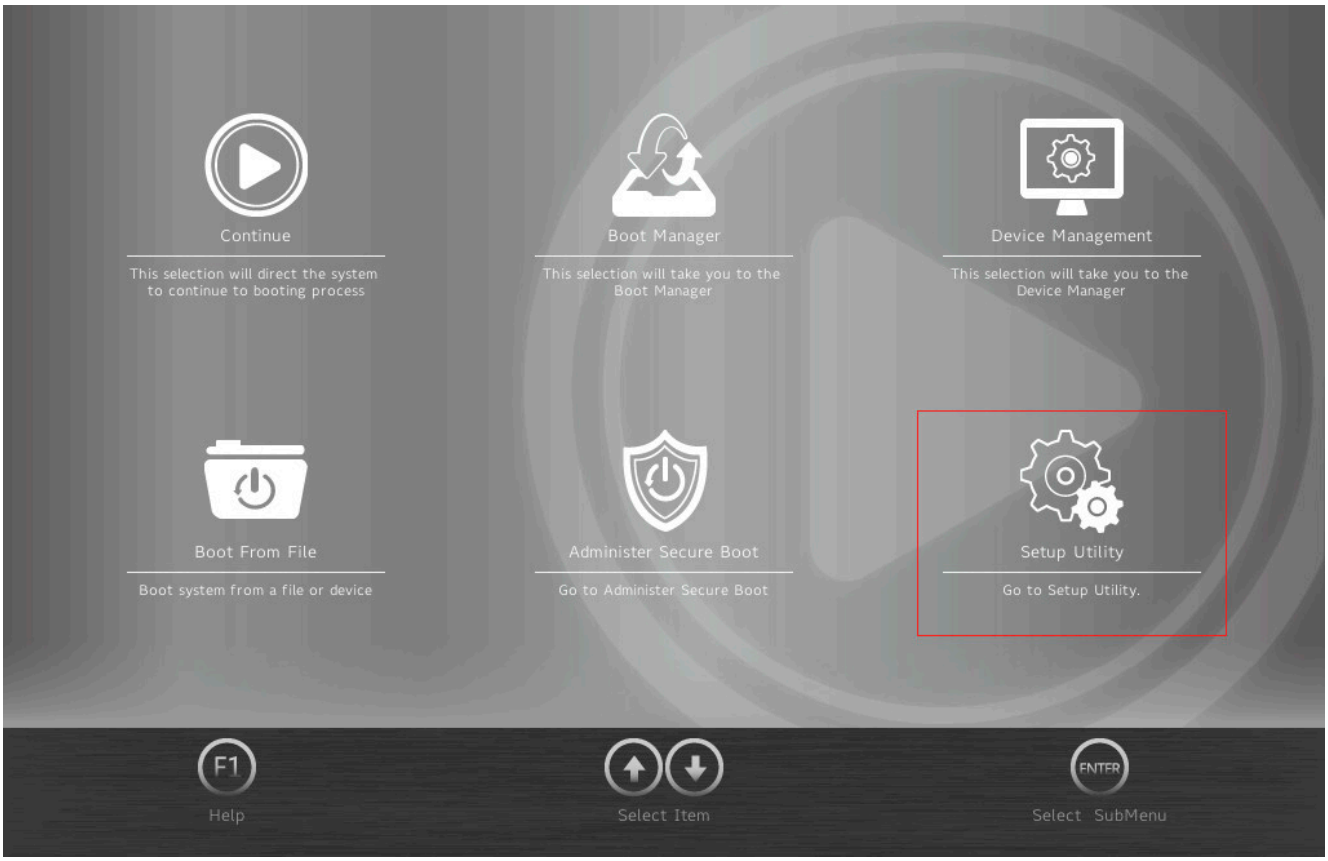
Key	Function
F9	Loads the default settings[1)]
F10	Saves and closes
Enter	Opens the selected submenu/parameter
Alphanumeric keys	Defines manual values for parameters that permit this

1) Save and close to restore the default values.

Information:

All manual changes are overwritten if the default values are loaded and saved.

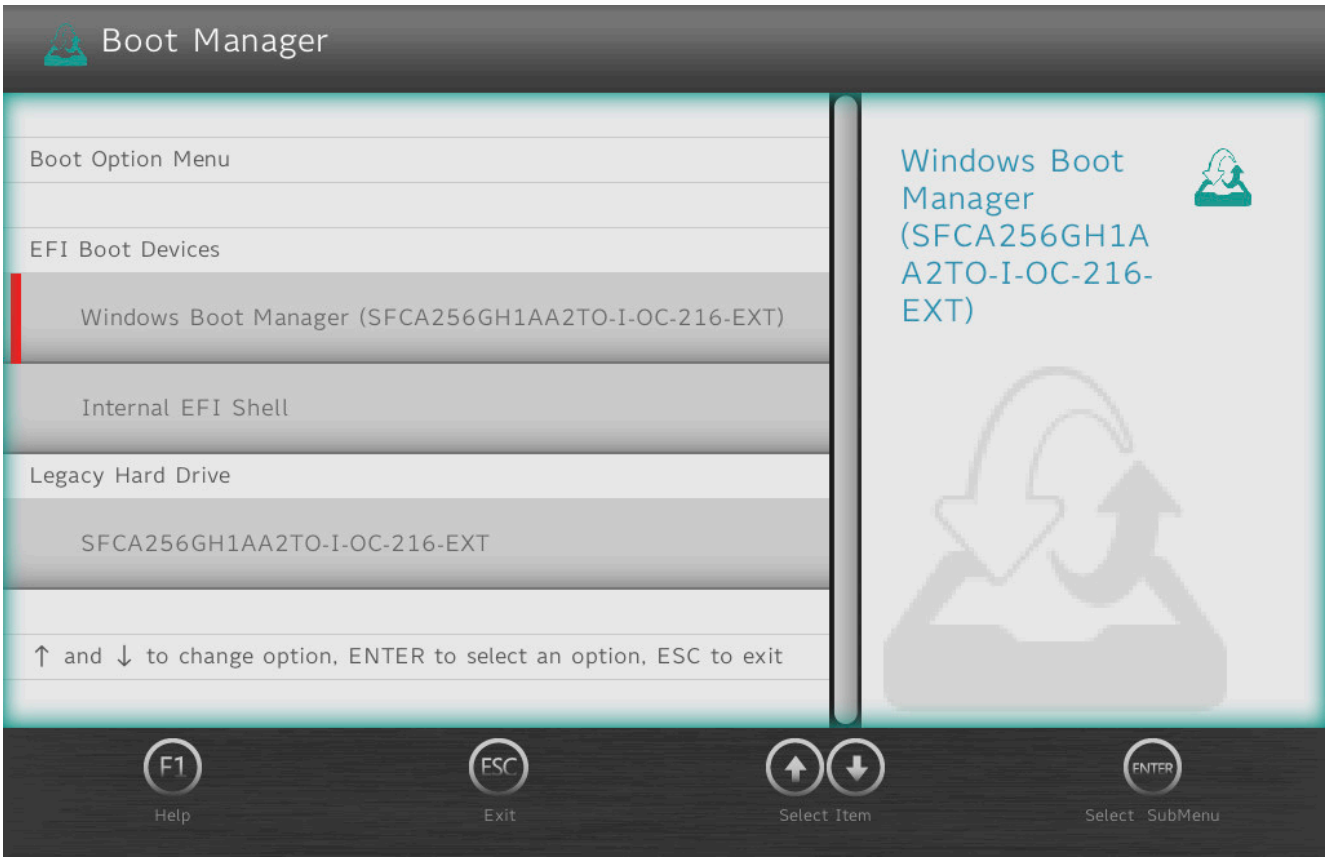
7.1.3 Boot menu



Boot menu option	Description
Continue	Resumes the boot process.
Boot manager	Lists all detected and bootable media. See "Boot manager" on page 61.
Device management	Lists all supported and enabled devices (e.g. Ethernet).
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 63.

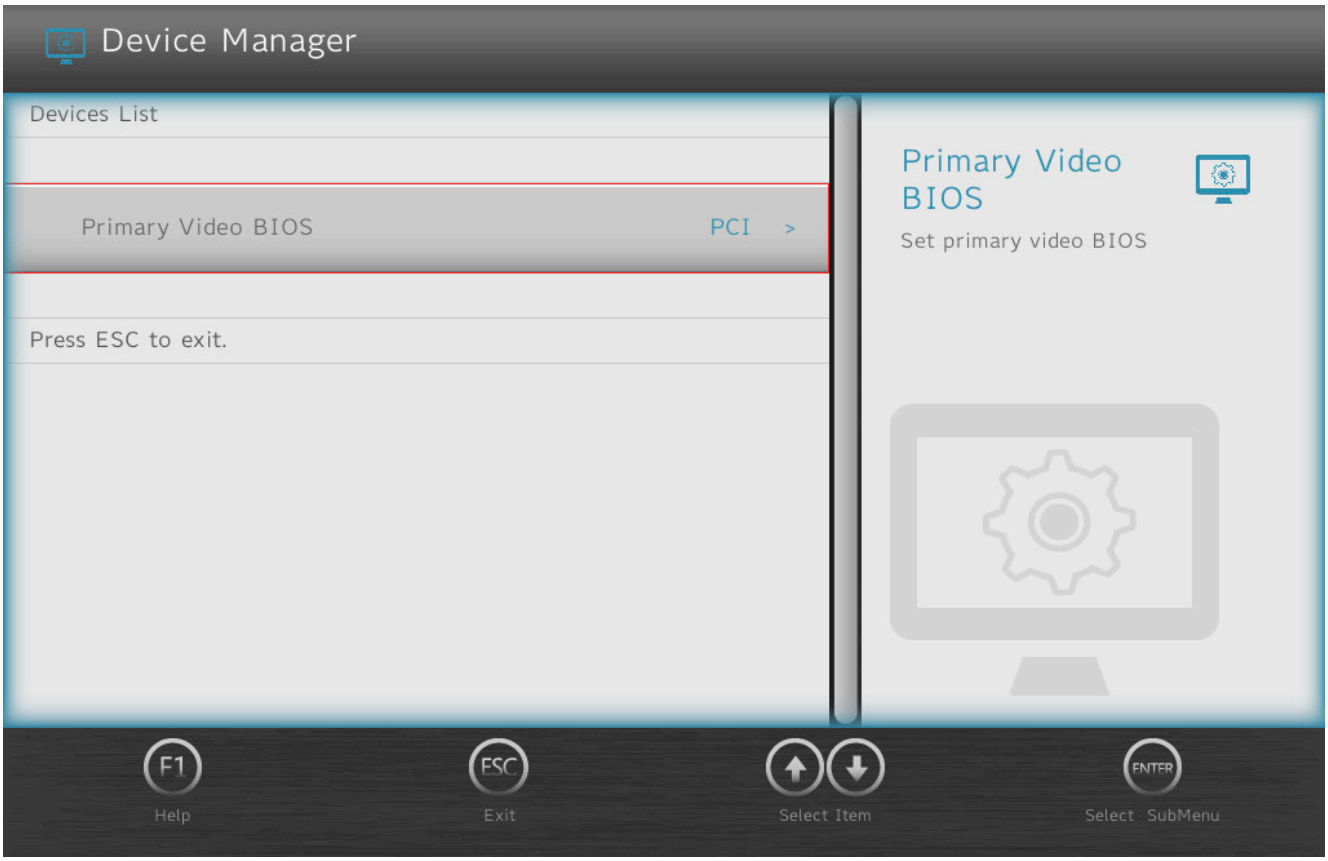
Table 7: Boot menu

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	

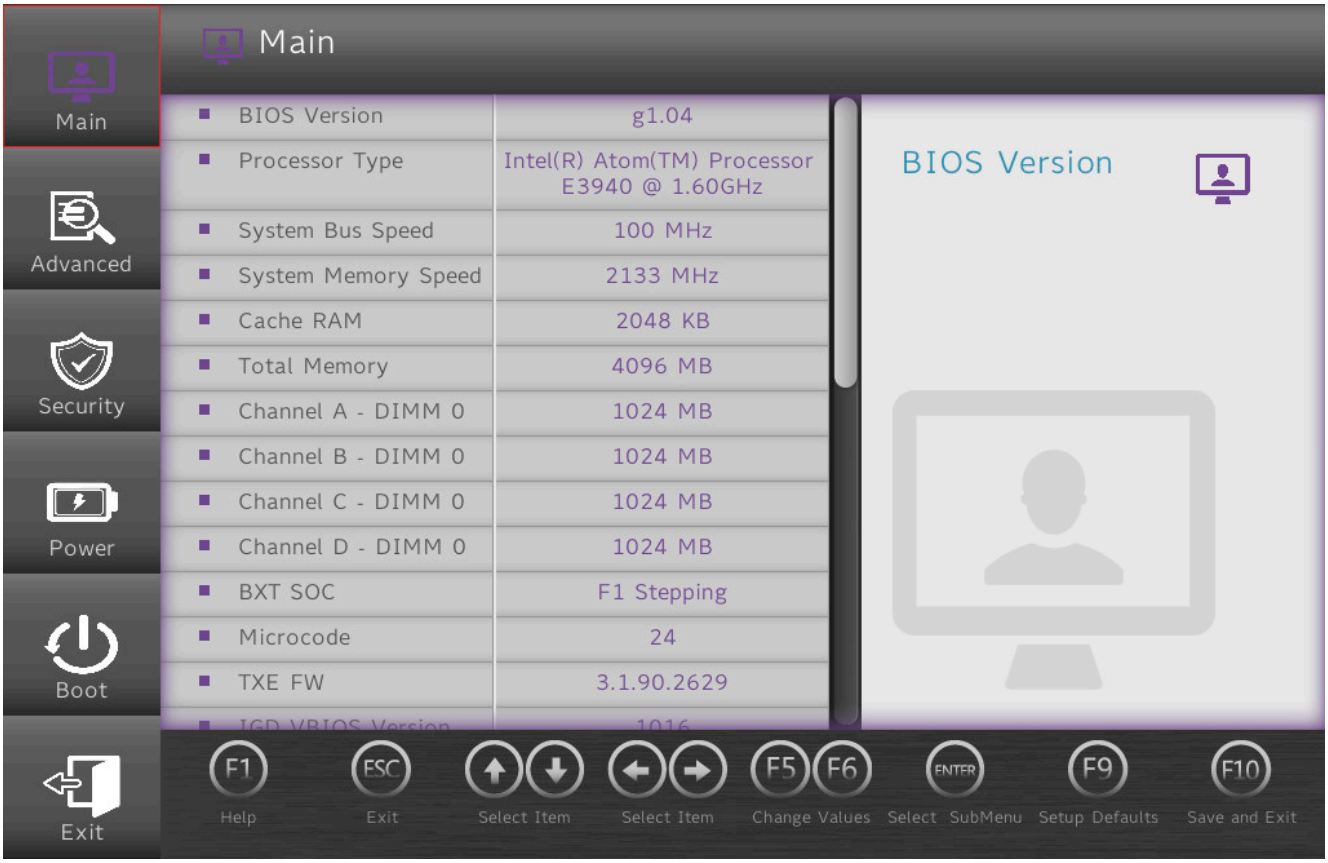
7.1.6 Setup utility

Settings can be made in the boot menu under **Setup utility**.

Submenu	Setting options	Description
Main	Enter	Basic system information is displayed and the system time can be set here.
Advanced	Enter	Changes to system settings can be made here.
Security	Enter	Changes to the Trusted Platform Module can be made here. Passwords for storage media can be created and managed here.
Power	Enter	Changes that affect the power consumption of the system can be made here.
Boot	Enter	Opens submenu "Boot" on page 77 Changes to the boot modes and boot sequence can be made here.
Exit	Enter	Opens submenu "Exit" on page 80 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 8: 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 9: Main

7.1.6.2 Advanced

BIOS parameter	Setting options	Description
OEM features	Enter	Opens submenu "OEM features" on page 66
Graphics configuration	Enter	Opens submenu "Graphics configuration" on page 69
IO configuration	Enter	Opens submenu "IO configuration" on page 70
Security configuration	Enter	Opens submenu "Security configuration" on page 73
ACPI settings	Enter	Opens submenu "ACPI settings" on page 73

Table 10: 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 Enabling is necessary for real-time operating systems.
	Enabled	
Hypervisor environment	***Disabled***	Disables/Enables the hypervisor environment Enabling is necessary for hypervisor operation. Parameters "VT-d" and "Intel Virtualization Technology" on page 75 are enabled and cannot be changed during hypervisor operation.
	Enabled	
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 66
H2OUVE	Enter	Opens submenu "H2OUVE" on page 66
Baseboard	Enter	Opens submenu "Baseboard" on page 67
Panel settings	Enter	Opens submenu "Panel settings" on page 67
SSD monitoring service	Enter	Opens submenu "SSD monitoring services" on page 67
Custom boot logo	Enter	Opens submenu "Custom boot logo" on page 67

Table 11: Advanced - OEM features

7.1.6.2.1.1 Super IO

BIOS parameter	Setting options	Description
MTCX interrupt	***Automatic***	Disables the MTCX interrupt or assigns it automatically if permitted by the system configuration (at least 1 IRQ free).
	Disable	

Table 12: 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 13: 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
ETH3 MAC address	-	Reserved
Power on cycles[1)]	-	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]
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]

Table 14: Advanced - OEM features - Baseboard

1) Each start/restart increases the value by 1.

7.1.6.2.1.4 Panel settings

BIOS parameter	Setting options	Description
Backlight on cycles[1)]	-	Displays the backlight-on cycles of the panel
Backlight on hours	-	Displays the operating time of the backlight [h] for the panel
Brightness	INT Default: ***100***	Screen brightness of the panel [%] Range: 0 to 100 Resolution: 1%

Table 15: Advanced - OEM features - Panel settings

1) Each time the backlight is switched on increases the value by 1.

7.1.6.2.1.5 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[1)] status	-	Displays the S.M.A.R.T. status of the CFast card
WAF[2)]	-	Displays the WAF of the CFast card
Average erase count	-	Displays the average number of erase operations on a block of the CFast card
Remaining life	-	Displays the remaining service life of the CFast card [%]

Table 16: Advanced - OEM features - SSD monitoring service

1) Self-Monitoring, Analysis and Reporting Technology
2) Write amplification factor

7.1.6.2.1.6 Custom boot logo

BIOS parameter	Setting options	Description
Custom boot logo	-	Displays whether a user-specific logo is being used
Add custom boot logo	Enter	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[1)]

Table 17: Advanced - OEM Features - Custom boot logo

1) If no customized boot logo is available, the B&R boot logo is used by default.

7.1.6.2.1.7 Backup settings

BIOS parameter	Setting options	Description
Backup settings	***Disabled***	Disables/Enables backup of BIOS settings during the next reboot Folder "XPCSET" (*./XPCSET/*) must exist in the root directory of the target medium as the target for the backup.
	Enabled	
Recover settings	***Disabled***	Disables/Enables restoring BIOS settings from a backup during the next reboot The backup file must be stored in folder "XPCSET" (*./XPCSET/*) in the root directory of the target medium.
	Enabled	

Table 18: 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 Rotation takes place clockwise.
	90° 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) Permits the GPU to go into standby.
	Enabled	
GTT[1)] 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[2)] total Gfx mem	128M	Selects the memory size [MB] that can be used by the IDG. MAX uses the entire available main memory.
	256M	
	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 19: 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 70
SATA configuration	Enter	Opens submenu "SATA configuration" on page 71
USB configuration	Enter	Opens submenu "USB configuration" on page 72
Miscellaneous configuration	Enter	Opens submenu "Miscellaneous configuration" on page 72

Table 20: 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 1 (NVMe)	Enter	Opens submenu "PCI Express root port n" on page 70[1]
PCI Express root port 3 (ETH2)	Enter	
PCI Express root port 4 (ETH1)	Enter	
PCI Express root port 5 (ETH3)	Enter	Reserved

Table 21: Advanced - IO configuration - PCI Express configuration

1) Each parameter opens its own menu. Since the included options are the same, schematic menu "PCI Express root port *n*" is described here.

PCI Express root port *n*

BIOS parameter		Setting options		Description
PCI Express root port *n*[1]		***Auto***		Disables/Enables PCI Express root port *n* manually or automatically In mode "Auto", unallocated interfaces are automatically disabled and allocated interfaces are enabled.
		Disabled		
		Enabled		
ASPM		***Auto***		Selects PCIe Active State 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		
	ACS	Disabled		Disables/Enables access control services extended capabilities
		Enabled		
	URR	***Disabled***		Disables/Enables unsupported request reporting Notification of unsupported requests
		Enabled		
	FER	***Disabled***		Disables/Enables fatal error reporting Notification of fatal errors[2]
		Enabled		
	NFER	***Disabled***		Disables/Enables non-fatal error reporting Notification of non-fatal errors[2]
		Enabled		
	CER	***Disabled***		Disable/Enable correctable error reporting Notification of correctable errors[2]
		Enabled		
	CTO	***Disabled***		Disables/Enables PCIe completion timer timeout
		Enabled		
	SEFE	***Disabled***		Disables/Enables system error on fatal error[3]
		Enabled		
	SENFE	***Disabled***		Disables/Enables system error on non-fatal error[3]
		Enabled		
	SECE	***Disabled***		Disables/Enables system error on correctable error[3]
		Enabled		
	PME SCI	Disabled		Disables/Enables system control interrupt on a power management event
		Enabled		
	Hot plug	***Disabled***		Disables/Enables hot plugging
		Enabled		
PCIe speed		***Auto***	-	Selects the PCIe transfer rate [gigatransfers per second (GT/s)] automatically or manually
		Gen1	Gen1: Max. 2.5 GT/s	
		Gen2	Gen2: Max. 5.0 GT/s	
		Gen3	Gen3: Max. 8.0 GT/s	
	Transmitter half swing	***Disabled***		Disables/Enables transmitter half-swing Signals are transferred with a half-swing.
		Enabled		

Table 22: Advanced - PCH-IO configuration - PCI Express root port *n*

BIOS parameter			Setting options	Description
Extra bus reserved			INT Default: ***0***	Defines the extra bus reserved for bridges after this root bridge Range: 0 to 7
Reserved memory			INT Default: ***10***	Defines reserved memory [MB] for this bridge Range: 0 to 20
Reserved I/O			INT Default: ***4***	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 override		***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 multiplier	1 ns	Defines the snoop latency multiplier value [ns]
			32 ns	
			1024 ns	
			32768 ns	
			1048576 ns	
			33554432 ns	
	Non-snoop latency override		***Auto***	Disables the non-snoop latency override or selects manual or automatic mode
			Disabled	
			Manual	
		Non-snoop latency value	INT Default: ***60***	Defines the non-snoop latency value Range: 0 to 1023
		Non-snoop latency multiplier	1 ns	Defines the non-snoop latency multiplier value [ns]
			32 ns	
			1024 ns	
			32768 ns	
			1048576 ns	
			33554432 ns	
PCIE1 LTR lock			***Disabled***	Disables/Enables the PCIe1 LTR lock function
			Enabled	
PCIe selectable de-emphasis			Disabled	Disables/Enables PCIe selectable de-emphasis
			Enabled	

Table 22: Advanced - PCH-IO configuration - PCI Express root port *n*

1) PCI Express root port *n* must be enabled in order to make further configurations.
2) 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 the test function This is only used for control measurements.	
		Enabled		
Aggressive LPM support		***Disabled***	Disables/Enables Aggressive Link Power Management The host controller can change to a low-power state in the idle phase of the SATA device.	
		Enabled		
	SATA port 0	-	Displays the name and capacity of the SATA device	
	Software preserve	-	Displays support for 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 configuration	***Disabled***	Disables/Enables device sleep idle timeout	
		Enabled		
	DITO value	INT Default: ***625***	Defines the DITO value [ms] Range: 0 to 1024	
	DM value	INT Default: ***15***	Defines the DITO multiplier Range: 0 to 15	

Table 23: Advanced - IO configuration - SATA configuration

7.1.6.2.3.3 USB configuration

BIOS parameter		Setting options	Description
USB BIOS support		Disabled	Disables USB support in BIOS or enables USB support (UEFI only) or USB support (UEFI and Legacy Mode)
		Enabled	
		UEFI only	
XHCI disable compliance mode		***False***	Selects XHCI disable compliance mode
		True	
USB port disable override		***Disabled***	Manually disables/enables USB ports or enables all ports Disable this parameter to enable all ports, or enable it to disable/enable each port manually.
		Select per-port	
	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	

Table 24: 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 gating	
	Enabled		
State after G3	S0 state	Working	Selects the state after G3 Defines how to proceed after "mechanical off" (G3). S0/S5 after G3 or restores the state before G3
	S5 state	Soft off	
	Last state	State previous to G3	
BIOS lock	Disabled	Disables/Enables the PCH BIOS lock function The BIOS lock function must be enabled for SMM[1].	
	Enabled		
RTC lock	Disabled	Disables/Enables lock bytes 0x38h 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 keypad during booting Enables BIOS input via the numeric keypad of a keyboard.	
	On		
Real time option	***RT Disabled***	Disables Intel real-time option or enables it with IDI agent real-time mask bits set (RT enabled, agent IDI1) or not set (RT enabled, agent disabled)	
	RT enabled, agent IDI1		
	RT enabled, agent disabled		
Shell startup script delay	INT Default: ***3***	Defines the shell startup script delay time [s] Range: 0 to 10	
Block boot fail pop-up	***Disabled***	Enables/Disables the boot-fail pop-up (e.g. for UEFI PXE). The device tries to boot from the next boot device automatically.	
	Enabled		

Table 25: Advanced - IO configuration - Miscellaneous configuration

1) System Management Mode

7.1.6.2.4 Security configuration

BIOS parameter	Setting options	Description
TXE[1] 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 fTPM: Firmware/CPU TPM dTPM: Dedicated/Hardware TPM
	dTPM	

Table 26: 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 73
FACP - RTC S4 wakeup	Disabled	Disables/Enables S4 wakeup via RTC
	Enabled	
APIC[1] - IO APIC mode	Disabled	Disables/Enables IO APIC mode
	Enabled	

Table 27: 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 ASPM[1]	Disabled	Disables native ASPM (BIOS controls ASPM) or enables it (operating system controls ASPM)
	Enabled	
Low power S0 idle capability	Disabled	Disables/Enables low power S0 idle capability
	Enabled	

Table 28: Advanced - ACPI settings - ACPI settings

1) Active State Power Management

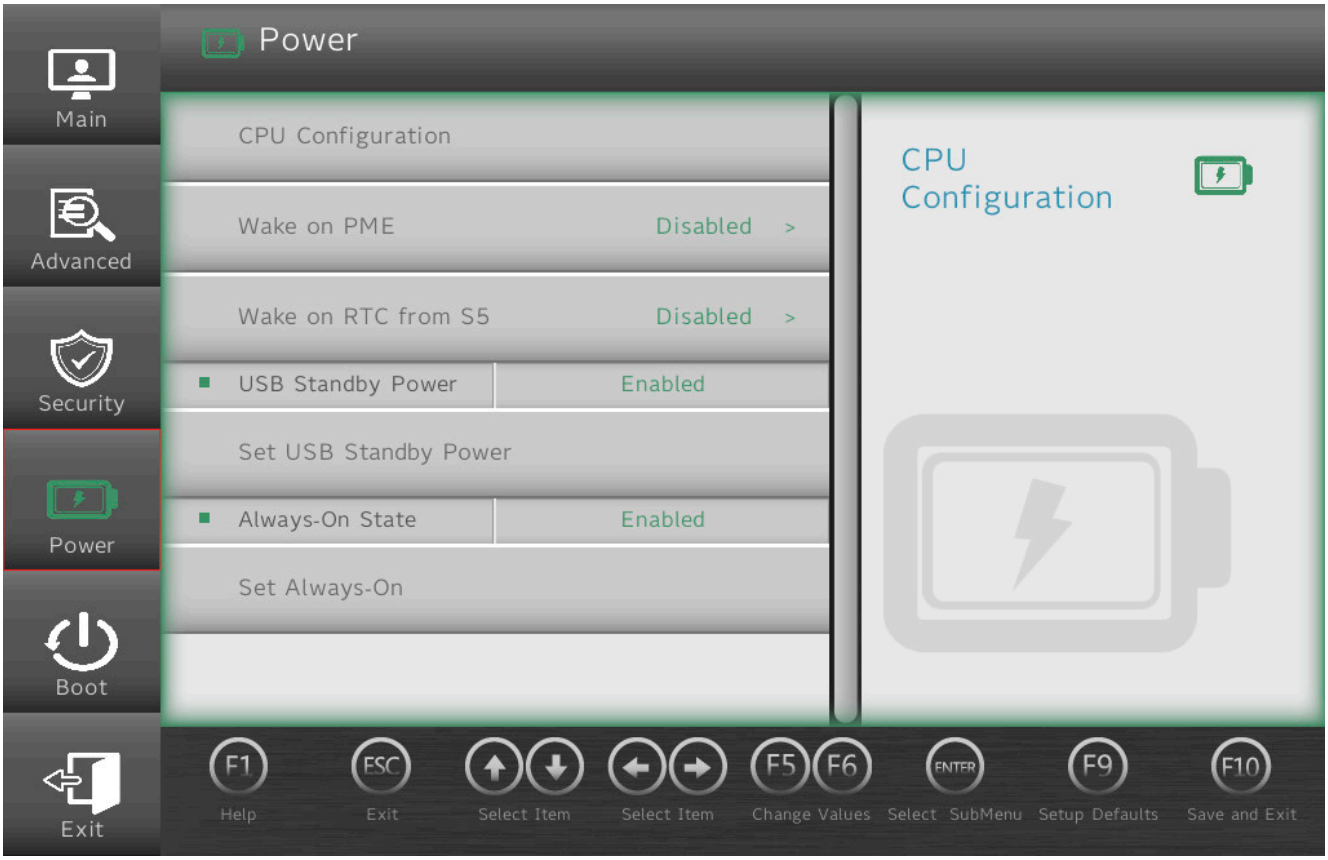
7.1.6.3 Security

BIOS parameter	Setting options	Description
Current TPM[1)] 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 29: Security

1) Trusted Platform Module

7.1.6.4 Power



BIOS parameter		Setting options	Description
CPU configuration		Enter	Opens submenu "CPU configuration" on page 75
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 or by operating system utility The configuration for *By OS Utility* must be made in the operating system.
		By every day	
		By day of month	
		By sleep time	
		By OS utility	
	Wake on S5 hour	INT	Defines the time for wake from S5 *By Every Day* or *By Day of Month* [hh:mm:ss] [hh] range: 0 to 23 Range [mm]: 0 to 59 Range [ss]: 0 to 59
	Wake on S5 minute	INT	
	Wake on S5 seconds	INT	
	Day of month	INT Default: ***1***	Defines the time for wake from S5 *By Day of Month* [d @ hh:mm:ss] Range [d]: 1 to 31
	Wake from S5 after (seconds)	INT Default: ***5***	Defines the timer for waking from S5 *By Sleep Time* [s] 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		-	Displays the always-on state
Set always-on		Disabled	Disables/Enables or does not set always-on
		Enabled	

Table 30: 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 CPU utilization is reduced by additional idle cycles to control the CPU temperature.
	Enabled	
AES-NI	Disabled	Disables/Enables the Advanced Encryption Standard
	Enabled	

Table 31: 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 If this parameter is disabled, all processor cores are used. Enabling makes it possible to configure individual processor cores.
	Enabled	
Core 0	-	This processor core must always be active.
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 system and hardware
	Disabled	
	Enabled	
CPU power management	Enter	Opens submenu "CPU power management" on page 76

Table 31: Power - CPU configuration

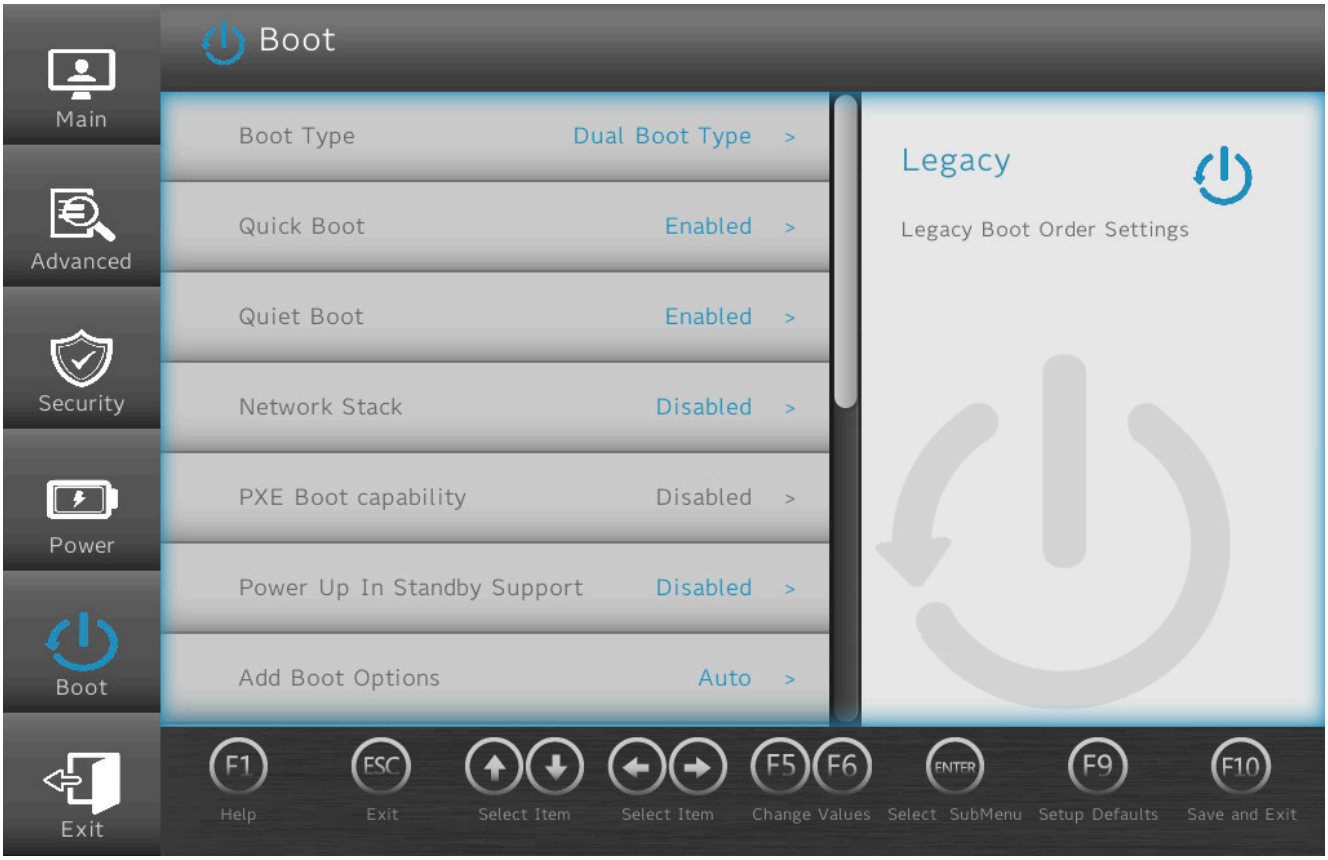
7.1.6.4.1.1 CPU power management

BIOS parameter		Setting options		Description
Boot performance mode		***Max performance***		Selects the performance mode for optimized performance or energy optimization BIOS starts in the selected mode and transfers this configuration to the operating system.
		Max battery		
Intel SpeedStep		Disabled		Disables/Enables Intel SpeedStep Enable if more than 2 frequency ranges should be supported.
		Enabled		
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 Enabling makes it possible to undershoot the base clock frequency to control the processor core temperature.
		Enabled		
	Power limit 1 power	***Auto***		Selects the value for PL1 [W] or defines it automatically based on the processor Range: 6 to 25
		(Various)		
	Power limit 1 time window	***Auto***		Selects the PL1 time window [s] or defines it automatically based on the processor Range: 1 to 128
		(Various)		
C-states		***Disabled***		Disables/Enables processor C-states
		Enabled		
	Enhanced C-states	Disabled		Disables/Enables enhanced C-states (C1E) Enabling allows the CPU to switch to the lowest speed if all processor cores change to a C-state.
		Enabled		
	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), no limiting or a preset value (fused value)
		Core C10	C9 optimized VR[1] off	
		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 Can be used to prevent unnecessary changing of C-states
		C1	Halt	
	C-state un-demotion	Disabled	-	Disables/Enables C-state un-demotion
		C1	Halt	
T-states		***Disabled***		Disables/Enables T-states
		Enabled		

Table 32: 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 In dual boot mode, both UEFI and Legacy boot are possible and the CSM is enabled. In Legacy boot mode, the CSM is enabled. In UEFI boot mode, the CSM is disabled.
	Legacy boot type	
	UEFI boot type	
Quick boot	Disabled	Disables/Enables quick boot If quick boot is enabled, certain tests are not performed so the boot procedure is faster.
	Enabled	
Quiet boot	Disabled	Disables/Enables booting in text mode
	Enabled	
Network stack	***Disabled***	Disables/Enables the network stack Enabling makes ETH booting possible.
	Enabled	
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 devices Manual mode is not fully UEFI compatible.
	First	
	Manual	
	Last	
ACPI selection	Acpi3.0	Selects the ACPI mode
	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 Enable to boot EFI devices before legacy devices. Disable to boot legacy devices before EFI devices.
	Enabled	
Timeout	INT Default: ***0***	Delay time until the boot list is processed [s] Range: 0 to 99

Table 33: Boot

BIOS parameter	Setting options	Description
Automatic failover	Disabled	Disables/Enables automatic failover
	Enabled	
EFI	Enter	Opens submenu "EFI" on page 78
Legacy	Enter	Opens submenu "Legacy" on page 79

Table 33: Boot

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 78
1st device	***CFast***	Selects this device as first in the boot sequence
	NVMe	
	USB device	
	Internal EFI shell	
	ETH1 IPv4	
	ETH1 IPv6	
	ETH2 IPv4	
	ETH2 IPv6	
	Other	
	Disabled	
2nd device[1)]	***NVMe***	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 34: Boot - EFI

1) Starting with the *2nd device*, only the respective default values are specified.

7.1.6.5.1.1 EFI

BIOS parameter	Setting options	Description
EFI	Enter, then: ► Keyboard: F5/F6 ► Touch screen: Move items at the gray arrows	Defines the boot sequence

Table 35: Boot - EFI - EFI

7.1.6.5.2 Legacy

BIOS parameter	Setting options	Description
boot menu	***Normal***	Selects the boot sequence type
	Advanced	
Boot type order	Enter	
Other	Enter	Opens submenu[1)]
Floppy disk	Enter	
Hard disk drive	Enter	Opens submenu "Hard disk drive" on page 79
CD/DVD-ROM drive	Enter	Opens submenu[1)]
USB	Enter	
Legacy	Enter, then: ► Keyboard: F5/F6 ► Touch screen: Move items at the gray arrows	Defines the boot sequence

Table 36: Boot - Legacy

1) 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: ► Keyboard: F5/F6 ► Touch screen: Move items at the gray arrows	Defines the boot sequence

Table 37: 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 79

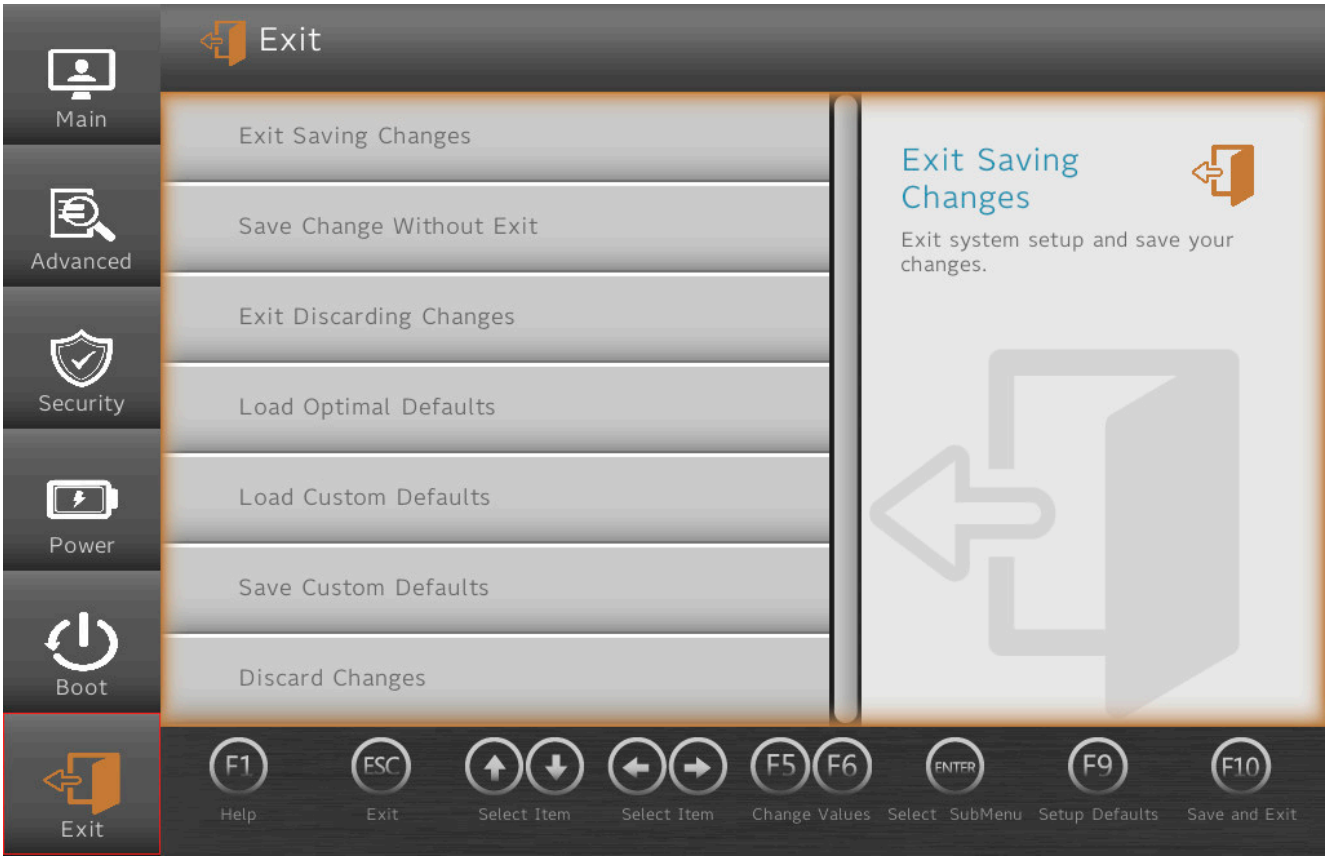
Table 38: Boot - Legacy - Hard disk drive

Hard disk drive

BIOS parameter	Setting options	Description
Hard disk drive	Enter, then: ► Keyboard: F5/F6 ► Touch screen: Move items at the gray arrows	Defines the boot sequence

Table 39: 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 40: Exit

7.2 Upgrade information

Warning!

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

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 PPC1200, open BIOS Setup with **[Esc]**, **[Del]** or **[F2]**.
2. The installed versions are displayed under **Setup utility / Advanced / OEM features**, see figure (symbolic).

7.2.2 PC firmware upgrade

With *Firmware upgrade (MTCX)*, it is possible to update the firmware depending on the variant of the Panel PC system.

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

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/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 www.br-automation.com.

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 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

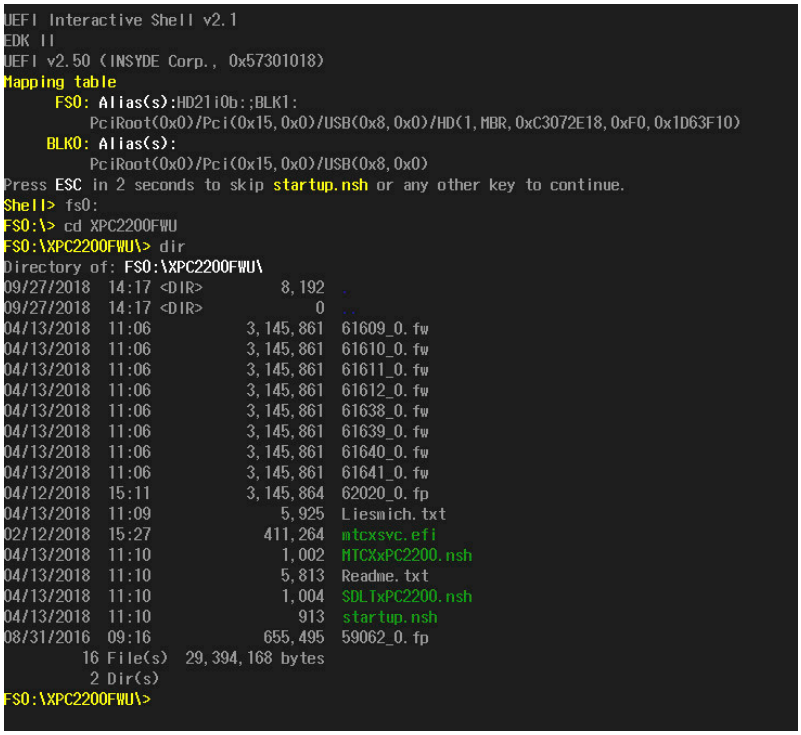
With the PPC1200, it is possible to perform updates automatically.

For this, parameter **Automatic firmware update** must be enabled in BIOS (see "Advanced - OEM features" on page 66).

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 "XPC1200FWU" 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.



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
- B&R Linux 10

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 (www.br-automation.com).**

7.4.1.2 Order data

Order number	Short description	Figure
	Windows 10 IoT Enterprise 2019 LTSC	
5SWW10.0965-MUL	Windows 10 IoT Enterprise 2019 LTSC - 64-bit - Entry - Multilingual - PPC1200 (UEFI boot) - License - Only available with a new device	

7.4.1.3 Overview

Order number	5SWW10.0965-MUL
Operating system	
Target systems	
Industrial PC	PPC1200
Processor	Atom
Chipset	Apollo Lake
License class	Entry
Architecture	64-bit (UEFI boot)
Language	Multilingual
Minimum size of RAM	2 GB 1)
Minimum size of data storage medium	20 GB 2)

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.

7.4.1.4 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	Configurable (default: disabled by UWF)
SuperFetch	
File indexing service	
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.

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 installed in UEFI mode.

The data storage medium containing the Windows partition is formatted as a GUID Partition Table (GPT) file system. 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.

7.4.1.6 Drivers

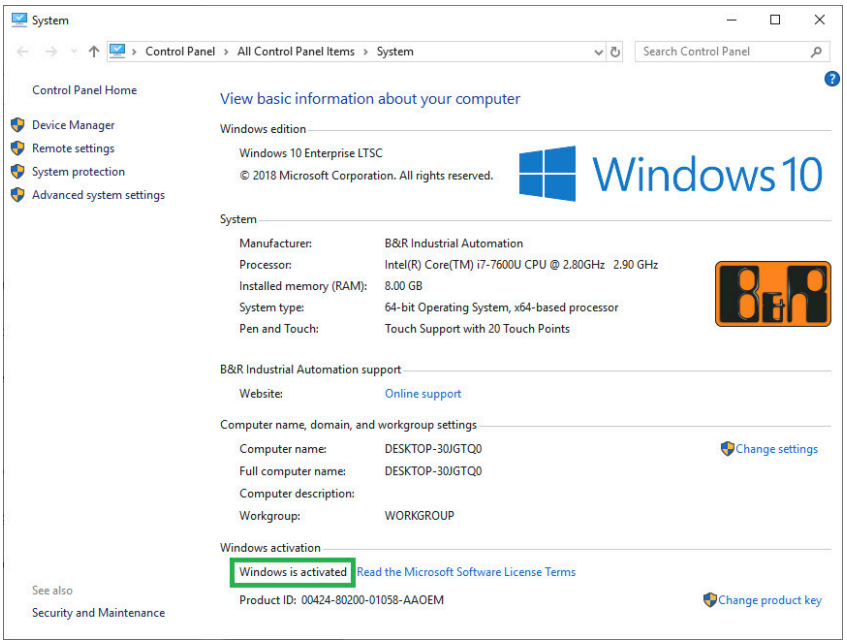
The operating system contains all drivers necessary for operation. If an older driver version is installed, the latest version can be downloaded and installed from the B&R website (www.br-automation.com). It is important to ensure that "Unified Write Filter (UWF)" is disabled.

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. 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 B&R Linux 10 (GNU/Linux)

7.4.2.1 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 (www.br-automation.com).**

7.4.2.2 Order data

Order number	Short description	Figure
	B&R Linux 10	
5SWLIN.0865-MUL	B&R Linux 10 - 64-bit - Multilingual - PPC1200 (UEFI boot) - Installation - Only available with a new device	
	Optional accessories	
	CFast cards	
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	

7.4.2.3 Overview

Order number	5SWLIN.0865-MUL
Operating system	
Target systems	
Industrial PC	PPC1200
Chipset	Apollo Lake
Architecture	64-bit (UEFI boot)
Language	Multilingual
Minimum size of RAM	2 GB
Minimum size of data storage medium	8 GB

7.4.2.4 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 (www.br-automation.com).

7.4.2.5 Installation

B&R Linux 10 is preinstalled at B&R on the desired data storage medium (e.g. CFast card).

7.4.2.6 Drivers

The operating system contains all drivers necessary for operation.

The latest versions of the B&R specific drivers can be downloaded and installed from the B&R website (www.br-automation.com).

7.5 Automation Device Interface (ADI)

The Automation Device Interface (ADI) enables access to specific functions of B&R devices.

7.5.1 ADI driver

7.5.1.1 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 (www.br-automation.com). If a more recent version is available, it can be installed later.

Information:

The *Write filter* must be disabled during installation.

7.5.1.2 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.

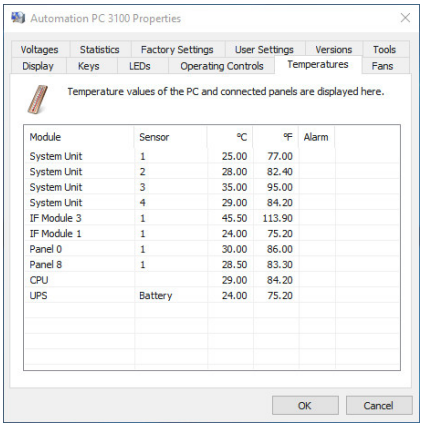


Figure 4: ADI Control Center screenshots - Examples

7.5.1.2.1 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 or calibrating control devices (e.g. key switch, handwheel, joystick, potentiometer)
- Reading out temperatures, fan speeds, switch positions and statistical data
- Reading out operating hours (power-on hours)
- Reading user settings and factory settings
- Reading out software versions
- Updating and backing up BIOS and 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.

7.5.2 ADI Development Kit

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

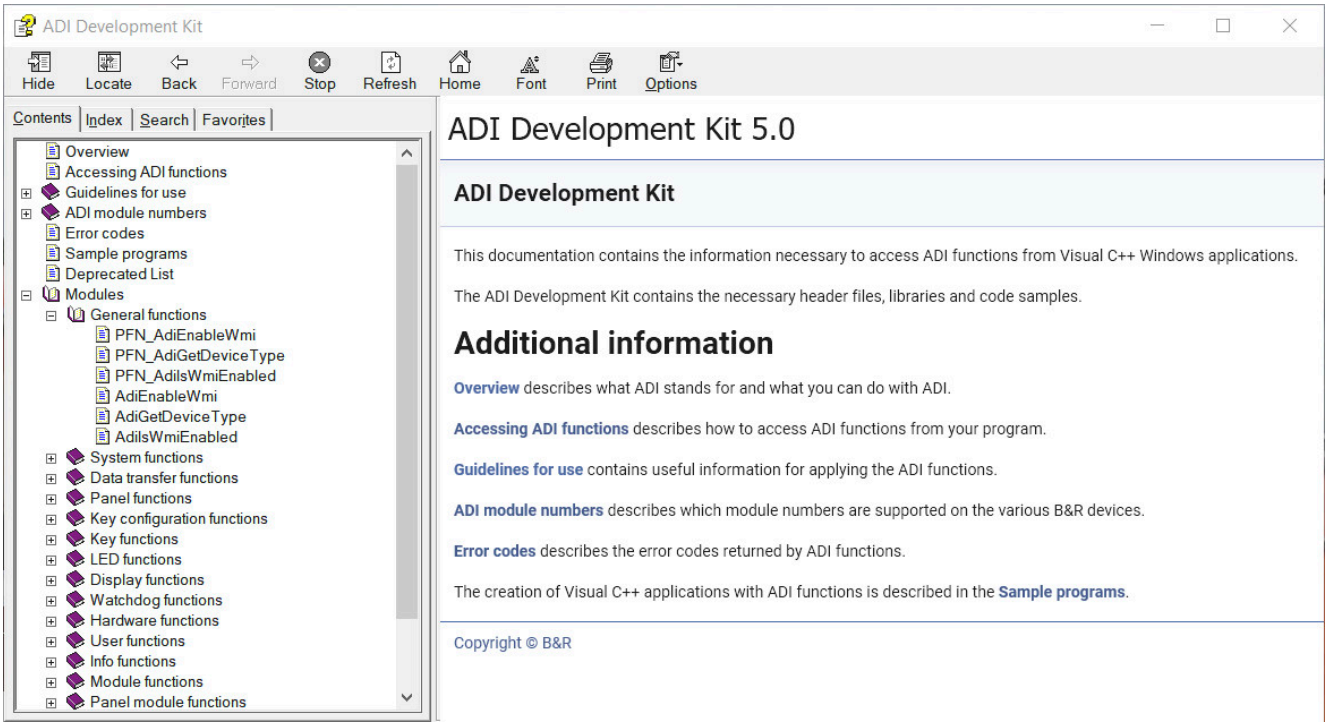


Figure 5: ADI Development Kit screenshots

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 (www.br-automation.com).

7.5.3 ADI .NET SDK

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

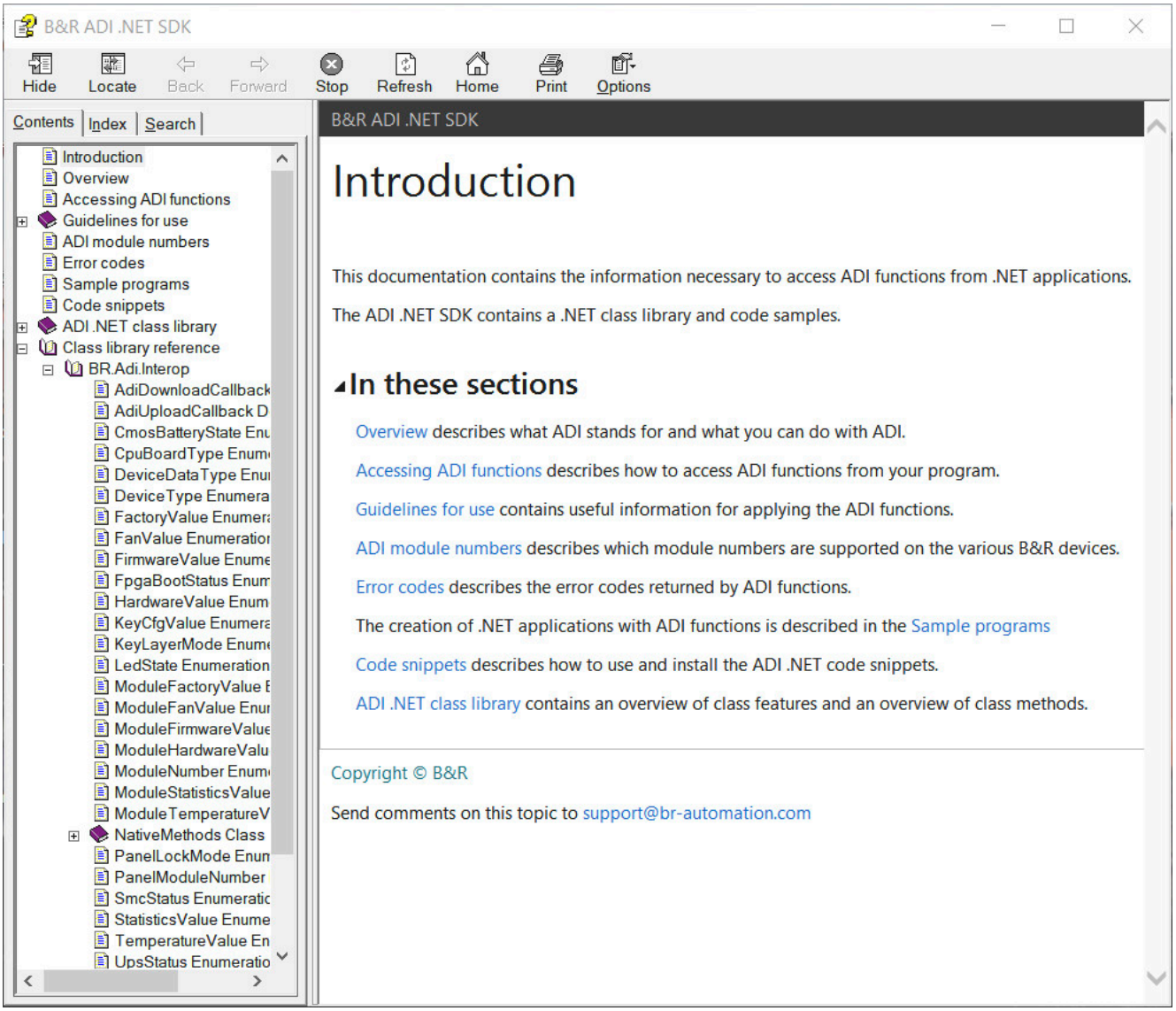


Figure 6: ADI .NET SDK screenshots

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.

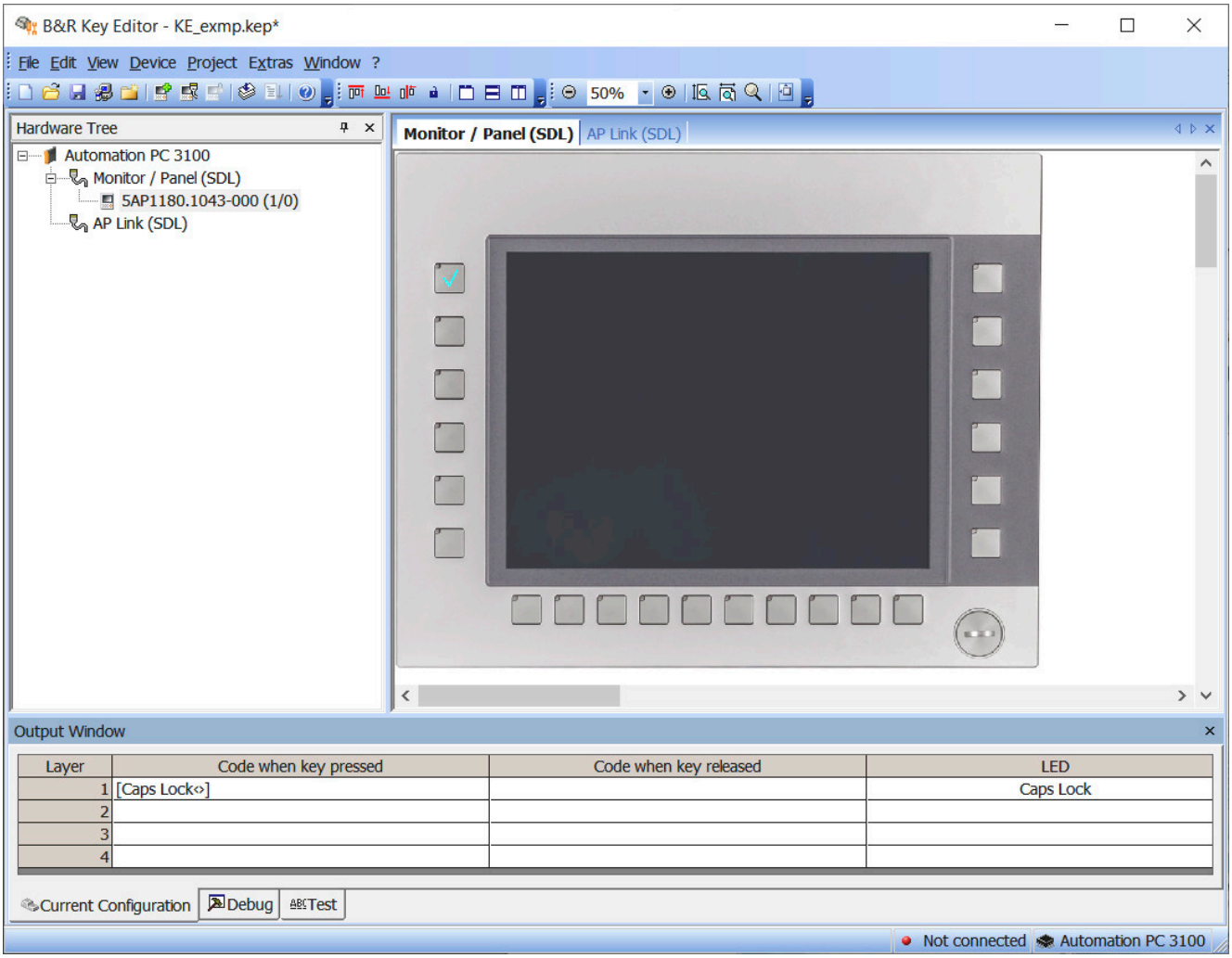
The appropriate ADI driver must be installed for the device. The ADI driver is already included in B&R images of embedded operating systems.

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 (www.br-automation.com).

7.6 Key Editor

A frequently occurring requirement for panels is adapting function keys and LEDs to the application software. With the Key Editor, individual adaptation to the application is possible quickly and easily.



Features:

- Configuration of normal keys like on a keyboard (A, B, C, etc.)
- Keyboard shortcuts (CTRL+C, SHIFT+DEL, etc.) on one key
- Special key functions (change brightness, etc.)
- Assignment of LED functions (HDD access, power, etc.)
- 4 assignments possible per key (using layers)
- Configuration of the panel lock time when connecting several Automation Panel devices to Automation PCs and Panel PCs

For detailed instructions about configuring keys and LEDs and installing the key configuration on the target system, see the help documentation for the Key Editor. The Key Editor and help documentation can be downloaded at no cost from the Downloads section of the B&R website (www.br-automation.com).

7.7 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.

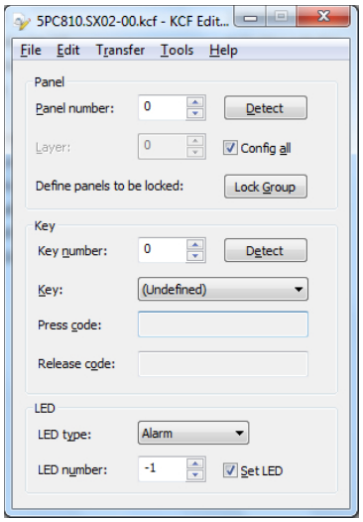


Figure 7: B&R KCF Editor version 1.0 screenshot

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).

7.8 HMI Service Center

7.8.1 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 (www.br-automation.com).

7.8.2 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 APC2200/PPC2200 - For APC3100/PPC3100 - For APC mobile - For AP800/AP900 - For AP9x3/AP9xD - For AP1000/AP5000	

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 the CFast card

Caution!

The CFast card is only permitted to be replaced in a voltage-free state.

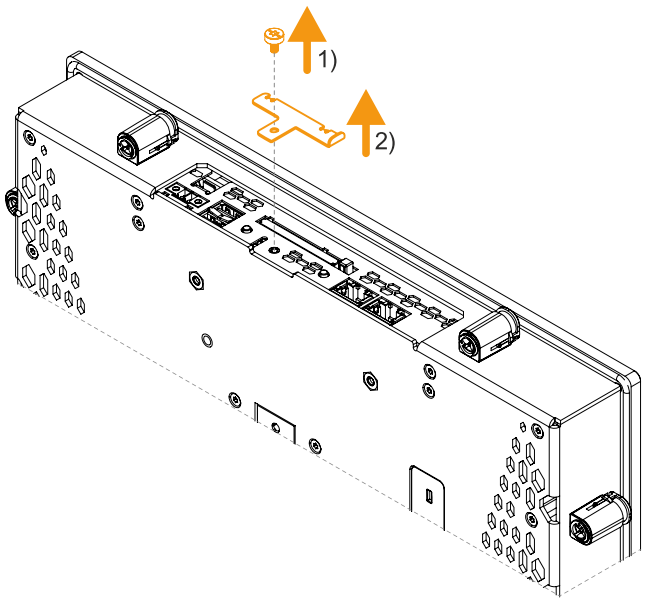
Improper handling of the ejection lever (e.g. applying a large amount of force) can result in a defect in the ejector mechanism.

Required tools:

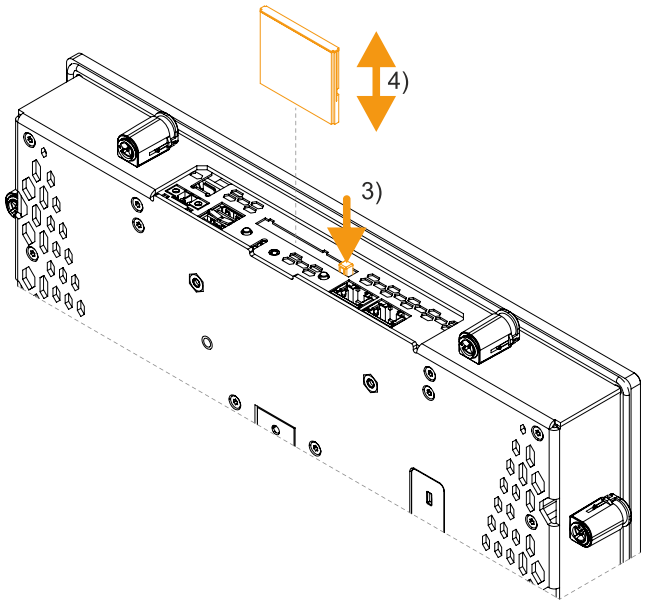
- Torx screwdriver (T10)

Procedure

1. Disconnect the power supply cable to the B&R industrial PC (disconnect the power supply).
2. Loosen the Torx screw (T10) of the cover (1).
3. Remove the cover (2).



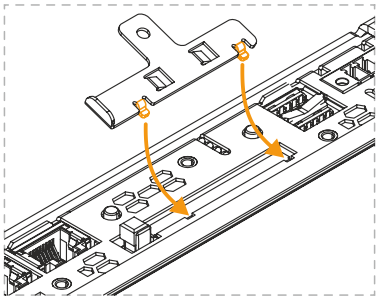
4. Press the ejector next to the card slot (3).



✓ The card is ejected and can be replaced (4).

8.1.1 After changing the CFast card

1. After replacing, re-secure the cover of the CFast card slot. The cover must be hooked into the recesses of the housing before it is screwed on. The maximum tightening torque of the Torx 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 5ACCRHMI.0018-000. The battery is permanently installed and cannot be replaced. The entire battery compartment must always be replaced.

The use of any other battery may present a risk of fire or explosion.

The battery can explode if handled improperly. Do not recharge, disassemble or dispose of the battery in fire.

Information:

The self-discharge time when changing the battery is approx. 2 minutes.

The lithium battery ensures the retention of the internal real-time clock (RTC) and CMOS data.

Note the following when changing the battery:

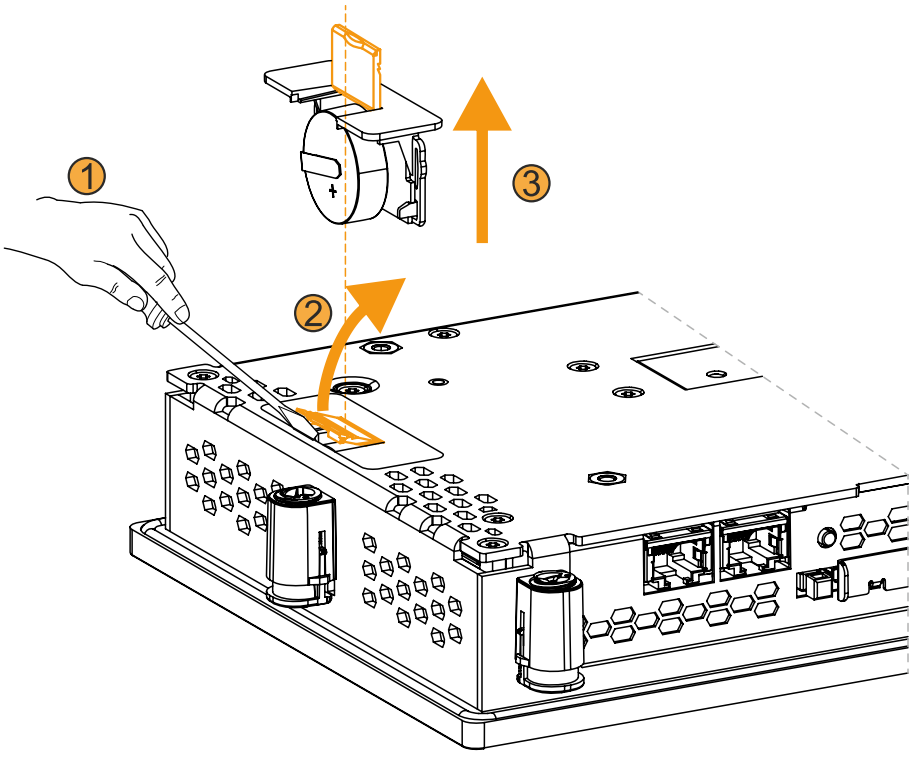
- The product design allows the battery to be changed when the PLC is in a voltage-free state as well as when the B&R device is switched on. In some countries, changing under operating voltage is not permitted, however; local regulations must be observed!
- The battery is only permitted to be changed 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.

Required tools

- Flat-blade screwdriver

Procedure

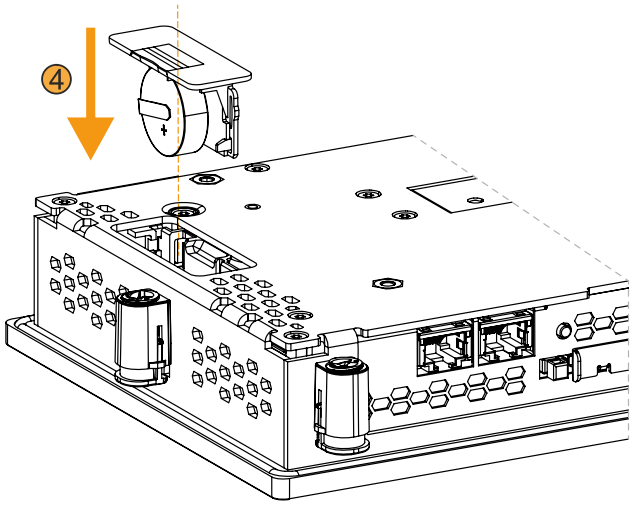
1. Disconnect the power supply cable to the B&R industrial PC (disconnect the power cable).
2. Carry out electrostatic discharge on the housing or at the ground connection.
3. Carefully open the tab of the battery holder with a flat-blade screwdriver (1) and fully straighten the tab until it forms a 90° angle with the device (2).
4. Pull the battery holder out of the device by the tab (3).



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

Note:

When reinserting, pay attention to the polarity.



6. Reapply power to the B&R industrial PC (connect the power cable).
7. Reset the date and time in BIOS.

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

Warning!

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

8.3 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%.

8.5.2 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 (www.br-automation.com).

9 Accessories

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

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

9.1 0TB6102 2-pin power supply connector

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

9.1.1 Order data

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

9.1.2 Technical data

Information:

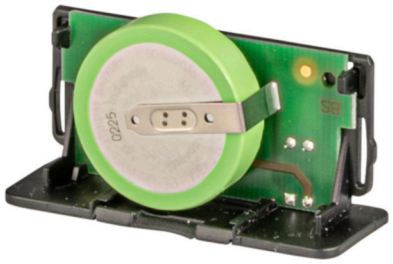
The following specified characteristic data, features and limit values are only valid for these individual components and may differ from those of the complete system. The data specified for the complete system applies to the complete system in which this individual component is used, for example.

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

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

9.2 Replacement parts

The following replacement parts are available for the B&R Panel PC 1200.

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

9.2.1 5ACCRHMI.0018-000 - Technical data

> **Information:**
>
> **The following specified characteristic data, features and limit values are only valid for this accessory and may differ from those of the complete system. The data specified for the complete system applies to the complete system in which this accessory is installed, for example.**

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

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

10 International and national certifications

10.1 Directives and declarations

10.1.1 CE marking

All directives applicable to the respective product and their harmonized EN standards are met.

10.1.2 EMC Directive

The products meet the requirements of EU directive "Electromagnetic compatibility 2014/30/EU" and are designed for industrial applications:

EN 61131-2:2007	Programmable controllers - Part 2: Equipment requirements and tests
EN 61000-6-2:2005	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
EN 61000-6-4:2007	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments

Information:

The declarations of conformity are available on the B&R website under Declarations of conformity.

10.2 Certifications

Danger!

A complete system can only receive certification if all individual components installed and connected in it have the corresponding certifications. If an individual component is used that does not have the corresponding certification, the complete system will also not be certified.

B&R products and services comply with applicable standards. These are international standards from organizations such as ISO, IEC and CENELEC, as well as national standards from organizations such as UL, CSA, FCC, VDE, ÖVE, etc. We pay special attention to the reliability of our products in the industrial sector.

Information:

The certifications valid for the respective product are available on the website and in the user's manual under the technical data in section "Certifications" or in the associated certificates.

10.2.1 UL certification

Ind. Cont. Eq.
E115267

Products with this mark are tested by Underwriters Laboratories and listed as "industrial control equipment". The mark is valid for the USA and Canada and 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 Downloads - Certificates - UL.

When using industrial control equipment per UL 61010-1 / UL 61010-2-201, make sure that the device is classified as "open type". The prerequisite for certification or operation per UL 61010-1 / UL 61010-2-201 is therefore the installation of the device in an appropriate protective housing.

10.2.2 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).

10.2.3 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).

10.2.4 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).

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

A.1 MTCX

The MTCX controller (FPGA processor) is located on the mainboard (component of every system unit) of the PPC1200:

The MTCX is responsible for the following monitoring and control functions:

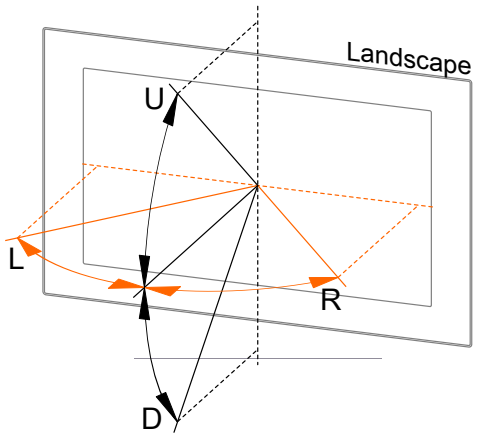
- Power failure logic and power on logic (power OK sequencing)
- Handling of watchdog (handling of NMI/reset)
- Temperature monitoring and fan control
- Handling/Coordination of keys and LEDs (matrix keyboard of B&R panels)
- Advanced desktop operation (buttons, USB forwarding)
- Daisy chain display 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)
- 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 the firmware[5)]. The version can be read in BIOS or in approved Microsoft Windows operating systems using the ADI Control Center.

5) Available for download from the Downloads section of the B&R website (www.br-automation.com).

A.2 Viewing angles

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



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

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

A.3 Projected capacitive touch (PCT)

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

Operation with gloves

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

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

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

Support for stylus pens

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

Active stylus pens are not supported!

Touch actions during cleaning

Touch actions can be triggered while cleaning the PCT touch screen. Cleaning is therefore only permitted to take place when the power is switched off, see "Cleaning" on page 98.

A.4 Surface resistance of the touchscreen (PCT)

The surface of the PCT is resistant to the following chemicals when exposed for up to 1 hour at a temperature of 25°C:

- Acetone
- Methylene chloride
- Methyl ethyl ketone
- Isopropanol
- Hexane
- Turpentine
- Mineral spirit
- Unleaded gasoline
- Diesel fuel
- Motor oil
- Gear oil
- Antifreeze
- Ammonia-based glass cleaner
- Washing agents
- Household cleaners
- Vinegar
- Coffee
- Tea
- Lubricating grease
- Cooking oil
- Salt