# Power Panel 500

## User's Manual

Version: **1.11 (May 2011)**

Order nr.: **MAPP500-ENG**

**Chapter 1: General information**

**Chapter 2: Technical data**

**Chapter 3: Commissioning**

**Chapter 4: Software**

**Chapter 5: Standards and certifications**

**Chapter 6:  Accessories**

# Chapter 7: Maintenance / Servicing

# Appendix A

# Chapter 1 • General information

## 1 Manual history

| Version | Date | Change |
|---|---|---|
| 0.10 Preliminary | 2010-11-19 | - First version |
| 0.20 Preliminary | 2010-12-15 | - Technical data for the display in the 5.7" and 7" system units corrected.<br>- Technical data for the 5PP5IO.GNAC-00 I/O board corrected.<br>- The dimension diagram "5PP520.0573-01 - Dimensions" was corrected. |
| 0.21 Preliminary | 2010-12-21 | - Specifications for the graphic memory of the CPU board corrected. |
| 0.50 Preliminary | 2010-12-23 | - The section 1 "BIOS options", on page 159 was updated. |
| 0.51 Preliminary | 2011-01-24 | - The description of the menu items " PCI Express Root Port 1", on page 191 and " PCI Express Root Port 2", on page 194 in the section 1 "BIOS options" was updated.<br>- Section 2.3 "Serial number sticker", on page 31 was updated.<br>- Section 1 "Maintenance Controller Extended (MTCX)", on page 286 was revised. |
| 1.00 | 2011-03-29 | - Sections 6 " Windows Embedded Standard 7", on page 232 and 5 " Windows Embedded Standard 2009", on page 229 were added to Chapter 4 "Software" .<br>- The ambient temperatures of the PP500 system units without keys were added to the technical data.<br>- The vibration and shock specifications and the starting current of the PP500 system units were added to the technical data.<br>- Dimension diagrams for the system units 5PP520.1214-00, 5PP552.0573-00, 5PP580.1043-00, 5PP580.1505-00, 5PP581.1043-00, 5PP581.1505-00 and 5PP582.1043-00 added.<br>- The technical data for the system units was expanded to include the attribute "Altitude" in the category "Environmental conditions" and "Protection in accordance with EN 60529" in the category "Operational conditions".<br>- The description of the Mode / Node switch in the "FF" setting was changed, see "Mode / Node switch", on page 44.<br>- The system unit 5PP520.0573-01, the section "I/O boards" and the section "I/O board insert" were removed.<br>- BIOS updated to version N0.15.<br>- The section 1.4 " orientation", on page 141 was added to Chapter 3 "Commissioning" .<br>- The info text in section 2.4.9 " Power button", on page 43 was removed. The backup BIOS will now be automatically loaded if a BIOS update error occurs.<br>- The section 8 " Automation Runtime", on page 237 in Chapter 4 "Software" was updated.<br>- The max. specified temperatures for the temperature sensors in the section 2.1.1 " Temperature sensor locations", on page 29 were added.<br>- The section 2.4.11 "Mode / Node switch", on page 44 was changed. |

Table 1: Manual history

| Version | Date | Change |
|---------|------|--------|
| 1.10 | 2011-05-19 | - The section 3 "Key and LED configuration", on page 148 was added to Chapter 3 "Commissioning" .<br>- The Chapter 5 "Standards and certifications", on page 246 was updated.<br>- BIOS updated to version N0.16.<br>- Sections 11 "B&R Key Editor", on page 244 and 9 " B&R Automation Device Interface (ADI) - Control Center", on page 239 were added to Chapter 4 "Software" .<br>- The section 7 " Windows CE", on page 235 was added to Chapter 4 "Software" .<br>- Temperature humidity diagram for the 5.7", 7", 15" system units updated.<br>- Ambient temperatures and power consumption for the system units and interface boards updated.<br>- Interface boards "5PP5IF.FCAN-00", on page 131, "5PP5IF.FX2X-00", on page 134 and "5PP5IF.FXCM-00", on page 136 updated.<br>- Lifespan of the battery in the PP500 updated.<br>- Humidity specifications for CPU boards and interface boards updated, see " Humidity specifications", on page 30.<br>- Sections 2 "Grounding concept", on page 147 and 1.5 " Circulation spacing", on page 146 were added to Chapter 3 "Commissioning" . |
| 1.11 | 2011-05-27 | - Temperature humidity diagrams corrected.<br>- Missing temperature humidity diagrams added. |

Table 1: Manual history

# 2 Safety notices

## 2.1 Intended use

Programmable logic controllers (PLCs), operating and monitoring devices (industrial PCs, Power Panels, Mobile Panels, etc.), and B&R uninterruptible power supplies have been designed, developed, and manufactured for conventional use in industry. They were not designed, developed, and manufactured for any use involving serious risks or hazards that could lead to death, injury, serious physical damage, or loss of any kind without the implementation of exceptionally stringent safety precautions. In particular, such risks and hazards include the use of these devices to monitor nuclear reactions in nuclear power plants, as well as flight control systems, flight safety, the control of mass transit systems, medical life support systems and the control of weapons systems.

## 2.2 Protection against electrostatic discharge

Electrical components that are vulnerable to electrostatic discharge (ESD) must be handled accordingly.

### 2.2.1 Packaging

- **Electrical components with a housing**
  do not require special ESD packaging, but must be handled properly (see "Electrical components with housing").
- **Electrical components without housing**
  must be protected by ESD-suitable packaging.

### 2.2.2 Guidelines for proper ESD- handling

**Electrical components with housing**
- Do not touch the connector contacts on connected cables.
- Do not touch the contact tips on the circuit boards.

**Electrical components with housing**
The following is valid in addition to "Electrical components with housing"

- Any persons handling electrical components or devices that will be installed in the electrical components must be grounded.
- Components can only be touched on the small sides or on the front plate.
- Components should always be stored in a suitable medium (ESD packaging, conductive foam, etc.). Metallic surfaces are not suitable storage surfaces!
- Electrostatic discharges should be avoided on the components (e.g. through charged plastics).
- A minimum distance of 10 cm must be kept from monitors and TV sets.

- Measurement devices and equipment must be grounded.

- Measurement probes on potential-free measurement devices must be discharged on sufficiently grounded surfaces before taking measurements.

**Individual components**
- ESD protective measures for individual components are thoroughly integrated at B&R (conductive floors, footwear, arm bands, etc.).

- The increased ESD protective measures for individual components are not necessary for our customers for handling B&R products.

## 2.3 Policy and procedures

Electronic devices are generally not failsafe. In the event of a failure on the programmable control system, operating or monitoring device, or uninterruptible power supply, the user is responsible for ensuring that other devices that may be connected, e.g. motors, are in a secure state.

Both when using programmable logic controllers and when using operating and monitoring devices as control systems in conjunction with a soft PLC (e.g. B&R Automation Runtime or comparable products) or a slot PLC (e.g. B&R LS251 or comparable products), the safety precautions applying to industrial control systems (e.g. the provision of safety devices such as emergency stop circuits, etc.) must be observed in accordance with applicable national and international regulations. The same applies for all other devices connected to the system, such as drives.

All tasks such as installation, commissioning, and maintenance are only permitted to be carried out by qualified personnel. Qualified personnel are persons familiar with transport, mounting, installation, commissioning, and operation of the product who also have the respective qualifications (e.g. IEC 60364). National accident prevention guidelines must be followed.
The safety guidelines, connection descriptions (type plate and documentation), and limit values listed in the technical data are to be read carefully before installation and commissioning and must be observed.

## 2.4  Transport and storage

During transport and storage, devices must be protected from excessive stress (mechanical load, temperature, humidity, aggressive atmospheres, etc.).

## 2.5  Mounting

- Installation must take place according to the documentation, using suitable equipment and tools.

- Devices must be installed without voltage applied and by qualified personnel. Before installation, voltage to the switching cabinet should be switched off and prevented from being switched on again.

- General safety regulations and nationally applicable accident prevention guidelines must be observed.
- Electrical installation must be carried out according to the relevant guidelines (e.g. line cross section, fuse, protective ground connection).

## 2.6  Operation

### 2.6.1 Protection against touching electrical parts

To operate programmable logic controllers, operating and monitoring devices or uninterruptible power supplies, certain components must carry dangerous voltage levels of over 42 VDC. A life-threatening electrical shock could occur if you come into contact with these parts. This could result in death, severe injury or material damage.

Before turning on the programmable logic controller, the operating and monitoring devices and the uninterruptible power supply, ensure that the housing is properly grounded (PE rail). The ground connection must be established when testing the operating and monitoring devices or the uninterruptible power supply, even when operating them for only a short time.

Before turning the device on, make sure that all parts with voltage applied are securely covered. During operation, all covers must remain closed.

### 2.6.2  Environmental conditions - Dust, humidity, aggressive gases

Use of operating and monitoring devices (e.g. industrial PCs, power panels, mobile panels, etc.) and uninterruptible power supplies in very dusty environments should be avoided. Dust collection on the devices influences their function and, especially in systems with active cooling (fans), sufficient cooling cannot be guaranteed.

The presence of aggressive gases in the environment can also lead to malfunctions. When combined with high temperature and humidity, aggressive gases - e.g. with sulfur, nitrogen and chlorine components - start chemical processes that can damage electronic components very quickly. Signs of the presence of aggressive gases are blackened copper surfaces and cable ends on existing installations.

For operation in dusty or humid conditions, correctly installed (cutout installation) operating and monitoring devices like Automation Panel or Power Panel are protected on the front side. The rear side of all devices must be protected from dust and humidity and must be cleaned at suitable intervals.

### 2.6.3 Programs, viruses and dangerous programs

The system is subject to potential danger each time data is exchanged or software is installed from a data medium (e.g. diskette, CD-ROM, USB flash drive, etc.), a network connection, or the Internet. The user is responsible for assessing these dangers, implementing preventative measures such as virus protection programs, firewalls, etc. and obtaining software from reliable sources.

## 2.7 Environmentally-friendly disposal

All B&R programmable controllers, operating and monitoring devices, and uninterruptible power supplies are designed to inflict as little harm on the environment as possible.

### 2.7.1 Seperation of materials

It is necessary to separate different materials so the device can undergo an environmentally-friendly recycling process.

| Component | Disposal |
|---|---|
| Programmable logic controllers<br>Operating and monitoring devices<br>Uninterruptible power supply<br>Batteries & rechargeable batteries<br>Cables | Electronics recycling |
| Cardboard box / paper packaging | Paper / cardboard recycling |
| Plastic packaging | Plastic recycling |

Table 2: Environmentally-friendly separation of materials

Disposal must comply with the respective legal regulations.

# 3 Organization of safety notices

The safety notices in this manual are organized as follows:

| Safety notice | Description |
|---|---|
| Danger! | Disregarding the safety regulations and guidelines can be life-threatening. |
| Caution! | Disregarding the safety regulations and guidelines can result in severe injury or major damage to material. |
| Warning! | Disregarding the safety regulations and guidelines can result in injury or damage to material. |
| Information: | Important information for preventing errors. |

Table 3: Organization of safety notices

# 4 Guidelines
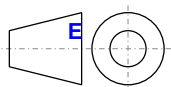
 European dimension standards apply to all of the dimension diagrams in this document.

All dimensions in mm.

| Nominal measurement area | General tolerance according to DIN ISO 2768 medium |
|---|---|
| Up to 6 mm | ± 0.1 mm |
| for 6 to 30 mm | ± 0.2 mm |
| for 30 to 120 mm | ± 0.3 mm |
| for 120 to 400 mm | ± 0.5 mm |
| for 400 to 1000 mm | ± 0.8 mm |

Table 4: Nominal measurement areas

# 5 Overview

| Product ID | Short description | on page |
|---|---|---|
| 5SWWCE.0836-ENG | Microsoft OEM Windows CE 6.0 Professional, English; for PP500; please order CompactFlash separately (minimum 128 MB). | 235 |
| | **Accessories** | |
| 5AC900.1201-00 | USB Cover M20 IP65 flat | 279 |
| 5AC900.1201-01 | USB Cover M20 IP65 raised | 279 |
| 5AC900.BLOC-00 | Mounting block with wings 10pcs Spare part. | 280 |
| 5AC900.BLOC-01 | Terminal block without brackets 10 pcs, replacement part. | 280 |
| 5AC900.CLIP-01 | Spare Retaining clip plastic 10pcs | 281 |
| | **Automation Runtime** | |
| 1A4600.10-5 | B&R Automation Runtime ARwin, incl. license sticker | 237 |
| 1A4601.06-5 | B&R Automation Runtime ARemb, incl. license sticker | 237 |
| 1A4601.06-T | B&R Automation Runtime ARemb terminal, incl. license sticker | 237 |
| | **Batteries** | |
| 0AC201.91 | Lithium Battery 4 pieces, 3 V / 950 mAh button cell | 261 |
| 4A0006.00-000 | Lithium battery, 3 V / 950 mAh, button cell | 261 |
| | **CPU boards** | |
| 5PP5CP.US15-00 | PP500 CPU board Intel Atom Z510, 1100 MHz, 400 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | 121 |
| 5PP5CP.US15-01 | PP500 CPU board Intel Atom Z520, 1330 MHz, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | 121 |
| 5PP5CP.US15-02 | PP500 CPU board Intel Atom Z530, 1600 MHz, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | 121 |
| | **CompactFlash** | |
| 5CFCRD.0064-03 | CompactFlash 64 MB Western Digital | 271 |
| 5CFCRD.0128-03 | CompactFlash 128 MB Western Digital | 271 |
| 5CFCRD.016G-04 | CompactFlash 16 GB B&R | 266 |
| 5CFCRD.0256-03 | CompactFlash 256 MB Western Digital | 271 |
| 5CFCRD.0512-03 | CompactFlash 512 MB Western Digital | 271 |
| 5CFCRD.0512-04 | CompactFlash 512 MB B&R | 266 |
| 5CFCRD.1024-03 | CompactFlash 1 GB Western Digital | 271 |
| 5CFCRD.1024-04 | CompactFlash 1 GB B&R | 266 |
| 5CFCRD.2048-03 | CompactFlash 2 GB Western Digital | 271 |
| 5CFCRD.2048-04 | CompactFlash 2 GB B&R | 266 |
| 5CFCRD.4096-03 | CompactFlash 4 GB Western Digital | 271 |
| 5CFCRD.4096-04 | CompactFlash 4 GB B&R | 266 |
| 5CFCRD.8192-03 | CompactFlash 8 GB Western Digital | 271 |
| 5CFCRD.8192-04 | CompactFlash 8 GB B&R | 266 |
| | **Interface boards** | |
| 5PP5IF.CETH-00 | PP500 Interface board; connection for 1x Ethernet 10/100/1000 | 124 |
| 5PP5IF.CHDA-00 | PP500 Interface board; connection for 1x HDA sound | 126 |
| 5PP5IF.FCAN-00 | PP500 Interface board; connection for 1x CAN master, 512 kByte SRAM | 131 |
| 5PP5IF.FPLM-00 | PP500 Interface board; connections for 2x POWERLINK | 128 |
| 5PP5IF.FX2X-00 | PP500 Interface board; connection for 1x X2X master, 512 kByte SRAM | 134 |
| 5PP5IF.FXCM-00 | PP500 Interface board; connection for 1x CAN master, 1x X2X master, 512 kByte SRAM | 136 |
| | **Main memory** | |
| 5MMDDR.0512-01 | SO-DIMM DDR2 RAM 512 MB PC2-5300 | 123 |
| 5MMDDR.1024-01 | SO-DIMM DDR2 RAM 1024 MB PC2-5300 | 123 |
| 5MMDDR.2048-01 | SO-DIMM DDR2 RAM 2048 MB PC2-5300 | 123 |
| | **System units** | |
| 5PP520.0573-00 | Power Panel 520 5.7" VGA TFT display with touch screen (resistive); connections for 1x RS232, 2x USB 2.0, 1x Ethernet 10/100/1000; can be expanded with interface board; IP65 protection (front side); order 24 VDC plug for supply voltage separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91) | 47 |

| Product ID | Short description | on page |
|---|---|---|
| 5PP520.0702-00 | Power Panel 520 7" WVGA TFT display with touch screen (resistive); connections for 1x RS232, 2x USB 2.0, 1x Ethernet 10/100/1000; can be expanded with interface board; IP65 protection (front side); order 24 VDC plug for supply voltage separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91) | 66 |
| 5PP520.1043-00 | Power Panel 520 10.4" VGA TFT display with touch screen (resistive); connections for 1x RS232, 3x USB 2.0, 1x Ethernet 10/100/1000; can be expanded with interface board; IP65 protection (front side); order 24 VDC plug for supply voltage separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91) | 72 |
| 5PP520.1214-00 | Power Panel 520 12.1" SVGA TFT display with touch screen (resistive); connections for 1x RS232, 3x USB 2.0, 1x Ethernet 10/100/1000; can be expanded with interface board; IP65 protection (front side); order 24 VDC plug for supply voltage separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91) | 97 |
| 5PP520.1505-00 | Power Panel 520 15" XGA TFT display with touch screen (resistive); connections for 1x RS232, 3x USB 2.0, 1x Ethernet 10/100/1000; can be expanded with interface board; IP65 protection (front side); order 24 VDC plug for supply voltage separatelyn (screw clamp: 0TB103.9; cage clamp: 0TB103.91) | 103 |
| 5PP551.0573-00 | Power Panel 551 5.7" VGA TFT display; 22 function keys and 20 system keys; connections for 1x RS232, 2x USB 2.0, 1x Ethernet 10/100/1000; can be expanded with interface board; IP65 protection (front side); order 24 VDC plug for supply voltage separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91) | 53 |
| 5PP552.0573-00 | Power Panel 552 5.7" VGA TFT display; 20 function keys and 20 system keys; connections for 1x RS232, 2x USB 2.0, 1x Ethernet 10/100/1000; can be expanded with interface board; IP65 protection (front side); order 24 VDC plug for supply voltage separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91) | 60 |
| 5PP580.1043-00 | Power Panel 580 10.4" VGA TFT display with touch screen (resistive); 22 function keys; connections for 1x RS232, 3x USB 2.0, 1x Ethernet 10/100/1000; can be expanded with interface board; IP65 protection (front side); order 24 VDC plug for supply voltage separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91) | 78 |
| 5PP580.1505-00 | Power Panel 580 15" XGA TFT display with touch screen (resistive); 32 function keys; connections for 1x RS232, 3x USB 2.0, 1x Ethernet 10/100/1000; can be expanded with interface board; IP65 protection (front side); order 24 VDC plug for supply voltage separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91) | 109 |
| 5PP581.1043-00 | Power Panel 581 10.4" VGA TFT display with touch screen (resistive); 38 function keys and 20 system keys; connections for 1x RS232, 3x USB 2.0, 1x Ethernet 10/100/1000; can be expanded with interface board; IP65 protection (front side); order 24 VDCm plug for supply voltage separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91) | 84 |
| 5PP581.1505-00 | Power Panel 581 15" XGA TFT display with touch screen (resistive); 32 function keys and 92 system keys; connections for 1x RS232, 3x USB 2.0, 1x Ethernet 10/100/1000; can be expanded with interface board; IP65 protection (front side); order 24 VDC plug for supply voltage separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91) | 115 |
| 5PP582.1043-00 | Power Panel 582 10.4" VGA TFT display with touch screen (resistive); 44 function keys and 20 system keys; connections for 1x RS232, 3x USB 2.0, 1x Ethernet 10/100/1000; can be expanded with interface board; IP65 protection (front side); order 24 VDC plug for supply voltage separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91) | 91 |
| **Terminal Blocks** | | |
| 0TB103.9 | Connector, 24 VDC, 3-pin female, screw clamp, 3.31 mm², protected against vibration by the screw flange | 263 |
| 0TB103.91 | Connector, 24 VDC, 3-pin female, cage clamp, 3.31 mm², protected against vibration by the screw flange | 263 |
| **USB Zubehör** | | |
| 5MMUSB.2048-01 | USB Memory Stick 2048MB B&R | 276 |
| **Windows 7** | | |
| 5SWWI7.0100-ENG | Microsoft OEM Windows 7 Professional 32-bit, DVD, English. Only available with a new device. | 227 |
| 5SWWI7.0100-GER | Microsoft OEM Windows 7 Professional 32-bit, DVD, German. Only available with a new device. | 227 |
| 5SWWI7.0300-MUL | Microsoft OEM Windows 7 Ultimate 32-bit, DVD, multilaguange. Only available with a new device. | 227 |
| **Windows Embedded Standard 2009** | | |
| 5SWWXP.0736-ENG | Microsoft OEM Windows Embedded Standard 2009, English; for PP500; please order CompactFlash separately (minimum 1 GB). | 229 |
| **Windows Embedded Standard 7** | | |
| 5SWWI7.0536-ENG | Microsoft OEM Windows Embedded Standard 7 32-bit, English; for PP500; please order CompactFlash separately (minimum 8 GB). | 232 |
| 5SWWI7.0736-MUL | Microsoft OEM Windows Embedded Standard 7 Premium 32-bit, multilanguage; for PP500; please order CompactFlash separately (minimum 8 GB). | 232 |

| Product ID | Short description | on page |
|---|---|---|
| | **Windows XP Professional** | |
| 5SWWXP.0600-ENG | Microsoft OEM Windows XP Professional Service Pack 3, CD, English. Only available with a B&R device. | 225 |
| 5SWWXP.0600-GER | Microsoft OEM Windows XP Professional Service Pack 3, CD, German. Only available with a device. | 225 |
| 5SWWXP.0600-MUL | Microsoft OEM Windows XP Professional Service Pack 3, CD, multilanguage. Only available with a B&R device. | 225 |

Chapter 1
General information

# Chapter 2 • Technical data

## 1 Introduction

### 1.1 The right device for any automation task

Now more than ever, competitive control and visualization solutions must be complete, scalable and tailored to match the specific application. A wide range of product types and various possibilities for flexible system expansion are extremely important for machine manufacturing. For this reason, intelligent all-in-one solutions that offer users the highest level of freedom with regard to the control topology are important components for automation. Cost-effective solutions can be implemented through precise adaptation to the respective application, as is proven by the vast number of Power Panels operating in the field.

Integrating control, visualization and drive technology into one device makes it possible to offer intelligent complete solutions that provide maximum uniformity and can be easily connected to various automation infrastructures. Compact Power Panel devices are designed for use in the harshest industrial environments and ensure the highest level of operating comfort. Complete project engineering and integrated language options make B&R control panels the worldwide industry standard.

### 1.2 Panels with the performance of an industrial PC

The new Power Panel 500 series with Intel® Atom™ architecture advances into areas that were previously only handled by industrial PCs. The Intel® Atom™ Z5xx processor used in the Power Panel 500 has plenty of power, even for challenging applications. There is also plenty of RAM—up to 2 GB. The extensive product range includes panels ranging from 5.7" VGA to 15" XGA displays with intuitive touch screen and function keys. Gigabit Ethernet ensures fast communication over the plant network. Optional fieldbus interfaces or another gigabit Ethernet interface can also be added if needed. When designing the Power Panel 500, a great deal of attention was given to minimizing installation depth so that it can also be used in tight spaces.

### 1.3 A complete solution with the highest degree of flexibility.

As a central operating and control unit, B&R Power Panel devices combine control, visualization and drive technology into a single package. From embedded processors to full PC power, this product range always provides an optimal system architecture, enabling cost-effective solutions for machine manufacturing.

If expansions are required, remote I/O and drives can be easily connected using modular fieldbus interfaces. Depending on requirements, Power Panels can be expanded with POWER-LINK, CAN bus, Profibus DP or other fieldbus interfaces. This allows additional topologies to be implemented at a later date without problems.

Several distributed operating stations are often used in order to guarantee reliable operation of complex machines. That means they can be easily accessed by operating personnel and that process information is available on the machine where it is needed.

## 1.4 Open system platform

In addition to providing complete automation solutions, Power Panel devices are also an optimal platform for open operating systems. This provides users with the highest degree of flexibility because different software architectures can be implemented on the same system platform.

Regardless of whether they are used to automate complete systems, as intelligent visualization terminals or together with open PC operating systems, the Power Panel series offers the right tool for any situation. A complete solution with the highest degree of flexibility.

## 1.5 Features

- Intel® Atom™ Z510, Z520 or Z530 processor
- Up to 2 GB SDRAM
- 5.7" VGA to 15" XGA displays
- 2x USB 2.0 (5.7" and 7" devices), 3x USB 2.0 (10.4", 12.1" and 15" devices)
- 1x RS232
- 1x Ethernet 10/100/1000 MBit/s
- Optional I/O and interface boards
- 1 CompactFlash slot (type I)
- 24 VDC supply voltage
- Operation without fan or heatsink
- BIOS (Insyde)
- Real-time clock, RTC (battery-buffered)

## 1.6 System components / configuration

The PP500 system can be assembled to meet individual requirements and operating conditions.

The following components are absolutely essential for operation:

- System unit
- CPU board
- Main memory
- Drive (mass memory such as CompactFlash card) for the operating system
- Supply voltage connector (terminal block)

### 1.6.1 Configuration  - Basic system



Image 1: Configuration - Basic system

## 1.6.2 Configuration software, accessories
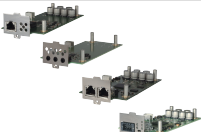


| Configuration - Software, accessories | | | | | |
|---|---|---|---|---|---|
| **System unit** | Select 1 | | | | |
| A system unit consists of a housing and display.<br><br>**Variants:**<br>PP500 with slot for Interface board:<br>5PP5xx.xxxx-**00**<br><br>PP500 with slot for Interface & I/O board:<br>5PP5xx.xxxx-**01** | 5.7"<br><br>5PP520.0573-00<br>5PP551.0573-00<br>5PP552.0573-00 | 7"<br><br>5PP520.0702-00 | 10.4"<br><br>5PP520.1043-00<br>5PP580.1043-00<br>5PP581.1043-00<br>5PP582.1043-00 | 12.1"<br><br>5PP520.1214-00 | 15"<br><br>5PP520.1505-00<br>5PP580.1505-00<br>5PP581.1505-00 |
| **Interface board** | Select 1 | | | | |
| | 5PP5IF.CETH-00 - 1x ETH 10/100/100<br>5PP5IF.CHDA-00 - 1x HDA sound<br>5PP5IF.FPLM-00 - 2x POWERLINK<br>5PP5IF.FCAN-00 - 1x CAN<br>5PP5IF.FX2X-00 - 1x X2X<br>5PP5IF.FXCM-00 - 1x CAN, 1x X2X | | | | |
| **CompactFlash** | Select 1 | | | | |
| | 5CFCRD.0512-04    5CFCRD.4096-04<br>5CFCRD.1024-04    5CFCRD.8192-04<br>5CFCRD.2048-04    5CFCRD.016G-04 | | | | |
| **USB accessories** | Select 1 | | | | |
| | 5MMUSB.2048-01 | | | | |
| **Software** | Select 1 | | | | |
| | **Windows XP**<br>5SWWXP.0600-ENG<br>5SWWXP.0600-GER<br>5SWWXP.0600-MUL<br><br>**Windows 7**<br>5SWWI7.0100-ENG<br>5SWWI7.0100-GER<br>5SWWI7.0300-MUL | **Windows Embedded Standard 2009**<br>5SWWXP.0736-ENG<br><br><br><br>**Windows Embedded Standard 7**<br>5SWWI7.0536-ENG<br>5SWWI7.0736-MUL | **Windows CE**<br>5SWWCE.0836-ENG<br><br><br><br>**Automation Runtime**<br>1A4600.10-5<br>1A4601.06-5<br>1A4601.06-T | | |
| **Terminal blocks** | Select 1 | | | | |
| | 0TB103.9<br>0TB103.91 | | | | |

Image 2: Configuration - Software, accessories

## 1.7 Differences between Power Panel 500 and Power Panel 300/400

### 1.7.1 General

Like the B&R Automation PCs and B&R Panel PCs, the new Power Panel device family PP500 can also have a custom configuration. Customers can choose from three different CPU boards and main memory variations. It is also possible to connect interface boards and, in some devices (devices whose model number ends in -01, e.g. 5PP5xx.xxx-01), also I/O boards. For detailed information regarding configuration, see section 1.6 "System components / configuration", on page 26.

### 1.7.2 Mechanical

The Power Panel 500 is mechanically mounting-compatible with the Power Panel 300/400, but not connection-compatible (interface, plug and key positions are positioned differently). An overview of the mounting compatibility is documented in section 5 " Mounting compatibilities", on page 292 .

# 2 Entire device

## 2.1 Temperature specifications

### 2.1.1 Temperature sensor locations

Sensors show temperature values in a variety of locations (USB ports, main memory) in the PP500. The temperatures[1] can be read in approved Microsoft Windows and Automation Runtime operating systems using the B&R Control Center[2] .
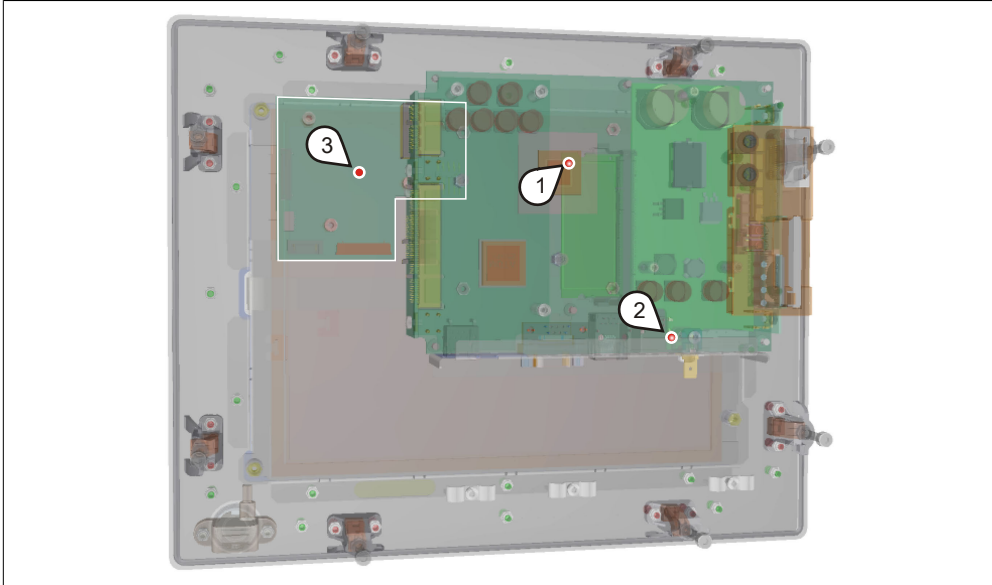


Image 3: Temperature sensor locations

| Position | Measurement point for | Measurement | Max. specified |
|---|---|---|---|
| A | CPU Main memory | Temperature of the processor and ambient temperature of the main memory (sensor integrated in the processor). | 100°C: 5PP5CP.US15-00, 5PP5CP.US15-01<br><br>90°C: 5PP5CP.US15-02 |
| B | Interfaces | Temperature of the interfaces (sensor integrated beside USB ports). | 80°C |
| C | Display | Temperature of the display (sensor integrated on the display board - the exact position depends on the display diagonal). | 80°C: Diagonals 5.7", 7", 10.4", 15" |
| | Interface board | Temperature of an interface board (sensor integrated on the interface board). | dependent on the board |

Table 5: Temperature sensor locations

[1]  The measured temperature is a guideline for the immediate ambient temperature, but can be influenced by neighboring components.
[2]  The B&R Control Center - ADI driver - can be downloaded for free from the download area on the B&R homepage (www.br-automation.com).

### 2.1.2 Temperature monitoring

Sensors monitor temperature values in various places (CPU, interfaces, display, interface board) in the PP500. The locations of the temperature sensors can be found in figure "Image 3: Temperature sensor locations", on page 29 . The value listed in the table represents the defined maximum temperature for this measurement point[1] . An alarm is not triggered when this temperature is exceeded. The temperatures can be read in BIOS or in approved Microsoft Windows operating system and Automation Runtime, using B&R Control Center.

## 2.2 Humidity specifications

The following table displays the minimum and maximum relative humidity for the individual components that are relevant for the humidity limitations of the entire device. The lowest and highest common values are always used when establishing these limits.

| Component | | Operation[1] | Storage / Transport[1] |
|---|---|---|---|
| System units | | See temperature humidity diagrams for individual components | |
| US15W - CPU boards | | 5 to 90% | 5 to 95% |
| Main memory for CPU boards | | 10 to 90% | 5 to 95% |
| Interface boards | 5PP5IF.CETH-00 | 5 to 90% | 5 to 95% |
| | 5PP5IF.CHDA-00 | 5 to 90% | 5 to 95% |
| | 5PP5IF.FPLM-00 | 5 to 90% | 5 to 95% |
| | 5PP5IF.FCAN-00 | 5 to 90% | 5 to 95% |
| | 5PP5IF.FX2X-00 | 5 to 90% | 5 to 95% |
| | 5PP5IF.FXCM-00 | 5 to 90% | 5 to 95% |
| Accessories | CompactFlash cards 5CFCRD.xxxx-04 | 85% | 85% |
| | CompactFlash cards - 5CFCRD.xxxx-03 | 8 to 95% | 8 to 95% |
| | Flash drive 5MMUSB.2048-01 | 10 to 90% | 5 to 90% |

Table 6: Overview of humidity specifications for individual components

1) Specifications correspond to the relative humidity, non-condensing.

The listed specifications correspond to the relative humidity at an ambient temperature of 30°C. More detailed information about the specific temperature-dependent humidity values can be found in the technical data for the individual components.

1)    The measured temperature is a guideline for the immediate ambient temperature, but can be influenced by neighboring components.

## 2.3 Serial number sticker

Each B&R device is given a unique Serial number sticker with Barcodes (type 128), which allows it to be clearly identified. This serial number represents all of the components built into the system (model number, name, revision, serial number and order number).

serial number sticker for the entire device

Sticker indicating installed components and serial number sticker for the System unit
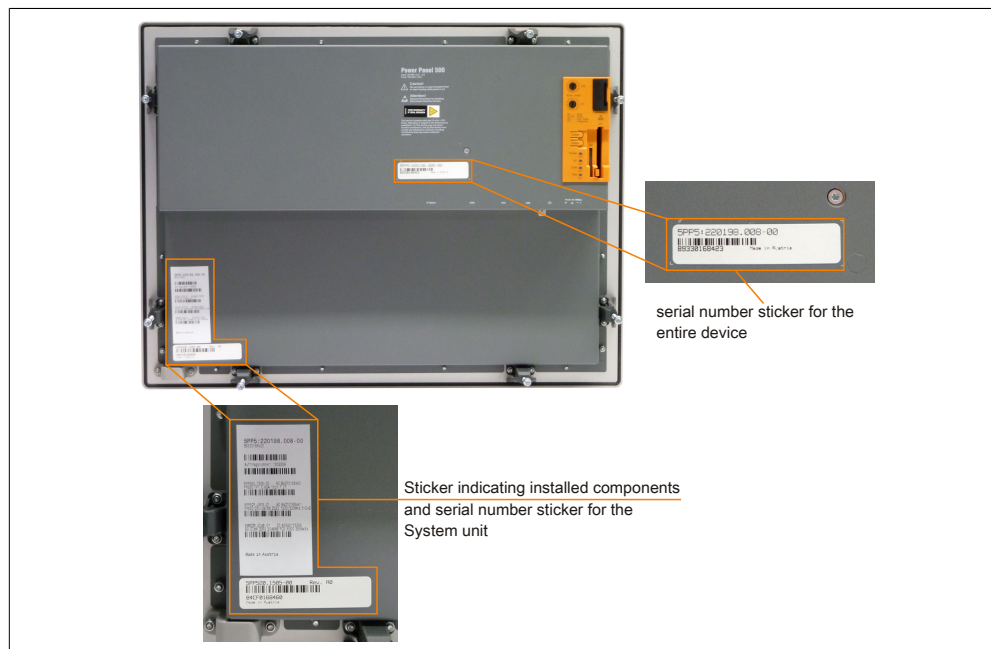
Image 4: Serial number sticker

This information can also be found on the B&R homepage. On the start page www.br-automation.com the serial number must be entered for the entire device in the serial number search field. The search provides you with a detailed list of the individual components.

Image 5: Serial number search

## 2.4 Device interfaces

### 2.4.1 Overview - Device interfaces

**Interfaces for system units with interface board**
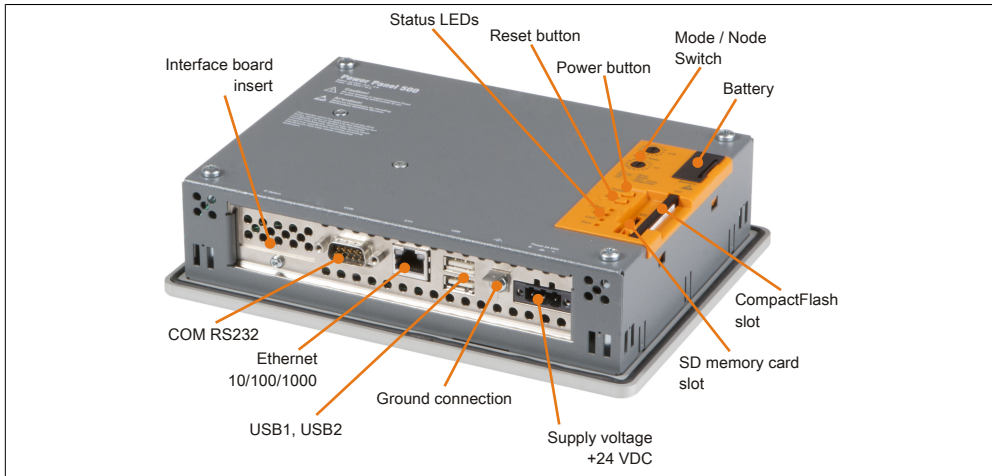
Image 6: Interfaces - PP500 with interface board

## Back cover of the system units

Mode / Node Switch x16 — x16

Mode / Node

Mode / Node Switch x1 — x1

00........... Boot
01-FD.... Node
FE......... Dyn. Node
FF.......... Diagnosis

Battery — Battery

Battery

CF

Power button — Power

Reset button — Reset

SD

Power LED — Power

CF LED — CF

Link LED — Link

Run LED — Run

CompactFlash Slot

SD Memory Card Slot
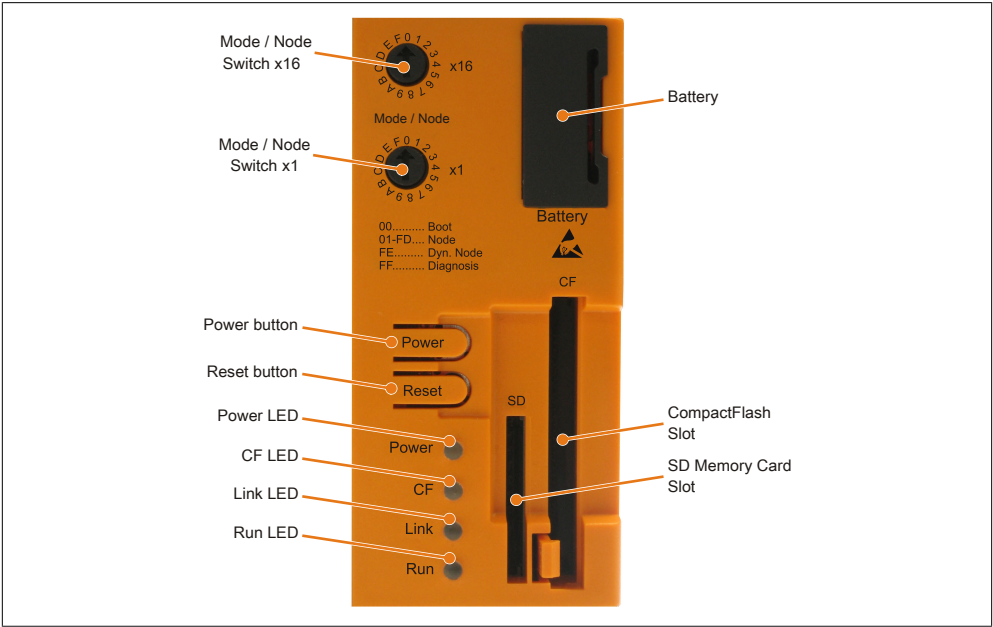
Image 7: PP500 - Back cover

### 2.4.2  Supply voltage +24 VDC

The 3-pin socket required for the supply voltage connection is not included in delivery. This can be ordered from B&R using the model number 0TB103.9 (screw clamp) or 0TB103.91 (cage clamp).

The pin assignments can be found either in the following table or printed on the PP500 housing. The supply voltage is protected internally by a soldered fuse (10A, fast-acting), so that the device cannot be damaged if there is an overload (fuse replacement necessary) or if the voltage supply is connected incorrectly (reverse polarity protection - fuse replacement not necessary). The device must be returned to B&R for repairs if the fuse is blown because of an error.

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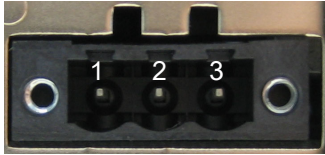
| Supply voltage | | |
|---|---|---|
| Protected against reverse polarity | | 3-pin, male |
| Pin | Description | |
| 1 | + | |
| 2 | Functional ground | |
| 3 | - | |
| Model number | Short description | |
| | Terminal blocks | |
| 0TB103.9 | Plug 24 V 5.08 3-pin screw clamp | |
| 0TB103.91 | Plug 24 V 5.08 3-pin cage clamp | |

Table 7: Supply voltage connection + 24VDC

#### 2.4.2.1  Ground

# Caution!

**The pin's connection to the functional ground (pin 2) should be as short as possible (e.g. in the control cabinet). We recommend using the largest possible conductor cross section on the supply plug.**

The grounding connection is located on the back of the PP500 systems.
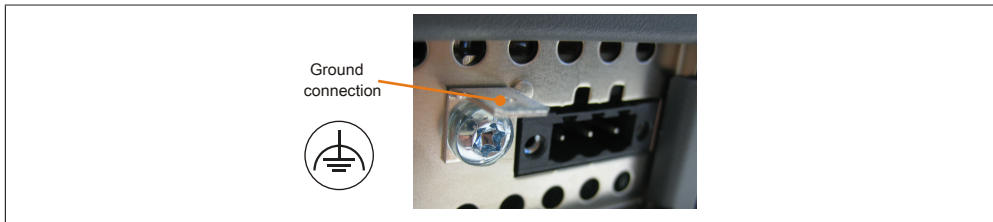
Image 8: Ground connection

The M4 self-locking nut can be used, for example, to fasten a copper strip that is built into the PP500 at a central grounding point in the control cabinet or system. The largest possible conductor cross section should be used (at least 2.5 mm²).

## 2.4.3 Serial interface COM

| Serial interface COM | | |
|---|---|---|
| | **RS232** | |
| Type | RS232, modem-capable, not electrically isolated | |
| UART | 16550-compatible, 16-byte FIFO | |
| Transfer rate | Max. 115 kBaud | 9-pin DSUB plug |
| Cable length | Max. 15 meters | |
| **Pin** | **Assignment** | |
| 1 | DCD | |
| 2 | RXD | |
| 3 | TXD | |
| 4 | DTR | |
| 5 | GND | |
| 6 | DSR | |
| 7 | RTS | |
| 8 | CTS | |
| 9 | RI | |

Table 8: Pin assignments - COM
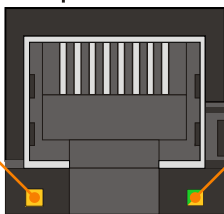
### 2.4.4  Ethernet (ETH)

This Ethernet controller is integrated in the CPU board and is fed outwards via the CPU board.

| Ethernet connection (ETH) | | | |
|---|---|---|---|
| Controller | Intel 82574 | | RJ45 twisted pair (10BaseT/100BaseT), female |
| Cabling | S/STP (Cat5e) | | |
| Transfer rate | 10/100/1000 Mbit/s[1] | | |
| Cable length | max. 100 m (min. Cat5e) | | |
| **Speed LED** | **On** | **Off** | |
| Green | 100 Mbit/s | 10 Mbit/s[2] | |
| Orange | 1000 Mbit/s | - | |
| **Link LED** | **On** | **Off** | |
| Orange | Link (Ethernet network connection available) | Activity (blinking - data transfer in progress) | |

Table 9: Ethernet connection (ETH)

1) Switching takes place automatically.
2) The 10 Mbit/s transfer speed / connection is only present if the Link LED is simultaneously active.

### Driver support

A special driver is necessary for operating the Intel Ethernet controller 82574. The necessary drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com.

## Info:

**Required drivers can only be downloaded from the B&R homepage, not from manufacturers' pages.**

### 2.4.5 USB Ports (USB1, 2, 3)

The PP500 devices have a USB 2.0 (Universal Serial Bus) host controller with multiple USB ports, two of which on the PP500 devices are on the outside for easy access. PP500 devices with a display diagonal of 10.4", 12.1" and 15" are additionally equipped with a front USB port.

# Warning!

**Peripheral USB devices can be connected to the USB interfaces. Due to the vast number of USB devices available on the market, B&R cannot guarantee their performance. B&R does ensure the performance of all USB devices that they provide.**

# Caution!

**Because of the general PC specifications, this interface should be handled with extreme care with regard to EMC, location of cables, etc.**

### USB1, 2

| Universal Serial Bus (USB1, USB2)[1] | | |
|---|---|---|
| Type | USB 2.0 | 2x USB Type A, female |
| Design | Type A | |
| Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), to high speed (480 Mbit/s) | |
| Current load[2]<br>USB1, USB2 | Max. 1 A | |
| Cable length | max. 5 m (without hub) | |
| | | |

Table 10: USB1, USB2 port

1) The interfaces, etc. available on the device or module were numbered accordingly for easy identification. This numbering can differ from the numbering used by the particular operating system.
2) For safety, every USB port is equipped with a maintenance free "USB current-limiting circuit breaker" (max. 500 mA or 1 A).

## USB3

This front USB port is only provided on the PP500 devices with a display diagonal of 10.4", 12.1" or 15".

| Universal Serial Bus (USB3)[1] | | |
|---|---|---|
| Type | USB 2.0 | 1x USB type A, female |
| Design | Type A | |
| Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), to high speed (480 Mbit/s) | |
| Current load[2]<br>USB3 | Max. 1 A | |
| Cable length | max. 5 m (without hub) | |

Table 11: USB3 port

1) The interfaces, etc. available on the device or module were numbered accordingly for easy identification. This numbering can differ from the numbering used by the particular operating system.
2) For safety, the USB port is equipped with a maintenance free "USB current-limiting circuit breaker" (max. 1 A)

### 2.4.6  Battery

The lithium battery located behind the black cover (3 V, 950 mAh) buffers the internal real-time clock (RTC) as well as the data in the SRAM of interface cards. The buffer duration of the battery is at least 4 years (at 50°C, 8.5 µA current requirements of the supplied components and a self discharge of 40%; if an interface board with SRAM is installed, then the service life equals 2½ years). The battery is subject to wear and should be replaced regularly (at least following the specified lifespan).

| Battery | | |
|---|---|---|
| Battery<br>  Type<br>  Removable<br>  Service life | Renata 950 mAh<br>Yes, accessible from the outside<br>4 years[1] |  |
| **Model number** | **Short description** | |
| | **Batteries** | |
| 0AC201.91 | Lithium batteries, 4 pcs., 3 V / 950 mAh, button cell | |
| 4A0006.00-000 | Lithium batteries, 1 pcs., 3 V / 950 mAh, button cell | |
| | | |

Table 12: Battery

1) Aat 50°C, 8.5 µA current requirements of the supplied components and a self discharge of 40%. If an interface board with SRAM is installed, then the service life equals 2½ years.

**Battery status evaluation**

The battery status is evaluated immediately following start-up of the device and is subsequently checked by the system every 24 hours. The battery is subjected to a brief load (1 second) during the measurement and then evaluated. The evaluated battery status is displayed in the BIOS Setup pages (under OEM Features - CPU Board Features - CPU Board Monitor) and in the B&R Control Center (ADI driver), but can also be read in a customer application via the ADI Library.

| Battery status | Meaning |
|---|---|
| N/A | Hardware, i.e. firmware used is too old and does not support read. |
| GOOD | Data buffering is guaranteed. |
| BAD | Data buffering is guaranteed for approx. another 500 hours from the point in time that the battery capacity is determined to be BAD (insufficient). |

Table 13: Meaning of battery status

From the point when battery capacity is recognized as insufficient, data buffering is guaranteed for approximately another 500 hours. When changing the battery, data is buffered for approximately another 10 minutes by a gold leaf capacitor.

### 2.4.7 CompactFlash Slot

This CompactFlash slot is a fixed part of an PPC500 system and is internally connected with the chipset via IDE PATA. Type I CompactFlash cards are supported.
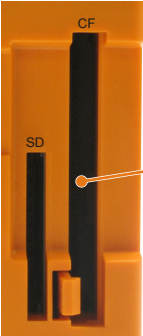
| CompactFlash slot | | |
|---|---|---|
| Connection | PATA Master | |
| CompactFlash Type | Type I | |
| Model number | Short description | |
| | CompactFlash | |
| 5CFCRD.0512-04 | 512 MB B&R CompactFlash card | |
| 5CFCRD.1024-04 | 1024 MB B&R CompactFlash card | |
| 5CFCRD.2048-04 | 2048 MB B&R CompactFlash card | |
| 5CFCRD.4096-04 | 4096 MB B&R CompactFlash card | |
| 5CFCRD.8192-04 | 8192 MB B&R CompactFlash card | |
| 5CFCRD.016G-04 | 16 GB B&R CompactFlash card | |



Table 14: CompactFlash slot

# Warning!

**Turn off power before inserting or removing the CompactFlash card!**

### 2.4.8 SD Memory Card Slot

# Caution!

**The SD Memory Card Slot has not yet been released because it is still in development. Inserting an SD memory card can cause the device to malfunction! Therefore, the use of SD Memory cards is not permitted.**
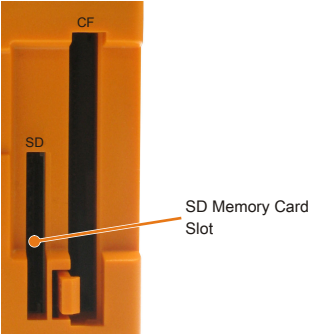
| SD Memory Card Slot | | |
|---|---|---|
| | |  |
| | | |
| | | |
| | | |
| | | |
| | | |

Table 15: SD Memory Card Slot

### 2.4.9 Power button

The power button has a variety of functions due to full ATX power supply support.
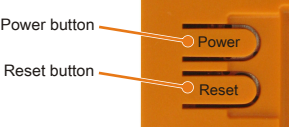
| Power button | |
|---|---|
| The power button acts like the on/off switch on a normal desktop PC with ATX power supply:<br>**Press and release** ... Switches on PP500 or shuts down operating system and switches off the PP500.<br>**Press and hold** ... ATX power supply switches off without shutting down the PP500 (data could be lost!).<br><br>Pressing the power button does not reset the MTCX processor. | Power button<br>Reset button<br>Power<br>Reset |

Table 16: Power button

### 2.4.10 Reset button
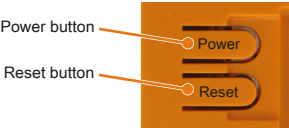
| Reset button | |
|---|---|
| Pushing the reset button triggers a hardware and PCI reset.<br><br>The PP500 restarts (cold restart). The MTCX processor is not reset when the reset button is pressed. | Power button<br>Reset button<br>Power<br>Reset |

Table 17: Reset button

# Warning!

**A system reset can result in data loss!**

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## 2.4.11 Mode / Node switch

Power Panels are equipped with 2 16-position hex selection switches. These can be used as operating mode switches. The switch positions 01 to FD are available for any purpose in an application and can be evaluated by the application program.

| Mode / Node switch | | | |
|---|---|---|---|
| **Switch position** | | | |
| **x16** | **x1** | **D**escription | |
| 0 | 0 | **Boot**<br>Default switch position - No Terminal Node switch position |  |
| 0...1 | F...D | **Node**<br>Automation Runtime run mode with node 01-FD (CompactFlash Automation Runtime or terminal operation). Freely available for use in an application, e.g. setting the INA2000 node number for the Ethernet interface. | |
| F | E | **Dyn. node**<br>Automation Runtime run mode with dynamic node assignment (CompactFlash Automation Runtime or terminal operation). Device addresses can be assigned through the software. | |
| F | F | **Diagnostics**<br>The device boots in Diagnostics mode. Program sections in User RAM and User FlashPROM are not initialized. After diagnostics mode, the CPU always boots with a cold restart. | |

Table 18: Mode / Node switch

## 2.4.12 Status LEDs

The status LEDs are located on the back of the system unit.

| Status LEDs | | | | |
|---|---|---|---|---|
| **LED** | **Color** | **Status** | **Meaning** | |
| Power | Green | On | Supply voltage OK | |
| | Green | Blinking | The device has booted, the battery status is "BAD" - for more information, see see " Battery", on page 40. | |
| | Red | On | The system is in standby mode (S5: soft-off mode or S4: hibernate mode -Suspend-to-Disk) | |
| | Red | Blinking | The MTCX is running, the battery status is "BAD" - for more information, see see " Battery", on page 40. | |
| | Red / green | Blinking | Service function for MTCX upgrade: A red/green blinking power LED indicates a faulty or incomplete MTCX upgrade. The MTCX runs using the firmware version installed when delivered. This could be caused by a power failure during an MTCX upgrade. An MTCX upgrade must be performed again. | Power LED  CF LED  Link LED  Run LED  [Power CF Link Run] |
| CF | Yellow | On | Indicates IDE drive access (CF) | |
| Link | Yellow | On | Indicates an active SDL connection on the monitor / panel plug. | |
| | | Blinking | An active SDL connection has been interrupted by a loss of power in the display unit. | |
| Run | Green | On | Application running | |
| | | Off | Application is not running | |
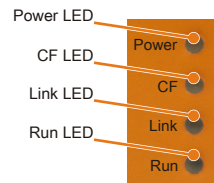
Table 19: Data - status LEDs

### 2.4.13 Interface board Insert

| Interface board insert | | |
|---|---|---|
| Model number | Short description | Interface board insert with installed interface board |
| | Interface boards | |
| 5PP5IF.CETH-00 | PP500 interface board; connection for 1x Ethernet 10/100/1000 | |
| 5PP5IF.CHDA-00 | PP500 interface board; connection for 1x MIC, 1x Line IN, 1x Line OUT | |
| 5PP5IF.FPLM-00 | PP500 interface board; connections for 2x POWERLINK | |
| 5PP5IF.FCAN-00 | PP500 interface board; connection for 1x CAN master, 512 kB SRAM | |
| 5PP5IF.FX2X-00 | PP500 interface board; connection for 1x X2X master, 512 kB SRAM | |
| 5PP5IF.FXCM-00 | PP500 interface board; connection for 1x CAN master, 1x X2X master, 512 kB SRAM | |

Table 20: Interface board insert

## Info:

**Installation and replacement of interface boards ONLY possible at the B&R plant.**

# 3 Individual components

## 3.1 System units

### 3.1.1 5.7" system units

#### 3.1.1.1 5PP520.0573-00

##### 3.1.1.1.1 General information

- 5.7" TFT VGA color display
- Analog resistive touch screen
- Intel® Atom™ technology
- Small installation depth
- Fan-free operation
- Can be expand via interface board

##### 3.1.1.1.2 Order data

| Model number | Short description | Figure |
|---|---|---|
| | **System units** | |
| 5PP520.0573-00 | Power Panel 520 5.7" VGA TFT display with touch screen (resistive); connections for 1x RS232, 2x USB 2.0, 1x Ethernet 10/100/1000; can be expanded with interface board; IP65 protection (front side); order 24 VDC plug for supply voltage separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91) | |
| | **Mandatory accessory** | |
| | **CPU boards** | |
| 5PP5CP.US15-00 | PP500 CPU board Intel Atom Z510, 1100 MHz, 400 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| 5PP5CP.US15-01 | PP500 CPU board Intel Atom Z520, 1330 MHz, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| 5PP5CP.US15-02 | PP500 CPU board Intel Atom Z530, 1600 MHz, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| | **Main memory** | |
| 5MMDDR.0512-01 | SO-DIMM DDR2 RAM 512 MB PC2-5300 | |
| 5MMDDR.1024-01 | SO-DIMM DDR2 RAM 1024 MB PC2-5300 | |
| 5MMDDR.2048-01 | SO-DIMM DDR2 RAM 2048 MB PC2-5300 | |
| | **Terminal Blocks** | |
| 0TB103.9 | Connector, 24 VDC, 3-pin female, screw clamp, 3.31 mm², protected against vibration by the screw flange | |
| 0TB103.91 | Connector, 24 VDC, 3-pin female, cage clamp, 3.31 mm², protected against vibration by the screw flange | |

Table 21: 5PP520.0573-00 - Order data

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| Model number | Short description | Figure |
|---|---|---|
| | **Optional accessory** | |
| | **Batteries** | |
| 0AC201.91 | Lithium Battery 4 pieces, 3 V / 950 mAh button cell | |
| 4A0006.00-000 | Lithium battery, 3 V / 950 mAh, button cell | |
| | **CompactFlash** | |
| 5CFCRD.016G-04 | CompactFlash 16 GB B&R | |
| 5CFCRD.0512-04 | CompactFlash 512 MB B&R | |
| 5CFCRD.1024-04 | CompactFlash 1 GB B&R | |
| 5CFCRD.2048-04 | CompactFlash 2 GB B&R | |
| 5CFCRD.4096-04 | CompactFlash 4 GB B&R | |
| 5CFCRD.8192-04 | CompactFlash 8 GB B&R | |
| | **Interface boards** | |
| 5PP5IF.CETH-00 | PP500 Interface board; connection for 1x Ethernet 10/100/1000 | |
| 5PP5IF.CHDA-00 | PP500 Interface board; connection for 1x HDA sound | |
| 5PP5IF.FCAN-00 | PP500 Interface board; connection for 1x CAN master, 512 kByte SRAM | |
| 5PP5IF.FPLM-00 | PP500 Interface board; connections for 2x POWER-LINK | |
| 5PP5IF.FX2X-00 | PP500 Interface board; connection for 1x X2X master, 512 kByte SRAM | |
| 5PP5IF.FXCM-00 | PP500 Interface board; connection for 1x CAN master, 1x X2X master, 512 kByte SRAM | |
| | **USB Accessories** | |
| 5MMUSB.2048-01 | USB 2.0 Memory Stick 2048 MB B&R | |

Table 21: 5PP520.0573-00 - Order data

### 3.1.1.1.3 Technical data

| Product ID | 5PP520.0573-00 |
|---|---|
| **General information** | |
| Cooling | Fan-free |
| LEDs | Power, CF, Link, Run |
| Power button | Yes |
| Reset button | Yes |
| Buzzer | Yes |
| Battery | |
|   Type | Renata 950 mAh |
|   Method | Lithium Ion |
|   Lifespan | 4 years[1] |
|   removable | Yes, accessible from the outside |
| Certification | |
|   CE | In preparation |
| B&R ID code | $B4CB |
| **Controllers** | |
| Bootloader | BIOS |
| Mode/Node switch | 2, 16 positions each (back side) |
| Watchdog | MTCX |
| Power failure logic | |
|   Controllers | MTCX[2] |
|   Buffer time | 10 ms |

Table 22: 5PP520.0573-00 - Technical data

| Product ID | 5PP520.0573-00 |
|---|---|
| Graphics | |
| Controllers | Intel® Graphics Media Accelerator 500 |
| Memory | |
| Type | DDR2 SDRAM |
| Size | Max. 2 GB |
| **Interfaces** | |
| COM1 | |
| Type | RS232, modem-capable, not electrically isolated |
| Design | 9-pin DSUB plug |
| UART | 16550-compatible, 16-byte FIFO |
| Max. baud rate | 115 kbit/s |
| CompactFlash slot 1 | |
| Type | Type I |
| USB | |
| Type | USB 2.0 |
| Amount | 2 |
| Design | Type A |
| Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), to high speed (480 Mbit/s) |
| Current load | Max. 1 A per connection |
| Ethernet | |
| Amount | 1 |
| Controllers | Intel 82574 |
| Design | Shielded RJ45 port |
| Transfer rate | 10/100/1000 Mbit/s |
| **Display** | |
| Type | Color TFT |
| Diagonal | 5.7" (144 mm) |
| Colors | 262,144 |
| Resolution | VGA, 640 x 480 pixels |
| Contrast | 850:1 |
| Viewing angles | |
| Horizontal | Direction R / direction L =80° |
| Vertical | Direction U / direction D = 80° |
| Background lighting | |
| Method | LED |
| Brightness | 400 cd/m² |
| Half-brightness time[3] | 50,000 h |
| Touch screen[4] | |
| Type | AMT |
| Technology | Analog, resistive |
| Controllers | B&R, serial, 12-bit |
| Degree of transmission | 80% ±3% |
| **Keys** | |
| Function keys | No |
| System keys | No |
| Lifespan | - |
| LED brightness | - |
| **Inserts** | |
| Interface board | Yes |
| I/O board | No |
| **Electrical properties** | |
| Rated voltage | 24 VDC ±25% |
| Rated current | 1 A[5] |

Table 22: 5PP520.0573-00 - Technical data

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Technical data

| Product ID | 5PP520.0573-00 |
|---|---|
| Starting current | Typ. 3 A, max. 50 A for <300 µs |
| Power consumption | 23 W[6] |
| Electrical isolation | Yes |
| **Operating conditions** | |
| EN 60529 protection | IP20 back side (only with an inserted CF card or IF board, or with an optional IF cover) IP65 / NEMA 250 type 4X, protection from dust and sprayed water on front side |
| **Environmental conditions** | |
| Temperature | |
|    Operation | 0 to 55°C |
|    Storage | -20 to 60°C |
|    Transport | -20 to 60°C |
| Relative humidity | |
|    Operation | See temperature humidity diagram |
|    Storage | See temperature humidity diagram |
|    Transport | See temperature humidity diagram |
| Vibration | |
|    Operation (continuous) | 2 to 9 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g |
|    Operation (occasional) | 2 to 9 Hz: 3.5 mm amplitude / 9 to 200 Hz: 1 g |
|    Storage | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
|    Transport | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
| Shock | |
|    Operation | 15 g, 11 ms |
|    Storage | 30 g, 15 ms |
|    Transport | 30 g, 15 ms |
| Altitude | |
|    Operation | Max. 3000 m (component-dependent)[7] |
| **Mechanical characteristics** | |
| Housing | |
|    Item | Aluminum paint |
| Front[8] | |
|    Frame | Naturally anodized aluminum |
|    Membrane | |
|       Item | Polyester |
|       Light background | RAL 9006 |
|       Dark gray border around display | RAL 7024 |
|    Gasket | Flat gasket around display front |
| Dimensions | |
|    Width | 212 mm |
|    Height | 156 mm |
|    Depth | 55 mm |
| Weight | 1287 g |

Table 22: 5PP520.0573-00 - Technical data

1) At 50°C, 8.5 µA of the supplied components and a self-discharge of 40%. If an interface board with SRAM is installed, then the service life equals 2½ years.
2) Maintenance controller extended.
3) At 25°C ambient temperature. Reducing the brightness by 50% can result in an approximate 50% increase of the half-brightness time.
4) Touch screen drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).
5) The specified value is valid for a nominal voltage of 24 VDC.
6) The specified value applies to a system unit with CPU board without an interface board.
7) Derating the maximum ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).
8) Depending on the process or batch, there may be visible deviations in the color and surface structure.

### 3.1.1.1.4 Dimensions



Image 9: 5PP520.0573-00 - Dimensions

Chapter 2
Technical data

### 3.1.1.1.5 Cutout



Image 10: 5PP520.0573-00 - Cutout installation

### 3.1.1.1.6 Temperature humidity diagram
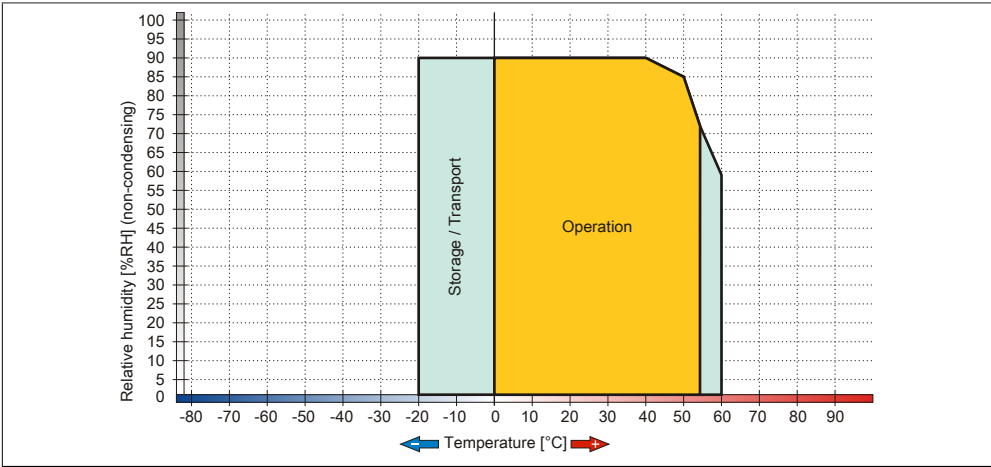


Image 11: 5PP520.0573-00 - Temperature humidity diagram

### 3.1.1.2 5PP551.0573-00

#### 3.1.1.2.1 General information

- 5.7" TFT VGA color display
- Function and system keys
- Intel® Atom™ technology
- Small installation depth
- Fan-free operation
- Can be expand via interface board

#### 3.1.1.2.2 Order data

| Model number | Short description | Figure |
|---|---|---|
| | **System units** | |
| 5PP551.0573-00 | Power Panel 551 5.7" VGA TFT display; 22 function keys and 20 system keys; connections for 1x RS232, 2x USB 2.0, 1x Ethernet 10/100/1000; can be expanded with interface board; IP65 protection (front side); order 24 VDC plug for supply voltage separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91) | |
| | **Mandatory accessory** | |
| | **CPU boards** | |
| 5PP5CP.US15-00 | PP500 CPU board Intel Atom Z510, 1100 MHz, 400 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| 5PP5CP.US15-01 | PP500 CPU board Intel Atom Z520, 1330 MHz, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| 5PP5CP.US15-02 | PP500 CPU board Intel Atom Z530, 1600 MHz, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| | **Main memory** | |
| 5MMDDR.0512-01 | SO-DIMM DDR2 RAM 512 MB PC2-5300 | |
| 5MMDDR.1024-01 | SO-DIMM DDR2 RAM 1024 MB PC2-5300 | |
| 5MMDDR.2048-01 | SO-DIMM DDR2 RAM 2048 MB PC2-5300 | |
| | **Terminal Blocks** | |
| 0TB103.9 | Connector, 24 VDC, 3-pin female, screw clamp, 3.31 mm², protected against vibration by the screw flange | |
| 0TB103.91 | Connector, 24 VDC, 3-pin female, cage clamp, 3.31 mm², protected against vibration by the screw flange | |
| | **Optional accessory** | |
| | **Batteries** | |
| 0AC201.91 | Lithium Battery 4 pieces, 3 V / 950 mAh button cell | |
| 4A0006.00-000 | Lithium battery, 3 V / 950 mAh, button cell | |
| | **CompactFlash** | |
| 5CFCRD.016G-04 | CompactFlash 16 GB B&R | |
| 5CFCRD.0512-04 | CompactFlash 512 MB B&R | |
| 5CFCRD.1024-04 | CompactFlash 1 GB B&R | |

Table 23: 5PP551.0573-00 - Order data

| Model number | Short description | Figure |
|---|---|---|
| 5CFCRD.2048-04 | CompactFlash 2 GB B&R | |
| 5CFCRD.4096-04 | CompactFlash 4 GB B&R | |
| 5CFCRD.8192-04 | CompactFlash 8 GB B&R | |
| | **Interface boards** | |
| 5PP5IF.CETH-00 | PP500 Interface board; connection for 1x Ethernet 10/100/1000 | |
| 5PP5IF.CHDA-00 | PP500 Interface board; connection for 1x HDA sound | |
| 5PP5IF.FCAN-00 | PP500 Interface board; connection for 1x CAN master, 512 kByte SRAM | |
| 5PP5IF.FPLM-00 | PP500 Interface board; connections for 2x POWER-LINK | |
| 5PP5IF.FX2X-00 | PP500 Interface board; connection for 1x X2X master, 512 kByte SRAM | |
| 5PP5IF.FXCM-00 | PP500 Interface board; connection for 1x CAN master, 1x X2X master, 512 kByte SRAM | |
| | **USB Accessories** | |
| 5MMUSB.2048-01 | USB 2.0 Memory Stick 2048 MB B&R | |

Table 23: 5PP551.0573-00 - Order data

### 3.1.1.2.3 Technical data

| Product ID | 5PP551.0573-00 |
|---|---|
| **General information** | |
| Cooling | Fan-free |
| LEDs | Power, CF, Link, Run |
| Power button | Yes |
| Reset button | Yes |
| Buzzer | Yes |
| Battery | |
|    Type | Renata 950 mAh |
|    Method | Lithium Ion |
|    Lifespan | 4 years[1] |
|    removable | Yes, accessible from the outside |
| Certification | |
|    CE | In preparation |
| B&R ID code | $B604 |
| **Controllers** | |
| Bootloader | BIOS |
| Mode/Node switch | 2, 16 positions each (back side) |
| Watchdog | MTCX |
| Power failure logic | |
|    Controllers | MTCX[2] |
|    Buffer time | 10 ms |
| Graphics | |
|    Controllers | Intel® Graphics Media Accelerator 500 |
| Memory | |
|    Type | DDR2 SDRAM |
|    Size | Max. 2 GB |

Table 24: 5PP551.0573-00 - Technical data

| Product ID | 5PP551.0573-00 |
|---|---|
| **Interfaces** | |
| COM1 | |
|    Type | RS232, modem-capable, not electrically isolated |
|    Design | 9-pin DSUB plug |
|    UART | 16550-compatible, 16-byte FIFO |
|    Max. baud rate | 115 kbit/s |
| CompactFlash slot 1 | |
|    Type | Type I |
| USB | |
|    Type | USB 2.0 |
|    Amount | 2 |
|    Design | Type A |
|    Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), to high speed (480 Mbit/s) |
|    Current load | Max. 1 A per connection |
| Ethernet | |
|    Amount | 1 |
|    Controllers | Intel 82574 |
|    Design | Shielded RJ45 port |
|    Transfer rate | 10/100/1000 Mbit/s |
| **Display** | |
| Type | Color TFT |
| Diagonal | 5.7" (144 mm) |
| Colors | 262,144 |
| Resolution | VGA, 640 x 480 pixels |
| Contrast | 850:1 |
| Viewing angles | |
|    Horizontal | Direction R / direction L =80° |
|    Vertical | Direction U / direction D = 80° |
| Background lighting | |
|    Method | LED |
|    Brightness | 400 cd/m² |
|    Half-brightness time[3] | 50,000 h |
| Touch screen[4] | |
|    Type | - |
|    Technology | - |
|    Controllers | - |
|    Degree of transmission | - |
| **Keys** | |
| Function keys | 22 with LED (yellow) |
| System keys | Numeric keys, cursor block |
| Lifespan | > 1,000,000 actuations with 1 ±0.3 N to 3 ±0.3 N operating force |
| LED brightness | |
|    Yellow | Typ. 38 mcd |
| **Inserts** | |
| Interface board | Yes |
| I/O board | No |
| **Electrical properties** | |
| Rated voltage | 24 VDC ±25% |
| Rated current | 1.1 A[5] |
| Starting current | Typ. 3 A, max. 50 A for <300 µs |
| Power consumption | 26 W[6] |
| Electrical isolation | Yes |

Table 24: 5PP551.0573-00 - Technical data

| Product ID | 5PP551.0573-00 |
|---|---|
| **Operating conditions** | |
| EN 60529 protection | IP20 back side (only with an inserted CF card or IF board, or with an optional IF cover) |
| | IP65 / NEMA 250 type 4X, protection from dust and sprayed water on front side |
| **Environmental conditions** | |
| Temperature | |
|    Operation | 0 to 55°C |
|    Storage | -20 to 60°C |
|    Transport | -20 to 60°C |
| Relative humidity | |
|    Operation | See temperature humidity diagram |
|    Storage | See temperature humidity diagram |
|    Transport | See temperature humidity diagram |
| Vibration | |
|    Operation (continuous) | 2 to 9 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g |
|    Operation (occasional) | 2 to 9 Hz: 3.5 mm amplitude / 9 to 200 Hz: 1 g |
|    Storage | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
|    Transport | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
| Shock | |
|    Operation | 15 g, 11 ms |
|    Storage | 30 g, 15 ms |
|    Transport | 30 g, 15 ms |
| Altitude | |
|    Operation | Max. 3000 m (component-dependent)[7] |
| **Mechanical characteristics** | |
| Housing | |
|    Item | Aluminum paint |
| Front[8] | |
|    Frame | Naturally anodized aluminum |
|    Membrane | |
|      Item | Polyester |
|      Light background | RAL 9006 |
|      Dark gray border around display | RAL 7024 |
|    Gasket | Flat gasket around display front |
| Dimensions | |
|    Width | 212 mm |
|    Height | 245 mm |
|    Depth | 54.95 mm |
| Weight | 1750 g |

Table 24: 5PP551.0573-00 - Technical data

1) At 50°C, 8.5 µA of the supplied components and a self-discharge of 40%. If an interface board with SRAM is installed, then the service life equals 2½ years.
2) Maintenance controller extended.
3) At 25°C ambient temperature. Reducing the brightness by 50% can result in an approximate 50% increase of the half-brightness time.
4) Touch screen drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).
5) The specified value is valid for a nominal voltage of 24 VDC.
6) The specified value applies to a system unit with CPU board without an interface board.
7) Derating the maximum ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).
8) Depending on the process or batch, there may be visible deviations in the color and surface structure.

### 3.1.1.2.4 Dimensions

Image 12: 5PP551.0573-00 - Dimensions

### 3.1.1.2.5 Cutout

Outer contour (Power Panel)

Cutout

245

238.5

Cutout size 199 ±0.5 mm x 232 ±0.5 mm

6.5

0

0

6.5

205.5

212

Image 13: 5PP551.0573-00 - Cutout installation

### 3.1.1.2.6 Temperature humidity diagram



Image 14: 5PP551.0573-00 - Temperature humidity diagram

### 3.1.1.3 5PP552.0573-00

#### 3.1.1.3.1 General information

- 5.7" TFT VGA color display
- Function and system keys
- Intel® Atom™ technology
- Small installation depth
- Fan-free operation
- Can be expand via interface board

#### 3.1.1.3.2 Order data

| Model number | Short description | Figure |
|---|---|---|
| | **System units** | |
| 5PP552.0573-00 | Power Panel 552 5.7" VGA TFT display; 20 function keys and 20 system keys; connections for 1x RS232, 2x USB 2.0, 1x Ethernet 10/100/1000; can be expanded with interface board; IP65 protection (front side); order 24 VDC plug for supply voltage separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91) | |
| | **Mandatory accessory** | |
| | **CPU boards** | |
| 5PP5CP.US15-00 | PP500 CPU board Intel Atom Z510, 1100 MHz, 400 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| 5PP5CP.US15-01 | PP500 CPU board Intel Atom Z520, 1330 MHz, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| 5PP5CP.US15-02 | PP500 CPU board Intel Atom Z530, 1600 MHz, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| | **Main memory** | |
| 5MMDDR.0512-01 | SO-DIMM DDR2 RAM 512 MB PC2-5300 | |
| 5MMDDR.1024-01 | SO-DIMM DDR2 RAM 1024 MB PC2-5300 | |
| 5MMDDR.2048-01 | SO-DIMM DDR2 RAM 2048 MB PC2-5300 | |
| | **Terminal Blocks** | |
| 0TB103.9 | Connector, 24 VDC, 3-pin female, screw clamp, 3.31 mm², protected against vibration by the screw flange | |
| 0TB103.91 | Connector, 24 VDC, 3-pin female, cage clamp, 3.31 mm², protected against vibration by the screw flange | |
| | **Optional accessory** | |
| | **Batteries** | |
| 0AC201.91 | Lithium Battery 4 pieces, 3 V / 950 mAh button cell | |
| 4A0006.00-000 | Lithium battery, 3 V / 950 mAh, button cell | |
| | **CompactFlash** | |
| 5CFCRD.016G-04 | CompactFlash 16 GB B&R | |
| 5CFCRD.0512-04 | CompactFlash 512 MB B&R | |
| 5CFCRD.1024-04 | CompactFlash 1 GB B&R | |

Table 25: 5PP552.0573-00 - Order data

| Model number | Short description | Figure |
|---|---|---|
| 5CFCRD.2048-04 | CompactFlash 2 GB B&R | |
| 5CFCRD.4096-04 | CompactFlash 4 GB B&R | |
| 5CFCRD.8192-04 | CompactFlash 8 GB B&R | |
| | **Interface boards** | |
| 5PP5IF.CETH-00 | PP500 Interface board; connection for 1x Ethernet 10/100/1000 | |
| 5PP5IF.CHDA-00 | PP500 Interface board; connection for 1x HDA sound | |
| 5PP5IF.FCAN-00 | PP500 Interface board; connection for 1x CAN master, 512 kByte SRAM | |
| 5PP5IF.FPLM-00 | PP500 Interface board; connections for 2x POWER-LINK | |
| 5PP5IF.FX2X-00 | PP500 Interface board; connection for 1x X2X master, 512 kByte SRAM | |
| 5PP5IF.FXCM-00 | PP500 Interface board; connection for 1x CAN master, 1x X2X master, 512 kByte SRAM | |
| | **USB Accessories** | |
| 5MMUSB.2048-01 | USB 2.0 Memory Stick 2048 MB B&R | |

Table 25: 5PP552.0573-00 - Order data

## 3.1.1.3.3 Technical data

| Product ID | 5PP552.0573-00 |
|---|---|
| **General information** | |
| Cooling | Fan-free |
| LEDs | Power, CF, Link, Run |
| Power button | Yes |
| Reset button | Yes |
| Buzzer | Yes |
| Battery | |
|    Type | Renata 950 mAh |
|    Method | Lithium Ion |
|    Lifespan | 4 years[1] |
|    removable | Yes, accessible from the outside |
| Certification | |
|    CE | In preparation |
| B&R ID code | $B605 |
| **Controllers** | |
| Bootloader | BIOS |
| Mode/Node switch | 2, 16 positions each (back side) |
| Watchdog | MTCX |
| Power failure logic | |
|    Controllers | MTCX[2] |
|    Buffer time | 10 ms |
| Graphics | |
|    Controllers | Intel® Graphics Media Accelerator 500 |
| Memory | |
|    Type | DDR2 SDRAM |
|    Size | Max. 2 GB |

Table 26: 5PP552.0573-00 - Technical data

Chapter 2
Technical data

| Product ID | 5PP552.0573-00 |
|---|---|
| **Interfaces** | |
| COM1 | |
|     Type | RS232, modem-capable, not electrically isolated |
|     Design | 9-pin DSUB plug |
|     UART | 16550-compatible, 16-byte FIFO |
|     Max. baud rate | 115 kbit/s |
| CompactFlash slot 1 | |
|     Type | Type I |
| USB | |
|     Type | USB 2.0 |
|     Amount | 2 |
|     Design | Type A |
|     Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), to high speed (480 Mbit/s) |
|     Current load | Max. 1 A per connection |
| Ethernet | |
|     Amount | 1 |
|     Controllers | Intel 82574 |
|     Design | Shielded RJ45 port |
|     Transfer rate | 10/100/1000 Mbit/s |
| **Display** | |
| Type | Color TFT |
| Diagonal | 5.7" (144 mm) |
| Colors | 262,144 |
| Resolution | VGA, 640 x 480 pixels |
| Contrast | 850:1 |
| Viewing angles | |
|     Horizontal | Direction R / direction L =80° |
|     Vertical | Direction U / direction D = 80° |
| Background lighting | |
|     Method | LED |
|     Brightness | 400 cd/m² |
|     Half-brightness time[3] | 50,000 h |
| Touch screen[4] | |
|     Type | - |
|     Technology | - |
|     Controllers | - |
|     Degree of transmission | - |
| **Keys** | |
| Function keys | 20 with LED (yellow) |
| System keys | Numeric keys, cursor block |
| Lifespan | > 1,000,000 actuations with 1 ±0.3 N to 3 ±0.3 N operating force |
| LED brightness | |
|     Yellow | Typ. 38 mcd |
| **Inserts** | |
| Interface board | Yes |
| I/O board | No |
| **Electrical properties** | |
| Rated voltage | 24 VDC ±25% |
| Rated current | 1.1 A[5] |
| Starting current | Typ. 3 A, max. 50 A for <300 µs |
| Power consumption | 26 W[6] |
| Electrical isolation | Yes |

Table 26: 5PP552.0573-00 - Technical data

| Product ID | 5PP552.0573-00 |
|---|---|
| **Operating conditions** | |
| EN 60529 protection | IP20 back side (only with an inserted CF card or IF board, or with an optional IF cover) <br> IP65 / NEMA 250 type 4X, protection from dust and sprayed water on front side |
| **Environmental conditions** | |
| Temperature | |
|    Operation | 0 to 55°C |
|    Storage | -20 to 60°C |
|    Transport | -20 to 60°C |
| Relative humidity | |
|    Operation | See temperature humidity diagram |
|    Storage | See temperature humidity diagram |
|    Transport | See temperature humidity diagram |
| Vibration | |
|    Operation (continuous) | 2 to 9 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g |
|    Operation (occasional) | 2 to 9 Hz: 3.5 mm amplitude / 9 to 200 Hz: 1 g |
|    Storage | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
|    Transport | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
| Shock | |
|    Operation | 15 g, 11 ms |
|    Storage | 30 g, 15 ms |
|    Transport | 30 g, 15 ms |
| Altitude | |
|    Operation | Max. 3000 m (component-dependent)[7] |
| **Mechanical characteristics** | |
| Housing | |
|    Item | Aluminum paint |
| Front[8] | |
|    Frame | Naturally anodized aluminum |
|    Membrane | |
|       Item | Polyester |
|       Light background | RAL 9006 |
|       Dark gray border around display | RAL 7024 |
|    Gasket | Flat gasket around display front |
| Dimensions | |
|    Width | 302 mm |
|    Height | 187 mm |
|    Depth | 55 mm |
| Weight | 1750 g |

Table 26: 5PP552.0573-00 - Technical data

1) At 50°C, 8.5 µA of the supplied components and a self-discharge of 40%. If an interface board with SRAM is installed, then the service life equals 2½ years.
2) Maintenance controller extended.
3) At 25°C ambient temperature. Reducing the brightness by 50% can result in an approximate 50% increase of the half-brightness time.
4) Touch screen drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).
5) The specified value is valid for a nominal voltage of 24 VDC.
6) The specified value applies to a system unit with CPU board without an interface board.
7) Derating the maximum ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).
8) Depending on the process or batch, there may be visible deviations in the color and surface structure.
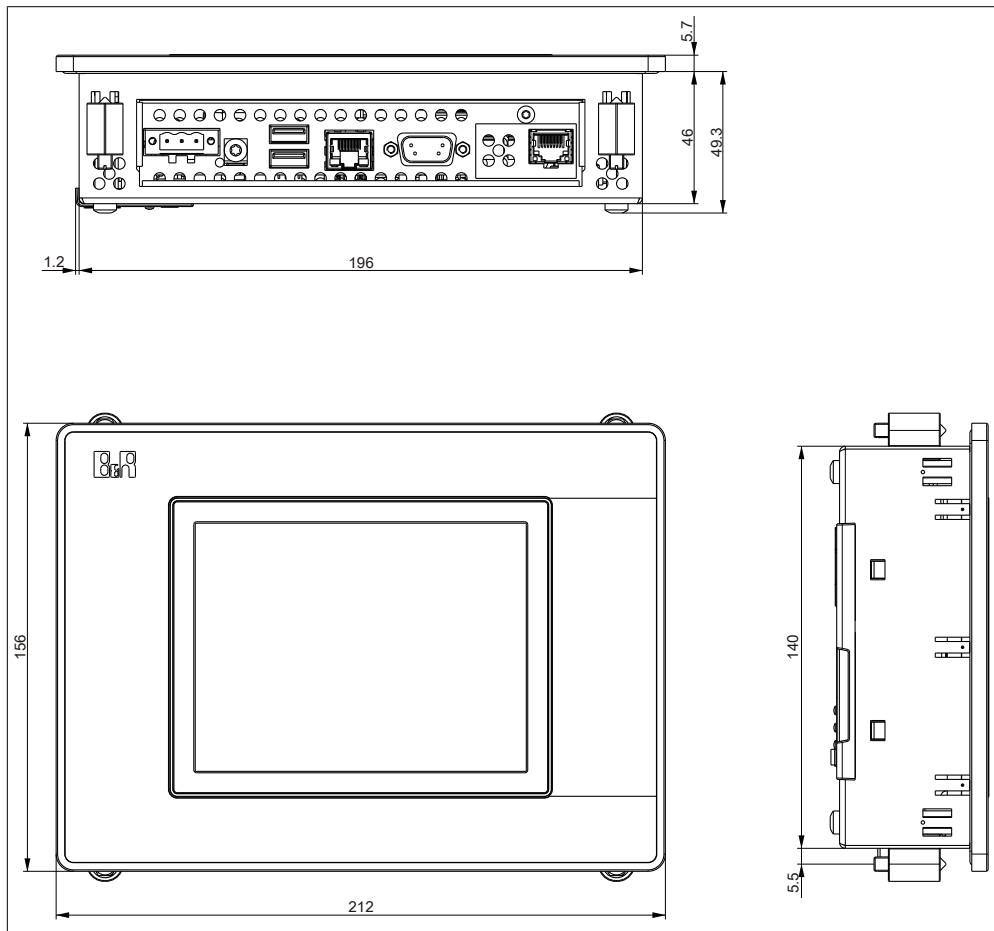
### 3.1.1.3.4 Dimensions
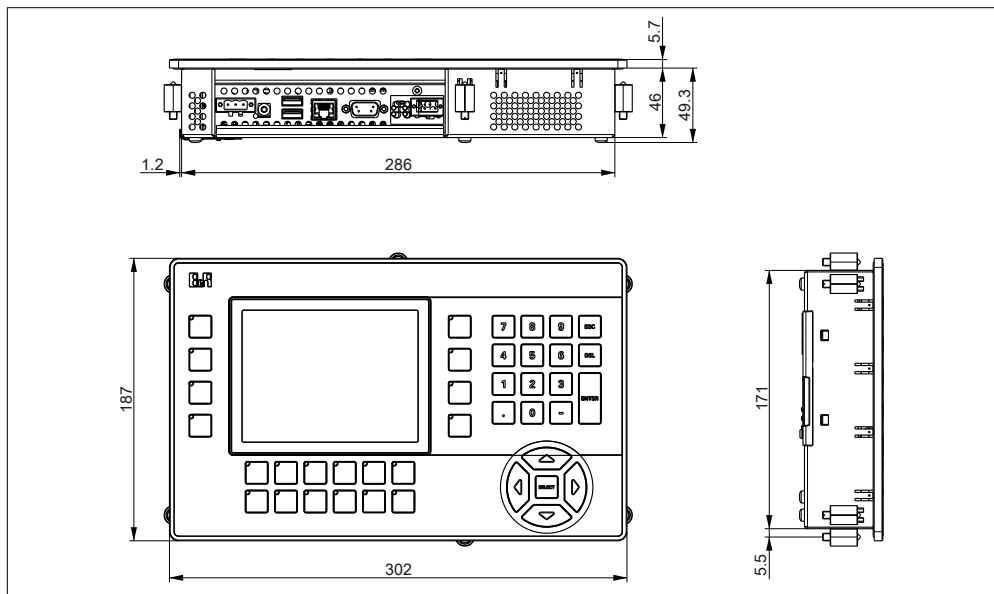


Image 15: 5PP552.0573-00 - Dimensions

### 3.1.1.3.5 Cutout
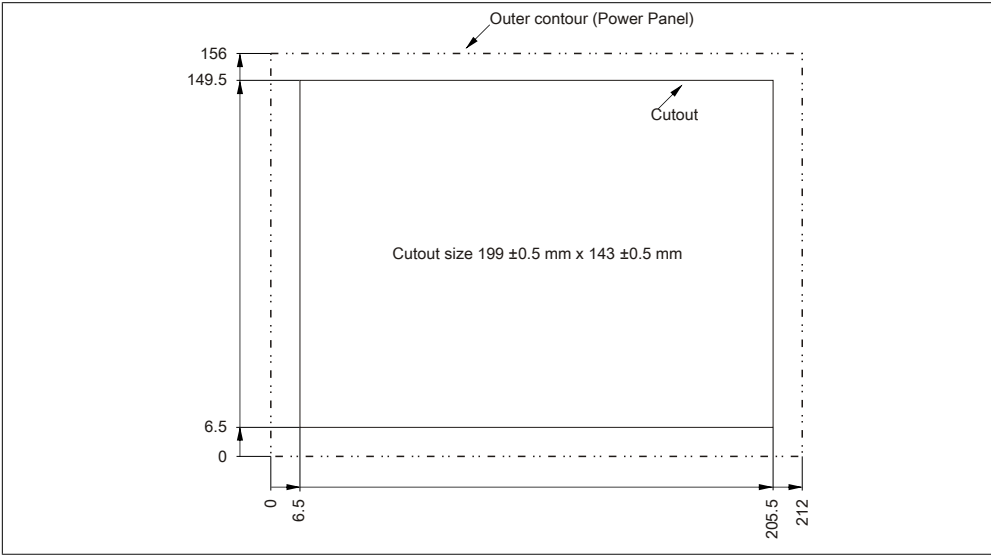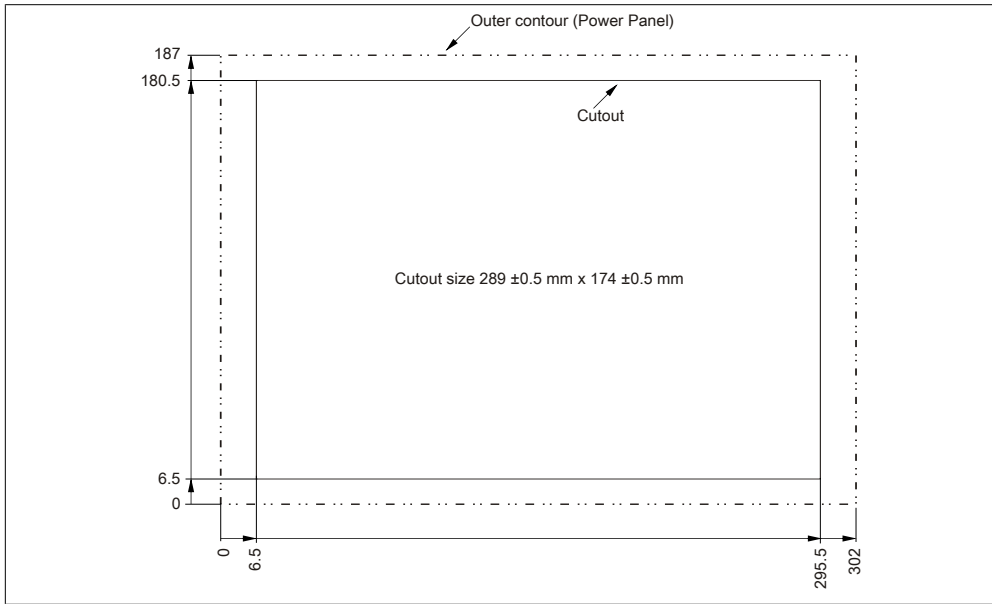


Image 16: 5PP552.0573-00 - Cutout installation

### 3.1.1.3.6 Temperature humidity diagram



Image 17: 5PP552.0573-00 - Temperature humidity diagram

### 3.1.2 7" system unit

#### 3.1.2.1 5PP520.0702-00

##### 3.1.2.1.1 General information

- 7" TFT WVGA color display
- Analog resistive touch screen
- Intel® Atom™ technology
- Small installation depth
- Fan-free operation
- Can be expand via interface board

##### 3.1.2.1.2 Order data

| Model number | Short description | Figure |
|---|---|---|
| | **System units** | |
| 5PP520.0702-00 | Power Panel 520 7" WVGA TFT display with touch screen (resistive); connections for 1x RS232, 2x USB 2.0, 1x Ethernet 10/100/1000; can be expanded with interface board; IP65 protection (front side); order 24 VDC plug for supply voltage separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91) | |
| | **Mandatory accessory** | |
| | **CPU boards** | |
| 5PP5CP.US15-00 | PP500 CPU board Intel Atom Z510, 1100 MHz, 400 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| 5PP5CP.US15-01 | PP500 CPU board Intel Atom Z520, 1330 MHz, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| 5PP5CP.US15-02 | PP500 CPU board Intel Atom Z530, 1600 MHz, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| | **Main memory** | |
| 5MMDDR.0512-01 | SO-DIMM DDR2 RAM 512 MB PC2-5300 | |
| 5MMDDR.1024-01 | SO-DIMM DDR2 RAM 1024 MB PC2-5300 | |
| 5MMDDR.2048-01 | SO-DIMM DDR2 RAM 2048 MB PC2-5300 | |
| | **Terminal Blocks** | |
| 0TB103.9 | Connector, 24 VDC, 3-pin female, screw clamp, 3.31 mm², protected against vibration by the screw flange | |
| 0TB103.91 | Connector, 24 VDC, 3-pin female, cage clamp, 3.31 mm², protected against vibration by the screw flange | |
| | **Optional accessory** | |
| | **Batteries** | |
| 0AC201.91 | Lithium Battery 4 pieces, 3 V / 950 mAh button cell | |
| 4A0006.00-000 | Lithium battery, 3 V / 950 mAh, button cell | |
| | **CompactFlash** | |

Table 27: 5PP520.0702-00 - Order data

| Model number | Short description | Figure |
|---|---|---|
| 5CFCRD.016G-04 | CompactFlash 16 GB B&R | |
| 5CFCRD.0512-04 | CompactFlash 512 MB B&R | |
| 5CFCRD.1024-04 | CompactFlash 1 GB B&R | |
| 5CFCRD.2048-04 | CompactFlash 2 GB B&R | |
| 5CFCRD.4096-04 | CompactFlash 4 GB B&R | |
| 5CFCRD.8192-04 | CompactFlash 8 GB B&R | |
| | **Interface boards** | |
| 5PP5IF.CETH-00 | PP500 Interface board; connection for 1x Ethernet 10/100/1000 | |
| 5PP5IF.CHDA-00 | PP500 Interface board; connection for 1x HDA sound | |
| 5PP5IF.FCAN-00 | PP500 Interface board; connection for 1x CAN master, 512 kByte SRAM | |
| 5PP5IF.FPLM-00 | PP500 Interface board; connections for 2x POWER-LINK | |
| 5PP5IF.FX2X-00 | PP500 Interface board; connection for 1x X2X master, 512 kByte SRAM | |
| 5PP5IF.FXCM-00 | PP500 Interface board; connection for 1x CAN master, 1x X2X master, 512 kByte SRAM | |
| | **USB Accessories** | |
| 5MMUSB.2048-01 | USB 2.0 Memory Stick 2048 MB B&R | |

Table 27: 5PP520.0702-00 - Order data

## 3.1.2.1.3 Technical data

| Product ID | 5PP520.0702-00 |
|---|---|
| **General information** | |
| Cooling | Fan-free |
| LEDs | Power, CF, Link, Run |
| Power button | Yes |
| Reset button | Yes |
| Buzzer | Yes |
| Battery | |
|    Type | Renata 950 mAh |
|    Method | Lithium Ion |
|    Lifespan | 4 years[1] |
|    removable | Yes, accessible from the outside |
| Certification | |
|    CE | In preparation |
| B&R ID code | $B4CD |
| **Controllers** | |
| Bootloader | BIOS |
| Mode/Node switch | 2, 16 positions each (back side) |
| Watchdog | MTCX |
| Power failure logic | |
|    Controllers | MTCX[2] |
|    Buffer time | 10 ms |
| Graphics | |
|    Controllers | Intel® Graphics Media Accelerator 500 |
| Memory | |
|    Type | DDR2 SDRAM |
|    Size | Max. 2 GB |

Table 28: 5PP520.0702-00 - Technical data

Chapter 2
Technical data

| Product ID | 5PP520.0702-00 |
|---|---|
| **Interfaces** | |
| COM1 | |
| Type | RS232, modem-capable, not electrically isolated |
| Design | 9-pin DSUB plug |
| UART | 16550-compatible, 16-byte FIFO |
| Max. baud rate | 115 kbit/s |
| CompactFlash slot 1 | |
| Type | Type I |
| USB | |
| Type | USB 2.0 |
| Amount | 2 |
| Design | Type A |
| Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), to high speed (480 Mbit/s) |
| Current load | Max. 1 A per connection |
| Ethernet | |
| Amount | 1 |
| Controllers | Intel 82574 |
| Design | Shielded RJ45 port |
| Transfer rate | 10/100/1000 Mbit/s |
| **Display** | |
| Type | Color TFT |
| Diagonal | 7" (177.8 mm) |
| Colors | 16 million |
| Resolution | WVGA, 800 x 480 pixels |
| Contrast | 600:1 |
| Viewing angles | |
| Horizontal | Direction R / direction L =70° |
| Vertical | Direction U / direction D = 60° |
| Background lighting | |
| Method | LED |
| Brightness | 500 cd/m² |
| Half-brightness time[3] | 50,000 h |
| Touch screen[4] | |
| Type | AMT |
| Technology | Analog, resistive |
| Controllers | B&R, serial, 12-bit |
| Degree of transmission | 80% ±3% |
| **Keys** | |
| Function keys | No |
| System keys | No |
| Lifespan | - |
| LED brightness | - |
| **Inserts** | |
| Interface board | Yes |
| I/O board | No |
| **Electrical properties** | |
| Rated voltage | 24 VDC ±25% |
| Rated current | 1 A[5] |
| Starting current | Typ. 3 A, max. 50 A for <300 µs |
| Power consumption | 24 W[6] |
| Electrical isolation | Yes |

Table 28: 5PP520.0702-00 - Technical data

| Product ID | 5PP520.0702-00 |
|---|---|
| **Operating conditions** | |
| EN 60529 protection | IP20 back side (only with an inserted CF card or IF board, or with an optional IF cover) <br> IP65 / NEMA 250 type 4X, protection from dust and sprayed water on front side |
| **Environmental conditions** | |
| Temperature | |
|   Operation | 0 to 55°C |
|   Storage | -20 to 60°C |
|   Transport | -20 to 60°C |
| Relative humidity | |
|   Operation | See temperature humidity diagram |
|   Storage | See temperature humidity diagram |
|   Transport | See temperature humidity diagram |
| Vibration | |
|   Operation (continuous) | 2 to 9 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g |
|   Operation (occasional) | 2 to 9 Hz: 3.5 mm amplitude / 9 to 200 Hz: 1 g |
|   Storage | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
|   Transport | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
| Shock | |
|   Operation | 15 g, 11 ms |
|   Storage | 30 g, 15 ms |
|   Transport | 30 g, 15 ms |
| Altitude | |
|   Operation | Max. 3000 m (component-dependent)[7] |
| **Mechanical characteristics** | |
| Housing | |
|   Item | Aluminum paint |
| Front[8] | |
|   Frame | Naturally anodized aluminum |
|   Membrane | |
|     Item | Polyester |
|     Light background | RAL 9006 |
|     Dark gray border around display | RAL 7024 |
|   Gasket | Flat gasket around display front |
| Dimensions | |
|   Width | 212 mm |
|   Height | 156 mm |
|   Depth | 55 mm |
| Weight | 1200 g |

Table 28: 5PP520.0702-00 - Technical data

1) At 50°C, 8.5 µA of the supplied components and a self-discharge of 40%. If an interface board with SRAM is installed, then the service life equals 2½ years.
2) Maintenance controller extended.
3) At 25°C ambient temperature. Reducing the brightness by 50% can result in an approximate 50% increase of the half-brightness time.
4) Touch screen drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).
5) The specified value is valid for a nominal voltage of 24 VDC.
6) The specified value applies to a system unit with CPU board without an interface board.
7) Derating the maximum ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).
8) Depending on the process or batch, there may be visible deviations in the color and surface structure.
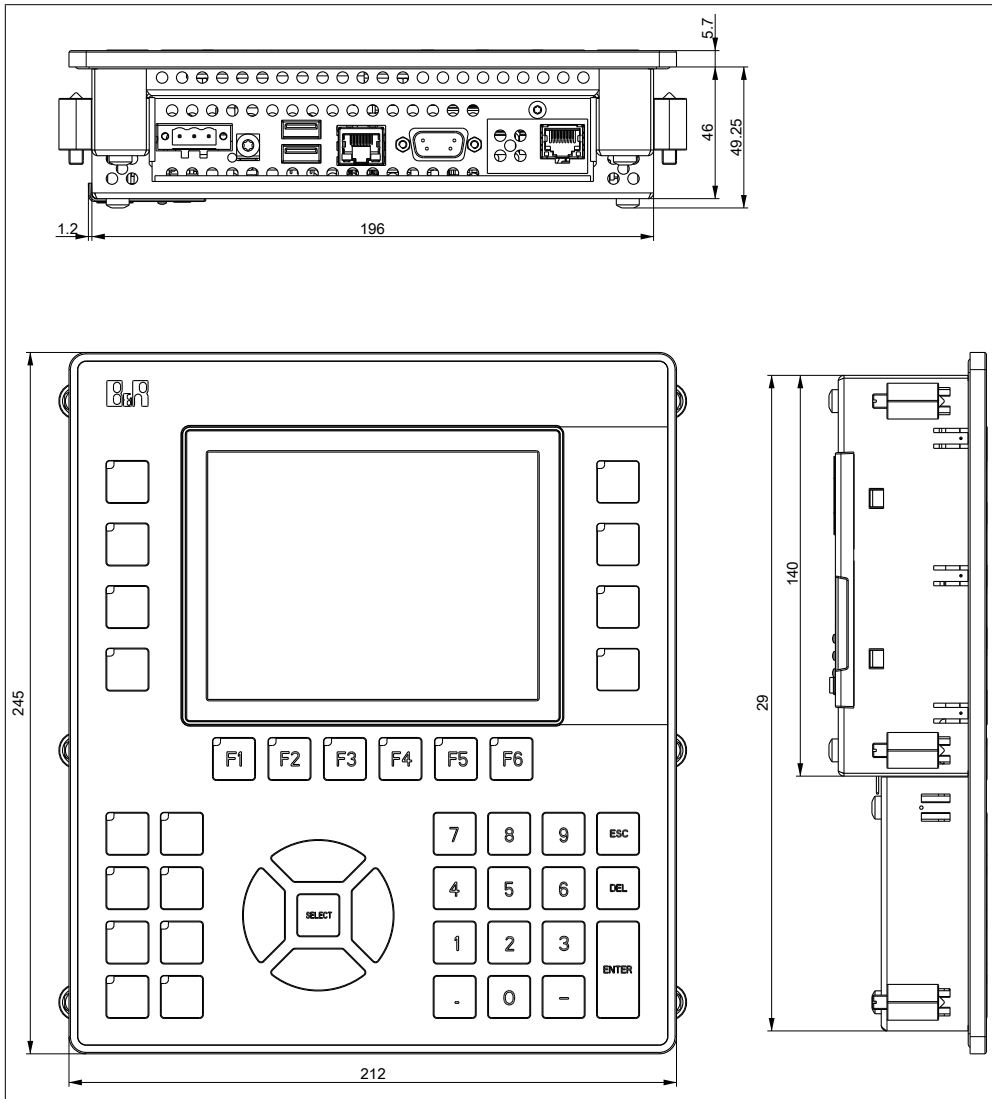
### 3.1.2.1.4 Dimensions
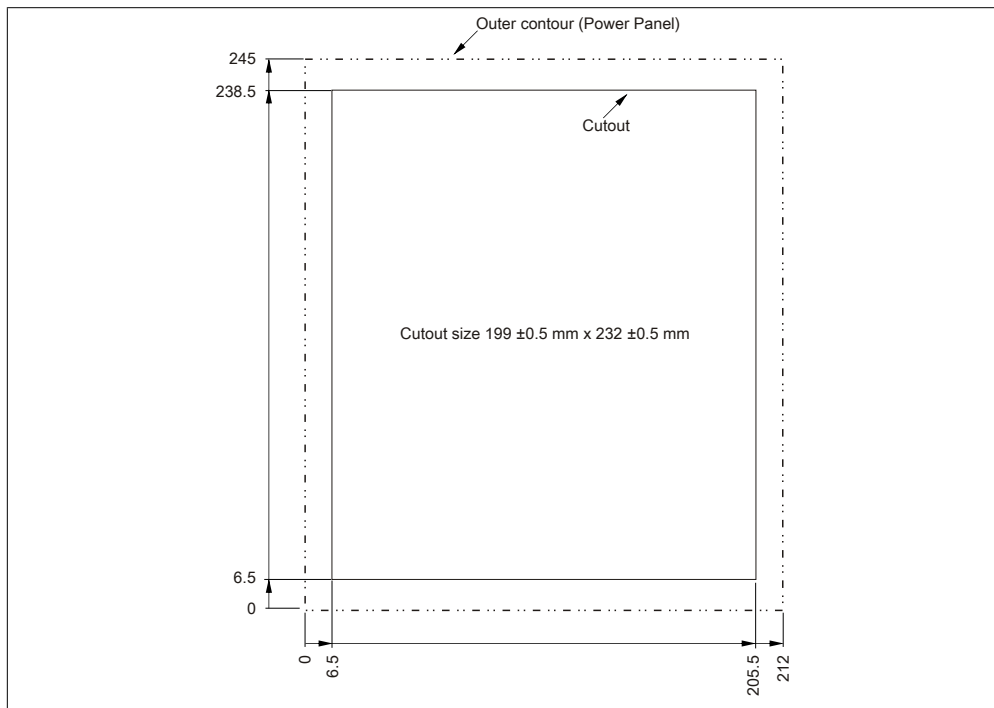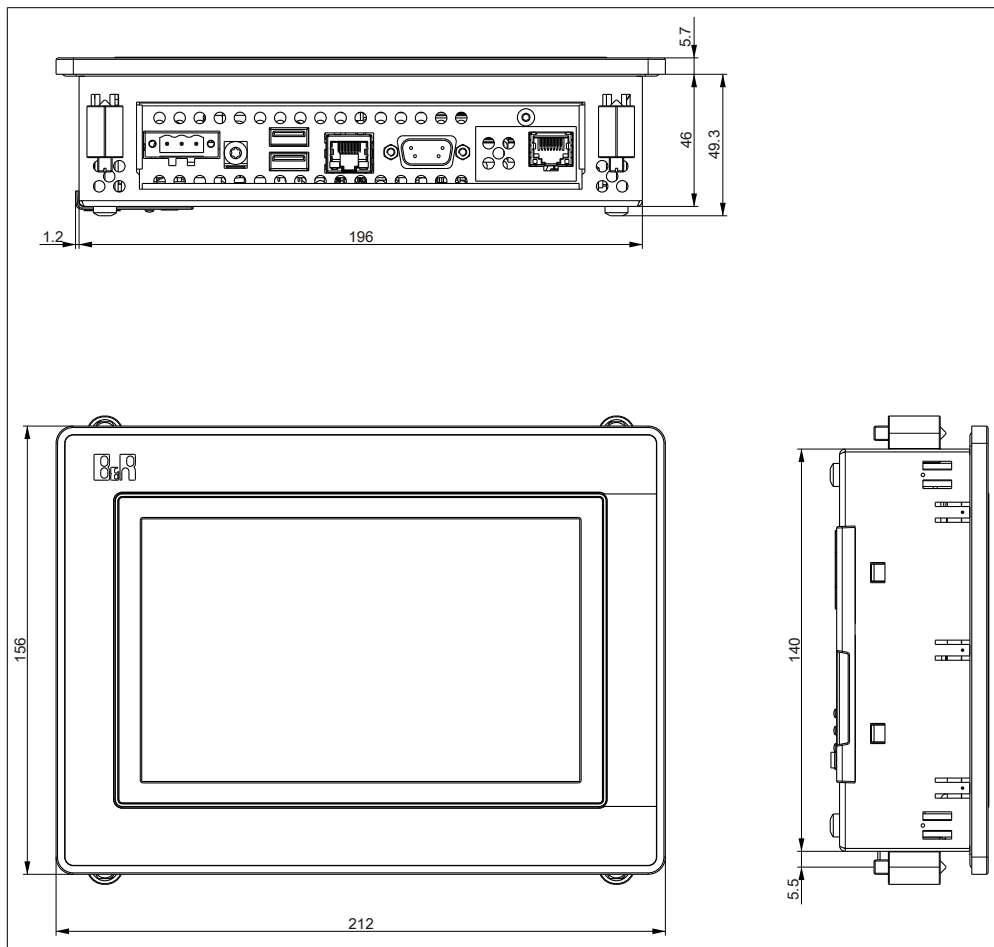


Image 18: 5PP520.0702-00 - Dimensions

### 3.1.2.1.5 Cutout
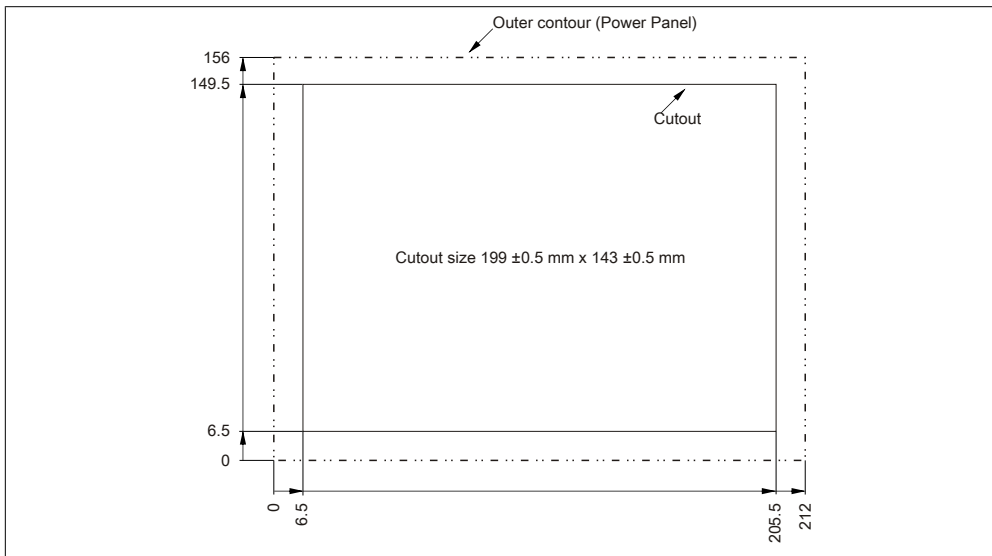


Image 19: 5PP520.0702-00 - Cutout installation

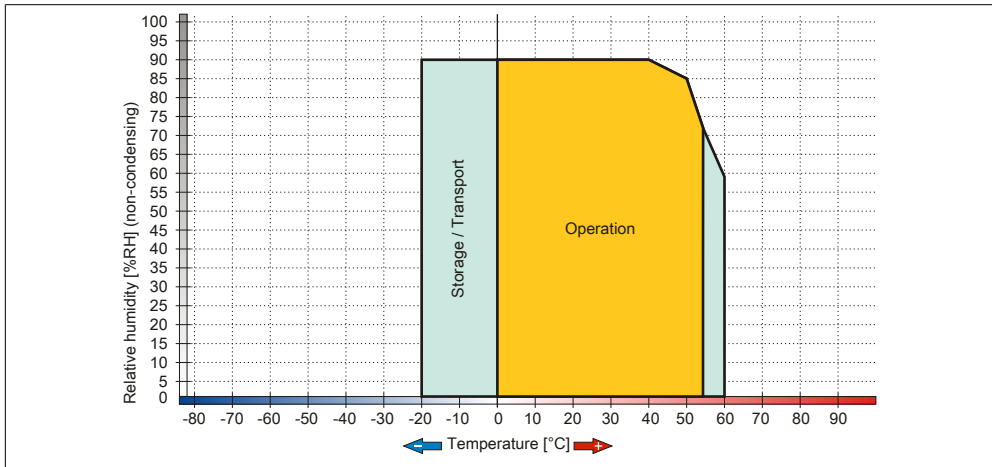### 3.1.2.1.6 Temperature humidity diagram
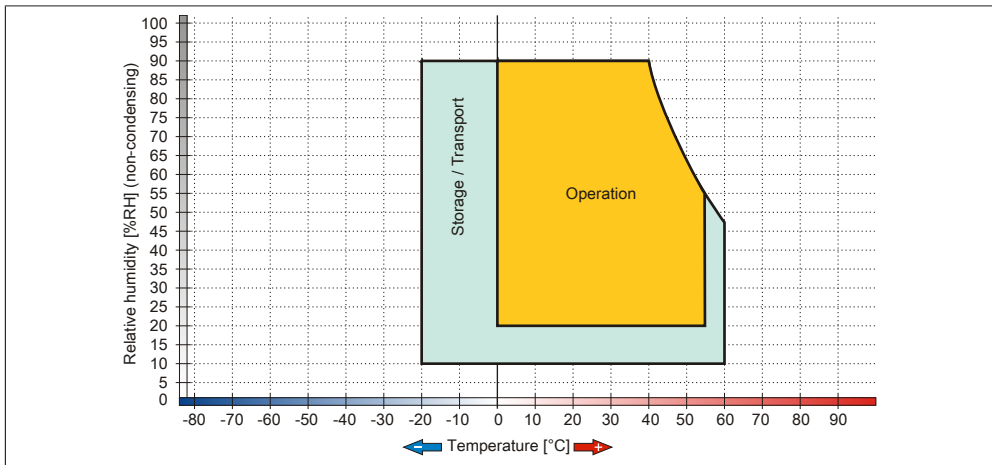


Image 20: 5PP520.0702-00 - Temperature humidity diagram

### 3.1.3 10.4" system units

#### 3.1.3.1 5PP520.1043-00

3.1.3.1.1 General information

- 10.4" TFT VGA color display
- Analog resistive touch screen
- Intel® Atom™ technology
- Small installation depth
- Fan-free operation
- Can be expand via interface board

3.1.3.1.2 Order data

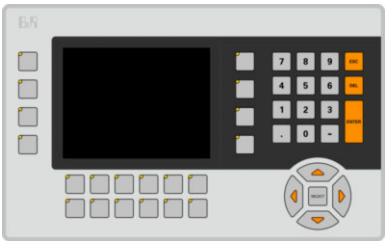| Model number | Short description | Figure |
|---|---|---|
| | **System units** | |
| 5PP520.1043-00 | Power Panel 520 10.4" VGA TFT display with touch screen (resistive); connections for 1x RS232, 3x USB 2.0, 1x Ethernet 10/100/1000; can be expanded with interface board; IP65 protection (front side); order 24 VDC plug for supply voltage separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91) | |
| | **Mandatory accessory** | |
| | **CPU boards** | |
| 5PP5CP.US15-00 | PP500 CPU board Intel Atom Z510, 1100 MHz, 400 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| 5PP5CP.US15-01 | PP500 CPU board Intel Atom Z520, 1330 MHz, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| 5PP5CP.US15-02 | PP500 CPU board Intel Atom Z530, 1600 MHz, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| | **Main memory** | |
| 5MMDDR.0512-01 | SO-DIMM DDR2 RAM 512 MB PC2-5300 | |
| 5MMDDR.1024-01 | SO-DIMM DDR2 RAM 1024 MB PC2-5300 | |
| 5MMDDR.2048-01 | SO-DIMM DDR2 RAM 2048 MB PC2-5300 | |
| | **Terminal Blocks** | |
| 0TB103.9 | Connector, 24 VDC, 3-pin female, screw clamp, 3.31 mm², protected against vibration by the screw flange | |
| 0TB103.91 | Connector, 24 VDC, 3-pin female, cage clamp, 3.31 mm², protected against vibration by the screw flange | |
| | **Optional accessory** | |
| | **Batteries** | |
| 0AC201.91 | Lithium Battery 4 pieces, 3 V / 950 mAh button cell | |
| 4A0006.00-000 | Lithium battery, 3 V / 950 mAh, button cell | |
| | **CompactFlash** | |

Table 29: 5PP520.1043-00 - Order data

| Model number | Short description | Figure |
|---|---|---|
| 5CFCRD.016G-04 | CompactFlash 16 GB B&R | |
| 5CFCRD.0512-04 | CompactFlash 512 MB B&R | |
| 5CFCRD.1024-04 | CompactFlash 1 GB B&R | |
| 5CFCRD.2048-04 | CompactFlash 2 GB B&R | |
| 5CFCRD.4096-04 | CompactFlash 4 GB B&R | |
| 5CFCRD.8192-04 | CompactFlash 8 GB B&R | |
| | **Interface boards** | |
| 5PP5IF.CETH-00 | PP500 Interface board; connection for 1x Ethernet 10/100/1000 | |
| 5PP5IF.CHDA-00 | PP500 Interface board; connection for 1x HDA sound | |
| 5PP5IF.FCAN-00 | PP500 Interface board; connection for 1x CAN master, 512 kByte SRAM | |
| 5PP5IF.FPLM-00 | PP500 Interface board; connections for 2x POWER-LINK | |
| 5PP5IF.FX2X-00 | PP500 Interface board; connection for 1x X2X master, 512 kByte SRAM | |
| 5PP5IF.FXCM-00 | PP500 Interface board; connection for 1x CAN master, 1x X2X master, 512 kByte SRAM | |
| | **USB Accessories** | |
| 5MMUSB.2048-01 | USB 2.0 Memory Stick 2048 MB B&R | |

Table 29: 5PP520.1043-00 - Order data

## 3.1.3.1.3 Technical data

| Product ID | 5PP520.1043-00 |
|---|---|
| **General information** | |
| Cooling | Fan-free |
| LEDs | Power, CF, Link, Run |
| Power button | Yes |
| Reset button | Yes |
| Buzzer | Yes |
| Battery | |
|    Type | Renata 950 mAh |
|    Method | Lithium Ion |
|    Lifespan | 4 years[1] |
|    removable | Yes, accessible from the outside |
| Certification | |
|    CE | In preparation |
| B&R ID code | $B4CE |
| **Controllers** | |
| Bootloader | BIOS |
| Mode/Node switch | 2, 16 positions each (back side) |
| Watchdog | MTCX |
| Power failure logic | |
|    Controllers | MTCX[2] |
|    Buffer time | 10 ms |
| Graphics | |
|    Controllers | Intel® Graphics Media Accelerator 500 |
| Memory | |
|    Type | DDR2 SDRAM |
|    Size | Max. 2 GB |

Table 30: 5PP520.1043-00 - Technical data

Chapter 2
Technical data

| Product ID | 5PP520.1043-00 |
|---|---|
| **Interfaces** | |
| COM1 | |
|    Type | RS232, modem-capable, not electrically isolated |
|    Design | 9-pin DSUB plug |
|    UART | 16550-compatible, 16-byte FIFO |
|    Max. baud rate | 115 kbit/s |
| CompactFlash slot 1 | |
|    Type | Type I |
| USB | |
|    Type | USB 2.0 |
|    Amount | 3 |
|    Design | Type A |
|    Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), to high speed (480 Mbit/s) |
|    Current load | Max. 1 A per connection |
| Ethernet | |
|    Amount | 1 |
|    Controllers | Intel 82574 |
|    Design | Shielded RJ45 port |
|    Transfer rate | 10/100/1000 Mbit/s |
| **Display** | |
| Type | Color TFT |
| Diagonal | 10.4" (264 mm) |
| Colors | 16 million |
| Resolution | VGA, 640 x 480 pixels |
| Contrast | 700:1 |
| Viewing angles | |
|    Horizontal | Direction R / direction L =80° |
|    Vertical | Direction U = 60°/ direction D = 80° |
| Background lighting | |
|    Method | LED |
|    Brightness | 450 cd/m² |
|    Half-brightness time[3] | 50,000 h |
| Touch screen[4] | |
|    Type | AMT |
|    Technology | Analog, resistive |
|    Controllers | B&R, serial, 12-bit |
|    Degree of transmission | 80% ±3% |
| **Keys** | |
| Function keys | No |
| System keys | No |
| Lifespan | - |
| LED brightness | - |
| **Inserts** | |
| Interface board | Yes |
| I/O board | No |
| **Electrical properties** | |
| Rated voltage | 24 VDC ±25%[5] |
| Rated current | 1.2 A |
| Starting current | Typ. 3 A, max. 50 A for <300 µs |
| Power consumption | 25.5 W[6] |
| Electrical isolation | Yes |

Table 30: 5PP520.1043-00 - Technical data

| Product ID | 5PP520.1043-00 |
|---|---|
| **Operating conditions** | |
| EN 60529 protection | IP20 back side (only with an inserted CF card or IF board, or with an optional IF cover) IP65 / NEMA 250 type 4X, protection from dust and sprayed water on front side |
| **Environmental conditions** | |
| Temperature | |
| Operation | 0 to 55°C |
| Storage | -20 to 60°C |
| Transport | -20 to 60°C |
| Relative humidity | |
| Operation | See temperature humidity diagram |
| Storage | See temperature humidity diagram |
| Transport | See temperature humidity diagram |
| Vibration | |
| Operation (continuous) | 2 to 9 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g |
| Operation (occasional) | 2 to 9 Hz: 3.5 mm amplitude / 9 to 200 Hz: 1 g |
| Storage | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
| Transport | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
| Shock | |
| Operation | 15 g, 11 ms |
| Storage | 30 g, 15 ms |
| Transport | 30 g, 15 ms |
| Altitude | |
| Operation | Max. 3000 m (component-dependent)[7] |
| **Mechanical characteristics** | |
| Housing | |
| Item | Aluminum paint |
| Front[8] | |
| Frame | Naturally anodized aluminum |
| Membrane | |
| Item | Polyester |
| Light background | RAL 9006 |
| Dark gray border around display | RAL 7024 |
| Gasket | Flat gasket around display front |
| Dimensions | |
| Width | 323 mm |
| Height | 260 mm |
| Depth | 59.7 mm |
| Weight | 2750 g |

Table 30: 5PP520.1043-00 - Technical data

1) At 50°C, 8.5 µA of the supplied components and a self-discharge of 40%. If an interface board with SRAM is installed, then the service life equals 2½ years.
2) Maintenance controller extended.
3) At 25°C ambient temperature. Reducing the brightness by 50% can result in an approximate 50% increase of the half-brightness time.
4) Touch screen drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).
5) The specified value is valid for a nominal voltage of 24 VDC.
6) The specified value applies to a system unit with CPU board without an interface board.
7) Derating the maximum ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).
8) Depending on the process or batch, there may be visible deviations in the color and surface structure.

### 3.1.3.1.4 Dimensions
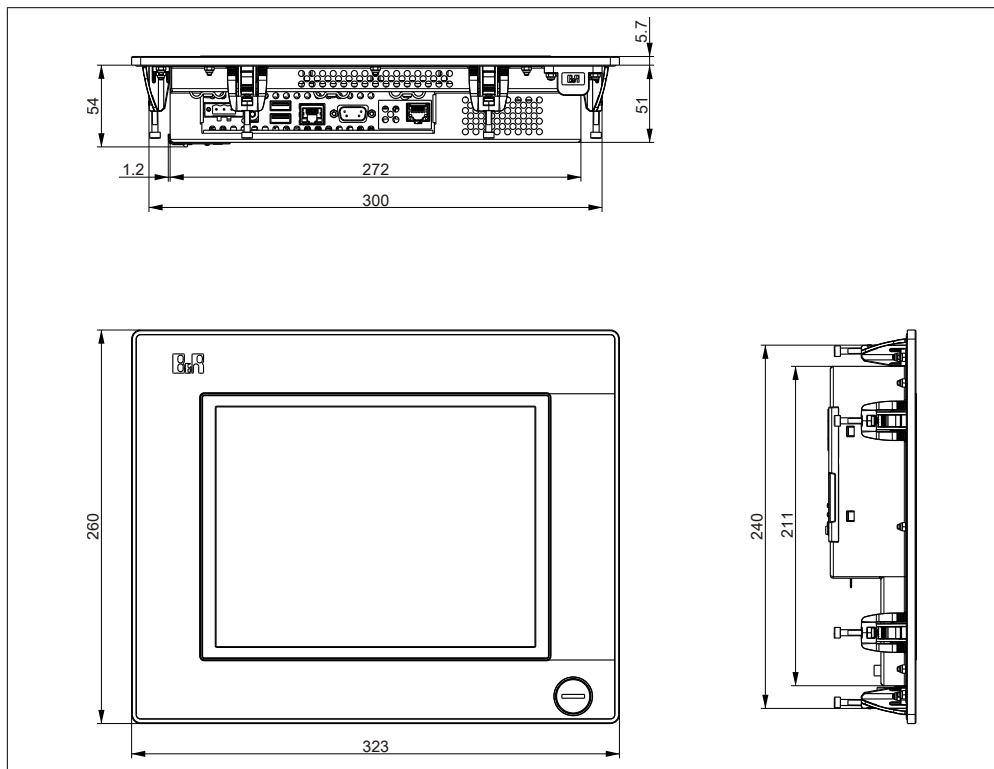


Image 21: 5PP520.1043-00 - Dimensions

### 3.1.3.1.5 Cutout
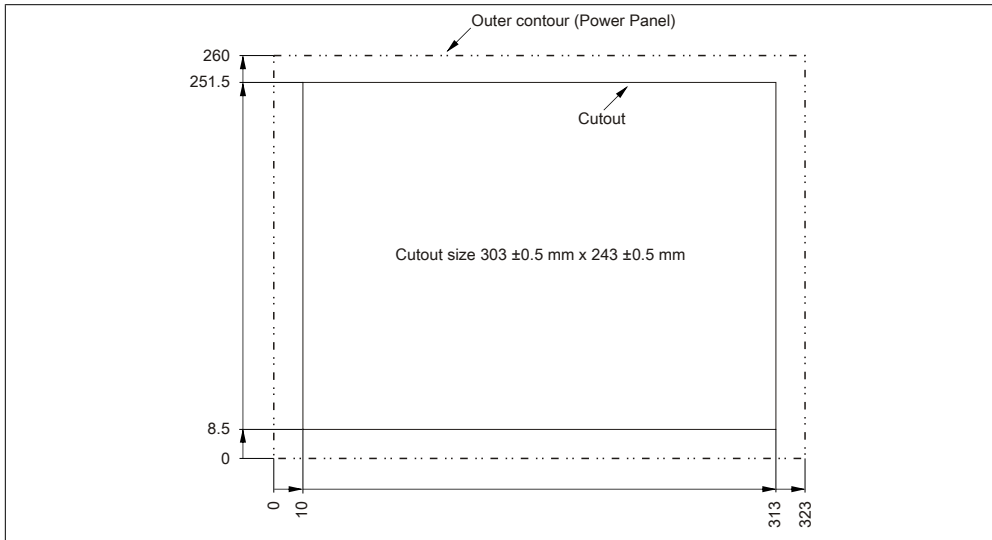


Image 22: 5PP520.1043-00 - Cutout installation
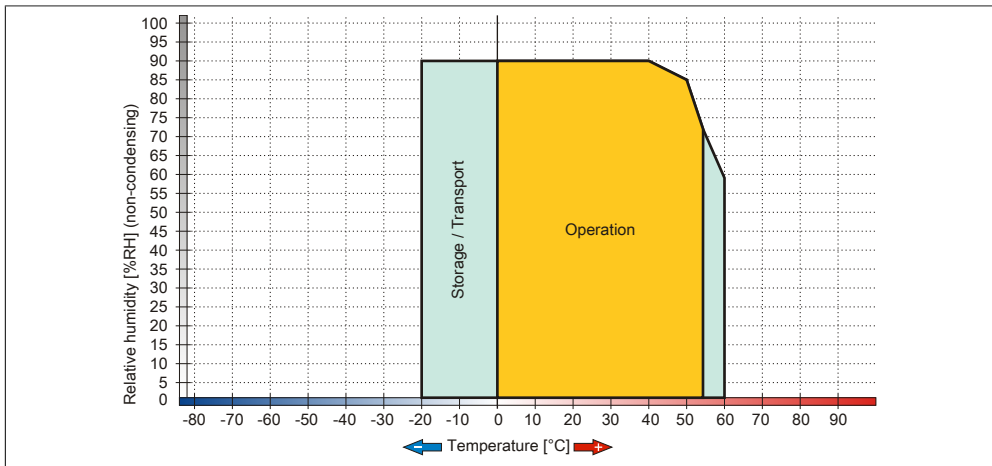
### 3.1.3.1.6 Temperature humidity diagram
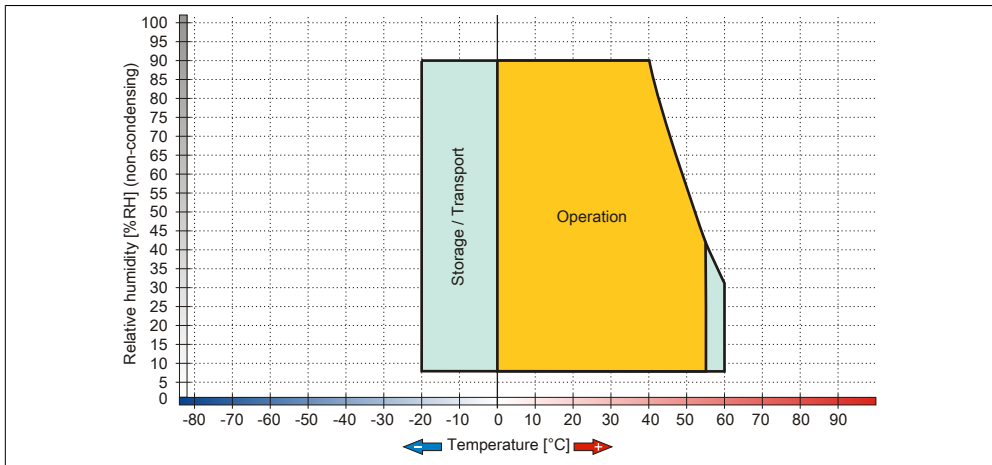


Image 23: 5PP520.1043-00 - Temperature humidity diagram

### 3.1.3.2 5PP580.1043-00

3.1.3.2.1 General information

- 10.4" TFT VGA color display
- Analog resistive touch screen and function keys
- Intel® Atom™ technology
- Small installation depth
- Fan-free operation
- Can be expand via interface board

3.1.3.2.2 Order data
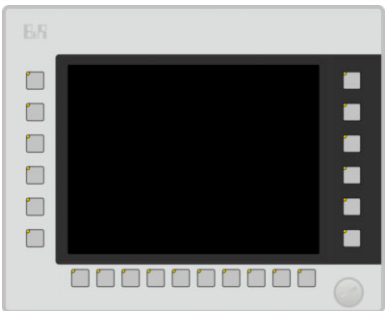
| Model number | Short description | Figure |
|---|---|---|
| | **System units** | |
| 5PP580.1043-00 | Power Panel 580 10.4" VGA TFT display with touch screen (resistive); 22 function keys; connections for 1x RS232, 3x USB 2.0, 1x Ethernet 10/100/1000; can be expanded with interface board; IP65 protection (front side); order 24 VDC plug for supply voltage separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91) | |
| | **Mandatory accessory** | |
| | **CPU boards** | |
| 5PP5CP.US15-00 | PP500 CPU board Intel Atom Z510, 1100 MHz, 400 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| 5PP5CP.US15-01 | PP500 CPU board Intel Atom Z520, 1330 MHz, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| 5PP5CP.US15-02 | PP500 CPU board Intel Atom Z530, 1600 MHz, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| | **Main memory** | |
| 5MMDDR.0512-01 | SO-DIMM DDR2 RAM 512 MB PC2-5300 | |
| 5MMDDR.1024-01 | SO-DIMM DDR2 RAM 1024 MB PC2-5300 | |
| 5MMDDR.2048-01 | SO-DIMM DDR2 RAM 2048 MB PC2-5300 | |
| | **Terminal Blocks** | |
| 0TB103.9 | Connector, 24 VDC, 3-pin female, screw clamp, 3.31 mm², protected against vibration by the screw flange | |
| 0TB103.91 | Connector, 24 VDC, 3-pin female, cage clamp, 3.31 mm², protected against vibration by the screw flange | |
| | **Optional accessory** | |
| | **Batteries** | |
| 0AC201.91 | Lithium Battery 4 pieces, 3 V / 950 mAh button cell | |
| 4A0006.00-000 | Lithium battery, 3 V / 950 mAh, button cell | |
| | **CompactFlash** | |
| 5CFCRD.016G-04 | CompactFlash 16 GB B&R | |
| 5CFCRD.0512-04 | CompactFlash 512 MB B&R | |
| 5CFCRD.1024-04 | CompactFlash 1 GB B&R | |

Table 31: 5PP580.1043-00 - Order data

| Model number | Short description | Figure |
|---|---|---|
| 5CFCRD.2048-04 | CompactFlash 2 GB B&R | |
| 5CFCRD.4096-04 | CompactFlash 4 GB B&R | |
| 5CFCRD.8192-04 | CompactFlash 8 GB B&R | |
| | **Interface boards** | |
| 5PP5IF.CETH-00 | PP500 Interface board; connection for 1x Ethernet 10/100/1000 | |
| 5PP5IF.CHDA-00 | PP500 Interface board; connection for 1x HDA sound | |
| 5PP5IF.FCAN-00 | PP500 Interface board; connection for 1x CAN master, 512 kByte SRAM | |
| 5PP5IF.FPLM-00 | PP500 Interface board; connections for 2x POWER-LINK | |
| 5PP5IF.FX2X-00 | PP500 Interface board; connection for 1x X2X master, 512 kByte SRAM | |
| 5PP5IF.FXCM-00 | PP500 Interface board; connection for 1x CAN master, 1x X2X master, 512 kByte SRAM | |
| | **USB Accessories** | |
| 5MMUSB.2048-01 | USB 2.0 Memory Stick 2048 MB B&R | |

Table 31: 5PP580.1043-00 - Order data

## 3.1.3.2.3 Technical data

| Product ID | 5PP580.1043-00 |
|---|---|
| **General information** | |
| Cooling | Fan-free |
| LEDs | Power, CF, Link, Run |
| Power button | Yes |
| Reset button | Yes |
| Buzzer | Yes |
| Battery | |
|    Type | Renata 950 mAh |
|    Method | Lithium Ion |
|    Lifespan | 4 years[1] |
|    removable | Yes, accessible from the outside |
| Certification | |
|    CE | In preparation |
| B&R ID code | $B606 |
| **Controllers** | |
| Bootloader | BIOS |
| Mode/Node switch | 2, 16 positions each (back side) |
| Watchdog | MTCX |
| Power failure logic | |
|    Controllers | MTCX[2] |
|    Buffer time | 10 ms |
| Graphics | |
|    Controllers | Intel® Graphics Media Accelerator 500 |
| Memory | |
|    Type | DDR2 SDRAM |
|    Size | Max. 2 GB |

Table 32: 5PP580.1043-00 - Technical data

Chapter 2
Technical data

| Product ID | 5PP580.1043-00 |
|---|---|
| **Interfaces** | |
| COM1 | |
|     Type | RS232, modem-capable, not electrically isolated |
|     Design | 9-pin DSUB plug |
|     UART | 16550-compatible, 16-byte FIFO |
|     Max. baud rate | 115 kbit/s |
| CompactFlash slot 1 | |
|     Type | Type I |
| USB | |
|     Type | USB 2.0 |
|     Amount | 3 |
|     Design | Type A |
|     Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), to high speed (480 Mbit/s) |
|     Current load | Max. 1 A per connection |
| Ethernet | |
|     Amount | 1 |
|     Controllers | Intel 82574 |
|     Design | Shielded RJ45 port |
|     Transfer rate | 10/100/1000 Mbit/s |
| **Display** | |
| Type | Color TFT |
| Diagonal | 10.4" (264 mm) |
| Colors | 16 million |
| Resolution | VGA, 640 x 480 pixels |
| Contrast | 700:1 |
| Viewing angles | |
|     Horizontal | Direction R / direction L =80° |
|     Vertical | Direction U = 60°/ direction D = 80° |
| Background lighting | |
|     Method | LED |
|     Brightness | 450 cd/m² |
|     Half-brightness time[3] | 50,000 h |
| Touch screen[4] | |
|     Type | AMT |
|     Technology | Analog, resistive |
|     Controllers | B&R, serial, 12-bit |
|     Degree of transmission | 80% ±3% |
| **Keys** | |
| Function keys | 22 with LED (yellow) |
| System keys | No |
| Lifespan | > 1,000,000 actuations with 1 ±0.3 N to 3 ±0.3 N operating force |
| LED brightness | |
|     Yellow | Typ. 38 mcd |
| **Inserts** | |
| Interface board | Yes |
| I/O board | No |
| **Electrical properties** | |
| Rated voltage | 24 VDC ±25% |
| Rated current | 1.2 A[5] |
| Starting current | Typ. 3 A, max. 50 A for <300 µs |
| Power consumption | 28.5 W[6] |
| Electrical isolation | Yes |

Table 32: 5PP580.1043-00 - Technical data

| Product ID | 5PP580.1043-00 |
|---|---|
| **Operating conditions** | |
| EN 60529 protection | IP20 back side (only with an inserted CF card or IF board, or with an optional IF cover)<br>IP65 / NEMA 250 type 4X, protection from dust and sprayed water on front side |
| **Environmental conditions** | |
| Temperature | |
|    Operation | 0 to 55°C |
|    Storage | -20 to 60°C |
|    Transport | -20 to 60°C |
| Relative humidity | |
|    Operation | See temperature humidity diagram |
|    Storage | See temperature humidity diagram |
|    Transport | See temperature humidity diagram |
| Vibration | |
|    Operation (continuous) | 2 to 9 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g |
|    Operation (occasional) | 2 to 9 Hz: 3.5 mm amplitude / 9 to 200 Hz: 1 g |
|    Storage | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
|    Transport | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
| Shock | |
|    Operation | 15 g, 11 ms |
|    Storage | 30 g, 15 ms |
|    Transport | 30 g, 15 ms |
| Altitude | |
|    Operation | Max. 3000 m (component-dependent)[7] |
| **Mechanical characteristics** | |
| Housing | |
|    Item | Aluminum paint |
| Front[8] | |
|    Frame | Naturally anodized aluminum |
|    Membrane | |
|       Item | Polyester |
|       Light background | RAL 9006 |
|       Dark gray border around display | RAL 7024 |
|    Gasket | Flat gasket around display front |
| Dimensions | |
|    Width | 323 mm |
|    Height | 260 mm |
|    Depth | 59.7 mm |
| Weight | 2650 g |

Table 32: 5PP580.1043-00 - Technical data

1) At 50°C, 8.5 µA of the supplied components and a self-discharge of 40%. If an interface board with SRAM is installed, then the service life equals 2½ years.
2) Maintenance controller extended.
3) At 25°C ambient temperature. Reducing the brightness by 50% can result in an approximate 50% increase of the half-brightness time.
4) Touch screen drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).
5) The specified value is valid for a nominal voltage of 24 VDC.
6) The specified value applies to a system unit with CPU board without an interface board.
7) Derating the maximum ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).
8) Depending on the process or batch, there may be visible deviations in the color and surface structure.

### 3.1.3.2.4 Dimensions
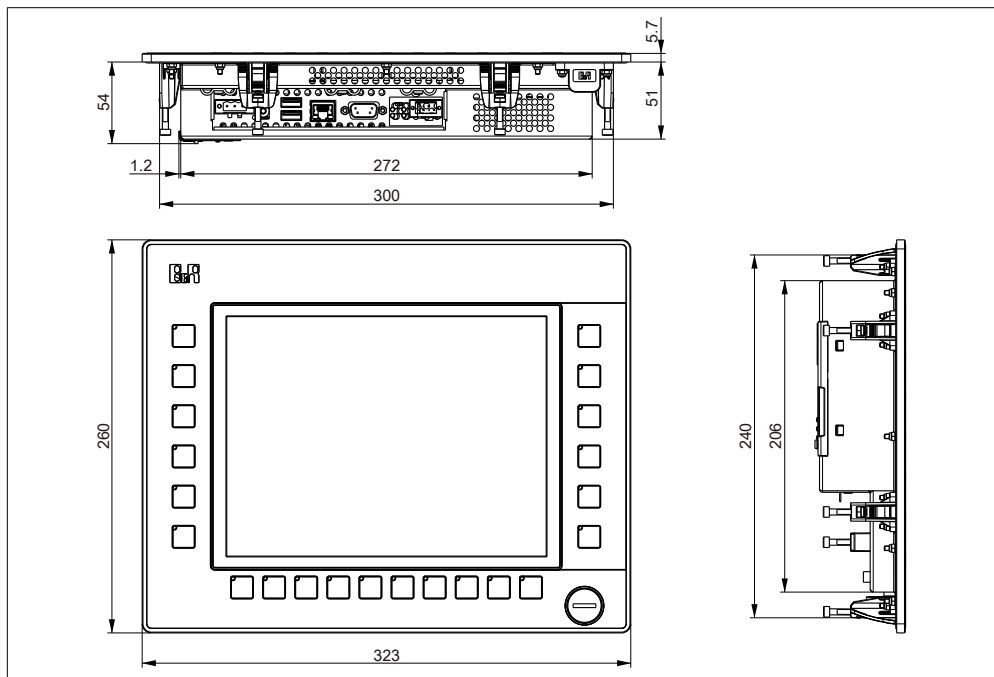


Image 24: 5PP580.1043-00 - Dimensions

### 3.1.3.2.5 Cutout
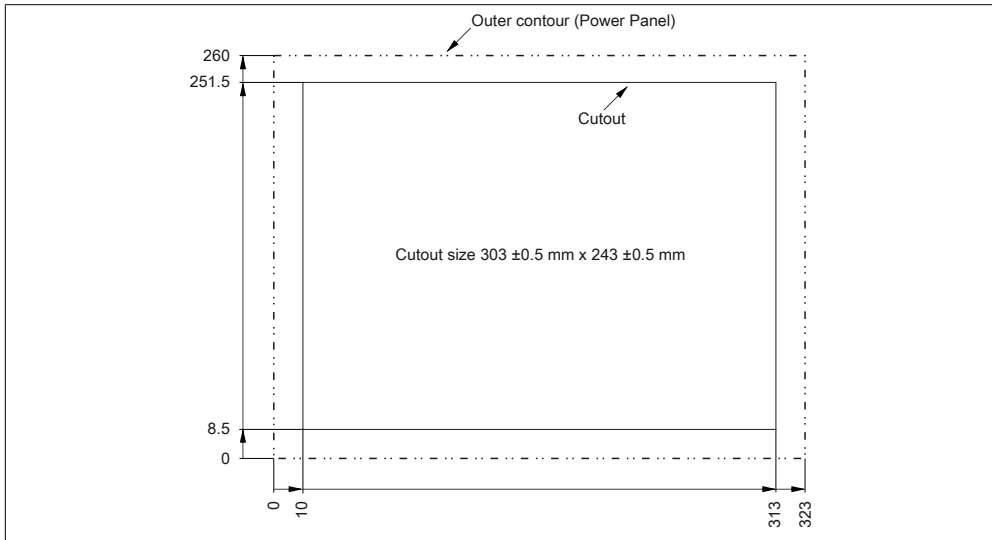


Image 25: 5PP580.1043-00 - Cutout installation

### 3.1.3.2.6 Temperature humidity diagram
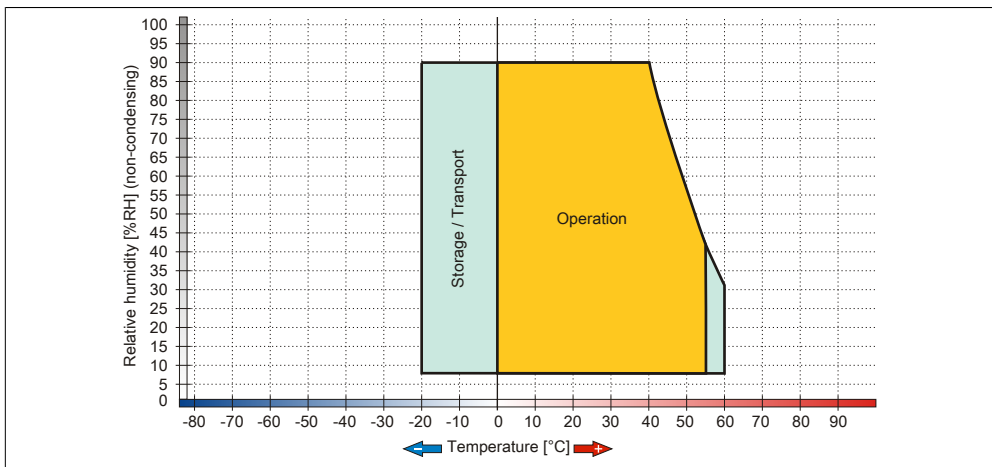


Image 26: 5PP580.1043-00 - Temperature humidity diagram

### 3.1.3.3 5PP581.1043-00

#### 3.1.3.3.1 General information

- 10.4" TFT VGA color display
- Analog resistive touch screen plus function and system keys
- Intel® Atom™ technology
- Small installation depth
- Fan-free operation
- Can be expand via interface board

#### 3.1.3.3.2 Order data

| Model number | Short description | Figure |
|---|---|---|
| | **System units** | |
| 5PP581.1043-00 | Power Panel 581 10.4" VGA TFT display with touch screen (resistive); 38 function keys and 20 system keys; connections for 1x RS232, 3x USB 2.0, 1x Ethernet 10/100/1000; can be expanded with interface board; IP65 protection (front side); order 24 VDCm plug for supply voltage separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91) | |
| | **Mandatory accessory** | |
| | **CPU boards** | |
| 5PP5CP.US15-00 | PP500 CPU board Intel Atom Z510, 1100 MHz, 400 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| 5PP5CP.US15-01 | PP500 CPU board Intel Atom Z520, 1330 MHz, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| 5PP5CP.US15-02 | PP500 CPU board Intel Atom Z530, 1600 MHz, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| | **Main memory** | |
| 5MMDDR.0512-01 | SO-DIMM DDR2 RAM 512 MB PC2-5300 | |
| 5MMDDR.1024-01 | SO-DIMM DDR2 RAM 1024 MB PC2-5300 | |
| 5MMDDR.2048-01 | SO-DIMM DDR2 RAM 2048 MB PC2-5300 | |
| | **Terminal Blocks** | |
| 0TB103.9 | Connector, 24 VDC, 3-pin female, screw clamp, 3.31 mm², protected against vibration by the screw flange | |
| 0TB103.91 | Connector, 24 VDC, 3-pin female, cage clamp, 3.31 mm², protected against vibration by the screw flange | |
| | **Optional accessory** | |
| | **Batteries** | |
| 0AC201.91 | Lithium Battery 4 pieces, 3 V / 950 mAh button cell | |
| 4A0006.00-000 | Lithium battery, 3 V / 950 mAh, button cell | |
| | **CompactFlash** | |
| 5CFCRD.016G-04 | CompactFlash 16 GB B&R | |
| 5CFCRD.0512-04 | CompactFlash 512 MB B&R | |

Table 33: 5PP581.1043-00 - Order data

| Model number | Short description | Figure |
|---|---|---|
| 5CFCRD.1024-04 | CompactFlash 1 GB B&R | |
| 5CFCRD.2048-04 | CompactFlash 2 GB B&R | |
| 5CFCRD.4096-04 | CompactFlash 4 GB B&R | |
| 5CFCRD.8192-04 | CompactFlash 8 GB B&R | |
| | **Interface boards** | |
| 5PP5IF.CETH-00 | PP500 Interface board; connection for 1x Ethernet 10/100/1000 | |
| 5PP5IF.CHDA-00 | PP500 Interface board; connection for 1x HDA sound | |
| 5PP5IF.FCAN-00 | PP500 Interface board; connection for 1x CAN master, 512 kByte SRAM | |
| 5PP5IF.FPLM-00 | PP500 Interface board; connections for 2x POWER-LINK | |
| 5PP5IF.FX2X-00 | PP500 Interface board; connection for 1x X2X master, 512 kByte SRAM | |
| 5PP5IF.FXCM-00 | PP500 Interface board; connection for 1x CAN master, 1x X2X master, 512 kByte SRAM | |
| | **USB Accessories** | |
| 5MMUSB.2048-01 | USB 2.0 Memory Stick 2048 MB B&R | |

Table 33: 5PP581.1043-00 - Order data

### 3.1.3.3.3 Technical data

| Product ID | 5PP581.1043-00 |
|---|---|
| **General information** | |
| Cooling | Fan-free |
| LEDs | Power, CF, Link, Run |
| Power button | Yes |
| Reset button | Yes |
| Buzzer | Yes |
| Battery | |
|    Type | Renata 950 mAh |
|    Method | Lithium Ion |
|    Lifespan | 4 years[1] |
|    removable | Yes, accessible from the outside |
| Certification | |
|    CE | In preparation |
| B&R ID code | $B608 |
| **Controllers** | |
| Bootloader | BIOS |
| Mode/Node switch | 2, 16 positions each (back side) |
| Watchdog | MTCX |
| Power failure logic | |
|    Controllers | MTCX[2] |
|    Buffer time | 10 ms |
| Graphics | |
|    Controllers | Intel® Graphics Media Accelerator 500 |
| Memory | |
|    Type | DDR2 SDRAM |
|    Size | Max. 2 GB |

Table 34: 5PP581.1043-00 - Technical data

| Product ID | 5PP581.1043-00 |
|---|---|
| **Interfaces** | |
| COM1 | |
|     Type | RS232, modem-capable, not electrically isolated |
|     Design | 9-pin DSUB plug |
|     UART | 16550-compatible, 16-byte FIFO |
|     Max. baud rate | 115 kbit/s |
| CompactFlash slot 1 | |
|     Type | Type I |
| USB | |
|     Type | USB 2.0 |
|     Amount | 3 |
|     Design | Type A |
|     Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), to high speed (480 Mbit/s) |
|     Current load | Max. 1 A per connection |
| Ethernet | |
|     Amount | 1 |
|     Controllers | Intel 82574 |
|     Design | Shielded RJ45 port |
|     Transfer rate | 10/100/1000 Mbit/s |
| **Display** | |
| Type | Color TFT |
| Diagonal | 10.4" (264 mm) |
| Colors | 16 million |
| Resolution | VGA, 640 x 480 pixels |
| Contrast | 700:1 |
| Viewing angles | |
|     Horizontal | Direction R / direction L =80° |
|     Vertical | Direction U = 60°/ direction D = 80° |
| Background lighting | |
|     Method | LED |
|     Brightness | 450 cd/m² |
|     Half-brightness time[3] | 50,000 h |
| Touch screen[4] | |
|     Type | AMT |
|     Technology | Analog, resistive |
|     Controllers | B&R, serial, 12-bit |
|     Degree of transmission | 80% ±3% |
| **Keys** | |
| Function keys | 38 with LED (yellow) |
| System keys | Numeric keys, cursor block |
| Lifespan | > 1,000,000 actuations with 1 ±0.3 N to 3 ±0.3 N operating force |
| LED brightness | |
|     Yellow | Typ. 38 mcd |
| **Inserts** | |
| Interface board | Yes |
| I/O board | No |
| **Electrical properties** | |
| Rated voltage | 24 VDC ±25% |
| Rated current | 1.2 A[5] |
| Starting current | Typ. 3 A, max. 50 A for <300 µs |
| Power consumption | 28.5 W[6] |
| Electrical isolation | Yes |

Table 34: 5PP581.1043-00 - Technical data

| Product ID | 5PP581.1043-00 |
|---|---|
| **Operating conditions** | |
| EN 60529 protection | IP20 back side (only with an inserted CF card or IF board, or with an optional IF cover) <br> IP65 / NEMA 250 type 4X, protection from dust and sprayed water on front side |
| **Environmental conditions** | |
| Temperature | |
|   Operation | 0 to 55°C |
|   Storage | -20 to 60°C |
|   Transport | -20 to 60°C |
| Relative humidity | |
|   Operation | See temperature humidity diagram |
|   Storage | See temperature humidity diagram |
|   Transport | See temperature humidity diagram |
| Vibration | |
|   Operation (continuous) | 2 to 9 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g |
|   Operation (occasional) | 2 to 9 Hz: 3.5 mm amplitude / 9 to 200 Hz: 1 g |
|   Storage | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
|   Transport | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
| Shock | |
|   Operation | 15 g, 11 ms |
|   Storage | 30 g, 15 ms |
|   Transport | 30 g, 15 ms |
| Altitude | |
|   Operation | Max. 3000 m (component-dependent)[7] |
| **Mechanical characteristics** | |
| Housing | |
|   Item | Aluminum paint |
| Front[8] | |
|   Frame | Naturally anodized aluminum |
|   Membrane | |
|     Item | Polyester |
|     Light background | RAL 9006 |
|     Dark gray border around display | RAL 7024 |
|   Gasket | Flat gasket around display front |
| Dimensions | |
|   Width | 323 mm |
|   Height | 358 mm |
|   Depth | 59.7 mm |
| Weight | 3350 g |

Table 34: 5PP581.1043-00 - Technical data

1) At 50°C, 8.5 µA of the supplied components and a self-discharge of 40%. If an interface board with SRAM is installed, then the service life equals 2½ years.
2) Maintenance controller extended.
3) At 25°C ambient temperature. Reducing the brightness by 50% can result in an approximate 50% increase of the half-brightness time.
4) Touch screen drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).
5) The specified value is valid for a nominal voltage of 24 VDC.
6) The specified value applies to a system unit with CPU board without an interface board.
7) Derating the maximum ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).
8) Depending on the process or batch, there may be visible deviations in the color and surface structure.

### 3.1.3.3.4 Dimensions
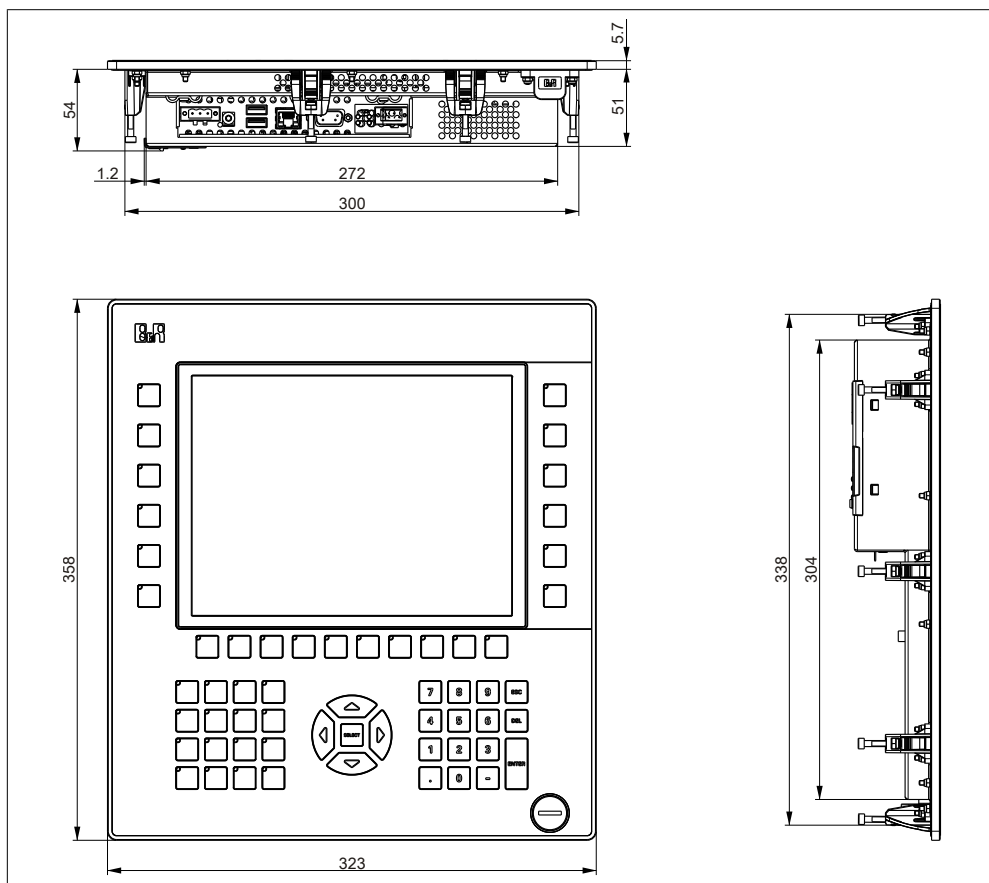


Image 27: 5PP581.1043-00 - Dimensions

### 3.1.3.3.5 Cutout
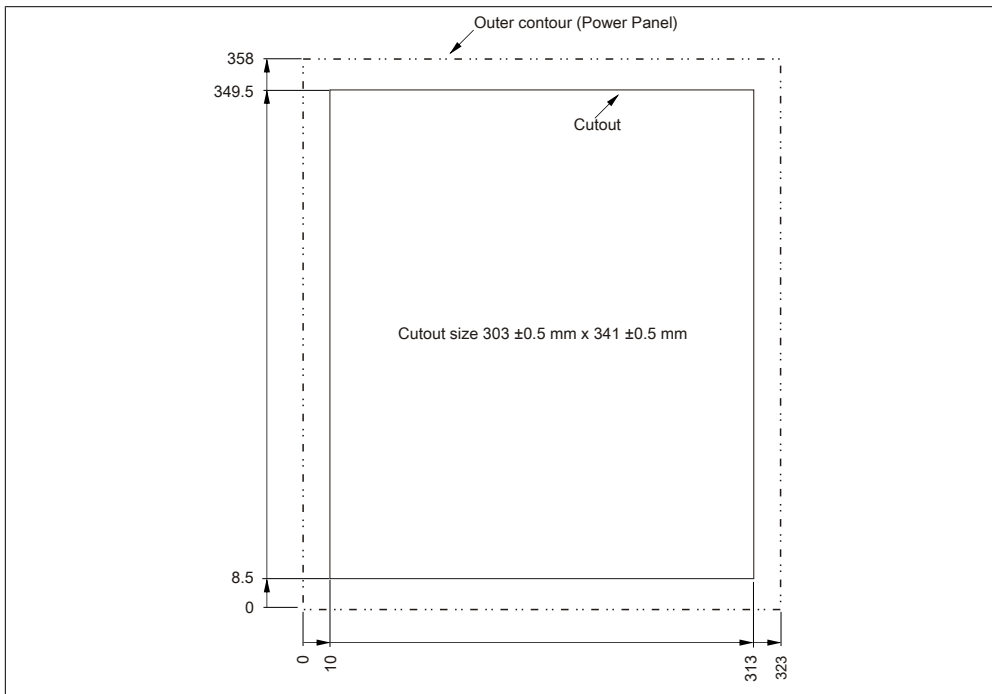


Image 28: 5PP581.1043-00 - Cutout installation

### 3.1.3.3.6 Temperature humidity diagram
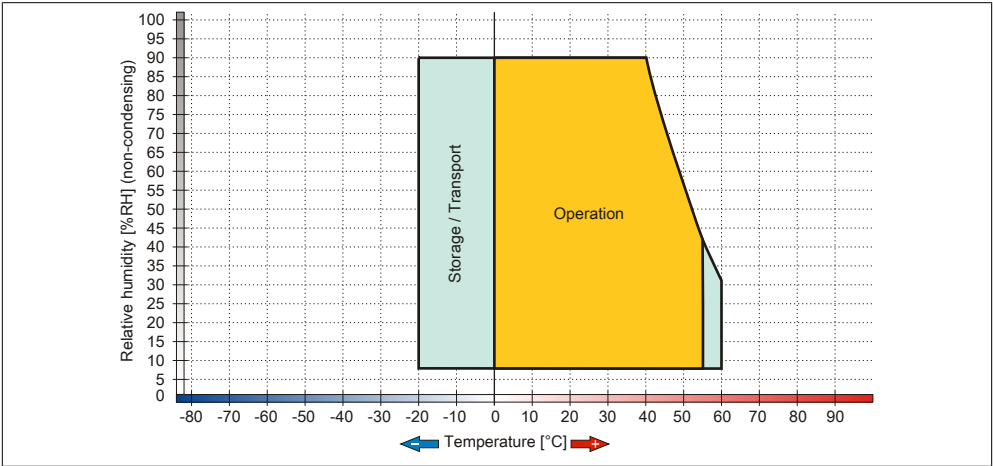


Image 29: 5PP581.1043-00 - Temperature humidity diagram

### 3.1.3.4 5PP582.1043-00

#### 3.1.3.4.1 General information

- 10.4" TFT VGA color display
- Analog resistive touch screen plus function and system keys
- Intel® Atom™ technology
- Small installation depth
- Fan-free operation
- Can be expand via interface board

#### 3.1.3.4.2 Order data
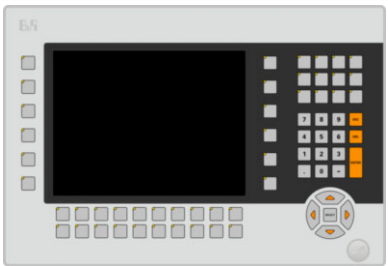
| Model number | Short description | Figure |
|---|---|---|
| | **System units** | |
| 5PP582.1043-00 | Power Panel 582 10.4" VGA TFT display with touch screen (resistive); 44 function keys and 20 system keys; connections for 1x RS232, 3x USB 2.0, 1x Ethernet 10/100/1000; can be expanded with interface board; IP65 protection (front side); order 24 VDC plug for supply voltage separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91) | |
| | **Mandatory accessory** | |
| | **CPU boards** | |
| 5PP5CP.US15-00 | PP500 CPU board Intel Atom Z510, 1100 MHz, 400 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| 5PP5CP.US15-01 | PP500 CPU board Intel Atom Z520, 1330 MHz, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| 5PP5CP.US15-02 | PP500 CPU board Intel Atom Z530, 1600 MHz, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| | **Main memory** | |
| 5MMDDR.0512-01 | SO-DIMM DDR2 RAM 512 MB PC2-5300 | |
| 5MMDDR.1024-01 | SO-DIMM DDR2 RAM 1024 MB PC2-5300 | |
| 5MMDDR.2048-01 | SO-DIMM DDR2 RAM 2048 MB PC2-5300 | |
| | **Terminal Blocks** | |
| 0TB103.9 | Connector, 24 VDC, 3-pin female, screw clamp, 3.31 mm², protected against vibration by the screw flange | |
| 0TB103.91 | Connector, 24 VDC, 3-pin female, cage clamp, 3.31 mm², protected against vibration by the screw flange | |
| | **Optional accessory** | |
| | **Batteries** | |
| 0AC201.91 | Lithium Battery 4 pieces, 3 V / 950 mAh button cell | |
| 4A0006.00-000 | Lithium battery, 3 V / 950 mAh, button cell | |
| | **CompactFlash** | |
| 5CFCRD.016G-04 | CompactFlash 16 GB B&R | |
| 5CFCRD.0512-04 | CompactFlash 512 MB B&R | |

Table 35: 5PP582.1043-00 - Order data

| Model number | Short description | Figure |
|---|---|---|
| 5CFCRD.1024-04 | CompactFlash 1 GB B&R | |
| 5CFCRD.2048-04 | CompactFlash 2 GB B&R | |
| 5CFCRD.4096-04 | CompactFlash 4 GB B&R | |
| 5CFCRD.8192-04 | CompactFlash 8 GB B&R | |
| **Interface boards** | | |
| 5PP5IF.CETH-00 | PP500 Interface board; connection for 1x Ethernet 10/100/1000 | |
| 5PP5IF.CHDA-00 | PP500 Interface board; connection for 1x HDA sound | |
| 5PP5IF.FCAN-00 | PP500 Interface board; connection for 1x CAN master, 512 kByte SRAM | |
| 5PP5IF.FPLM-00 | PP500 Interface board; connections for 2x POWER-LINK | |
| 5PP5IF.FX2X-00 | PP500 Interface board; connection for 1x X2X master, 512 kByte SRAM | |
| 5PP5IF.FXCM-00 | PP500 Interface board; connection for 1x CAN master, 1x X2X master, 512 kByte SRAM | |
| **USB Accessories** | | |
| 5MMUSB.2048-01 | USB 2.0 Memory Stick 2048 MB B&R | |

Table 35: 5PP582.1043-00 - Order data

## 3.1.3.4.3 Technical data

| Product ID | 5PP582.1043-00 |
|---|---|
| **General information** | |
| Cooling | Fan-free |
| LEDs | Power, CF, Link, Run |
| Power button | Yes |
| Reset button | Yes |
| Buzzer | Yes |
| Battery | |
|   Type | Renata 950 mAh |
|   Method | Lithium Ion |
|   Lifespan | 4 years[1] |
|   removable | Yes, accessible from the outside |
| Certification | |
|   CE | In preparation |
| B&R ID code | $B609 |
| **Controllers** | |
| Bootloader | BIOS |
| Mode/Node switch | 2, 16 positions each (back side) |
| Watchdog | MTCX |
| Power failure logic | |
|   Controllers | MTCX[2] |
|   Buffer time | 10 ms |
| Graphics | |
|   Controllers | Intel® Graphics Media Accelerator 500 |
| Memory | |
|   Type | DDR2 SDRAM |
|   Size | Max. 2 GB |

Table 36: 5PP582.1043-00 - Technical data

| Product ID | 5PP582.1043-00 |
|---|---|
| **Interfaces** | |
| COM1 | |
|    Type | RS232, modem-capable, not electrically isolated |
|    Design | 9-pin DSUB plug |
|    UART | 16550-compatible, 16-byte FIFO |
|    Max. baud rate | 115 kbit/s |
| CompactFlash slot 1 | |
|    Type | Type I |
| USB | |
|    Type | USB 2.0 |
|    Amount | 3 |
|    Design | Type A |
|    Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), to high speed (480 Mbit/s) |
|    Current load | Max. 1 A per connection |
| Ethernet | |
|    Amount | 1 |
|    Controllers | Intel 82574 |
|    Design | Shielded RJ45 port |
|    Transfer rate | 10/100/1000 Mbit/s |
| **Display** | |
| Type | Color TFT |
| Diagonal | 10.4" (264 mm) |
| Colors | 16 million |
| Resolution | VGA, 640 x 480 pixels |
| Contrast | 700:1 |
| Viewing angles | |
|    Horizontal | Direction R / direction L =80° |
|    Vertical | Direction U = 60°/ direction D = 80° |
| Background lighting | |
|    Method | LED |
|    Brightness | 450 cd/m² |
|    Half-brightness time[3] | 50,000 h |
| Touch screen[4] | |
|    Type | AMT |
|    Technology | Analog, resistive |
|    Controllers | B&R, serial, 12-bit |
|    Degree of transmission | 80% ±3% |
| **Keys** | |
| Function keys | 44 with LED (yellow) |
| System keys | Numeric keys, cursor block |
| Lifespan | > 1,000,000 actuations with 1 ±0.3 N to 3 ±0.3 N operating force |
| LED brightness | |
|    Yellow | Typ. 38 mcd |
| **Inserts** | |
| Interface board | Yes |
| I/O board | No |
| **Electrical properties** | |
| Rated voltage | 24 VDC ±25% |
| Rated current | 1.2 A[5] |
| Starting current | Typ. 3 A, max. 50 A for <300 µs |
| Power consumption | 28.5 W[6] |
| Electrical isolation | Yes |

Table 36: 5PP582.1043-00 - Technical data

Chapter 2
Technical data

| Product ID | 5PP582.1043-00 |
|---|---|
| **Operating conditions** | |
| EN 60529 protection | IP20 back side (only with an inserted CF card or IF board, or with an optional IF cover)<br>IP65 / NEMA 250 type 4X, protection from dust and sprayed water on front side |
| **Environmental conditions** | |
| Temperature | |
|   Operation | 0 to 55°C |
|   Storage | -20 to 60°C |
|   Transport | -20 to 60°C |
| Relative humidity | |
|   Operation | See temperature humidity diagram |
|   Storage | See temperature humidity diagram |
|   Transport | See temperature humidity diagram |
| Vibration | |
|   Operation (continuous) | 2 to 9 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g |
|   Operation (occasional) | 2 to 9 Hz: 3.5 mm amplitude / 9 to 200 Hz: 1 g |
|   Storage | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
|   Transport | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
| Shock | |
|   Operation | 15 g, 11 ms |
|   Storage | 30 g, 15 ms |
|   Transport | 30 g, 15 ms |
| Altitude | |
|   Operation | Max. 3000 m (component-dependent)[7] |
| **Mechanical characteristics** | |
| Housing | |
|   Item | Aluminum paint |
| Front[8] | |
|   Frame | Naturally anodized aluminum |
|   Membrane | |
|     Item | Polyester |
|     Light background | RAL 9006 |
|     Dark gray border around display | RAL 7024 |
|   Gasket | Flat gasket around display front |
| Dimensions | |
|   Width | 423 mm |
|   Height | 288 mm |
|   Depth | 59.7 mm |
| Weight | 3500 g |

Table 36: 5PP582.1043-00 - Technical data

1) At 50°C, 8.5 µA of the supplied components and a self-discharge of 40%. If an interface board with SRAM is installed, then the service life equals 2½ years.
2) Maintenance controller extended.
3) At 25°C ambient temperature. Reducing the brightness by 50% can result in an approximate 50% increase of the half-brightness time.
4) Touch screen drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).
5) The specified value is valid for a nominal voltage of 24 VDC.
6) The specified value applies to a system unit with CPU board without an interface board.
7) Derating the maximum ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).
8) Depending on the process or batch, there may be visible deviations in the color and surface structure.

### 3.1.3.4.4 Dimensions
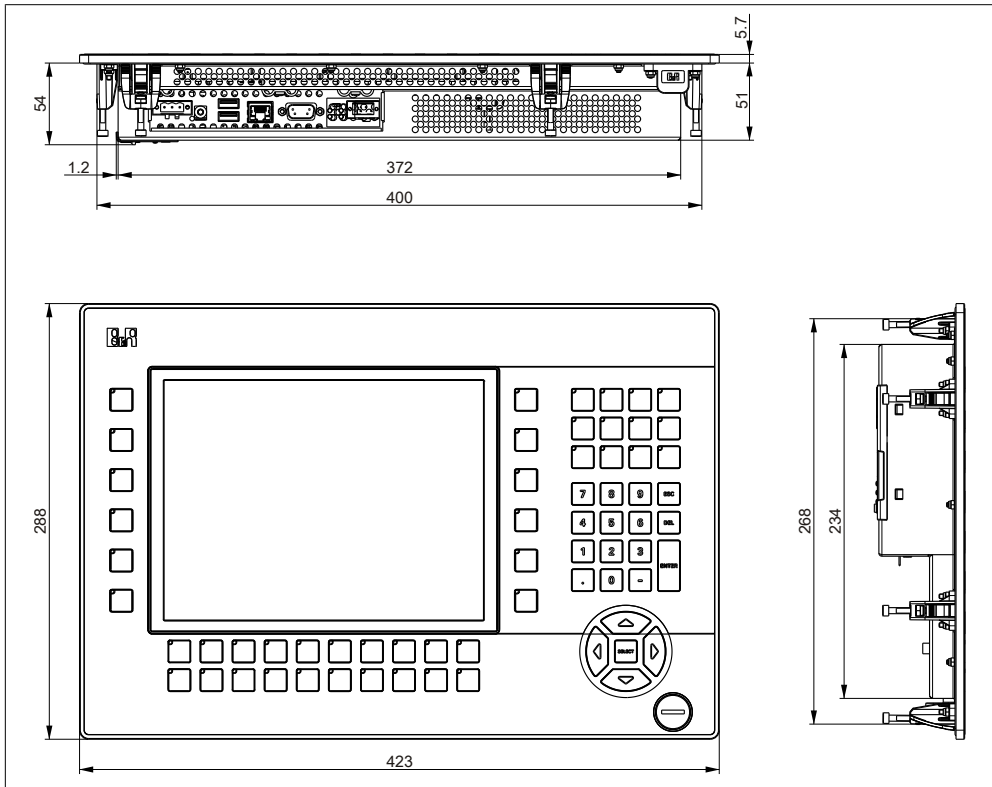


Image 30: 5PP582.1043-00 - Dimensions

### 3.1.3.4.5 Cutout
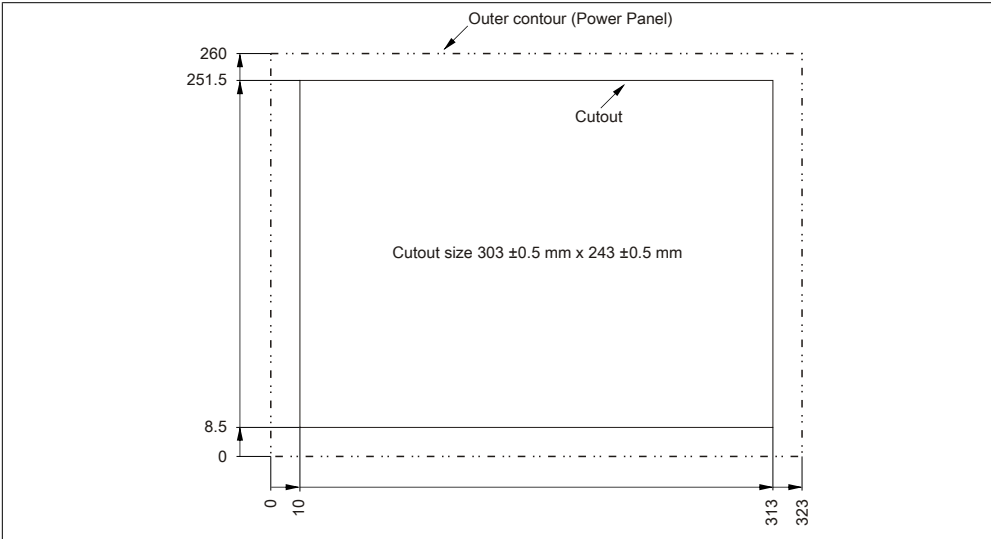


Image 31: 5PP582.1043-00 - Cutout installation

### 3.1.3.4.6 Temperature humidity diagram
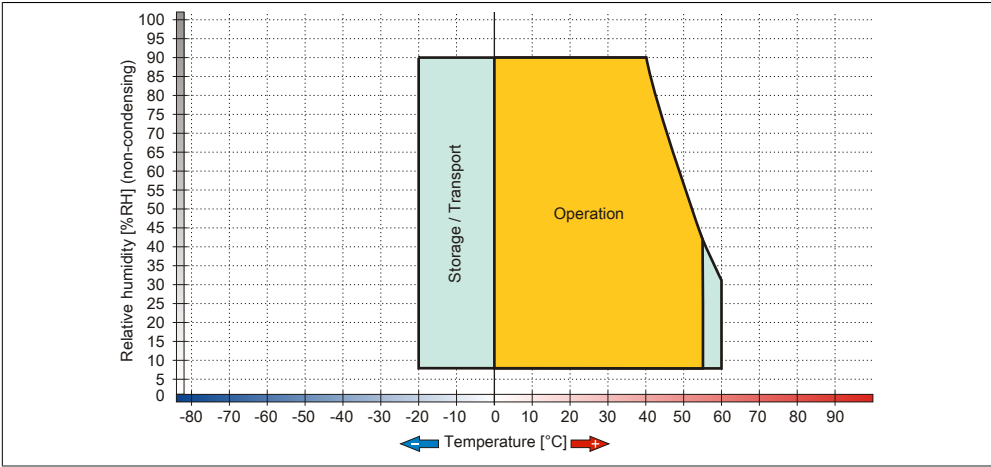


Image 32: 5PP582.1043-00 - Temperature humidity diagram

### 3.1.4 12.1" system unit

### 3.1.4.1 5PP520.1214-00

#### 3.1.4.1.1 General information

- 12.1" TFT SVGA color display
- Analog resistive touch screen
- Intel® Atom™ technology
- Small installation depth
- Fan-free operation
- Can be expand via interface board

#### 3.1.4.1.2 Order data

| Model number | Short description | Figure |
|---|---|---|
| | **System units** | |
| 5PP520.1214-00 | Power Panel 520 12.1" SVGA TFT display with touch screen (resistive); connections for 1x RS232, 3x USB 2.0, 1x Ethernet 10/100/1000; can be expanded with interface board; IP65 protection (front side); order 24 VDC plug for supply voltage separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91) | |
| | **Mandatory accessory** | |
| | **CPU boards** | |
| 5PP5CP.US15-00 | PP500 CPU board Intel Atom Z510, 1100 MHz, 400 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| 5PP5CP.US15-01 | PP500 CPU board Intel Atom Z520, 1330 MHz, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| 5PP5CP.US15-02 | PP500 CPU board Intel Atom Z530, 1600 MHz, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| | **Main memory** | |
| 5MMDDR.0512-01 | SO-DIMM DDR2 RAM 512 MB PC2-5300 | |
| 5MMDDR.1024-01 | SO-DIMM DDR2 RAM 1024 MB PC2-5300 | |
| 5MMDDR.2048-01 | SO-DIMM DDR2 RAM 2048 MB PC2-5300 | |
| | **Terminal Blocks** | |
| 0TB103.9 | Connector, 24 VDC, 3-pin female, screw clamp, 3.31 mm², protected against vibration by the screw flange | |
| 0TB103.91 | Connector, 24 VDC, 3-pin female, cage clamp, 3.31 mm², protected against vibration by the screw flange | |
| | **Optional accessory** | |
| | **Batteries** | |
| 0AC201.91 | Lithium Battery 4 pieces, 3 V / 950 mAh button cell | |
| 4A0006.00-000 | Lithium battery, 3 V / 950 mAh, button cell | |
| | **CompactFlash** | |

Table 37: 5PP520.1214-00 - Order data

| Model number | Short description | Figure |
|---|---|---|
| 5CFCRD.016G-04 | CompactFlash 16 GB B&R | |
| 5CFCRD.0512-04 | CompactFlash 512 MB B&R | |
| 5CFCRD.1024-04 | CompactFlash 1 GB B&R | |
| 5CFCRD.2048-04 | CompactFlash 2 GB B&R | |
| 5CFCRD.4096-04 | CompactFlash 4 GB B&R | |
| 5CFCRD.8192-04 | CompactFlash 8 GB B&R | |
| | **Interface boards** | |
| 5PP5IF.CETH-00 | PP500 Interface board; connection for 1x Ethernet 10/100/1000 | |
| 5PP5IF.CHDA-00 | PP500 Interface board; connection for 1x HDA sound | |
| 5PP5IF.FCAN-00 | PP500 Interface board; connection for 1x CAN master, 512 kByte SRAM | |
| 5PP5IF.FPLM-00 | PP500 Interface board; connections for 2x POWER-LINK | |
| 5PP5IF.FX2X-00 | PP500 Interface board; connection for 1x X2X master, 512 kByte SRAM | |
| 5PP5IF.FXCM-00 | PP500 Interface board; connection for 1x CAN master, 1x X2X master, 512 kByte SRAM | |
| | **USB Accessories** | |
| 5MMUSB.2048-01 | USB 2.0 Memory Stick 2048 MB B&R | |

Table 37: 5PP520.1214-00 - Order data

### 3.1.4.1.3 Technical data

| Product ID | 5PP520.1214-00 |
|---|---|
| **General information** | |
| Cooling | Fan-free |
| LEDs | Power, CF, Link, Run |
| Power button | Yes |
| Reset button | Yes |
| Buzzer | Yes |
| Battery | |
|    Type | Renata 950 mAh |
|    Method | Lithium Ion |
|    Lifespan | 4 years[1] |
|    removable | Yes, accessible from the outside |
| Certification | |
|    CE | In preparation |
| B&R ID code | $B4E0 |
| **Controllers** | |
| Bootloader | BIOS |
| Mode/Node switch | 2, 16 positions each (back side) |
| Watchdog | MTCX |
| Power failure logic | |
|    Controllers | MTCX[2] |
|    Buffer time | 10 ms |
| Graphics | |
|    Controllers | Intel® Graphics Media Accelerator 500 |
| Memory | |
|    Type | DDR2 SDRAM |
|    Size | Max. 2 GB |

Table 38: 5PP520.1214-00 - Technical data

| Product ID | 5PP520.1214-00 |
|---|---|
| **Interfaces** | |
| COM1 | |
|     Type | RS232, modem-capable, not electrically isolated |
|     Design | 9-pin DSUB plug |
|     UART | 16550-compatible, 16-byte FIFO |
|     Max. baud rate | 115 kbit/s |
| CompactFlash slot 1 | |
|     Type | Type I |
| USB | |
|     Type | USB 2.0 |
|     Amount | 3 |
|     Design | Type A |
|     Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), to high speed (480 Mbit/s) |
|     Current load | Max. 1 A per connection |
| Ethernet | |
|     Amount | 1 |
|     Controllers | Intel 82574 |
|     Design | Shielded RJ45 port |
|     Transfer rate | 10/100/1000 Mbit/s |
| **Display** | |
| Type | Color TFT |
| Diagonal | 12.1" (307 mm) |
| Colors | 262,144 |
| Resolution | SVGA, 800 x 600 pixels |
| Contrast | 800:1 |
| Viewing angles | |
|     Horizontal | Direction R / direction L =80° |
|     Vertical | Direction U = 35°/ direction D = 60° |
| Background lighting | |
|     Method | LED |
|     Brightness | 450 cd/m² |
|     Half-brightness time[3] | 50,000 h |
| Touch screen[4] | |
|     Type | AMT |
|     Technology | Analog, resistive |
|     Controllers | B&R, serial, 12-bit |
|     Degree of transmission | 80% ±3% |
| **Keys** | |
| Function keys | No |
| System keys | No |
| Lifespan | - |
| LED brightness | - |
| **Inserts** | |
| Interface board | Yes |
| I/O board | No |
| **Electrical properties** | |
| Rated voltage | 24 VDC ±25% |
| Rated current | TBD[5] |
| Starting current | Typ. 3 A, max. 50 A for <300 μs |
| Power consumption | TBD[6] |
| Electrical isolation | Yes |

Table 38: 5PP520.1214-00 - Technical data

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Technical data

| Product ID | 5PP520.1214-00 |
|---|---|
| **Operating conditions** | |
| EN 60529 protection | IP20 back side (only with an inserted CF card or IF board, or with an optional IF cover)<br>IP65 / NEMA 250 type 4X, protection from dust and sprayed water on front side |
| **Environmental conditions** | |
| Temperature | |
| Operation | 0 to 55°C |
| Storage | -20 to 60°C |
| Transport | -20 to 60°C |
| Relative humidity | |
| Operation | See temperature humidity diagram |
| Storage | See temperature humidity diagram |
| Transport | See temperature humidity diagram |
| Vibration | |
| Operation (continuous) | 2 to 9 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g |
| Operation (occasional) | 2 to 9 Hz: 3.5 mm amplitude / 9 to 200 Hz: 1 g |
| Storage | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
| Transport | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
| Shock | |
| Operation | 15 g, 11 ms |
| Storage | 30 g, 15 ms |
| Transport | 30 g, 15 ms |
| Altitude | |
| Operation | Max. 3000 m (component-dependent)[7] |
| **Mechanical characteristics** | |
| Housing | |
| Item | Aluminum paint |
| Front[8] | |
| Frame | Naturally anodized aluminum |
| Membrane | |
| Item | Polyester |
| Light background | RAL 9006 |
| Dark gray border around display | RAL 7024 |
| Gasket | Flat gasket around display front |
| Dimensions | |
| Width | 362 mm |
| Height | 284 mm |
| Depth | 60.2 mm |
| Weight | 3350 g |

Table 38: 5PP520.1214-00 - Technical data

1) At 50°C, 8.5 µA of the supplied components and a self-discharge of 40%. If an interface board with SRAM is installed, then the service life equals 2½ years.
2) Maintenance controller extended.
3) At 25°C ambient temperature. Reducing the brightness by 50% can result in an approximate 50% increase of the half-brightness time.
4) Touch screen drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).
5) The specified value is valid for a nominal voltage of 24 VDC.
6) The specified value applies to a system unit with CPU board without an interface board.
7) Derating the maximum ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).
8) Depending on the process or batch, there may be visible deviations in the color and surface structure.

### 3.1.4.1.4 Dimensions



Image 33: 5PP520.1214-00 - Dimensions

### 3.1.4.1.5 Cutout
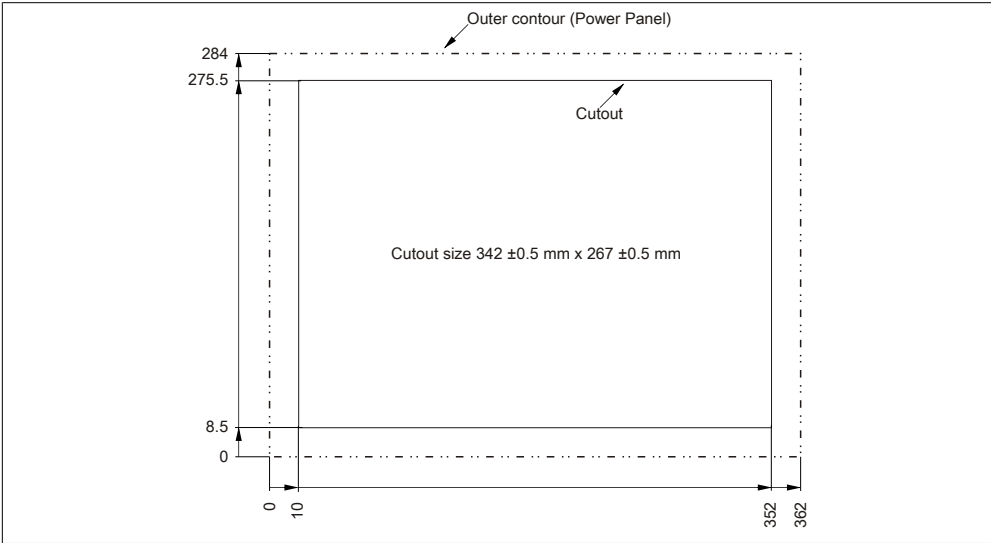


Image 34: 5PP520.1214-00 - Cutout installation

### 3.1.4.1.6 Temperature humidity diagram



Image 35: 5PP520.1214-00 - Temperature humidity diagram

### 3.1.5 15" system units

#### 3.1.5.1 5PP520.1505-00

##### 3.1.5.1.1 General information

- 15" TFT XGA color display
- Analog resistive touch screen
- Intel® Atom™ technology
- Small installation depth
- Fan-free operation
- Can be expand via interface board

##### 3.1.5.1.2 Order data

| Model number | Short description | Figure |
|---|---|---|
| | **System units** | |
| 5PP520.1505-00 | Power Panel 520 15" XGA TFT display with touch screen (resistive); connections for 1x RS232, 3x USB 2.0, 1x Ethernet 10/100/1000; can be expanded with interface board; IP65 protection (front side); order 24 VDC plug for supply voltage separatelyn (screw clamp: 0TB103.9; cage clamp: 0TB103.91) | |
| | **Mandatory accessory** | |
| | **CPU boards** | |
| 5PP5CP.US15-00 | PP500 CPU board Intel Atom Z510, 1100 MHz, 400 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| 5PP5CP.US15-01 | PP500 CPU board Intel Atom Z520, 1330 MHz, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| 5PP5CP.US15-02 | PP500 CPU board Intel Atom Z530, 1600 MHz, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| | **Main memory** | |
| 5MMDDR.0512-01 | SO-DIMM DDR2 RAM 512 MB PC2-5300 | |
| 5MMDDR.1024-01 | SO-DIMM DDR2 RAM 1024 MB PC2-5300 | |
| 5MMDDR.2048-01 | SO-DIMM DDR2 RAM 2048 MB PC2-5300 | |
| | **Terminal Blocks** | |
| 0TB103.9 | Connector, 24 VDC, 3-pin female, screw clamp, 3.31 mm², protected against vibration by the screw flange | |
| 0TB103.91 | Connector, 24 VDC, 3-pin female, cage clamp, 3.31 mm², protected against vibration by the screw flange | |
| | **Optional accessory** | |
| | **Batteries** | |
| 0AC201.91 | Lithium Battery 4 pieces, 3 V / 950 mAh button cell | |
| 4A0006.00-000 | Lithium battery, 3 V / 950 mAh, button cell | |
| | **CompactFlash** | |

Table 39: 5PP520.1505-00 - Order data

| Model number | Short description | Figure |
|---|---|---|
| 5CFCRD.016G-04 | CompactFlash 16 GB B&R | |
| 5CFCRD.0512-04 | CompactFlash 512 MB B&R | |
| 5CFCRD.1024-04 | CompactFlash 1 GB B&R | |
| 5CFCRD.2048-04 | CompactFlash 2 GB B&R | |
| 5CFCRD.4096-04 | CompactFlash 4 GB B&R | |
| 5CFCRD.8192-04 | CompactFlash 8 GB B&R | |
| | **Interface boards** | |
| 5PP5IF.CETH-00 | PP500 Interface board; connection for 1x Ethernet 10/100/1000 | |
| 5PP5IF.CHDA-00 | PP500 Interface board; connection for 1x HDA sound | |
| 5PP5IF.FCAN-00 | PP500 Interface board; connection for 1x CAN master, 512 kByte SRAM | |
| 5PP5IF.FPLM-00 | PP500 Interface board; connections for 2x POWER-LINK | |
| 5PP5IF.FX2X-00 | PP500 Interface board; connection for 1x X2X master, 512 kByte SRAM | |
| 5PP5IF.FXCM-00 | PP500 Interface board; connection for 1x CAN master, 1x X2X master, 512 kByte SRAM | |
| | **USB Accessories** | |
| 5MMUSB.2048-01 | USB 2.0 Memory Stick 2048 MB B&R | |

Table 39: 5PP520.1505-00 - Order data

## 3.1.5.1.3 Technical data

| Product ID | 5PP520.1505-00 |
|---|---|
| **General information** | |
| Cooling | Fan-free |
| LEDs | Power, CF, Link, Run |
| Power button | Yes |
| Reset button | Yes |
| Buzzer | Yes |
| Battery | |
| Type | Renata 950 mAh |
| Method | Lithium Ion |
| Lifespan | 4 years[1] |
| removable | Yes, accessible from the outside |
| Certification | |
| CE | In preparation |
| B&R ID code | $B4CF |
| **Controllers** | |
| Bootloader | BIOS |
| Mode/Node switch | 2, 16 positions each (back side) |
| Watchdog | MTCX |
| Power failure logic | |
| Controllers | MTCX[2] |
| Buffer time | 10 ms |
| Graphics | |
| Controllers | Intel® Graphics Media Accelerator 500 |
| Memory | |
| Type | DDR2 SDRAM |
| Size | Max. 2 GB |

Table 40: 5PP520.1505-00 - Technical data

| Product ID | 5PP520.1505-00 |
|---|---|
| **Interfaces** | |
| COM1 | |
|    Type | RS232, modem-capable, not electrically isolated |
|    Design | 9-pin DSUB plug |
|    UART | 16550-compatible, 16-byte FIFO |
|    Max. baud rate | 115 kbit/s |
| CompactFlash slot 1 | |
|    Type | Type I |
| USB | |
|    Type | USB 2.0 |
|    Amount | 3 |
|    Design | Type A |
|    Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), to high speed (480 Mbit/s) |
|    Current load | Max. 1 A per connection |
| Ethernet | |
|    Amount | 1 |
|    Controllers | Intel 82574 |
|    Design | Shielded RJ45 port |
|    Transfer rate | 10/100/1000 Mbit/s |
| **Display** | |
| Type | Color TFT |
| Diagonal | 15" (381 mm) |
| Colors | 16 million |
| Resolution | XGA, 1024 x 768 pixels |
| Contrast | 700:1 |
| Viewing angles | |
|    Horizontal | Direction R / direction L =80° |
|    Vertical | Direction U = 80°/ direction D = 60° |
| Background lighting | |
|    Method | LED |
|    Brightness | 350 cd/m² |
|    Half-brightness time[3] | 50,000 h |
| Touch screen[4] | |
|    Type | AMT |
|    Technology | Analog, resistive |
|    Controllers | B&R, serial, 12-bit |
|    Degree of transmission | 81% ±3% |
| **Keys** | |
| Function keys | No |
| System keys | No |
| Lifespan | - |
| LED brightness | - |
| **Inserts** | |
| Interface board | Yes |
| I/O board | No |
| **Electrical properties** | |
| Rated voltage | 24 VDC ±25% |
| Rated current | 1.5 A[5] |
| Starting current | Typ. 3 A, max. 50 A for <300 µs |
| Power consumption | 31 W[6] |
| Electrical isolation | Yes |

Table 40: 5PP520.1505-00 - Technical data

Chapter 2
Technical data

| Product ID | 5PP520.1505-00 |
|---|---|
| **Operating conditions** | |
| EN 60529 protection | IP20 back side (only with an inserted CF card or IF board, or with an optional IF cover) <br> IP65 / NEMA 250 type 4X, protection from dust and sprayed water on front side |
| **Environmental conditions** | |
| Temperature | |
|   Operation | 0 to 55°C |
|   Storage | -20 to 60°C |
|   Transport | -20 to 60°C |
| Relative humidity | |
|   Operation | See temperature humidity diagram |
|   Storage | See temperature humidity diagram |
|   Transport | See temperature humidity diagram |
| Vibration | |
|   Operation (continuous) | 2 to 9 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g |
|   Operation (occasional) | 2 to 9 Hz: 3.5 mm amplitude / 9 to 200 Hz: 1 g |
|   Storage | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
|   Transport | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
| Shock | |
|   Operation | 15 g, 11 ms |
|   Storage | 30 g, 15 ms |
|   Transport | 30 g, 15 ms |
| Altitude | |
|   Operation | Max. 3000 m (component-dependent)[7] |
| **Mechanical characteristics** | |
| Housing | |
|   Item | Aluminum paint |
| Front[8] | |
|   Frame | Naturally anodized aluminum |
|   Membrane | |
|     Item | Polyester |
|     Light background | RAL 9006 |
|     Dark gray border around display | RAL 7024 |
|   Gasket | Flat gasket around display front |
| Dimensions | |
|   Width | 435 mm |
|   Height | 330 mm |
|   Depth | 62.7 mm |
| Weight | 5100 g |

Table 40: 5PP520.1505-00 - Technical data

1) At 50°C, 8.5 µA of the supplied components and a self-discharge of 40%. If an interface board with SRAM is installed, then the service life equals 2½ years.
2) Maintenance controller extended.
3) At 25°C ambient temperature. Reducing the brightness by 50% can result in an approximate 50% increase of the half-brightness time.
4) Touch screen drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).
5) The specified value is valid for a nominal voltage of 24 VDC.
6) The specified value applies to a system unit with CPU board without an interface board.
7) Derating the maximum ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).
8) Depending on the process or batch, there may be visible deviations in the color and surface structure.
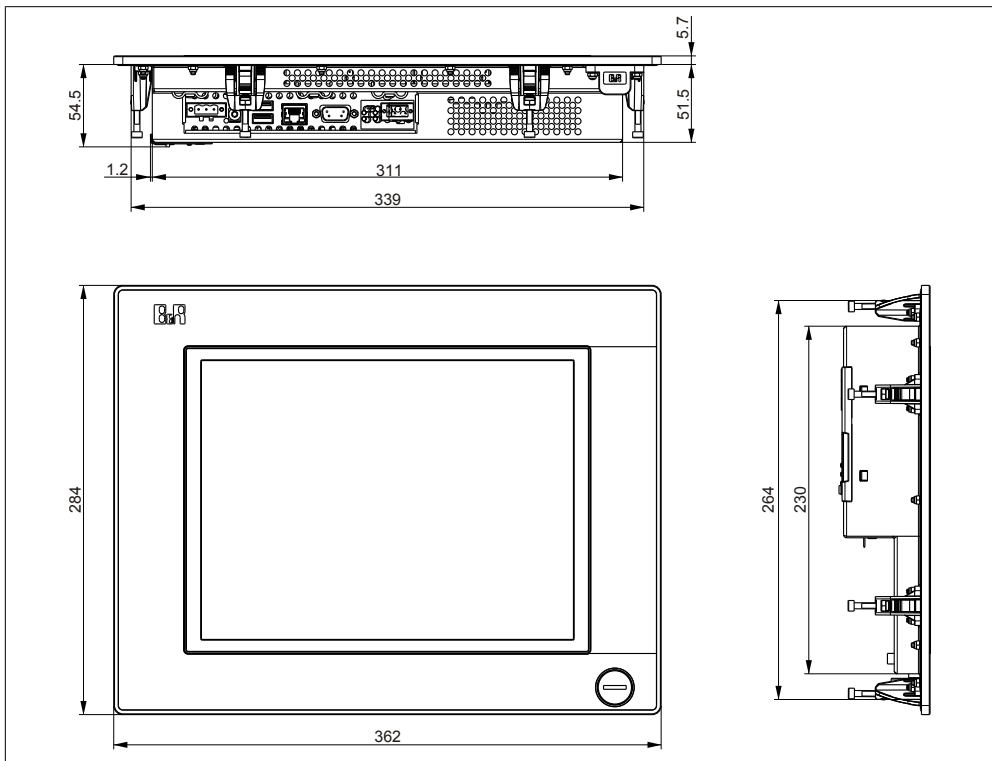
### 3.1.5.1.4 Dimensions



Image 36: 5PP520.1505-00 - Dimensions

### 3.1.5.1.5 Cutout



Image 37: 5PP520.1505-00 - Cutout installation

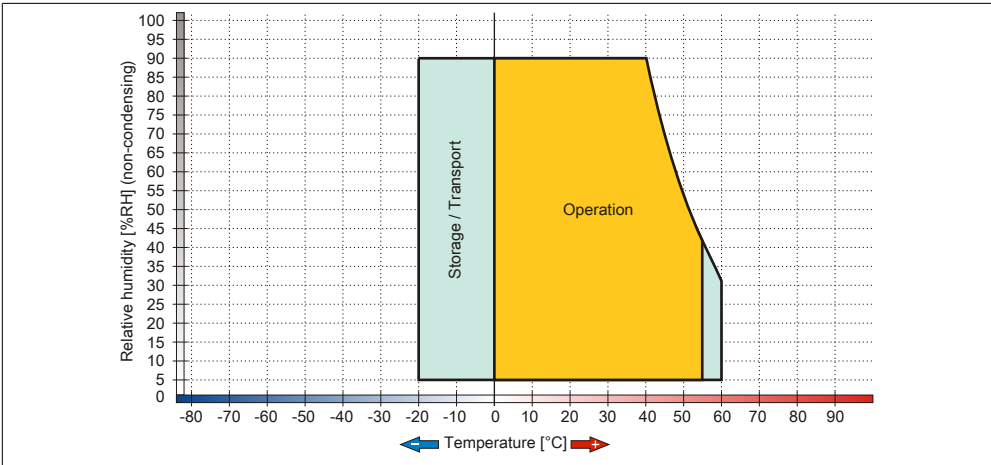### 3.1.5.1.6 Temperature humidity diagram



Image 38: 5PP520.1505-00 - Temperature humidity diagram

### 3.1.5.2 5PP580.1505-00

#### 3.1.5.2.1 General information

- 15" TFT XGA color display
- Analog resistive touch screen and function keys
- Intel® Atom™ technology
- Small installation depth
- Fan-free operation
- Can be expand via interface board

#### 3.1.5.2.2 Order data

| Model number | Short description | Figure |
|---|---|---|
| | **System units** | |
| 5PP580.1505-00 | Power Panel 580 15" XGA TFT display with touch screen (resistive); 32 function keys; connections for 1x RS232, 3x USB 2.0, 1x Ethernet 10/100/1000; can be expanded with interface board; IP65 protection (front side); order 24 VDC plug for supply voltage separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91) |  |
| | **Mandatory accessory** | |
| | **CPU boards** | |
| 5PP5CP.US15-00 | PP500 CPU board Intel Atom Z510, 1100 MHz, 400 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| 5PP5CP.US15-01 | PP500 CPU board Intel Atom Z520, 1330 MHz, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| 5PP5CP.US15-02 | PP500 CPU board Intel Atom Z530, 1600 MHz, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| | **Main memory** | |
| 5MMDDR.0512-01 | SO-DIMM DDR2 RAM 512 MB PC2-5300 | |
| 5MMDDR.1024-01 | SO-DIMM DDR2 RAM 1024 MB PC2-5300 | |
| 5MMDDR.2048-01 | SO-DIMM DDR2 RAM 2048 MB PC2-5300 | |
| | **Terminal Blocks** | |
| 0TB103.9 | Connector, 24 VDC, 3-pin female, screw clamp, 3.31 mm², protected against vibration by the screw flange | |
| 0TB103.91 | Connector, 24 VDC, 3-pin female, cage clamp, 3.31 mm², protected against vibration by the screw flange | |
| | **Optional accessory** | |
| | **Batteries** | |
| 0AC201.91 | Lithium Battery 4 pieces, 3 V / 950 mAh button cell | |
| 4A0006.00-000 | Lithium battery, 3 V / 950 mAh, button cell | |
| | **CompactFlash** | |
| 5CFCRD.016G-04 | CompactFlash 16 GB B&R | |
| 5CFCRD.0512-04 | CompactFlash 512 MB B&R | |
| 5CFCRD.1024-04 | CompactFlash 1 GB B&R | |

Table 41: 5PP580.1505-00 - Order data

| Model number | Short description | Figure |
|---|---|---|
| 5CFCRD.2048-04 | CompactFlash 2 GB B&R | |
| 5CFCRD.4096-04 | CompactFlash 4 GB B&R | |
| 5CFCRD.8192-04 | CompactFlash 8 GB B&R | |
| | **Interface boards** | |
| 5PP5IF.CETH-00 | PP500 Interface board; connection for 1x Ethernet 10/100/1000 | |
| 5PP5IF.CHDA-00 | PP500 Interface board; connection for 1x HDA sound | |
| 5PP5IF.FCAN-00 | PP500 Interface board; connection for 1x CAN master, 512 kByte SRAM | |
| 5PP5IF.FPLM-00 | PP500 Interface board; connections for 2x POWER-LINK | |
| 5PP5IF.FX2X-00 | PP500 Interface board; connection for 1x X2X master, 512 kByte SRAM | |
| 5PP5IF.FXCM-00 | PP500 Interface board; connection for 1x CAN master, 1x X2X master, 512 kByte SRAM | |
| | **USB Accessories** | |
| 5MMUSB.2048-01 | USB 2.0 Memory Stick 2048 MB B&R | |

Table 41: 5PP580.1505-00 - Order data

## 3.1.5.2.3 Technical data

| Product ID | 5PP580.1505-00 |
|---|---|
| **General information** | |
| Cooling | Fan-free |
| LEDs | Power, CF, Link, Run |
| Power button | Yes |
| Reset button | Yes |
| Buzzer | Yes |
| Battery | |
|    Type | Renata 950 mAh |
|    Method | Lithium Ion |
|    Lifespan | 4 years[1] |
|    removable | Yes, accessible from the outside |
| Certification | |
|    CE | In preparation |
| B&R ID code | $B607 |
| **Controllers** | |
| Bootloader | BIOS |
| Mode/Node switch | 2, 16 positions each (back side) |
| Watchdog | MTCX |
| Power failure logic | |
|    Controllers | MTCX[2] |
|    Buffer time | 10 ms |
| Graphics | |
|    Controllers | Intel® Graphics Media Accelerator 500 |
| Memory | |
|    Type | DDR2 SDRAM |
|    Size | Max. 2 GB |

Table 42: 5PP580.1505-00 - Technical data

| Product ID | 5PP580.1505-00 |
|---|---|
| **Interfaces** | |
| COM1 | |
|    Type | RS232, modem-capable, not electrically isolated |
|    Design | 9-pin DSUB plug |
|    UART | 16550-compatible, 16-byte FIFO |
|    Max. baud rate | 115 kbit/s |
| CompactFlash slot 1 | |
|    Type | Type I |
| USB | |
|    Type | USB 2.0 |
|    Amount | 3 |
|    Design | Type A |
|    Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), to high speed (480 Mbit/s) |
|    Current load | Max. 1 A per connection |
| Ethernet | |
|    Amount | 1 |
|    Controllers | Intel 82574 |
|    Design | Shielded RJ45 port |
|    Transfer rate | 10/100/1000 Mbit/s |
| **Display** | |
| Type | Color TFT |
| Diagonal | 15" (381 mm) |
| Colors | 16 million |
| Resolution | XGA, 1024 x 768 pixels |
| Contrast | 700:1 |
| Viewing angles | |
|    Horizontal | Direction R / direction L =80° |
|    Vertical | Direction U = 80°/ direction D = 60° |
| Background lighting | |
|    Method | LED |
|    Brightness | 350 cd/m² |
|    Half-brightness time[3] | 50,000 h |
| Touch screen[4] | |
|    Type | AMT |
|    Technology | Analog, resistive |
|    Controllers | B&R, serial, 12-bit |
|    Degree of transmission | 81% ±3% |
| **Keys** | |
| Function keys | 32 with LED (yellow) |
| System keys | No |
| Lifespan | > 1,000,000 actuations with 1 ±0.3 N to 3 ±0.3 N operating force |
| LED brightness | |
|    Yellow | Typ. 38 mcd |
| **Inserts** | |
| Interface board | Yes |
| I/O board | No |
| **Electrical properties** | |
| Rated voltage | 24 VDC ±25% |
| Rated current | 1.4 A[5] |
| Starting current | Typ. 3 A, max. 50 A for <300 µs |
| Power consumption | 34 W[6] |
| Electrical isolation | Yes |

Table 42: 5PP580.1505-00 - Technical data

| Product ID | 5PP580.1505-00 |
|---|---|
| **Operating conditions** | |
| EN 60529 protection | IP20 back side (only with an inserted CF card or IF board, or with an optional IF cover) IP65 / NEMA 250 type 4X, protection from dust and sprayed water on front side |
| **Environmental conditions** | |
| Temperature | |
|    Operation | 0 to 55°C |
|    Storage | -20 to 60°C |
|    Transport | -20 to 60°C |
| Relative humidity | |
|    Operation | See temperature humidity diagram |
|    Storage | See temperature humidity diagram |
|    Transport | See temperature humidity diagram |
| Vibration | |
|    Operation (continuous) | 2 to 9 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g |
|    Operation (occasional) | 2 to 9 Hz: 3.5 mm amplitude / 9 to 200 Hz: 1 g |
|    Storage | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
|    Transport | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
| Shock | |
|    Operation | 15 g, 11 ms |
|    Storage | 30 g, 15 ms |
|    Transport | 30 g, 15 ms |
| Altitude | |
|    Operation | Max. 3000 m (component-dependent)[7] |
| **Mechanical characteristics** | |
| Housing | |
|    Item | Aluminum paint |
| Front[8] | |
|    Frame | Naturally anodized aluminum |
|    Membrane | |
|       Item | Polyester |
|       Light background | RAL 9006 |
|       Dark gray border around display | RAL 7024 |
|    Gasket | Flat gasket around display front |
| Dimensions | |
|    Width | 435 mm |
|    Height | 330 mm |
|    Depth | 62.7 mm |
| Weight | 4900 g |

Table 42: 5PP580.1505-00 - Technical data

1) At 50°C, 8.5 µA of the supplied components and a self-discharge of 40%. If an interface board with SRAM is installed, then the service life equals 2½ years.
2) Maintenance controller extended.
3) At 25°C ambient temperature. Reducing the brightness by 50% can result in an approximate 50% increase of the half-brightness time.
4) Touch screen drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).
5) The specified value is valid for a nominal voltage of 24 VDC.
6) The specified value applies to a system unit with CPU board without an interface board.
7) Derating the maximum ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).
8) Depending on the process or batch, there may be visible deviations in the color and surface structure.
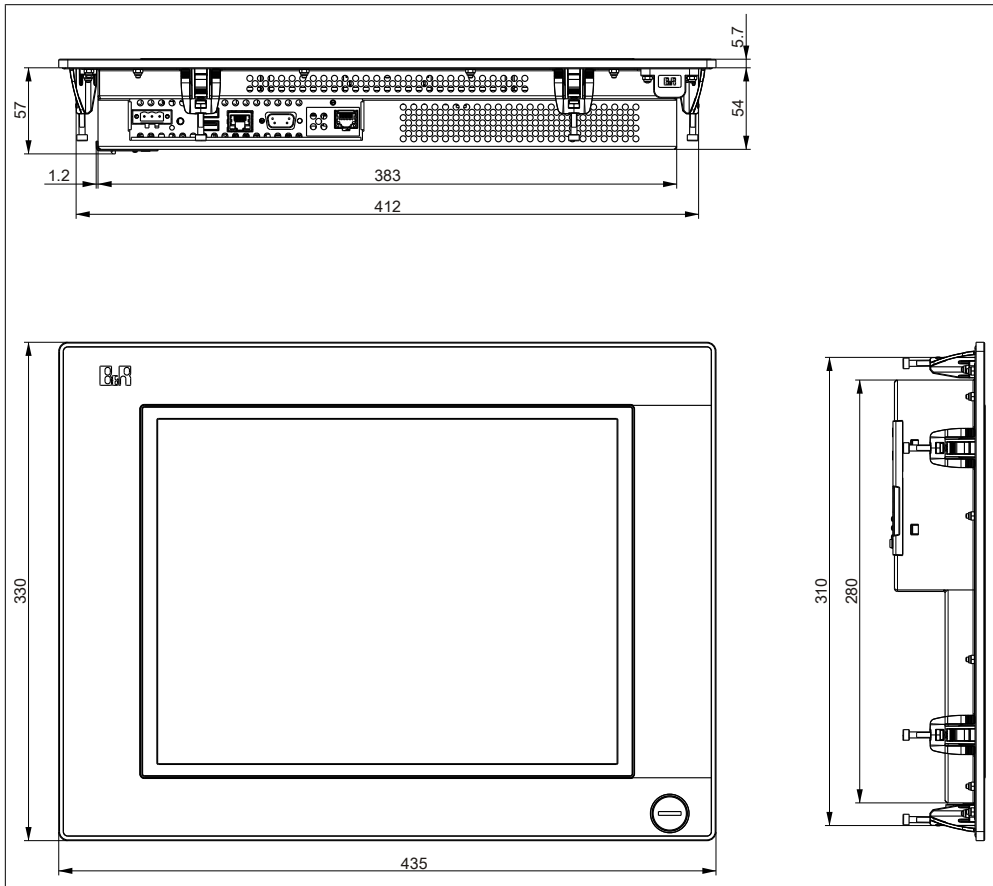
### 3.1.5.2.4 Dimensions
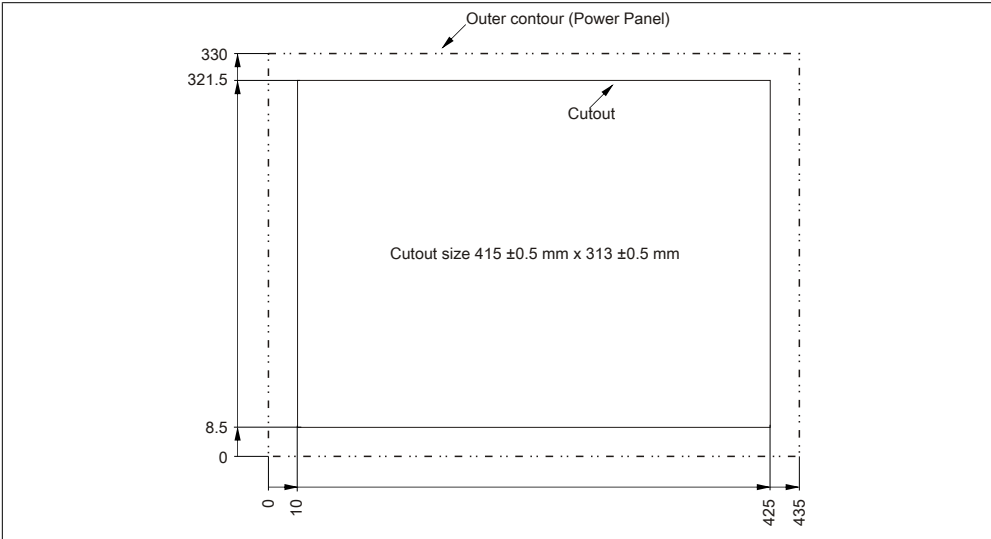


Image 39: 5PP580.1505-00 - Dimensions

### 3.1.5.2.5 Cutout
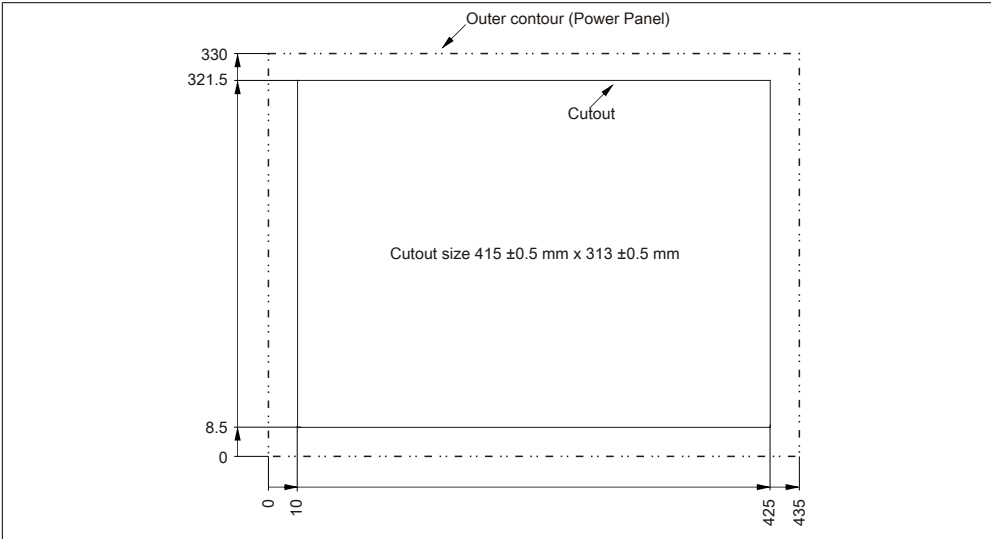


Image 40: 5PP580.1505-00 - Cutout installation

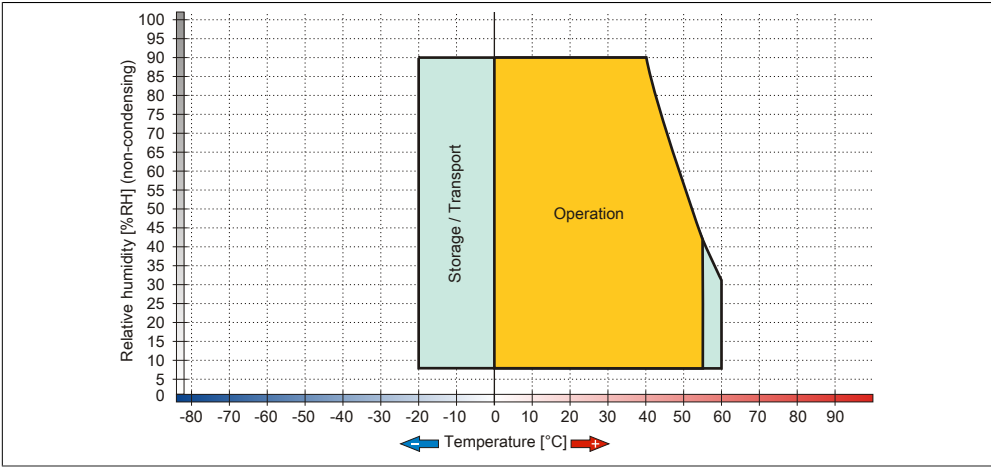### 3.1.5.2.6 Temperature humidity diagram
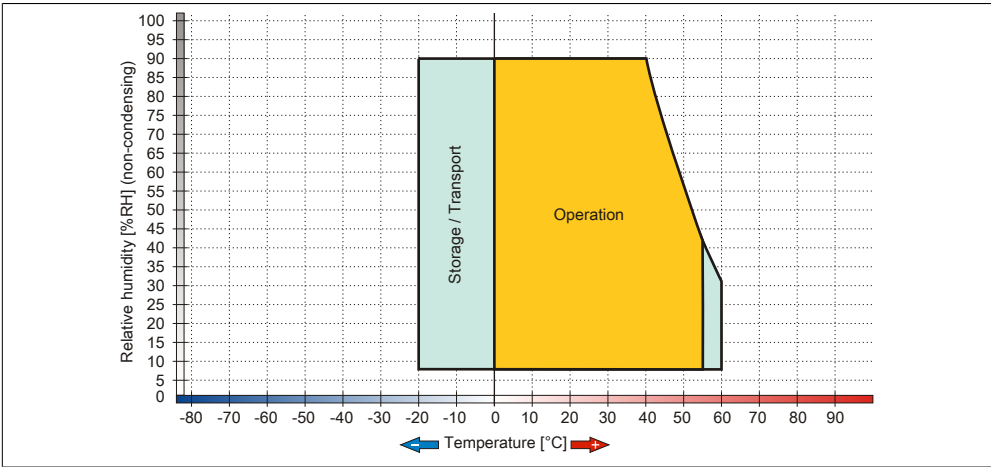


Image 41: 5PP580.1505-00 - Temperature humidity diagram

### 3.1.5.3 5PP581.1505-00

#### 3.1.5.3.1 General information

- 15" TFT XGA color display
- Analog resistive touch screen plus function and system keys
- Intel® Atom™ technology
- Small installation depth
- Fan-free operation
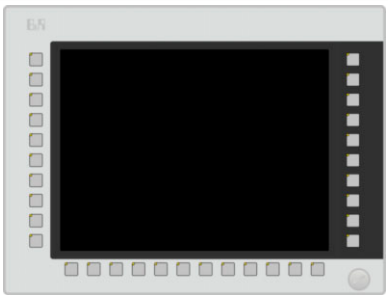- Can be expand via interface board

#### 3.1.5.3.2 Order data
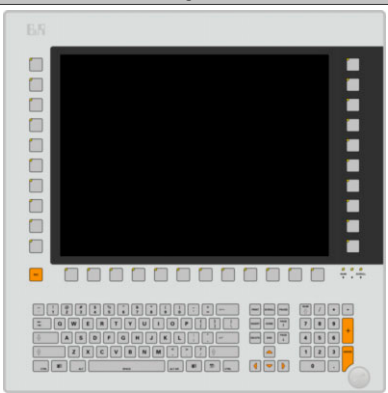
| Model number | Short description | Figure |
|---|---|---|
| | **System units** | |
| 5PP581.1505-00 | Power Panel 581 15" XGA TFT display with touch screen (resistive); 32 function keys and 92 system keys; connections for 1x RS232, 3x USB 2.0, 1x Ethernet 10/100/1000; can be expanded with interface board; IP65 protection (front side); order 24 VDC plug for supply voltage separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91) | |
| | **Mandatory accessory** | |
| | **CPU boards** | |
| 5PP5CP.US15-00 | PP500 CPU board Intel Atom Z510, 1100 MHz, 400 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| 5PP5CP.US15-01 | PP500 CPU board Intel Atom Z520, 1330 MHz, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| 5PP5CP.US15-02 | PP500 CPU board Intel Atom Z530, 1600 MHz, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| | **Main memory** | |
| 5MMDDR.0512-01 | SO-DIMM DDR2 RAM 512 MB PC2-5300 | |
| 5MMDDR.1024-01 | SO-DIMM DDR2 RAM 1024 MB PC2-5300 | |
| 5MMDDR.2048-01 | SO-DIMM DDR2 RAM 2048 MB PC2-5300 | |
| | **Terminal Blocks** | |
| 0TB103.9 | Connector, 24 VDC, 3-pin female, screw clamp, 3.31 mm², protected against vibration by the screw flange | |
| 0TB103.91 | Connector, 24 VDC, 3-pin female, cage clamp, 3.31 mm², protected against vibration by the screw flange | |
| | **Optional accessory** | |
| | **Batteries** | |
| 0AC201.91 | Lithium Battery 4 pieces, 3 V / 950 mAh button cell | |
| 4A0006.00-000 | Lithium battery, 3 V / 950 mAh, button cell | |
| | **CompactFlash** | |
| 5CFCRD.016G-04 | CompactFlash 16 GB B&R | |
| 5CFCRD.0512-04 | CompactFlash 512 MB B&R | |

Table 43: 5PP581.1505-00 - Order data

| Model number | Short description | Figure |
|---|---|---|
| 5CFCRD.1024-04 | CompactFlash 1 GB B&R | |
| 5CFCRD.2048-04 | CompactFlash 2 GB B&R | |
| 5CFCRD.4096-04 | CompactFlash 4 GB B&R | |
| 5CFCRD.8192-04 | CompactFlash 8 GB B&R | |
| **Interface boards** | | |
| 5PP5IF.CETH-00 | PP500 Interface board; connection for 1x Ethernet 10/100/1000 | |
| 5PP5IF.CHDA-00 | PP500 Interface board; connection for 1x HDA sound | |
| 5PP5IF.FCAN-00 | PP500 Interface board; connection for 1x CAN master, 512 kByte SRAM | |
| 5PP5IF.FPLM-00 | PP500 Interface board; connections for 2x POWER-LINK | |
| 5PP5IF.FX2X-00 | PP500 Interface board; connection for 1x X2X master, 512 kByte SRAM | |
| 5PP5IF.FXCM-00 | PP500 Interface board; connection for 1x CAN master, 1x X2X master, 512 kByte SRAM | |
| **USB Accessories** | | |
| 5MMUSB.2048-01 | USB 2.0 Memory Stick 2048 MB B&R | |

Table 43: 5PP581.1505-00 - Order data

### 3.1.5.3.3 Technical data

| Product ID | 5PP581.1505-00 |
|---|---|
| **General information** | |
| Cooling | Fan-free |
| LEDs | Power, CF, Link, Run |
| Power button | Yes |
| Reset button | Yes |
| Buzzer | Yes |
| Battery | |
|    Type | Renata 950 mAh |
|    Method | Lithium Ion |
|    Lifespan | 4 years[1] |
|    removable | Yes, accessible from the outside |
| Certification | |
|    CE | In preparation |
| B&R ID code | $B60A |
| **Controllers** | |
| Bootloader | BIOS |
| Mode/Node switch | 2, 16 positions each (back side) |
| Watchdog | MTCX |
| Power failure logic | |
|    Controllers | MTCX[2] |
|    Buffer time | 10 ms |
| Graphics | |
|    Controllers | Intel® Graphics Media Accelerator 500 |
| Memory | |
|    Type | DDR2 SDRAM |
|    Size | Max. 2 GB |

Table 44: 5PP581.1505-00 - Technical data

| Product ID | 5PP581.1505-00 |
|---|---|
| **Interfaces** | |
| COM1 | |
|    Type | RS232, modem-capable, not electrically isolated |
|    Design | 9-pin DSUB plug |
|    UART | 16550-compatible, 16-byte FIFO |
|    Max. baud rate | 115 kbit/s |
| CompactFlash slot 1 | |
|    Type | Type I |
| USB | |
|    Type | USB 2.0 |
|    Amount | 3 |
|    Design | Type A |
|    Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), to high speed (480 Mbit/s) |
|    Current load | Max. 1 A per connection |
| Ethernet | |
|    Amount | 1 |
|    Controllers | Intel 82574 |
|    Design | Shielded RJ45 port |
|    Transfer rate | 10/100/1000 Mbit/s |
| **Display** | |
| Type | Color TFT |
| Diagonal | 15" (381 mm) |
| Colors | 16 million |
| Resolution | XGA, 1024 x 768 pixels |
| Contrast | 700:1 |
| Viewing angles | |
|    Horizontal | Direction R / direction L =80° |
|    Vertical | Direction U = 80°/ direction D = 60° |
| Background lighting | |
|    Method | LED |
|    Brightness | 350 cd/m² |
|    Half-brightness time[3] | 50,000 h |
| Touch screen[4] | |
|    Type | AMT |
|    Technology | Analog, resistive |
|    Controllers | B&R, serial, 12-bit |
|    Degree of transmission | 81% ±3% |
| **Keys** | |
| Function keys | 32 with LED (yellow) |
| System keys | Alphanumeric keys, numeric keys, cursor block |
| Lifespan | > 1,000,000 actuations with 1 ±0.3 N to 3 ±0.3 N operating force |
| LED brightness | |
|    Yellow | Typ. 38 mcd |
| **Inserts** | |
| Interface board | Yes |
| I/O board | No |
| **Electrical properties** | |
| Rated voltage | 24 VDC ±25% |
| Rated current | 1.4 A[5] |
| Starting current | Typ. 3 A, max. 50 A for <300 µs |
| Power consumption | 34 W[6] |
| Electrical isolation | Yes |

Table 44: 5PP581.1505-00 - Technical data

Chapter 2
Technical data

| Product ID | 5PP581.1505-00 |
|---|---|
| **Operating conditions** | |
| EN 60529 protection | IP20 back side (only with an inserted CF card or IF board, or with an optional IF cover) IP65 / NEMA 250 type 4X, protection from dust and sprayed water on front side |
| **Environmental conditions** | |
| Temperature | |
|   Operation | 0 to 55°C |
|   Storage | -20 to 60°C |
|   Transport | -20 to 60°C |
| Relative humidity | |
|   Operation | See temperature humidity diagram |
|   Storage | See temperature humidity diagram |
|   Transport | See temperature humidity diagram |
| Vibration | |
|   Operation (continuous) | 2 to 9 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g |
|   Operation (occasional) | 2 to 9 Hz: 3.5 mm amplitude / 9 to 200 Hz: 1 g |
|   Storage | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
|   Transport | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
| Shock | |
|   Operation | 15 g, 11 ms |
|   Storage | 30 g, 15 ms |
|   Transport | 30 g, 15 ms |
| Altitude | |
|   Operation | Max. 3000 m (component-dependent)[7] |
| **Mechanical characteristics** | |
| Housing | |
|   Item | Aluminum paint |
| Front[8] | |
|   Frame | Naturally anodized aluminum |
|   Membrane | |
|     Item | Polyester |
|     Light background | RAL 9006 |
|     Dark gray border around display | RAL 7024 |
|   Gasket | Flat gasket around display front |
| Dimensions | |
|   Width | 435 mm |
|   Height | 430 mm |
|   Depth | 62.7 mm |
| Weight | 5800 g |

Table 44: 5PP581.1505-00 - Technical data

1) At 50°C, 8.5 µA of the supplied components and a self-discharge of 40%. If an interface board with SRAM is installed, then the service life equals 2½ years.
2) Maintenance controller extended.
3) At 25°C ambient temperature. Reducing the brightness by 50% can result in an approximate 50% increase of the half-brightness time.
4) Touch screen drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).
5) The specified value is valid for a nominal voltage of 24 VDC.
6) The specified value applies to a system unit with CPU board without an interface board.
7) Derating the maximum ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).
8) Depending on the process or batch, there may be visible deviations in the color and surface structure.
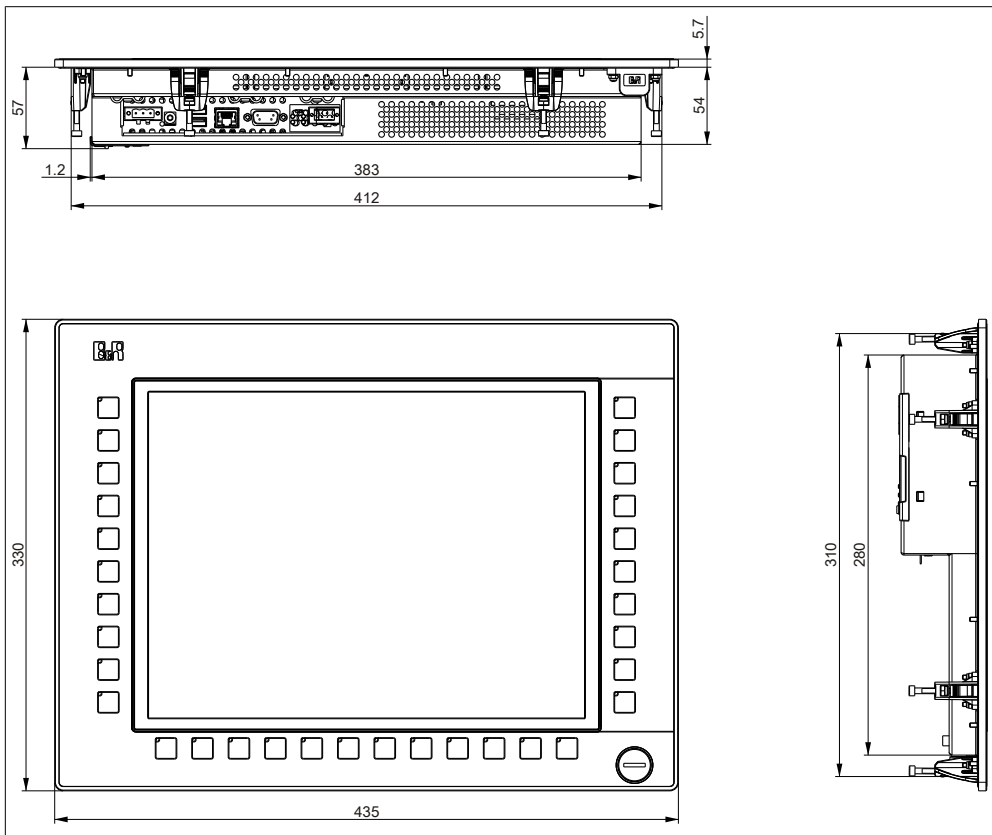
### 3.1.5.3.4 Dimensions
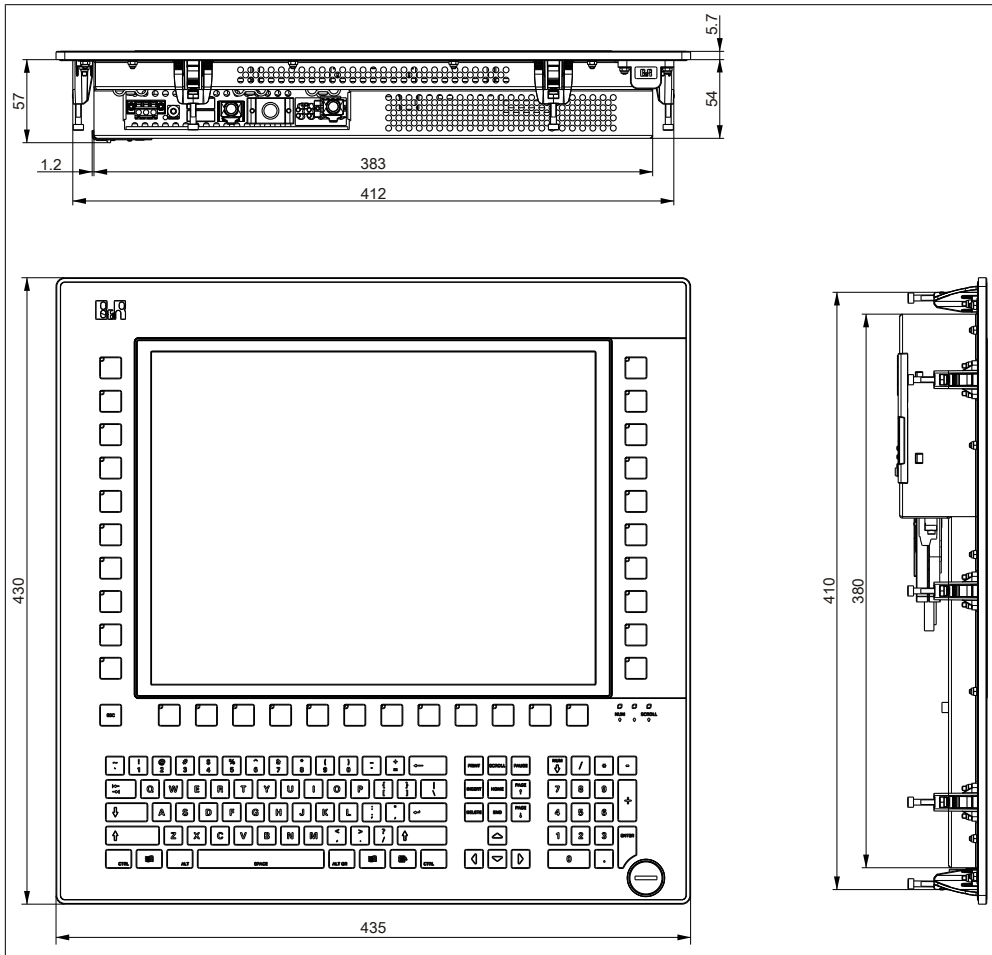


Image 42: 5PP581.1505-00 - Dimensions

### 3.1.5.3.5 Cutout

Outer contour (Power Panel)

Cutout

430
421.5

Cutout size 415 ±0.5 mm x 413 ±0.5 mm

8.5
0

0
10
425
435
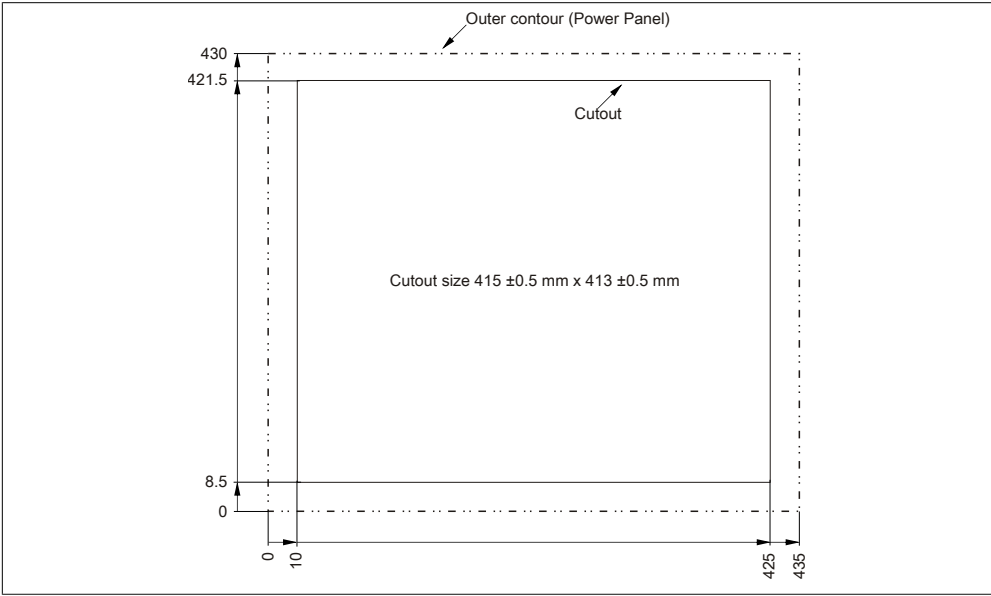
Image 43: 5PP581.1505-00 - Cutout installation

### 3.1.5.3.6 Temperature humidity diagram

Relative humidity [%RH] (non-condensing)

Storage / Transport

Operation
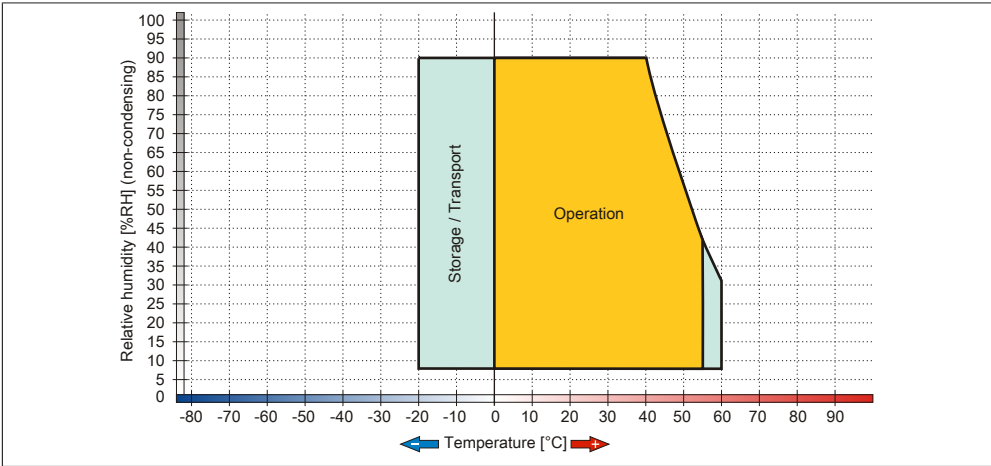
Temperature [°C]

Image 44: 5PP581.1505-00 - Temperature humidity diagram

## 3.2 US15W - CPU boards

### 3.2.1 General information

PP500 CPU boards are based on the Intel® US15W chipset and contain one DDR2 memory location for a maximum of 2 GB. Additionally, the Intel® GMA 500 with 128 MB RAM is also integrated.

- Insyde BIOS
- Intel® US15W chipset
- 1x DDR2 memory socket
- Intel® GMA 500
- Gigabit Ethernet
- Intel® Atom™ technology

### 3.2.2 Order data
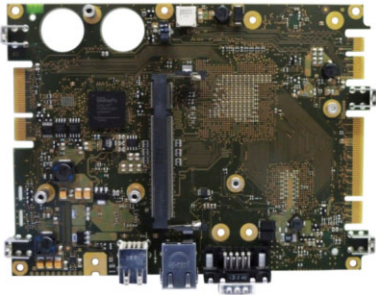
| Model number | Short description | Figure |
|---|---|---|
| | **CPU boards** | |
| 5PP5CP.US15-00 | PP500 CPU board Intel Atom Z510, 1100 MHz, 400 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| 5PP5CP.US15-01 | PP500 CPU board Intel Atom Z520, 1330 MHz, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| 5PP5CP.US15-02 | PP500 CPU board Intel Atom Z530, 1600 MHz, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 RAM module | |
| | **Mandatory accessory** | |
| | **Main memory** | |
| 5MMDDR.0512-01 | SO-DIMM DDR2 RAM 512 MB PC2-5300 | |
| 5MMDDR.1024-01 | SO-DIMM DDR2 RAM 1024 MB PC2-5300 | |
| 5MMDDR.2048-01 | SO-DIMM DDR2 RAM 2048 MB PC2-5300 | |

Table 45: 5PP5CP.US15-00, 5PP5CP.US15-01, 5PP5CP.US15-02 - Order data

## 3.2.3 Technical data

| Product ID | 5PP5CP.US15-00 | 5PP5CP.US15-01 | 5PP5CP.US15-02 |
|---|---|---|---|
| **Controllers** | | | |
| Bootloader | BIOS Insyde | | |
| Processor | | | |
|    Type | Intel® Atom™ Z510 | Intel® Atom™ Z520 | Intel® Atom™ Z530 |
|    Clock frequency | 1100 MHz | 1330 MHz | 1600 MHz |
|    Architectures | 45 nm | | |
|    L1 cache | 32 kB | | |
|    L2 cache | 512 kB | | |
|    External bus | 400 MHz | 533 MHz | |
|    Intel 64 architecture | No | | |
|    Expanded command set | Intel® virtualization technology, enhanced SpeedStep technology SSE, SSE2, SSE3 | | |
| Chipset | Intel® US15W | | |
| Real-time clock | | | |
|    Accuracy | At 25°C: typ. 12 ppm (1 seconds) per day[1] | | |
|    Battery-buffered | Yes | | |
| Memory socket | | | |
|    Type | DDR2 | | |
|    Size | Max. 2 GB | | |
| Graphics | | | |
|    Controllers | Intel® Graphics Media Accelerator 500 | | |
|    Memory | Up to 256 MB[2] | | |
|    Color depth | Max. 32-bit | | |
|    Resolution | | | |
|       GE1 = LVDS[3] | Depends on the system unit used | | |
| Power management | ACPI 3.0 | | |

Table 46: 5PP5CP.US15-00, 5PP5CP.US15-01, 5PP5CP.US15-02 - Technical data

1) At 50°C, 8.5 A of the supplied components and a self discharge of 40%.
2) Allocated in main memory.
3) GE = Graphics engine

## 3.3  Main memory

### 3.3.1 General information

The CPU Boards offer room for one main memory module.

### 3.3.2 Order data

| Model number | Short description | Figure |
|---|---|---|
| | **Main memory** | |
| 5MMDDR.0512-01 | SO-DIMM DDR2 RAM 512 MB PC2-5300 |  |
| 5MMDDR.1024-01 | SO-DIMM DDR2 RAM 1024 MB PC2-5300 | |
| 5MMDDR.2048-01 | SO-DIMM DDR2 RAM 2048 MB PC2-5300 | |

Table 47: 5MMDDR.0512-01, 5MMDDR.1024-01, 5MMDDR.2048-01 - Order data

### 3.3.3 Technical data

| Product ID | 5MMDDR.0512-01 | 5MMDDR.1024-01 | 5MMDDR.2048-01 |
|---|---|---|---|
| **General information** | | | |
| Type | SO-DIMM DDR2 SDRAM | | |
| Memory size | 512 MB | 1 GB | 2 GB |
| Construction | 200-pin | | |
| Organization | 64M x 64 bit | 128M x 64 bit | 256M x 64-bit |
| Speed | DDR2-667 (PC2-5300) | | |
| Certification | | | |
|    CE | Yes | | |

Table 48: 5MMDDR.0512-01, 5MMDDR.1024-01, 5MMDDR.2048-01 - Technical data

## Info:

**A main memory module can only be replaced at the B&R plant.**

## 3.4 Interface Boards

> ## Info:
>
> **Installation and replacement of interface boards ONLY possible at the B&R plant.**

### 3.4.1 5PP5IF.CETH-00

#### 3.4.1.1 General information

The PP500 interface board 5PP5IF.CETH-00 has a 10/100/1000 Mbit/s network connection and can be inserted in a Power Panel 500 and operated as an additional network interface.

- 1 network connection (10/100/1000 Mbit/s)
- mounting compatible in PP500

#### 3.4.1.2 Order data

| Model number | Short description | Figure |
|---|---|---|
| | Interface boards | |
| 5PP5IF.CETH-00 | PP500 Interface board; connection for 1x Ethernet 10/100/1000 | |

Table 49: 5PP5IF.CETH-00 - Order data

#### 3.4.1.3 Technical data

| Product ID | 5PP5IF.CETH-00 |
|---|---|
| **General information** | |
| Diagnostics | |
|   Data transfer | Yes, with status LED |
| Certification | |
|   CE | In preparation |
| B&R ID code | $B4D5 |
| **Interfaces** | |
| Ethernet | |
|   Amount | 1 |
|   Controllers | Intel 82574 |
|   Design | Shielded RJ45 port |
|   Cable length | max. 100 m (min. Cat5e) |
|   Transfer rate | 10/100/1000 Mbit/s |
| **Electrical properties** | |
| Power consumption | 2 W |

Table 50: 5PP5IF.CETH-00 - Technical data

| Product ID | 5PP5IF.CETH-00 |
|---|---|
| **Environmental conditions** | |
| Temperature | |
| Operation | 0 to 55°C |
| Storage | -20 to 60°C |
| Transport | -20 to 60°C |
| Relative humidity | |
| Operation | 5 to 90%, non-condensing |
| Storage | 5 to 95%, non-condensing |
| Transport | 5 to 95%, non-condensing |

Table 50: 5PP5IF.CETH-00 - Technical data

### 3.4.1.3.1 Ethernet interface (ETH)

| Ethernet interface | | | |
|---|---|---|---|
| Controller | Intel 82574 | | |
| Cabling | S/STP (Cat5e) | | |
| Transfer rate | 10/100/1000 Mbit/s[1] | | |
| Cable length | max. 100 m (min. Cat5e) | | |
| **Speed LED** | **On** | **Off** | |
| Green | 100 Mbit/s | 10 Mbit/s[2] | |
| Orange | 1000 Mbit/s | - | |
| **Link LED** | **On** | **Off** | |
| Orange | Link (Ethernet network connection available) | Activity (blinking - data transfer in progress) | |



Table 51: 5PP5IF.CETH-00 - Ethernet connection

1) Switching takes place automatically.
2) The 10 Mbit/s transfer speed / connection is only present if the IF slot Link LED is simultaneously active.

A special driver is necessary for operating the Intel Ethernet controller 82574. The necessary drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com.

## Info:

**Required drivers can only be downloaded from the B&R homepage, not from manufacturers' pages.**

### 3.4.2 5PP5IF.CHDA-00

#### 3.4.2.1 General information

The PP500 interface board 5PP5IF.CHDA-00 has a HDA soundchip with which the channels MIC, Line IN and Line OUT are externally accessible.

- 1x MIC

- 1x Line IN

- 1x Line OUT

- mounting compatible in PP500

#### 3.4.2.2 Order data
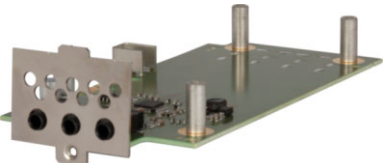
| Model number | Short description | Figure |
|---|---|---|
| | Interface boards | |
| 5PP5IF.CHDA-00 | PP500 Interface board; connection for 1x HDA sound |  |

Table 52: 5PP5IF.CHDA-00 - Order data

#### 3.4.2.3 Technical data

| Product ID | 5PP5IF.CHDA-00 |
|---|---|
| General information | |
| Certification | |
| CE | In preparation |
| B&R ID code | $B4D6 |
| Interfaces | |
| Audio | |
| Type | HDA Sound |
| Controllers | Realtek ALC 662 |
| Inputs | Microphone, Line in |
| Outputs | Line Out |
| Electrical properties | |
| Power consumption | 2 W |
| Environmental conditions | |
| Temperature | |
| Operation | 0 to 55°C |
| Storage | -20 to 60°C |
| Transport | -20 to 60°C |

Table 53: 5PP5IF.CHDA-00 - Technical data

| Product ID | 5PP5IF.CHDA-00 |
|---|---|
| Relative humidity | |
|    Operation | 5 to 90%, non-condensing |
|    Storage | 5 to 95%, non-condensing |
|    Transport | 5 to 95%, non-condensing |

Table 53: 5PP5IF.CHDA-00 - Technical data

### 3.4.2.3.1  MIC, Line IN, Line OUT
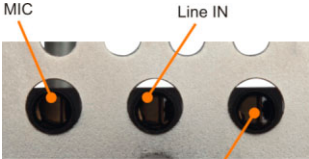
| MIC, Line IN, Line OUT | | |
|---|---|---|
| Controller | Realtek ALC 662 | 3.5 mm jack, female |
| MIC | Connection of a mono microphone with a 3.5 mm stereo (headphone) jack. |  |
| Line IN | Stereo Line IN signals supplied via 3.5 mm jack. | |
| Line OUT | Connection of a stereo sound device (e.g. amplifier) via a 3.5 mm jack. | |
| | | |

Table 54: MIC, Line IN, Line OUT

A special driver is necessary for operating the audio controller. The necessary drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com.

## Info:

**Required drivers can only be downloaded from the B&R homepage, not from manufacturers' pages.**

### 3.4.3 5PP5IF.FPLM-00

#### 3.4.3.1 General information

The PP500 interface board 5PP5IF.FPLM-00 has two POWERLINK-connections and 512 kB SRAM.

- 2x POWERLINK- connections
- 512 KB SRAM
- mounting compatible in PP500

#### 3.4.3.2 Order data

| Model number | Short description | Figure |
|---|---|---|
| | Interface boards | |
| 5PP5IF.FPLM-00 | PP500 Interface board; connections for 2x POWER-LINK | |

Table 55: 5PP5IF.FPLM-00 - Order data

#### 3.4.3.3 Technical data

| Product ID | 5PP5IF.FPLM-00 |
|---|---|
| **General information** | |
| Diagnostics | |
|   Data transfer | Yes, with status LED |
| Certification | |
|   CE | In preparation |
| B&R ID code | $B4D8 |
| **Controllers** | |
| SRAM | |
|   Size | 512 kB |
| **Interfaces** | |
| POWERLINK | |
|   Amount | 2 |
|   Design | Shielded RJ45 port |
| **Electrical properties** | |
| Power consumption | 3 W |
| **Environmental conditions** | |
| Temperature | |
|   Operation | 0 to 55°C |
|   Storage | -20 to 60°C |
|   Transport | -20 to 60°C |

Table 56: 5PP5IF.FPLM-00 - Technical data

| Product ID | 5PP5IF.FPLM-00 |
|---|---|
| Relative humidity | |
|    Operation | 5 to 90%, non-condensing |
|    Storage | 5 to 95%, non-condensing |
|    Transport | 5 to 95%, non-condensing |

Table 56: 5PP5IF.FPLM-00 - Technical data

### 3.4.3.3.1  POWERLINK interface



| POWERLINK Interface Board 2 connections | | |
|---|---|---|
| Cabling | S/STP (Cat5e) | |
| Cable length | max. 100 m (min. Cat5e) | |
| **Speed LED** | **On** | **Off** |
| Green / red | see Status / Error LED | |
| **Link LED** | **On** | **Off** |
| Yellow | Link (POWER-LINK network connection available) | Activity (blinking - data transfer in progress) |

Table 57: POWERLINK Interface Board 2port connection

### 3.4.3.3.2  Status / Error LED

The status/error LED is a green/red LED.

| Red - error | Description |
|---|---|
| On | The POWERLINK interface has encountered an error (failed Ethernet frames, increased number of collisions on the network, etc.). |

Table 58: Status / Error LED as error LED - POWERLINK operating mode

| Green - status | Description |
|---|---|
| Off<br>NOT_ACTIVE | **Managing Node (MN)**<br>The bus is monitored for POWERLINK frames. If a frame is not received within the configured time window (timeout), the interface goes directly into PRE_OPERATIONAL_1 status (single flash).<br>If, however, POWERLINK communication is detected before this time passes, the interface goes directly into the BASIC_ETHERNET status (flickering).<br>**Controlled Node (CN)**<br>The bus is monitored for POWERLINK frames. If a frame is not received within the configured time window (timeout), the interface goes directly into BASIC_ETHERNET status (flickering).<br>If, however, POWERLINK communication is detected during this time, the interface goes directly into the PRE_OPERATIONAL_1 status (single flash). |
| Green flickering (approx. 10 Hz)<br>BASIC_ETHERNET | The interface is in BASIC_ETHERNET status, and is operated purely as an Ethernet TCP/IP interface.<br>**Managing Node (MN)**<br>This status can only be changed by resetting the interface.<br>**Controlled Node (CN)**<br>If POWERLINK communication is detected while in this status, the interface goes into the PRE_OPERATIONAL_1 state (single flash). |

Table 59: Status/Error LED as status LED - POWERLINK operating mode

| Green - status | Description |
|---|---|
| Single flash (approx. 1 Hz) PRE_OPERATIONAL_1 | The interface status is PRE_OPERATIONAL_1. **Managing Node (MN)** The MN starts the operation of the "reduced cycle". Collisions are allowed on the bus. There is not yet any cyclic communication. **Controlled Node (CN)** The CN waits until it receives an SoC frame and then switches to PRE_OPERATIONAL_2 status (double flash). |
| Double flash (approx. 1 Hz) PRE_OPERATIONAL_2 | The interface status is PRE_OPERATIONAL_2. **Managing Node (MN)** The MN begins with the cyclic communication (cyclic input data is not yet evaluated). The CNs are configured in this status. **Controlled Node (CN)** In this status, the interface is normally configured by the manager. After this, a command changes the status to PRE_OPERATIONAL_3 (triple flash). |
| Triple flash (approx. 1 Hz) READY_TO_OPERATE | The interface status is READY_TO_OPERATE. **Managing Node (MN)** Normal cyclic and asynchronous communication. Received PDO data is ignored. **Controlled Node (CN)** The configuration of the interface is complete. Normal cyclic and asynchronous communication. The PDO data sent corresponds to the PDO mapping used. However, cyclic data is not yet evaluated. |
| On OPERATIONAL | The interface status is OPERATIONAL. |
| Blinking (approx. 2.5 Hz) STOPPED | The interface status is STOPPED. **Managing Node (MN)** This status is not possible for the MN. **Controlled Node (CN)** No output data is produced and no input data is received. Only the appropriate command from the manager can enter or leave this state. |

Table 59: Status/Error LED as status LED - POWERLINK operating mode

### 3.4.4 5PP5IF.FCAN-00

#### 3.4.4.1 General information

The PP500 interface board 5PP5IF.FCAN-00 contains one CAN Master interface and 512 kB SRAM.

- 1x CAN Master interface
- 512 KB SRAM
- mounting compatible in PP500

#### 3.4.4.2 Order data

| Model number | Short description | Figure |
|---|---|---|
| | Interface boards | |
| 5PP5IF.FCAN-00 | PP500 Interface board; connection for 1x CAN master, 512 kByte SRAM | |
| | Mandatory accessory | |
| | Terminal Blocks | |
| 0TB1208.3100 | Connector 3.5 8p clamp | |

Table 60: 5PP5IF.FCAN-00 - Order data

#### 3.4.4.3 Technical data

| Product ID | 5PP5IF.FCAN-00 |
|---|---|
| **General information** | |
| Diagnostics | |
|    Terminating Resistance | Yes, with status LED |
|    Module status | Yes, with status LED |
|    Data transfer | Yes, with status LED |
| Certification | |
|    CE | In preparation |
| B&R ID code | $B4DA |
| **Controllers** | |
| SRAM | |
|    Size | 512 kB |
| **Interfaces** | |
| CAN | |
|    Amount | 1 |
|    Design | 8-pin multipoint plug |
|    Transfer rate | Max. 500 kbit/s |
|    Terminating Resistance | |
|      Type | Can be activated and deactivated using a sliding switch |
|      Default setting | Disabled |
| **Electrical properties** | |
| Power consumption | 3 W |

Table 61: 5PP5IF.FCAN-00 - Technical data

---

| Product ID | 5PP5IF.FCAN-00 |
|---|---|
| **Environmental conditions** | |
| Temperature | |
|    Operation | 0 to 55°C |
|    Storage | -20 to 60°C |
|    Transport | -20 to 60°C |
| Relative humidity | |
|    Operation | 5 to 90%, non-condensing |
|    Storage | 5 to 95%, non-condensing |
|    Transport | 5 to 95%, non-condensing |

Table 61: 5PP5IF.FCAN-00 - Technical data

### 3.4.4.3.1 CAN interface

| CAN bus | | |
|---|---|---|
| The electrically isolated CAN bus interface is a 8-pin multipoint plug. | | |
| Transfer rate | Max. 500 kbit/s | |
| Cable length | Max. 1000 meters | |
| **Pin** | **CAN bus** | 8-pin multipoint plug |
| 1 | - | |
| 2 | - | |
| 3 | - | |
| 4 | CAN⊥ (CAN ground) | |
| 5 | SHLD (shield) | |
| 6 | SHLD (shield) | |
| 7 | CAN_L (CAN Low) | |
| 8 | CAN_H (CAN High) | |
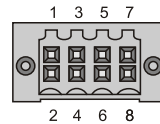
Table 62: 5PP5IF.FCAN-00 - CAN interface

### 3.4.4.3.2 Status LEDs

| Status LEDs | | | | |
|---|---|---|---|---|
| **LED** | **Color** | **Status** | **Meaning** | |
| CAN | Yellow | On | Sends data | |
| | | Off | Receives data | |
| Status LED | Green | On | Interface module is active | |
| | Red | On | CPU starting up | |
| LED TERM | Yellow | On | The terminating resistor is switched on | |
| | | Off | The terminating resistor is switched off | |
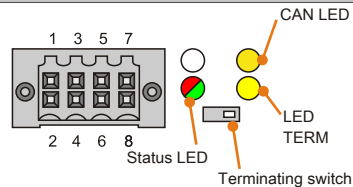
Table 63: 5PP5IF.FCAN-00 - Status LEDs

### 3.4.4.3.3  CAN terminating switch
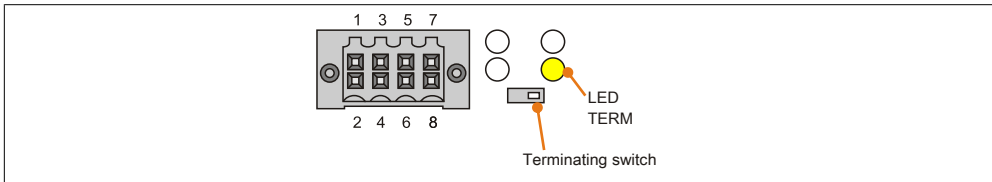


Image 45: CAN terminating switch

A CAN terminating resistor is integrated on the interface board. It is turned on and off with a switch on the front side. An active terminating resistor is indicated by the TERM LED.

Chapter 2
Technical data

### 3.4.5 5PP5IF.FX2X-00

#### 3.4.5.1 General information

The PP500 interface board 5PP5IF.FX2X-00 contains one X2X Link Master interface and 512 kB SRAM.

- 1x X2X Link Master interface
- 512 KB SRAM
- mounting compatible in PP500

#### 3.4.5.2 Order data

| Model number | Short description | Figure |
|---|---|---|
| | **Interface boards** | |
| 5PP5IF.FX2X-00 | PP500 Interface board; connection for 1x X2X master, 512 kByte SRAM | |
| | **Mandatory accessory** | |
| | **Terminal Blocks** | |
| 0TB1208.3100 | Connector 3.5 8p clamp | |

Table 64: 5PP5IF.FX2X-00 - Order data

#### 3.4.5.3 Technical data

| Product ID | 5PP5IF.FX2X-00 |
|---|---|
| **General information** | |
| Diagnostics | |
|    Module status | Yes, with status LED |
|    Data transfer | Yes, with status LED |
| Certification | |
|    CE | In preparation |
| B&R ID code | $B4D9 |
| **Controllers** | |
| SRAM | |
|    Size | 512 kB |
| **Interfaces** | |
| X2X | |
|    Type | X2X Link master |
|    Amount | 1 |
|    Design | 8-pin multipoint plug |
| **Electrical properties** | |
| Power consumption | 3 W |
| **Environmental conditions** | |
| Temperature | |
|    Operation | 0 to 55°C |
|    Storage | -20 to 60°C |
|    Transport | -20 to 60°C |

Table 65: 5PP5IF.FX2X-00 - Technical data

| Product ID | 5PP5IF.FX2X-00 |
|---|---|
| Relative humidity | |
|    Operation | 5 to 90%, non-condensing |
|    Storage | 5 to 95%, non-condensing |
|    Transport | 5 to 95%, non-condensing |

Table 65: 5PP5IF.FX2X-00 - Technical data

### 3.4.5.3.1  X2X interface

| X2X Link Master connection | | |
|---|---|---|
| The electrically isolated X2X Link is a 8-pin multipoint plug. | | |
| **Pin** | **X2X Link** | |
| 1 | X2X\ | |
| 2 | X2X | |
| 3 | X2X⊥ | |
| 4 | - | |
| 5 | SHLD (shield) | |
| 6 | SHLD (shield) | |
| 7 | - | |
| 8 | - | |



Table 66: 5PP5IF.FX2X-00 - X2X interface

### 3.4.5.3.2  Status LEDs

| Status LEDs | | | | |
|---|---|---|---|---|
| **LED** | **Color** | **Status** | **Meaning** | |
| X2X | Yellow | On | Sends data | |
| | | Off | Receives data | |
| Status LED | Green | On | Interface module is active | |
| | Red | On | CPU starting up | |
| | | | | |
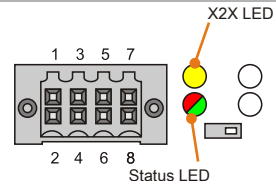


Table 67: 5PP5IF.FX2X-00 - Status LEDs

### 3.4.6 5PP5IF.FXCM-00

#### 3.4.6.1 General information

The PP500 interface board 5PP5IF.FXCM-00 contains one CAN Master interface, one X2X Link Master interface and 512 kB SRAM.

- 1x CAN Master interface
- 1x X2X Master interface
- 512 KB SRAM
- mounting compatible in PP500

#### 3.4.6.2 Order data

| Model number | Short description | Figure |
|---|---|---|
| | **Interface boards** | |
| 5PP5IF.FXCM-00 | PP500 Interface board; connection for 1x CAN master, 1x X2X master, 512 kByte SRAM | |
| | **Mandatory accessory** | |
| | **Terminal Blocks** | |
| 0TB1208.3100 | Connector 3.5 8p clamp | |

Table 68: 5PP5IF.FXCM-00 - Order data

#### 3.4.6.3 Technical data

| Product ID | 5PP5IF.FXCM-00 |
|---|---|
| **General information** | |
| Diagnostics | |
| Terminating Resistance | Yes, with status LED |
| Module status | Yes, with status LED |
| Data transfer | Yes, with status LED |
| Certification | |
| CE | In preparation |
| B&R ID code | $BB9D |
| **Controllers** | |
| SRAM | |
| Size | 512 kB |
| **Interfaces** | |
| CAN | |
| Amount | 1 |
| Design | 8-pin multipoint plug |
| Transfer rate | Max. 500 kbit/s |
| Terminating Resistance | |
| Type | Can be activated and deactivated using a sliding switch |
| Default setting | Disabled |

Table 69: 5PP5IF.FXCM-00 - Technical data

| Product ID | 5PP5IF.FXCM-00 |
|---|---|
| X2X | |
| Type | X2X Link master |
| Amount | 1 |
| Design | 8-pin multipoint plug |
| **Electrical properties** | |
| Power consumption | 3 W |
| **Environmental conditions** | |
| Temperature | |
| Operation | 0 to 55°C |
| Storage | -20 to 60°C |
| Transport | -20 to 60°C |
| Relative humidity | |
| Operation | 5 to 90%, non-condensing |
| Storage | 5 to 95%, non-condensing |
| Transport | 5 to 95%, non-condensing |

Table 69: 5PP5IF.FXCM-00 - Technical data

### 3.4.6.3.1  CAN interface

| CAN bus | | |
|---|---|---|
| The electrically isolated CAN bus interface is a 8-pin multipoint plug. | | |
| Transfer rate | Max. 500 kbit/s | |
| Cable length | Max. 1000 meters | |
| **Pin** | **CAN bus** | 8-pin multipoint plug |
| 1 | - | |
| 2 | - | 1  3  5  7 |
| 3 | - | |
| 4 | CAN⊥ (CAN ground) | |
| 5 | SHLD (shield) | |
| 6 | SHLD (shield) | 2  4  6  8 |
| 7 | CAN_L (CAN Low) | |
| 8 | CAN_H (CAN High) | |

Table 70: 5PP5IF.FCAN-00 - CAN interface

### 3.4.6.3.2  X2X interface

| X2X Link Master connection | | |
|---|---|---|
| The electrically isolated X2X Link is a 8-pin multipoint plug. | | |
| **Pin** | **X2X Link** | 8-pin multipoint plug |
| 1 | X2X\ | |
| 2 | X2X | 1  3  5  7 |
| 3 | X2X⊥ | |
| 4 | - | |
| 5 | SHLD (shield) | |
| 6 | SHLD (shield) | 2  4  6  8 |
| 7 | - | |
| 8 | - | |

Table 71: 5PP5IF.FX2X-00 - X2X interface

### 3.4.6.3.3  Status LEDs

| Status LEDs | | | | |
|---|---|---|---|---|
| **LED** | **Color** | **Status** | **Meaning** | |
| X2X | Yellow | On | Sends data | |
| | | Off | Receives data | |
| CAN | Yellow | On | Sends data | |
| | | Off | Receives data | |
| Status LED | Green | On | Interface module is active | |
| | Red | On | CPU starting up | |
| LED TERM | Yellow | On | The terminating resistor is switched on | |
| | | Off | The terminating resistor is switched off | |

Table 72: 5PP5IF.FXCM-00 - Status LEDs

### 3.4.6.3.4  CAN terminating switch
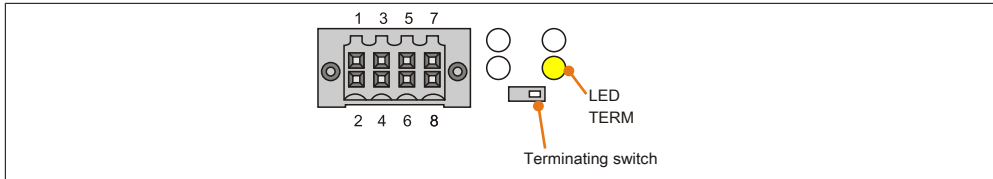


Image 46: CAN terminating switch

A CAN terminating resistor is integrated on the interface board. It is turned on and off with a switch on the front side. An active terminating resistor is indicated by the TERM LED.

# Chapter 3 • Commissioning

## 1 Installation

Power Panel 500 devices are best mounted in a housing cutout using the mounting clamps and terminal blocks found on the housing (different designs possible).

### 1.1 Mounting with retaining clips

Mounting with terminal blocks is used on PP500 devices with a diagonal of 5.7" and 7".
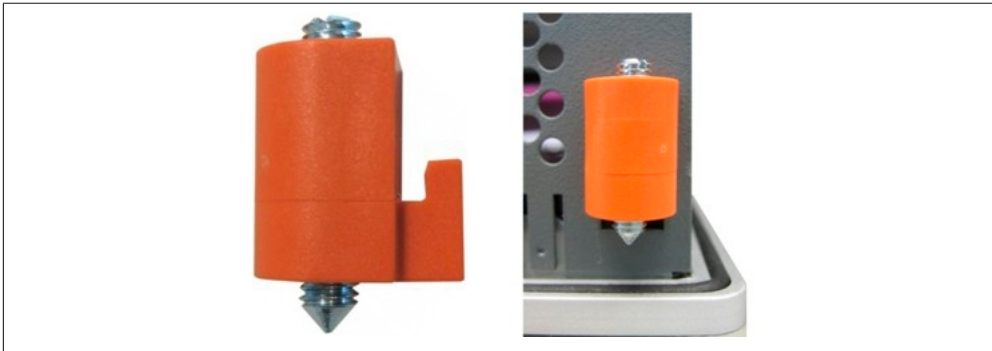


Image 47: Retaining clips

The retaining clips for the material where the device is being clamped are designed for a maximum thickness of 6 mm and minimum thickness of 2 mm.

A large flat-head screwdriver is needed to tighten and loosen the screws. The maximum torque for the retaining clips is 0.5 Nm.

The device must be mounted to a flat surface because uneven areas can cause damage to the display when the screws are tightened.

## 1.2 Mounting with terminal blocks

Mounting with terminal blocks is used on PP500 devices with a diagonal of 10.4", 12" and 15".
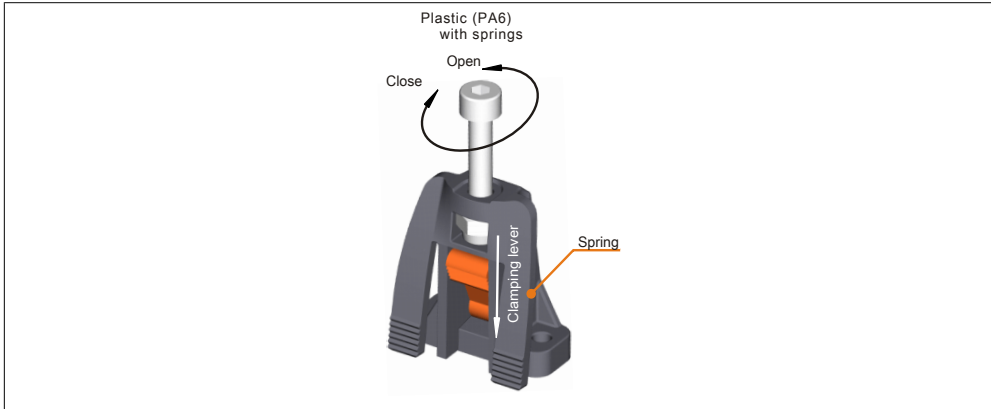


Image 48: Termincal block for the Power Panel 500

The terminal blocks are designed for a maximum thickness of 10 mm for the material where the device is being clamped.

A hex key (3mm) is needed to tighten and loosen the screws on the plastic terminals.

The maximum torque when tightening the clamp is 0.5 Nm. A Power Panel 500 unit must be mounted to a flat surface. Uneven areas can cause damage to the display when the screws are tightened.

## 1.3 Important mounting information

- The environmental conditions must be taken into consideration.
- The PP500 must be mounted to a planar surface.
- The PP500 is only certified for operation in closed rooms.
- The PP500 cannot be situated in direct sunlight.
- The ventilation holes cannot be covered.
- When mounting the device, only the specified mounting orientations are permitted.
- Be sure the wall or control cabinet can withstand four times the total weight of the the PP500.
- When connecting certain cable types (DVI, SDL, USB, etc.), keep the flex radius in mind.

## 1.4  orientation

The following diagrams show the specified mounting orientation for the Power Panel 500 device. The mounting orientations apply for all Power Panel devices.

### 1.4.1 Standard mounting 0°
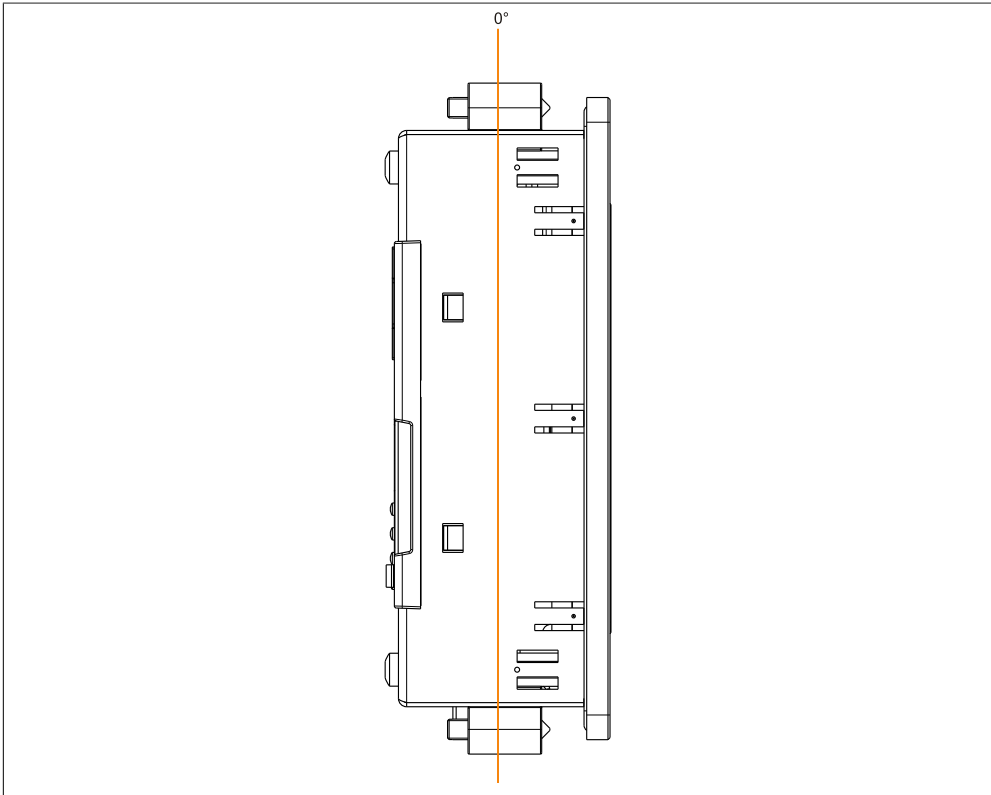


Image 49: Mounting orientation 0°

### 1.4.2 Standard mounting 45°

The maximum Ambient temperaturespecification with a mounting orientation of 45° must be **lowered by 5°C**.
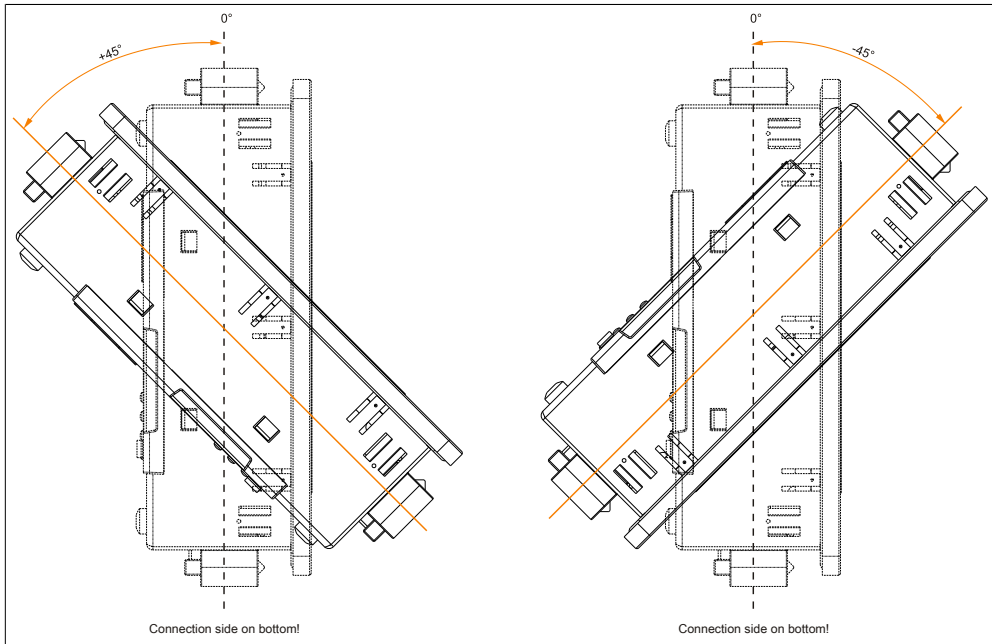


Image 50: Mounting orientation -45° and +45°.

### 1.4.3 Standard mounting 90°

The maximum Ambient temperaturespecification with a mounting orientation of 90° (horizontal) must be **lowered by 10°C**.
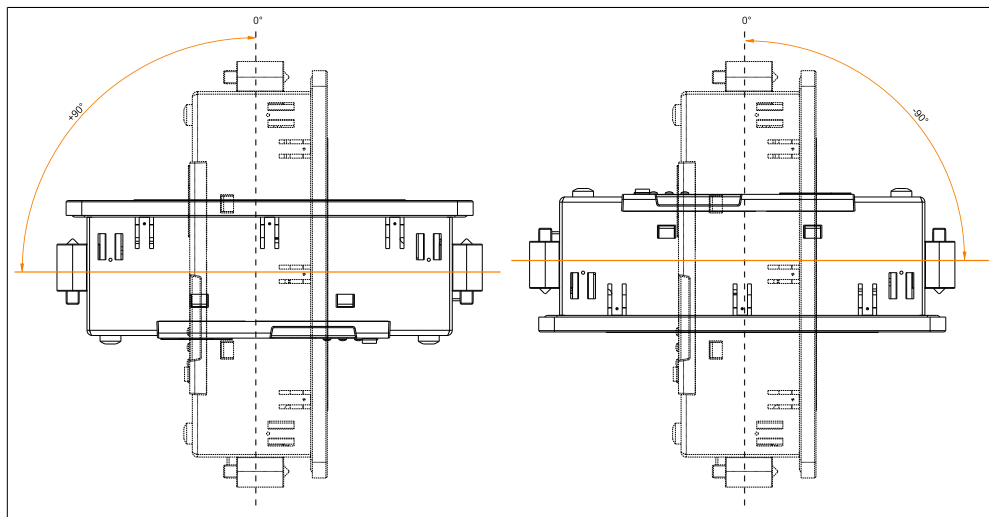


Image 51: Mounting orientation -90° and +90°.

### 1.4.4 Standard mounting 90° vertical

The maximum ambient temperature specification with a mounting orientation of 90° (vertical) must be **lowered by 5°C** .
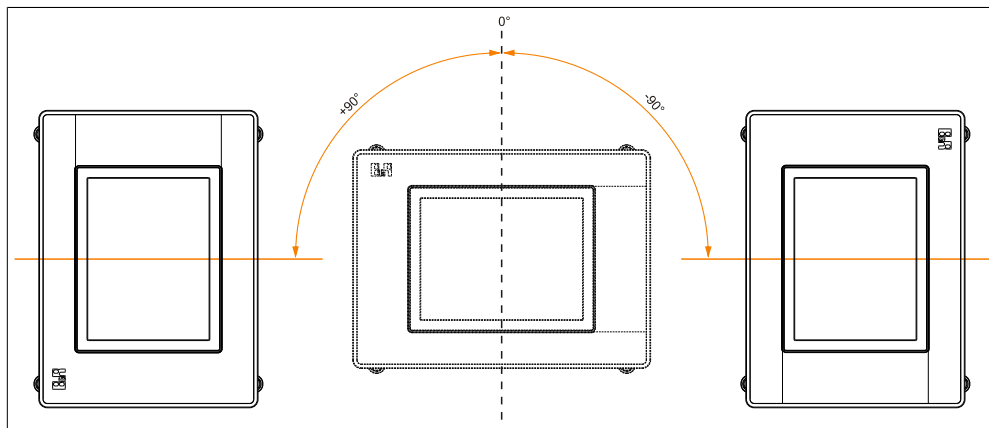


Image 52: Mounting orientation -90° and +90° vertical

### 1.4.5 Standard mounting 180°

There are no limitations regarding ambient temperature when mounted at 180°.
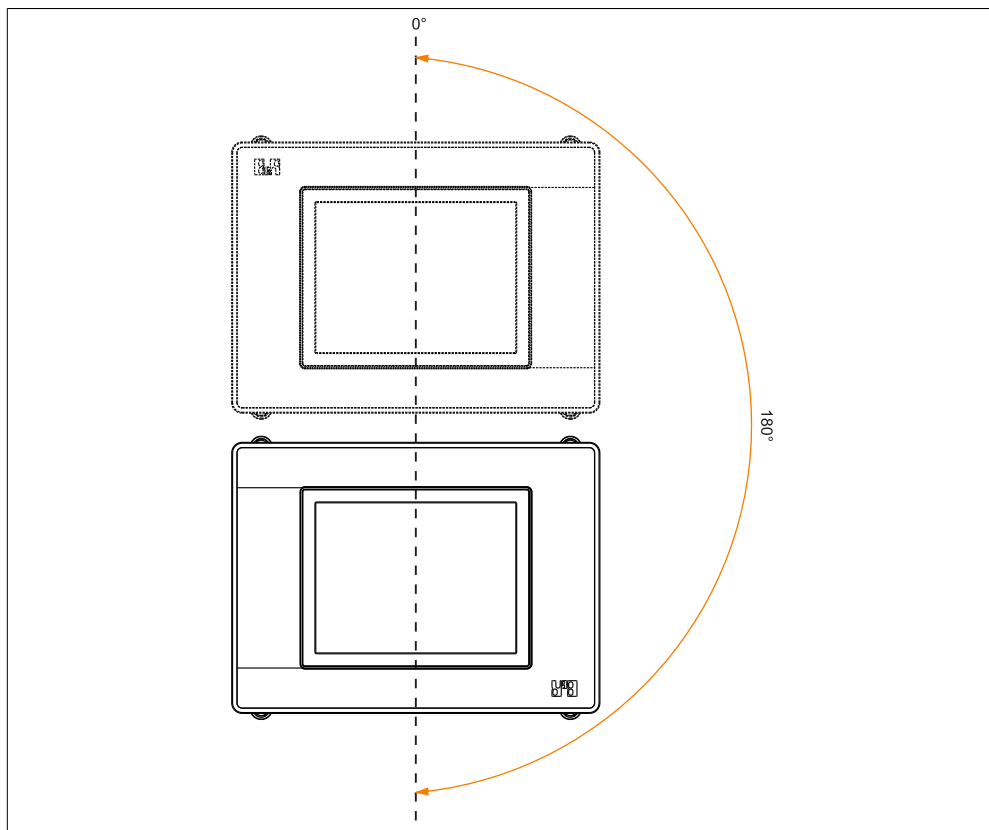


Image 53: Mounting orientation 180°

## 1.5 Circulation spacing

In order to guarantee proper air circulation, allow the specified amount of space above, below, to the side and behind the Power Panel 500. The minimum specified free space can be found in the following diagrams. These specifications apply for all Power Panel devices.
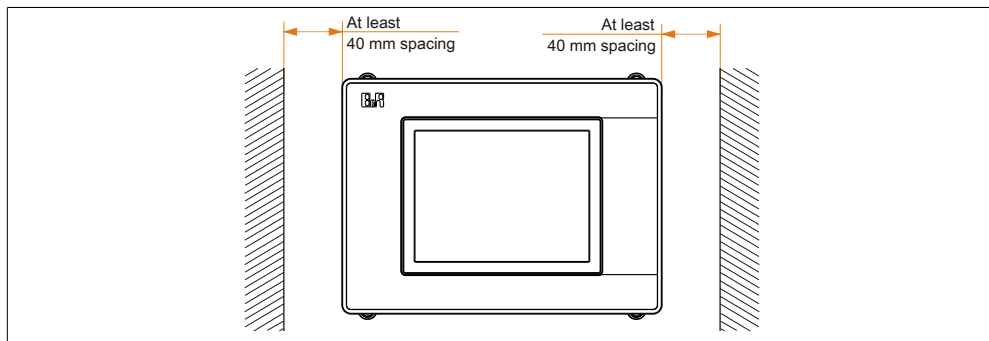


Image 54: Air circulation spacing - Front view
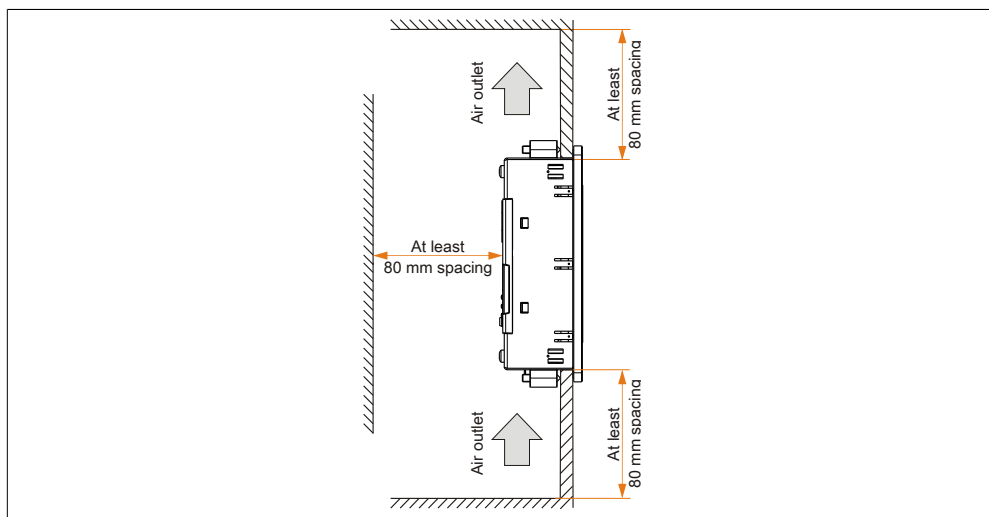


Image 55: Air circulation spacing - Side view

# 2 Grounding concept

The functional ground is a current path with low impedance between isolated circuits and ground, which is not a protective measure, but rather provides e.g. increased immunity to disturbances. It serves only as disturbance dissipation and not as contact protection for persons.

The functional ground on the device has 2 connections:

- Supply voltage
- Ground connection

To guarantee secure dissipation of electric disturbances, the following points should be observed:

- The device should be connected to the ground using the shortest route possible.
- Use cable with a minimum cross section of 2.5 mm² per connection.
- Note the line shielding concept, all connected data cables are used as shielded lines.
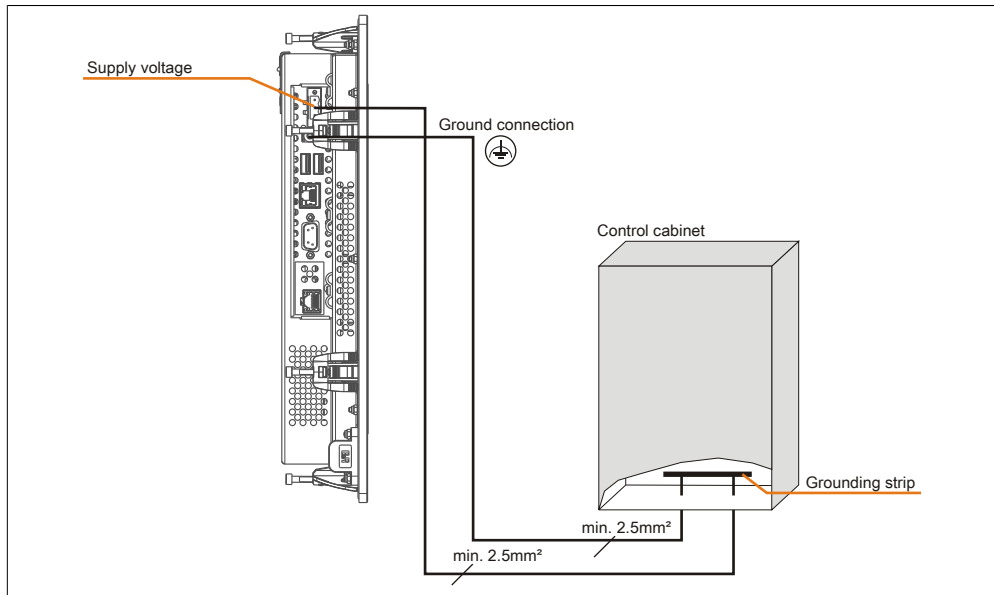


Image 56: Grounding concept

# 3 Key and LED configuration

Each key or LED can be configured individually and adjusted to suit the application. Various B&R tools are available for this purpose:

- • B&R Key Editor for Windows operating systems
- • Visual Components for Automation Runtime

Keys and LEDs from each device are processed by the matrix controller in a bit sequence of 128 bits each.

The positions of the keys and LEDs in the matrix are shown as hardware numbers. The hardware numbers can be read directly on the target system, for example with the B&R Key Editor and the B&R Control Center.
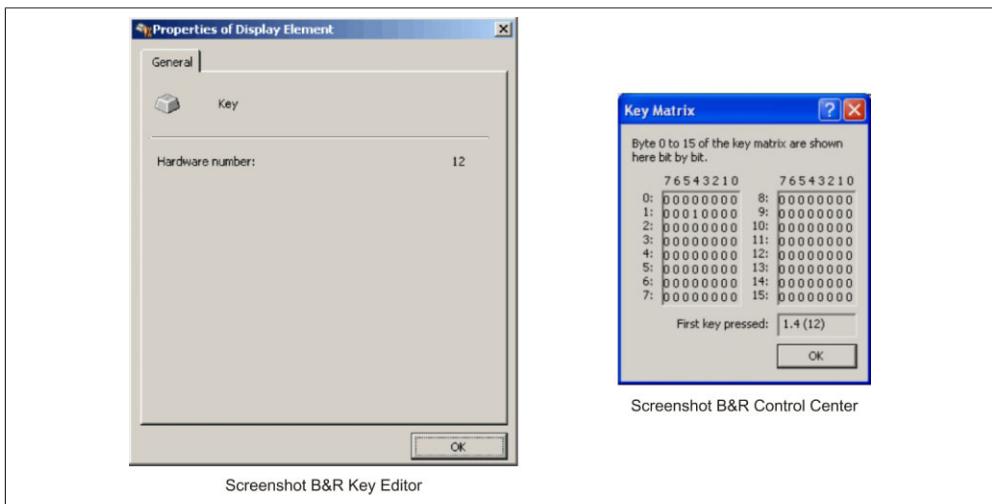


Image 57: Example - Hardware number in the B&R Key Editor or in the B&R Control Center

The following graphics show the positions of the keys and LEDs in the matrix. They are shown as follows.
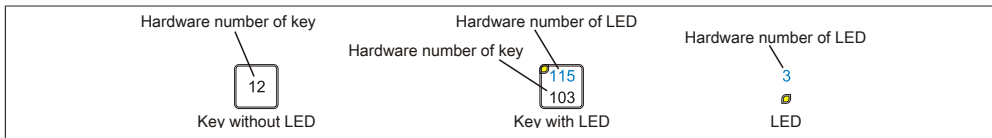


Image 58: Display - Keys and LEDs

## 3.1 5PP551.0573-00
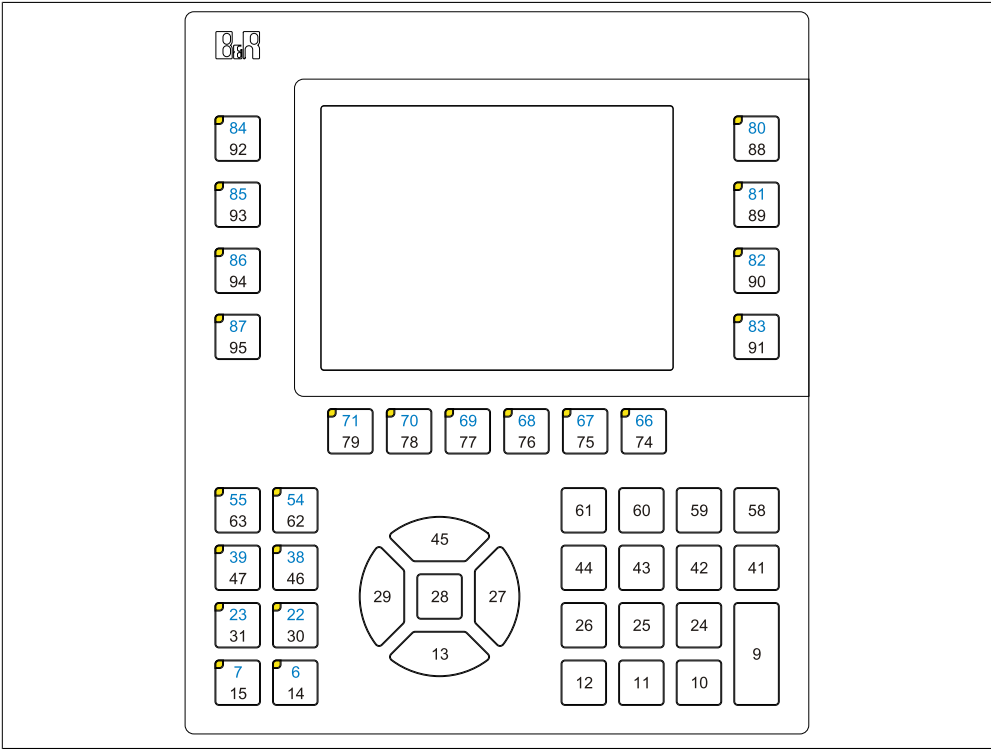


Image 59: 5PP551.0573-00 - Key and LED configuration

## 3.2 5PP552.0573-00
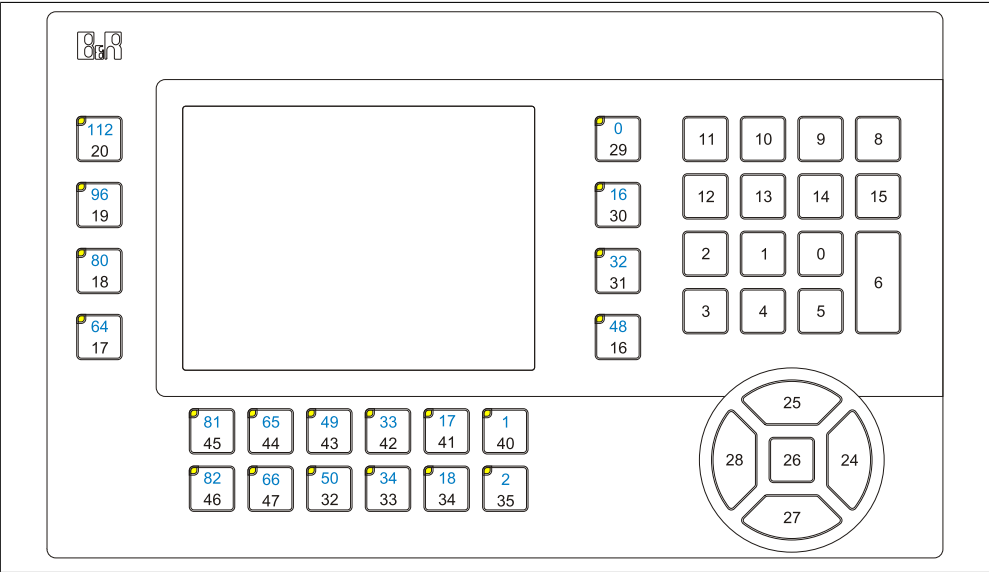


Image 60: 5PP552.0573-00 - Key and LED configuration

## 3.3 5PP580.1043-00
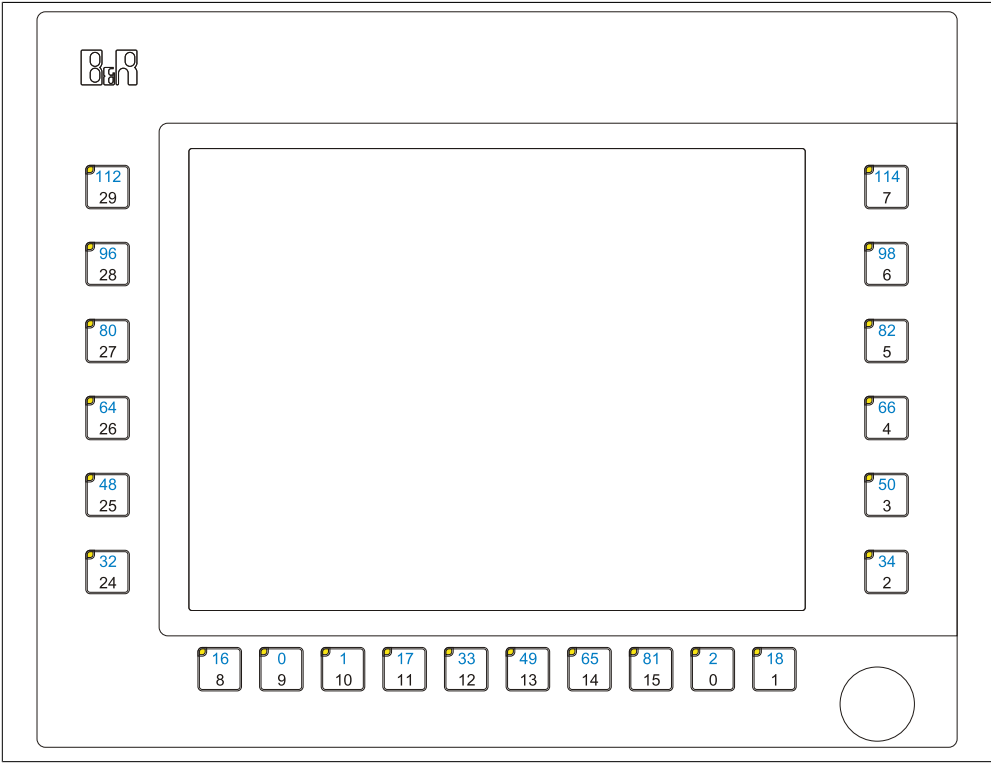


Image 61: 5PP580.1043-00 - Key and LED configuration

## 3.4 5PP581.1043-00
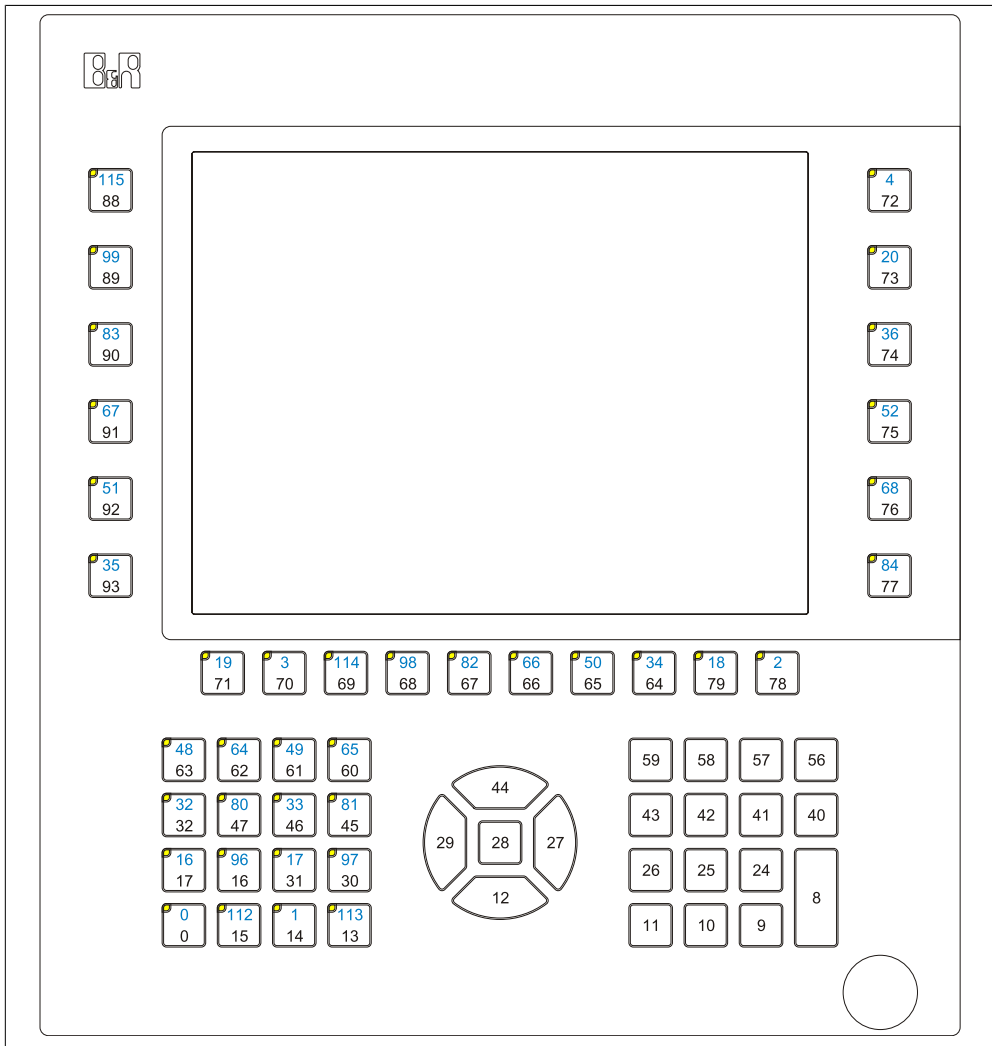
Image 62: 5PP581.1043-00 - Key and LED configuration

## 3.5 5PP582.1043-00
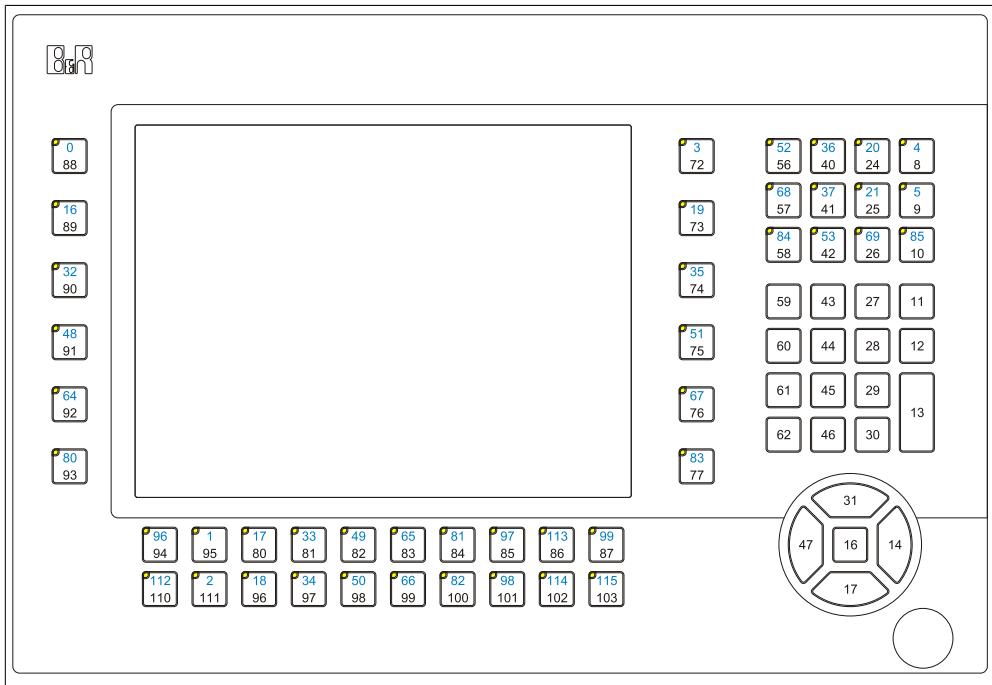


Image 63: 5PP582.1043-00 - Key and LED configuration

## 3.6 5PP580.1505-00
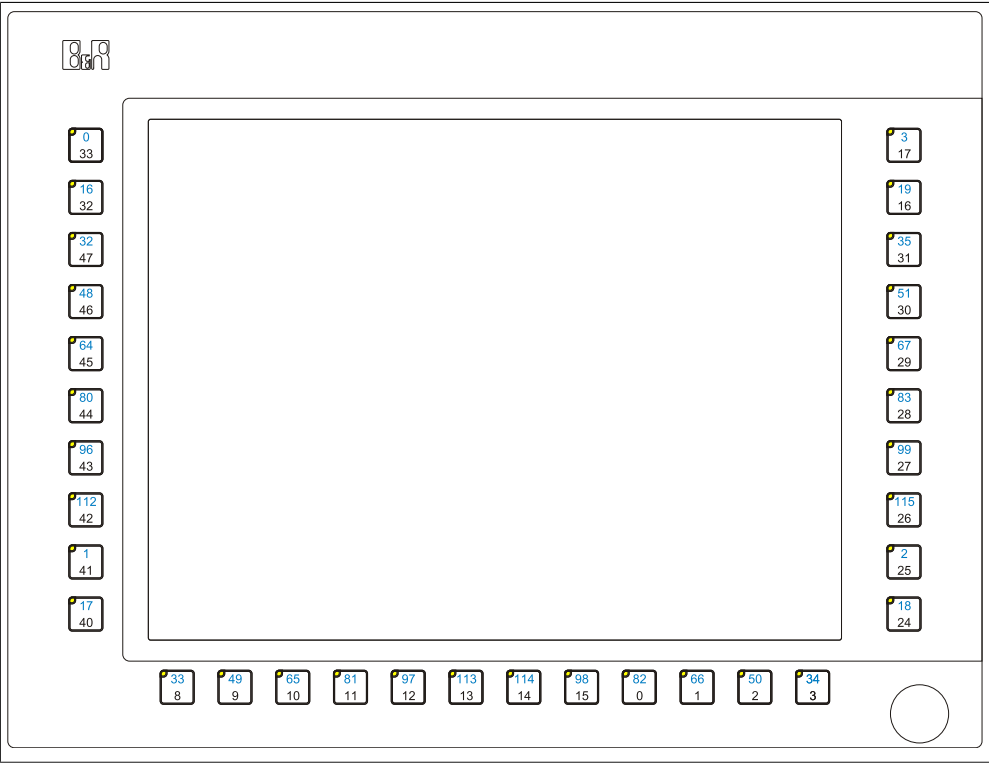


Image 64: 5PP580.1505-00 - Key and LED configuration

## 3.7 5PP581.1505-00
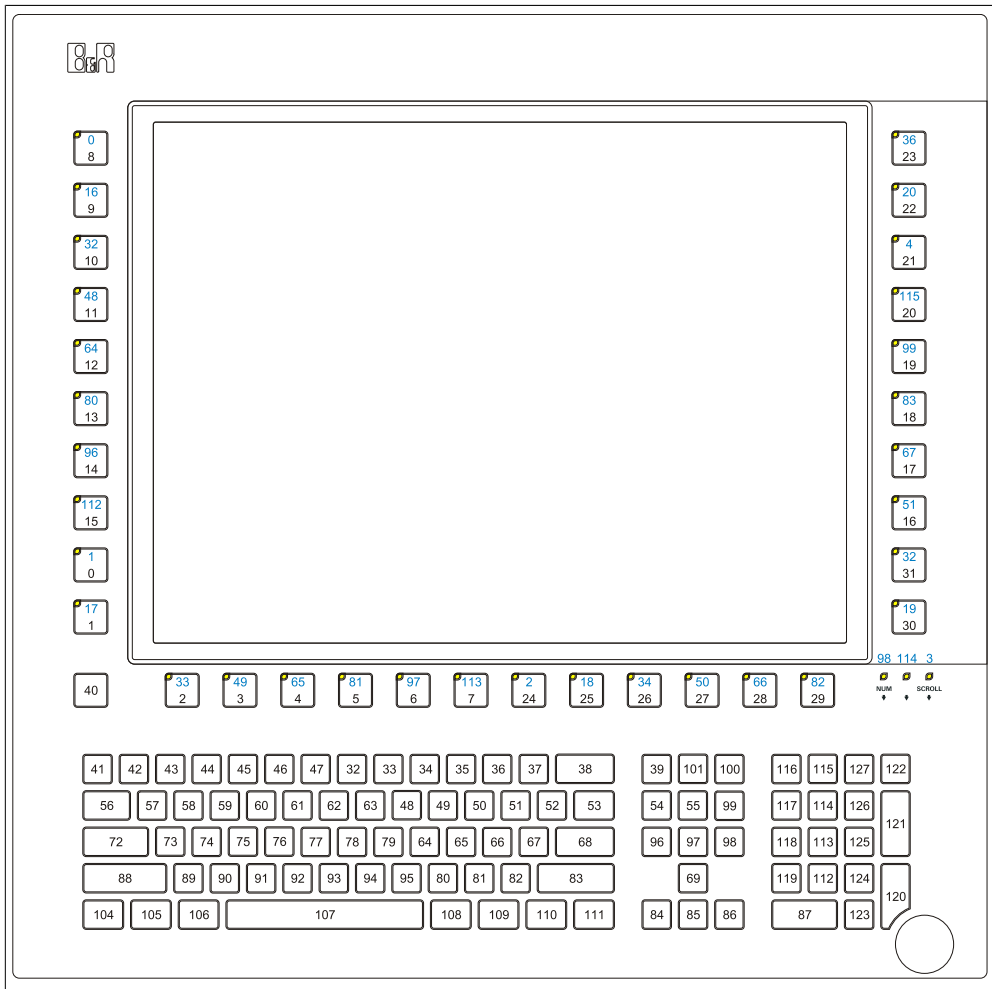


Image 65: 5PP581.1505-00 - Key and LED configuration

# 4 Touch screen calibration

B&R touch screen devices are equipped with a B&R touch controller that supports hardware calibration. This means that the devices are precalibrated from stock. This feature proves advantageous in the case of a replacement part because a new calibration is no longer required when exchanging devices (identical model / type). Nevertheless, we recommend calibrating the device in order to achieve the best results and to better readjust the touch screen to the user's preferences.

## 4.1 Windows XP Professional

After installing Windows XP Professional, the touch screen driver must be installed in the device in order to operate the touch screen. The corresponding drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).

## 4.2 Windows Embedded Standard 2009

After first starting Windows Embedded Standard 2009 (First Boot Agent), the touch screen driver must be installed in the device in order to operate the touch screen. The corresponding drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).

## 4.3 Windows 7

After installing Windows 7, the touch screen driver must be installed in the device in order to operate the touch screen. The corresponding drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).

## 4.4 Windows Embedded Standard 7

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

The touch screen driver must be installed manually if a touch controller was not detected during the Windows Embedded Standard 7 setup or if a an Automation Panel 800/900 has been connected after setup. The corresponding drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).

## 4.5 Automation Runtime / Visual Components

The first time the touch screen is used, it must be calibrated once in the customer application for the existing device and project.

# 5 User tips for increasing the display lifespan

## 5.1 Backlight

The lifespan of the backlight is specified in "Half Brightness Time". An operating time of 50,000 hours would mean that the display brightness would still be 50% after this time.

### 5.1.1 How can the lifespan of backlights be extended?

- Set the display brightness to the lowest value that is still comfortable for the eyes
- Use dark images
- Reducing the brightness by 50% can result in an approximate 50% increase of the half-brightness time.

## 5.2 Image sticking

Image sticking is the "burning in" of a static image on a display after being displayed for a prolonged period of time. However, this does not only occur with static images. Image sticking is known in technical literature as the "burn-in effect", "image retention", "memory effect", "memory sticking" or "ghost image".

There are 2 types of this:

- Area type: This is seen with a dark gray image. The effect disappears if the display is switched off for a longer period of time.
- Line type: This can cause lasting damage.

### 5.2.1 What causes image sticking?

- Static images
- Screensaver not enabled
- Sharp contrast transitions (e.g. black / white)
- High ambient temperatures
- Operation outside of the specifications

### 5.2.2 How can image sticking be avoided?

- Continual change between static and dynamic images
- avoiding excessive brightness contrast between foreground and background display
- use of colors with similar brightness
- use of complementary colors in subsequent images
- use of screensavers

Chapter 3
Commissioning

# 6 Pixel error

## Info:

**Displays can contain flawed pixels caused during (Pixel error) production. These flaws are not grounds claiming reclamation or warranty.**

# Chapter 4 • Software

## 1 BIOS options

> **Info:**
>
> **The following diagrams and BIOS menu items including descriptions refer to BIOS version N0.16. It is therefore possible that these diagrams and BIOS descriptions do not correspond with the installed BIOS version.**

### 1.1 General information

BIOS stands for "Basic Input Output System". It is the most basic standardized communication between the user and the system (hardware). The BIOS system used in this B&R industrial PC is produced by Insyde.

The BIOS Setup Utility lets you modify basic system configuration settings. These settings are stored in CMOS and in EEPROM (as a backup).

The CMOS data is buffered by a battery (if present), and remains in the B&R industrial PC even when the power is turned off (no 24 VDC supply).

### 1.2  BIOS setup and start procedure

BIOS is immediately activated when switching on the power supply of the B&R industrial PC or pressing the power button. The system checks if the setup data from the EEPROM is "OK". If the data is "OK", then it is transferred to the CMOS. If the data is "not OK", then the CMOS data is checked for validity. An error message is output if the CMOS data contains errors and the boot procedure can be continued by pressing the <F1> key. To prevent the error message from appearing at each restart, open the BIOS setup by pressing the <Del> key and re-save the settings.
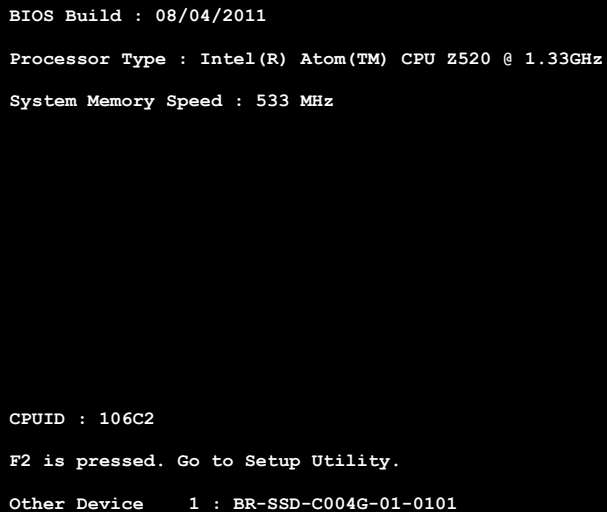
BIOS reads the system configuration information in CMOS RAM, checks the system, and configures it using the Power On Self Test (POST).

When these "preliminaries" are finished, BIOS seeks an operating system in the data storage devices available (hard drive, floppy drive, etc.). BIOS launches the operating system and hands over control of system operations to it.

To enter BIOS Setup, the <F2> key must be pressed after the USB controller has been initialized as soon as the following message appears on the monitor (during POST): "Press F2 go to Setup Utility"

## Info:

**The POST screen is only displayed for a fraction of a second due to optimized boot procedures. It is however, still possible to enter BIOS.**

```
BIOS Build : 08/04/2011

Processor Type : Intel(R) Atom(TM) CPU Z520 @ 1.33GHz

System Memory Speed : 533 MHz




CPUID : 106C2

F2 is pressed. Go to Setup Utility.

Other Device    1 : BR-SSD-C004G-01-0101
```

Image 66: Boot screen

### 1.2.1 BIOS setup keys

The following keys are enabled during the POST:

> ## Info:
>
> **The key signals from the USB keyboard are only registered after the USB controller has been initialized.**

| Keys | Function |
|---|---|
| F2 | Enters the BIOS setup menu. |
| F12 | Cues the boot menu. Lists all bootable devices that are connected to the system. Select the device to boot from with cursor ↑, cursor ↓ and <ENTER>. Use the ESC key to exit the boot menu.<br><br>**Boot Manager**<br><br>**Boot Option Menu**<br>**IBA GE Slot 0100 v1353**<br>**BR-SSD-C004G-01-0101**<br>**SwissbitunitedCONTRAST**<br><br>**↑ and ↓ to change option, ENTER to select an option, ESC to exit** |
| <Pause> | Pressing the <Pause> key stops the POST. Press any other key to resume the POST. |

Table 73: BIOS-relevant keys for POST

The following keys can be used after entering the BIOS setup:

| Key | Function |
|---|---|
| F1 | General help. |
| Cursor ↑ | Moves to the previous item. |
| Cursor ↓ | Go to the next item. |
| Cursor ← | Moves to the previous menu. |
| Cursor → | Go to the next menu. |
| F5/F6 | Change BIOS settings. |
| Enter | Changes to the selected menu. |
| F9 | These settings are loaded for all BIOS configurations. |
| F10 | Save and close. |
| Esc | Exits the submenu. |

Table 74: BIOS-relevant keys in the BIOS menu

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Software

## 1.3 Main

Immediately after the <F2> key is pressed during startup, the main BIOS setup menu appears.

```
                            InsydeH2O Setup Utility              Rev. *
    Main   OEM Features   Advanced   Security   Power   Boot   Exit

                                                        This is the help for the
                                                        hour field. Valid range
       InsydeH2O Version        Menlow 03.60.12.0034     is from 0 to 23.
                                                        INCREASE/REDUCE: +/-
       Processor Type          Intel(R) Atom(TM) CPU Z520
                               @ 1.33GHz
       System Bus Speed        533 MHz
       System Memory Speed     533 MHz

       Cache RAM               512 KB

       Total Memory            1024 MB
       SODIMM 0                1024 MB

       System Time             [13:30:15]
       System Date             [02/28/2011]




     F1  Help       ↑↓ Select Item   F5/F6 Change Values    F9  Setup Defaults
     Esc Exit        ↔ Select Menu   Enter Select ▶ SubMenu  F10 Save and Exit
```

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| InsydeH2O Version | Displays the BIOS InsydeH2O version. | None | - |
| Processor type | Displays the processor type. | None | - |
| System Bus Speed | Displays the System Bus speed | | |
| System Memory Speed | Displays the system memory speed. | None | - |
| Cache RAM | Displays the Cache RAM in the system. | None | - |
| Total Memory | Displays the entire system memory size. | None | - |
| SODIMM 0 | Displays the amount of RAM in the SODIMM 0 slot. | None | - |
| System Time | This is the current system time setting. The time is buffered by a battery (CMOS battery) after the system has been switched off. | Adjustment of the system time | Set the system time in the format Hour:Minute:Second (hh:mm:ss). |
| System Date | This is the current system date setting. The time is buffered by a battery (CMOS battery) after the system has been switched off. | Changes to the system date | Sets the system date in the format Month:Day:Year (mm:dd:yyyy). |

Table 75: US15W Main - Menu setting options

## 1.4 OEM Features

```
                    InsydeH2O Setup Utility              Rev. *
    Main   OEM Features  Advanced  Security  Power  Boot  Exit

    Versions                                    Show features of CPU
       BIOS:              N0.16                  Board.
       Boot Source:       Normal

       MTCX:              V0.23

    ▶CPU Board Features
    ▶System Unit Features
    ▶I/O Board Features
    ▶IF Board features
    ▶Memory Module Features




    F1  Help    ↑↓Select Item   F5/F6 Change Values   F9  Setup defaults
    Esc Exit    ↔ Select Menu   Enter Select ▶ SubMenu  F10 Save and Exit
```

Image 67: US15W OEM Features - Menu

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| BIOS | Displays the B&R BIOS boot version. | None | - |
| Boot Source | Displays whether boot source is "normal" BIOS version (Normal) or the Backup BIOS version (Backup) . | | **Info:** If a BIOS update failed, then the backup BIOS will be loaded automatically. The BIOS update can then be attempted again. |
| MTCX | Displays the MTCX version that is installed. | None | - |
| **CPU Board Features** | Displays device specific information and setup of device specific values for the CPU board. | Enter | Opens the submenu See " CPU Board Features", on page 164 |
| **System Unit Features** | Displays device specific information and setup of device specific values for the system unit. | Enter | Opens the submenu See " System Unit Features", on page 169 |
| **I/O Board Features** | Displays device specific information for the I/O board. | Enter | Opens the submenu See " I/O Board Features", on page 173 |
| **IF Board features** | Displays device specific information for the IF board. | Enter | Opens the submenu See " IF Board Features", on page 175 |
| **Memory Module Features** | Displays device specific information for the main memory. | Enter | Opens the submenu See " Memory Module Features", on page 177 |

Table 76: US15W OEM Features - Menu setting options

### 1.4.1 CPU Board Features

```
                        InsydeH2O Setup Utility              Rev. *
           OEM Features

   CPU Board Features                          Show and configure
                                               available LPC devices.
     Device ID:              0000B4D1
     Compatibility ID:       0000
     Vendor ID:              00000000
     Hardware Revision:      A0
     Serial number:          B4D10168431
     Product name:           5PP5CP.US15-01
     Hardware Number:        00201ADB
     Parent Device ID:       FFFFFFFF
     Parent Compatib. ID:    FFFF
     User Serial ID:         Not defined

     LAN1 MAC ADDRESS:        00:60:65:0D:07:FE

   ▶LPC Devices
   ▶Statistical Values
   ▶Temperature Values
   ▶CPU board monitor



   F1   Help     ↑↓ Select Item   F5/F6 Change Values    F9   Setup defaults
   Esc  Exit     ↔  Select Menu   Enter Select ▶ SubMenu  F10  Save and Exit
```

Image 68: US15W OEM Features - Baseboard Features

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| Device ID | Displays the device ID of the CPU board. | None | - |
| Compatibility ID | Displays the version of the device within the same B&R device code. This ID is needed for Automation Runtime. | None | - |
| Vendor ID | Displays the Vendor ID. | None | - |
| Hardware revision | Displays the CPU board hardware revision. | None | - |
| Serial number | Displays the B&R serial number. | None | - |
| Product name | Displays the B&R model number. | None | - |
| Hardware Number | Displays the CPU board hardware number. | None | - |
| Parent Device ID | Displays the manufacturer number. | None | - |
| Parent Compatib. ID | Displays the manufacturer ID. | None | - |
| User serial ID | Displays the user serial ID. This 8 digit hex value can be freely assigned by the user (e.g. to give the device a unique ID) and can only be changed with using the "B&R Control Center" via the ADI driver. | None | - |
| LAN1 MAC ADDRESS | Displays the MAC addresses assigned for the ETH interface. | None | - |
| **LPC Devices** | Configuration of the LPC Devices. | Enter | Opens the submenu See " LPC Devices", on page 165 |

Table 77: US15W OEM Features - Baseboard Features setting options

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| Statistical Values | Displays the statistical values. | Enter | Opens the submenu<br>See "Statistical Values", on page 166 |
| Temperature Values | Displays the current temperature values. | Enter | Opens the submenu<br>See "Temperature Values", on page 167 |
| CPU board monitor | Displays the current voltage values on the CPU board being used. | Enter | Opens the submenu<br>See "CPU Board Monitor", on page 168 |

Table 77: US15W OEM Features - Baseboard Features setting options

## 1.4.1.1 LPC Devices

```
          InsydeH2O Setup Utility              Rev. *
      OEM Features

 CPU Board LPC Devices                    Show the base I/O address
                                          for serial port.
 COMA                                     Ressource Conflict is
   Base I/O address      <3F8>            marked with a star (*).
   Interrupt             <IRQ4>




 F1   Help       ↑↓ Select Item   F5/F6 Change Values    F9   Setup defaults
 Esc  Exit       ↔  Select Menu   Enter Select ▶ SubMenu  F10  Save and Exit
```
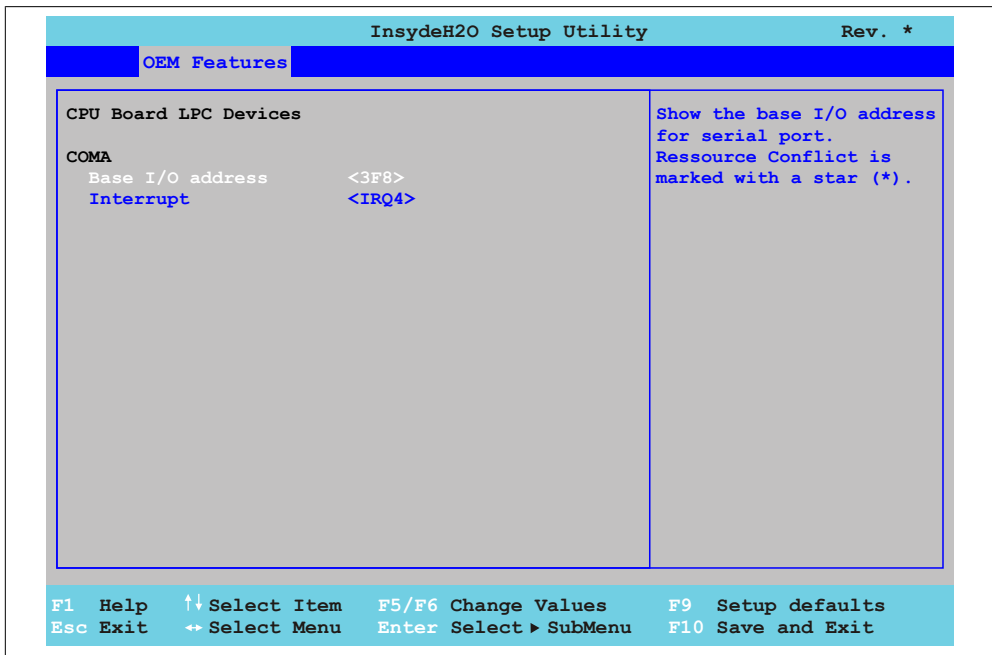
Image 69: US15W OEM Features - Baseboard Features - LPC Devices

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| COMA | Settings for the COM serial interface in the system. | None | - |
| Base I/O address | Selection of the base I/O address for the COM port. | Disabled, 238, 2E8, 2F8, 328, 338, 3E8, 3F8 | Disables or assigns the selected base I/O address. |
| Interrupt | Selection of the interrupt for the COM port. | IRQ3, IRQ4, IRQ5, IRQ6, IRQ10, IRQ11, IRQ12 | Selected interrupt is assigned. |

Table 78: US15W OEM Features - Baseboard Features - LPC Devices setting options

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> # Info:
>
> **A resource conflict can occur regarding the Base I/O address or Interrupt settings, which will cause a warning. In order to make the settings anyways, the setting must first be made on the Base I/O address or Interrupt being that is used.**

### 1.4.1.2 Statistical Values

```
                          InsydeH2O Setup Utility                  Rev. *
            OEM Features

    CPU Board Statistical Values                    Shows statistical values
                                                    of chosen module.
    Temperature Minimum/Maximum
     Sensor 1                     24°C / 31°C
                                  75°F / 87°F

     Sensor 2                     23°C / 32°C
                                  73°F / 89°F

     Sensor 3                     34°C / 50°C
                                  93°F / 122°F


    Operating Time
     Total Hours:                 241
     Power On Cycles:             20




    F1   Help     ↑↓ Select Item   F5/F6 Change Values   F9   Setup defaults
    Esc  Exit      ↔ Select Menu   Enter Select ▶ SubMenu F10  Save and Exit
```

Image 70: US15W OEM Features - Baseboard Features - Statistical Values

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| Sensor 1 | Displays the minimum and maximum temperature of sensor 1 (interfaces) in °C and °F. | None | - |
| Sensor 2 | Displays the minimum and maximum temperature of sensor 2 (CPU) in °C and °F. | None | - |
| Sensor 3 | Displays the minimum and maximum temperature of sensor 3 (main memory) in °C and °F. | None | - |
| Total Hours | Displays the runtime in whole hours. | None | - |
| Power on cycles | Displays the Power On Cycles - each restart increases the counter by one. | None | - |

Table 79: US15W OEM Features - Baseboard Features - Statistical Values setting options

### 1.4.1.3 Temperature Values

```
                        InsydeH2O Setup Utility                    Rev. *
          OEM Features

    CPU Board Statistical Values                    Press enter for
                                                    refreshing live
    Refresh Values              <OK>                temperature values.

    Live Temperature Values
     Sensor 1                 27°C / 80°F
     Sensor 2                 27°C / 80°F
     Sensor 3                 39°C / 102°F




    F1   Help    ↑↓ Select Item   F5/F6 Change Values   F9   Setup defaults
    Esc  Exit    ↔ Select Menu    Enter Select ▶ SubMenu   F10 Save and Exit
```
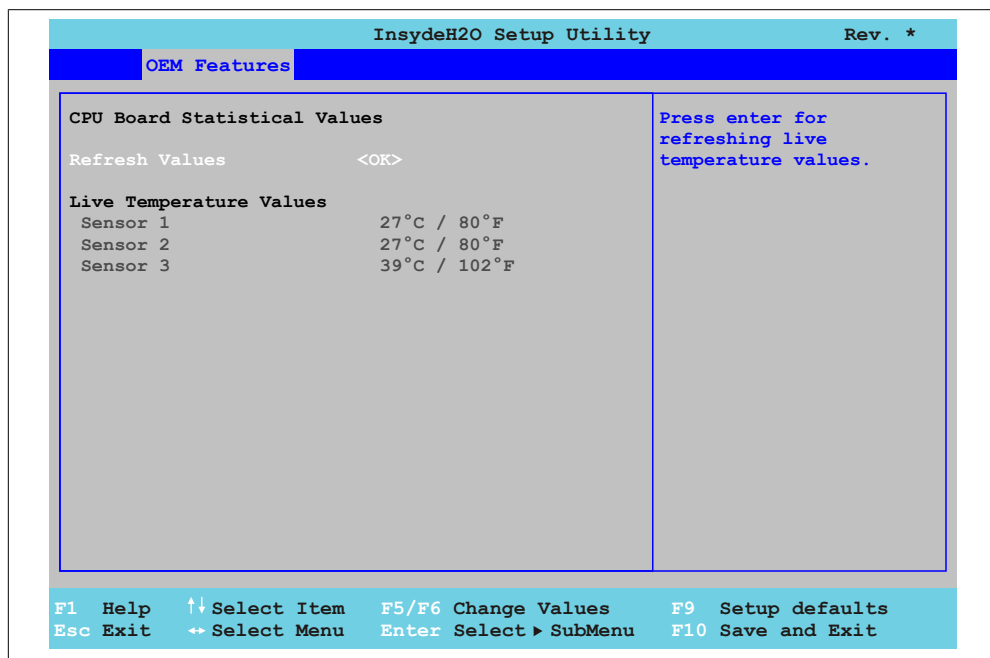
Image 71: US15W OEM Features - Baseboard Features - Temperature Values

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| Refresh Values | Option for refreshing the temperature values. | OK | Refreshes the temperature values shown bellow. |
| Sensor 1 | Displays the current temperature of sensor 1 (interfaces) in °C and °F. | None | - |
| Sensor 2 | Displays the current temperature of sensor 2 (CPU) in °C and °F. | None | - |
| Sensor 3 | Displays the current temperature of sensor 3 (main memory) in °C and °F. | None | - |

Table 80: US15W OEM Features - Baseboard Features - Temperature Values setting options

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### 1.4.1.4  CPU Board Monitor

```
                        InsydeH2O Setup Utility                Rev. *
           OEM Features

     CPU board monitor                           Monitors CPU Board
                                                 values.
     Wcpu:                     0.96W
     Vin:                      16.90V
     Battery voltage:          2.81V
     Battery state:            Good




     F1   Help    ↑↓ Select Item    F5/F6 Change Values     F9   Setup defaults
     Esc  Exit    ↔ Select Menu     Enter Select ▶ SubMenu  F10  Save and Exit
```
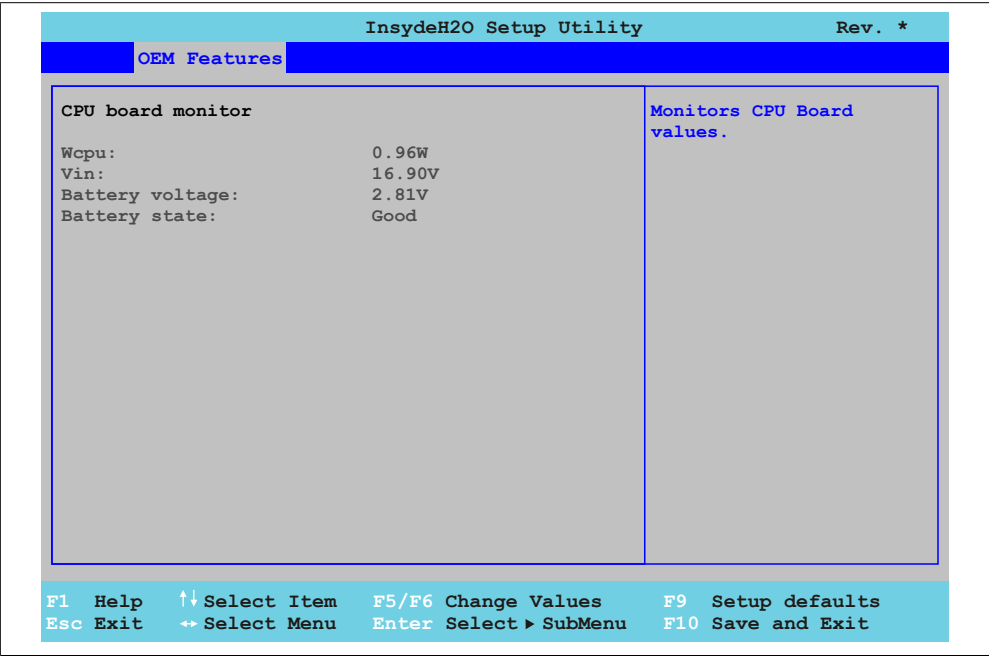
Image 72: US15W OEM Features - Baseboard Features - Baseboard Monitor

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| Wcpu: | Displays the CPU power consumption in watts. | None | - |
| Vin: | Displays the current voltage of the power supply in volts. | None | - |
| Battery voltage: | Displays the battery voltage (in volts). | None | - |
| Battery state: | Displays the battery status. | None | - |

Table 81: US15W OEM Features - Baseboard Features - Baseboard Monitor setting options

## 1.4.2 System Unit Features

```
                        InsydeH2O Setup Utility                Rev. *
        OEM Features

  System Unit Features                        Adjust the brightness of
                                              the local panel.
    Device ID:             0000B4CB
    Compatibility ID:      0000
    Vendor ID:             00000000
    Hardware Revision:     A0
    Serial number:         B4CB0168435
    Product name:          5PP520.0573-01
    Hardware Number:       00201849
    Parent Device ID:      FFFFFFFF
    Parent Compatib. ID:   FFFF
    User Serial ID:        Not defined

    Display (0) Brightness:  <Auto>

  ▶LPC Devices
  ▶Statistical Values
  ▶Temperature Values



  F1   Help      ↑↓ Select Item    F5/F6 Change Values    F9   Setup defaults
  Esc  Exit       ↔ Select Menu    Enter Select ▶ SubMenu F10  Save and Exit
```

Image 73: US15W OEM Features - Display Features

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| Device ID | Displays the device code of the Power Panel device. | None | - |
| Compatibility ID | Displays the version of the device within the same B&R device code. This ID is needed for Automation Runtime. | None | - |
| Vendor ID | Displays the Vendor ID. | None | - |
| Hardware revision | Displays the system unit hardware revision. | None | - |
| Serial number | Displays the B&R serial number. | None | - |
| Product name | Displays the B&R model number. | None | - |
| Hardware Number | Displays the system unit hardware number. | None | - |
| Parent Device ID | Displays the manufacturer number. | None | - |
| Parent Compatib. ID | Displays the manufacturer ID. | None | - |
| User serial ID | Displays the user serial ID. This 8 digit hex value can be freely assigned by the user (e.g. to give the device a unique ID) and can only be changed with using the "B&R Control Center" via the ADI driver. | None | - |
| Display (0) Brightness | Option for setting the background lighting of the display. | Auto | The optimal brightness is automatically configured using the factory settings. A brightness value between 100% and 0% is set. |

Table 82: US15W OEM Features - Display Features setting options

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| | | 0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100% | Manual setting of the desired brightness within factory settings limits. |
| LPC Devices | Configuration of the LPC Devices. | Enter | Opens the submenu See " LPC Devices", on page 170 |
| Statistical Values | Displays the statistical values. | Enter | Opens the submenu See " Statistical Values", on page 171 |
| Temperature Values | Displays the current temperature values. | Enter | Opens the submenu See " Temperature Values", on page 172 |

Table 82: US15W OEM Features - Display Features setting options

### 1.4.2.1 LPC Devices

```
                          InsydeH2O Setup Utility              Rev. *
           OEM Features

     System Unit LPC Devices                    Show the base I/O address
                                                for serial port.
     COMB                                        Ressource Conflict is
       Base I/O address         <2F8>           marked with a star (*).
       Interrupt                <IRQ3>




     F1  Help      ↑↓ Select Item   F5/F6 Change Values    F9  Setup defaults
     Esc Exit      ↔ Select Menu    Enter Select ▶ SubMenu  F10 Save and Exit
```
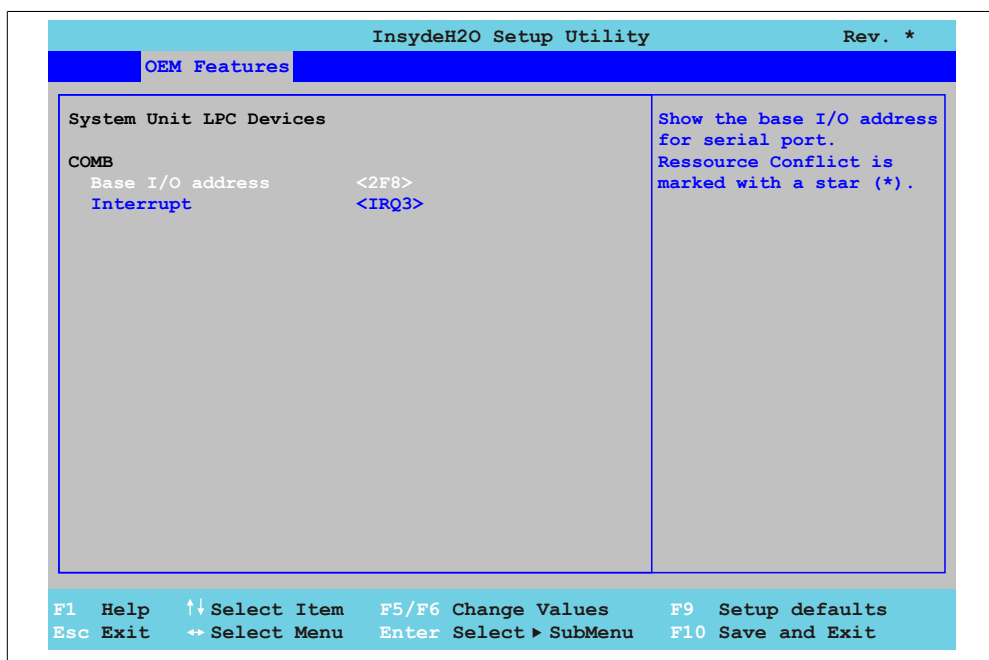
Image 74: US15W OEM Features - Display Features - LPC Devices

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| COMB | Settings for the COM serial interface in the system. | None | - |
| Base I/O address | Selection of the base I/O address for the COM port. | Disabled, 238, 2E8, 2F8, 328, 338, 3E8, 3F8 | Disables or assigns the selected base I/O address. |
| Interrupt | Selection of the interrupt for the COM port. | IRQ3, IRQ4, IRQ5, IRQ6, IRQ10, IRQ11, IRQ12 | Selected interrupt is assigned. |

Table 83: US15W OEM Features - Display Features - LPC Devices setting options

# Info:

**A resource conflict can occur regarding the Base I/O address or Interrupt settings, which will cause a warning. In order to make the settings anyways, the setting must first be made on the Base I/O address or Interrupt being that is used.**

## 1.4.2.2 Statistical Values

```
                        InsydeH2O Setup Utility                   Rev. *
        OEM Features

     System Unit Statistical Values                 Shows statistical values
                                                    of chosen module.
     Temperature Minimum/Maximum
      Sensor 1                    23°C / 56°C
                                  73°F / 132°F


     Operating Time
      Total Hours:                241
      Power On Cycles:            389














     F1   Help     ↑↓ Select Item    F5/F6 Change Values    F9  Setup defaults
     Esc  Exit     ↔ Select Menu     Enter Select ▶ SubMenu  F10 Save and Exit
```
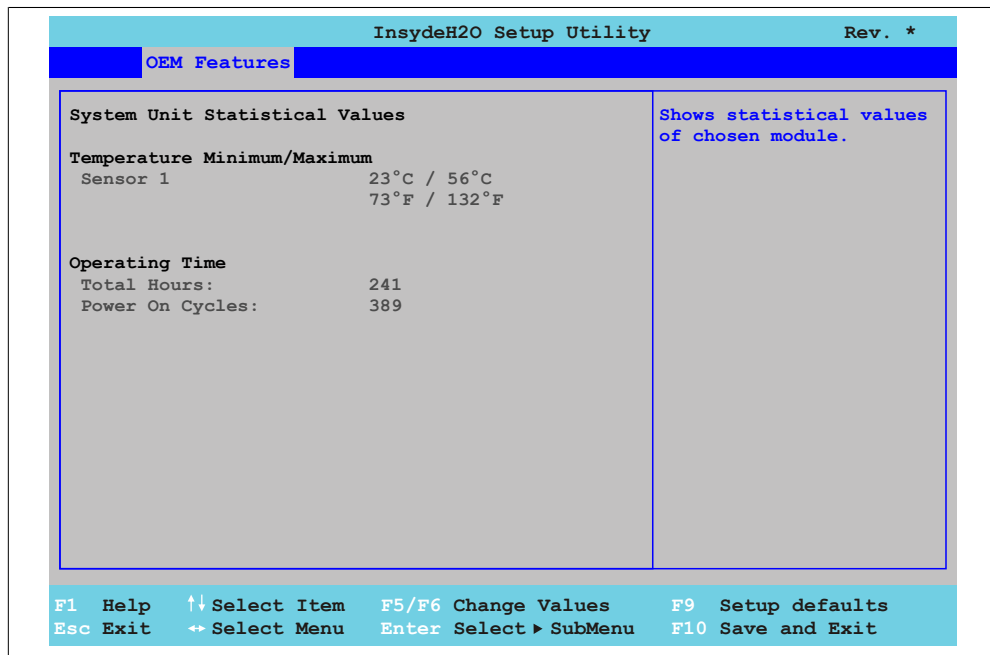
Image 75: US15W OEM Features - Display Features - Statistical Values

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| Sensor 1 | Displays the minimum and maximum sensor temperature 1 in °C and °F. | None | - |
| Total Hours | Displays the runtime in whole hours. | None | - |
| Power on cycles | Displays the Power On Cycles - each restart increases the counter by one. | None | - |

Table 84: US15W OEM Features - Display Features - Statistical Values setting options

### 1.4.2.3 Temperature Values

```
                        InsydeH2O Setup Utility              Rev. *
        OEM Features

    System Unit Temperature Values                Press enter for
                                                  refreshing live
    Refresh Values              <OK>              temperature values.


    Live Temperature Values
     Sensor 1                    27°C / 80°F












    F1   Help     ↑↓ Select Item    F5/F6  Change Values    F9   Setup defaults
    Esc  Exit     ↔  Select Menu    Enter  Select ▶ SubMenu  F10  Save and Exit
```
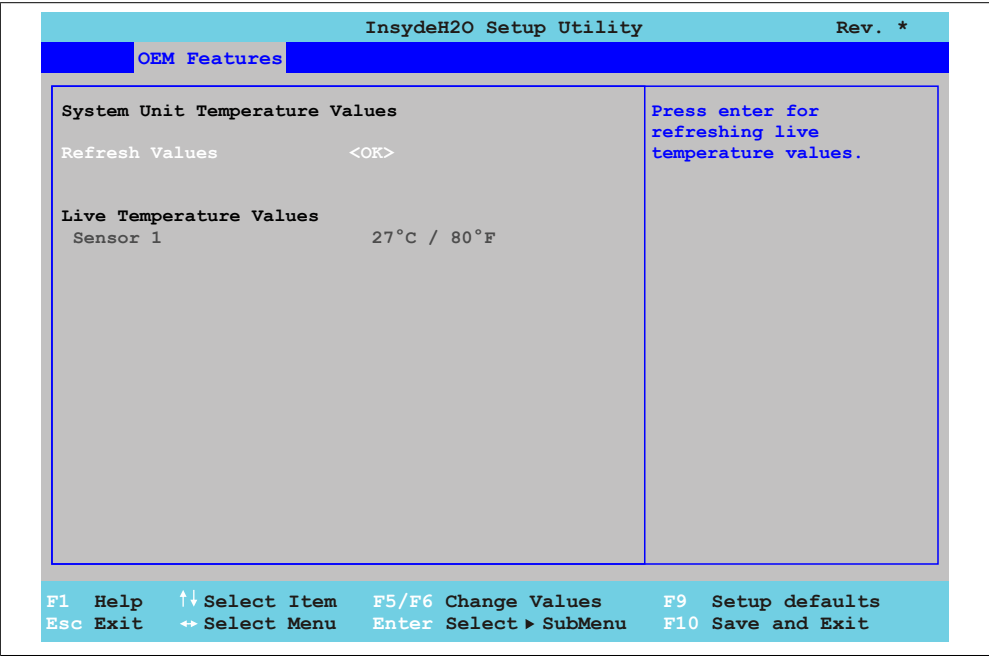
Image 76: US15W OEM Features - Display Features - Temperature Values

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| Refresh Values | Option for refreshing the temperature values. | OK | Refreshes the temperature values shown bellow. |
| Sensor 1 | Displays the current sensor temperature 1 in °C and °F. | None | - |

Table 85: US15W OEM Features - Display Features - Temperature Values setting options

### 1.4.3  I/O Board Features

```
                          InsydeH2O Setup Utility                    Rev. *
         OEM Features

    I/O Board Features                              Show statistical values
                                                    of chosen board.
      Device ID:              0000B4D5
      Compatibility ID:       0000
      Vendor ID:              00000000
      Hardware Revision:      A0
      Serial number:          01234567890
      Product name:           5PP5IO.GNAC-00
      Hardware Number:        00000000
      Parent Device ID:       FFFFFFFF
      Parent Compatib. ID:    FFFF
      User Serial ID:         not defined

    ▶Statistical Values




    F1   Help      ↑↓ Select Item   F5/F6 Change Values      F9   Setup defaults
    Esc  Exit      ↔  Select Menu   Enter Select ▶ SubMenu   F10  Save and Exit
```
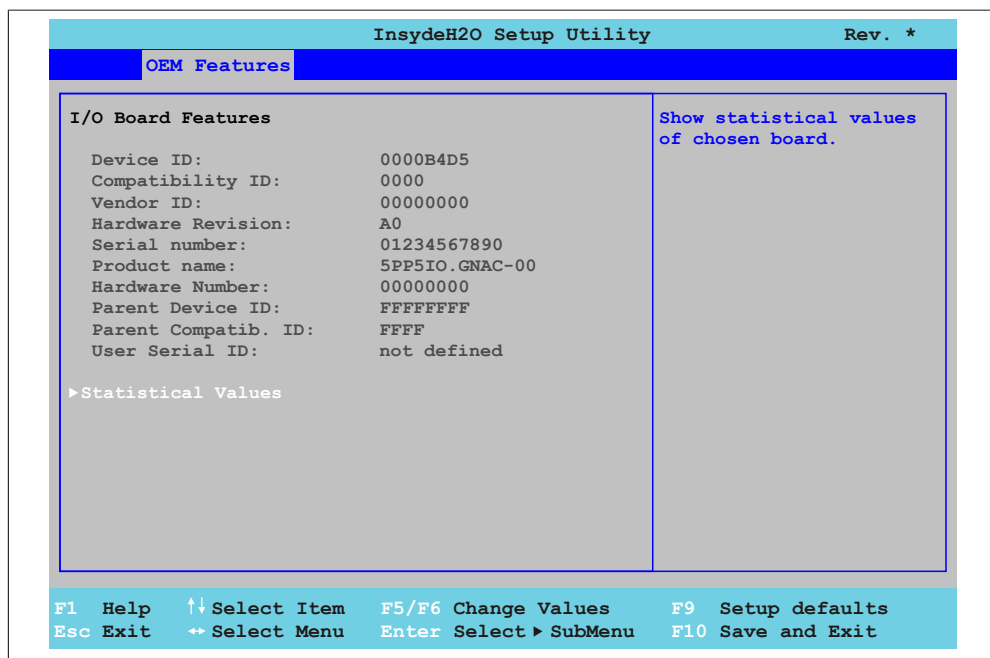
Image 77: US15W OEM Features - IO Module Features

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| Device ID | Displays the device ID of the IO board. | None | - |
| Compatibility ID | Displays the version of the device within the same B&R device code. This ID is needed for Automation Runtime. | None | - |
| Vendor ID | Displays the Vendor ID. | None | - |
| Hardware revision | Displays the IO board hardware revision. | None | - |
| Serial number | Displays the B&R serial number. | None | - |
| Product name | Displays the B&R model number. | None | - |
| Hardware Number | Displays the IO board hardware number. | None | - |
| Parent Device ID | Displays the manufacturer number. | None | - |
| Parent Compatib. ID | Displays the manufacturer ID. | None | - |
| User serial ID | Displays the user serial ID. This 8 digit hex value can be freely assigned by the user (e.g. to give the device a unique ID) and can only be changed with using the "B&R Control Center" via the ADI driver. | None | - |
| Statistical Values | Displays the statistical values. | Enter | Opens the submenu See " Statistical Values", on page 174 |

Table 86: US15W OEM Features - IO Module Features setting options

### 1.4.3.1 Statistical Values

```
                        InsydeH2O Setup Utility                    Rev. *
            OEM Features

    I/O Board statistical values                    Shows statistical values
                                                    of chosen board.

    Operating Time
     Total Hours:                121
     Power On Cycles:            23












    F1   Help    ↑↓ Select Item    F5/F6 Change Values    F9   Setup defaults
    Esc  Exit    ↔ Select Menu     Enter Select ▶ SubMenu F10  Save and Exit
```

Image 78: US15W OEM Features - IO Module Features - Statistical Values

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| Total Hours | Displays the runtime in whole hours. | None | - |
| Power on cycles | Displays the Power On Cycles - each restart increases the counter by one. | None | - |

Table 87: US15W OEM Features - IO Module Features - Statistical Values setting options

### 1.4.4 IF Board Features

```
                       InsydeH2O Setup Utility              Rev. *
           OEM Features

    IF Board features                          Show statistical values
                                               of chosen board.
      Device ID:              0000B4D5
      Compatibility ID:       0000
      Vendor ID:              00000000
      Hardware Revision:      A0
      Serial number:          01234567890
      Product name:           5PP5IF.CETH-00
      Hardware Number:        00000000
      Parent Device ID:       FFFFFFFF
      Parent Compatib. ID:    FFFF
      User Serial ID:         not defined

      LAN2 MAC ADDRESS:        00:60:65:0D:55:0C

    ▶Statistical Values




    F1   Help      ↑↓ Select Item   F5/F6  Change Values    F9   Setup defaults
    Esc  Exit      ↔ Select Menu    Enter  Select ▶ SubMenu  F10  Save and Exit
```

Image 79: US15W OEM Features - IF Module Features

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| Device ID | Displays the device ID of the IF board. | None | - |
| Compatibility ID | Displays the version of the device within the same B&R device code. This ID is needed for Automation Runtime. | None | - |
| Vendor ID | Displays the Vendor ID. | None | - |
| Hardware revision | Displays the IF board hardware revision. | None | - |
| Serial number | Displays the B&R serial number. | None | - |
| Product name | Displays the B&R model number. | None | - |
| Hardware Number | Displays the IF board hardware number. | None | - |
| Parent Device ID | Displays the manufacturer number. | None | - |
| Parent Compatib. ID | Displays the manufacturer ID. | None | - |
| User serial ID | Displays the user serial ID. This 8 digit hex value can be freely assigned by the user (e.g. to give the device a unique ID) and can only be changed with using the "B&R Control Center" via the ADI driver. | None | - |
| LAN2 MAC AD-DRESS[1] | Displays the MAC addresses assigned for the ETH interface. | None | - |
| **Statistical Values** | Displays the statistical values. | Enter | Opens the submenu See " Statistical Values", on page 176 |

Table 88: US15W OEM Features - IF Module Features setting options

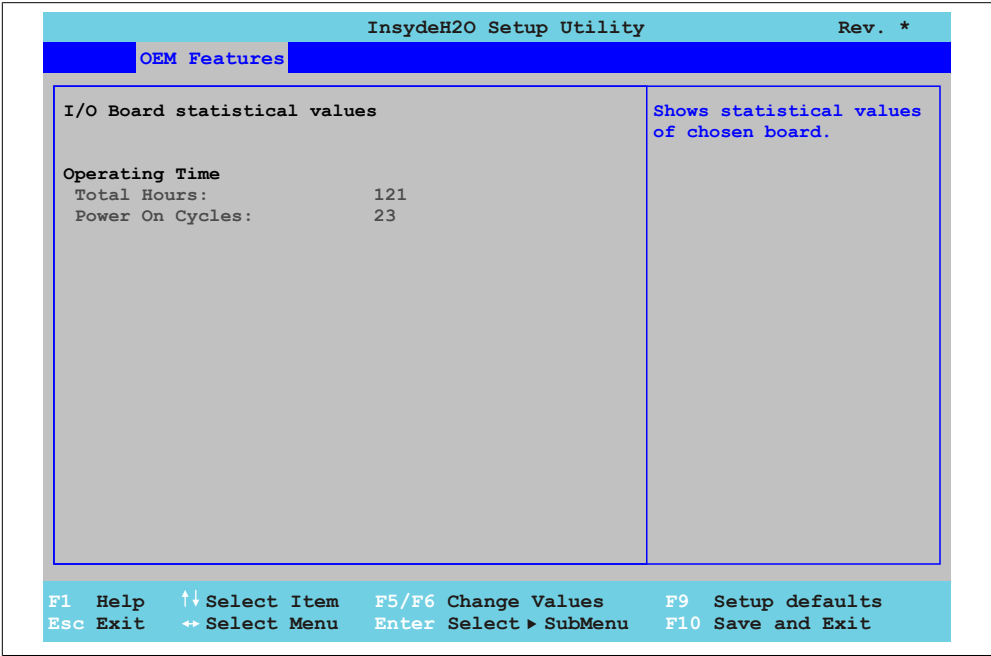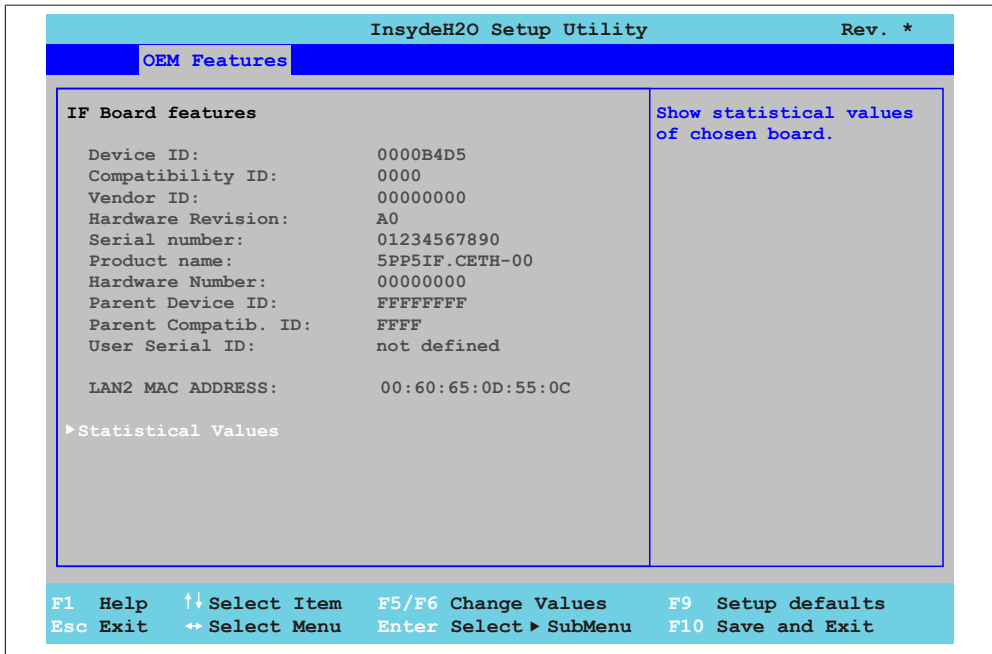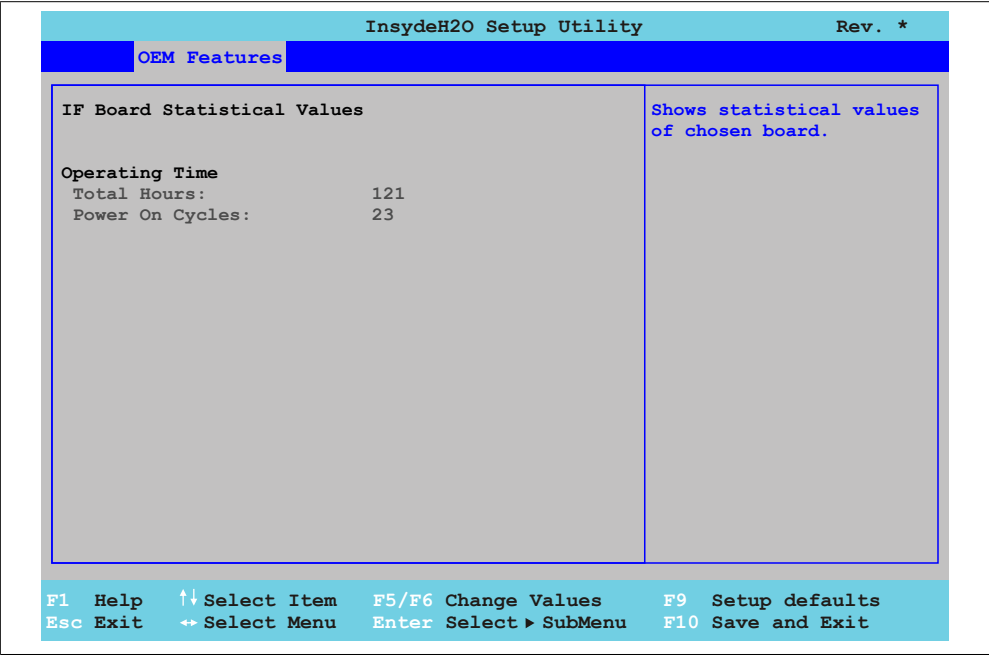1) The *LAN2 MAC ADDRESS* is only displayed with the interface board 5PP5IF.CETH-00.

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### 1.4.4.1 Statistical Values

```
                        InsydeH2O Setup Utility                    Rev. *
         OEM Features

    IF Board Statistical Values                      Shows statistical values
                                                     of chosen board.

    Operating Time
     Total Hours:              121
     Power On Cycles:          23




    F1   Help    ↑↓Select Item   F5/F6 Change Values    F9  Setup defaults
    Esc  Exit    ↔ Select Menu   Enter Select ▶ SubMenu F10 Save and Exit
```

Image 80: US15W OEM Features - IF Module Features - Statistical Values

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| Total Hours | Displays the runtime in whole hours. | None | - |
| Power on cycles | Displays the Power On Cycles - each restart increases the counter by one. | None | - |

Table 89: US15W OEM Features - IF Module Features - Statistical Values setting options
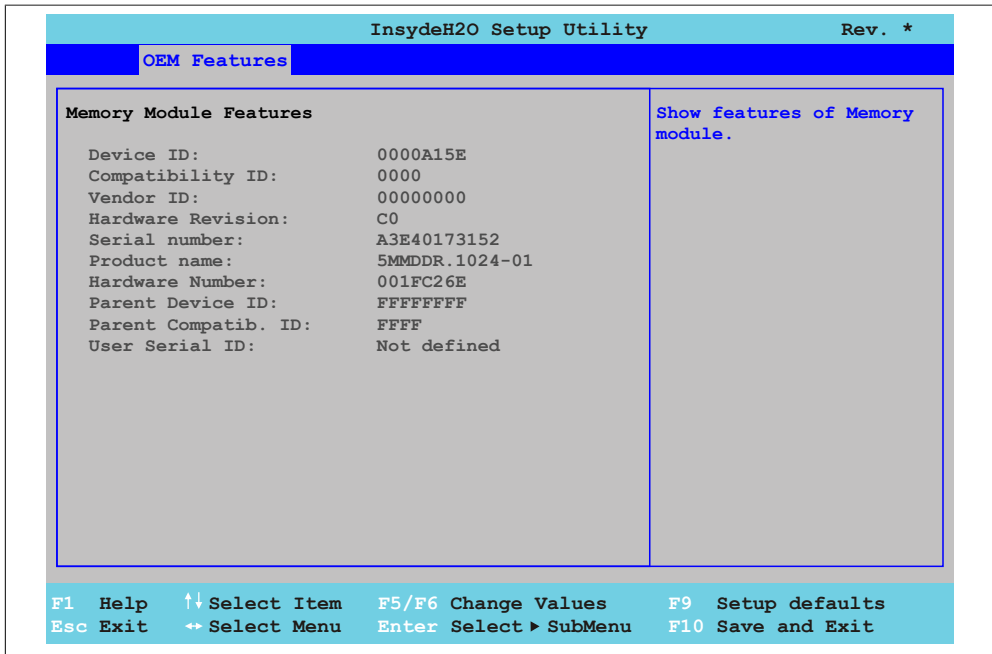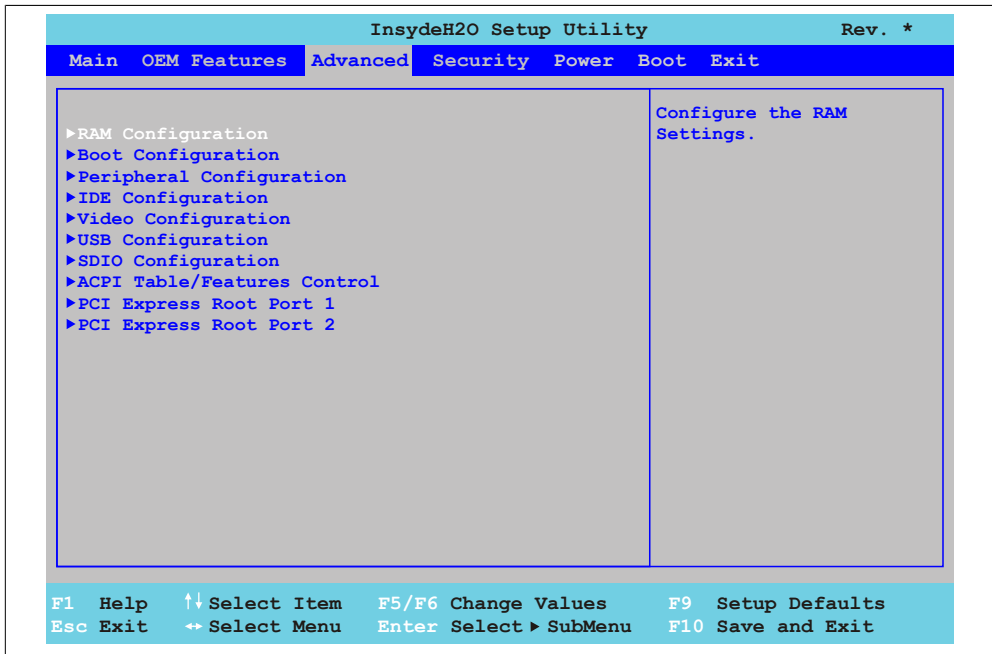
### 1.4.5 Memory Module Features

```
                        InsydeH2O Setup Utility                    Rev. *
            OEM Features

    Memory Module Features                        Show features of Memory
                                                  module.
      Device ID:            0000A15E
      Compatibility ID:     0000
      Vendor ID:            00000000
      Hardware Revision:    C0
      Serial number:        A3E40173152
      Product name:         5MMDDR.1024-01
      Hardware Number:      001FC26E
      Parent Device ID:     FFFFFFFF
      Parent Compatib. ID:  FFFF
      User Serial ID:       Not defined




    F1   Help    ↑↓ Select Item   F5/F6 Change Values    F9   Setup defaults
    Esc  Exit    ↔ Select Menu    Enter Select ▶ SubMenu  F10 Save and Exit
```

Image 81: US15W OEM Features - RAM Features

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| Device ID | Displays the device ID of the RAM. | None | - |
| Compatibility ID | Displays the version of the device within the same B&R device code. This ID is needed for Automation Runtime. | None | - |
| Vendor ID | Displays the Vendor ID. | None | - |
| Hardware revision | Displays the main memory hardware revision. | None | - |
| Serial number | Displays the B&R serial number. | None | - |
| Product name | Displays the B&R model number. | None | - |
| Hardware Number | Displays the main memory hardware number. | None | - |
| Parent Device ID | Displays the manufacturer number. | None | - |
| Parent Compatib. ID | Displays the manufacturer ID. | None | - |
| User serial ID | Displays the user serial ID. This 8 digit hex value can be freely assigned by the user (e.g. to give the device a unique ID) and can only be changed with using the "B&R Control Center" via the ADI driver. | None | - |

Table 90: US15W OEM Features - RAM Features setting options

## 1.5 Advanced

```
                    InsydeH2O Setup Utility                    Rev. *
   Main   OEM Features   Advanced   Security   Power   Boot   Exit

                                                Configure the RAM
                                                Settings.
   ▶RAM Configuration
   ▶Boot Configuration
   ▶Peripheral Configuration
   ▶IDE Configuration
   ▶Video Configuration
   ▶USB Configuration
   ▶SDIO Configuration
   ▶ACPI Table/Features Control
   ▶PCI Express Root Port 1
   ▶PCI Express Root Port 2




   F1   Help    ↑↓Select Item    F5/F6 Change Values    F9   Setup Defaults
   Esc  Exit    ↔ Select Menu    Enter Select ▶ SubMenu  F10  Save and Exit
```

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| RAM Configuration | Configures the RAM settings. | Enter | Opens the submenu<br>See " RAM configuration", on page 180 |
| Boot Configuration | Configures the boot settings. | Enter | Opens the submenu<br>See " Boot Configuration", on page 181 |
| Peripheral Configuration[1] | Configures the peripheral settings. | Enter | Opens the submenu<br>See " Peripheral Configuration", on page 182 |
| IDE Configuration | Configures the IDE functions. | Enter | Opens the submenu<br>See " IDE Configuration", on page 183 |
| Video Configuration | Configures the graphics settings. | Enter | Opens the submenu<br>See " Video Configuration", on page 186 |
| USB configuration | Configures the USB settings. | Enter | Opens the submenu<br>See " USB Configuration", on page 187 |
| SDIO Configuration[1] | Configures the SDIO settings. | Enter | Opens the submenu<br>See " SDIO Configuration", on page 189 |
| ACPI Table/Features Control Configuration | Configures the ACPI Table/Features. | Enter | Opens the submenu<br>See " ACPI Table/Features Control", on page 190 |

Table 91: US15W Advanced - Menu setting options

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| **PCI Express Root Port 1** | Configures the PCI Express settings on Port 1.<br><br># Warning!<br><br>**Making settings carelessly can cause instability or device problems. Therefore, it is strongly recommended that these settings only be changed by experienced users.** | Enter | Opens the submenu<br>See " PCI Express Root Port 1", on page 191 |
| **PCI Express Root Port 2** | Configures the PCI Express settings on Port 2.<br><br># Warning!<br><br>**Making settings carelessly can cause instability or device problems. Therefore, it is strongly recommended that these settings only be changed by experienced users.** | Enter | Opens the submenu<br>See " PCI Express Root Port 2", on page 194 |

Table 91: US15W Advanced - Menu setting options

1) This menu option is only present if there is an Audio connection.
2) SDIO - Secure Digital Input Output

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### 1.5.1 RAM configuration

```
                        InsydeH2O Setup Utility                    Rev. *
                        Advanced

   RAM Configuration                                   Configure the RAM
                                                       Settings.
   Refresh Rate                  <Auto>




   F1   Help      ↑↓ Select Item    F5/F6 Change Values    F9   Setup Defaults
   Esc  Exit      ↔  Select Menu    Enter Select ▶ SubMenu  F10  Save and Exit
```

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| Refresh rate | Option for setting the DRAM refresh rate. | Auto | DRAM Refresh is read from the SPD data of the DRAM module. |
| | | 7.8 µs | Manual setting for the DRAM refresh rate. |
| | | 3.9 µs | Manual setting for the DRAM refresh rate. |

Table 92: US15W Advanced - RAM Configuration setting options

## 1.5.2 Boot Configuration

```
                         InsydeH2O Setup Utility              Rev. *
                    Advanced

   Boot Configuration                             Selects Power-on state
                                                  for Numlock
   Numlock                  <On>




   F1   Help     ↑↓ Select Item   F5/F6  Change Values    F9   Setup Defaults
   Esc  Exit      ↔ Select Menu    Enter  Select ▶ SubMenu  F10  Save and Exit
```

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| NumLock | With this field you can define the state of the NumLock key when booting. | On | Numeric keypad is enabled. |
| | | Off | Only the cursor functions of the numerical keypad are activated. |

Table 93: US15W Advanced - Boot Configuration setting options

### 1.5.3 Peripheral Configuration

```
            InsydeH2O Setup Utility                    Rev. *
                   Advanced

 Peripheral Configuration                    AUTO: Auto detect HD
                                             Audio, if available.
 High Definition Audio   <Auto>              DISABLED: Disable HD
                                             Audio, if available.




















 F1   Help     ↑↓ Select Item    F5/F6 Change Values    F9   Setup Defaults
 Esc  Exit      ↔ Select Menu    Enter  Select ▶ SubMenu  F10  Save and Exit
```

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| High Definition Audio | The audio mode can be turned on or off here. | Disabled | Disables the audio controller. |
| | | Auto | Enables High Definition Audio (HDA) Sound. The HDA controller automatically detects installed audio devices. |

Table 94: US15W Advanced - Peripheral Configuration setting options

### 1.5.4 IDE Configuration

```
                        InsydeH2O Setup Utility                    Rev. *
                   Advanced

   IDE Configuration

  ▶Channel 1 Master          [BR-SSD-C004G-01-0101]
  ▶Channel 1 Slave           [Not Installed]




  F1   Help     ↑↓ Select Item   F5/F6 Change Values    F9   Setup Defaults
  Esc  Exit     ↔ Select Menu    Enter Select ▶ SubMenu  F10  Save and Exit
```
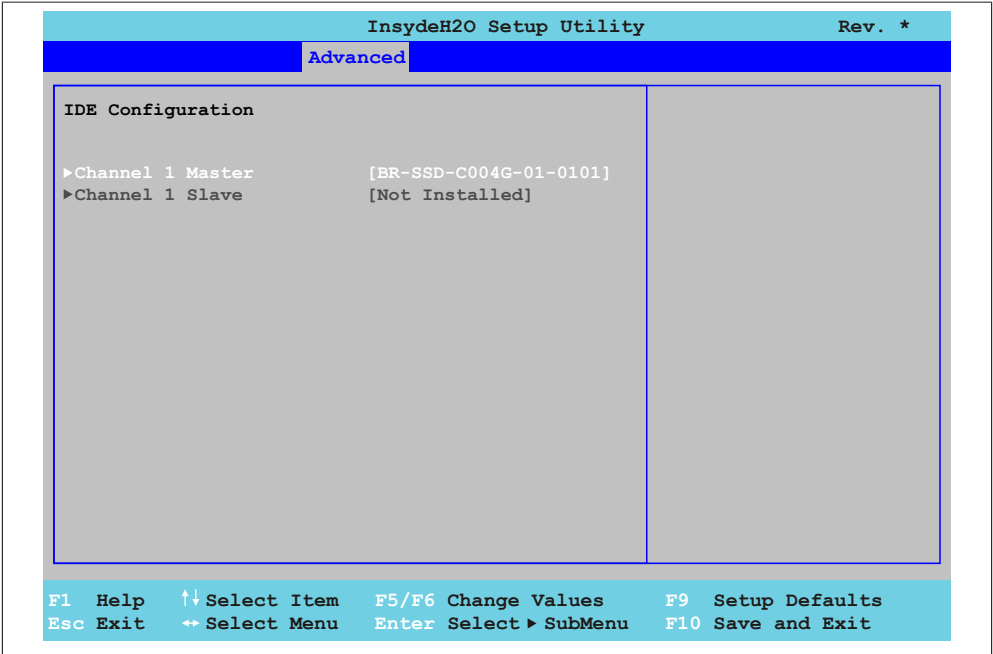
| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| Channel 1 Master | Displays the drive that is connected to Channel 1 Master. | Enter | Opens the submenu See " Channel 1 Master", on page 184 |
| Channel 1 Slave | Displays the drive that is connected to Channel 1 Slave. | Enter | Opens the submenu See " Channel 1 slave", on page 185 |

Table 95: US15W Advanced - IDE Configuration setting options

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### 1.5.4.1  Channel 1 Master

```
                          InsydeH2O Setup Utility                    Rev. *
                    Advanced

        Channel 1 Master             [BR-SSD-C004G-01-0101]

        Transfer Mode:               <Ultra DMA ATA-66>

        Security Mode:               Uninstall




        F1   Help     ↑↓Select Item   F5/F6 Change Values    F9  Setup Defaults
        Esc  Exit     ↔ Select Menu   Enter Select ▶ SubMenu F10 Save and Exit
```

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| Transfer mode | Displays the communication path between the Channel 1 Master drive and the system memory. | None | - |
| Security Mode | | None | - |

Table 96: US15W Advanced - IDE Configuration - Channel 1 Master setting options

### 1.5.4.2 Channel 1 slave
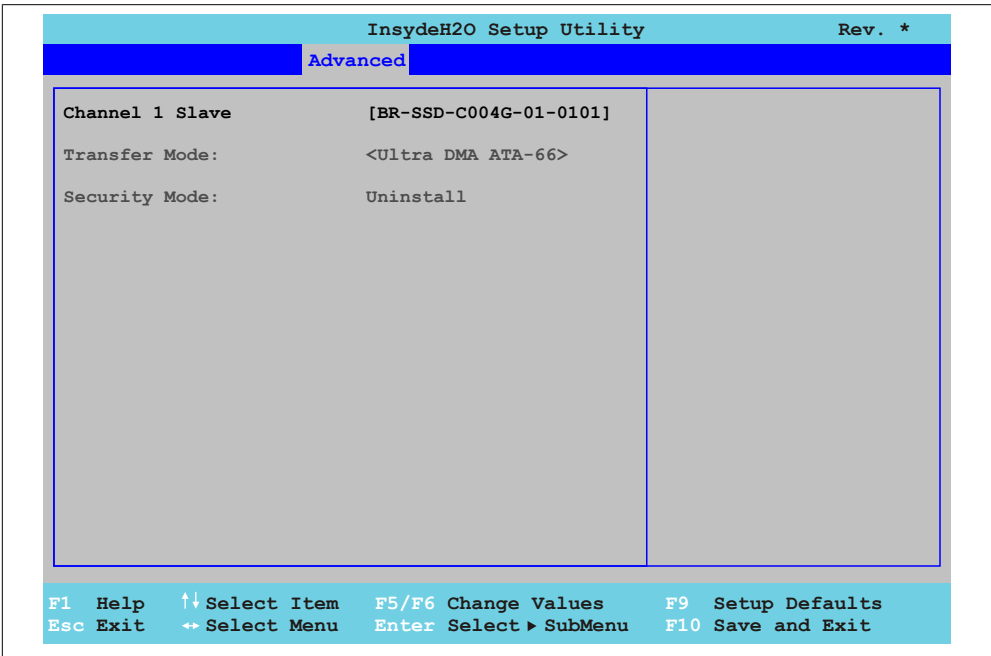
```
                           InsydeH2O Setup Utility                Rev. *
                      Advanced

      Channel 1 Slave              [BR-SSD-C004G-01-0101]

      Transfer Mode:               <Ultra DMA ATA-66>

      Security Mode:               Uninstall




      F1   Help    ↑↓ Select Item   F5/F6 Change Values    F9  Setup Defaults
      Esc  Exit    ↔ Select Menu    Enter Select ▶ SubMenu  F10 Save and Exit
```

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| Transfer mode | Displays the communication path between the Channel 1 Slave drive and the system memory. | None | - |
| Security Mode | | None | - |

Table 97: US15W Advanced - IDE Configuration - Channel 1 Slave setting options

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### 1.5.5 Video Configuration

```
                         InsydeH2O Setup Utility                    Rev. *
                  Advanced

       Video Configuration                                Select the amount of
                                                          Pre-allocated Memory
       IGD - Pre-Allocated        <UMA = 8MB>             that the Internal
       Memory                                             Graphics Device will
       IGD - Boot Type            <VBIOS Default>         use. Warning: Some
       IGD - LCD Panel Type       <640x480 (5.7) LVDS>    features may not support
                                                          with 1MB Pre-allocated
                                                          Memory.












       F1   Help      ↑↓ Select Item   F5/F6 Change Values    F9   Setup Defaults
       Esc  Exit      ↔ Select Menu    Enter  Select ▶ SubMenu F10  Save and Exit
```

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| IGD - Pre-allocated memory | Option for setting the memory size that can be used for the internal graphics controller.<br><br>**Info:**<br>**Some functions are not supported with the setting "UMA = 1MB".** | UMA = 1MB | 1 MByte main memory provided. |
| | | UMA = 4MB | 4 MByte main memory provided. |
| | | UMA = 8MB | 8 MByte main memory provided. |
| IGD - Boot Type | This option determines the order in which the devices on the connected channels LFP and SDVO should be checked and booted. | VBIOS Default | One of the panels listed under "IGD - LCD Panel Type" will be automatically selected. |
| | | LFP - SDVO | It is possible to boot from the LFP (Local Flat Panel) as well as the SDVO (Serial Digital Video Output) channel. |
| IGD - LCD Panel Type | Option for setting the display resolution.<br><br>**Info:**<br>**If the display setting is present in the EPROM data, then this setting has no effect on the display resolution because the EPROM data is loaded each time the system is restarted and the BIOS setting is overwritten.** | 640x480 (5.7) LVDS | Resolution at 640 x 480 pixels (for 5.7" display) |
| | | 800x480 (7.0) LVDS | Resolution at 800 x 480 pixels (for 7" display) |
| | | 800x600 (8.4) LVDS | Resolution at 800 x 600 pixels (for 8.4" display) |
| | | 640x480 (10.4) LVDS | Resolution at 640 x 480 pixels (for 10.4" display) |
| | | 800x600 (12.0) LVDS | Resolution at 800 x 600 pixels (for 12.0" display) |
| | | 1024x768 (15.0) LVDS | Resolution at 1024 x 768 pixels (for 15" display) |

Table 98: US15W Advanced - Video Configuration setting options

### 1.5.6  USB Configuration

```
                        InsydeH2O Setup Utility                    Rev. *
                    Advanced

    USB configuration                              Enable/Disable USB
                                                   Leagcy Support.
    USB Legacy              <Enabled>
    EHCI                   <Enabled>
    UHCI 1                 <Enabled>
    UHCI 2                 <Disabled>
    UHCI 3                 <Enabled>
    USB Client             <Disabled>




    F1   Help     ↑↓ Select Item   F5/F6 Change Values    F9   Setup defaults
    Esc  Exit     ↔ Select Menu    Enter Select ▶ SubMenu  F10  Save and Exit
```
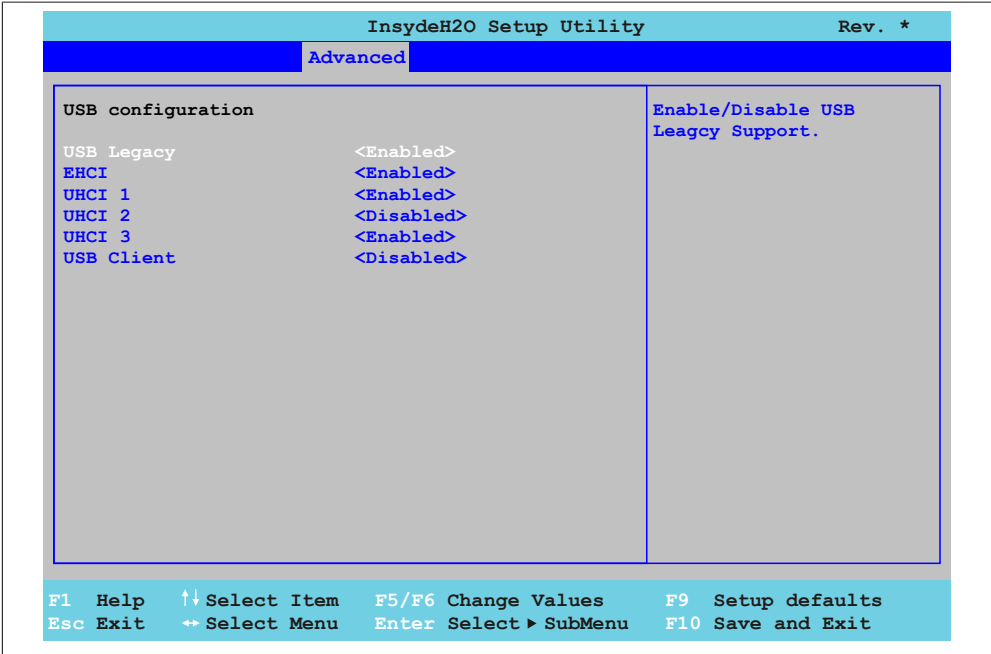
Image 82: US15W Advanced - USB Configuration

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| USB Legacy | Legacy USB support can be enabled/disabled here. USB ports do not function during startup. USB is supported again after the operating system has started. A USB keyboard is still recognized during the POST. | Enabled | Enables this function. |
| | | Disabled | Disables this function. |
| EHCI | The support for the operating system can be set up without the fully automatic EHCI function. | Enabled | Enables USB support. USB 2.0 support is enabled as soon as a USB 2.0 device is connected to the interface. |
| | | Disabled | Disables USB 2.0 support. |

Table 99: US15W Advanced - USB Configuration setting options

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| UHCI 1 | Configuration of the USB UHCI controller 1 for USB port 2 and 3. | Enabled | Enables USB support. |
| | | Disabled | Deactivates the USB support. **Warning!** If this setting is *Disabled*, then the settings *UHCI 2* and *UHCI 3* will be set to *Disabled* and all USB ports will be disabled. As a result, it will no longer be possible to enter BIOS. However, if UHCI 1 has been disabled, then you can use the Backup BIOS to once again enter BIOS. For more information, please see " OEM Features", on page 163 |
| UHCI 2[1] | Configuration of the USB UHCI controller 2 for USB ports on the I/O board. | Enabled | Enables USB support. |
| | | Disabled | Deactivates the USB support. |
| UHCI 3[1] | Configuration of the USB UHCI controller 3 for USB port 3. | Enabled | Enables USB support. |
| | | Disabled | Deactivates the USB support. |
| USB client | Setting for USB Client support. | Enabled | Enables USB Client support. |
| | | Disabled | Disables USB Client support. |

Table 99: US15W Advanced - USB Configuration setting options

1) These settings are only possible if *UHCI 1* is set to *Enabled* .

### 1.5.7 SDIO Configuration

```
                        InsydeH2O Setup Utility              Rev. *

                    Advanced

     SDIO Configuration                          Enabled/Disable SDIO
                                                 Port1
     SDIO Port 1      <Enabled>
     SDIO Port 2      <Enabled>




     F1   Help      ↑↓ Select Item   F5/F6 Change Values     F9   Setup Defaults
     Esc  Exit      ↔ Select Menu    Enter Select ▶ SubMenu  F10  Save and Exit
```
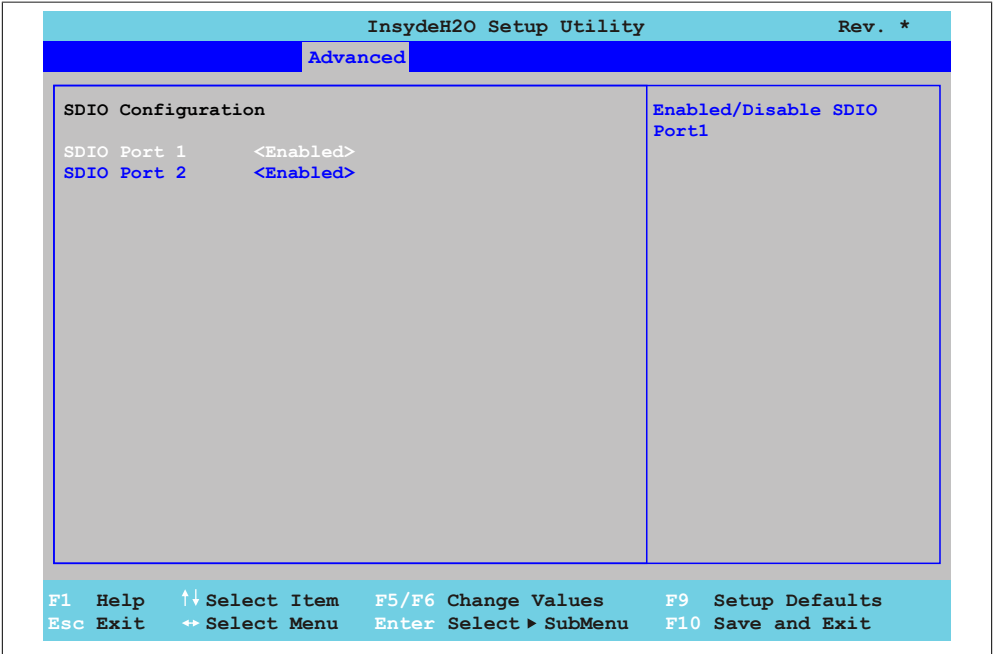
| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| SDIO Port 1 | SDIO Port 1 (Secure Digital Input Output - SD Memory Card Slot) can be enabled/ disabled here. | Enabled | Enables this function. |
| | | Disabled | Disables this function. |
| SDIO Port 2 | SDIO Port 2 (Secure Digital Input Output - SD Memory Card Slot) can be enabled/ disabled here. | Enabled | Enables this function. |
| | | Disabled | Disables this function. |

Table 100: US15W Advanced - SDIO Configuration setting options

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## 1.5.8 ACPI Table/Features Control

```
                    InsydeH2O Setup Utility                    Rev. *

         Advanced


ACPI Table/Features Control                    High Performance Event
                                               Timer Support in Windows
FACP – C2 Latency Value        <Disabled>      XP. Enable this
FACP – C3 Latency Value        <Disabled>      feature, the HPET table
HPET – HPET Support            <Enabled>       will be add-into ACPI
APIC – IO APIC Mode            <Enabled>       Tables.












F1   Help      ↑↓ Select Item   F5/F6 Change Values   F9   Setup defaults
Esc  Exit      ↔  Select Menu   Enter Select ▶ SubMenu F10  Save and Exit
```

Image 83: US15W Advanced - ACPI Table/Features Control

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| FACP – C2 Latency Value[1] | Option for setting a latency period in the C2 state. | Enabled | Enables this function. A latency of 1 µs is set (i.e. the C2 state will be entered within 1 µs and exited again within 1 µs). |
| | | Disabled | Disables this function. |
| FACP – C3 Latency Value[1] | Option for setting a latency period in the C3 state. | Enabled | Enables this function. A latency of 85 µs is set (i.e. the C3 state will be entered within 85 µs and exited again within 85 µs). |
| | | Disabled | Disables this function. |
| HPET – HPET Support | The HPET is a timer inside the PC. It is able to trigger an interrupt with a high degree of accuracy, which allows other programs to better synchronize a variety of applications. | Enabled | Enables this function. This function is recommended for multimedia applications. |
| | | Disabled | Disables this function. |
| APIC - I/O APIC mode | This option controls the support of the advanced programmable interrupt controller in the processor. | Enabled | Enables this function. |
| | | Disabled | Disables this function. **Warning!** Windows XP will not be started if this setting is disabled. |

Table 101: US15W Advanced - ACPI Table/Features Control setting options

1) These settings are only possible if *C-States* is set to *Enabled* in the menu item *Power - Advanced CPU Control*.

### 1.5.9 PCI Express Root Port 1

# Warning!

**Making settings carelessly can cause instability or device problems. Therefore, it is strongly recommended that these settings only be changed by experienced users.**

```
                        InsydeH2O Setup Utility                    Rev. *
                    Advanced

                                                    Control the PCI Express
    PCI Express Root Port 1   <Enabled>             Root Port.
     Interrupt Pin 0          <Auto>
     VC1 Enable               <Disabled>
     ASPM                     <Disabled>
     URR                      <Disabled>
     FER                      <Disabled>
     NFER                     <Disabled>
     CER                      <Disabled>
     CT0                      <Disabled>
     SEFE                     <Disabled>
     SENFE                    <Disabled>
     SECE                     <Disabled>
     PME Interrupt            <Disabled>
     PME SCI                  <Disabled>
     Hot Plug SCI             <Disabled>




    F1  Help      ↑↓ Select Item    F5/F6 Change Values    F9   Setup Defaults
    Esc Exit      ↔ Select Menu     Enter Select ▶ SubMenu  F10  Save and Exit
```
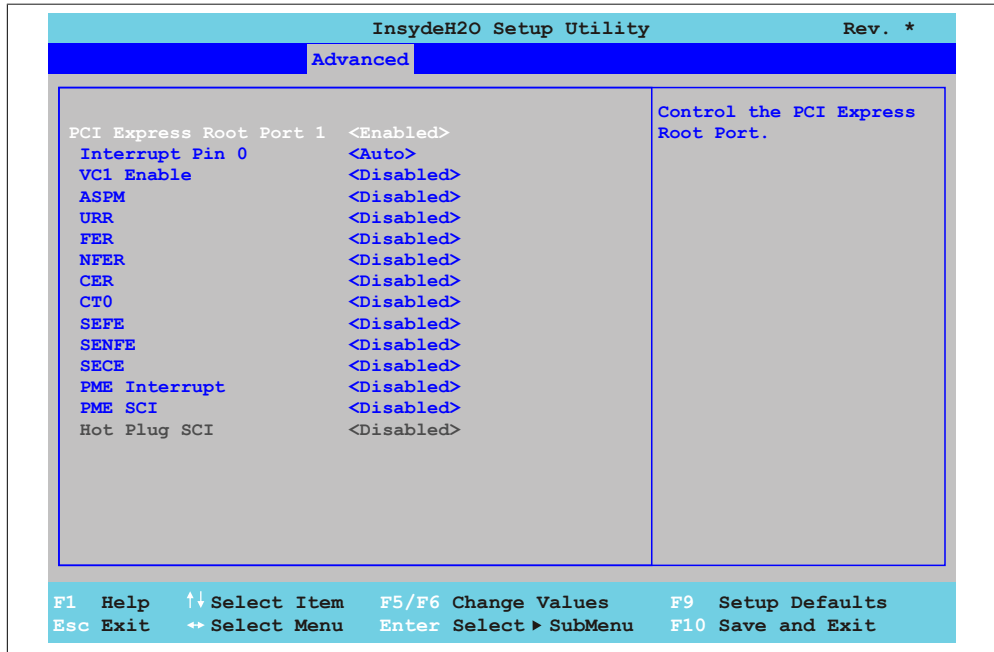
| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| PCI Express Root Port 1 | This option is used to enable/disable PCI Express Root Port 1. | Enabled | PCI Express Root Port 1 enabled. |
| | | Disabled | PCI Express Root Port 1 and 2 disabled. |
| Interrupt pin 0 | | Auto | IRQ enabled for Root Port 1. |
| | | Disabled | IRQ disabled for Root Port 1. |
| VC1 Enable | Virtual Channel 1 | Auto | Setting the mapping via the BIOS setting "VC1/TC Mapping". |
| | | Disabled | Disables this function. The TC0 Traffic class is automatically used and mapped to the VC0 Virtual Channel. |
| VC1/TC Mapping[1] | This option is used to define which traffic will be mapped to which Virtual Channel. | TC0 | TBD |
| | | TC1 | The TC1 traffic class is mapped manually to the VC1 Virtual Channel. |
| | | TC2 | The TC2 traffic class is mapped manually to the VC1 Virtual Channel. |
| | | TC3 | The TC3 traffic class is mapped manually to the VC1 Virtual Channel. |

Table 102: US15W Advanced - PCI Express Root Port 1 setting options

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| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| | | TC4 | The TC4 traffic class is mapped manually to the VC1 Virtual Channel. |
| | | TC5 | The TC5 traffic class is mapped manually to the VC1 Virtual Channel. |
| | | TC6 | The TC6 traffic class is mapped manually to the VC1 Virtual Channel. |
| | | TC7 | The TC7 traffic class is mapped manually to the VC1 Virtual Channel. |
| ASPM | *Active State Power Management* Option for setting a power saving function (L0s/L1) for PCIE links if they do not require full power. | Enabled | Enables this function. |
| | | Disabled | Disables this function. |
| Automatic ASPM[2] | Option for configuring automatic or manual assignment of the ASPM. | Auto | Automatic assignment by the BIOS and operating system. |
| | | Manual | Setting for assignment under the BIOS setting "ASPM L0s" and "ASPM L1". |
| ASPM L0s[3] | Option for setting the L0 power saving function. | Disabled | Disables this function. |
| | | Root Port Only | Enables the power saving function for the Root port. |
| | | Endpoint Port Only | Enables the power saving function for the Endpoint port. |
| | | Root&Endpoint Ports | Enables the power saving function for the Root and Endpoint ports. |
| ASPM L1[3] | Option for setting the L1 power saving function. Power consumption is lower than with L0, but the exit latency higher. | Enabled | Enables this function. |
| | | Disabled | Disables this function. |
| URR | *Unsupported Request (UR) Reporting* Option for reporting unsupported requests. Logging of error messages received by the Root Port is controlled exclusively by the Root Control Register. | Enabled | Enables this function. |
| | | Disabled | Disables this function. |
| FER | *Fatal Error Reporting* Option for reporting fatal errors. All of the functions in a multifunction device will be monitored. The report for the Root Port takes place internally inside the Root Complex. | Enabled | Enables this function. |
| | | Disabled | Disables this function. |
| NFER | *Non-Fatal Error Reporting* Option for reporting non-fatal errors. All of the functions in a multifunction device will be monitored. The report for the Root Port takes place internally inside the Root Complex. | Enabled | Enables this function. |
| | | Disabled | Disables this function. |
| CER | *Correctable Error Reporting* Option for reporting non-fatal errors. All of the functions in a multifunction device will be monitored. The report for the Root Port takes place internally inside the Root Complex. | Enabled | Enables this function. |
| | | Disabled | Disables this function. |
| CT0 | *PCI Express Completion Timer T0* | Enabled | Enables this function. |

Table 102: US15W Advanced - PCI Express Root Port 1 setting options

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| | This option is used to enable/disable PCI Express Completion Timer. **Info:** If the system detected an ROB (Processor Reorder Buffer) Timeout, then this setting should be set to Enabled. | Disabled | Disables this function. |
| SEFE | *System Error on Fatal Error* Option for generating a System Error, if a fatal error is registered by a device on the Root Port or on the Root Port itself. | Enabled | Enables this function. |
| | | Disabled | Disables this function. |
| SENFE | *System Error on Non-Fatal Error* Option for generating a System Error, if a non-fatal error is registered by a device on the Root Port or on the Root Port itself. | Enabled | Enables this function. |
| | | Disabled | Disables this function. |
| SECE | *System Error on Correctable Error* Option for generating a System Error, if a correctable error is registered by a device on the Root Port or on the Root Port itself. | Enabled | Enables this function. |
| | | Disabled | Disables this function. |
| PME Interrupt | *Power Management Event Interrupt* Option for generating a PME Interrupt. An Interrupt is generated when a PME Message is received from a PCIe device. | Enabled | Enables this function. A PME Interrupt is generated when a PME message is received. |
| | | Disabled | Disables this function. |
| PME SCI | Option for generating an SCI if Power Management is detected. | Enabled | Enables this function. The Root Port is enabled to generate SCI if Power Management is detected. |
| | | Disabled | Disables this function. |
| Hot Plug SCI | Option for generating an SCI if a Hot-Plug is detected. | Enabled | Enables this function. The Root Port is enabled to generate SCI if a Hot-Plug is detected. |
| | | Disabled | Disables this function. |

Table 102: US15W Advanced - PCI Express Root Port 1 setting options

1) These settings are only possible if *VC1 Enable* is set to *Auto*.
2) These settings are only possible if *ASPM* is set to *Enabled*.
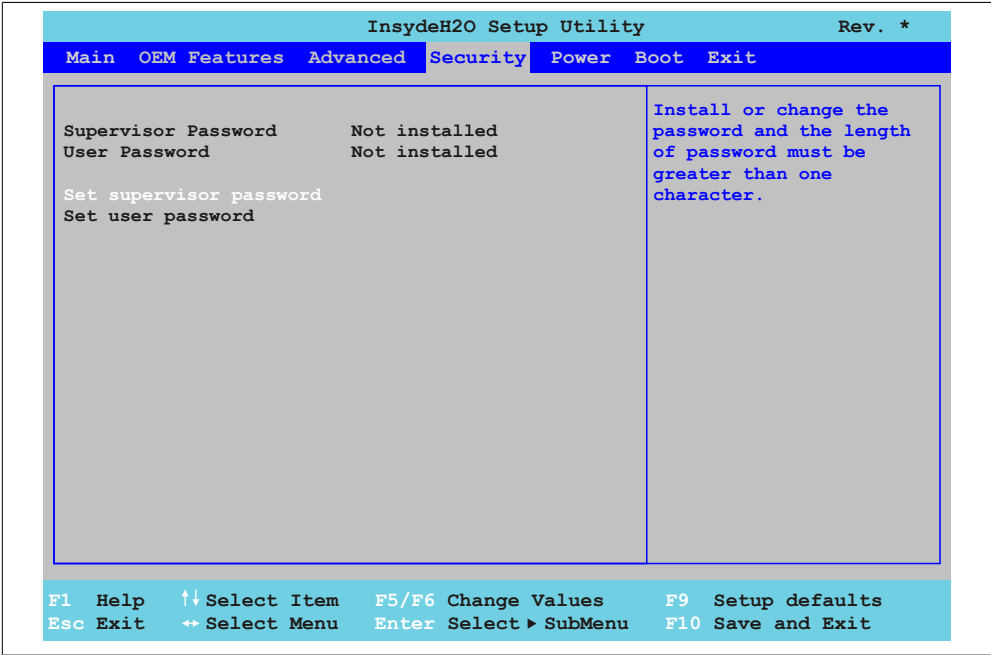3) These settings are only possible if *Automatic ASPM* is set to *Manual*.

### 1.5.10 PCI Express Root Port 2

# Warning!

**Making settings carelessly can cause instability or device problems. Therefore, it is strongly recommended that these settings only be changed by experienced users.**

```
                      InsydeH2O Setup Utility                    Rev. *
                    Advanced

                                                   Control the PCI Express
                                                   Root Port.
   PCI Express Root Port 2   <Enabled>
    Interrupt Pin 1          <Auto>
    VC1 Enable               <Disabled>
    ASPM                     <Disabled>
    URR                      <Disabled>
    FER                      <Disabled>
    NFER                     <Disabled>
    CER                      <Disabled>
    CT0                      <Disabled>
    SEFE                     <Disabled>
    SENFE                    <Disabled>
    SECE                     <Disabled>
    PME Interrupt            <Disabled>
    PME SCI                  <Disabled>
    Hot Plug SCI             <Disabled>




   F1   Help      ↑↓ Select Item    F5/F6 Change Values    F9   Setup Defaults
   Esc  Exit      ↔ Select Menu     Enter Select ▶ SubMenu  F10  Save and Exit
```
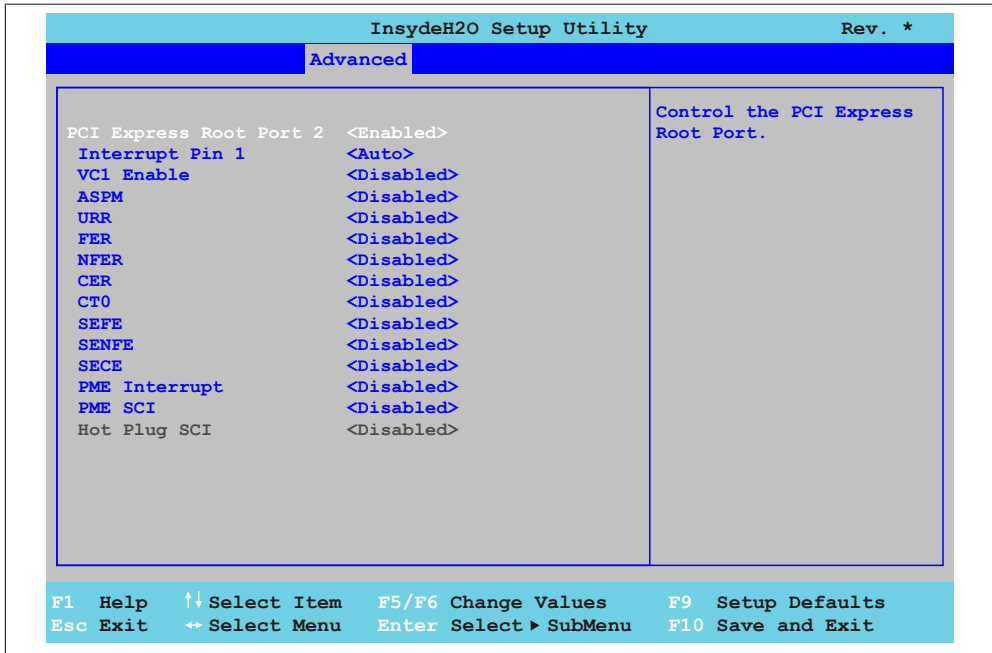
| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| PCI Express Root Port 2 | This option is used to enable/disable PCI Express Root Port 2. | Enabled | PCI Express Root Port 2 enabled. |
| | | Disabled | PCI Express Root Port 2 disabled. |
| Interrupt pin 1 | **Info:** This function is disabled by default when using ARwin and/or a fieldbus card. The function must be disabled in order to use a fieldbus card. | Auto | IRQ enabled for Root Port 2. |
| | | Disabled | IRQ disabled for Root Port 2. |
| VC1 Enable | Virtual Channel 1 | Auto | Setting the mapping via the BIOS setting "VC1/TC Mapping". |
| | | Disabled | Disables this function. The TC0 Traffic class is automatically used and mapped to the VC0 Virtual Channel. |
| VC1/TC Mapping[1] | This option is used to define which traffic will be mapped to which Virtual Channel. | TC0 | TBD |
| | | TC1 | The TC1 traffic class is mapped manually to the VC1 Virtual Channel. |

Table 103: US15W Advanced - PCI Express Root Port 2 setting options

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| | | TC2 | The TC2 traffic class is mapped manually to the VC1 Virtual Channel. |
| | | TC3 | The TC3 traffic class is mapped manually to the VC1 Virtual Channel. |
| | | TC4 | The TC4 traffic class is mapped manually to the VC1 Virtual Channel. |
| | | TC5 | The TC5 traffic class is mapped manually to the VC1 Virtual Channel. |
| | | TC6 | The TC6 traffic class is mapped manually to the VC1 Virtual Channel. |
| | | TC7 | The TC7 traffic class is mapped manually to the VC1 Virtual Channel. |
| ASPM | *Active State Power Management* | Enabled | Enables this function. |
| | Option for setting a power saving function (L0s/L1) for PCIE links if they do not require full power. | Disabled | Disables this function. |
| Automatic ASPM[2] | Option for configuring automatic or manual assignment of the ASPM. | Auto | Automatic assignment by the BIOS and operating system. |
| | | Manual | Setting for assignment under the BIOS setting "ASPM L0s" and "ASPM L1". |
| ASPM L0s[3] | Option for setting the L0 power saving function. | Disabled | Disables this function. |
| | | Root Port Only | Enables the power saving function for the Root port. |
| | | Endpoint Port Only | Enables the power saving function for the Endpoint port. |
| | | Root&Endpoint Ports | Enables the power saving function for the Root and Endpoint ports. |
| ASPM L1[3] | Option for setting the L1 power saving function. Power consumption is lower than with L0, but the exit latency higher. | Enabled | Enables this function. |
| | | Disabled | Disables this function. |
| URR | *Unsupported Request (UR) Reporting* | Enabled | Enables this function. |
| | Option for reporting unsupported requests. Logging of error messages received by the Root Port is controlled exclusively by the Root Control Register. | Disabled | Disables this function. |
| FER | *Fatal Error Reporting* | Enabled | Enables this function. |
| | Option for reporting fatal errors. All of the functions in a multifunction device will be monitored. The report for the Root Port takes place internally inside the Root Complex. | Disabled | Disables this function. |
| NFER | *Non-Fatal Error Reporting* | Enabled | Enables this function. |
| | Option for reporting non-fatal errors. All of the functions in a multifunction device will be monitored. The report for the Root Port takes place internally inside the Root Complex. | Disabled | Disables this function. |
| CER | *Correctable Error Reporting* | Enabled | Enables this function. |
| | Option for reporting non-fatal errors. All of the functions in a multifunction device will be monitored. The report for the Root Port takes place internally inside the Root Complex. | Disabled | Disables this function. |
| CT0 | *PCI Express Completion Timer T0* | Enabled | Enables this function. |

Table 103: US15W Advanced - PCI Express Root Port 2 setting options

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| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| | This option is used to enable/disable PCI Express Completion Timer.<br><br>**Info:**<br>**If the system detected an ROB (Processor Reorder Buffer) Time-out, then this setting should be set to Enabled.** | Disabled | Disables this function. |
| SEFE | *System Error on Fatal Error*<br>Option for generating a System Error, if a fatal error is registered by a device on the Root Port or on the Root Port itself. | Enabled | Enables this function. |
| | | Disabled | Disables this function. |
| SENFE | *System Error on Non-Fatal Error*<br>Option for generating a System Error, if a non-fatal error is registered by a device on the Root Port or on the Root Port itself. | Enabled | Enables this function. |
| | | Disabled | Disables this function. |
| SECE | *System Error on Correctable Error*<br>Option for generating a System Error, if a correctable error is registered by a device on the Root Port or on the Root Port itself. | Enabled | Enables this function. |
| | | Disabled | Disables this function. |
| PME Interrupt | *Power Management Event Interrupt*<br>Option for generating a PME Interrupt.<br>An Interrupt is generated when a PME Message is received from a PCIe device. | Enabled | Enables this function.<br>A PME Interrupt is generated when a PME message is received. |
| | | Disabled | Disables this function. |
| PME SCI | Option for generating an SCI if Power Management is detected. | Enabled | Enables this function.<br>The Root Port is enabled to generate SCI if Power Management is detected. |
| | | Disabled | Disables this function. |
| Hot Plug SCI | Option for generating an SCI if a Hot-Plug is detected. | Enabled | Enables this function.<br>The Root Port is enabled to generate SCI if a Hot-Plug is detected. |
| | | Disabled | Disables this function. |

Table 103: US15W Advanced - PCI Express Root Port 2 setting options

1) These settings are only possible if *VC1 Enable* is set to *Auto*.
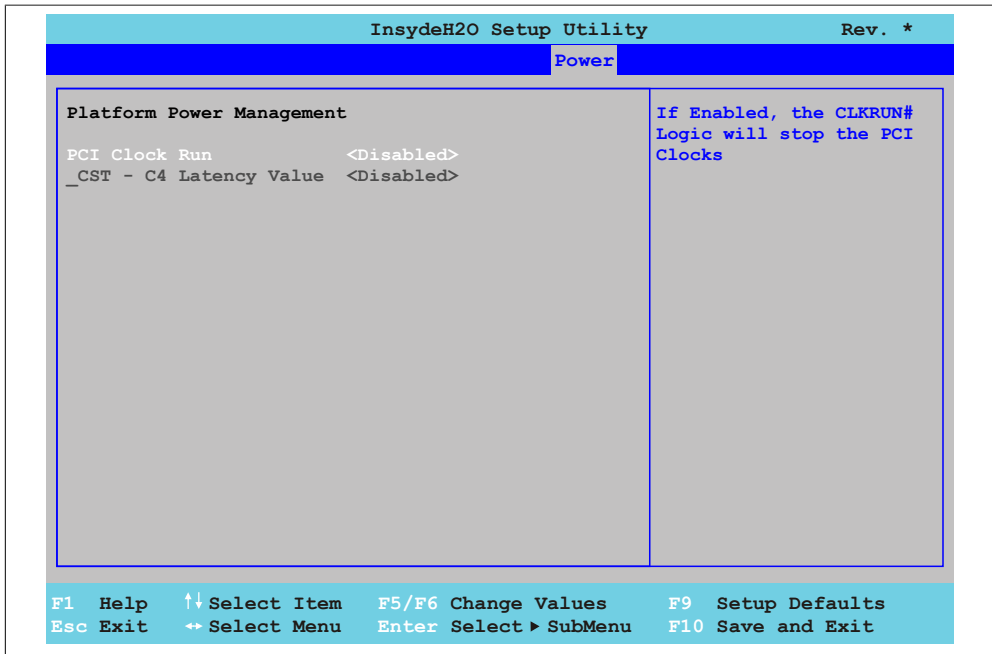2) These settings are only possible if *ASPM* is set to *Enabled*.
3) These settings are only possible if *Automatic ASPM* is set to *Manual*.

## 1.6 Security

```
              InsydeH2O Setup Utility              Rev. *
   Main  OEM Features  Advanced  Security  Power  Boot  Exit

   Supervisor Password      Not installed     Install or change the
   User Password            Not installed     password and the length
                                              of password must be
   Set supervisor password                    greater than one
   Set user password                          character.

 F1  Help    ↑↓Select Item   F5/F6 Change Values   F9  Setup defaults
 Esc Exit    ↔ Select Menu   Enter Select ▶ SubMenu  F10 Save and Exit
```

Image 84: US15W Security - Menu

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| Supervisor Password | Displays whether or not a supervisor password has been set. | None | - |
| User Password | Displays whether or not a user password has been set. | None | - |
| Set supervisor password | Option for entering/changing a supervisor password. A supervisor password is necessary to edit all BIOS settings. | Enter | Enter password. |
| Set user password | Option for entering/changing a user password. A user password allows the user to edit only certain BIOS settings. | Enter | Enter password. |

Table 104: US15W Security - Menu setting options

### 1.6.1 Set Supervisor Password

```
                      InsydeH2O Setup Utility                    Rev. *

    Main   OEM Features   Advanced   Security   Power   Boot   Exit

                                                 Install or change the
                                                 password and the length
       Supervisor Password       Installed      of password must be
       User Password             Not installed  greater than one
                                                 character.
       Set supervisor password
       Power on Password         <Disabled>
       User Access Level         <Full>
       Set user password
```

```
    F1   Help     ↑↓ Select Item   F5/F6  Change Values    F9   Setup defaults
    Esc  Exit     ↔ Select Menu    Enter  Select ▶ SubMenu  F10  Save and Exit
```

Image 85: US15W Security - Set Supervisor Password

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| Supervisor Password | Displays whether or not a supervisor password has been set. | None | - |
| User Password | Displays whether or not a user password has been set. | None | - |
| Set supervisor password | Option for entering/changing a supervisor password. A supervisor password is necessary to edit all BIOS settings. | Enter | Enter password. |
| Power on Password | Entering BIOS or starting the operating system requires a password to be entered. | Enabled | POST requires the Supervisor Password to be entered. |
| | | Disabled | Entering BIOS requires the Supervisor Password to be entered, but the operating system can be started without a password. |
| User Access Level | Assigning editing permissions in BIOS. These settings are only relevant if a user password has been created. | View Only | User can only view BIOS settings (cannot make any changes). |
| | | Limited | User can view all BIOS settings, but only make some changes. Settings that the user can change: Main - System Time, Main - System Date, Advanced - Boot Configuration - Numlock |
| | | Full | User has full access to BIOS and can make any changes. |

Table 105: US15W Security - Set Supervisor Password setting options

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| Set user password | Option for entering/changing a user pass-word. A user password allows the user to edit only certain BIOS settings. | Enter | Enter password. |
| Clear User Password[1] | Option for clearing the user password. | | Clears user password. |

Table 105: US15W Security - Set Supervisor Password setting options

1) This setting is only visible if a user password was created with *Set User Password*.

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## 1.7 Power

```
                        InsydeH2O Setup Utility                    Rev. *
    Main  OEM Features  Advanced  Security  Power  Boot  Exit

                                                These items control
   ▶Advanced CPU Control                        various CPU parameters.
   ▶Platform Power Management

    Power Loss Control          <Remain Off>

    ACPI S3                     <Disabled>




    F1   Help      ↑↓ Select Item   F5/F6 Change Values     F9   Setup defaults
    Esc  Exit      ↔ Select Menu    Enter Select ▶ SubMenu  F10  Save and Exit
```
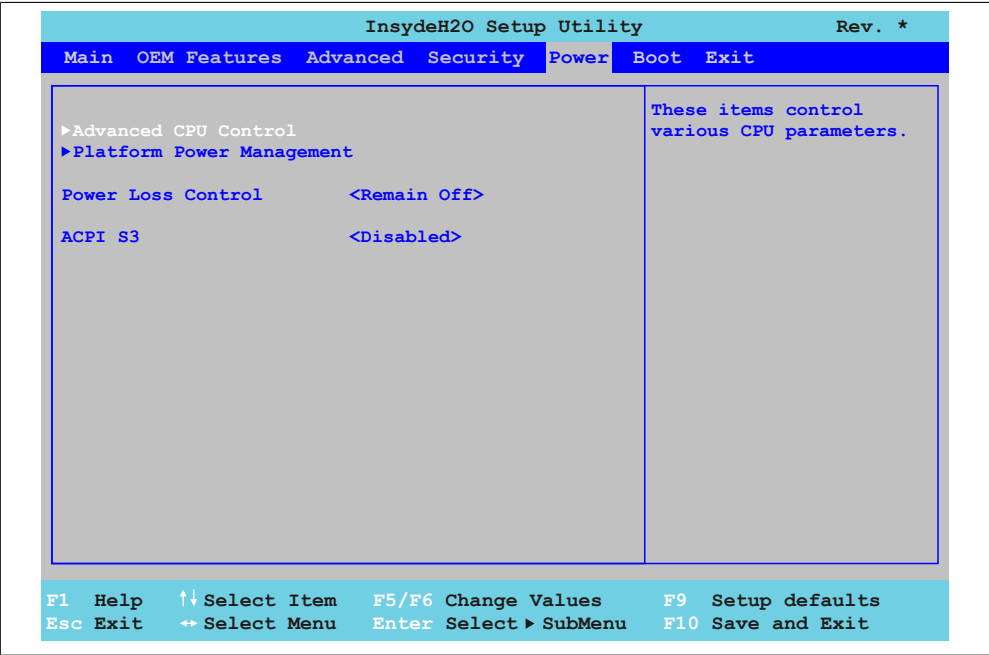
Image 86: US15W Power - Menu

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| **Advanced CPU Control** | Configuration of the Advanced CPU Control settings. | None | Opens the submenu See " Advanced CPU Control", on page 201 |
| **Platform Power Management** | Configuration of the Platform Power Management settings. | None | Opens the submenu See " Platform Power Management", on page 204 |
| Power Loss Control | This option determines what should occur after a power failure. | Remain Off | Device remains off. |
| | | Turn On | The device turns back on. |
| ACPI S3 | This option is used to determine whether or not the operating system should be written to the RAM, in which case only the RAM should be supplied with power. | Enabled | Enables this function. |
| | | Disabled | Disables the function |

Table 106: US15W Power - Menu setting options

## 1.7.1 Advanced CPU Control

```
                        InsydeH2O Setup Utility                Rev. *
                                        Power

    Advanced CPU Control                          Enable processor
                                                  performance states
    P-States(IST)             <Enabled>          (P-States).
    CMP Support               <Enabled>
    Thermal Mode              <TM1 and TM2>
    Use XD Capability         <Enabled>
    VT Support                <Enabled>
    SMRR Support              <Enabled>

    C-States                  <Disabled>
    Enhanced C-States         <Disabled>
    C-States Pop Up Mode      <Disabled>
    C-States Pop Down Mode    <Disabled>
    Hard C4E                  <Disabled>
    Enable C6                 <Disabled>

    DTS                       <Enabled>

    ▶Thermal Trip Points Setting


    F1   Help     ↑↓ Select Item   F5/F6 Change Values     F9  Setup Defaults
    Esc  Exit     ↔ Select Menu    Enter  Select ▶ SubMenu  F10 Save and Exit
```

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| P-States(IST) | Option for controlling the Intel(R) SpeedStep(TM) technology. The processor clock speed is increased or decreased according to the amount of calculations that must be made. As a result, the power consumption depends largely on the processor load. | Enabled | The processor speed is regulated by the operating system. |
| | | Disabled | Disables SpeedStep technology. |
| CMP Support | This option supports the use of multiple CPUs (CMP=core multi-processing). **Info:** In order to use ARwin, CMP Support must be switched off to avoid runtime violations. | Enabled | Enables this function. |
| | | Disabled | Disables this function. |
| Thermal Mode[1] | Option for configuring the temperature monitoring. | Disabled | Temperature monitoring disabled. |
| | | TM1 | Intel Thermal Mode 1 enabled. If the CPU reaches excessive temperatures, the processor speed will be reduced by 50%. |
| | | TM2 | Intel Thermal Mode 2 enabled. If the CPU reaches excessive temperatures, the Intel SpeedStep technology will be activated. |

Table 107: US15W Power - Advanced CPU Control setting options

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| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| | **Info:**<br><br>**To operate the processor within the specified values, we recommend not changing the default setting (TM1 and TM2).** | TM1 and TM2 | Intel Thermal Mode 1 and 2 enabled.<br>If the CPU reaches excessive temperatures, TM1 reduces the processor speed by 50% and TM2 activates the Intel SpeedStep technology. |
| Use XD Capability | This option is a safety feature that protects specific data regions of the system memory from potentially damaging code. | Enabled | Enables this function. |
| | | Disabled | Disables this function. |
| VT Support | Option for activating or deactivating a virtual machine.<br><br>**Info:**<br><br>**You must restart in order to apply changes made to this setting.** | Enabled | If the function is enabled, a virtual machine can use the additional hardware capacity. |
| | | Disabled | Disables this function. |
| SMRR Support | The SMRR (System Management Range Register) limits cacheable references of addresses in SMRAM in order to keep the code running in SMM (System Management Mode).<br>In some circumstances, an intruder who is loggeg on as administrator could configure the Intel processor to gain access to the SMM. Implementation of SMRR reduces this risk of unauthorized access. | Enabled | Enables this function. |
| | | Disabled | Disables this function. |
| C-States | This setting allows the operating system to set processor clock rates on its own, thereby saving energy. | Enabled | Enables this function.<br>The processors are run at different frequencies, thereby saving energy. |
| | | Disabled | Disables this function.<br>Both processors are run at the same frequency. |
| Enhanced C-States[2] | This setting allows the operating system to set processor clock rates on its own, thereby saving energy. | Enabled | Enables this function. |
| | | Disabled | Disables this function. |
| C-State Pop Up Mode | This setting makes it possible to detect Bus Master requests and to assign processor clock frequencies. This can be done to save energy. | Enabled | If ICH receives a Bus Master request, then the system changes from C3/C4 state to C2 state and the Bus Master is automatically activated. |
| | | Disabled | Bus Master data transfer is a Break Event and ICH will attempt to return to the C0 state. |
| C-State Pop Down Mode[3] | This setting makes it possible to detect Bus Master requests and to assign processor clock frequencies. This can be done to save energy. | Enabled | If ICH does not receive a Bus Master request, then the system will be set back to C3/C4 state. |
| | | Disabled | ICH will not attempt to automatically return to C3/C4 state. |
| Hard C4E[4] | Power Management for the Intel Atom processor - Enhanced C4 support. | Enabled | Enables this function.<br>CPU voltage is reduced and the Memory Cache is turned off. |
| | | Disabled | Disables this function. |
| Enable C6 | Power Management for the Intel Atom processor - C6 support. | Enabled | Enables this function.<br>The internal CPU voltage is reduced (can also be 0 V). |
| | | Disabled | Disables this function. |

Table 107: US15W Power - Advanced CPU Control setting options

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| DTS | Option for enabling or disabling the CPU Digital Thermal Sensor function. | Enabled | Enables this function. |
| | | Disabled | Disables this function. |
| Thermal Trip Points Setting[5] | Configuration of the Thermal Trip Points settings. | Enter | Opens the submenu See " Thermal Trip Points Settings", on page 203 |

Table 107: US15W Power - Advanced CPU Control setting options

1) These settings are only possible if *P-States(IST)* is set to *Enabled*.
2) These settings are only possible if *C-States* is set to *Enabled*.
3) These settings are only possible if *C-States Pop Up Mode* is set to *Enabled*.
4) These settings are only possible if *Enhanced C-States* is set to *Enabled*.
5) These settings are only possible if *DTS* is set to *Enabled*.

### 1.7.1.1 Thermal Trip Points Settings

```
                    InsydeH2O Setup Utility              Rev. *
                                    Power

   Thermal Trip Points Setting                  Set the CPU temperature
                                                point of Throttle On
   Throttle On Temperature  <100°C>




 F1  Help      ↑↓ Select Item    F5/F6 Change Values   F9  Setup Defaults
 Esc Exit      ↔ Select Menu     Enter Select ▶ SubMenu  F10 Save and Exit
```
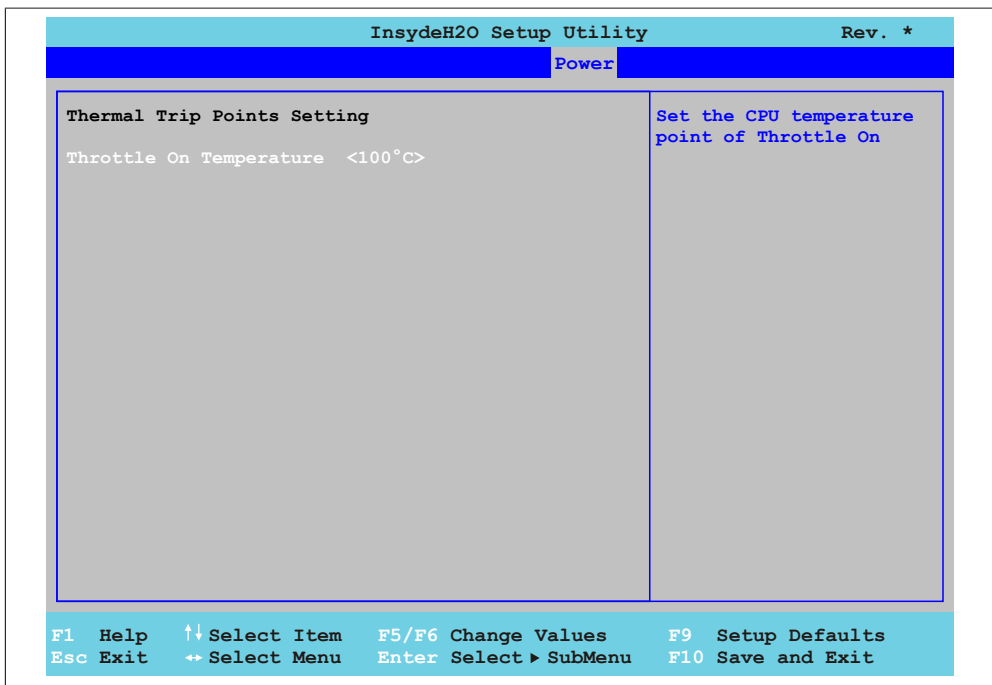
| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| Throttle On Temperature | With this function, a temperature can be set at which the operating system throttles the system. | 40°C, 45°C, 50°C, 55°C, 60°C, 65°C, 70°C, 75°C, 80°C, 85°C, 90°C, 95°C, 100°C | Temperature setting for the thermal trip point. Can be set in 5 degree increments. |

Table 108: US15W Power - Advanced CPU Control - Thermal Trip Points Settings options

## 1.7.2 Platform Power Management

```
                        InsydeH2O Setup Utility                    Rev. *
                                          Power

   Platform Power Management                      If Enabled, the CLKRUN#
                                                  Logic will stop the PCI
   PCI Clock Run            <Disabled>            Clocks
   _CST - C4 Latency Value  <Disabled>
```

```
   F1   Help      ↑↓ Select Item    F5/F6  Change Values    F9   Setup Defaults
   Esc  Exit       ↔  Select Menu    Enter  Select ▶ SubMenu F10  Save and Exit
```

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| PCI Clock Run | Option for enabling / disabling the PCI Clocks to save energy. | Enabled | Enables this function. |
| | | Disabled | Disables this function. |
| _CST - C4 Latency Value[1] | Option for enabling / disabling the latency period for C4 C-States in the ACPI _CST object.<br><br>**Info:**<br>For more detailed information about this setting, see the ACPI specification (www.acpi.info). | Enabled | Enables this function. |
| | | Disabled | Disables this function. |
| C4 on C3 - Deeper Sleep[2] | Fine-tunes the power saving function on an ACPI operating system. | Enabled | Processor is needed in C4 if the operating system is initiated in a C3 state. |
| | | Disabled | Disables this function. |

Table 109: US15W Power - Platform Power Management setting options

1) These settings are only possible if *C-States* is set to *Enabled* in the menu item *Advanced CPU Control*.
2) These settings are only possible if *_CST - C4 Latency Value* is set to *Enabled*.

## 1.8 Boot

```
                        InsydeH2O Setup Utility              Rev. *

    Main   OEM Features   Advanced   Security   Power   Boot   Exit

                                                Allows InsydeH2O to skip
    Quick Boot                <Enabled>         certain tests while
    Quiet Boot                <Enabled>         booting. This will
    Delay for Logo & Summary  <Default>         decrease the time needed
    USB Boot                  <Enabled>         to boot the system.
    SD Card Boot              <Disabled>
    PXE Boot to LAN           <Enabled>
    ACPI Selection            <Acpi3.0>

    ▶Legacy




    F1   Help      ↑↓Select Item   F5/F6 Change Values    F9   Setup Defaults
    Esc  Exit      ↔ Select Menu   Enter Select ▶ SubMenu  F10  Save and Exit
```

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| Quick Boot | This function reduces the boot time by skipping some POST tests. | Enabled | Enables this function. |
| | | Disabled | Disables this function. |
| Quiet Boot | Determines if POST message or OEM logo (default = black background) is displayed. | Enabled | OEM logo display instead of POST message. |
| | | Disabled | POST message display. |
| Delay for Logo & Summary | Option for setting the display duration of the logo and summary screen. | Default | The display duration is minimized for a quick boot procedure. |
| | | 1 Sec., 1.5 Sec., 2 Sec., 2.5 Sec., 3 Sec., 4 Sec., 5 Sec., 10 Sec., 20 Sec. | A display duration of x seconds can be defined. |
| USB Boot | This function can be used to enable / disable the option of booting from USB devices. | Enabled | Enables this function. |
| | | Disabled | Disables this function. |
| SD Card Boot | This function can be used to enable / disable the option of booting from SD cards. <br><br> # Warning! <br><br> **The SD Memory Card Slot has not yet been released because it is still in development. Inserting an SD memory card can cause the device to malfunction! Therefore, the use of SD Memory cards is not permitted.** | Enabled | Enables this function. |
| | | Disabled | Disables this function. |

Table 110: US15W Boot - Menu setting options

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| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| PXE Boot to LAN | This function can be used to enable / disable the option of booting from LAN (ETH). | Enabled | Enables this function. |
| | | Disabled | Disables this function. |
| ACPI Selection | Option for setting the power option specifications to be supported. The ACPI functions must be supported by the drivers and operating systems being used. | Acpi 1.0B | ACPI functions in accordance with v1.0B |
| | | Acpi 3.0 | ACPI functions in accordance with v3.0 |
| | | Acpi 4.0 | ACPI functions in accordance with v4.0 |
| **Legacy** | Configuration and display of the Boot sequence. | Enter | Opens the submenu See " Legacy", on page 206 |

Table 110: US15W Boot - Menu setting options

## 1.8.1 Legacy

```
                    InsydeH2O Setup Utility              Rev. *

                                                  Boot

    Boot Device Priority                    Select Normal Boot
                                            Option Priority or
    Normal Boot Mode          <Normal>      Advanced Boot Option
    ▶Boot Type Order                        Priority.

    ▶Hard Disk Drive                        *Normal Boot Option:
    ▶USB                                    Change boot order via
    ▶Others                                 Boot Type Order submenu.

                                            *Advanced Boot Option:
                                            Choose installed boot
                                            devices below and press +
                                            or - for changing boot
                                            order.


    F1  Help      ↑↓ Select Item   F5/F6  Change Values   F9  Setup Defaults
    Esc Exit      ↔ Select Menu    Enter  Select ▶ SubMenu  F10 Save and Exit
```

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| Normal Boot Mode | Boot mode configuration. | Normal | Displays the submenus for changing the boot sequence settings. |
| | | Advanced | Displays only the product names of the bootable connected devices. The boot sequence can be defined right here. |
| **Boot Type Order**[1] | Configuration of Boot Type Order settings. | Enter | Opens the submenu See " Boot Type Order", on page 207 |
| **Hard Disk Drive**[1)2)] | Displays the inserted CompactFlash cards. | Enter | Opens the submenu See " Hard Disk Drive", on page 208 |

Table 111: US15W Boot - Legacy setting options

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| **USB**[1)3)] | Displays connected USB flash drives. | Enter | Opens the submenu<br>See " USB", on page 209 |
| **Others**[1)4)] | Displays the CPU Boards / Baseboards for PXE Boot with the onboard Ethernet interfaces. | Enter | Opens the submenu<br>See " Others", on page 210 |

Table 111: US15W Boot - Legacy setting options

1) These submenus are only shown if *Normal Boot Mode* is set to *Normal*.
2) Only shown if a CompactFlash card is connected.
3) Only shown if a USB flash drive is connected.
4) Only shown if *PXE Boot to LAN* is set to *Enabled* in the boot menu.

## 1.8.1.1  Boot Type Order

```
         InsydeH2O Setup Utility                    Rev. *
                                    Boot

  Boot Type Order

  Others
  Hard Disk Drive
  CD/DVD-ROM Drive
  USB
  Floppy Drive




  F1   Help    ↑↓ Select Item   F5/F6 Change Values   F9   Setup Defaults
  Esc  Exit    ↔  Select Menu    Enter  Select ▶ SubMenu  F10  Save and Exit
```
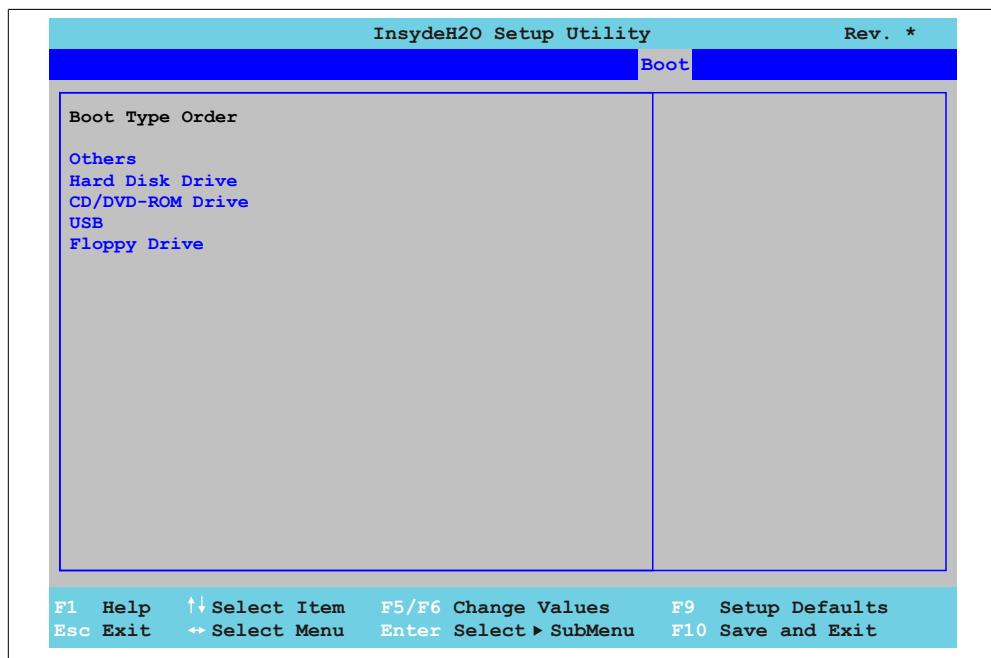
| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| Others | The boot drives can be set using this option. | Others | Select the desired sequence. |
| Hard Disk Drive | | Hard Disk Drive | |
| CD/DVD ROM drive | | CD/DVD ROM drive | |
| USB | | USB | |
| Floppy Drive | | Floppy Drive | |

Table 112: US15W Boot - Legacy - Boot Type Order setting options

## 1.8.1.2 Hard Disk Drive

```
                            InsydeH2O Setup Utility              Rev. *
                                           Boot

      Hard Disk Drive

      BR-SSD-C004G-01-0101












      F1   Help      ↑↓ Select Item    F5/F6 Change Values    F9   Setup Defaults
      Esc  Exit      ↔ Select Menu     Enter Select ▶ SubMenu  F10  Save and Exit
```

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| | Displays the inserted CompactFlash cards. | None | - |

Table 113: US15W Boot - Legacy - Hard Disk Drive setting options

### 1.8.1.3  USB

```
                         InsydeH2O Setup Utility                    Rev. *

                                               Boot

     USB

     SwissbitunitedCONTRAST
```

```
     F1   Help      ↑↓ Select Item    F5/F6 Change Values    F9   Setup Defaults
     Esc  Exit      ↔ Select Menu     Enter Select ▶ SubMenu  F10  Save and Exit
```

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| | Displays connected USB flash drives. | None | - |

Table 114: US15W Boot - Legacy - USB setting options

### 1.8.1.4  Others

```
                        InsydeH2O Setup Utility              Rev. *
                                            Boot

  Others

  IBA GE Slot 0100 v1353




  F1   Help      ↑↓ Select Item   F5/F6 Change Values   F9  Setup Defaults
  Esc  Exit      ↔ Select Menu    Enter Select ▶ SubMenu F10 Save and Exit
```

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| - | Displays the CPU Boards / Baseboards for PXE Boot with the onboard Ethernet interfaces. | None | - |

Table 115: US15W Boot - Legacy - Others setting options

## 1.9 Exit

```
                    InsydeH2O Setup Utility              Rev. *
    Main  OEM Features  Advanced  Security  Power  Boot  Exit

                                              Exit system setup and
                                              save your changes.
    Exit Saving Changes
    Save Change Without Exit
    Exit Discarding Changes
    Load Optimal Defaults
    Load Custom Defaults
    Save Custom Defaults
    Discarding Changes




    F1   Help     ↑↓ Select Item   F5/F6  Change Values    F9   Setup Defaults
    Esc  Exit     ↔ Select Menu    Enter  Select ▶ SubMenu  F10  Save and Exit
```

| BIOS setting | Meaning | Setting options | Effect |
|---|---|---|---|
| Exit saving changes | BIOS setup is closed with this item. Changes made are saved in CMOS after confirmation, and the system is rebooted. | OK / Cancel | |
| Save Change Without Exit | After this is confirmed, any changes that have been made will be saved to the CMOS. | OK / Cancel | |
| Exit discarding changes | With this item you can close BIOS set-up without saving the changes made. The system is then rebooted. | OK / Cancel | |
| Load Optimal Defaults | This item loads the CMOS default values, which are defined by the Mode / Node switch settings. These settings are loaded for all BIOS configurations. | OK / Cancel | |
| Load Custom Defaults | This item loads the CMOS values, which are defined by the Mode / Node switch settings. These settings are loaded for all BIOS configurations. | OK / Cancel | |
| Save Custom Defaults | This saves defined CMOS vales. These settings are saved for all BIOS configurations. | OK / Cancel | |
| Discarding Changes | In the event that settings were made which the user can no longer remember, changes can be reset as long as they haven't been saved. | OK / Cancel | |

Table 116: US15W Exit - Menu setting options

## 1.10 BIOS default settings

If the function "load setup defaults" is chosen in the main BIOS setup menu, or if exit is selected (or <F9> is pressed) in the individual setup screens, the following BIOS settings are the optimized values that will be used.

### 1.10.1 Main

| Setting / View | Profile 0 | My setting |
|---|---|---|
| InsydeH2O Version | - | |
| Processor type | - | |
| System Bus Speed | - | |
| System Memory Speed | - | |
| Cache RAM | - | |
| Total Memory | - | |
| SODIMM 0 | - | |
| System Time | - | |
| System Date | - | |

Table 117: US15W - Main profile setting overview

### 1.10.2 OEM Features

| Setting / View | Profile 0 | My setting |
|---|---|---|
| BIOS | - | |
| Boot Source | - | |
| MTCX | - | |

Table 118: US15W - OEM Features profile setting overview

### 1.10.2.1 CPU Board Features

| Setting / View | Profile 0 | My setting |
|---|---|---|
| Device ID | - | |
| Compatibility ID | - | |
| Vendor ID | - | |
| Hardware revision | - | |
| Serial number | - | |
| Product name | - | |
| Hardware Number | - | |
| Parent Device ID | - | |
| Parent Compatib. ID | - | |
| User serial ID | - | |
| LAN1 MAC ADDRESS | - | |
| **LPC Devices** | | |
| COMA | - | |
| Base I/O Address | 3F8 | |
| Interrupt | IRQ4 | |
| **Statistical Values** | | |
| Sensor 1 | - | |
| Sensor 2 | - | |

Table 119: US15W - Baseboard Features profile setting overview

| Setting / View | Profile 0 | My setting |
|---|---|---|
| Sensor 3 | - | |
| Total Hours | - | |
| Power On Cyles | - | |
| **Temperature Values** | | |
| Refresh Values | - | |
| Sensor 1 | - | |
| Sensor 2 | - | |
| Sensor 3 | - | |
| **Temperature Values** | | |
| Wcpu | - | |
| Vin | - | |
| Battery voltage | - | |
| Battery state | - | |

Table 119: US15W - Baseboard Features profile setting overview

## 1.10.2.2 System Unit Features

| Setting / View | Profile 0 | My setting |
|---|---|---|
| Device ID | - | |
| Compatibility ID | - | |
| Vendor ID | - | |
| Hardware revision | - | |
| Serial number | - | |
| Product name | - | |
| Hardware Number | - | |
| Parent Device ID | - | |
| Parent Compatib. ID | - | |
| User serial ID | - | |
| Display (0) Brightness | Auto | |
| **LPC Devices** | | |
| COMB | - | |
| Base I/O Address | 2F8 | |
| Interrupt | IRQ3 | |
| **Statistical Values** | | |
| Sensor 1 | - | |
| Total Hours | - | |
| Power on cycles | - | |
| **Temperature Values** | | |
| Refresh Values | - | |
| Sensor 1 | - | |

Table 120: US15W - Display Features profile setting overview

### 1.10.2.3 I/O Board Features

| Setting / View | Profile 0 | My setting |
|---|---|---|
| Device ID | - | |
| Compatibility ID | - | |
| Vendor ID | - | |
| Hardware revision | - | |
| Serial number | - | |
| Product name | - | |
| Hardware Number | - | |
| Parent Device ID | - | |
| Parent Compatib. ID | - | |
| User serial ID | - | |
| **Statistical Values** | | |
| Total Hours | - | |
| Power on cycles | - | |

Table 121: US15W - I/O Board Features profile setting overview

### 1.10.2.4 IF Board features

| Setting / View | Profile 0 | My setting |
|---|---|---|
| Device ID | - | |
| Compatibility ID | - | |
| Vendor ID | - | |
| Hardware revision | - | |
| Serial number | - | |
| Product name | - | |
| Hardware Number | - | |
| Parent Device ID | - | |
| Parent Compatib. ID | - | |
| User serial ID | - | |
| LAN2 MAC ADDRESS | - | |
| **Statistical Values** | | |
| Total Hours | - | |
| Power on cycles | - | |

Table 122: US15W - IF Module Features profile setting overview

### 1.10.2.5 Memory Module Features

| Setting / View | Profile 0 | My setting |
|---|---|---|
| Device ID | - | |
| Compatibility ID | - | |
| Vendor ID | - | |
| Hardware revision | - | |
| Serial number | - | |
| Product name | - | |

Table 123: US15W - RAM Features profile setting overview

| Setting / View | Profile 0 | My setting |
|---|---|---|
| Hardware Number | - | |
| Parent Device ID | - | |
| Parent Compatib. ID | - | |
| User serial ID | - | |

Table 123: US15W - RAM Features profile setting overview

### 1.10.3 Advanced

#### 1.10.3.1 RAM Configuration

| Setting / View | Profile 0 | My setting |
|---|---|---|
| Refresh rate | Auto | |

Table 124: US15W - RAM Configuration profile setting overview

#### 1.10.3.2 Boot Configuration

| Setting / View | Profile 0 | My setting |
|---|---|---|
| NumLock | On | |

Table 125: US15W - Boot Configuration profile setting overview

#### 1.10.3.3 Peripheral Configuration

| Setting / View | Profile 0 | My setting |
|---|---|---|
| High Definition Audio[1] | Auto | |

Table 126: US15W - Peripheral Configuration profile setting overview

1) This menu option is only present if there is an Audio connection.

#### 1.10.3.4 IDE Configuration

| Setting / View | Profile 0 | My setting |
|---|---|---|
| **Channel 1 Master** | | |
| Transfer mode | - | |
| Security Mode | - | |
| **Channel 1 Slave** | | |
| Transfer mode | - | |
| Security Mode | - | |

Table 127: US15W - IDE Configuration profile setting overview

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### 1.10.3.5 Video Configuration

| Setting / View | Profile 0 | My setting |
|---|---|---|
| IGD - Pre-allocated memory | UMA = 8MB | |
| IGD - Boot Type | VBIOS Default | |
| IGD - LCD Panel Type | 640x480 (5.7) LVDS | |

Table 128: US15W - Video Configuration profile setting overview

### 1.10.3.6 USB configuration

| Setting / View | Profile 0 | My setting |
|---|---|---|
| USB Legacy | Enabled | |
| EHCI | Enabled | |
| UHCI 1 | Enabled | |
| UHCI 2 | If an I/O board is not connected: Disabled<br>If an I/O board is connected: Enabled | |
| UHCI 3 | Enabled | |
| USB client | Disabled | |

Table 129: US15W - USB Configuration profile setting overview

### 1.10.3.7 SDIO Configuration

| Setting / View | Profile 0 | My setting |
|---|---|---|
| SDIO Port 1 | Enabled | |
| SDIO Port 2 | Enabled | |

Table 130: US15W - SDIO Configuration profile setting overview

### 1.10.3.8 ACPI Table/Features Control

| Setting / View | Profile 0 | My setting |
|---|---|---|
| FACP - C2 Latency Value | Disabled | |
| FACP - C3 Latency Value | Disabled | |
| HPET - HPET support | Enabled | |
| APIC - I/O APIC mode | Enabled | |

Table 131: US15W - ACPI Table/Features Control profile setting overview

### 1.10.3.9 PCI Express Root Port 1

| Setting / View | Profile 0 | My setting |
|---|---|---|
| PCI Express Root Port 1 | Enabled | |
| Interrupt pin 0 | Auto | |
| VC1 Enable | Disabled | |
| VC1/TC Mapping | Disabled | |
| ASPM | Disabled | |
| Automatic ASPM | Disabled | |
| ASPM L0s | Disabled | |

Table 132: US15W - PCI Express Root Port 1 profile setting overview

| Setting / View | Profile 0 | My setting |
|---|---|---|
| ASPM L1s | Disabled | |
| URR | Disabled | |
| FER | Disabled | |
| NFER | Disabled | |
| CER | Disabled | |
| CT0 | Disabled | |
| SEFE | Disabled | |
| SENFE | Disabled | |
| SECE | Disabled | |
| PME Interrupt | Disabled | |
| PME SCI | Disabled | |
| Hot Plug SCI | Disabled | |

Table 132: US15W - PCI Express Root Port 1 profile setting overview

### 1.10.3.10 PCI Express Root Port 2

| Setting / View | Profile 0 | My setting |
|---|---|---|
| PCI Express Root Port 2 | Enabled | |
| Interrupt pin 1 | If a fieldbus card is not connected: Auto<br>If a fieldbus card is connected: Disabled | |
| VC1 Enable | Disabled | |
| VC1/TC Mapping | Disabled | |
| ASPM | Disabled | |
| Automatic ASPM | Disabled | |
| ASPM L0s | Disabled | |
| ASPM L1s | Disabled | |
| URR | Disabled | |
| FER | Disabled | |
| NFER | Disabled | |
| CER | Disabled | |
| CT0 | Disabled | |
| SEFE | Disabled | |
| SENFE | Disabled | |
| SECE | Disabled | |
| PME Interrupt | Disabled | |
| PME SCI | Disabled | |
| Hot Plug SCI | Disabled | |

Table 133: US15W - PCI Express Root Port 2 profile setting overview

### 1.10.4 Power

| Setting / View | Profile 0 | My setting |
|---|---|---|
| Power Loss Control | is read from the EEPROM data | |
| ACPI S3 | Disabled | |

Table 134: US15W - Power profile setting overview

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## 1.10.4.1 Advanced CPU Control

| Setting / View | Profile 0 | My setting |
|---|---|---|
| P-States(IST) | Enabled | |
| CMP Support | Enabled | |
| Thermal Mode | TM1 and TM2 | |
| Use XD Capability | Enabled | |
| VT Support | Enabled | |
| SMRR Support | Enabled | |
| C-States | Disabled | |
| Enhanced C-States | Disabled | |
| C-States Pop Up Mode | Disabled | |
| C-States Pop Down Mode | Disabled | |
| Hard C4E | Disabled | |
| Enable C6 | Disabled | |
| DTS | Enabled | |
| **Thermal Trip Point Settings** | | |
| Throttle On Temperature | 100°C | |

Table 135: US15W - Advanced CPU Control profile setting overview

## 1.10.4.2 Platform Power Management

| Setting / View | Profile 0 | My setting |
|---|---|---|
| PCI Clock Run | Disabled | |
| _CST - C4 Latency Value | Disabled | |
| C4 on C3 - Deeper Sleep | Disabled | |

Table 136: US15W - Platform Power Management profile setting overview

## 1.10.5 Boot

| Setting / View | Profile 0 | My setting |
|---|---|---|
| Quick Boot | Enabled | |
| Quiet Boot | Enabled | |
| Delay for Logo & Summary | Default | |
| USB Boot | Enabled | |
| SD Card Boot | Disabled | |
| PXE Boot to LAN | Disabled | |
| ACPI Selection | Acpi3.0 | |

Table 137: US15W - Boot profile setting overview

## 1.11 Distribution of resources

### 1.11.1 RAM address assignment

| RAM address | Address in Hex | Resource |
|---|---|---|
| (TOM - FB[1]) – TOM[2] | N.A. | ACPI reclaim, MPS and NVS area[3] |
| (TOM - FB - TSEG[4]) – (TOM - FB) | N.A. | VGA frame buffer[5] |
| 1024 kB – (TOM - 8 MB - 192 kB) | 100000h - N.A. | Extended memory |
| 896 kB – 1024 kB | 0E0000h - 0FFFFFh | Runtime BIOS |
| 832 kB – 896 kB | 0D0000h - 0DFFFFh | Upper memory |
| 640 kB – 832 kB | 0A0000h - 0CFFFFh | Video memory and BIOS |
| 639 kB – 640 kB | 09FC00h - 09FFFFh | Extended BIOS data |
| 0 – 639 kB | 000000h - 09FC00h | Conventional memory |

Table 138: RAM address assignment

1) FB - VGA frame buffer
2) TOM - Top of memory: max. installed DRAM
3) Only if ACPI Aware OS is set to "YES" in the setup.
4) TSEG - Intended internally for SMI handling in system BIOS.
5) The VGA frame buffer can be reduced to 1 MB in the setup.

### 1.11.2 I/O address assignment

| I/O address | Resource |
|---|---|
| 0000h - 00FFh | Motherboard resources |
| 01F0h - 01F7h | Primary IDE channel |
| 03B0h - 03DFh | Video system |
| 03F6h - 03F6h | Primary IDE channel command port |
| 03F7h - 03F7h | Primary IDE channel status port |
| 03F8h - 03FFh | COM1 |
| 0480h - 04BFh | Motherboard resources |
| 04D0h - 04D1h | Motherboard resources |
| 0800h - 087Fh | Motherboard resources |
| 0CF8h - 0CFBh | PCI config address register |
| 0CFCh - 0CFFh | PCI config data register |
| 0D00h - FFFFh | PCI / PCI Express bus[1] |
| 4100h - 417Fh | MTCX |
| FF00h - FF07h | IDE bus master register |

Table 139: I/O address assignment

1) The BIOS assigns the PCI and PCI Express Bus I/O resources from FFF0h downward. Devices that are not compatible with PnP/PCI/PCI Express cannot use the I/O resources in this area.

### 1.11.3 Interrupt assignmentone in PIC mode

| IRQ | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | NMI | NONE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System timer | ● | | | | | | | | | | | | | | | | | |
| Keyboard | | ● | | | | | | | | | | | | | | | | |
| IRQ cascade | | | ● | | | | | | | | | | | | | | | |
| COM1 (Serial port A) | | | | ○ | ● | ○ | ○ | | | | ○ | ○ | ○ | | | | | |
| COM2 (Serial port B) | | | | ● | ○ | ○ | ○ | | | | ○ | ○ | ○ | | | | | |
| ACPI[1] | | | | | | | | | | ● | | | | | | | | |

Table 140: IRQ interrupt assignments PIC Mode

| IRQ | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | NMI | NONE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Real-time clock | | | | | | | | | ● | | | | | | | | | |
| Coprocessor (FPU) | | | | | | | | | | | | | | ● | | | | |
| Primary IDE channel | | | | | | | | | | | | | | | ● | | | |
| Secondary IDE channel | | | | | | | | | | | | | | | | ● | | |

Table 140: IRQ interrupt assignments PIC Mode

1) **A**dvanced **C**onfiguration and **P**ower **I**nterface.

● ... Standard setting
○ ... Optional setting

### 1.11.4 Interrupt assignments in APIC mode

A total of 23 IRQs are available in the APIC mode (**A**dvanced **P**rogrammable **I**nterrupt **C**ontroller). The activation of this option is only effective if it takes place before the operating system is activated.

| IRQ | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | NMI | NONE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System timer | ● | | | | | | | | | | | | | | | | | | | | | | | | | |
| Keyboard | | ● | | | | | | | | | | | | | | | | | | | | | | | | |
| IRQ cascade | | | ● | | | | | | | | | | | | | | | | | | | | | | | |
| COM1 (Serial port A) | | | | ○ | ● | ○ | ○ | | | | ○ | ○ | ○ | | | | | | | | | | | | | |
| COM2 (Serial port B) | | | | ● | ○ | ○ | ○ | | | | ○ | ○ | ○ | | | | | | | | | | | | | |
| ACPI[1] | | | | | | | | | | ● | | | | | | | | | | | | | | | | |
| Real-time clock | | | | | | | | | ● | | | | | | | | | | | | | | | | | |
| Coprocessor (FPU) | | | | | | | | | | | | | | ● | | | | | | | | | | | | |
| Primary IDE channel | | | | | | | | | | | | | | | ● | | | | | | | | | | | |
| Secondary IDE channel | | | | | | | | | | | | | | | | ● | | | | | | | | | | |
| PIRQ A[2] | | | | | | | | | | | | | | | | | ● | | | | | | | | | |
| PIRQ B[3] | | | | | | | | | | | | | | | | | | ● | | | | | | | | |
| PIRQ C[4] | | | | | | | | | | | | | | | | | | | ● | | | | | | | |
| PIRQ D[5] | | | | | | | | | | | | | | | | | | | | ● | | | | | | |
| PIRQ E[6] | | | | | | | | | | | | | | | | | | | | | ● | | | | | |
| PIRQ F[7] | | | | | | | | | | | | | | | | | | | | | | ● | | | | |
| PIRQ G[8] | | | | | | | | | | | | | | | | | | | | | | | ● | | | |
| PIRQ H[9] | | | | | | | | | | | | | | | | | | | | | | | | ● | | |

Table 141: IRQ interrupt assignments in APIC mode

1) **A**dvanced **C**onfiguration and **P**ower **I**nterface.
2) PIRQ A: for IF board; GMA500 graphics controller, LPC, root port 1, Ethernet controller, USB client
3) PIRQ B: for IF board; root port 2
4) PIRQ C: for IF board
5) PIRQ D: for IF board; HDA audio
6) PIRQ E: UHCI host controller 0, SDIO 0 controller
7) PIRQ F: UHCI host controller 1, SDIO 1 controller
8) PIRQ G: UHCI host controller 2, SDIO 2 controller
9) PIRQ H: EHCI host controller

● ... Standard setting
○ ... Optional setting
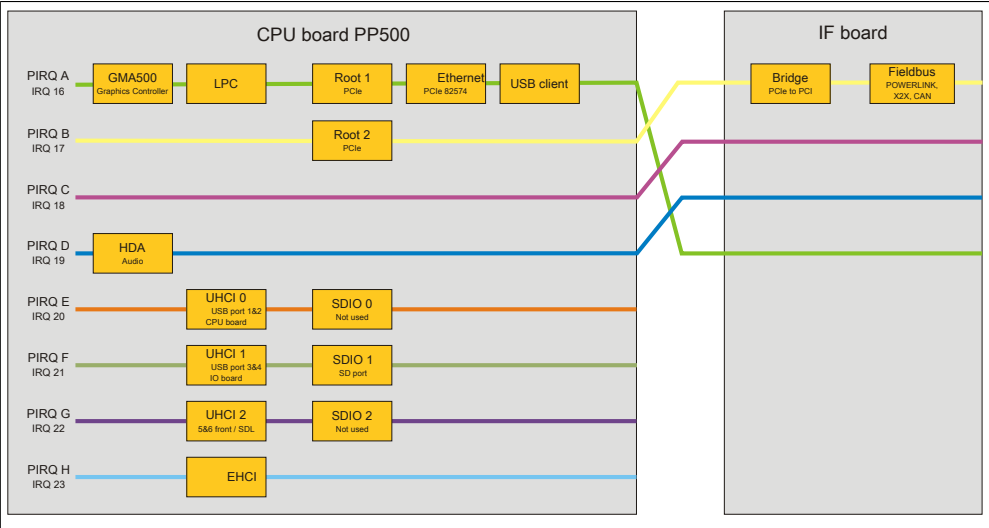
Image 87: Interrupt routing with activated APIC - BIOS version N0.15 and higher

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# 2  Upgrade information

## Warning!

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

## 2.1  BIOS upgrade

An upgrade might be necessary for the following reason:

- To update implemented functions or to add newly implemented functions or components to the BIOS setup (information about changes can be found in the Readme files of the BIOS upgrade).

### 2.1.1 What information do I need?

## Info:

**Individually saved BIOS settings are deleted when upgrading the BIOS.**

Before you begin the upgrade, it helps to determine the various software versions.

### 2.1.1.1 Which BIOS version and firmware are already installed on the PP500?

This information can be found on the following BIOS setup page:

- After switching on the PP500, you can get to the BIOS Setup by pressing "F2".
- The current BIOS and MTCX version can be viewed in the BIOS main menu under "OEM Features".

```
                    InsydeH2O Setup Utility              Rev. *
   Main  OEM Features  Advanced  Security  Power  Boot  Exit

   Versions                                      Show features of
      BIOS:              N0.16    ─ System BIOS   baseboard module.
      Boot Source:       Normal

      MTCX:              V0.23    ─ Firmware MTCX

   ▶CPU Board Features
   ▶System Unit Features
   ▶I/O Module Features
   ▶IF Module Features
   ▶Memory Module Features



   F1  Help     ↑↓ Select Item   F5/F6 Change Values    F9  Setup defaults
   Esc Exit     ↔ Select Menu    Enter Select ▶ SubMenu F10 Save and Exit
```

Image 88: BIOS and MTCX software versions

### 2.1.2 Procedure

1. Download the zip file from the B&R homepage ([www.br-automation.com](www.br-automation.com)).

2. Go to Control Panel and **open the Control Center** .

3. Open the **Versions tab** .

4. Go to **CPU board,** BIOS **and** click on **update** . The dialog 'Open' is opened.

5. Go to **file name** and enter the name of the BIOS file or select a file.

6. Click **on** open. The dialog 'Open' is opened.

The transfer can be canceled by clicking on **Cancel** in the Download dialog box. Cancel is disabled when the flash memory is being written to.

Deleting the data in flash memory can take several seconds depending on the memory block being used. The progress indicator is not updated during this time.

## Info:

**The system must be restarted for the BIOS to take effect and for the updated version to be displayed. The user is prompted to restart the system when closing the Control Center.**

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## Info:

**For more information about saving and updating the BIOS, please refer to the help files for the Control Center.**

## 2.2  Firmware upgrade

Current "PP500 MTCX Upgrade" software can be downloaded directly from the service portal on the B&R homepage ([www.br-automation.com](www.br-automation.com)).

### 2.2.1 Procedure

1. Download the zip file from the B&R homepage ([www.br-automation.com](www.br-automation.com)).
2. Go to Control Panel **and open** Control Panel.
3. Open the **Versions** tab.
4. Go to **CPU board,** MTCX **and** click on **Update** . The dialog 'Open' is opened.
5. Go to **File name** and enter the name of the firmware file or select a file.
6. Click **on** open. The dialog 'Open' is opened.

The transfer can be canceled by clicking on **Cancel** in the Download dialog box. **Cancel** is disabled when the flash memory is being written to.

## Warning!

**Do not press any panel keys while the firmware is being transferred! This can disrupt the procedure.**

Deleting the data in flash memory can take several seconds depending on the memory block being used. The progress indicator is not updated during this time.

## Info:

**Power to the PC must be shut off and turned back on for the new firmware to become effective and for the updated version to be displayed. The user is prompted to do this when closing the Control Center.**

## Info:

**For more information about saving and updating the firmware, please refer to the help files for the Control Center.**

## 2.3  Upgrade problems

Potential upgrade problems are listed in the Liesmich.txt or Readme.txt files on the upgrade disks.

# 3 Windows XP Professional

## 3.1 Order data

| Model number | Short description | Figure |
|---|---|---|
| | **Windows XP Professional** | |
| 5SWWXP.0600-ENG | Microsoft OEM Windows XP Professional Service Pack 3, CD, English. Only available with a B&R device. | |
| 5SWWXP.0600-GER | Microsoft OEM Windows XP Professional Service Pack 3, CD, German. Only available with a device. | |
| 5SWWXP.0600-MUL | Microsoft OEM Windows XP Professional Service Pack 3, CD, multilanguage. Only available with a B&R device. | |
| | **Mandatory accessory** | |
| | **CompactFlash** | |
| 5CFCRD.016G-04 | CompactFlash 16 GB B&R | |
| 5CFCRD.4096-03 | CompactFlash 4 GB Western Digital | |
| 5CFCRD.4096-04 | CompactFlash 4 GB B&R | |
| 5CFCRD.8192-03 | CompactFlash 8 GB Western Digital | |
| 5CFCRD.8192-04 | CompactFlash 8 GB B&R | |

Table 142: 5SWWXP.0600-ENG, 5SWWXP.0600-GER, 5SWWXP.0600-MUL - Order data

## 3.2 Overview

| Model number | Type | Target system | CPU board | Prein-stalled | Memory required on CF/HDD | Minimum amount of RAM |
|---|---|---|---|---|---|---|
| 5SWWXP.0600-ENG | WinXP Pro SP3 CD | APC620 APC810 APC820 PPC700 PPC725 PPC800 PP500 | | Optional | ≤ 2.1 GB | 128 MB |
| 5SWWXP.0600-GER | WinXP Pro SP3 CD | APC620 APC810 APC820 PPC700 PPC725 PPC800 PP500 | | Optional | ≤ 2.1 GB | 128 MB |
| 5SWWXP.0600-MUL | WinXP Pro SP3 CD | APC620 APC810 APC820 PPC700 PPC725 PPC800 PP500 | | Optional | ≤ 2.1 GB | 128 MB |

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## 3.3 Installation

Upon request, B&R can pre-install the required Windows XP Professional version on the desired mass memory (e.g. CompactFlash card, etc.). All of the drivers required for operation (graphics, network, etc.) are also installed when doing so.

### 3.4 Drivers

The latest drivers for all released operating systems can be found in the download area (Service - Material Related Downloads - BIOS / Drivers / Updates) on the B&R homepage www.br-automation.com .

## Info:

**Required drivers can only be downloaded from the B&R homepage, not from manufacturers' pages.**

# 4 Windows 7

## 4.1 General Information

Windows® 7 offers a wealth of innovative features and performance improvements. Faster switching to power saving mode, quicker restores, less memory usage, and high-speed detection of USB devices are just a few of the advantages provided by Windows® 7. Both German and English are available in Windows® 7 Professional, while Windows® 7 Ultimate supports up to 35 different languages. Product activation is not necessary on B&R PCs, which is a huge advantage for simple logistical procedures relating to machine automation.

All of the Windows® operating systems offered by B&R are from the Microsoft Embedded division. This guarantees much longer availability, especially when compared to products offered on the consumer market.

## 4.2 Order data

| Model number | Short description | Figure |
|---|---|---|
| | **Windows 7** | |
| 5SWWI7.0100-ENG | Microsoft OEM Windows 7 Professional 32-bit, DVD, English. Only available with a new device. | |
| 5SWWI7.0100-GER | Microsoft OEM Windows 7 Professional 32-bit, DVD, German. Only available with a new device. | |
| 5SWWI7.0300-MUL | Microsoft OEM Windows 7 Ultimate 32-bit, DVD, multi-laguange. Only available with a new device. | |

Table 143: 5SWWI7.0100-ENG, 5SWWI7.0100-GER, 5SWWI7.0300-MUL - Order data

## 4.3 Overview

| Model number | Type | Edition | Target system | Chipset | Prein-stalled | Minimum size of CF/HDD | Minimum size of RAM |
|---|---|---|---|---|---|---|---|
| 5SWWI7.0100-ENG | Win7 Pro 32bit DVD | Professional | PPC800 APC810 PP500 | 945GME GM45 US15W | Optional | 16 GB | 1 GB |
| 5SWWI7.0100-GER | Win7 Pro 32bit DVD | Professional | PPC800 APC810 PP500 | 945GME GM45 US15W | Optional | 16 GB | 1 GB |
| 5SWWI7.0300-MUL | Win7 Ult 32bit DVD | Ultimate | PPC800 APC810 PP500 | 945GME GM45 US15W | Optional | 16 GB | 1 GB |

## 4.4 Installation

Upon request, B&R can pre-install the required Windows 7 version on the desired mass memory (e.g. CompactFlash card, etc.). All of the drivers required for operation (graphics, network, etc.) are also installed when doing so.

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## 4.5 Drivers

The latest drivers for all released operating systems can be found in the download area (Service - Material Related Downloads - BIOS / Drivers / Updates) on the B&R homepage [www.br-automation.com](http://www.br-automation.com) .

## Info:

**Required drivers can only be downloaded from the B&R homepage, not from manu-facturers' pages.**

## 4.6 Special considerations, limitations

- Windows 7 does not contain a Beep.sys file, which means that audible signal is no longer played (i.e. when touching a key or button).

# 5 Windows Embedded Standard 2009

## 5.1 General information

Windows® Embedded Standard 2009 is the modular version of Windows® XP Professional. It's used if XP applications require a smaller operating system size to run. Together with Compact-Flash memory, Windows® Embedded Standard 2009 makes it possible to use the Microsoft desktop operating system in rough environmental conditions. In addition to the familiar features included in Windows® XP Professional, Windows® Embedded Standard 2009 has been improved with regard to dependability by adding a write filter for individual memory partitions. By protecting individual partitions such as the boot partition, the PC system can be started without any problems, even after an unexpected power failure. B&R offers complete images for industrial PCs, Power Panel and Mobile Panel devices to make the transition to Windows® Embedded Standard 2009 as easy as possible. In addition to Windows® Embedded Standard 2009, the standard Windows® XP Professional operating system is also available in English, German and multilanguage.

Windows® Embedded Standard 2009 is based on the same binary files as Windows® XP Professional with Service Pack 3 and is optimally tailored to the hardware being used. In other words, only the functions and modules required by the respective device are included. Windows® Embedded Standard 2009 is also based on the same reliable code as Windows® XP Professional with SP3. It provides industry with leading reliability, improvements in security and performance, and the latest technology for Web browsing and extensive device support.

## 5.2 Order data

| Model number | Short description | Figure |
|---|---|---|
| | **Windows Embedded Standard 2009** | |
| 5SWWXP.0736-ENG | Microsoft OEM Windows Embedded Standard 2009, English; for PP500; please order CompactFlash separately (minimum 1 GB). | |
| | **Mandatory accessory** | |
| | **CompactFlash** | |
| 5CFCRD.016G-04 | CompactFlash 16 GB B&R | |
| 5CFCRD.1024-03 | CompactFlash 1 GB Western Digital | |
| 5CFCRD.1024-04 | CompactFlash 1 GB B&R | |
| 5CFCRD.2048-03 | CompactFlash 2 GB Western Digital | |
| 5CFCRD.2048-04 | CompactFlash 2 GB B&R | |
| 5CFCRD.4096-03 | CompactFlash 4 GB Western Digital | |
| 5CFCRD.4096-04 | CompactFlash 4 GB B&R | |
| 5CFCRD.8192-03 | CompactFlash 8 GB Western Digital | |
| 5CFCRD.8192-04 | CompactFlash 8 GB B&R | |

Table 144: 5SWWXP.0736-ENG - Order data

## 5.3 Overview

| Model number | Type | Target system | Chipset | Language | Preinstalled | Minimum size of CF/HDD | Minimum amount of RAM |
|---|---|---|---|---|---|---|---|
| 5SWWXP.0736-ENG | WES2009 PP500 US15W | PP500 | US15W | English | Yes | 1 GB | 256 MB |

## 5.4 Features with WES2009 (Windows Embedded Standard 2009)

The feature list shows the most important device functions in Windows Embedded Standard 2009.

| Function | Present |
|---|---|
| Enhanced write filter (EWF) | ✓ |
| File Based Write Filter (FBWF) | ✓ |
| Page file | Configurable |
| Administrator account | ✓ |
| User account | Configurable |
| Explorer shell | ✓ |
| Registry filter | ✓ |
| Internet Explorer 8.0 | ✓ |
| Internet information service (IIS) | - |
| Terminal service | ✓ |
| Windows Firewall | ✓ |
| MSN-Explorer | - |
| Outlook Express | - |
| Administrative Tools | ✓ |
| Remote Desktop | ✓ |
| Remote Assistance | - |
| .NET Framework | - |
| ASP.NET | - |
| OpenGL support | ✓ |
| Local Network Bridge | ✓ |
| Codepages/User Locale/Keyboard | ✓ |
| Disk Management Service | ✓ |
| Windows Installer Service | ✓ |
| Class Installer | ✓ |
| CoDevice Installer | ✓ |
| Media Player 6.4 | ✓ |
| DirectX 9.0c | ✓ |
| Accessories | ✓ |
| Number of fonts | 89 |

Table 145: Device functions in Windows Embedded Standard 2009

## 5.5 Installation

Upon request, Windows Embedded Standard 2009 can be preinstalled at B&R Austria on a suitable CompactFlash card (min. 1GB). The system is then automatically configured after it has been switched on for the first time. This procedure takes approximately 30 minutes, and the device will be rebooted a number of times.

## 5.6 Drivers

All drivers required for operation are preinstalled on the operating system. If an older driver version is installed, the latest version can be downloaded from the B&R homepage (www.br-automation.com) and installed. A potentially activated "Enhanced Write Filter (EWF)" must be taken into consideration.

### 5.6.1 Touch screen drivers

The touch screen driver must be manually installed in order to operate Automation Panel 800 or Automation Panel 900 touch screen devices. The driver can be downloaded from the download area on the B&R homepage (www.br-automation.com). A potentially activated "Enhanced Write Filter (EWF)" must be taken into consideration.

## Info:

**Required drivers can only be downloaded from the B&R homepage, not from manufacturers' pages.**

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# 6 Windows Embedded Standard 7

## 6.1 General Information

The successor to Windows® XP Embedded has been given the name Windows® Embedded Standard 7. As with previous versions, this embedded operating system offers full system support of Automation PC 810, Panel PC 800 and Power Panel 500 devices. In addition to brand new features that are also included in Windows® 7 Professional, Windows® Embedded Standard 7 includes components such as Enhanced Write Filter, File-Based Write Filter, Registry Filter and USB Boot. Windows® Embedded Standard 7 is available in two different versions. The main difference between them has to do with multilanguage support. Windows® Embedded Standard 7 is only available in a single language, whereas Windows® Embedded Standard 7 Premium supports the installation of several languages simultaneously.

With Windows® Embedded Standard 7, Microsoft has also made substantial improvements in the area of security. The AppLocker program, available in the premium version, can prevent the execution of unknown or potentially unwanted applications that should be installed over a network or from drives that are directly connected. A tiered approach allows the differentiation between scripts (.ps1, .bat, .cmd, .vbs and .js), installer files (.msi, .msp) and libraries (.dll, .ocx). AppLocker can also be configured to record undesired activity and display it in the Event Viewer. Windows® Embedded Standard 7 is available in both 32-bit and 64-bit versions, which ensures that even the most demanding applications have the level of support they need.

## 6.2 Order data

| Model number | Short description | Figure |
|---|---|---|
| | **Windows Embedded Standard 7** | |
| 5SWWI7.0536-ENG | Microsoft OEM Windows Embedded Standard 7 32-bit, English; for PP500; please order CompactFlash separately (minimum 8 GB). | |
| 5SWWI7.0736-MUL | Microsoft OEM Windows Embedded Standard 7 Premium 32-bit, multilanguage; for PP500; please order CompactFlash separately (minimum 8 GB). | |
| | **Mandatory accessory** | |
| | **CompactFlash** | |
| 5CFCRD.016G-04 | CompactFlash 16 GB B&R | |
| 5CFCRD.8192-04 | CompactFlash 8 GB B&R | |
| | **Optional accessory** | |
| | **Windows Embedded Standard 7** | |
| 5SWWI7.0900-MUL | WES7P 32bit Language Pack DVD | |

Table 146: 5SWWI7.0536-ENG, 5SWWI7.0736-MUL - Order data

## 6.3 Overview

| Model number | Edition | Target system | Chipset | Architectures | Language | Preinstalled | Minimum size of CF/HDD | Minimum amount of RAM |
|---|---|---|---|---|---|---|---|---|
| 5SWWI7.0536-ENG | Embedded | PP500 | US15W | 32-bit | English | Optional | 8 GB | 1 GB |
| 5SWWI7.0736-MUL | Premium | PP500 | US15W | 32-bit | Multi-language | Optional | 8 GB | 1 GB |

## 6.4 Features with WES7 (Windows Embedded Standard 7)

The feature list displays the essential device functions and differences in Windows Embedded Standard 7 and Windows Embedded Standard 7 Premium.

| Function | Windows Embedded Standard 7 | Windows Embedded Standard 7 Premium |
|---|---|---|
| Enhanced write filter (EWF) | ✓ | ✓ |
| File Based Write Filter (FBWF) | ✓ | ✓ |
| Administrator account | ✓ | ✓ |
| User account | Configurable | Configurable |
| Windows Explorer Shell | ✓ | ✓ |
| Registry filter | ✓ | ✓ |
| Internet Explorer 8.0 | ✓ | ✓ |
| Internet Information Service (IIS) 7.0 | ✓ | ✓ |
| AntiMalware (Windows Defender) | - | ✓ |
| Add-ons (Snipping tool, Sticky Notes) | - | ✓ |
| Windows Firewall | ✓ | ✓ |
| .NET Framework 3.5 | ✓ | ✓ |
| Remote Desktop Protocol 7.0 | ✓ | ✓ |
| File Compression Utility | ✓ | ✓ |
| Windows Installer Service | ✓ | ✓ |
| Windows XP Mode | - | - |
| Media Player 12 | ✓ | ✓ |
| DirectX | ✓ | ✓ |
| Multilingual User Interface Packs in the same image | - | ✓ |
| International Components and Language Services | ✓ | ✓ |
| Language Pack Setup | ✓ | ✓ |
| Windows Update | Configurable | Configurable |
| Windows PowerShell 2.0 | ✓ | ✓ |
| Bitlocker | - | ✓ |
| Applocker | - | ✓ |
| Tablet PC Support | - | ✓ |
| Windows Touch | - | ✓ |
| Boot from USB Stick | ✓ | ✓ |
| Accessories | ✓ | ✓ |
| Page file | Configurable | Configurable |
| Number of fonts | 134 | 134 |

Table 147: Device functions in Windows Embedded Standard 7

## 6.5 Installation

Upon request, Windows Embedded Standard 7 can be preinstalled at B&R Austria on a suitable CompactFlash card (min. 8 GB). The system is then automatically configured after it has been switched on for the first time. This procedure takes approximately 30 minutes, and the device will be rebooted a number of times.

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## 6.6 Drivers

All drivers required for operation are preinstalled on the operating system. If an older driver version is installed, the latest version can be downloaded from the B&R homepage (www.br-automation.com) and installed. A potentially activated "Enhanced Write Filter (EWF)" must be taken into consideration.

### 6.6.1 Touch screen drivers

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

The touch screen driver must be installed manually if a touch controller was not detected during the Windows Embedded Standard 7 setup or if a an Automation Panel 800/900 has been connected after setup. The driver can be downloaded from the download area on the B&R homepage (www.br-automation.com). A potentially activated "Enhanced Write Filter (EWF)" must be taken into consideration.

## Info:

**Required drivers can only be downloaded from the B&R homepage, not from manufacturers' pages.**

# 7 Windows CE

## 7.1 General information

B&R Windows CE is an operating system which is optimally tailored to B&R's devices. It includes only the functions and modules which are required by each device. This makes this operating system extremely robust and stable. A further advantage of B&R Windows CE compared to other operating systems are the low licensing costs.

## 7.2 Order data

| Model number | Short description | Figure |
|---|---|---|
| | | |
| 5SWWCE.0836-ENG | Microsoft OEM Windows CE 6.0 Professional, English; for PP500; please order CompactFlash separately (minimum 128 MB). | |
| | **Mandatory accessory** | |
| | **CompactFlash** | |
| 5CFCRD.0128-03 | CompactFlash 128 MB Western Digital | |
| 5CFCRD.016G-04 | CompactFlash 16 GB B&R | |
| 5CFCRD.0256-03 | CompactFlash 256 MB Western Digital | |
| 5CFCRD.0512-03 | CompactFlash 512 MB Western Digital | |
| 5CFCRD.0512-04 | CompactFlash 512 MB B&R | |
| 5CFCRD.1024-03 | CompactFlash 1 GB Western Digital | |
| 5CFCRD.1024-04 | CompactFlash 1 GB B&R | |
| 5CFCRD.2048-03 | CompactFlash 2 GB Western Digital | |
| 5CFCRD.2048-04 | CompactFlash 2 GB B&R | |
| 5CFCRD.4096-03 | CompactFlash 4 GB Western Digital | |
| 5CFCRD.4096-04 | CompactFlash 4 GB B&R | |
| 5CFCRD.8192-03 | CompactFlash 8 GB Western Digital | |
| 5CFCRD.8192-04 | CompactFlash 8 GB B&R | |

Table 148: 5SWWCE.0836-ENG - Order data

## 7.3 Overview

| Model number | Type | Target system | Chipset | Language | Preinstalled | Minimum size of CF/HDD | Minimum amount of RAM |
|---|---|---|---|---|---|---|---|
| 5SWWCE.0836-ENG | WinCE6.0 Pro US15W | PP500 PP500 | US15W | English | Yes | 128 MB | 128 MB |

## 7.4 Windows CE 6.0 features

Detailed information about Windows CE for B&R devices can be downloaded in the download area on the B&R homepage (www.br-automation.com).

| Features | Windows CE 6.0 |
|---|---|
| Supported screen resolutions | WVGA (TFT), VGA (TFT), SVGA (TFT), XGA (TFT) |
| Chipset | Intel US15W |
| Color depth | 16-bit or 65,536 colors[1] |
| Graphics card driver | Intel(R) embedded graphics driver |

Table 149: Windows CE 6.0 features

| Features | Windows CE 6.0 |
|---|---|
| Main memory | Automatic detection and use of up to 512 MB RAM |
| Boot time / Startup time | Approx. 25 seconds |
| Screen rotation | not supported |
| Web browser | Internet Explorer |
| .NET | Compact Framework |
| Image size | Approx. 40 MB[2], uncompressed |
| Custom keys | Supported |
| PVI | Supported |
| Automation Device Interface | Supported |
| Remote Desktop Protocol for thin clients | Supported |
| B&R VNC Viewer | Supported |
| B&R Task Manager | Supported |
| B&R Picture Viewer | Supported |
| Compatible with zenOn | Yes |
| Compatible with Wonderware | No |
| Serial interfaces for any use | 2 |
| DirectX | No |
| Audio ports | "Line OUT" and "MIC" are supported. "Line IN" is not supported. |

Table 149: Windows CE 6.0 features

1)  The color depth depends on the display used.
2)  Use the function "Compress Windows CE Image" in the B&R Embedded OS Installer to reduce the image size.

## 7.5 Requirements

The device must fulfill the following criteria to be able run the Windows CE operating system.

- At least 128 MB main memory
- At least one 128 MB CompactFlash card (size should be specified when ordered)

## 7.6 Installation

Windows CE is usually preinstalled at the B&R plant.

## 7.7  B&R Embedded OS Installer

The B&R Embedded OS Installer allows you to install existing B&R Windows CE images. The four files (NK.BIN, BLDR, LOGOXRES.BMP, and LOGOQVGA.BMP) must be provided from an already functioning B&R Windows CE installation.

The B&R Embedded OS Installer can be downloaded from the download area on the B&R homepage (www.br-automation.com). Further information is available in the online help for the B&R Embedded OS Installer.

# 8 Automation Runtime

## 8.1 General Information

A integral component of Automation Studio is the real-time operating system. This real-time operating system makes up the software kernel which allows applications to run on a target system.

- Guaranteed highest possible performance for the hardware being used
- Runs on all B&R target systems
- Makes the application hardware-independent
- Applications can be easily ported between B&R target systems
- Cyclic runtime system guarantees deterministic behavior
- Multitasking according to deterministic runtime rules
- Configure priorities, time classes, and jitter tolerance
- Up to eight different time classes with any subprograms
- Guaranteed response to time violations and exceeding jitter tolerances
- Exception handling
- Configurable jitter tolerance in all task classes
- Supports all relevant programming language such as IEC 61131-3 and ANSI C
- Extensive function library conforming to IEC 61131-3 as well as the expanded Automation library
- Access to all networks and bus systems via function calls or the Automation Studio configuration

B&R Automation Runtime™ is fully embedded in the corresponding target system (this is the hardware where Automation Runtime™ is installed). It allows application programs to access I/O systems (e.g. via fieldbus) and other devices (interfaces, networks, etc.).

## 8.2 Order data
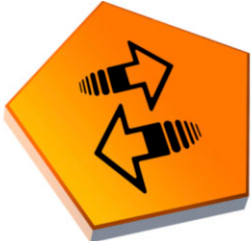
| Model number | Short description | Figure |
|---|---|---|
| | **Automation Runtime** | |
| 1A4600.10-5 | B&R Automation Runtime ARwin, incl. license sticker | |
| 1A4601.06-5 | B&R Automation Runtime ARemb, incl. license sticker | |
| 1A4601.06-T | B&R Automation Runtime ARemb terminal, incl. license sticker | |

Table 150: 1A4600.10-5, 1A4601.06-5, 1A4601.06-T - Order data

## 8.3  Automation Runtime Windows (ARwin)

The system is supported by ARwin with an AS 3.0.90 / AR 4.00 upgrade.

## Info:

**Audio output is not supported when using ARwin.**

## 8.4  Automation Runtime Embedded (ARemb)

The system is supported by ARemb with an AS 3.0.90 / AR 4.00 upgrade.

## Info:

**Audio output is not supported when using ARemb.**

# 9 B&R Automation Device Interface (ADI) - Control Center

The ADI (Automation Device Interface) enables access to specific functions of B&R devices. Settings for this device can be read and edited using the B&R Control Center applet in the control panel.
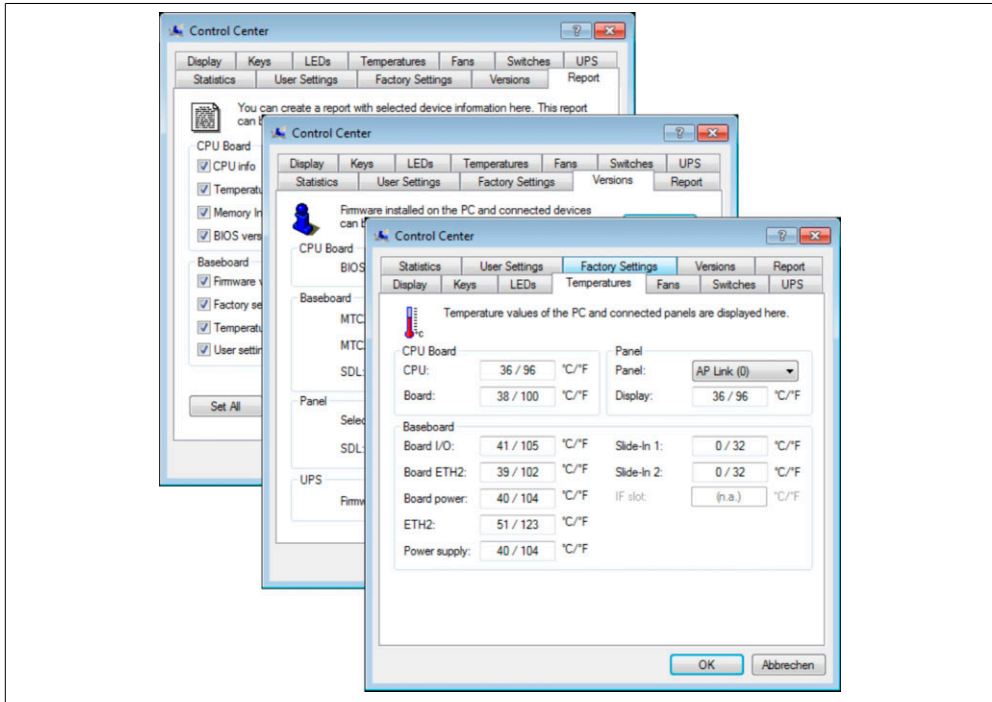


Image 89: ADI Control Center screenshots - Examples (symbol photo)

## Info:

**The displayed temperature and voltage values (e.g. CPU temperature, core voltage, battery voltage) on the corresponding ADI page represent uncalibrated information values. These cannot be used to draw any conclusions about any hardware alarms or error conditions. The hardware components used have automatic diagnostics functions that can be applied in the event of error.**

### 9.1 Functions

> **Info:**
>
> **The functions provided by the Automation Device Interface (ADI) - Control Center vary according to device series.**

- Changing display-specific parameters
- Reading of device-specific keys
- Updating the key configuration
- Activation of device specific LEDs on a foil keypad
- Read or calibrate the entry devices (e.g. key switch, handwheel, joystick, potentiometer)
- Reading temperatures, fan speeds, statistical data, and switch settings
- Read the operating hours (power on hours)
- Reading user settings and factory settings
- Reading Software versions
- Updating and securing BIOS and firmware
- Creating reports about the current system (support assistance)
- Setting the SDL equalizer value for the SDL cable adjustment
- Changing the User serial ID

Supports following systems:

- Automation PC 620
- Automation PC 810
- Automation PC 820
- Panel PC 700
- Panel PC 725
- Panel PC 800
- Power Panel 100/200
- Power Panel 300/400
- Power Panel 500
- Mobile Panel 40/50
- Mobile Panel 100/200
- Automation Panel 800 (together with Automation PCs and Panel PCs)
- Automation Panel 900 (together with Automation PCs and Panel PCs)

## 9.2 Installation

A detailed description of the Control Center can be found in the integrated online help. The B&R Automation Device Interface (ADI) driver (also contains Control Center) can be downloaded for free from the download area on the B&R homepage (www.br-automation.com).

1. Download and unzip the ZIP archive

2. Close all applications

3. Run the Setup.exe file (e.g. double-click on it in Explorer).

- or -

1. Right click on Setup.inf in explorer and select "Install".

# Info:

**The ADI driver is already included in the B&R images of embedded operating systems.**

**If a more current ADI driver version exists (see the B&R homepage download area), it can be installed later. A potentially activated "Enhanced Write Filter (EWF)" must be taken into consideration when installing.**

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# 10 B&R Automation Device Interface (ADI) Development Kit

This software can be used to activate functions in the B&R Automation Device Interface (ADI) from Windows applications, which were created using a development environment such as one of the following.

- Microsoft Visual C++ 6.0

- Microsoft Visual Basic 6.0

- Microsoft eMbedded Visual C++ 4.0

- Microsoft Visual Studio 2005 (or newer)
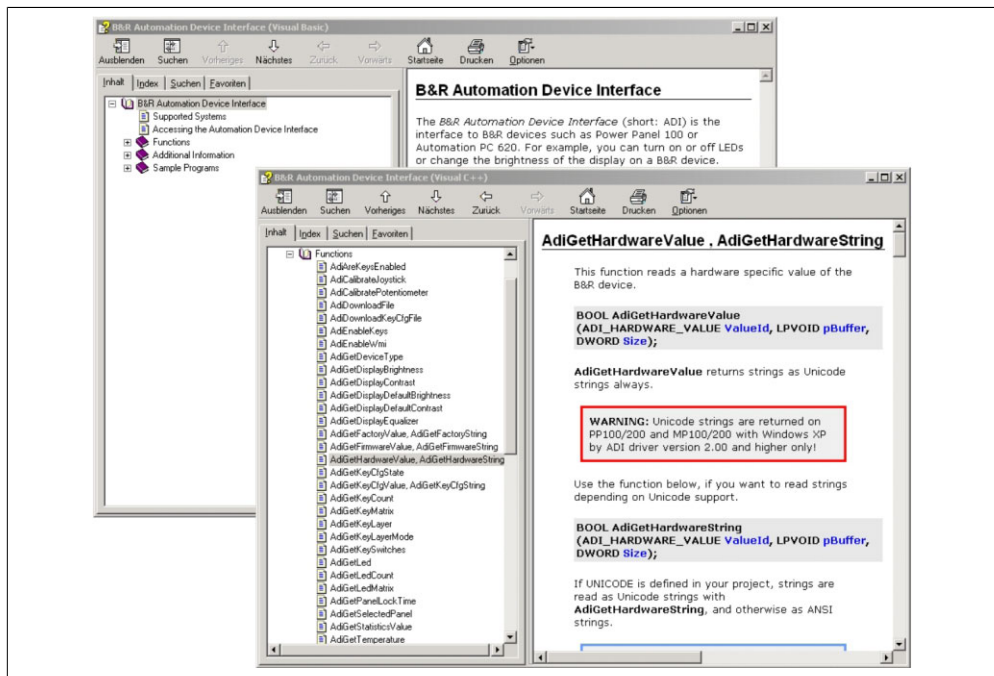


Image 90: ADI development kit screenshots (Version 2.40)

Features:

- One Microsoft Visual Basic module with declarations for the ADI functions

- Header files and import libraries for Microsoft Visual C++

- Help files for Visual Basic and Visual C++

- Sample projects for Visual Basic and Visual C++

- ADI DLL (for testing the applications, if no ADI drive is installed)

Supports following systems (Version 3.10 and higher):

- Automation PC 620
- Automation PC 810
- Automation PC 820
- Mobile Panel 40/50
- Mobile Panel 100/200
- Panel PC 300
- Panel PC 700
- Panel PC 800
- Power Panel 100/200
- Power Panel 300/400
- Power Panel 500

The ADI driver suitable for the device must be installed on the stated product series. The ADI driver is already included in the B&R images of embedded operating systems.

A detailed description of using the ADI functions can be found in the integrated online help.

The B&R Automation Device Interface (ADI) development kit can be downloaded for free from the download area on the B&R homepage (www.br-automation.com).

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# 11 B&R Key Editor

On display units, it is often necessary to adjust the function keys and LEDs for the application software being used. The B&R Key Editor makes it quick and easy to adapt the application to a unique configuration.
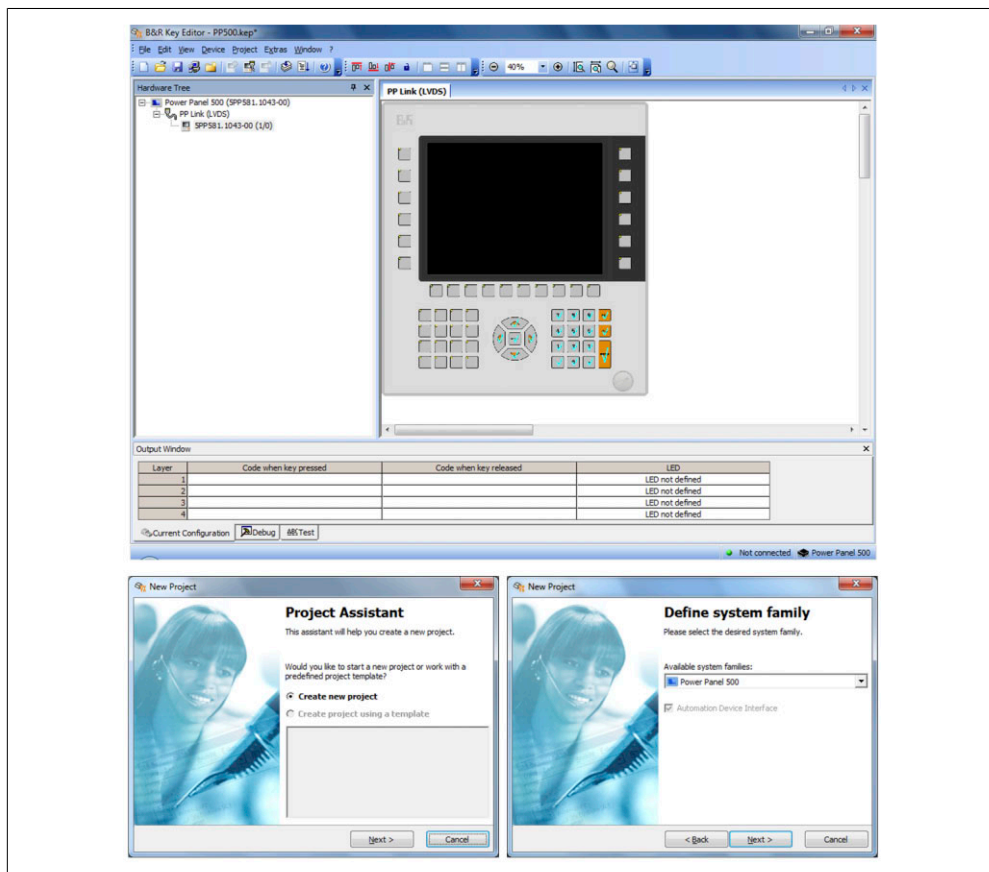


Image 91: B&R Key Editor screenshots version 3.10 (representation picture)

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.)
- Assign functions to LEDs (HDD access, power, etc.)
- 4 assignments per key possible (using layer function)

- Configuration of panel locking time when multiple Automation Panel 900 devices are connected to Automation PC and Panel PC devices

Supports following systems (Version 3.10):

- Automation PC 620
- Automation PC 810
- Automation PC 820
- Automation Panel 800
- Automation Panel 900
- IPC2000, IPC2001, IPC2002
- IPC5000, IPC5600
- IPC5000C, IPC5600C
- Mobile Panel 40/50
- Mobile Panel 100/200
- Panel PC 300
- Panel PC 700
- Panel PC 800
- Power Panel 100/200
- Power Panel 300/400
- Power Panel 500 (the Key Editor device file must be downloaded from B&R homepage separately)

A detailed guide for configuring keys and LEDs can be found in the B&R Key Editor's online help. The B&R Key Editor can be downloaded for free from the download area on the B&R homepage (www.br-automation.com). Additionally, it can also be found on the B&R HMI Drivers & Utilities DVD (model number 5SWHMI.0000-00).

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# Chapter 5 • Standards and certifications

## 1 Applicable European Directives

- EMC directive 2004/108/EG
- Low-voltage directive 2006/95/EG

## 2 Overview of standards

| Standard | Description |
|---|---|
| EN 55011<br>Class A | Electromagnetic compatibility (EMC), radio disturbance product standard, industrial, scientific, and medical high-frequency devices (ISM devices), limit values and measurement procedure; group 1 (devices that do not create HF during material processing) and group 2 (devices that create HF during material processing) |
| EN 55022<br>Class A | Electromagnetic compatibility (EMC), radio disturbance characteristics, information technology equipment (ITE devices), limits and methods of measurement |
| EN 60060-1 | High-voltage test techniques - part 1: General specifications and testing conditions |
| EN 60068-2-1 | Environmental testing - part 2: Tests; test A: Dry cold |
| EN 60068-2-2 | Environmental testing - part 2: Tests; test B: Dry heat |
| EN 60068-2-3 | Environmental testing - part 2: Tests; test and guidance: Damp heat, constant |
| EN 60068-2-6 | Environmental testing - part 2: Tests; test: Vibration (sinusoidal) |
| EN 60068-2-14 | Environmental testing - part 2: Tests; test N: Change of temperature |
| EN 60068-2-27 | Environmental testing - part 2: Tests; test and guidance: Shock |
| EN 60068-2-30 | Environmental testing - part 2: Tests; test and guidance: Damp heat, cyclic |
| EN 60068-2-31 | Environmental testing - part 2: Tests; test: Drop and topple, primarily for equipment-type specimens |
| EN 60068-2-32 | Environmental testing - part 2: Tests; test: Free fall |
| EN 60204-1 | Safety of machinery, electrical equipment on machines - part 1: General requirements |
| EN 60529 | Degrees of protection provided by enclosures (IP code) |
| EN 60664-1 | Insulation coordination for equipment within low-voltage systems - part 1: Principles, requirements and tests |
| EN 60721-3-2 | Classification of environmental conditions - part 3: Classification of groups of environmental parameters and their severities, section 2: Transport |
| EN 60721-3-3 | Classification of environmental conditions - part 3: Classification of groups of environmental parameters and their severities, section 3: Stationary use at weather-protected locations |
| EN 61000-4-2 | Electromagnetic compatibility (EMC) - part 4-2: Testing and measuring techniques; electrostatic discharge immunity test |
| EN 61000-4-3 | Electromagnetic compatibility (EMC) - part 4-3: Testing and measuring techniques; radiated radio-frequency electromagnetic field immunity test |
| EN 61000-4-4 | Electromagnetic compatibility (EMC) - part 4-4: Testing and measuring techniques; electrical fast transient/burst immunity test |
| EN 61000-4-5 | Electromagnetic compatibility (EMC) - part 4-5: Testing and measuring techniques; surge immunity test |
| EN 61000-4-6 | Electromagnetic compatibility (EMC) - part 4-6: Testing and measuring techniques; immunity to conducted disturbances, induced by radio-frequency fields |
| EN 61000-4-8 | Electromagnetic compatibility (EMC) - part 4-8: Testing and measuring techniques; power frequency magnetic field immunity test |

Table 151: Overview of standards

| Standard | Description |
|---|---|
| EN 61000-4-18 | Electromagnetic compatibility (EMC) - part 4-18: Testing and measuring techniques; damped oscillatory waves immunity test |
| EN 61000-4-29 | Electromagnetic compatibility (EMC) - part 4-29: Testing and measuring techniques; voltage dips, short interruptions and voltage variations on DC input power port immunity tests |
| EN 61000-6-2 | Electromagnetic compatibility (EMC), generic immunity standard - part 2: Industrial environment |
| EN 61000-6-4 | Electromagnetic compatibility (EMC), generic emission standard - part 2: Industrial environment |
| EN 61131-2 | Product standard, programmable logic controllers - part 2: Equipment requirements and tests |
| Germanischer Lloyd 2003 | Germanischer Lloyd 2003: Supplementary provisions and guidelines - Part 7: Guidelines for type testing |
| UL 508 | Industrial control equipment (UL = Underwriters Laboratories) |
| 47 CFR | Federal Communications Commission (FCC), 47 CFR Part 15 Subpart B Class A |

Table 151: Overview of standards

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# 3 Emission requirements

| Emissions | Test carried out according to | Limits according to |
|---|---|---|
| Network-related emissions | EN 55011 / EN 55022 | EN 61000-6-4: Generic standard (industrial areas) |
| | | EN 55011: Industrial product standard, scientific and medical high-frequency devices (ISM devices) class A (industrial area) |
| | | EN 55022: Product standard equipment for Information Technology (ITE devices) class A (industrial area) |
| | | EN 61131-2: Programmable logic controllers |
| | | 47 CFR Part 15 Subpart B Class A (FCC) |
| | | Germanischer Lloyd 2003 |
| Emissions | EN 55011 / EN 55022 | EN 61000-6-4: Generic standard (industrial areas) |
| | | EN 55011: Industrial product standard, scientific and medical high-frequency devices (ISM devices) class A (industrial area) |
| | | EN 55022: Product standard equipment for Information Technology (ITE devices) class A (industrial area) |
| | | EN 61131-2: Programmable logic controllers |
| | | 47 CFR Part 15 Subpart B Class A (FCC) |
| | | Germanischer Lloyd 2003 |

Table 152: Overview of limits and testing guidelines for emissions

## 3.1 Network-related emissions

| Tests in accordance with EN 55011 / EN 55022 | Limit values in accordance with EN 61000-6-4 | Limit values in accordance with EN 55011 Class A | Limit values in accordance with EN 55022 Class A |
|---|---|---|---|
| Power mains connections 150 kHz - 500 kHz | - | 79 dB (µV) quasi-peak value 66 dB (µV) average value | 79 dB (µV) quasi-peak value 66 dB (µV) average value |
| Power mains connections 500 kHz - 30 MHz | - | 73 dB (µV) quasi-peak value 60 dB (µV) average value | 73 dB (µV) quasi-peak value 60 dB (µV) average value |
| AC mains connections 150 kHz - 500 kHz | 79 dB (µV) quasi-peak value 66 dB (µV) average value | - | - |
| AC mains connections 500 kHz - 30 MHz | 73 dB (µV) quasi-peak value 60 dB (µV) average value | - | - |
| Other connections 150 kHz - 500 kHz | - | - | 97 - 87 dB (µV) and 53 - 43 dB (µA) quasi-peak value 84 - 74 dB (µV) and 40 - 30 dB (µA) average value |
| Other connections 500 kHz - 30 MHz | - | - | 87 dB (µV) and 43 dB (µA) quasi-peak value 74 dB (µV) and 30 dB (µA) average value |
| **Tests in accordance with EN 55011 / EN 55022** | **Limit value in accordance with IEC 61131-2** | **Limits according to 47 CFR Part 15 Subpart B class A** | |
| AC mains connections 150 kHz - 500 kHz | 79 dB (µV) quasi-peak value 66 dB (µV) average value | 79 dB (µV) quasi-peak value 66 dB (µV) average value | |
| AC mains connections 500 kHz - 30 MHz | 73 dB (µV) quasi-peak value 60 dB (µV) average value | 73 dB (µV) quasi-peak value 60 dB (µV) average value | |
| **Test carried out in accordance with CISPR 16-1, 16-2** | **Limit value in accordance with Germanischer Lloyd 2003** | | |
| Power mains connections 10 kHz - 150 kHz | 96 dB(µV) – 50 dB (µV) | | |

Table 153: Test requirements - Network-related emissions for industrial areas

| Power mains connections 150 kHz - 500 kHz | 60 dB(µV) – 50 dB (µV) | | |
|---|---|---|---|
| Power mains connections 500 kHz - 30 MHz | 50 dB (µV) | | |

Table 153: Test requirements - Network-related emissions for industrial areas

## 3.2 Emissions, electromagnetic emissions

| Tests in accordance with EN 55011 / EN 55022 | Limit values in accordance with EN 61000-6-4 | Limit values in accordance with EN 55011 Class A | Limit values in accordance with EN 55022 Class A |
|---|---|---|---|
| 30 MHz - 230 MHz measured at a distance of 10 m | < 40 dB (µV/m) Quasi-peak value | < 40 dB (µV/m) Quasi-peak value | < 40 dB (µV/m) Quasi-peak value |
| 230 MHz - 1 GHz measured at a distance of 10 m | < 47 dB (µV/m) Quasi-peak value | < 47 dB (µV/m) Quasi-peak value | < 47 dB (µV/m) Quasi-peak value |
| Tests in accordance with EN 55011 / EN 55022 | Limit value in accordance with IEC 61131-2 | | |
| 30 MHz - 230 MHz measured at a distance of 10 m | < 40 dB (µV/m) Quasi-peak value | | |
| 230 MHz - 1 GHz measured at a distance of 10 m | < 47 dB (µV/m) Quasi-peak value | | |
| Test carried out according to EN 55011 / EN 55022 | Limits according to 47 CFR Part 15 Subpart B class A | | |
| 30 MHz - 88 MHz measured at a distance of 10 m | < 90 dB (µV/m) Quasi-peak value | | |
| 88 MHz - 216 MHz measured at a distance of 10 m | < 150 dB (µV/m) Quasi-peak value | | |
| 216 MHz - 960 MHz measured at a distance of 10 m | < 210 dB (µV/m) Quasi-peak value | | |
| > 960 MHz measured at a distance of 10 m | < 300 dB (µV/m) Quasi-peak value | | |
| Test carried out in accordance with CISPR 16-1, CISPR 16-2 | Limit value in accordance with Germanischer Lloyd 2003 | | |
| 150 kHz - 300 kHz measured at a distance of 3 m | < 80 dBµV/m - 52 dBµV/m Quasi-peak value | | |
| 300kHz - 30 MHz measured at a distance of 3 m | < 52 dBµV/m - 34 dBµV/m Quasi-peak value | | |
| 30 MHz - 2 GHz measured at a distance of 3 m | < 54 dBµV/m Quasi-peak value | | |
| except for 156 MHz - 165 MHz measured at a distance of 3 m | < 24 dBµV/m Quasi-peak value | | |

Table 154: Test requirements - Electromagnetic emissions for industrial areas

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# 4 Requirements for immunity to disturbances

| Immunity | Test carried out according to | Limits according to |
|---|---|---|
| Electrostatic discharge (ESD) | EN 61000-4-2 | EN 61000-6-2: Generic standard (industrial areas) |
| | | EN 61131-2: Programmable logic controllers |
| | | Germanischer Lloyd 2003 |
| Immunity to high-frequency electromagnetic fields (HF field) | EN 61000-4-3 | EN 61000-6-2: Generic standard (industrial areas) |
| | | EN 61131-2: Programmable logic controllers |
| | | Germanischer Lloyd 2003 |
| Immunity to high-speed transient electrical disturbances (burst) | EN 61000-4-4 | EN 61000-6-2: Generic standard (industrial areas) |
| | | EN 61131-2: Programmable logic controllers |
| | | Germanischer Lloyd 2003 |
| Immunity to surge voltages | EN 61000-4-5 | EN 61000-6-2: Generic standard (industrial areas) |
| | | EN 61131-2: Programmable logic controllers |
| | | Germanischer Lloyd 2003 |
| Immunity to conducted disturbances | EN 61000-4-6 | EN 61000-6-2: Generic standard (industrial areas) |
| | | EN 61131-2: Programmable logic controllers |
| | | Germanischer Lloyd 2003 |
| Immunity against magnetic fields with electrical frequencies | EN 61000-4-8 | EN 61000-6-2: Generic standard (industrial areas) |
| | | EN 61131-2: Programmable logic controllers |
| | | Germanischer Lloyd 2003 |
| Immunity to damped oscillatory waves (only zone C) | EN 61000-4-18 | EN 61131-2: Programmable logic controllers |
| Voltage fluctuations | EN 61000-4-29 | EN 61131-2: Programmable logic controllers |
| | | Germanischer Lloyd 2003 |
| Voltage dips | EN 61000-4-29 | EN 61131-2: Programmable logic controllers |
| Changed supply voltage | EN 61131-2 | EN 61131-2: Programmable logic controllers |
| Turning off and back on | EN 61131-2 | EN 61131-2: Programmable logic controllers |

Table 155: Overview of limits and testing guidelines for immunity

**Evaluation criteria in accordance with EN 61000-6-2**

Criteria A:
The operating equipment must continue to work as intended during the test. There should be no interference in the operating behavior and no system failures below a minimum operating quality as defined by the manufacturer.

Criteria B:
The operating equipment must continue to work as intended after the test. There should be no interference in the operating behavior and no system failures below a minimum operating quality as defined by the manufacturer.

Criteria C:
A temporary function failure is permitted if the function restores itself, or the function can be restored by activating configuration and control elements.

Criteria D:
Deterioration or failure of the function, which can no longer be established (operating equipment destroyed).

## 4.1 Electrostatic discharge (ESD)

| Tests in accordance with IEC 61000-4-2 | Limit values in accordance with EN 61000-6-2 | Limit value in accordance with IEC 61131-2 | Limit value in accordance with Germanischer Lloyd 2003 |
|---|---|---|---|
| Contact discharge to powder-coated and bare metal housing parts | ±4 kV, 10 discharges, criteria B | ±4 kV, 10 discharges, criteria B | ±6 kV, 10 discharges, criteria B |
| Discharge through the air to plastic housing parts | ±8 kV, 10 discharges, criteria B | ±8 kV, 10 discharges, criteria B | ±8 kV, 10 discharges, criteria B |

Table 156: Test requirements - Electrostatic discharge (ESD)

## 4.2 High-frequency electromagnetic fields (HF field)

| Tests in accordance with IEC 61000-4-3 | Limit values in accordance with EN 61000-6-2 | Limit value in accordance with IEC 61131-2 | Limit value in accordance with Germanischer Lloyd 2003 |
|---|---|---|---|
| Housing, completely wired | 80 MHz - 1 GHz, 10 V/m, 80% amplitude modulation with 1 kHz, 3 seconds duration, criteria A | 2 GHz - 2.7 GHz, 1 V/m, 1.4 GHz - 2 GHz, 3 V/m, 80 MHz - 1 GHz, 10 V/m, 80% amplitude modulation with 1kHz, 3 second duration, criteria A | 80MHz - 2 GHz, 10V/m, 80% amplitude modulation with 1kHz, 1%/3sec, criteria A |

Table 157: Test requirements - High-frequency electromagnetic fields (HF field)

## 4.3 High-speed transient electrical disturbances (burst)

| Tests in accordance with IEC 61000-4-4 | Limit values in accordance with EN 61000-6-2 | Limit value in accordance with IEC 61131-2 | Limit values in accordance with Germanischer Lloyd 2003 |
|---|---|---|---|
| AC mains inputs/outputs | ±2 kV, criteria B | ±2 kV, criteria B | - |
| AC power inputs | - | ±2 kV, criteria B | ±2 kV, criteria B |
| DC mains inputs/outputs >3 m[1] | ±2 kV, criteria B | ±2 kV, criteria B | - |
| DC power outputs | - | - | ±2 kV, criteria B |
| Functional ground connections, signal lines and I/Os >3 m | ±1 kV, criteria B | ±1 kV, criteria B | ±1 kV, criteria B |
| Unshielded AC inputs/outputs >3 m | ±2 kV, criteria B | ±2 kV, criteria B | - |
| Analog I/O | ±1 kV, criteria B | ±1 kV, criteria B | ±1 kV, criteria B |

Table 158: Test requirements - High-speed transient electrical disturbances (burst)

1) For EN 55024 without length limitation.

## 4.4 Surge

| Tests in accordance with IEC 61000-4-5 | Limit values in accordance with EN 61000-6-2 | Limit value in accordance with IEC 61131-2 | Limit values in accordance with Germanischer Lloyd 2003 |
|---|---|---|---|
| AC power I/O, L to L | ±1 kV, criteria B | ±1 kV, criteria B | - |
| AC power I/O, L to PE | ±2 kV, criteria B | ±2 kV, criteria B | - |
| DC mains inputs/outputs, L+ to L-, >30 m | ±1 kV, criteria B | ±1 kV, criteria B | - |
| DC mains inputs/outputs, L to PE, >30 m | ±2 kV, criteria B | ±2 kV, criteria B | - |

Table 159: Test requirements - Surge voltages

| Tests in accordance with IEC 61000-4-5 | Limit values in accordance with EN 61000-6-2 | Limit value in accordance with IEC 61131-2 | Limit values in accordance with Germanischer Lloyd 2003 |
|---|---|---|---|
| DC power inputs, L+ to L- | - | - | ±0.5 kV, Criteria A |
| DC power inputs, L to PE | - | - | ±1 kV, Criteria A |
| Signal connections >30 m | ±1 kV, criteria B | ±1 kV, criteria B | - |
| All shielded cables | ±1 kV, criteria B | ±1 kV, criteria B | - |

Table 159: Test requirements - Surge voltages

## 4.5 Conducted disturbances

| Tests in accordance with IEC 61000-4-6 | Limit values in accordance with EN 61000-6-2 | Limit value in accordance with IEC 61131-2 | Limit value in accordance with Germanischer Lloyd 2003 |
|---|---|---|---|
| AC mains inputs/outputs | 150 kHz - 80 MHz, 10 V, 80% amplitude modulation with 1 kHz, 3 seconds duration, criteria A | 150 kHz - 80 MHz, 3 V, 80% amplitude modulation with 1 kHz, 3 seconds duration, criteria A | 150 kHz - 80 MHz, 10 V[1], 80% amplitude modulation with 1 kHz, 3 seconds duration, criteria A |
| DC mains inputs/outputs | 150 kHz - 80 MHz, 10 V, 80% amplitude modulation with 1 kHz, 3 seconds duration, criteria A | 150 kHz - 80 MHz, 3 V, 80% amplitude modulation with 1 kHz, 3 seconds duration, criteria A | 150 kHz - 80 MHz, 10 V[1], 80% amplitude modulation with 1 kHz, 3 seconds duration, criteria A |
| Functional ground connection | 150 kHz - 80 MHz, 10 V, 80% amplitude modulation with 1 kHz, 3 seconds duration, criteria A | 150 kHz - 80 MHz, 3 V, 80% amplitude modulation with 1 kHz, 3 seconds duration, criteria A | 150 kHz - 80 MHz, 10 V[1], 80% amplitude modulation with 1 kHz, 3 seconds duration, criteria A |
| Signal connections >3 m | 150 kHz - 80 MHz, 10 V, 80% amplitude modulation with 1 kHz, 3 seconds duration, criteria A | 150 kHz - 80 MHz, 3 V, 80% amplitude modulation with 1 kHz, 3 seconds duration, criteria A | 150 kHz - 80 MHz, 10 V[1], 80% amplitude modulation with 1 kHz, 3 seconds duration, criteria A |

Table 160: Test requirements - Conducted disturbances

1) Increase carrier signal voltage to 10Veff in accordance with IEC 60945 at following frequencies:2MHz; 3MHz; 4MHz; 6,2 MHz; 8,2MHz; 12,6MHz; 16,5MHz; 18.8 MHz; 22MHz; 25MHz

## 4.6 Magnetic fields with electrical frequencies

| Tests in accordance with IEC 61000-4-8 | Limit values in accordance with EN 61000-6-2 | Limit value in accordance with IEC 61131-2 | |
|---|---|---|---|
| Test direction x, test in the field of an induction coil 1m x 1m | 30 A/m, 50/60Hz criteria A | 30 A/m, 50/60Hz criteria A | |
| Test direction y, test in the field of an induction coil 1m x 1m | 30 A/m, 50/60Hz criteria A | 30 A/m, 50/60Hz criteria A | |
| Test direction z, test in the field of an induction coil 1m x 1m | 30 A/m, 50/60Hz criteria A | 30 A/m, 50/60Hz criteria A | |

Table 161: Test requirements - Magnetic fields with electrical frequencies

## 4.7 Damped oscillatory waves (only zone C)

| Tests in accordance with IEC 61000-4-18 | Limit value in accordance with IEC 61131-2 | | |
|---|---|---|---|
| Mains inputs/outputs, L to L | ±1 kV, 1 MHz, repeat rate 400/sec, length 2 sec, connection lengths 2 m, criteria B | | |
| Power I/O, L to PE | ±2.5 kV, 1 MHz, repeat rate 400/sec, length 2 sec, connection lengths 2 m, criteria B | | |

Table 162: Test requirements - Damped oscillatory waves (only zone C)

## 4.8 Voltage fluctuations

| Tests in accordance with IEC 61000-4-29 | Limit value in accordance with IEC 61131-2 | Limit values in accordance with Germanischer Lloyd 2003 | |
|---|---|---|---|
| Power supply connections | 30 min at 0.85 x $U_e$ or 1.2 x $U_e$ Constant ripple 0.05 x $U_e$ | 5 min at 0.75 x $U_e$ or 1.3 x $U_e$ | |

Table 163: Test requirements - Voltage fluctuations

## 4.9 Voltage dips

| Tests in accordance with IEC 61000-4-29 | Limit value in accordance with IEC 61131-2 | | |
|---|---|---|---|
| DC power inputs | 20 interruptions for 10 ms (PS2) | | |

Table 164: Test requirements - Voltage dips

## 4.10 Changed supply voltage

| Tests in accordance with EN 61131-2 | Limit value in accordance with IEC 61131-2 | | |
|---|---|---|---|
| Power supply connections | 100% to 90% /60s - 90% to 100% /60s 100% to 0% /5s - 0% to 100% /5s | | |

Table 165: Test requirements - Changed supply voltage

## 4.11 Turning off and back on

| Tests in accordance with EN 61131-2 | Limit value in accordance with IEC 61131-2 | | |
|---|---|---|---|
| Supply voltage | 100% to 0% /60s - 0% to 100% /60s | | |

Table 166: Test requirements - Turning off and back on

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# 5 Mechanical conditions

| Vibration | Test carried out according to | Limits according to |
|---|---|---|
| Vibration operation | EN 60068-2-6 | EN 61131-2: Programmable logic controllers |
| | | EN 60721-3-3 class 3M4 |
| Vibration during transport (packaged) | EN 60068-2-6 | EN 60721-3-2 class 2M1 |
| | | EN 60721-3-2 class 2M2 |
| | | EN 60721-3-2 class 2M3 |
| Shock during operation | EN 60068-2-27 | EN 61131-2: Programmable logic controllers |
| | | EN 60721-3-3 class 3M4 |
| Shock during transport (packaged) | EN 60068-2-27 | EN 60721-3-2 class 2M1 |
| | | EN 60721-3-2 class 2M2 |
| | | EN 60721-3-2 class 2M3 |
| Toppling (packaged) | EN 60068-2-31 | EN 60721-3-2 class 2M1 |
| | | EN 60721-3-2 class 2M2 |
| | | EN 60721-3-2 class 2M3 |
| Free fall (packaged) | EN 60068-2-32 | EN 61131-2: Programmable logic controllers |

Table 167: Overview of limits and testing guidelines for vibration

## 5.1 Vibration operation

| Tests in accordance with IEC 60068-2-6 | Limit value in accordance with IEC 61131-2 | | Limit values in accordance with EN 60721-3-3 Class 3M4 | | |
|---|---|---|---|---|---|
| Vibration during operation: Uninterrupted duty with moveable frequency in all 3 axes (x, y, z), 1 octave per minute | 10 sweeps for each axis | | 10 sweeps for each axis | | |
| | Frequency | Limit value | Frequency | Limit value | |
| | 5 - 9 Hz | Amplitude 3.5 mm | 2 - 9 Hz | Amplitude 3 mm | |
| | 9 - 150 Hz | Acceleration 1 g | 9 - 200 Hz | Acceleration 1 g | |

Table 168: Test requirements - Vibration during operation

## 5.2 Vibration during transport (packaged)

| Tests in accordance with IEC 60068-2-6 | Limit values in accordance with EN 60721-3-2 Class 2M1 | | Limit values in accordance with EN 60721-3-2 Class 2M2 | | |
|---|---|---|---|---|---|
| Vibration during transport: Uninterrupted duty with moveable frequency in all 3 axes (x, y, z) | 10 sweeps for each axis, packaged | | 10 sweeps for each axis, packaged | | |
| | Frequency | Limit value | Frequency | Limit value | |
| | 2 - 9 Hz | Amplitude 3.5 mm | 2 - 9 Hz | Amplitude 3.5 mm | |
| | 9 - 200 Hz | Acceleration 1 g | 9 - 200 Hz | Acceleration 1 g | |
| | 200 - 500 Hz | Acceleration 1.5 g | 200 - 500 Hz | Acceleration 1.5 g | |

Table 169: Test requirements - Vibration during transport (packaged)

## 5.3 Shock during operation

| Tests in accordance with IEC 60068-2-27 | Limit value in accordance with IEC 61131-2 | Limit values in accordance with EN 60721-3-3 Class 3M4 | |
|---|---|---|---|
| Shock during operation: Pulse (half-sine) stress in all 3 axes (x, y, z) | Acceleration 15 g, Duration 11 ms, 18 shocks | Acceleration 10 g, Duration 11 ms | |

Table 170: Test requirements - Shock during operation

## 5.4 Shock during transport (packaged)

| Tests in accordance with IEC 60068-2-27 | Limit values in accordance with EN 60721-3-2 Class 2M1 | Limit values in accordance with EN 60721-3-2 Class 2M2 | |
|---|---|---|---|
| Pulse (half-sine) stress in all 3 axes (x, y, z) | Acceleration 10 g, Duration 11 ms, each 3 shocks, packaged | Acceleration 30 g, Duration 6 ms, each 4 shocks, packaged | |

Table 171: Test requirements - Shock during transport

## 5.5 Toppling

| Tests in accordance with IEC 60068-2-31 | Limit values in accordance with EN 60721-3-2 Class 2M1 | | Limit values in accordance with EN 60721-3-2 Class 2M2 | | Limit values in accordance with EN 60721-3-2 Class 2M3 | |
|---|---|---|---|---|---|---|
| Drop and topple | Devices: Drop/topple on each edge. packaged | | Devices: Drop/topple on each edge. packaged | | Devices: Drop/topple on each edge. packaged | |
| | **Weight** | **Required** | **Weight** | **Required** | **Weight** | **Required** |
| | < 20 kg | Yes | < 20 kg | Yes | < 20 kg | Yes |
| | 20 - 100 kg | - | 20 - 100 kg | Yes | 20 - 100 kg | Yes |
| | > 100 kg | - | > 100 kg | - | > 100 kg | Yes |

Table 172: Test requirements - Toppling

## 5.6 Free fall (packaged)

| Tests in accordance with IEC 60068-2-32 | Limit value in accordance with IEC 61131-2 | | |
|---|---|---|---|
| Free fall | Devices with delivery packaging each with 5 fall tests | | |
| | **Weight** | **Height** | |
| | < 10 kg | 1.0 m | |
| | 10 - 40 kg | 0.5 m | |
| | > 40 kg | 0.25 m | |
| | Devices with product packaging each with 5 fall tests | | |
| | **Weight** | **Height** | |
| | < 10 kg | 0.3 m | |
| | 10 - 40 kg | 0.3 m | |
| | > 40 kg | 0.25 m | |

Table 173: Test requirements - Free fall

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# 6 Climate conditions

| Temperature / humidity | Test carried out according to | Limits according to |
|---|---|---|
| Worst case operation | UL 508 | UL 508: Industrial control equipment |
| | | EN 61131-2: Programmable logic controllers |
| Dry heat | EN 60068-2-2 | EN 61131-2: Programmable logic controllers |
| Dry cold | EN 60068-2-1 | EN 61131-2: Programmable logic controllers |
| Large temperature fluctuations | EN 60068-2-14 | EN 61131-2: Programmable logic controllers |
| Temperature fluctuations in operation | EN 60068-2-14 | EN 61131-2: Programmable logic controllers |
| Humid heat, cyclic | EN 60068-2-30 | EN 61131-2: Programmable logic controllers |
| Humid heat, constant (storage) | EN 60068-2-3 | EN 61131-2: Programmable logic controllers |

Table 174: Overview of limits and testing guidelines for temperature and humidity

## 6.1 Worst case operation

| Tests according to UL 508 | Limit values according to UL 508 | Limit value according to IEC 61131-2 | |
|---|---|---|---|
| Worst case during operation. Operation of the device with the max. ambient temperature specified in the data sheet at the max. specified load | 3 hours at max. ambient temperature (min. +40°C) duration approx. 5 hours | 3 hours at max. ambient temperature (min. +40°C) duration approx. 5 hours | |

Table 175: Test requirements - Worst case during operation

## 6.2 Dry heat

| Tests according to IEC 60068-2-2 | Limit value according to IEC 61131-2 | | |
|---|---|---|---|
| Dry heat | 16 hours at +70°C for 1 cycle, then 1 hour acclimatization and function testing, duration approximately 17 hours | | |

Table 176: Test requirements - Dry heat

## 6.3 Dry cold

| Tests according to IEC 60068-2-1 | Limit value according to IEC 61131-2 | | |
|---|---|---|---|
| Dry cold | 16 hours at -40°C for 1 cycle, then 1 hour acclimatization and function testing, duration approximately 17 hours | | |

Table 177: Test requirements - Dry cold

## 6.4 Large temperature fluctuations

| Tests according to IEC 60068-2-14 | Limit value according to IEC 61131-2 | | |
|---|---|---|---|
| Large temperature fluctuations | 3 hours at -40°C and 3 hours at +70°C, 5 cycles, then 2 hours acclimatization and function testing, duration approximately 14 hours | | |

Table 178: Test requirements - Large temperature fluctuations

## 6.5 Temperature fluctuations in operation

| Tests according to IEC 60068-2-14 | Limit value according to IEC 61131-2 | | |
|---|---|---|---|
| Open devices: These can also have a housing and are installed in switching cabinets | 3 hours at +5°C and 3 hours at 55°C, 5 cycles, temperature gradient 3°C / min, the unit is occasionally supplied with voltage during testing, duration approximately 30 hours | | |
| Closed devices: These are devices whose data sheet specifies a surrounding housing (enclosure) with the corresponding safety precautions | 3 hours at +5°C and 3 hours at +55°C, 5 cycles, temperature gradient 3°C / min, the unit is occasionally supplied with voltage during testing, duration approximately 30 hours | | |

Table 179: Test requirements - Temperature fluctuations during operation

## 6.6 Humid heat, cyclic

| Tests according to IEC 60068-2-30 | Limit value according to IEC 61131-2 | | |
|---|---|---|---|
| Alternating climate | 24 hours at +25°C / +55°C and 97% / 83% RH, 2 cycles, then 2 hours acclimatization, function testing and insulation, duration approximately 50 hours | | |

Table 180: Test requirements - Humid heat, cyclic

## 6.7  Humid heat, constant (storage)

| Tests according to IEC 60068-2-3 | Limit value according to IEC 61131-2 | | |
|---|---|---|---|
| Humid heat, constant (storage) | 48 hours at +40°C and 92.5% RH, then insulation test within 3 hours, duration approximately 49 hours | | |

Table 181: Test requirements - Humid heat, constant (storage)

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# 7 Safety

| Safety | Test carried out according to | Limits according to |
|---|---|---|
| Ground resistance | EN 61131-2 | EN 60204-1: Electrical equipment of machines |
| | | EN 61131-2: Programmable logic controllers |
| Insulation resistance | | EN 60204-1: Electrical equipment of machines |
| High voltage | EN 60060-1 | EN 61131-2: Programmable logic controllers |
| | | UL 508: Industrial control equipment |
| Voltage range | | EN 61131-2: Programmable logic controllers |

Table 182: Overview of limits and testing guidelines for safety

## 7.1 Ground resistance

| Tests in accordance with EN 61131-2 | Limit value in accordance with IEC 60204-1 | | Limit value in accordance with IEC 61131-2 |
|---|---|---|---|
| Ground resistance: housing (from any metal part to the ground terminal) | Smallest effective cross section of the protective ground conductor for the branch being tested | Maximum measured voltage drop at a test current of 10 A | Test current 30 A for 2 min, < 0.1 Ω |
| | 1.0 mm² | 3.3 V | |
| | 1.5 mm² | 2.6 V | |
| | 2.5 mm² | 1.9 V | |
| | 4.0 mm² | 1.4 V | |
| | > 6.0 mm² | 1.0 V | |

Table 183: Test requirements - Ground resistance

## 7.2 Insulation resistance

| Test carried out | Limit value in accordance with IEC 60204-1 | | |
|---|---|---|---|
| Insulation resistance: main circuits to protective ground conductor | > 1 MΩ at 500 VDC | | |

Table 184: Test requirements - Insulation resistance

## 7.3 High voltage

| Tests in accordance with EN 60060-1 | Limit value in accordance with IEC 61131-2 | | | | Limit values according to UL 508 | | |
|---|---|---|---|---|---|---|---|
| High voltage: Primary circuit to secondary circuit and to protective ground circuit (transformers, coils, varistors, capacitors and components used to protect against overvoltage can be removed before the test) | Input voltage | Test voltage | | | Input voltage | Test voltage | |
| | | 1.2/50 µs voltage surge peak | AC, 1 min | DC, 1 min | | AC, 1 min | AC, 1 min |
| | 0 - 50 VAC 0 - 60 VDC | 850 V | 510 V | 720 V | ≤ 50 V | 500 V | 707 V |
| | 50 - 100 VAC 60 - 100 VDC | 1360 V | 740 V | 1050 V | > 50 V | 1000 V + 2 x $U_N$ | (1000 V + 2 x $U_N$) x 1.414 |
| | 100 - 150 VAC 100 - 150 VDC | 2550 V | 1400 V | 1950 V | | | |

Table 185: Test requirements - High voltage

| Tests in accordance with EN 60060-1 | Limit value in accordance with IEC 61131-2 | | | Limit values according to UL 508 |
|---|---|---|---|---|
| | 150 - 300 VAC 150 - 300 VDC | 4250 V | 2300 V | 3250 V |
| | 300 - 600 VAC 300 - 600 VDC | 6800 V | 3700 V | 5250 V |
| | 600 - 1000 VAC 600 - 1000 VDC | 10200 V | 5550 V | 7850 V |
| | | **1.2/50 µs voltage surge peak** | **AC, 1 min** | **DC, 1 min** |
| | 0 – 65 V | - | 550 V | - |

Table 185: Test requirements - High voltage

# 8 Other tests

| Other tests | Test carried out according to | Limits according to |
|---|---|---|
| Protection | - | EN 60529: Degrees of protection provided by enclosures (IP code) |

Table 186: Overview of limits and testing guidelines for other tests

## 8.1 Protection

| Test carried out according to | Limit values in accordance with EN 60529 | Limit values in accordance with EN 60529 | |
|---|---|---|---|
| Protection of the operating equipment | IP2. Protection against large solid foreign bodies ≥ 12.5 mm diameter | IP.6 No penetration of dust -> Dust-proof | |
| Protection of personnel | IP2. Protection against touching dangerous parts with fingers | IP.6 Protection against touching dangerous parts with conductor | |
| Protection against water permeation with damaging consequences | IP0. Not protected | IP5. Protection against water jets | |

Table 187: Test requirements - Protection

# 9  International certifications

B&R products and services comply with applicable standards. They 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 give special consideration to the reliability of our products in an industrial environment.

| Certifications | |
|---|---|
| USA and Canada  | All important B&R products are tested and listed by Underwriters Laboratories and checked quarterly by a UL inspector. This mark is valid for the USA and Canada and simplifies certification of your machines and systems in these areas. |
| Europe  | All harmonized EN standards for the applicable directives are met. |

Table 188: International Certifications

# Chapter 6 • Accessories

## 1 Replacement CMOS batteries

### 1.1 0AC201.91 / 4A0006.00-000

### 1.2 General information

The lithium battery is needed for buffering the BIOS CMOS data and real-time clock (RTC).

The battery is subject to wear and must be replaced when the battery power ("Bad" status) is insufficient.

### 1.3 Order data

| Model number | Short description | Figure |
|---|---|---|
| | **Batteries** | |
| 0AC201.91 | Lithium Battery 4 pieces, 3 V / 950 mAh button cell | |
| 4A0006.00-000 | Lithium battery, 3 V / 950 mAh, button cell | |

Table 189: 0AC201.91, 4A0006.00-000 - Order data

### 1.4 Technical data

## Warning!

**Replace battery with Renata, type CR2477N only. Use of another battery may present a risk of fire or explosion.**

**Battery may explode if mistreated. Do not recharge, disassemble or dispose of in fire.**

## Info:

**The following characteristics, features and limit values only apply to this accessory and can deviate those specified for the entire device. For the entire device where this accessory is installed, refer to the data provided specifically for the entire device.**

| Product ID | 0AC201.91 | 4A0006.00-000 |
|---|---|---|
| **General information** | | |
| Storage time | Max. 3 years at 30°C | |
| **Electrical properties** | | |
| Capacity | 950 mAh | |
| Self discharging | < 1% per year (at 23°C) | |
| Voltage range | 3V | |
| **Environmental conditions** | | |
| Temperature | | |
|    Storage | -20 to 60°C | |
| Relative humidity | | |
|    Operation | 0 to 95% | |
|    Storage | 0 to 95% | |
|    Transport | 0 to 95% | |

Table 190: 0AC201.91, 4A0006.00-000 - Technical data

# 2 Supply voltage connectors

## 2.1 0TB103.9x

### 2.1.1 General information

The single row 3-pin terminal block TB103 is used to connect the supply voltage.

### 2.1.2 Order data

| Model number | Short description | Figure |
|---|---|---|
| | **Terminal Blocks** | |
| 0TB103.9 | Connector, 24 VDC, 3-pin female, screw clamp, 3.31 mm², protected against vibration by the screw flange | |
| 0TB103.91 | Connector, 24 VDC, 3-pin female, cage clamp, 3.31 mm², protected against vibration by the screw flange | |

Table 191: 0TB103.9, 0TB103.91 - Order data

### 2.1.3 Technical data

| Product ID | 0TB103.9 | 0TB103.91 |
|---|---|---|
| **Terminal block** | | |
| Note | Protected against vibration by the screw flange Rated values according to UL | |
| Number of pins | 3 (female) | |
| Type of terminal | Screw clamps | Cage clamps |
| Cable type | Copper wires only (no aluminum wires!) | |
| Distance between contacts | 5.08 mm | |
| Connection cross section | | |
|   AWG wire | 26 to 12 AWG | |
|   Wire tip sleeves with plastic covering | 0.20 to 1.50 mm² | |
|   Solid wire line | 0.20 to 2.50 mm² | |
|   Fine wire line | 0.20 to 2.50 mm² | |
|   With wire tip sleeves | 0.20 to 1.50 mm² | |
| Fastening torque | 0.4 Nm | - |
| **Electrical properties** | | |
| Rated voltage | 300 V | |
| Rated current[1] | 10 A / contact | |
| Contact resistance | ≤ 4.5 mΩ | |

Table 192: 0TB103.9, 0TB103.91 - Technical data

1) Please take the respective limit data for the I/O modules into consideration!

# 3 CompactFlash cards

## 3.1 General information

CompactFlash cards are easy-to-exchange storage media. Due to their robustness against environmental influences (e.g. temperature, shock, vibration, etc.), CompactFlash cards are ideal for use as storage media in industrial environments.

## 3.2 Basics

In order to be suited for use in industrial automation, CompactFlash cards must be highly reliable. To make this possible, the following is very important

- Flash technology used
- Efficient algorithm for maximizing the lifespan
- Good mechanisms for detecting and fixing errors in the Flash memory

### 3.2.1 Flash technology

Currently, CompactFlash cards are available with MLC (Multi Level Cell) and SLC (Single Level Cell) flash blocks.
SLC flash memory has a lifespan that is 10 times longer than MLC, which is why only CompactFlash cards with SLC flash blocks are suited for industrial applications.

### 3.2.2 Wear leveling

Wear leveling is an algorithm that can be used to maximize the lifespan of a CompactFlash card. There are three different algorithms:

- No Wear Leveling
- Dynamic Wear Leveling
- Static Wear Leveling

The basic idea behind wear leveling is to distribute data over a broad area of blocks or cells on the data carrier so that the same areas don't have to be cleared and reprogrammed over and over again.

#### 3.2.2.1 No Wear Leveling

The earliest CompactFlash cards didn't have an algorithm for maximizing the lifespan. The lifespan of a CompactFlash card was determined only by the guaranteed lifespan of the flash blocks.

### 3.2.2.2  Dynamic Wear Leveling

Dynamic wear leveling makes it possible to utilize unused flash blocks when writing to a file.
If the data carrier is 80% full with files, then only 20% can be used for wear leveling.
The lifespan of the CompactFlash card is therefore dependent on the amount of unused flash blocks.

### 3.2.2.3  Static wear leveling

Static wear leveling also monitors which data is rarely changed. From time to time, the controller then moves this data to blocks that have already been frequently programmed in order to prevent further wear on those cells.

### 3.2.3 ECC error correction

Bit errors can be caused by inactivity or when a certain cell is operated. Error Correction Coding (ECC) implemented via hardware or software can detect and correct many errors of this type.

### 3.2.4 Maximum reliability

CompactFlash cards used by B&R use SLC flash blocks and static wear leveling together with a powerful ECC algorithm to provide maximum reliability.

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Accessories

## 3.3 5CFCRD.xxxx-04

### 3.3.1 General information

## Info:

**B&R CompactFlash cards 5CFCRD.xxxx-04 and CompactFlash cards from a different manufacturer cannot be used in the same system at the same time. Due to differences in technology (older vs. newer technologies), problems can occur during system startup that are caused by the different boot times.**

**see "Known problems / issues", on page 275**

## Info:

**The 5CFCRD.xxxx-04 CompactFlash cards are supported on B&R devices with WinCE wersion ≥ 6.0 or higher.**

### 3.3.2 Order data

| Model number | Short description | Figure |
|---|---|---|
| | **CompactFlash** | |
| 5CFCRD.0512-04 | CompactFlash 512 MB B&R | |
| 5CFCRD.1024-04 | CompactFlash 1 GB B&R | |
| 5CFCRD.2048-04 | CompactFlash 2 GB B&R | |
| 5CFCRD.4096-04 | CompactFlash 4 GB B&R | |
| 5CFCRD.8192-04 | CompactFlash 8 GB B&R | |
| 5CFCRD.016G-04 | CompactFlash 16 GB B&R | |

Table 193: 5CFCRD.0512-04, 5CFCRD.1024-04, 5CFCRD.2048-04,
5CFCRD.4096-04, 5CFCRD.8192-04, 5CFCRD.016G-04 - Order data

### 3.3.3 Technical data

## Caution!

**A sudden loss of power can cause data to be lost! In very rare cases, the mass memory may also become damaged.**

**To prevent damage and loss of data, it is recommended to use a UPS device.**

## Info:

**The following characteristics, features and limit values only apply to this accessory and can deviate those specified for the entire device. For the entire device where this accessory is installed, refer to the data provided specifically for the entire device.**

| Product ID | 5CFCRD.-0512-04 | 5CFCRD.-1024-04 | 5CFCRD.-2048-04 | 5CFCRD.-4096-04 | 5CFCRD.-8192-04 | 5CFCRD.-016G-04 |
|---|---|---|---|---|---|---|
| **General information** | | | | | | |
| Data retention | 10 years | | | | | |
| Data reliability | < 1 unrecoverable error in $10^{14}$ bit read accesses | | | | | |
| Lifetime monitoring | Yes | | | | | |
| MTBF | > 3,000,000 hours (at 25°C) | | | | | |
| Maintenance | None | | | | | |
| Supported operating modes | PIO mode 0-6, Multiword DMA mode 0-4, Ultra DMA mode 0-4 | | | | | |
| Continuous reading | | | | | | |
|   Typical | 35 MB/s (240X)[1] | | | 33 MB/s (220X)[1] | 27 MB/s (180X)[1] | 36 MB/s (240X)[1] |
|   Maximum | 37 MB/s (260X)[1] | | | 34 MB/s (226X)[1] | 28 MB/s (186X)[1] | 37 MB/s (247X)[1] |
| Continuous writing | | | | | | |
|   Typical | 17 MB/s (110X) | | | 16 MB/s (106X) | 15 MB/s (100X) | 18 MB/s (120X) |
|   Maximum | 20 MB/s (133X) | | | 18 MB/s (120X) | 17 MB/s (110X) | 19 MB/s (126X) |
| Certification | | | | | | |
|   CE | Yes | | | | | |
| **Endurance** | | | | | | |
| Guaranteed amount of data | | | | | | |
|   Guaranteed[2] | 50 TB | 100 TB | 200 TB | 400 TB | 800 TB | 1600 TB |
|   Results in 5 years[2] | 27.40 GB/day | 54.79 GB/day | 109.9 GB/day | 219.8 GB/day | 438.6 GB/day | 876.72 GB/day |
| Clear/write cycles | | | | | | |
|   Typical[3] | 2,000,000 | | | | | |
|   Guaranteed | 100,000 | | | | | |
| SLC-Flash | Yes | | | | | |
| Wear leveling | Static | | | | | |
| Error Correction Coding (ECC) | Yes | | | | | |
| **Support** | | | | | | |
| Hardware | PP300/400, PP500, PPC300, PPC700, PPC725, PPC800, APC620, APC810, APC820 | | | | | |
| Operating Systems | | | | | | |
|   Windows 7 32-bit | No | | | | | Yes |
|   Windows 7 64-bit | No | | | | | |
|   Windows Embedded Standard 7, 32-bit | No | | | | Yes | |
|   Windows Embedded Standard 7, 64-bit | No | | | | | Yes |
|   Windows XP Professional | No | | | Yes | | |
|   Windows XP Embedded | Yes | | | | | |
|   Windows Embedded Standard 2009 | No | | Yes | | | |
|   Windows CE 6.0 | Yes | | | | | |
|   Windows CE 5.0 | No | | | | | |

Table 194: 5CFCRD.0512-04, 5CFCRD.1024-04, 5CFCRD.2048-04, 5CFCRD.4096-04, 5CFCRD.8192-04, 5CFCRD.016G-04 - Technical data

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| Product ID | 5CFCRD.-0512-04 | 5CFCRD.-1024-04 | 5CFCRD.-2048-04 | 5CFCRD.-4096-04 | 5CFCRD.-8192-04 | 5CFCRD.-016G-04 |
|---|---|---|---|---|---|---|
| **Software** | | | | | | |
| PVI Transfer Tool | ≥ V3.2.3.8 (part of PVI Development Setup ≥ V2.06.00.3011) | | | | | No |
| B&R Embedded OS Installer | ≥ V3.10 | | | | | No |
| **Environmental conditions** | | | | | | |
| Temperature | | | | | | |
| Operation | 0 to 70°C | | | | | |
| Storage | -65 to 150°C | | | | | |
| Transport | -65 to 150°C | | | | | |
| Relative humidity | | | | | | |
| Operation | Max. 85% at 85°C | | | | | |
| Storage | Max. 85% at 85°C | | | | | |
| Transport | Max. 85% at 85°C | | | | | |
| Vibration | | | | | | |
| Operation | 20 g peak, 20 to 2000 Hz, 4 in each direction (JEDEC JESD22, method B103) 5.35 g RMS, 15 min per level (IEC 68-2-6) | | | | | |
| Storage | 20 g peak, 20 to 2000 Hz, 4 in each direction (JEDEC JESD22, method B103) 5.35 g RMS, 15 min per level (IEC 68-2-6) | | | | | |
| Transport | 20 g peak, 20 to 2000 Hz, 4 in each direction (JEDEC JESD22, method B103) 5.35 g RMS, 15 min per level (IEC 68-2-6) | | | | | |
| Shock | | | | | | |
| Operation | 1.5 kg peak, 0-5 ms 5x (JEDEC JESD22, B110 method) 30 g, 11 ms 1x (IEC 68-2-27) | | | | | |
| Storage | 1.5 kg peak, 0-5 ms 5x (JEDEC JESD22, B110 method) 30 g, 11 ms 1x (IEC 68-2-27) | | | | | |
| Transport | 1.5 kg peak, 0-5 ms 5x (JEDEC JESD22, B110 method) 30 g, 11 ms 1x (IEC 68-2-27) | | | | | |
| Altitude | | | | | | |
| Operation | Max. 4.572 m | | | | | |
| **Mechanical characteristics** | | | | | | |
| Dimensions | | | | | | |
| Width | 42.8 ± 0.10 mm | | | | | |
| Length | 36.4 ± 0.15 mm | | | | | |
| Height | 3.3 ± 0.10 mm | | | | | |
| Weight | 10 g | | | | | |

Table 194: 5CFCRD.0512-04, 5CFCRD.1024-04, 5CFCRD.2048-04,
5CFCRD.4096-04, 5CFCRD.8192-04, 5CFCRD.016G-04 - Technical data

1) Speed specification with 1X = 150 kB/s. All specifications refer to the Samsung Flash chips, CompactFlash cards in UDMA mode 4, 30 ns cycle time in True-IDE mode with sequential write/read test.
2) Endurance of B&R CFs (with linear written block size ≥ 128 kB)
3) Depending on the average file size.

### 3.3.4 Temperature humidity diagram



Image 92: 5CFCRD.xxxx-04 - Temperature humidity diagram for CompactFlash cards

### 3.3.5 Dimensions

## 3.3.6  Benchmark
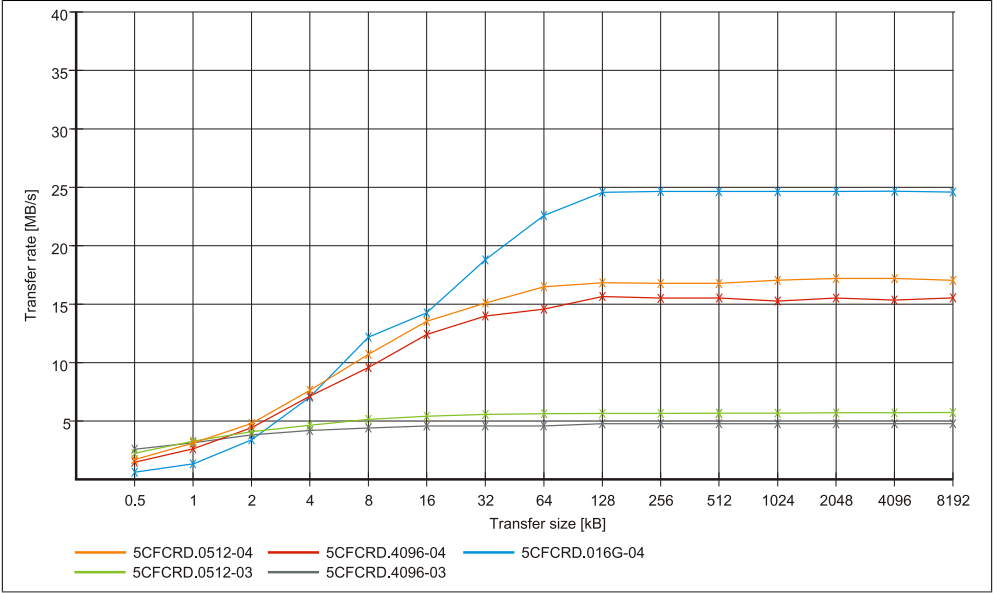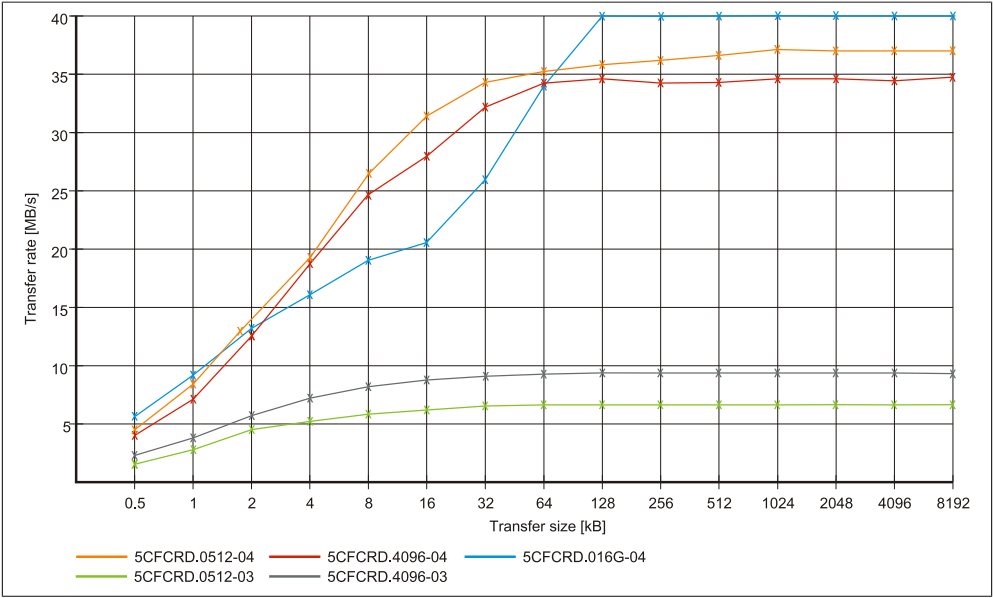
## 3.4 5CFCRD.xxxx-03

### 3.4.1 General information

**Info:**

**Western Digital CompactFlash cards 5CFCRD.xxxx- 03 and CompactFlash cards from a different manufacturer cannot be used in the same system at the same time. Due to differences in technology (older vs. newer technologies), problems can occur during system startup that are caused by the different boot times.**

**see "Known problems / issues", on page 275**

**Info:**

**On Windows CE 5.0 devices, 5CFCRD.xxxx-03 CompactFlash cards up to 1GB are supported.**

**Info:**

**On CompactFlash cards 5CFCRD.xxxx-03, only the sticker and the description have changed. The technical data has not bee changed.**

### 3.4.2 Order data

| Model number | Short description | Figure |
|---|---|---|
| | CompactFlash | |
| 5CFCRD.0064-03 | CompactFlash 64 MB Western Digital | |
| 5CFCRD.0128-03 | CompactFlash 128 MB Western Digital | |
| 5CFCRD.0256-03 | CompactFlash 256 MB Western Digital | |
| 5CFCRD.0512-03 | CompactFlash 512 MB Western Digital | |
| 5CFCRD.1024-03 | CompactFlash 1 GB Western Digital | |
| 5CFCRD.2048-03 | CompactFlash 2 GB Western Digital | |
| 5CFCRD.4096-03 | CompactFlash 4 GB Western Digital | |
| 5CFCRD.8192-03 | CompactFlash 8 GB Western Digital | |

Table 195: 5CFCRD.0064-03, 5CFCRD.0128-03, 5CFCRD.0256-03, 5CFCRD.0512-03, 5CFCRD.1024-03, 5CFCRD.2048-03, 5CFCRD.4096-03, 5CFCRD.8192-03 - Order data

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### 3.4.3 Technical data

> # Caution!
>
> **A sudden loss of power can cause data to be lost! In very rare cases, the mass memory may also become damaged.**
>
> **To prevent damage and loss of data, B&R recommends that you use a UPS device.**

> # Info:
>
> **The following characteristics, features and limit values only apply to this accessory and can deviate those specified for the entire device. For the entire device where this accessory is installed, refer to the data provided specifically for the entire device.**

| Product ID | 5CFCRD.-0064-03 | 5CFCRD.-0128-03 | 5CFCRD.-0256-03 | 5CFCRD.-0512-03 | 5CFCRD.-1024-03 | 5CFCRD.-2048-03 | 5CFCRD.-4096-03 | 5CFCRD.-8192-03 |
|---|---|---|---|---|---|---|---|---|
| **General information** | | | | | | | | |
| Data retention | 10 years | | | | | | | |
| Data reliability | < 1 unrecoverable error in $10^{14}$ bit read accesses | | | | | | | |
| Lifetime monitoring | Yes | | | | | | | |
| MTBF | > 4,000,000 hours (at 25°C) | | | | | | | |
| Maintenance | None | | | | | | | |
| Supported operating modes | PIO mode 0-4, Multiword DMA mode 0-2 | | | | | | | |
| Continuous reading<br>    Typical | 8 MB/s | | | | | | | |
| Continuous writing<br>    Typical | 6 MB/s | | | | | | | |
| Certification<br>    CE | Yes | | | | | | | |
| **Endurance** | | | | | | | | |
| Clear/write cycles<br>    Typical | > 2.000.000 | | | | | | | |
| SLC-Flash | Yes | | | | | | | |
| Wear leveling | Static | | | | | | | |
| Error Correction Coding (ECC) | Yes | | | | | | | |
| **Support** | | | | | | | | |
| Hardware | MP100/200, PP100/200, PP300/400, PP500, PPC300, PPC700, PPC725, PPC800, Provit 2000, Provit 5000, APC620, APC680, APC810, APC820 | | | | | | | |

Table 196: 5CFCRD.0064-03, 5CFCRD.0128-03, 5CFCRD.0256-03, 5CFCRD.0512-03, 5CFCRD.1024-03, 5CFCRD.2048-03, 5CFCRD.4096-03, 5CFCRD.8192-03 - Technical data

| Product ID | 5CFCRD.-0064-03 | 5CFCRD.-0128-03 | 5CFCRD.-0256-03 | 5CFCRD.-0512-03 | 5CFCRD.-1024-03 | 5CFCRD.-2048-03 | 5CFCRD.-4096-03 | 5CFCRD.-8192-03 |
|---|---|---|---|---|---|---|---|---|
| **Operating Systems** | | | | | | | | |
| Windows 7 32-bit | | | | | No | | | |
| Windows 7 64-bit | | | | | No | | | |
| Windows Embedded Standard 7, 32-bit | | | | No | | | | Yes |
| Windows Embedded Standard 7, 64-bit | | | | | No | | | |
| Windows XP Professional | | | | No | | | Yes | |
| Windows XP Embedded | No | | | | | Yes | | |
| Windows Embedded Standard 2009 | | No | | | | Yes | | |
| Windows CE 6.0 | | | | | Yes | | | |
| Windows CE 5.0 | | | Yes | | | | No | |
| **Software** | | | | | | | | |
| PVI Transfer Tool | ≥ V2.57 (part of PVI Development Setup ≥ V2.5.3.3005) | | | | | | | |
| B&R Embedded OS Installer | ≥ V2.21 | | | | | | | |
| **Environmental conditions** | | | | | | | | |
| Temperature | | | | | | | | |
| Operation | 0 to 70°C | | | | | | | |
| Storage | -50 to 100°C | | | | | | | |
| Transport | -50 to 100°C | | | | | | | |
| Relative humidity | | | | | | | | |
| Operation | 8 to 95%, non-condensing | | | | | | | |
| Storage | 8 to 95%, non-condensing | | | | | | | |
| Transport | 8 to 95%, non-condensing | | | | | | | |
| Vibration | | | | | | | | |
| Operation | Max. 16.3 g (159 m/s² 0-peak) | | | | | | | |
| Storage | Max. 30 g (294 m/s² 0-peak) | | | | | | | |
| Transport | Max. 30 g (294 m/s² 0-peak) | | | | | | | |
| Shock | | | | | | | | |
| Operation | Max. 1000 g (9810 m/s² 0-peak) | | | | | | | |
| Storage | Max. 3000 g (29430 m/s² 0-peak) | | | | | | | |
| Transport | Max. 3000 g (29430 m/s² 0-peak) | | | | | | | |
| Altitude | | | | | | | | |
| Operation | Max. 24.383 m | | | | | | | |
| **Mechanical characteristics** | | | | | | | | |
| Dimensions | | | | | | | | |
| Width | 42.8 ± 0.10 mm | | | | | | | |
| Length | 36.4 ± 0.15 mm | | | | | | | |
| Height | 3.3 ± 0.10 mm | | | | | | | |
| Weight | 11.4 g | | | | | | | |

Table 196: 5CFCRD.0064-03, 5CFCRD.0128-03, 5CFCRD.0256-03, 5CFCRD.0512-03, 5CFCRD.1024-03, 5CFCRD.2048-03, 5CFCRD.4096-03, 5CFCRD.8192-03 - Technical data

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### 3.4.4 Temperature humidity diagram
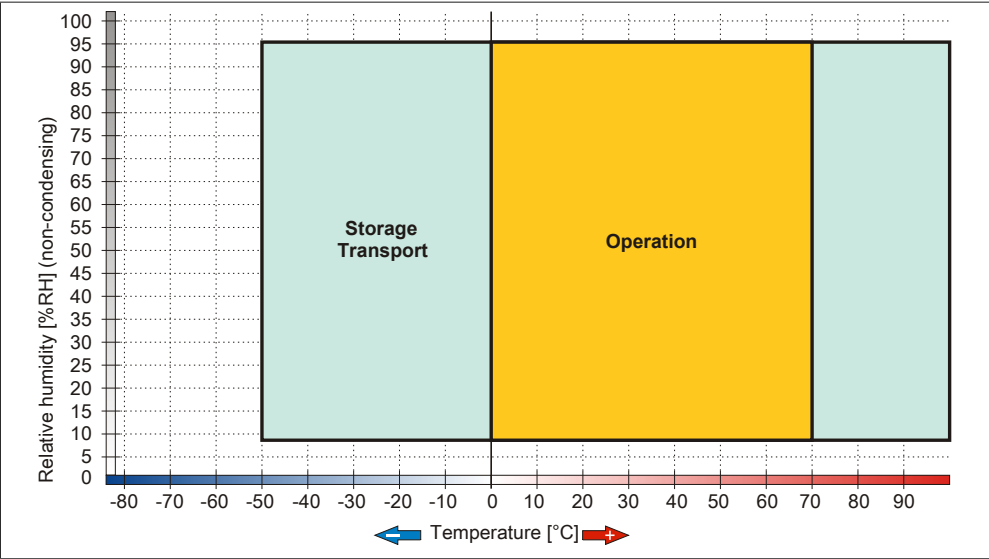


Image 93: 5CFCRD.xxxx-03 - Temperature humidity diagram for CompactFlash cards

### 3.4.5 Dimensions
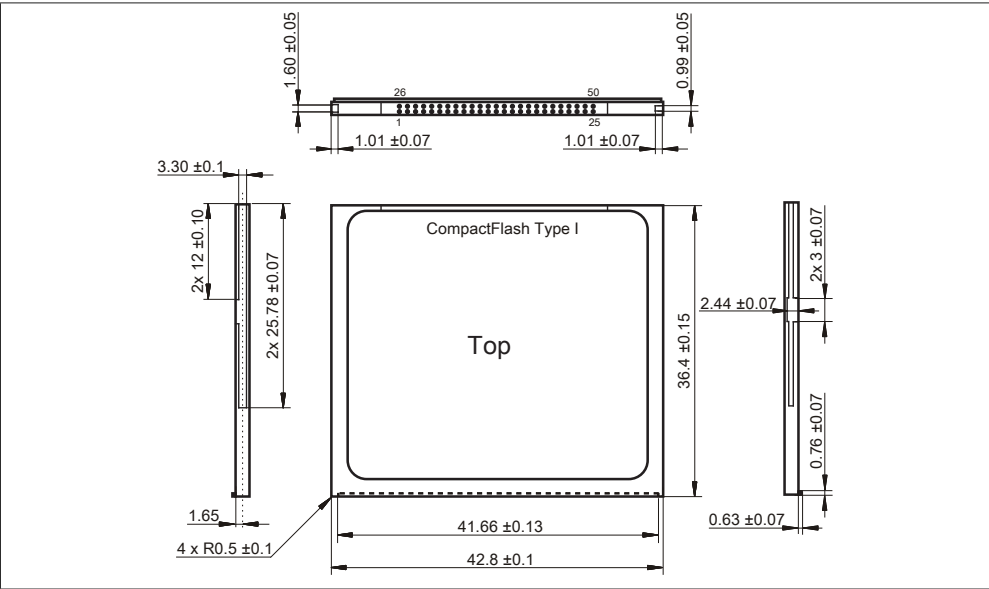
## 3.5 Known problems / issues

The following issue for devices with two CompactFlash slots is known:

- Using two different types of CompactFlash cards can cause problems in Automation PCs and Panel PCs. This can result in one of the two cards not being detected during system startup. This is caused by varying startup speeds. CompactFlash cards with older technology require significantly more time during system startup than CompactFlash cards with newer technology. This behavior occurs near the limits of the time frame provided for startup. The problem described above can occur because the startup time for the CompactFlash cards fluctuates due to the variance of the components being used. Depending on the CompactFlash cards being used, this error might never, sometimes or always occur.

# 4  USB flash drive

## 4.1 5MMUSB.2048-01

### 4.1.1 General information

USB flash drives are easy-to-exchange storage media. Because of the fast data transfer (USB 2.0), the USB flash drives are ideal for use as a portable memory medium. Without requiring additional drivers ("Hot Plug & Play" - except with Windows 98SE), the USB flash drive can immediately act as an additional drive where data can be read or written.

## Info:

**We reserve the right to supply alternative products due to the vast quantity of flash drives available on the market and their corresponding short product lifecycle. Therefore, the following measures might be necessary in order to boot from these flash drives:**

- **The flash drive must be reformatted or in some cases even re-partitioned (set active partition).**

- **The flash drive must be at the top of the BIOS boot order, or alternatively the IDE controllers can also be deactivated in the BIOS. This can be avoided in most cases if a "fdisk /mbr" command is also executed on the USB flash drive.**

- USB 1.1, USB 2.0
- High transfer rate
- High data storage
- Ambient temperature during operation: 0 to 70°C

### 4.1.2 Order data
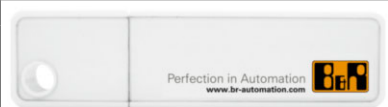
| Model number | Short description | Figure |
|---|---|---|
| | **USB accessories** | |
| 5MMUSB.2048-01 | USB 2.0 flash drive 2048 MB B&R | |

Table 197: 5MMUSB.2048-01 - Order data

## 4.1.3 Technical data

| Product ID | 5MMUSB.2048-01 |
|---|---|
| **General information** | |
| Data retention | > 10 years |
| LEDs | 1 LED (green), signals data transfer (send and receive)[1] |
| MTBF | > 3,000,000 hours |
| Type | USB 1.1 and 2.0 compatible |
| Maintenance | None |
| **Interfaces** | |
| USB | |
|    Type | USB 1.1, USB 2.0 |
|    Connection | To each USB type A interface |
|    Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), to high speed (480 Mbit/s) |
|    Sequential reading | Max. 31 MB/s |
|    Sequential writing | Max. 30 MB/s |
| **Support** | |
| Operating systems | |
|    Windows 2000 | Yes |
|    Windows ME | Yes |
|    Windows XP Professional | Yes |
|    Windows XP Embedded | Yes |
|    Windows CE 4.2 | Yes |
|    Windows CE 5.0 | Yes |
| **Electrical characteristics** | |
| Current requirements | Max. 500 µA sleep mode, max. 120 mA read/write |
| **Environmental conditions** | |
| Temperature | |
|    Operation | 0 to 70°C |
|    Bearings | -50 to 100°C |
|    Transport | -50 to 100°C |
| Relative humidity | |
|    Operation | 85%, non-condensing |
|    Bearings | 85%, non-condensing |
|    Transport | 85%, non-condensing |
| Vibration | |
|    Operation | 20 to 2000 Hz: 20 g (peak) |
|    Bearings | 20 to 2000 Hz: 20 g (peak) |
|    Transport | 20 to 2000 Hz: 20 g (peak) |
| Shock | |
|    Operation | Max. 1500 g (peak) |
|    Bearings | Max. 1500 g (peak) |
|    Transport | Max. 1500 g (peak) |
| Altitude | |
|    Operation | Max. 3048 m |
|    Bearings | Max. 12192 m |
|    Transport | Max. 12192 m |
| **Mechanical characteristics** | |
| Dimensions | |
|    Width | 17.97 mm |
|    Length | 67.85 mm |
|    Height | 8.35 mm |

Table 198: 5MMUSB.2048-01 - Technical data

1) Signals data transfer (send and receive).

Chapter 6
Accessories

## 4.1.4 Temperature humidity diagram
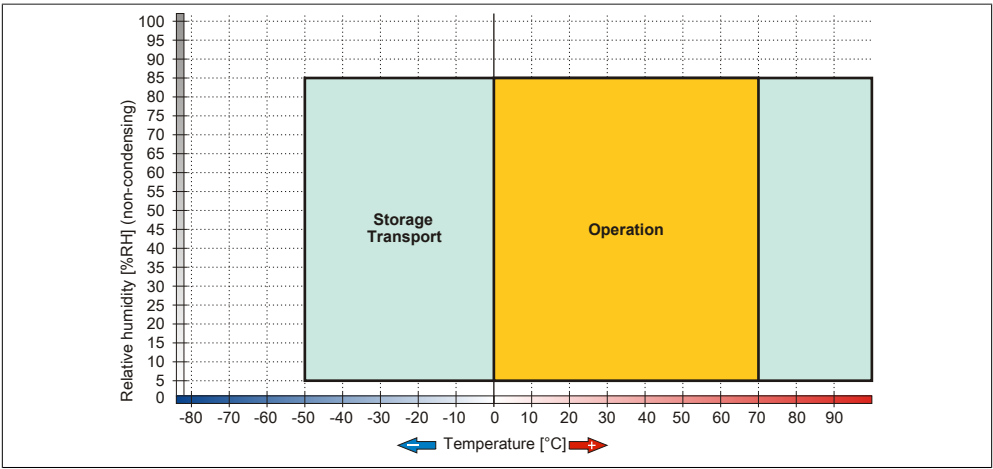


Image 94: 5MMUSB.2048-01 - Temperature humidity diagram

# 5 USB port cap

## 5.1 5AC900.1201-00

### 5.1.1 General information

Front side, flat USB port cap for Automation Panel 900, Power Panel 500 and Panel PC 700 and Panel PC 800 devices.

### 5.1.2 Order data

| Model number | Short description | Figure |
|---|---|---|
| | Accessories | |
| 5AC900.1201-00 | USB Cover M20 IP65 flat | |

Table 199: 5AC900.1201-00 - Order data

## 5.2 5AC900.1201-01

### 5.2.1 General information

Front side, rounded, knurled USB port cap (attached) for Automation Panel 900, Power Panel 500 and Panel PC 700 and Panel PC 800 devices.

### 5.2.2 Order data

| Model number | Short description | Figure |
|---|---|---|
| | Accessories | |
| 5AC900.1201-01 | USB Cover M20 IP65 raised | |

Table 200: 5AC900.1201-01 - Order data

Chapter 6
Accessories

# 6 Terminal block

## 6.1 5AC900.BLOC-00

### 6.1.1 General information

These replacement clips are used to fasten B&R panel devices.

### 6.1.2 Order data

| Model number | Short description | Figure |
|---|---|---|
| | **Accessories** | |
| 5AC900.BLOC-00 | Mounting block with wings 10pcs Spare part. |  |

Table 201: 5AC900.BLOC-00 - Order data

## 6.2 5AC900.BLOC-01

### 6.2.1 General information

These replacement terminal blocks are used to fasten B&R panel devices.

### 6.2.2 Order data

| Model number | Short description | Figure |
|---|---|---|
| | **Accessories** | |
| 5AC900.BLOC-01 | Terminal block without brackets 10 pcs, replacement part. |  |

Table 202: 5AC900.BLOC-01 - Order data

# 7 Clip

## 7.1 5AC900.CLIP-01

### 7.1.1 General information

These replacement clips are used to fasten B&R panel devices.

### 7.1.2 Order data

| Model number | Short description | Figure |
|---|---|---|
| | **Accessories** | |
| 5AC900.CLIP-01 | Spare Retaining clip plastic 10pcs |  |

Table 203: 5AC900.CLIP-01 - Order data

# Chapter 7 • Maintenance / Servicing

The following chapter describes service/maintenance work which can be carried out by a trained, qualified user.

## 1  Cleaning

### Danger!

**The unit can only be cleaned when turned off in order to prevent unintentionally executing functions by actuating the touch screen or pressing keys.**

A moist towel should be used to clean the device. When moistening the cloth, use only water with detergent, screen cleaning agent, or alcohol (ethanol). The cleaning agent should be applied to the cloth beforehand, not sprayed directly on the device! Never use aggressive solvents, chemicals, scouring agents, pressurized air or steam jet.

### Info:

**Displays with a touch screen should be cleaned at regular intervals.**

# 2  Changing the battery

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

## Info:

- **The product design allows the battery to be changed with the B&R device switched either on or off. In some countries, safety regulations do not allow batteries to be changed while the module is switched on.**

- **Any BIOS settings that have been made will remain when the battery is changed with the power turned off (stored in non-volatile EEPROM). The date and time must be reset later because this data is lost when the battery is changed.**

- **The battery should only be changed by qualified personnel.**

## Warning!

**Replace battery with Renata, type CR2477N only. Use of another battery may present a risk of fire or explosion.**

**Battery may explode if mistreated. Do not recharge, disassemble or dispose of in fire.**

The following replacement lithium batteries are available: 4A0006.00-000 (1 pc.) and 0AC201.91 (4 pcs.).

## 2.1  Battery status evaluation

The battery status is evaluated immediately following start-up of the device and is subsequently checked by the system every 24 hours. The battery is subjected to a brief load (1 second) during the measurement and then evaluated. The evaluated battery status is displayed in the BIOS Setup pages (under Advanced - Baseboard monitor) and in the B&R Control Center (ADI driver), but can also be read in a customer application via the ADI Library.

| Battery status | Meaning |
|---|---|
| N/A | Hardware, i.e. firmware used is too old and does not support read. |
| GOOD | Data buffering is guaranteed. |
| BAD | Data buffering is guaranteed for approx. another 500 hours from the point in time that the battery capacity is determined to be BAD (insufficient). |

Table 204: Meaning of battery status

From the point when battery capacity is recognized as insufficient, data buffering is guaranteed for approximately another 500 hours. When changing the battery, data is buffered for approximately another 10 minutes by a gold leaf capacitor.

## 2.2 Procedure

- Disconnect the B&R industrial PC.

- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.

- Remove the cover from the battery compartment and carefully pull out the battery using the removal strips.
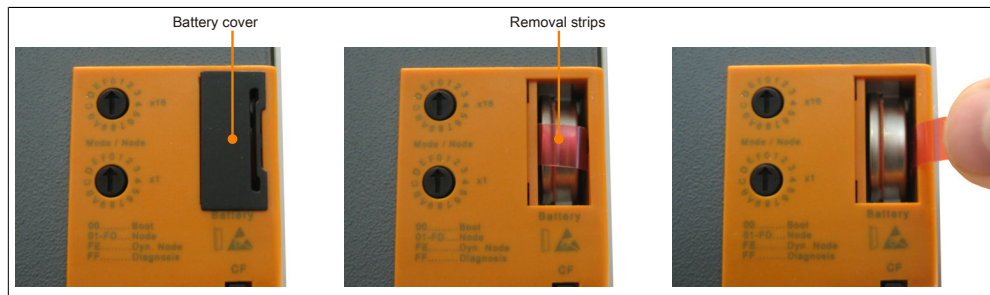


Image 95: Remove battery

- The battery should not be held by its edges. Insulated tweezers may also be used for inserting the battery.
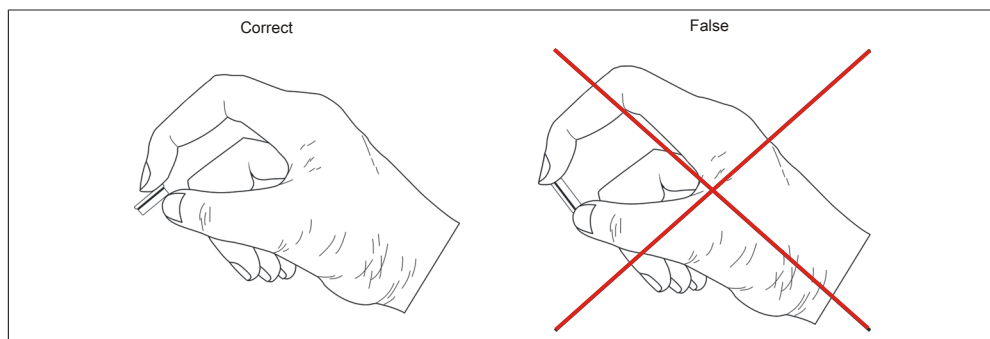


Image 96: Battery handling

- Insert the new battery with correct polarity.
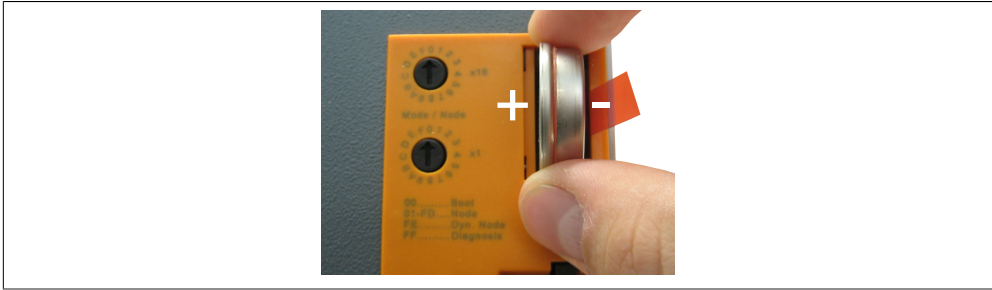
Image 97: Insert battery

- To make the next battery change easier, be sure the removal strip is in place when inserting battery.
- Reconnect power supply to the B&R industrial PC (plug in power cable and press power button).
- Date and time might need to be reset in BIOS.

## Warning!

**Lithium batteries are considered hazardous waste. Used batteries should be disposed of according to local requirements.**

# Appendix A

## 1 Maintenance Controller Extended (MTCX)

The MTCX controller (FPGA processor) is located on the CPU board in the PP500.
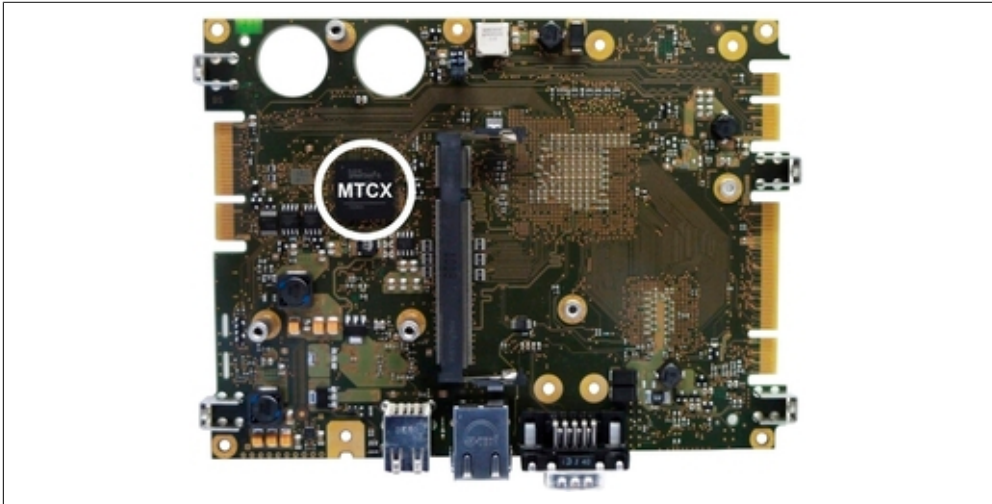


Image 98: MTCX controller location

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

- Power failure logic
- Watchdog handling (NMI and reset handling)
- Temperature monitoring (I/O area, power supply)
- Key and LED handling/coordination
- Advanced desktop operation (keys, USB forwarding)
- Backlight control for display
- Statistical data recording (power cycles - each power on, and power on are recorded - every full hour is counted e.g. 50 minutes no increase)
- Status LEDs (Power, CF, Link, Run)

The functions of the MTCX can be expanded via Firmware[1] upgrade. The version can be determined in the BIOS (menu item " OEM Features", on page 163) or in approved Microsoft operating systems using the B&R Control Center.

---

[1]    Can be downloaded from the download area on the B&R homepage ([www.br-automation.com](www.br-automation.com)).

# 2 Touch Screen AMT 5-wire

## 2.1 Technical data

> **Info:**
>
> **The following characteristics, features, and limit values only apply to this individual component and can deviate from those specified for the entire device. For the entire device in which this individual component is used, refer to the data given specifically for the entire device.**

| Product ID | Touch Screen AMT 5-wire |
|---|---|
| **General Information** | |
| Certification<br>    CE<br>    c-UL-us | <br>Yes<br>Yes |
| Manufacturer | AMT |
| Release pressure | < 1 N |
| Light permeability | 81 ±3% |
| **Environmental conditions** | |
| Temperature<br>    Operation<br>    Storage<br>    Transport | <br>- 20 to 70°C<br>- 40 to 80°C<br>- 40 to 80°C |
| Relative humidity<br>    Operation<br>    Storage<br>    Transport | <br>90% at max. 50°C<br>90% RH at max. 60°C for 504 hours<br>90% RH at max. 60°C for 504 hours |
| **Operating conditions** | |
| Service life | 36 million touch operations on the same point (release pressure: 250 g, interval: 2x per second) |
| Chemical resistance[1] | Acetone, methylene chloride, methyl ethyl ketone, isopropyl alcohol, hexane, turpentine, mineral spirits, unleaded gasoline, diesel, motor oil, gear lubricating oil, antifreeze, ammonia-based glass cleaner, chemical cleaning agents, household cleaning agents, vinegar, coffee, tea, lubricant, cooking oil, salt |
| Activation | Finger, pointer, credit card, glove |
| Drivers | Touch screen drivers can be downloaded from the download area on the B&R homepage www.br-automation.com). |

Table 205: Technical data - Touch Screen AMT 5-wire

1) The active area of the touch screen is resistant to these chemicals for a timeframe of one hour at 25°C.

## 2.2 Temperature humidity diagram
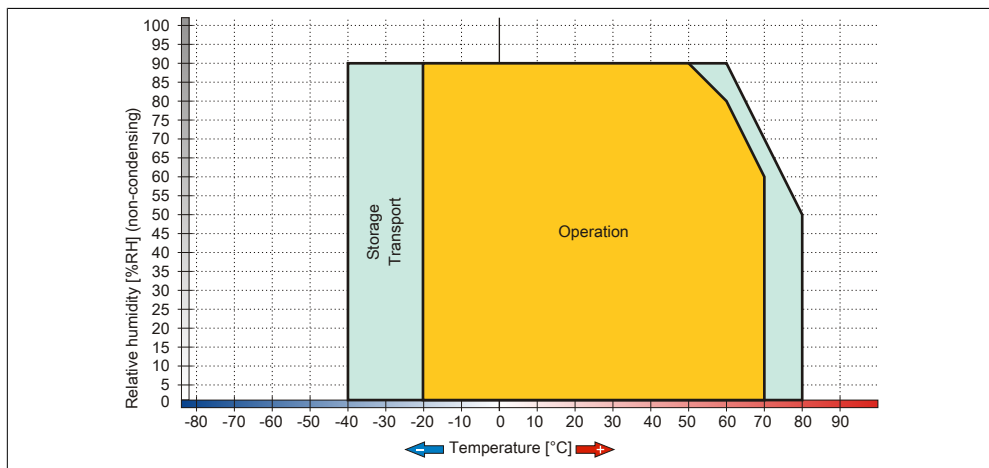
Image 99: Temperature humidity diagram - AMT touch screen 5-wire

## 2.3 Cleaning

The touch screen should be cleaned with a moist lint-free cloth. When moistening the cloth, use only water with detergent, screen cleaning agent, or alcohol (ethanol). The cleaning agent should be applied to the cloth beforehand and not sprayed directly onto the touch screen itself. Never use aggressive solvents, chemicals, or scouring agents.

## 3 Membrane

The décor foil conforms to DIN 42115 (section 2). This means it is resistant to exposure to the following chemicals for a 24-hour period with no visible signs of damage:

## Info:

**The following characteristics, features, and limit values only apply to this individual component and can deviate from those specified for the entire device.**

| | | |
|---|---|---|
| Ethanol<br>Cyclohexanol<br>Diacetone alcohol<br>Glycol<br>Isopropanol<br>Glycerine<br>Methanol<br>Triacetin<br>Dowandol<br>DRM/PM | Formaldehyde 37 to 42%<br>Acetaldehyde<br>Aliphatic hydrocarbons<br>Toluene<br>Xylene<br>White spirits | Trichloroethane<br>Ethyl acetate<br>Diethyl ether<br>N-Butyl acetate<br>Amyl acetate<br>Butylcellosolve<br>Ether |
| Acetone<br>Methyl ethyl ketone<br>Dioxan<br>Cyclohexanone<br>MIBK<br>Isophorone | Formic acid < 50%<br>Acetic acid < 50%<br>Phosphoric acid < 30%<br>Hydrochloric acid < 36%<br>Nitric acid < 10%<br>Trichloracetic acid < 50%<br>Sulphuric acid < 10% | Sodium hypochlorite < 20%<br>Hydrogen peroxide < 25%<br>Potassium carbonate<br>Washing agents<br>Tenside<br>Fabric conditioner<br>Ferrous chloride ($FeCl_2$)<br>Ferrous chloride ($FeCl_3$)<br>Dibutyl phthalate<br>Dioctyl phthalate<br>Sodium carbonate |
| Ammonia < 40%<br>Caustic soda < 40%<br>Potassium hydroxide<br>Alkali carbonate<br>Bichromate<br>Potassium<br>Acetonitrile<br>Sodium bisulphate | Cutting oil<br>Diesel oil<br>Linseed oil<br>Paraffin oil<br>Blown castor oil<br>Silicon oil<br>Turpentine oil substitute<br>Universal brake fluid<br>Aviation fuel<br>Gasoline<br>Water<br>Sea water<br>Decon | |

Table 206: Chemical resistance of the décor foil

The décor foil conforms to DIN 42115 section 2 for exposure to glacial acetic acid for less than one hour without visible damage.

# 4 Viewing angles

The viewing angle information of the display types (R, L, U, D) can be seen in the technical data for the individual components.



Facing 6 o'clock
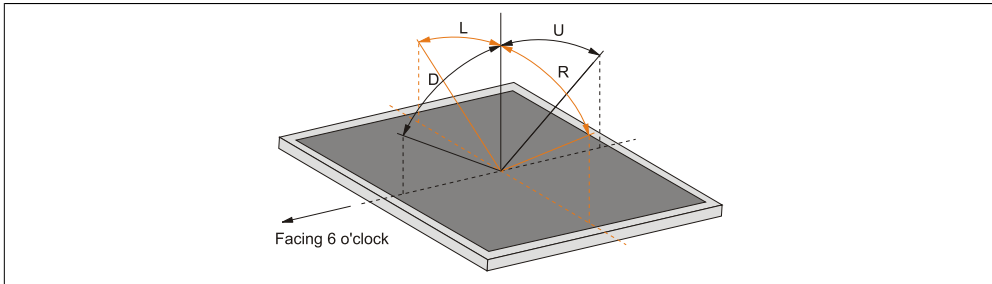
# 5 Mounting compatibilities

This section describes the compatibility of the installation dimensions for the Power Panel 100/200, Power Panel 300/400, Automation Panel 900 and Panel PC 800 units according to the respective device diagonals.

The outer dimensions of the device types are identical for the respective diagonals.

The different device types are abbreviated as follows:

| Device type | Abbreviation |
|---|---|
| Power Panel 100/200 | PP100/200 |
| Power Panel 300/400 | PP300/400 |
| Power Panel 500 | PP500 |
| Automation Panel 900 | AP900 |
| Panel PC 700 | PPC700 |
| Panel PC 800 | PPC800 |

Table 207: Product abbreviations

## 5.1 Compatibility overview

The following table offers a brief overview of the devices PP100/200, PP300/400, PP500, AP900, PPC700 and PPC800. For detailed information, see the section 5.2 "Compatibility details", on page 294 .

Compatibility between the device types is represented on each line by matching symbols.

| Size | Format | Compatible | PP100/200 | PP300/400 | PP500 | AP900 | PPC700 | PPC800 |
|---|---|---|---|---|---|---|---|---|
| 5.7" | Horizontal1 | Outer dimensions | ■ | ■ | ■ | - | - | - |
| | | Installation dimensions | ● | ● | ● | - | - | - |
| | | | | | | | | |
| | Horizontal2 | Outer dimensions | ■ | ■ | ■ | - | - | - |
| | | Installation dimensions | ● | ● | ● | - | - | - |
| | | | | | | | | |
| | Vertical1 | Outer dimensions | ■ | ■ | ■ | - | - | - |
| | | Installation dimensions | ● | ● | ▲ | - | - | - |
| | | | | | | | | |
| 10.4" | Horizontal 1 | Outer dimensions | ■ | ■ | ■ | ■ | ■ | - |
| | | Installation dimensions | ● | ● | ● | ● | ● | - |
| | | | | | | | | |
| | Horizontal2 | Outer dimensions | ■ | ■ | ■ | ■ | ■ | - |
| | | Installation dimensions | ● | ● | ▲ | ▲ | ▲ | - |
| | | | | | | | | |

Table 208: Device compatibility overview

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| Size | Format | Compatible | PP100/200 | PP300/400 | PP500 | AP900 | PPC700 | PPC800 |
|------|--------|-----------|-----------|-----------|-------|-------|--------|--------|
| | Vertical1 | Outer dimensions | ■ | ■ | ■ | ■ | ■ | - |
| | | Installation dimensions | ● | ● | ▲ | ▲ | ▲ | - |
| | | | | | | | | |
| 12.1" | Horizontal1 | Outer dimensions | ■ | ■ | ■ | ■ | ■ | - |
| | | Installation dimensions | ● | ● | ▲ | ▲ | ▲ | - |
| | | | | | | | | |
| 15" | Horizontal1 | Outer dimensions | ■ | ■ | ■ | ■ | ■ | ■ |
| | | Installation dimensions | ● | ● | ▲ | ● | ● | ● |
| | | | | | | | | |
| | Vertical1 | Outer dimensions | ■ | ■ | ■ | ■ | ■ | - |
| | | Installation dimensions | ● | ● | ▲ | ● | ● | - |
| | | | | | | | | |
| 17" | Horizontal 1 | Outer dimensions | - | - | - | ■ | ■ | |
| | | Installation dimensions | - | - | - | ▲ | ▲ | |
| | | | | | | | | |
| 19" | Horizontal 1 | Outer dimensions | - | - | - | ■ | ■ | |
| | | Installation dimensions | - | - | - | ▲ | - | |
| | | | | | | | | |
| 21.3" | Horizontal 1 | Outer dimensions | - | - | - | ■ | - | - |
| | | Installation dimensions | - | - | - | ▲ | - | - |

Table 208: Device compatibility overview

Appendix A

## 5.2 Compatibility details

### 5.2.1 Example

The measurement values (all in mm) in the following figures have the following meaning.
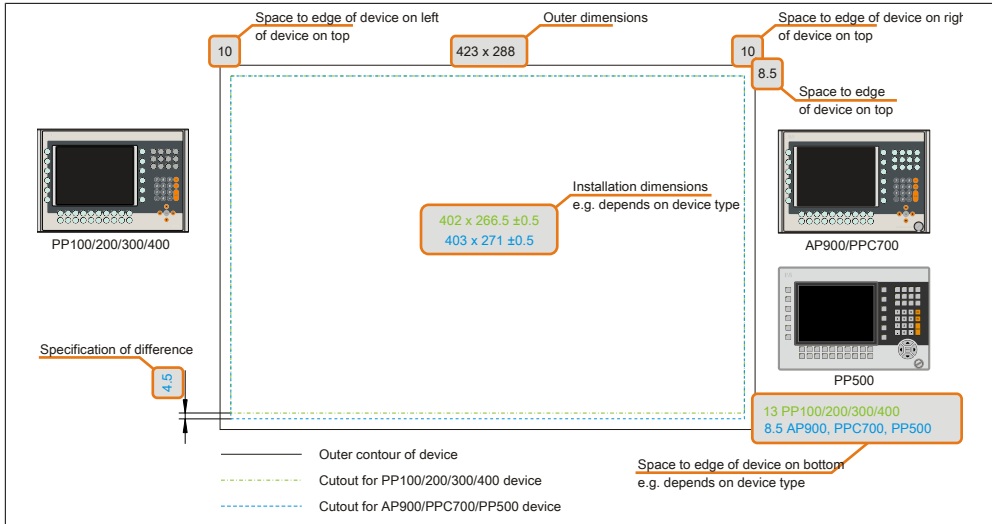


Image 100: Compatibility details - figure structure

### 5.2.2 5.7" devices
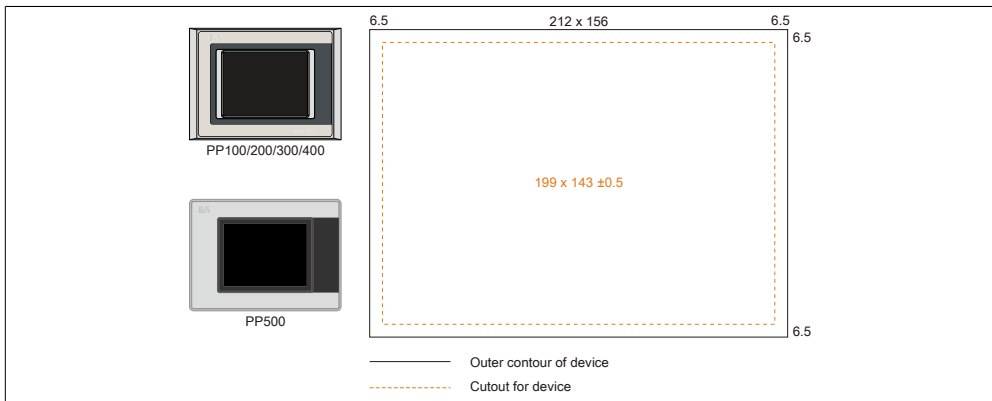


Image 101: Mounting compatibility - 5.7" device format - Horizontal1

5.7" Power Panel 500, Power Panel 300/400 and Power Panel 100/200 devices in Horizontal1 format are 100% mounting compatible.
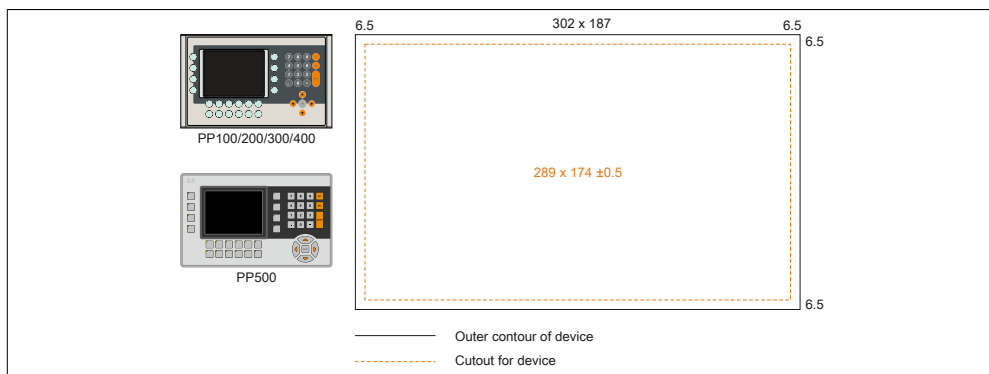
Image 102: Mounting compatibility - 5.7" device format - Horizontal2

5.7" Power Panel 500, Power Panel 300/400 and Power Panel 100/200 devices in Horizontal2 format are 100% mounting compatible.
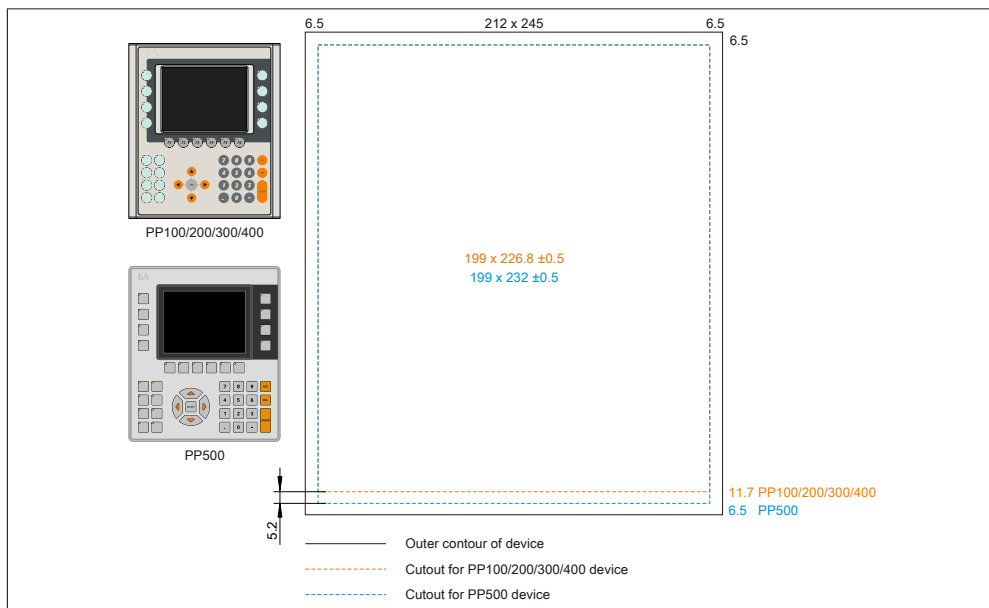


Image 103: Mounting compatibility - 5.7" device format - Vertical1

5.7" Power Panel 500 devices are not 100% mounting compatible with Power Panel 300/400 and Power Panel 100/200 devices in Vertical1 format. The Power Panel 500 devices require a cutout that is 5.2 mm higher (bottom edge).

The larger cutout can can be conditionally used for all devices:
- When mounting, make sure that the PP100/200/300/400 devices are placed and mounted as close to the center of the cutout as possible. Failure to do so can prevent the

retaining clips from holding firmly, which means that a firm seal is no longer guaranteed with the gasket (IP65).

### 5.2.3 10.4" devices
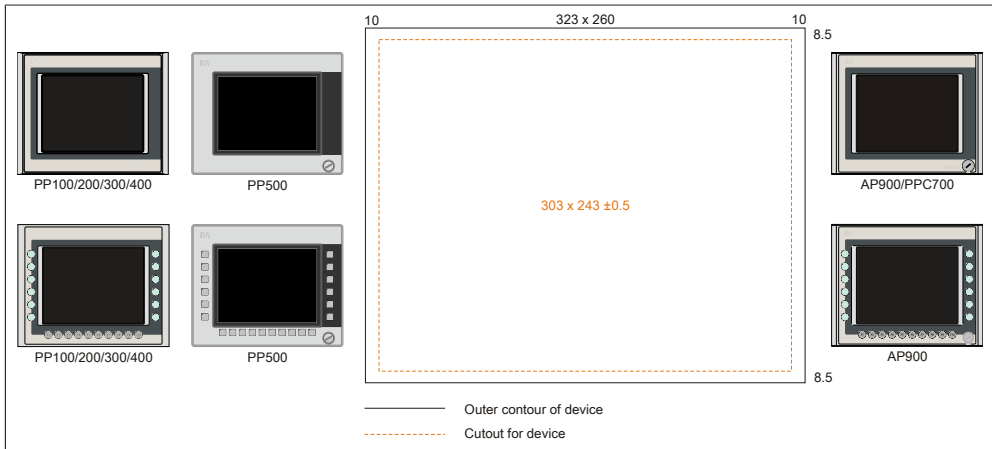


Image 104: Mounting compatibility - 10.4" device format - Horizontal1

10.4" Power Panel 500, Power Panel 300/400 and Power Panel 100/200 devices in Horizontal1 format are 100% mounting compatible.
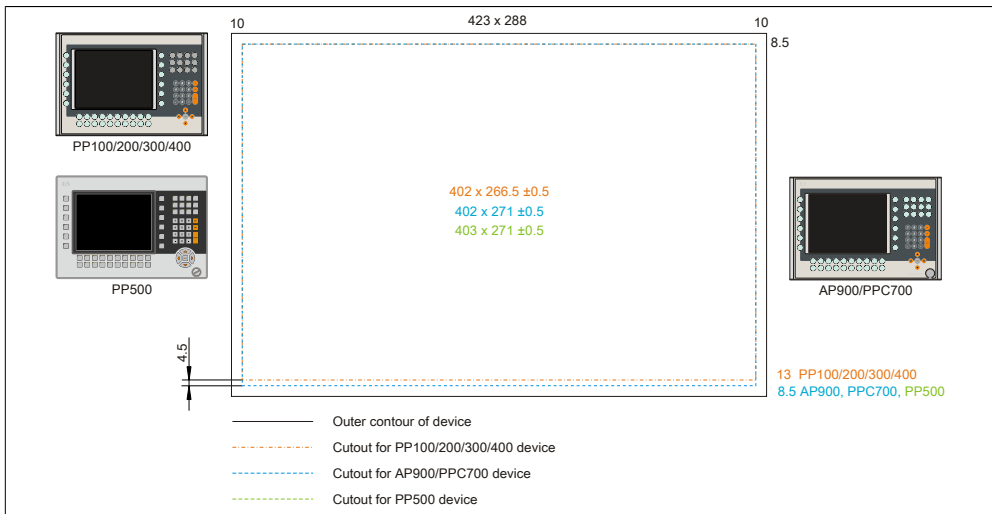


Image 105: Mounting compatibility - 10.4" device format - Horizontal2

The 10.4" Power Panel 500, Automation Panel 900 and Panel PC 700 devices are not 100% mounting compatible with the Power Panel 300/400 or Power Panel 100/200 device format Horizontal2. The Power Panel 500, Automation Panel 900 and Panel PC 700 devices require a cutout that is 4.5 mm higher (bottom edge).

The larger cutout can can be conditionally used for all devices:
*   When mounting, make sure that the PP100/200/300/400 devices are placed and mounted as close to the center of the cutout as possible. Failure to do so can prevent the retaining clips from holding firmly, which means that a firm seal is no longer guaranteed with the gasket (IP65).
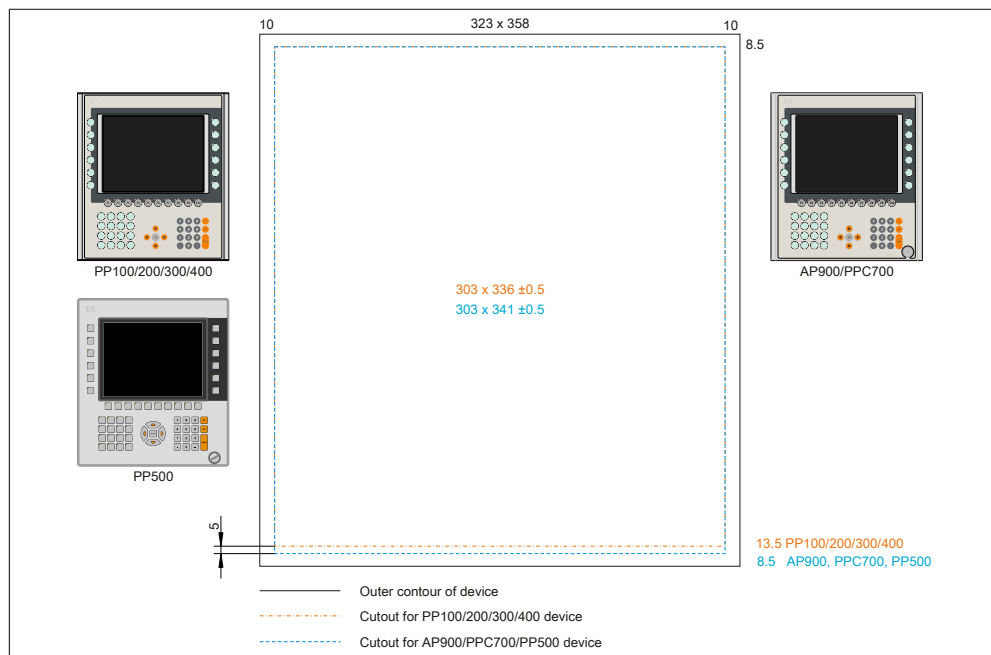


Image 106: Mounting compatibility - 10.4" device format - Vertical1

The 10.4" Power Panel 500, Automation Panel 900 and Panel PC 700 devices are not 100% mounting compatible with the Power Panel 300/400 or Power Panel 100/200 device format Vertical1. The Power Panel 500, Automation Panel 900 and Panel PC 700 devices require a cutout that is 5 mm higher (bottom edge).

The larger cutout can can be conditionally used for all devices:
*   When mounting, make sure that the PP100/200/300/400 devices are placed and mounted as close to the center of the cutout as possible. Failure to do so can prevent the retaining clips from holding firmly, which means that a firm seal is no longer guaranteed with the gasket (IP65).

### 5.2.4 12.1" devices
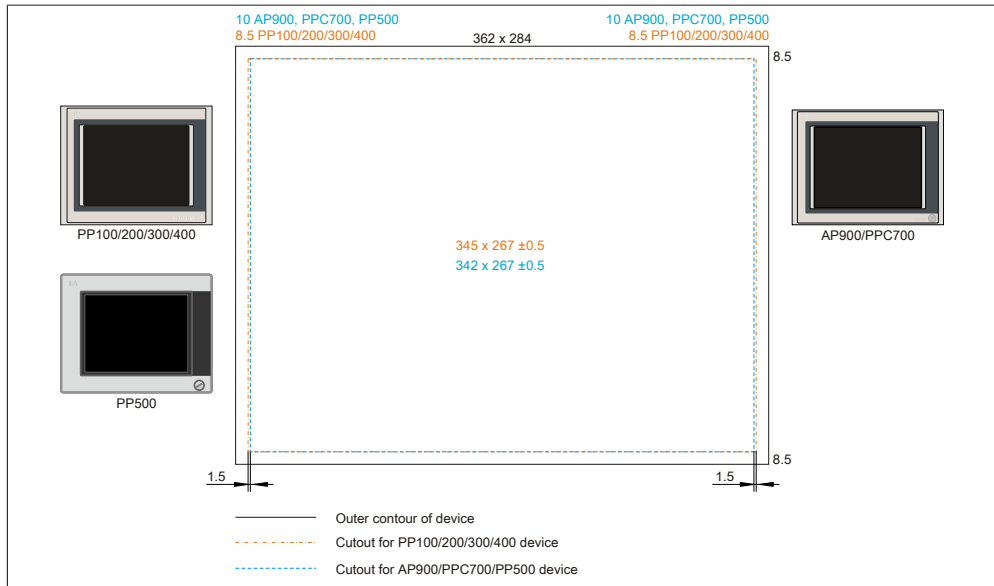


Image 107: Mounting compatibility - 12.1" device format - Horizontal1

The 12.1" Power Panel 500, Automation Panel 900 and Panel PC 700 devices are not 100% mounting compatible with the Power Panel 300/400 or Power Panel 100/200 device format Horizontal1. The Power Panel 300/400 and Power Panel 100/200 devices require a cut that is 1.5 mm wider (left and right).

The larger cutout can can be conditionally used for all devices:
- When mounting, make sure that the PP500, AP900 and PPC700 devices are placed and mounted as close to the center of the cutout as possible.

### 5.2.5 15" devices
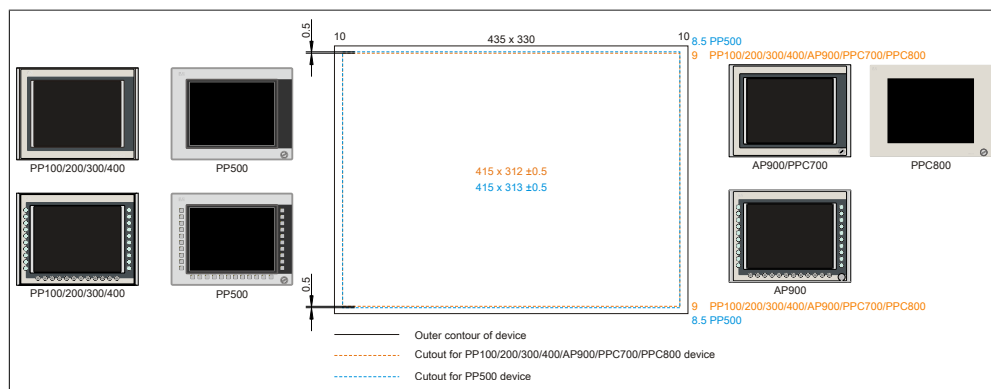


Image 108: Mounting compatibility - 15" device format - Horizontal1

15" Power Panel 500 devices are not 100% mounting compatible with the Power Panel 300/400, Power Panel 100/200, Automation Panel 900, Panel PC 700 and Panel PC 800 device format Vertical1. The Power Panel 500 devices require a cutout that is 0.5 mm higher (top and bottom edge).

The larger cutout can can be conditionally used for all devices:

- When mounting, make sure that the PP100/200/300/400, AP900, PPC700 and PPC800 devices are placed and mounted as close to the center of the cutout as possible. Failure to do so can prevent the retaining clips from holding firmly, which means that a firm seal is no longer guaranteed with the gasket (IP65).
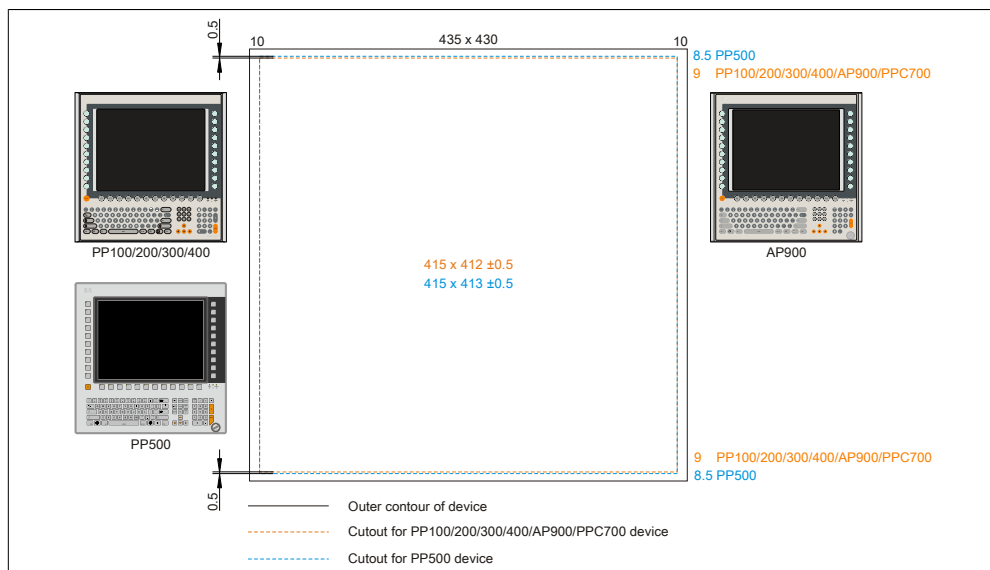
Image 109: Mounting compatibility - 15" device format - Vertical1

15" Power Panel 500 devices are not 100% mounting compatible with the Power Panel 300/400, Power Panel 100/200, Automation Panel 900 and Panel PC 700 device format Vertical1. The Power Panel 500 devices require a cutout that is 0.5 mm higher (top and bottom edge).

The larger cutout can can be conditionally used for all devices:

- When mounting, make sure that the PP100/200/300/400, AP900 and PPC700 devices are placed and mounted as close to the center of the cutout as possible. Failure to do so can prevent the retaining clips from holding firmly, which means that a firm seal is no longer guaranteed with the gasket (IP65).

### 5.2.6 17" devices
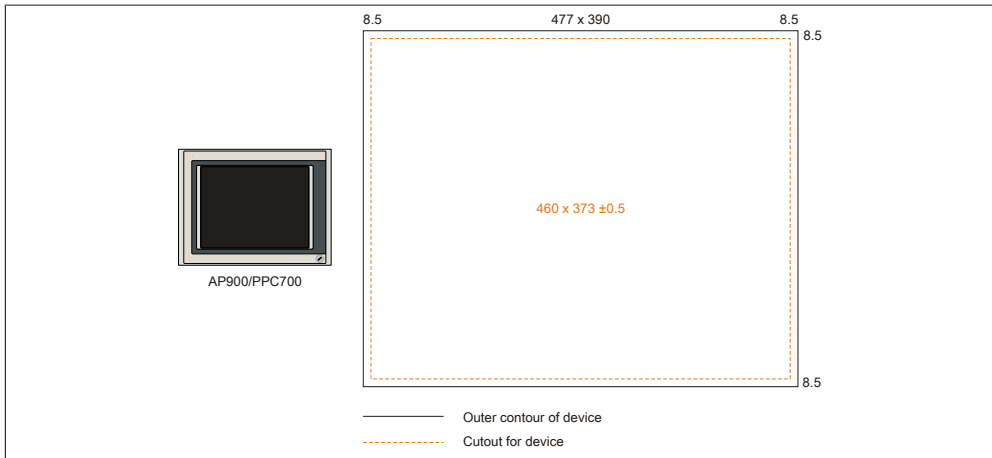


Image 110: Mounting compatibility - 17" device - Horizontal1

17" Automation Panel 900 and Panel PC 700 in Horizontal1 format are 100% mounting compatible.

### 5.2.7 19" devices
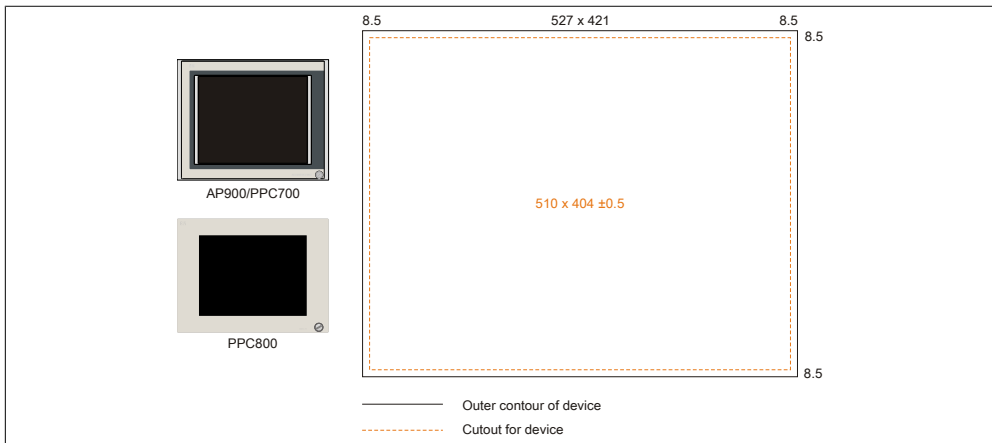


Image 111: Mounting compatibility - 19" device - Horizontal1

19" Automation Panel 900, Panel PC 700 and Panel PC 800 in Horizontal1 format are 100% mounting compatible.

Appendix A

**5.2.8 21.3" devices**



8.5          583 x 464          8.5
8.5

566 x 447 ±0.5

8.5

AP900

———————— Outer contour of device

- - - - - - - - Cutout for device
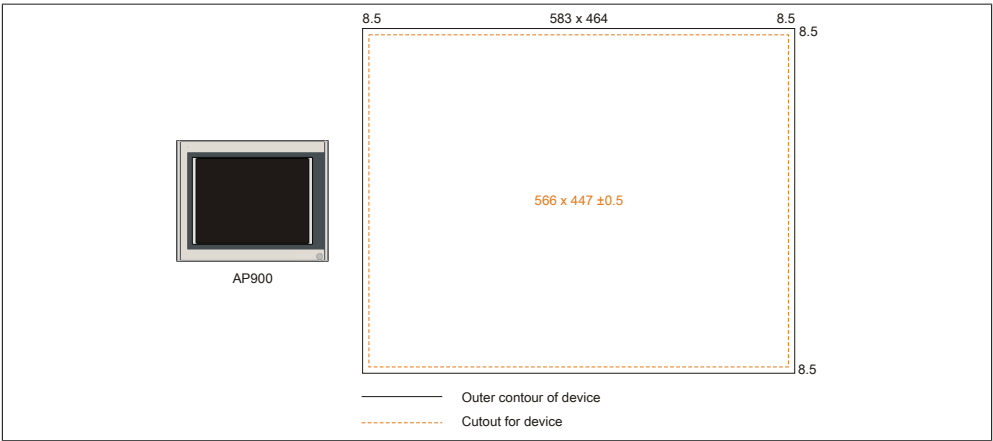
Image 112: Mounting compatibility - 21.1" device - Horizontal1

# 6 Abbreviations

| Abbreviation | Stands for | Description |
|---|---|---|
| NC | Normally closed | A normally closed (N.C.) relay contact. |
| | Not connected | Used in the description of pin assignments if a terminal or pin is not connected to a module. |
| ND | Not defined | In data tables, this stands for a value that has not been defined. Because a cable manufacturer does not provide certain technical data, for example. |
| NO | Normally open | A normally open (N.O.) relay contact. |
| TBD | To be defined | Used in technical data tables when certain information is not yet available. The value will be provided later. |

Table 209: Abbreviations used in this User's Manual

Appendix A

# 7 Glossary

| | |
|---|---|
| **Address** | An address is a character string for identifying a memory location or a memory area, where data is stored and can be retrieved. It is also a symbol (e.g. with numerical controllers) for identifying a function unit for which subsequent geometrical or technological data are determined by the symbol. |
| **Algorithms** | According to DIN 19226: Algorithms are a finite series of well-defined regulations. The desired output quantities are created from permitted system input quantities. It describes how something is to be done. A procedure must at least satisfy the following requirements to be valid as an algorithm in a mathematical context.<br><br>*Discreteness:* An algorithm is made up of a finite series of steps.<br><br>*Determinacy:* Under the same start conditions, it always creates the same end result.<br><br>*Clearness:* The series of steps is clearly defined.<br><br>*Finiteness:* It ends after a finite number of steps.<br><br>From a quantity theory perspective, an algorithm is clearly defined by a set of sizes [input, intermediate and output sizes], a set of elementary operations and also by a regulation, which specifies when and in what sequence certain operations should be carried out. From a functional perspective, it transfers a set of input sizes into a set of output sizes. It can be represented in text form in a natural or artificial formal language or using graphic representations [graph, program flow chart, structured chart, Petri Nets etc.]. |
| **ANSI** | American National Standards Institute > this organization promotes and manages American industrial standards. |
| **Application software** | Software, which is not used for operation by the computer itself, but rather when a computer is used to process a concrete application problem. It sets up the system software and uses this for fulfilling individual tasks. Application software can be accommodated in standard software used by a large number of customers in a wide range of industries. Common examples are Word, Excel, PowerPoint, Paint, Matlab etc. Industrial software tailored to the respective problems of a certain industry and individual software created for solving the particular problems of an individual user. |
| **Automation** | According to Brockhaus: The application of technical means, using specific programs that (either partially or totally) do not require human intervention to perform operations. |
| **Automation Runtime** | A uniform runtime system for all B&R automation components. |
| **Failure** | Failure according to IEC 61508: A function unit loses the ability to perform a required function. In regards to safety-oriented systems, a distinction is made between dangerous and safe failures. This depends on whether the status of the system failure is considered dangerous or safe. The cause of the failure may be load related or age-related, and therefore a random failure, or related to a flaw inherent in the system. In this case, it is known as a systematic failure. |

# A

# B

# X