Panel PC 800

User's Manual

Version: **1.18 (May 2013)**
Model no.: **MAPPC800-ENG**

Chapter 1 • General information

1 Manual history

Version	Date	Change
0.10 Preliminary	10-Nov-09	• First version
1.00	10-May-10	• Dimension diagrams for the PPC800 system units corrected. • Section "Temperature sensor locations" on page 31 expanded. • Additional point added to section 11 "Known problems / issues" on page 168. • Updated section 2.2 "Firmware upgrade" on page 216. • Updated section 2.1 "Temperature specifications" on page 28. • Updated section 2.2 "Humidity specifications" on page 32. • Updated section 2.3 "Power management" on page 33. • Updated section 2.4 "Block diagrams" on page 36. • Updated section 10 "Automation Runtime" on page 237. • Updated section 2.5 "Serial number sticker" on page 40. • Updated section 3.10 "Fan kit" on page 132. • Updated section 1.1 "Temperature monitoring - Fan control" on page 346. • Updated section 11 "B&R Automation Device Interface (ADI) - Control Center" on page 238. • Updated section 6 "Touch screen calibration" on page 158. • Updated section 7 "Connecting peripheral USB devices" on page 159. • Updated section 1.4 "Air circulation spacing" on page 140. • Updated section 1.3 "Mounting orientation" on page 137. • Updated section 7 "Windows Embedded Standard 2009" on page 230. • Updated section 5 "Connection examples" on page 147. • Chapter 5 "Standards and certifications" on page 254 updated. • The dongle 1A4300.LZ1U was added, see the section B&R Automation Runtime USB Dongle. • Technical data updated for the system units 5PC820.1505-00 and 5PC820.1906-00. • Revised technical data in sections 13.2 "SDL cables" on page 308, 13.3 "SDL cables with 45° connector" on page 311, 13.4 "SDL flex cables" on page 314 and 13.5 "SDL flex cables with extender" on page 317. • Warning regarding replacement of batteries updated in section 1.1 "0AC201.91 / 4A0006.00-000" on page 256 and 1 "Changing the battery" on page 325. • Figures updated for expansions, options and bus units. • CPU boards 5PC800.B945-05, 5PC800.B945-10, 5PC800.B945-11, 5PC800.B945-12, 5PC800.B945-13 and 5PC800.B945-14 were updated. • Description of +24 VDC supply voltage on page 41 changed. USB port caps (with anti-loss strap) 5AC900.1200-01, 5AC900.1200-02 and 5AC900.1200-03 added in Chapter 6 "Accessories". • The PCI SATA RAID controller 5ACPCI.RAIC-03 and the replacement PCI SATA RAID HDD 5ACPCI.RAIC-04 were updated. • Updated section 8 "Configuration of a SATA RAID array" on page 162.
1.01	04-Feb-11	• The name "AR010" was changed to "ARwin". • The section "B&R Automation Studio 3.0 USB Dongle" was changed to "B&R Automation Runtime USB Dongle". • The model numbers 9A0003.02U, 1A4600.10, 1A4600.10-2, 1A4600.10-3 and 1A4600.10-4 were updated. • Model number 1A4300.LZ1U removed. • B&R USB flash drive 5MMUSB.2048-01 added, see page USB flash drives. • "5AC801.HDDI-03" on page 90 updated. • "5ACPCI.RAIC-05" on page 122 updated. • "5MMHDD.0250-00" on page 128 updated. • Revised "Figure 2: Configuration - Optional components" on page 27. • 5AC801.HDDI-03, 5ACPCI.RAIC-05 and 5MMHDD.0250-00 added to the images for the ambient temperatures and in table "Table 8: Overview of humidity specifications for individual components" on page 32.

Table 1: Manual history

Version	Date	Change
1.02	20-May-11	• Model numbers in figure "Figure 25: 1 slot bus units" on page 76, in figure "Figure 26: 2 slot bus units" on page 76 and in figure 31 "Options", on page 88 corrected. • Sections "Windows 7" on page 225, "Windows Embedded Standard 7" on page 232, "Windows CE" on page 235, "B&R Automation Device Interface (ADI) .NET SDK" on page 250 added. • SRAM information for "5ACPCC.MPL0-00" on page 82 added. • BIOS version updated (1.15 -> 1.17). • Sections "Automation Runtime" on page 237, "B&R Automation Device Interface (ADI) - Control Center" on page 238, "B&R Automation Device Interface (ADI) Development Kit" on page 248, "B&R Key Editor" on page 252 and "HMI Drivers & Utilities DVD" on page 302 revised. • Lifespan of the battery corrected. • Chipset information for "CPU boards 945GME" on page 66 corrected. • Revised "Figure 2: Configuration - Optional components" on page 27. • Information about "Pixel errors" on page 167 added.
1.03	25-Jul-11	• Updated USB5 in heading ("USB interfaces (USB1, 2, 3, 4, 5)" on page 47). • Short description of 5AC801.HDDI-02 and 5AC801.HDDI-03 corrected in table "Table 31: Slide-in compact slot" on page 53. • Table entry "Typical charge duration when battery low" added in table "Table 212: 5AC600.UPSB-00, 5AC600.UPSB-00 - Technical data" on page 265. • Revised sections "B&R Automation Device Interface (ADI) - Control Center" on page 238, "B&R Automation Device Interface (ADI) Development Kit" on page 248 and "B&R Automation Device Interface (ADI) .NET SDK" on page 250. • Revised section "Windows XP Professional" on page 223. • "Information:" regarding installation added in section "Windows 7" on page 225. • Corrected information on "Windows XP mode" in section "Features with WES7 (Windows Embedded Standard 7)" on page 233. • Revised reference to external UPS 24 VDC in section "Uninterruptible power supply (UPS)" on page . • Sections "Mounting the side cover" on page 343, "5CAMSC.0001-00" on page 324 and "Connecting an external device to the mainboard" on page 348 added. • "Figure X: Leistungskalkulation PPC800 15"" on page and "Figure X: Leistungskalkulation PPC800 19"" on page revised. • Updated section "Switching the CompactFlash" on page 328.
1.04	29-Sep-11	• Temperatures during operation without fan were corrected for the CPU boards 5PC800.B945-10 and 5PC800.B945-11 to 35°C, for the CPU boards 5PC800.B945-12 and 5PC800.B945-13 to 45°C, see "Ambient temperature for CPU boards 5PC800.B945-1x and 5PC800.B945-05" on page 30.
1.05	21-Oct-11	• Section "card number switch" on page 85 for the POWERLINK insert card 5ACPCC.MPL0-00 revised.
1.10	24-Apr-12	• Revised section 9 "CompactFlash cards" on page 278. • Moved section "B&R Automation Device Interface (ADI) Development Kit" to Chapter 4 "Software". • Moved section "Temperature sensor locations" to Chapter 2 "Technical data". • Figure indicating how to change the battery updated (see "Figure 185: Remove battery" on page 326). • Updated section "Connection examples" on page 147. • The following sections were updated in Chapter 7 "Maintenance and service": "Installing the UPS module" on page 335, "Installing / exchanging the fan kit" on page 333, "5AC900.BLOC-00" on page 261, "Installing / exchanging an adapter" on page 340, "Installing / exchanging the bus unit" on page 339, "Procedure" on page 342, "Installing / exchanging a slide-in slot drive" on page 330, 331, "Procedure" on page 329, "Exchanging a PCI SATA RAID hard disk in a RAID 1 system" on page 344. • Revised chapter "Standards and certifications" on page 254. • Updated section "Cleaning" on page 327. • Updated section 3 "Touch Screen AMT 5-wire" on page 349 in Appendix A "Appendix A". • Added new CompactFlash cards 5CFCRD.xxxx-06 in Chapter 6 "Accessories". Discontinued CompactFlash cards 5CFCRD.xxxx-04. • BIOS version updated (1.13 -> 1.18). • Updated information about the Automation Device Interface and B&R Key Editor. • Revised entire manual according to current formatting standards.
1.11	13-Jul-12	• Updated section "Cable lengths and resolutions for SDL transmission" on page 42. • "Option" renamed to "Adapter".
1.12	06-Sep-12	• The table "Table 10: Power calculation for PPC800 19"" on page 35 was correct (Text Backlight Display 15" changed to Backlight Display 19").
1.15	04-Feb-13	• Updated section "General instructions for performing temperature testing" on page 143. • Updated Windows 7 Service Pack 1 (see "Windows 7" on page 225). • Updated Windows Embedded Standard 7 Service Pack 1 (see "Windows Embedded Standard 7" on page 232). • Added SSD drives "5AC801.SSDI-01" on page 97 and "5AC801.SSDI-02" on page 99. • Updated "B&R Automation Device Interface (ADI) - Control Center" on page 238. • Updated "B&R Automation Device Interface (ADI) Development Kit" on page 248 to version 3.40. • Updated "B&R Automation Device Interface (ADI) .NET SDK" on page 250 to version 1.80. • Updated "B&R Key Editor" on page 252 to version 3.30. • Image "Figure 2: Configuration - Optional components" on page 27 changed. • Updated technical data for CPU boards, see "CPU boards 945GME" on page 66. • CompactFlash card 5CFCRD.032G-06 updated, see "5CFCRD.xxxx-06" on page 280. • USB media drive updated, see "5MD900.USB2-02" on page 296

Table 1: Manual history

Version	Date	Change
1.16	13-Mar-13	• Updated the following drives: "5AC801.HDDI-04" on page 92, "5ACPCI.RAIC-06" on page 125, "5MMHDD.0500-00" on page 130. • General information revised for drives "5ACPCI.RAIC-05" on page 122 and "5MMHDD.0250-00" on page 128. • Order data added for system units "5PC820.1505-00" on page 54 and "5PC820.1906-00" on page 60.
1.17	18-Mar-13	• Section "Windows Embedded Standard 7" on page 232 revised. • New CompactFlash cards (8 GB) added in Chapter 6 "Accessories".
1.18	15-May-13	• Updated add-on fuse kit "5AC600.UPSF-00" on page 269 and replacement fuses "5AC600.UPSF-01" on page 269 for the UPS battery unit. • Added drive "5AC801.SSDI-03" on page 101. • Updated replacement SSDs "5MMSSD.0060-00" on page 103, "5MMSSD.0060-01" on page 105 and "5MMSSD.0180-00" on page 107. • Updated technical data for HDD "5AC801.HDDI-04" on page 92. • Changed the ambient temperature tables in section "Temperature specifications" on page 28

Table 1: Manual history

2 Safety guidelines

2.1 Intended use

Programmable logic controllers (PLCs), operating/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 industrial environments. 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, their use in flight control or flight safety systems as well as in the control of mass transportation systems, medical life support systems or weapons systems.

2.2 Protection against electrostatic discharge

Electrical components that can be damaged by 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 a housing").
- **Electrical components without a housing**
  …Must be protected by ESD-suitable packaging.

2.2.2 Guidelines for proper ESD handling

Electrical components with a housing

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

Electrical components without a housing

The following applies in addition to the points listed under "Electrical components with a housing":

- Any persons handling electrical components or devices with installed electrical components must be grounded.
- Components may only be touched on their narrow sides or front plate.
- Components should always be stored in a suitable medium (ESD packaging, conductive foam, etc.). Metallic surfaces are not suitable storage surfaces!
- Components should not be subjected to electrostatic discharge (e.g. through the use of charged plastics).
- Ensure a minimum distance of 10 cm 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.).
- These increased ESD protective measures for individual components are not necessary for customers handling B&R products.

2.3 Policies and procedures

Electronic devices are never completely failsafe. If the programmable control system, operating/monitoring device or uninterruptible power supply fails, the user is responsible for ensuring that other connected devices, e.g. motors, are brought to a secure state.

When using programmable logic controllers or operating/monitoring devices as control systems together with a Soft PLC (e.g. B&R Automation Runtime or comparable product) or Slot PLC (e.g. B&R LS251 or comparable product), safety precautions relevant 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 the installation, commissioning and servicing of devices are only permitted to be carried out by qualified personnel. Qualified personnel are those familiar with the transport, mounting, installation, commissioning and operation of of devices who also have the appropriate qualifications (e.g. IEC 60364). National accident prevention regulations must be observed.
The safety notices, 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 against undue stress (mechanical loads, temperature, humidity, aggressive atmospheres, etc.).

2.5 Installation

- Installation must be performed according to this documentation using suitable equipment and tools.
- Devices may only be installed by qualified personnel without voltage applied. Before installation, voltage to the control cabinet must be switched off and prevented from being switched on again.
- General safety guidelines and national accident prevention regulations must be observed.
- Electrical installation must be carried out according to applicable guidelines (e.g. line cross sections, fuses, protective ground connections).

2.6 Operation

2.6.1 Protection against touching electrical parts

To operate programmable logic controllers, operating/monitoring devices or uninterruptible power supplies, it is necessary for certain parts to carry dangerous voltage levels over 42 VDC. Touching one of these parts can result in a life-threatening electric shock. This could lead to death, severe injury or damage to equipment.

Before turning on the programmable logic controller, operating/monitoring devices or the uninterruptible power supply, the housing must be properly grounded (PE rail). Ground connections must be established even when testing or operating operating/monitoring devices or the uninterruptible power supply for a short time!

Before turning the device on, all parts that carry voltage must be securely covered. During operation, all covers must remain closed.

2.6.2 Environmental conditions - Dust, humidity, aggressive gases

The use of operating/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 can affect functionality and may prevent sufficient cooling, especially in systems with active cooling systems (fans).

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

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

2.6.3 Viruses and dangerous programs

This system is subject to potential risk 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 preventive measures such as virus protection programs, firewalls, etc. and making sure that software is only obtained from trusted sources.

2.7 Environmentally friendly disposal

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

2.7.1 Separation of materials

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

Component	Disposal
Programmable logic controllers Operating/monitoring devices Uninterruptible power supply Batteries and rechargeable batteries 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 applicable legal regulations.

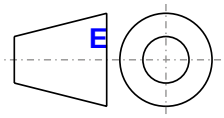
3 Organization of safety notices

Safety notices in this manual are organized as follows:

Safety notice	Description
Danger!	Disregarding these safety guidelines and notices can be life-threatening.
Warning!	Disregarding these safety guidelines and notices can result in severe injury or substantial damage to equipment.
Caution!	Disregarding these safety guidelines and notices can result in injury or damage to equipment.
Information:	This information is important for preventing errors.

Table 3: Description of the safety notices used in this documentation

4 Guidelines



European dimension standards apply to all dimension diagrams in this document.

All dimensions are specified in mm.

Range of nominal sizes	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: Range of nominal sizes

5 Overview

Product ID	Short description	on page
	24 VDC UPS modules	
9A0100.11	UPS 24 VDC, 24 VDC input, 24 VDC output, serial interface	270
	Accessories	
5AC900.1201-00	USB interface cover M20 IP65 flat	260
5AC900.1201-01	USB interface cover M20 IP65 curved	260
5AC900.BLOC-00	Terminal block with brackets, 10 pcs.; replacement part	261
5ACPCI.ETH1-01	PCI Ethernet card 1x 10/100	272
5ACPCI.ETH3-01	PCI Ethernet card 3x 10/100	275
5CAMSC.0001-00	Internal supply cable	324
9A0003.02U	USB port button holder DS9490B	237
	Adapter	
5AC803.BC01-00	PPC800 adapter: 1 compact PCI Express.	78
5AC803.BC02-00	PPC800 adapter: 1 compact slide-in.	78
	Automation Runtime	
1A4600.10-2	B&R Automation Runtime ARwin, ARNC0	237
1A4600.10-3	B&R Automation Runtime ARwin+PVIControls incl. license sticker and copy protection	237
1A4600.10-4	B&R Automation Runtime ARwin+ARNC0+PVIControls	237
	Batteries	
0AC201.91	Lithium batteries 4 pcs., 3 V / 950 mAh button cell We hereby declare that the Lithium cells contained in this shipment qualify as "partly regulated". Handle with care. If the package is damaged, inspect cells, repack intact cells and protect cells against short circuits. For emergency information, call RENATA SA at + 41 61 319 28 27	256
4A0006.00-000	Lithium battery, 3 V / 950 mAh, button cell	256
	Battery units	
9A0100.12	UPS battery unit type A, 24 V, 7 Ah, incl. battery cage	270
9A0100.14	UPS battery unit type B, 24 V, 2.2 Ah, incl. battery cage	270
9A0100.16	UPS battery unit type C, 24 V, 4.5 Ah, incl. battery cage	270
	Bus units	
5AC803.BX01-00	PPC800 bus; 1 PCI, 1 slide-in slot.	76
5AC803.BX01-01	PPC800 bus; 1 PCI Express, 1 slide-in slot.	76
5AC803.BX02-00	PPC800 bus; 2 PCI, 1 slide-in slot.	76
5AC803.BX02-01	PPC800 bus: 1 PCI, 1 PCI Express, 1 slide-in slot.	76
	CPU boards	
5PC800.B945-00	Intel Core Duo L2400 CPU board, 1.66 GHz, dual-core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	66
5PC800.B945-01	Intel Core2 Duo L7400 CPU board, 1.5 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	66
5PC800.B945-02	Intel Core2 Duo U7400 CPU board, 1.06 GHz, dual-core, 533 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	66
5PC800.B945-03	Intel Celeron M 423 CPU board, 1.06 GHz, single-core, 533 MHz FSB, 1 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	66
5PC800.B945-04	Intel Core2 Duo T7400 CPU board, 2.16 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	66
5PC800.B945-05	Intel Atom N270 CPU board, 1.6 GHz, single-core, 533 MHz FSB, 512 kB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	66
5PC800.B945-10	Intel Core Duo L2400 CPU board, 1.66 GHz, dual-core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	66
5PC800.B945-11	Intel Core2 Duo L7400 CPU board, 1.5 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	66
5PC800.B945-12	Intel Core2 Duo U7400 CPU board, 1.06 GHz, dual-core, 533 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	66
5PC800.B945-13	Intel Celeron M 423 CPU board, 1.06 GHz, single-core, 533 MHz FSB, 1 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	66
5PC800.B945-14	Intel Core2 Duo T7400 CPU board, 2.16 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	66
	CompactFlash	
5CFCRD.0064-03	CompactFlash 64 MB Western Digital (SLC)	288
5CFCRD.0128-03	CompactFlash 128 MB Western Digital (SLC)	288
5CFCRD.016G-04	CompactFlash 16 GB B&R (SLC)	284
5CFCRD.016G-06	CompactFlash 16 GB B&R (SLC)	280
5CFCRD.0256-03	CompactFlash 256 MB Western Digital (SLC)	288
5CFCRD.032G-06	CompactFlash 32 GB B&R (SLC)	280
5CFCRD.0512-03	CompactFlash 512 MB Western Digital (SLC)	288
5CFCRD.0512-04	CompactFlash 512 MB B&R (SLC)	284
5CFCRD.0512-06	CompactFlash 512 MB B&R (SLC)	280
5CFCRD.1024-03	CompactFlash 1 GB Western Digital (SLC)	288
5CFCRD.1024-04	CompactFlash 1 GB B&R (SLC)	284
5CFCRD.1024-06	CompactFlash 1 GB B&R (SLC)	280
5CFCRD.2048-03	CompactFlash 2 GB Western Digital (SLC)	288
5CFCRD.2048-04	CompactFlash 2 GB B&R (SLC)	284
5CFCRD.2048-06	CompactFlash 2 GB B&R (SLC)	280
5CFCRD.4096-03	CompactFlash 4 GB Western Digital (SLC)	288
5CFCRD.4096-04	CompactFlash 4 GB B&R (SLC)	284
5CFCRD.4096-06	CompactFlash 4 GB B&R (SLC)	280
5CFCRD.8192-03	CompactFlash 8 GB Western Digital (SLC)	288

Product ID	Short description	on page
5CFCRD.8192-04	CompactFlash 8 GB B&R (SLC)	284
5CFCRD.8192-06	CompactFlash 8 GB B&R (SLC)	280
	DVI cable	
5CADVI.0018-00	DVI-D cable, 1.8 m	305
5CADVI.0050-00	DVI-D cable, 5 m	305
5CADVI.0100-00	DVI-D cable, 10 m	305
	Drives	
5AC801.ADAS-00	SATA hard disk adapter for operating a slide-in compact hard disk in a slide-in slot	109
5AC801.DVDS-00	DVD-ROM slide-in SATA drive.	112
5AC801.DVRS-00	DVD-R/RW DVD+R/RW slide-in SATA drive.	114
5AC801.HDDI-00	40 GB slide-in compact SATA hard disk; 24/7 operation with extended temperature range. Note: Please see the manual for information about using this hard disk.	86
5AC801.HDDI-02	160 GB slide-in compact SATA hard disk; 24/7 hard disk with extended temperature range. Note: Please see the manual for information about using this hard disk.	88
5AC801.HDDI-03	250 GB slide-in compact SATA hard disk, 24/7 operation. Note: Please see the manual for information about using this hard disk.	90
5AC801.HDDI-04	500 GB SATA hard disk (slide-in compact); 24/7 hard disk. Note: Please see the manual for information about using this hard disk.	92
5AC801.HDDS-00	40 GB slide-in SATA hard disk; 24/7 operation with extended temperature range. Note: Please see the manual for information about using this hard disk.	110
5AC801.SSDI-00	32 GB slide-in compact SATA SSD (SLC).	94
5AC801.SSDI-01	60 GB slide-in compact SATA SSD (MLC).	97
5AC801.SSDI-02	180 GB slide-in compact SATA SSD (MLC).	99
5AC801.SSDI-03	60 GB slide-in compact SATA SSD (MLC).	101
5ACPCI.RAIC-03	PCI RAID system SATA 2x 160 GB; Note: Please see the manual for information about using this hard disk.	117
5ACPCI.RAIC-04	160 GB SATA hard disk, replacement part for 5ACPCI.RAIC-03; Note: Please see the manual for information about using this hard disk.	120
5ACPCI.RAIC-05	PCI RAID system SATA 2x 250 GB; Note: Please see the manual for information about using this hard disk.	122
5ACPCI.RAIC-06	PCI RAID system SATA 2x 500 GB; Note: Please see the manual for information about using this hard disk.	125
5MMHDD.0250-00	250 GB SATA hard disk replacement part for 5AC801.HDDI-03 and 5ACPCI.RAIC-05; Note: Please see the manual for information about using this hard disk.	128
5MMHDD.0500-00	500 GB SATA hard disk replacement part for 5AC801.HDDI-04, 5AC901.CHDD-01 and 5ACPCI.RAIC-06; Note: Please see the manual for information about using this hard disk.	130
5MMSSD.0060-00	60 GB SATA SSD (MLC); replacement part for 5AC801.SSDI-01 and 5AC901.CSSD-01; SSD for 5PP5IO.GMAC-00; note: Please see the manual for information about using this SSD.	103
5MMSSD.0060-01	60 GB SATA SSD (MLC); replacement part for 5AC801.SSDI-03 and 5AC901.CSSD-03; SSD for 5PP5IO.GMAC-00; note: Please see the manual for information about using this SSD.	105
5MMSSD.0180-00	180 GB SATA SSD (MLC); replacement part for 5AC801.SSDI-02 and 5AC901.CSSD-02; SSD for 5PP5IO.GMAC-00; note: Please see the manual for information about using this SSD.	107
	Expansions	
5AC803.SX01-00	PPC800 expansion; 1 PCI/PCI Express and 1 slide-in slot (bus 5AC803.BX01-00 or 5AC803.BX01-01 required)	71
5AC803.SX02-00	PPC800 expansion; 2 PCI/PCI Express and 1 slide-in slot (bus 5AC803.BX02-00 or 5AC803.BX02-01 required)	71
	Fan kits	
5AC803.FA01-00	PPC800 fan kit for system units without an expansion	132
5AC803.FA02-00	PPC800 fan kit for system units with expansion 5AC803.SX01-00	133
5AC803.FA03-00	PPC800 fan kit for system units with expansion 5AC803.SX02-00	135
	Heat sinks	
5AC803.HS00-00	PPC800 heat sink for CPU boards with dual-core processors L2400, L7400, U7500 and Celeron M 423.	69
5AC803.HS00-01	PPC800 heat sink for CPU boards with dual-core processors T7400, T9400 and P8400.	69
5AC803.HS00-02	PPC800 heat sink for CPU board with Atom processor N270.	69
	Interface cards	
5ACPCC.ETH0-00	Compact PCIe Ethernet card 1x 10/100/1000	80
5ACPCC.MPL0-00	PCIec POWERLINK card, 2 POWERLINK interfaces, 512 kB SRAM	82
	MS-DOS	
9S0000.01-010	OEM Microsoft MS-DOS 6.22, German disks, only supplied together with a new PC.	222
9S0000.01-020	OEM Microsoft MS-DOS 6.22, English disks, only supplied together with a new PC.	222
	Main memory	
5MMDDR.0512-01	SO-DIMM DDR2 RAM 512 MB PC2-5300	70
5MMDDR.1024-01	SO-DIMM DDR2 RAM 1024 MB PC2-5300	70
5MMDDR.2048-01	SO-DIMM DDR2 RAM 2048 MB PC2-5300	70
	Miscellaneous	
5AC900.1000-00	Adapter DVI (plug) to CRT (socket). For connecting a standard monitor to a DVI-I interface.	259
	Other	
5SWHMI.0000-00	HMI Drivers & Utilities DVD	302
	RS232 cable	
9A0014.02	RS232 extension cable for remote operation of a display unit with touch screen, 1.8 m	322
9A0014.05	RS232 extension cable for remote operation of a display unit with touch screen, 5 m	322
9A0014.10	RS232 extension cable for remote operation of a display unit with touch screen, 10 m	322
	Replacement batteries	
9A0100.13	UPS batteries type A (replacement part), 2x 12 V, 7 Ah, for battery unit 9A0100.12	270
9A0100.15	UPS batteries type B (replacement part), 2x 12 V, 2.2 Ah, for battery unit 9A0100.14	270
9A0100.17	UPS batteries type C (replacement part), 2x 12 V, 4.5 Ah, for battery unit 9A0100.16	270
	SDL cable - 45° connector	
5CASDL.0018-01	SDL cable with 45° connector, 1.8 m	311
5CASDL.0050-01	SDL cable with 45° connector, 5 m	311
5CASDL.0100-01	SDL cable with 45° connector, 10 m	311

Product ID	Short description	on page
5CASDL.0150-01	SDL cable with 45° connector, 15 m	311
	SDL cables	
5CASDL.0018-00	SDL cable, 1.8 m	308
5CASDL.0050-00	SDL cable, 5 m	308
5CASDL.0100-00	SDL cable, 10 m	308
5CASDL.0150-00	SDL cable, 15 m	308
5CASDL.0200-00	SDL cable, 20 m	308
5CASDL.0250-00	SDL cable, 25 m	308
5CASDL.0300-00	SDL cable, 30 m	308
	SDL flex cable	
5CASDL.0018-03	SDL flex cable, 1.8 m	314
5CASDL.0050-03	SDL flex cable, 5 m	314
5CASDL.0100-03	SDL flex cable, 10 m	314
5CASDL.0150-03	SDL flex cable, 15 m	314
5CASDL.0200-03	SDL flex cable, 20 m	314
5CASDL.0250-03	SDL flex cable, 25 m	314
5CASDL.0300-03	SDL flex cable, 30 m	314
5CASDL.0300-13	SDL flex cable with extender, 30 m	317
5CASDL.0400-13	SDL flex cable with extender, 40 m	317
5CASDL.0430-13	SDL flex cable with extender, 43 m	317
	System units	
5PC820.1505-00	Panel PC 820 15" XGA TFT display with touch screen (resistive); connections for 1x RS232, 5x USB 2.0, Smart Display Link/DVI/Monitor, 2x Ethernet 10/100/1000, HDA sound, add-on UPS slot, expandable with 1 or 2 PCI / PCI Express slots, optional CompactPCI Express and compact slide-in slot; IP65 protection (front side); order 24 VDC plug for supply voltage separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91).	54
5PC820.1906-00	Panel PC 820 19" SXGA color TFT display with touch screen (resistive); connections for 1x RS232, 5x USB 2.0, Smart Display Link/DVI/Monitor, 2x Ethernet 10/100/1000, HDA sound, add-on UPS slot, expandable with 1 or 2 PCI / PCI Express slots, optional CompactPCI Express and compact slide-in slot; IP65 protection (front side); order 24 VDC plug for supply voltage separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91).	60
	Terminal blocks	
0TB103.9	Connector, 24 VDC, 3-pin female, 3.31 mm² screw clamp, protected against vibration by the screw flange	258
0TB103.91	Connector, 24 VDC, 3-pin female, 3.31 mm² cage clamp, protected against vibration by the screw flange	258
	USB accessories	
5A5003.03	Front cover, for Remote CD-ROM drive 5A5003.02 and USB 2.0 drive combination 5MD900.USB2-00, 5MD900.USB2-01 and 5MD900.USB2-02.	300
5MD900.USB2-02	USB 2.0 drive combination, consists of DVD-R/RW DVD+R/RW, CompactFlash slot (Type II), USB connection (Type A on the front, Type B on the back); 24V DC (order screw clamp terminal 0TB103.9 or cage clamp terminal 0TB103.91 separately)	296
5MMUSB.2048-00	USB 2.0 flash drive, 2048 MB	292
5MMUSB.2048-01	USB 2.0 flash drive, 2048 MB, B&R	294
	USB cable	
5CAUSB.0018-00	USB 2.0 connection cable type A - type B, 1.8 m.	321
5CAUSB.0050-00	USB 2.0 connection cable type A - type B, 5 m.	321
	Uninterruptible power supplies	
5AC600.UPSB-00	Battery unit 5 Ah; or APC620, APC810 or PPC800 UPS.	265
5AC600.UPSF-00	UPS fuse kit for battery unit 5AC600.UPSB-00 up to revision D0.	269
5AC600.UPSF-01	UPS fuse, 5 pcs.	269
5AC600.UPSI-00	UPS module for APC620, APC810, PPC800; for system units 5PC600.SX01-00 (beginning with rev. H0), 5PC600.SX02-00 (beginning with rev. G0), 5PC600.SX02-01 (beginning with rev. H0), 5PC600.SX05-00 (beginning with rev. F0), 5PC600.SX05-01 (beginning with rev. F0), 5PC600.SF03-00 (beginning with rev. A0), 5PC810.SX*. 5PC820.1505-00, 5PC820.1906-00. Order cable (5CAUPS.0005-00 or 5CAUPS.0030-00) and battery unit (5AC600.UPSB-00) separately.	263
5CAUPS.0005-00	UPS cable 0.5 m; for UPS 5AC600.UPSI-00.	268
5CAUPS.0030-00	UPS cable 3 m; for UPS 5AC600.UPSI-00.	268
	Windows 7 Professional/Ultimate	
5SWWI7.0100-ENG	Microsoft OEM Windows 7 Professional 32-bit, DVD, English. Only available with a new device.	225
5SWWI7.0100-GER	Microsoft OEM Windows 7 Professional 32-bit, DVD, German. Only available with a new device.	225
5SWWI7.0200-ENG	Microsoft OEM Windows 7 Professional 64-bit, DVD, English. Only available with a new device.	225
5SWWI7.0200-GER	Microsoft OEM Windows 7 Professional 64-bit, DVD, German. Only available with a new device.	225
5SWWI7.0300-MUL	Microsoft OEM Windows 7 Ultimate 32-bit, DVD, multilingual. Only available with a new device.	225
5SWWI7.0400-MUL	Microsoft OEM Windows 7 Ultimate 64-bit, DVD, multilingual. Only available with a new device.	225
5SWWI7.1100-ENG	Microsoft OEM Windows 7 Professional 32-bit, Service Pack 1, DVD, English. Only available with a new device.	225
5SWWI7.1100-GER	Microsoft OEM Windows 7 Professional 32-bit, Service Pack 1, DVD, German. Only available with a new device.	225
5SWWI7.1200-ENG	Microsoft OEM Windows 7 Professional 64-bit, Service Pack 1, DVD, English. Only available with a new device.	225
5SWWI7.1200-GER	Microsoft OEM Windows 7 Professional 64-bit, Service Pack 1, DVD, German. Only available with a new device.	225
5SWWI7.1300-MUL	Microsoft OEM Windows 7 Ultimate 32-bit, Service Pack 1, DVD, multilingual. Only available with a new device.	225
5SWWI7.1400-MUL	Microsoft OEM Windows 7 Ultimate 64-bit, Service Pack 1, DVD, multilingual. Only available with a new device.	225
	Windows CE 6.0	
5SWWCE.0827-ENG	Microsoft OEM Windows CE 6.0 Professional, English; for PPC800 with 945GME chipset; order CompactFlash separately (at least 128 MB).	235
	Windows Embedded Standard 2009	
5SWWXP.0727-ENG	Microsoft OEM Windows Embedded Standard 2009, English; for PPC800 with 945GME chipset; order CompactFlash separately (min. 1 GB)	230
	Windows Embedded Standard 7	
5SWWI7.0527-ENG	Microsoft OEM Windows Embedded Standard 7 32-bit, English; for PPC800 with 945GME chipset; order CompactFlash separately (at least 8 GB).	232

Product ID	Short description	on page
5SWWI7.0627-ENG	Microsoft OEM Windows Embedded Standard 7 64-bit, English; for PPC800 with 945GME chipset; order CompactFlash separately (at least 16 GB).	232
5SWWI7.0727-MUL	Microsoft OEM Windows Embedded Standard 7 Premium 32-bit, multilingual; for PPC800 with 945GME chipset; order CompactFlash separately (at least 8 GB).	232
5SWWI7.0827-MUL	Microsoft OEM Windows Embedded Standard 7 Premium 64-bit, multilingual; for PPC800 with 945GME chipset; order CompactFlash separately (at least 16 GB).	232
5SWWI7.1527-ENG	Microsoft OEM Windows Embedded Standard 7 32-bit, Service Pack 1, English; for PPC800 with 945GME chipset; order CompactFlash separately (at least 16 GB).	232
5SWWI7.1627-ENG	Microsoft OEM Windows Embedded Standard 7 64-bit, Service Pack 1, English; for PPC800 with 945GME chipset; order CompactFlash separately (at least 16 GB).	232
5SWWI7.1727-MUL	Microsoft OEM Windows Embedded Standard 7 Premium 32-bit, Service Pack 1, Multilanguage; for PPC800 with 945GME chipset; order CompactFlash separately (min. 16 GB).	232
5SWWI7.1827-MUL	Microsoft OEM Windows Embedded Standard 7 Premium 64-bit, Service Pack 1, Multilanguage; for PPC800 with 945GME chipset; order CompactFlash separately (min. 16 GB).	232
	Windows XP Embedded	
5SWWXP.0427-ENG	Microsoft OEM Windows XP Embedded Feature Pack 2007, English; for PPC800 with 945GME chipset; order CompactFlash separately (at least 512 MB).	228
	Windows XP Professional	
5SWWXP.0500-ENG	Microsoft OEM Windows XP Professional Service Pack 2c, CD, English. Only available with a new device.	223
5SWWXP.0500-GER	Microsoft OEM Windows XP Professional Service Pack 2c, CD, German. Only available with a new device.	223
5SWWXP.0500-MUL	Microsoft OEM Windows XP Professional Service Pack 2c, CD, multilingual. Only available with a new device.	223
5SWWXP.0600-ENG	Microsoft OEM Windows XP Professional Service Pack 3, CD, English. Only available with a new device.	223
5SWWXP.0600-GER	Microsoft OEM Windows XP Professional Service Pack 3, CD, German. Only available with a new device.	223
5SWWXP.0600-MUL	Microsoft OEM Windows XP Professional Service Pack 3, CD, Multilanguage. Only available with a new device.	223
	Windows-based Runtime	
1A4600.10	B&R Automation Runtime ARwin, incl. license sticker and copy protection	237

Chapter 2 • Technical data

1 Introduction

The Panel PC 800 covers a wide performance range from efficient Intel Atom N270 processors to Core2 Duo processors for applications with the highest performance requirements. Brilliant 15" XGA and 19" SXGA touch screen displays provide a simple and intuitive user interface. The flexibility was raised to a new level when designing the PPC800. This makes it possible to add several different options to the cost-effective basic device. This includes up to two PCI and PCI Express slots, modular drives, additional interfaces and an integrated UPS. The chipset, processor and other components are connected directly to the heat sink using heat conductive materials. This makes it possible to operate not only Atom processors but also certain Dual Core processors without a fan at all.

1.1 Features

- 15" and 19" diagonals
- Latest processor technologies – Core Duo, Core 2 Duo, Celeron M and Atom N270
- Up to 3 GB main memory (dual-channel memory support)
- 2 CompactFlash slots (type I)
- Expandable expansion with 1 or 2 slots for PCI / PCI Express (PCIe) cards and a slide-in drive slot
- 1 optional PCIec (PCI express compact) card slot (can be expanded with adapter)
- 1 optional slide-in compact slot (can be expanded with adapter)
- 5x USB 2.0
- 2x Ethernet 10/100/1000 Mbit interfaces
- 1x RS232 interface, modem-compatible
- 24 VDC supply voltage
- BIOS (AMI)
- Real-time clock (RTC, battery-backed)
- Easy slide-in drive replacement (SATA hot plugging)
- HDA sound
- Add-on UPS slot

1.2 System components / configuration

The PPC800 system can be assembled to meet individual requirements and operating conditions.

The following components are absolutely essential for operation:

- System unit
- CPU board
- Heat sink (CPU board dependent)
- Main memory
- Drive (mass storage device such as CompactFlash card or hard disk) for the operating system
- Software

1.2.1 Configuration - Base system

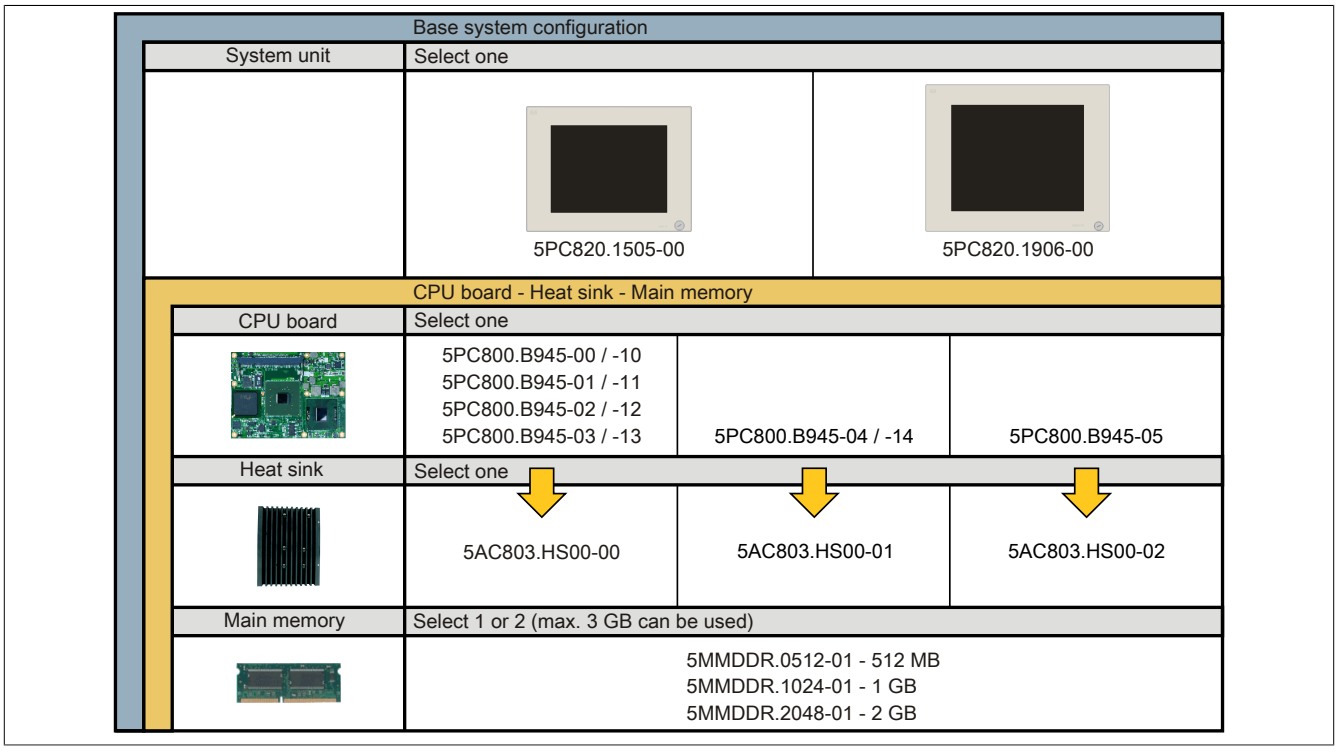


Figure 1: Base system configuration

1.2.2 Configuration - Optional components

Configuration - Optional components			
Configuration of a system unit with adapter			
Adapters[1]	Select 1 or both		
	5AC803.BC01-00		5AC803.BC02-00
	PCIec plug-in cards, select 1		Slide-in compact drives, select 1
	5ACPCC.ETH0-00 (PCIec Ethernet Card 10/100/1000) 5ACPCC.MPL0-00 (PCIec POWERLINK MN 2-port)		5AC801.HDDI-00 (40 GB) 5AC801.HDDDI-03 (250 GB) 5AC801.HDDI-04 (500 GB) 5AC801.SSDI-00 (32 GB) 5AC801.SSDI-01 (60 GB) 5AC801.SSDI-02 (180 GB) 5AC801.SSDI-03 (60 GB)
Configuration of a system unit with expansion			
Expansion	No expansion	1x PCI/PCIe + 1x slide-in slot	2x PCI/PCIe + 1x slide-in slot
		5AC803.SX01-00	5AC803.SX02-00
Bus units		Select one	Select one
		5AC803.BX01-00 5AC803.BX01-01	5AC803.BX02-00 5AC803.BX02-01
Fan kit [2]	Select one	Select one	Select one
	5AC803.FA01-00	5AC803.FA02-00	5AC803.FA03-00
Slide-in drives		Select one	
		5AC801.HDDS-00 (40 GB) 5AC801.DVDS-00 (DVD drive) 5AC801.DVRS-00 (DVD writer) 5AC801.ADAS-00 (adapter)	
RAID system		Select one	
		5ACPCI.RAIC-05 (2x 250 GB, uses 1 PCI slot) 5ACPCI-RAIC-06 (2x 500 GB, uses 1 PCI slot) 5MMHDD.0250-00 (replaces 250 GB SATA HDD 250) 5MMHDD.0500-00 (replaces 500 GB SATA HDD)	
CompactFlash	Select one or two		
	5CFCRD.0512-06, 5CFCRD.1024-06, 5CFCRD.2048-06, 5CFCRD.4096-06, 5CFCRD.8192-06, 5CFCRD.016G-06	5CFCRD.0064-03, 5CFCRD.0128-03, 5CFCRD.0256-03, 5CFCRD.0512-03, 5CFCRD.1024-03, 5CFCRD.2048-03, 5CFCRD.4096-03, 5CFCRD.8192-03	
UPS battery	Select one		
	5AC600.UPSI-00 (add-on UPS module), 5AC600.UPSB-00 (UPS battery unit) Connection cable: 5CAUPS.0005-00 (0.5 meters) or 5CAUPS.0030-00 (3 meters)		
Supply voltage plug	Select one		
	0TB103.9 (screw clamps) 0TB103.91 (cage clamps)		
Software	Select one		
	Windows XP 5SWWXP.0500-ENG 5SWWXP.0500-GER 5SWWXP.0500-MUL 5SWWXP.0600-ENG 5SWWXP.0600-GER 5SWWXP.0600-MUL **Windows 7** 5SWWI7.1100-ENG 5SWWI7.1100-GER 5SWWI7.1200-ENG 5SWWI7.1200-GER 5SWWI7.1300-MUL 5SWWI7.1400-MUL	**Windows Embedded Standard 2009** 5SWWXP.0727-ENG **Windows XP Embedded** 5SWWXP.0427-ENG **Windows CE** 5SWWCE.0827-ENG **Windows Embedded Standard 7** 5SWWI7.1527-ENG 5SWWI7.1627-ENG 5SWWI7.1727-MUL 5SWWI7.1827-MUL	**Automation Runtime** 1A4601.06 1A4601.06-2 1A4600.10 1A4600.10-2 1A4600.10-3 1A4600.10-4 **Microsoft DOS** 9S0000.01-010 9S0000.01-020

1) If both adapters are used, then a PCIec plug-in card and a slide-in compact drive can be operated in a single device.
2) A fan kit may be necessary for certain system configurations.

Figure 2: Configuration - Optional components

2 Fully assembled device

2.1 Temperature specifications

CPU boards can be combined with various other components such as drives, main memory, additional insert cards, etc. depending on the system unit and fan kit. The many different configurations possible result in varying maximum ambient temperatures, which can be seen in the following tables in this section.

> **Information:**
>
> **The maximum specified ambient temperatures for operation with and without a fan kit have been determined under worst-case conditions. Experience has shown that higher ambient temperatures can be reached in typical applications, e.g. those in Microsoft Windows. Testing and evaluation must be performed on-site by the user (temperatures can be read in BIOS or with the B&R Control Center).**

Information regarding worst-case conditions

- Thermal Analysis Tool (TAT V3.8) from Intel for simulating a 100% processor load
- BurnInTest tool (BurnInTest V4.0 Pro from Passmark Software) for simulating a 100% load on the interface via loop back adapters (serial interfaces, slide-in drives, USB ports, audio outputs)
- Maximum system expansion and power consumption

What must be considered when determining the maximum ambient temperature?

- Operating the fully assembled device with or without fan kit

2.1.1 Maximum ambient temperature

Information:

Only specified mounting orientations are permitted. See chapter "Installation", section "Mounting orientation" on page 137.

2.1.1.1 Ambient temperature for CPU boards 5PC800.B945-0x

		Operation without a fan kit					Operation with a fan kit						
		ETH1: Up to 100 Mbit operation ETH2: Up to 100 Mbit operation					ETH1: Up to 100 Mbit operation ETH2: Up to 1 Gbit operation						
	All temperature values in degrees Celsius (°C) at 500 m above sea level. The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level).	5PC800.B945-00	5PC800.B945-01	5PC800.B945-02	5PC800.B945-03	5PC800.B945-04	5PC800.B945-00	5PC800.B945-01	5PC800.B945-02	5PC800.B945-03	5PC800.B945-04		
	Maximum ambient temperature	**30**	**30**	**35**	**35**	**/**	**45**	**45**	**50**	**50**	**35**		
	What else can also be operated at the max. ambient temperature, or are there any limits?											Temperature limits	Location of sensor(s)
Slide-in compact drives	Onboard CompactFlash[1)]	✓	✓	✓	✓		✓	✓	✓	✓	✓	80	Board Power
	5AC801.HDDI-00	✓	✓	✓	✓		✓	✓	✓	✓	✓	80	
	5AC801.HDDI-02	✓	✓	✓	✓		✓	✓	✓	✓	✓	80	
	5AC801.HDDI-03	✓	✓	✓	✓		✓	✓	✓	✓	✓	60	
	5AC801.HDDI-04	✓	✓	✓	✓		✓	✓	✓	✓	✓	60	
	5AC801.SSDI-00	✓	✓	✓	✓		✓	✓	✓	✓	✓	70	
	5AC801.SSDI-01	✓	✓	✓	✓		✓	✓	✓	✓	✓	70	
	5AC801.SSDI-02	✓	✓	✓	✓		✓	✓	✓	✓	✓	70	
	5AC801.SSDI-03	✓	✓	✓	✓		✓	✓	✓	✓	✓	70	
Slide-in drives	5AC801.HDDS-00	✓	✓	✓	✓		✓	✓	✓	✓	✓	80	Slide-in drive 1
	5AC801.DVDS-00	✓	✓	✓	✓		✓	✓	✓	✓	✓	50	
	5AC801.DVRS-00	✓	✓	✓	✓		✓	✓	✓	✓	✓	50	
Main memory	5MMDDR.0512-01	✓	✓	✓	✓		✓	✓	✓	✓	✓	-	-
	5MMDDR.1024-01	✓	✓	✓	✓		✓	✓	✓	✓	✓	-	
	5MMDDR.2048-01	✓	✓	✓	✓		✓	✓	✓	✓	✓	-	
System units	5PC820.1505-00	✓	✓	✓	✓		✓	✓	✓	✓	✓	80	Power supply
	5PC820.1906-00	✓	✓	✓	✓		✓	✓	✓	✓	✓	80	
Additional insert cards PClec card slot	5ACPCC.ETH0-00	✓	✓	✓	✓		✓	✓	✓	✓	✓	-	Additional insert cards
	5ACPCC.MPL0-00	✓	✓	✓	✓		✓	✓	✓	✓	✓	-	
	5ACPCI.RAIC-03 (24 hours / standard)	✓	✓	✓	✓		✓	✓	✓	✓	✓	-	
	5ACPCI.RAIC-04 (24 hours / standard)	✓	✓	✓	✓		✓	✓	✓	✓	✓	-	
	5ACPCI.RAIC-05 (24 hours / standard)	✓	✓	✓	✓		✓	✓	✓	✓	✓	-	
	5ACPCI.RAIC-06 (24 hours / standard)	✓	✓	✓	✓		✓	✓	✓	✓	✓	-	

1) Only possible with a CompactFlash card from B&R that is compatible with the device.

Table 5: Ambient temperatures

2.1.1.2 Ambient temperature for CPU boards 5PC800.B945-1x and 5PC800.B945-05

Information:

Only specified mounting orientations are permitted. See chapter "Installation", section "Mounting orientation" on page 137.

		Operation without a fan kit						Operation with a fan kit							
		ETH1: Up to 1 Gbit operation ETH2: Up to 1 Gbit operation						ETH1: Up to 1 Gbit operation ETH2: Up to 1 Gbit operation							
	All temperature values in degrees Celsius (°C) at 500 m above sea level. The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level).	5PC800.B945-10	5PC800.B945-11	5PC800.B945-12	5PC800.B945-13	5PC800.B945-14	5PC800.B945-05	5PC800.B945-10	5PC800.B945-11	5PC800.B945-12	5PC800.B945-13	5PC800.B945-14	5PC800.B945-05		
	Maximum ambient temperature	**35**	**35**	**45**	**45**	**/**	**55**	**45**	**45**	**55**	**55**	**45**[1]	**60**		
	What else can also be operated at the max. ambient temperature, or are there any limits?													Temperature limits	Location of sensor(s)
Slide-in compact drives	Onboard CompactFlash[2]	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	80	Board Power
	5AC801.HDDI-00	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	80	
	5AC801.HDDI-02	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	80	
	5AC801.HDDI-03	✓	✓	✓	✓		45	✓	✓	50	50	✓	50	60	
	5AC801.HDDI-04	✓	✓	✓	✓		45	✓	✓	50	50	✓	50	60	
	5AC801.SSDI-00	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	70	
	5AC801.SSDI-01	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	70	
	5AC801.SSDI-02	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	70	
	5AC801.SSDI-03	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	70	
Slide-in drives	5AC801.HDDS-00	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	80	Slide-in drive 1
	5AC801.DVDS-00	✓	✓	✓	✓		50	✓	✓	50	50	✓	50	50	
	5AC801.DVRS-00	✓	✓	✓	✓		50	✓	✓	50	50	✓	50	50	
Main memory	5MMDDR.0512-01	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	-	-
	5MMDDR.1024-01	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	-	
	5MMDDR.2048-01	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	-	
System units	5PC820.1505-00	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	80	Power supply
	5PC820.1906-00	30	30	35	35		45	✓	✓	50	50	✓	50	80	
Additional insert cards PCIec card slot	5ACPCC.ETH0-00	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	-	Additional insert cards
	5ACPCC.MPL0-00	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	-	
	5ACPCI.RAIC-03 (24 hours / standard)	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	-	
	5ACPCI.RAIC-04 (24 hours / standard)	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	-	
	5ACPCI.RAIC-05 (24 hours / standard)	✓	✓	✓	✓		45	✓	✓	50	50	✓	50	-	
	5ACPCI.RAIC-06 (24 hours / standard)	✓	✓	✓	✓		45	✓	✓	50	50	✓	50	-	

1) The specified temperature applies only to the CPU board 5PC800.B945-14 with the heat sink 5AC803.HS00-01 Rev > A5.
If a heat sink with a lower revision number is used, then the maximum ambient temperature of the CPU board 5PC800.B954-04 should be used.
2) Only possible with a CompactFlash card from B&R that is compatible with the device.

Table 6: Ambient temperatures

2.1.1.3 How is the maximum ambient temperature determined?

1. The CPU board is selected (i.e. operation with or without a fan kit).
2. The "Maximum ambient temperature" row shows the maximum ambient temperature for the fully assembled device, including the respective CPU board.

Information:

Maximum temperature data is for operation at 500 meters. The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level).

3. Incorporating additional drives (slide-in), main memory, additional insert cards, etc. can change the temperature limits of an PPC800 system.

If there is a "✓" next to the component, it can be used at the maximum ambient temperature of the fully assembled device without problems.

If there is a specific temperature, for example "50", next to the component, then the ambient temperature of the fully assembled PPC800 system cannot exceed this temperature.

2.1.2 Minimum ambient temperatures

For systems containing one of the following components, the minimum ambient temperature is +5°C: 5AC801.DVDS-00, 5AC801.DVRS-00. If none of these components are used, then the minimum ambient temperature is 0°C.

2.1.3 Temperature monitoring

Sensors monitor temperature values at various places in the PPC800 (board I/O, board ETH2, board power, power supply, slide-in drive 1, IF slot). The location of the temperature sensors can be seen in "Figure 3: Temperature sensor locations" on page 31. The value listed in the table represents the defined maximum temperature for this measurement point. An alarm is not triggered if this temperature is exceeded. The temperatures[1)] can be read in BIOS (menu item Advanced - Baseboard/Panel Features - Baseboard Monitor) or in approved Microsoft Windows operating systems using the B&R Control Center.

In addition, the hard disks for PPC800 systems available from B&R are equipped with S.M.A.R.T, or Self Monitoring, Analysis, and Reporting Technology. This makes it possible to read various parameters, e.g. temperature, using software (such as HDD Thermometer, a freeware program) on approved Microsoft operating systems (except Windows CE).

2.1.4 Temperature sensor locations

Sensors monitor temperature values at many different locations in the PPC800. The temperatures can be read in BIOS (menu item Advanced - Baseboard/Panel Features - Baseboard Monitor) or in approved Microsoft operating systems using the B&R Control Center[2)].

For applications that don't use Windows, the temperatures can be evaluated using the B&R implementation guide. In addition to the implementation guide, there are also programs available in MS-DOS.

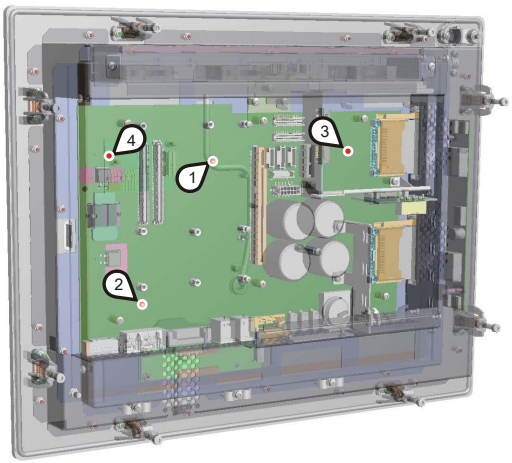


Figure 3: Temperature sensor locations

Position	Measurement point for	Measurement	Max. specified
1	Board I/O	Board I/O area temperature (sensor on the baseboard).	80°C
2	Board ETH2	Baseboard temperature near the ETH2 controller (sensor on the baseboard)	80°C
3	Board Power	Board power supply temperature (sensor on the mainboard)	80°C
4	Power Supply	Power supply temperature.	80°C
-	Slide-in drive 1	Temperature of a slide-in drive (the sensor is integrated on the slide-in drive).	Depending on the slide-in drive being used
-	IF Slot	Temperature of the PCIec slot; the sensor is located directly on the plug-in card.	Depending on the plug-in cards used

Table 7: Temperature sensor locations

1) The measured temperature approximates the immediate ambient temperature, but can be influenced by neighboring components.
2) The ADI driver containing the B&R Control Center is available in the Downloads section of the B&R website (www.br-automation.com).

2.2 Humidity specifications

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

Component		Operation	Storage / Transport
CPU boards 945GME COM Express		10 to 90%	5 to 95%
Main memory for CPU boards		10 to 90%	5 to 95%
Slide-in compact drives	5AC801.HDDI-00	5 to 90%	5 to 95%
	5AC801.HDDI-02	8 to 80%	5 to 95%
	5AC801.HDDI-03	5 to 95%	5 to 95%
	5AC801.HDDI-04	5 to 95%	5 to 95%
	5AC801.SSDI-00	5 to 95%	5 to 95%
	5AC801.SSDI-01	5 to 95%	5 to 95%
	5AC801.SSDI-02	5 to 95%	5 to 95%
	5AC801.SSDI-03	8 to 95%	8 to 95%
Slide-in drives	5AC801.HDDS-00	5 to 90%	5 to 90%
	5AC801.DVDS-00	8 to 90%	5 to 95%
	5AC801.DVRS-00	8 to 90%	5 to 95%
Additional insert cards	5ACPCI.RAIC-03 (24 hours / standard)	8 to 90%	5 to 95%
	5ACPCI.RAIC-04 (24 hours / standard)	8 to 90%	5 to 95%
	5ACPCI.RAIC-05 (24 hours / standard)	5 to 95%	5 to 95%
	5ACPCI.RAIC-06 (24 hours / standard)	5 to 95%	5 to 95%
	5MMHDD.0250-00 (24 hours / standard)	5 to 95%	5 to 95%
	5MMHDD.0500-00 (24 hours / standard)	5 to 95%	5 to 95%
Accessories	5CFCRD.xxxx-06 CompactFlash cards	85%	85%
	5CFCRD.xxxx-04 CompactFlash cards	85%	85%
	5CFCRD.xxxx-03 CompactFlash cards	8 to 95%	8 to 95%
	5MMUSB.2048-00 flash drive	10 to 90%	5 to 90%
	5MD900.USB2-01 USB media drive	20 to 80%	5 to 90% / 5 to 95%
	5MD900.USB2-02 USB media drive	20 to 80%	5 to 90% / 5 to 95%

Table 8: Overview of humidity specifications for individual components

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

2.3 Power management

2.3.1 Supply voltage block diagram

The following block diagram shows the simplified structure of the PPC800 supply voltage.

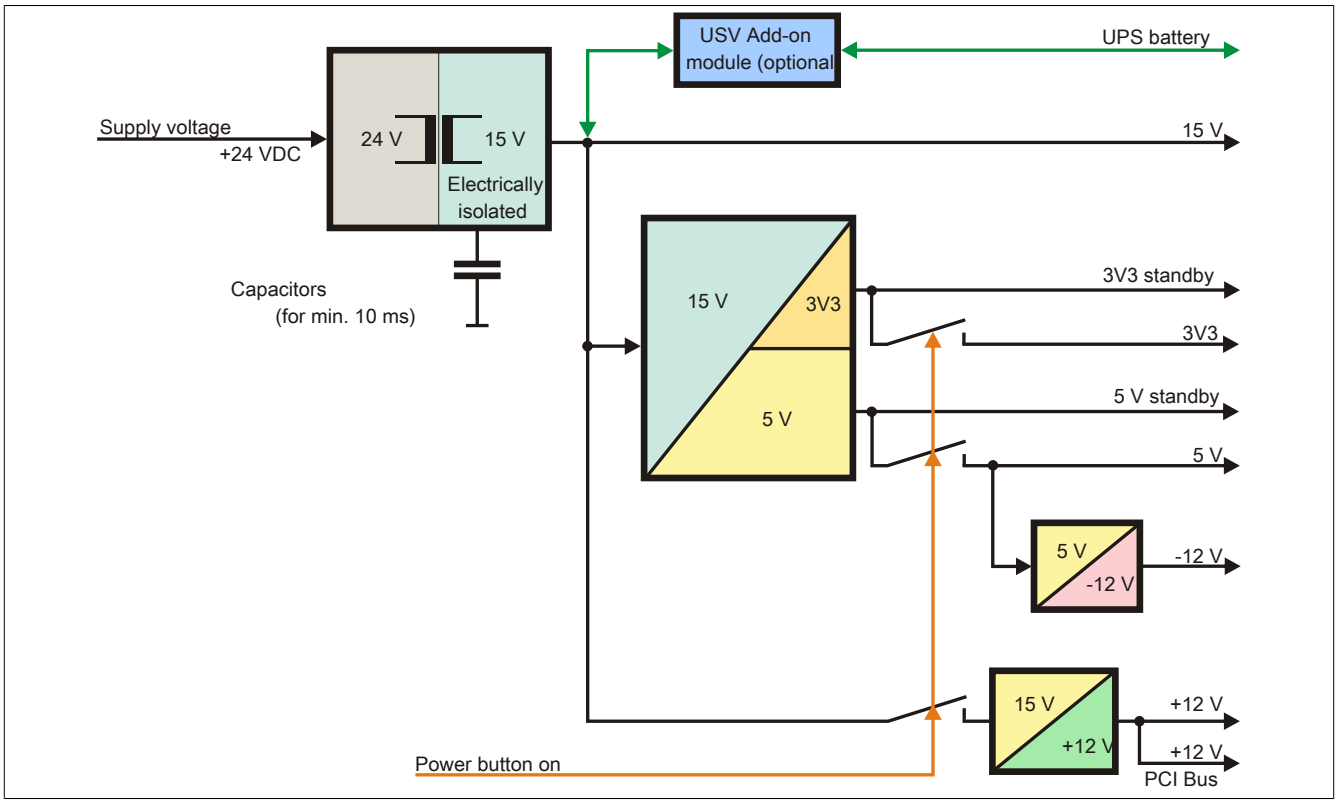


Figure 4: Supply voltage block diagram

Description

15 V is generated from the supply voltage using a DC-to-DC converter. This electrically isolated 15 V supplies additional DC-to-DC converters that generate the remaining voltage.

After the system is turned on (e.g. using the power button), the 3V3 and 5 V voltages are applied to the bus. At the 5 V output, another DC-to-DC converter generates -12 V and applies this to the bus. An additional DC-to-DC converter generates +12 V.

The optional add-on UPS (with battery unit) is supplied with 15 V and provides an uninterrupted power supply of the 15 V bus during a power failure.

2.3.2 Power calculation with 5PC820.1505-00

Information: All values in **watts** The values for the **suppliers** are maximum values. The values for the **consumers** are average maximum values, but not peak values.			CPU board						Current system
			5PC800.B945-00 5PC800.B945-10	5PC800.B945-01 5PC800.B945-11	5PC800.B945-02 5PC800.B945-12	5PC800.B945-03 5PC800.B945-13	5PC800.B945-04 5PC800.B945-14	5PC800.B945-05	Enter values in this column
			Total power supply power (maximum)						**130**
Total power supply		Add-on UPS module, optional	7.5	7.5	7.5	7.5	7.5	7.5	
Total power supply		Backlight Display 15"	14	14	14	14	14	14	
Total power supply		**Maximum possible at +12V**							**75**
Total power supply	+12 V	CPU board, permanent consumers	26	30	18	14	43	11	
Total power supply	+12 V	512 MB RAM, max. 2 with 1.5 W each							
Total power supply	+12 V	1024 MB RAM, max. 2 with 2.5 W each							
Total power supply	+12 V	2048 MB RAM, max. 2 with 3 W each							
Total power supply	+12 V	Fan kit, optional	2.4	2.4	2.4	2.4	2.4	2.4	
Total power supply	+12 V	External consumers, optional (via mainboard)	10	10	10	10	10	10	
Total power supply	+12 V	Power consumption of the PCIec cards, optional, max. 4 W[2]							
Total power supply	+12 V	PCI card limit, optional (max. 3 W without a fan kit, max. 6 W with a fan kit)[1]							
Total power supply	+12 V	PCIe x1 card limit, optional (max. 3 W without a fan kit, max. 20 W with a fan kit)[1]							
Total power supply	+12 V	**Consumers +12 V ∑**							
Total power supply	+5 V	**Maximum possible at +5V**							**65**
Total power supply	+5 V	System unit, permanent consumers	4	4	4	4	4	4	
Total power supply	+5 V	Hard disk (slide-in compact)	4	4	4	4	4	4	
Total power supply	+5 V	Slide-in drive (hard disk, DVD-ROM, etc.)	4	4	4	4	4	4	
Total power supply	+5 V	USB peripherals USB1 and USB3 with 2.5 W each							
Total power supply	+5 V	USB peripherals USB2, USB4 and USB5 with 5 W each							
Total power supply	+5 V	External consumers, optional (via mainboard)	5	5	5	5	5	5	
Total power supply	+5 V	Power consumption of the PCIec cards, optional, max. 4 W[2]							
Total power supply	+5 V	PCI card limit, optional (max. 3 W without a fan kit, max. 20 W with a fan kit)[1]							
Total power supply	+5 V	**Maximum possible at -12V**							**1.2**
Total power supply	+5 V / -12 V	PCI card limit, optional (max. 1.2 W with or without a fan kit)[1]							
Total power supply	+5 V	**Consumers -12 V ∑**							
Total power supply	+5 V	**Consumers +5 V ∑**							
Total power supply	3V3	**Maximum possible at 3V3**							**40**
Total power supply	3V3	System unit, permanent consumers	9	9	9	9	9	9	
Total power supply	3V3	CompactFlash, 1 W each							
Total power supply	3V3	Power consumption of the PCIec cards, optional, max. 4 W[2]							
Total power supply	3V3	PCI card limit, optional (max. 3 W without a fan kit, max. 15 W with a fan kit)[1]							
Total power supply	3V3	PCIe x1 card limit, optional (max. 3 W without a fan kit, max. 10 W with a fan kit)[1]							
Total power supply	3V3	**Consumers 3V3 ∑**							
Total power supply		**Consumers ∑**							

1) The total performance of one PCI/PCIe card per PCI slot (= sum of the power consumption for each voltage range) may not exceed the limits stated for operation with or without a fan kit.

2) The total performance of one PCIec card per PCIec slot (= sum of power consumptions for each voltage area) may not exceed the limits stated for operation with or without a fan kit.

Table 9: Power calculation for PPC800 15"

Information:

The PCIec card must not consume more than a total of 4 W (12V/5V/3V3)!

2.3.3 Power calculation with 5PC820.1906-00

Information: All values in **watts** The values for the **suppliers** are maximum values. The values for the **consumers** are average maximum values, but not peak values.			CPU board						Current system
			5PC800.B945-00 5PC800.B945-10	5PC800.B945-01 5PC800.B945-11	5PC800.B945-02 5PC800.B945-12	5PC800.B945-03 5PC800.B945-13	5PC800.B945-04 5PC800.B945-14	5PC800.B945-05	Enter values in this column
			Total power supply power (maximum)						**130**
Total power supply		Add-on UPS module, optional	7.5	7.5	7.5	7.5	7.5	7.5	
		Backlight Display 19"	32	32	32	32	32	32	
	+12 V						**Maximum possible at +12V**		**75**
		CPU board, permanent consumers	26	30	18	14	43	11	
		512 MB RAM, max. 2 with 1.5 W each							
		1024 MB RAM, max. 2 with 2.5 W each							
		2048 MB RAM, max. 2 with 3 W each							
		Fan kit, optional	2.4	2.4	2.4	2.4	2.4	2.4	
		External consumers, optional (via mainboard)	10	10	10	10	10	10	
		Power consumption of the PCIec cards, optional, max. 4 W[2]							
		PCI card limit, optional (max. 3 W without a fan kit, max. 6 W with a fan kit)[1]							
		PCIe x1 card limit, optional (max. 3 W without a fan kit, max. 20 W with a fan kit)[1]							
								Consumers +12 V ∑	
	+5 V						**Maximum possible at +5V**		**65**
		System unit, permanent consumers	12	12	12	12	12	12	
		Hard disk (slide-in compact)	4	4	4	4	4	4	
		Slide-in drive (hard disk, DVD-ROM, etc.)	4	4	4	4	4	4	
		USB peripherals USB1 and USB3 with 2.5 W each							
		USB peripherals USB2, USB4 and USB5 with 5 W each							
		External consumers, optional (via mainboard)	5	5	5	5	5	5	
		Power consumption of the PCIec cards, optional, max. 4 W[2]							
		PCI card limit, optional (max. 3 W without a fan kit, max. 20 W with a fan kit)[1]							
		-12 V					**Maximum possible at -12V**		**1.2**
			PCI card limit, optional (max. 1.2 W with or without a fan kit)[1]						
								Consumers -12 V ∑	
								Consumers +5 V ∑	
	3V3						**Maximum possible at 3V3**		**40**
		System unit, permanent consumers	9	9	9	9	9	9	
		CompactFlash, 1 W each							
		Power consumption of the PCIec cards, optional, max. 4 W[2]							
		PCI card limit, optional (max. 3 W without a fan kit, max. 15 W with a fan kit)[1]							
		PCIe x1 card limit, optional (max. 3 W without a fan kit, max. 10 W with a fan kit)[1]							
								Consumers 3V3 ∑	
								Consumers ∑	

1) The total performance of one PCI/PCIe card per PCI slot (= sum of the power consumption for each voltage range) may not exceed the limits stated for operation with or without a fan kit.

2) The total performance of one PCIec card per PCIec slot (= sum of power consumptions for each voltage area) may not exceed the limits stated for operation with or without a fan kit.

Table 10: Power calculation for PPC800 19"

Information:

The PCIec card must not consume more than a total of 4 W (12V/5V/3V3)!

2.4 Block diagrams

The following block diagrams show the simplified structure of system units (5PC820.1505 / 5PC820.1906-00) with a 945GME CPU board that depend on different bus units.

2.4.1 Bus unit 5AC803.BX01-00

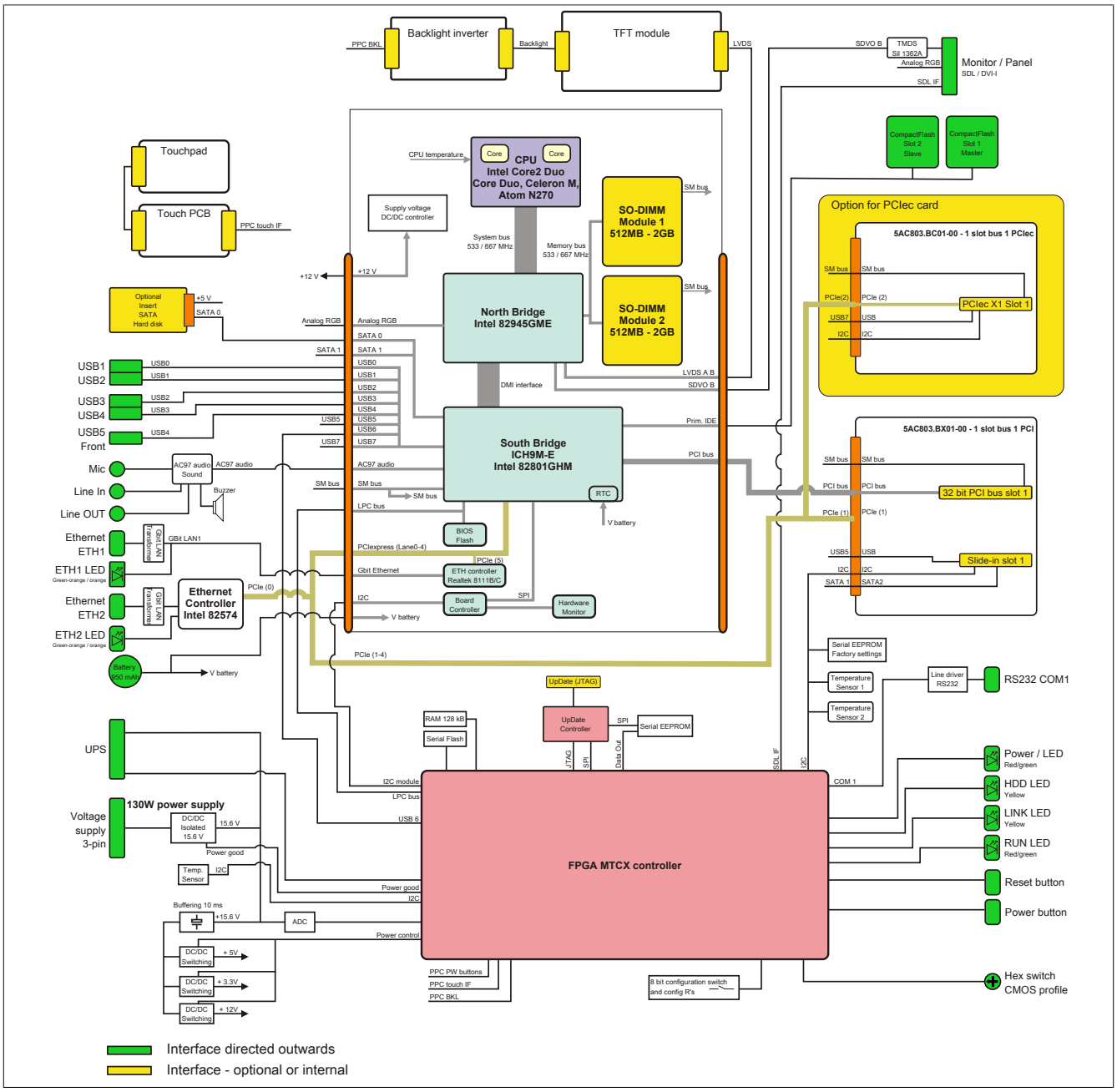


Figure 5: Block diagram with bus unit 5AC803.BX01-00

2.4.2 Bus unit 5AC803.BX01-01

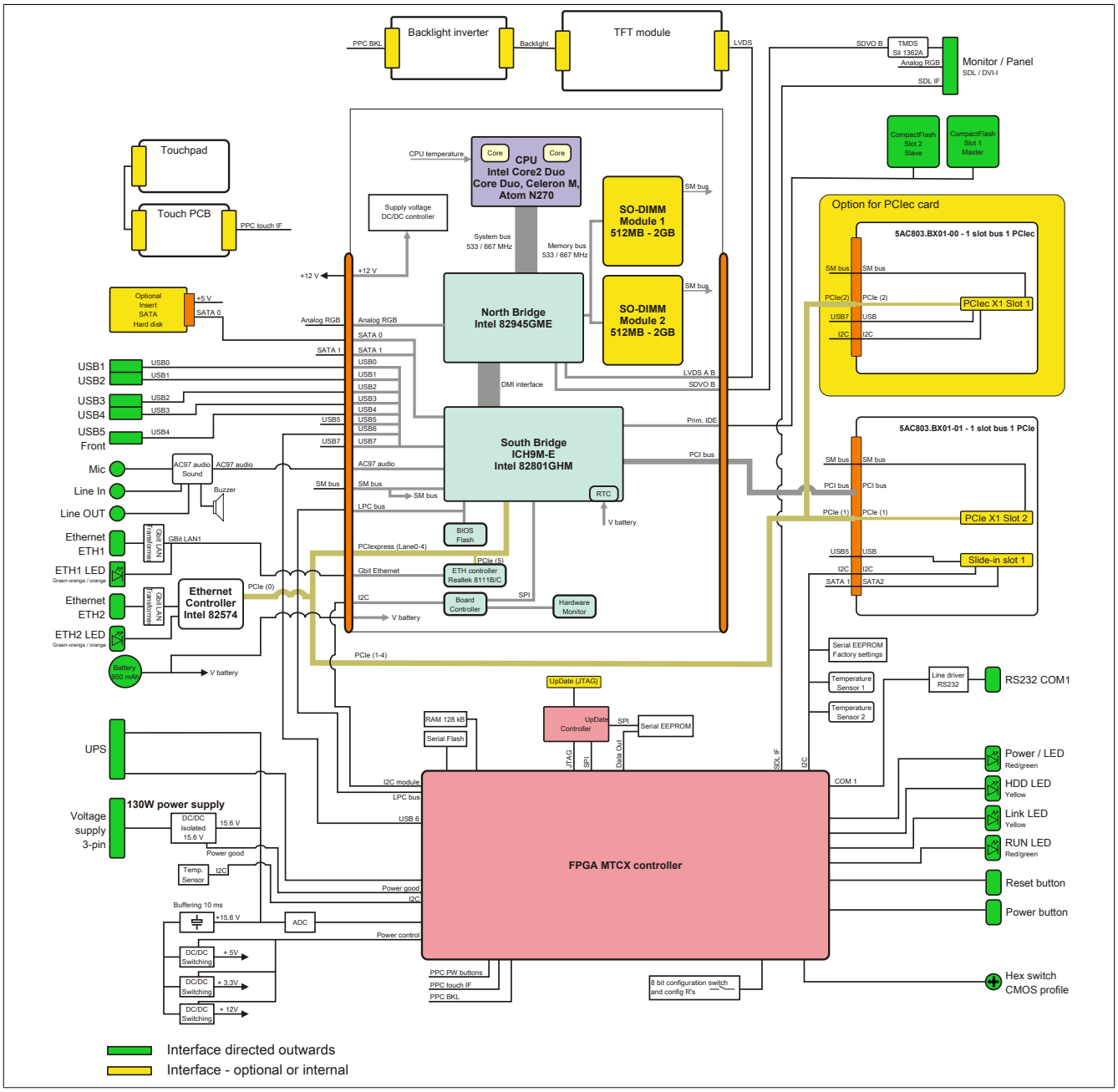


Figure 6: Block diagram with bus unit 5AC803.BX01-01

2.4.3 Bus unit 5AC803.BX02-00

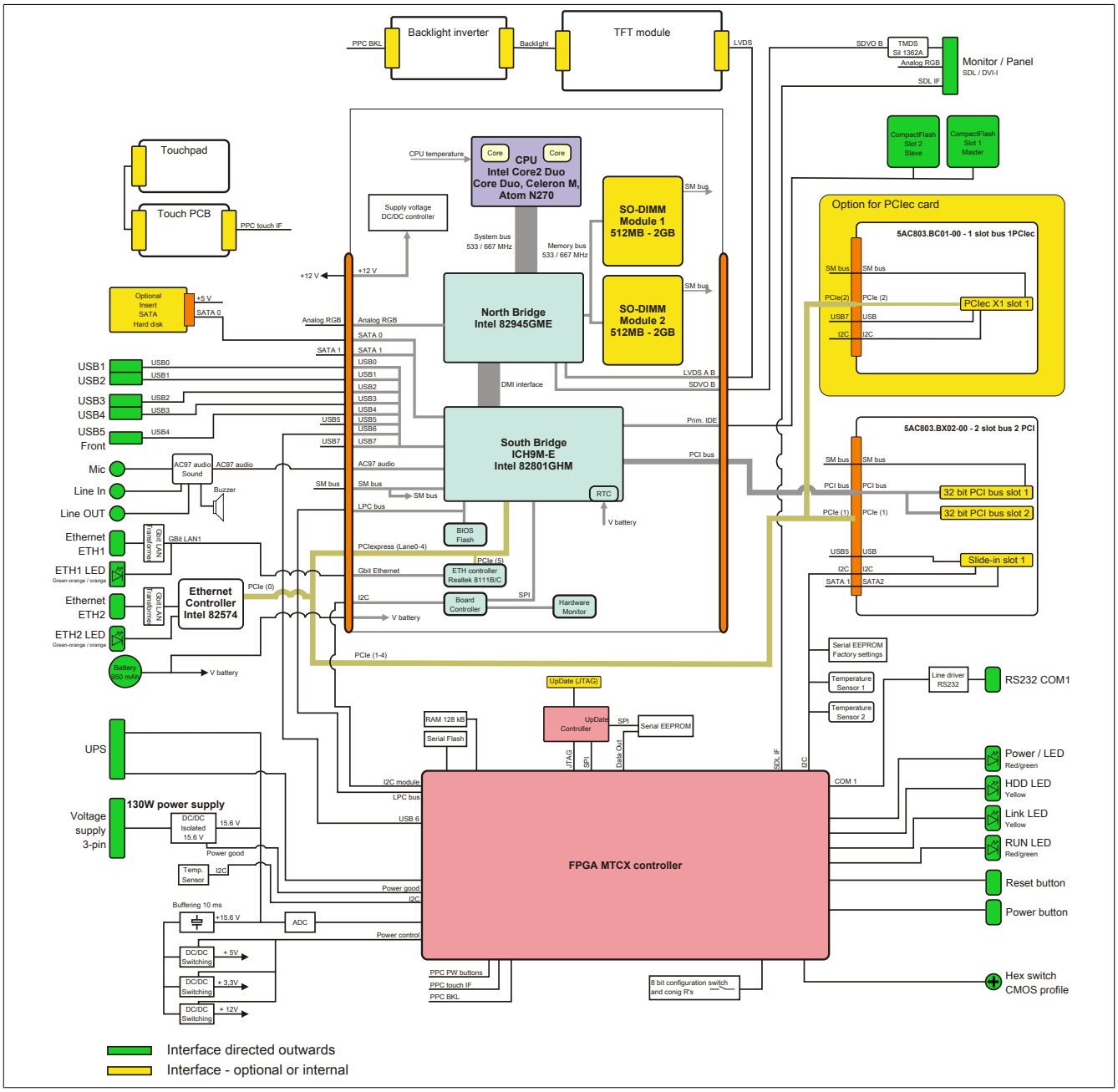


Figure 7: Block diagram with bus unit 5AC803.BX02-00

2.4.4 Bus unit 5AC803.BX02-01

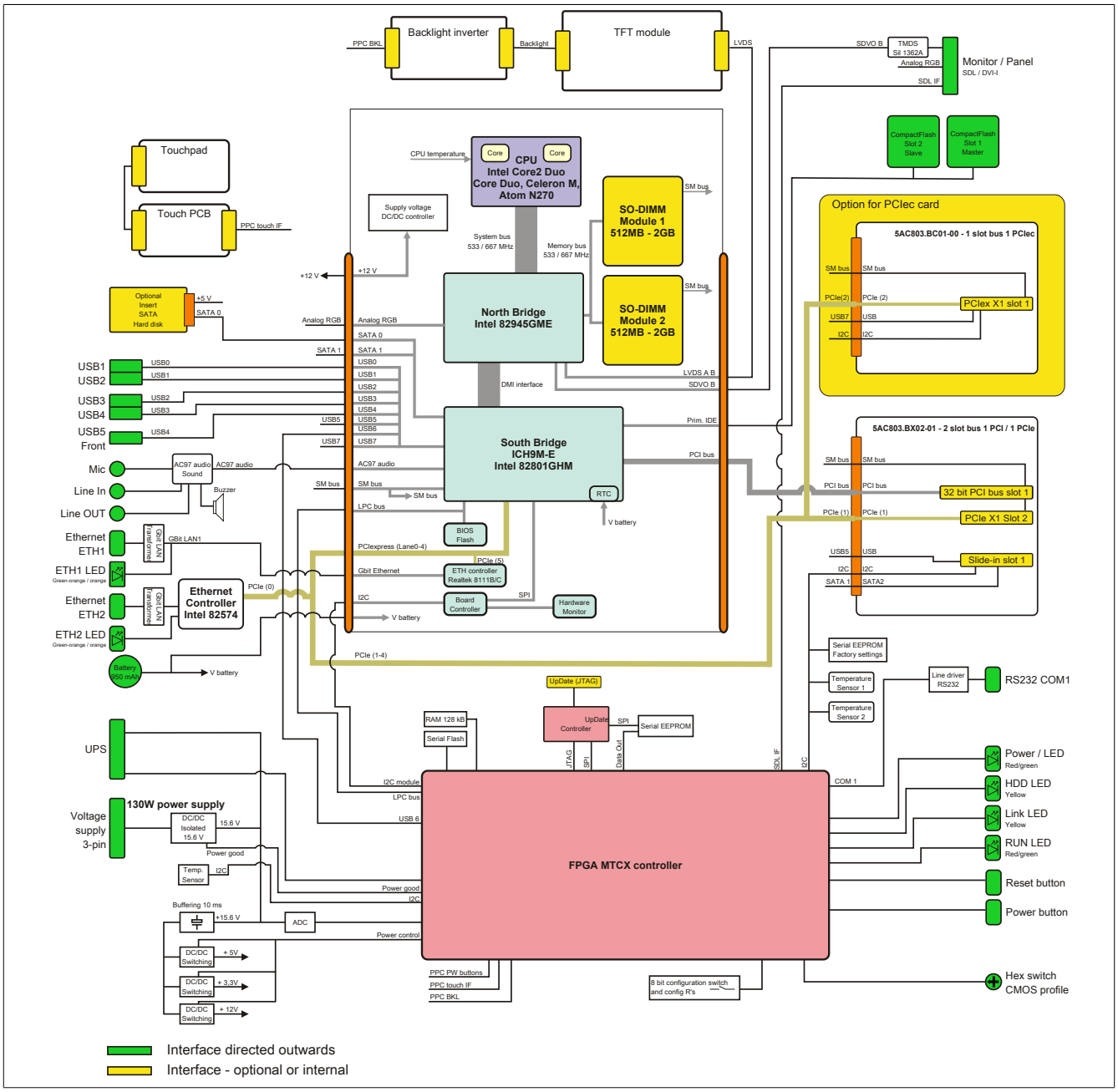


Figure 8: Block diagram with bus unit 5AC803.BX02-01

2.5 Serial number sticker

A unique serial number sticker with a barcode (Code 128) is affixed to each B&R device for identification purposes. This serial number represents all of the individual components built into the system (model number, name, revision, serial number, delivery date and duration of warranty).

Figure 9: Serial number sticker (back)

This information can also be found on the B&R website by entering the serial number of the fully assembled device in the search field tab (after selecting the "Serial number" option) at the top of the homepage www.br-automation.com. The search provides a detailed list of the installed components.

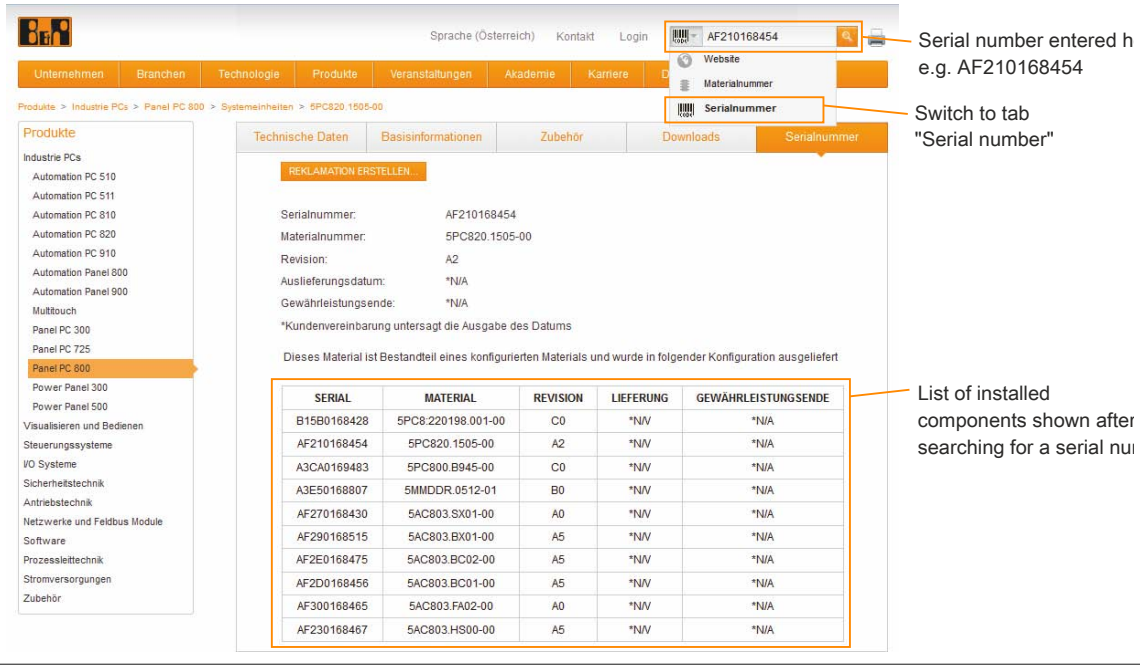


Figure 10: Example of serial number search

2.6 Device interfaces

2.6.1 +24 VDC supply voltage

The 3-pin connector 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 pinout is listed in the following table and printed on the PPC800 housing. The supply voltage is protected internally by a soldered fuse (15 A, fast-acting) so that the device cannot be damaged if an overload occurs (fuse replacement necessary) or 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 in the event of an error.

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

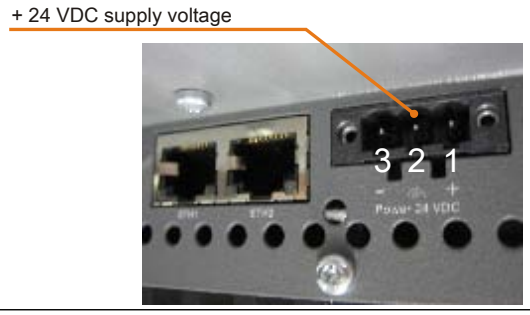


Table 11: Supply voltage connection 24 VDC

2.6.1.1 Grounding

> **Caution!**
>
> **The pin's connection to the functional ground (pin 2) should be as short a path as possible (e.g. in the control cabinet). Using the largest possible conductor cross section on the supply plug is recommended.**

The ground connection is located on the back of the PPC800 system.

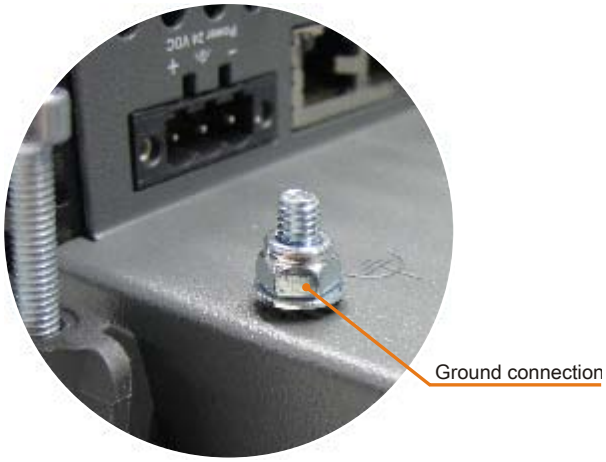


Figure 11: Ground connection

The M4 self-locking nut can be used, for example, to fasten a copper strip to a central grounding point in the control cabinet or system where the PPC800 is installed. The largest possible conductor cross section should be used (at least 2.5 mm²).

2.6.2 Monitor/panel connection - SDL (Smart Display Link / DVI)

Monitor/Panel connection - SDL (Smart Display Link) / DVI	
The following is an overview of the video signals available on the monitor/panel output. For details, see the technical data for the CPU board being used.	
CPU board	**Video signals with all system unit variants**
5PC800.B945-00 / -10	RGB, DVI, SDL
5PC800.B945-01 / -11	RGB, DVI, SDL
5PC800.B945-02 / -12	RGB, DVI, SDL
5PC800.B945-03 / -13	RGB, DVI, SDL
5PC800.B945-04 / -14	RGB, DVI, SDL
5PC800.B945-05	RGB, DVI, SDL

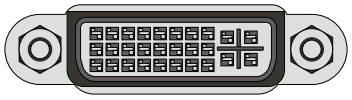


Table 12: Monitor/Panel connection - RGB, DVI, SDL

2.6.2.1 Pinout

Pin	Assignment	Description	Pin	Assignment	Description
1	TMDS data 2-	DVI lane 2 (negative)	16	HPD	Hot plug detect
2	TMDS data 2+	DVI lane 2 (positive)	17	TMDS data 0-	DVI lane 0 (negative)
3	TMDS data 2/4 SHIELD	Shield for data pair 2 and 4	18	TMDS data 0+	DVI lane 0 (positive)
4	SDL-	SDL lane (negative)	19	TMDS Data 0/ XUSB1 SHIELD	Shield for data pair 0 and USB1
5	SDL+	SDL lane (positive)	20	XUSB1-	USB lane 1 (negative)
6	DDC clock	DDC-based control signal (clock)	21	XUSB1+	USB lane 1 (positive)
7	DDC data	DDC-based control signal (data)	22	TMDS clock shield	Shield for clock pair
8	NC	Not connected	23	TMDS clock+	DVI clock (positive)
9	TMDS data 1-	DVI lane 1 (negative)	24	TMDS clock -	DVI clock (negative)
10	TMDS DATA 1+	DVI lane 1 (negative) HDMI clock (positive)	C1	ANALOG RED	Analog red
11	TMDS DATA 1/ XUSB0 SHIELD	Shield for data pair 1 and USB0	c2	ANALOG GREEN	Analog green
12	XUSB0-	USB lane 0 (negative)	C3	ANALOG BLUE	Analog blue
13	XUSB0+	USB lane 0 (positive)	C4	ANALOG HORZ SYNC	Analog horizontal synchro-nization
14	+5 V power[1)]	+5 V power supply	C5	ANALOG GND	Analog ground (return for R, G and B signals)
15	Ground (return for +5 V, HSync and VSync)	Ground			

DVI 24-pin, female

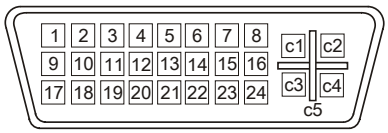


Table 13: DVI connection - Pinout

1) Protected internally by a multifuse.

2.6.2.2 Cable lengths and resolutions for SDL transmission

The following table lists the relationship between segment lengths and maximum resolution depending on the SDL cable being used:

SDL cables	Resolution					
Segment length [m]	VGA 640 x 480	SVGA 800 x 600	XGA 1024 x 768	SXGA 1280 x 1024	UXGA 1600 x 1200	FHD 1920 x 1080
1.8	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03
5	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03
10	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03
15	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	- - -	- - 5CASDL.0150-03
20	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	- -	- 5CASDL.0200-03
25	5CASDL.0250-00 5CASDL.0250-03	5CASDL.0250-00 5CASDL.0250-03	5CASDL.0250-00 5CASDL.0250-03	- -	- -	- -
30	5CASDL.0300-00 5CASDL.0300-03	5CASDL.0300-00 5CASDL.0300-03	- 5CASDL.0300-13	- 5CASDL.0300-13	- -	- 5CASDL.0300-13
40	5CASDL.0400-13	5CASDL.0400-13	5CASDL.0400-13	5CASDL.0400-13	-	5CASDL.0400-13

Table 14: Cable lengths and resolutions for SDL transmission

2.6.2.3 Cable lengths and resolutions for DVI transmission

The following table lists the relationship between segment lengths and maximum resolution depending on the DVI cable being used:

DVI cables	Resolution					
Segment length [m]	VGA 640 x 480	SVGA 800 x 600	XGA 1024 x 768	SXGA 1280 x 1024	UXGA 1600 x 1200	FHD 1920 x 1080
1.8	5CADVI.0018-00	5CADVI.0018-00	5CADVI.0018-00	5CADVI.0018-00	5CADVI.0018-00	5CADVI.0018-00
5	5CADVI.0050-00	5CADVI.0050-00	5CADVI.0050-00	5CADVI.0050-00	5CADVI.0050-00	5CADVI.0050-00

Table 15: Cable lengths and resolutions for DVI transmission

2.6.3 COM1 serial interface

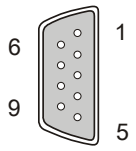
COM1 serial interface[1]		
	RS232	9-pin DSUB connector 
Type	RS232, modem-capable, not electrically isolated	
UART	16550-compatible, 16-byte FIFO	
Transfer rate	Max. 115 kbaud	
Cable length	Max. 15 meters	
Pin	**Assignment**	
1	DCD	
2	RXD	
3	TXD	
4	DTR	
5	GND	
6	DSR	
7	RTS	
8	CTS	
9	RI	

Table 16: COM1 - Pinout

1) The interfaces, etc. available on the device or module have been numbered as such for easy identification. This numbering may differ from that used by the particular operating system.

2.6.4 Ethernet 1 (ETH1)

This Ethernet controller is integrated in the CPU board and connected to external devices via the system unit.

Ethernet 1 connection (ETH1[1])			
Controller	Realtek RTL8111B/C[2]		RJ45 twisted pair (10BaseT/100BaseT), female
Cabling	S/STP (Cat 5e)		
Transfer rate	10/100/1000 Mbit/s[3]		
Cable length	Max. 100 m (min. Cat 5e)		
Speed LED	**On**	**Off**	
Green	100 Mbit/s	10 Mbit/s[4]	
Orange	1000 Mbit/s	-	
Link LED	**On**	**Off**	
Orange	Link (Ethernet network connection available)	Activity (blinking) (Data transfer in progress)	

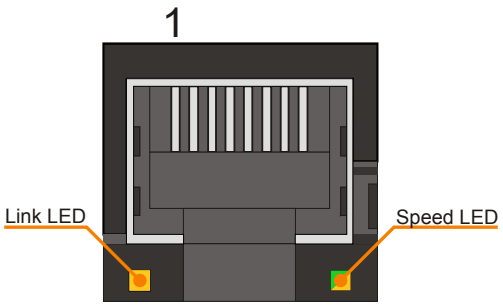


Table 17: Ethernet connection (ETH1)

1) The interfaces, etc. available on the device or module have been numbered as such for easy identification. This numbering may differ from that used by the particular operating system.
2) The Realtek 8111B is integrated in the CPU boards 5PC800.B945-00, -01, -02, -03, -04.
The Realtek 8111C is integrated in the CPU boards 5PC800.B945-05 and 5PC800.B945-10, -11, -12, -13, -14.
3) Switching takes place automatically.
4) The 10 Mbit/s transfer speed / connection only exists if the Link LED is also lit at the same time.

Driver support

A special driver is required in order to operate the Realtek RTL8111B/C Ethernet controller. Drivers for approved operating systems are available in the Downloads section of the B&R website (www.br-automation.com).

Information:

Required drivers can only be downloaded from the B&R website, not from manufacturer websites.

2.6.5 Ethernet 2 (ETH2)

This Ethernet controller is integrated in the mainboard and connected to external devices via the system unit.

Ethernet 2 connection (ETH2 [1])			
Controller	Intel 82574		RJ45 twisted pair (10BaseT/100BaseT), female
Cabling	S/STP (Cat 5e)		
Transfer rate	10/100/1000 Mbit/s[2]		
Cable length	Max. 100 m (min. Cat 5e)		
Speed LED	**On**	**Off**	
Green	100 Mbit/s	10 Mbit/s[3]	
Orange	1000 Mbit/s	-	
Link LED	**On**	**Off**	
Orange	Link (Ethernet network connection available)	Activity (blinking) (Data transfer in progress)	

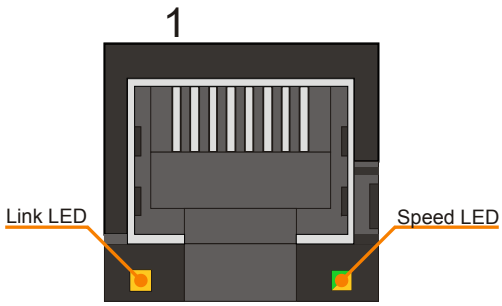


Table 18: Ethernet connection (ETH2)

1) The interfaces, etc. available on the device or module have been numbered as such for easy identification. This numbering may differ from that used by the particular operating system.
2) Switching takes place automatically.
3) The 10 Mbit/s transfer speed / connection only exists if the Link LED is also lit at the same time.

Driver support

A special driver is required in order to operate the Intel 82574 Ethernet controller. Drivers for approved operating systems are available in the Downloads section of the B&R website (www.br-automation.com).

Information:

Required drivers can only be downloaded from the B&R website, not from manufacturer websites.

2.6.6 USB interfaces (USB1, 2, 3, 4, 5)

The PPC800 features a USB 2.0 (Universal Serial Bus) host controller with multiple USB ports, 5 of which are accessible externally for easy user access.

Warning!

Peripheral USB devices can be connected to the USB ports on this device. Due to the vast number of USB devices available on the market, B&R cannot guarantee their performance. USB devices from B&R are guaranteed to work.

Caution!

Because this interface is designed according to general PC specifications, extreme care should be exercised with regard to EMC, cable routing, etc.

USB1,2,3,4

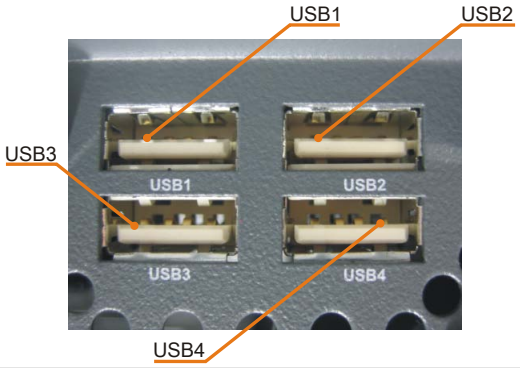
Universal Serial Bus (USB1, USB2, USB3, USB4[1])		
Type	USB 2.0	4x USB type A, female
Design	Type A	
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s)	
Current load[2] USB1, USB3 USB2, USB4	 Max. 1 A Max. 500 mA	
Cable length	Max. 5 m (without hub)	
		

Table 19: USB1, USB2, USB3 and USB4 connections

1) The interfaces, etc. available on the device or module have been numbered as such for easy identification. This numbering may differ from that used by the particular operating system.
2) Each USB port is protected by a maintenance-free "USB current-limiting circuit breaker" (max. 500 mA or 1 A).

USB5

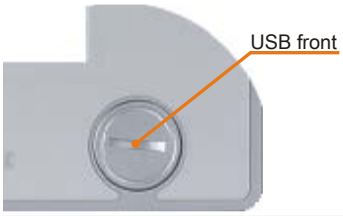
Universal Serial Bus (USB5)[1]		
Type	USB 2.0	1x USB type A, female
Design	Type A	
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s)	
Current load[2] USB5	 Max. 1 A	
Cable length	Max. 5 m (without hub)	
		

Table 20: USB5 interface

1) The interfaces, etc. available on the device or module have been numbered as such for easy identification. This numbering may differ from that used by the particular operating system.
2) Each USB port is protected by a maintenance-free "USB current-limiting circuit breaker" (max. 1 A).

2.6.7 CompactFlash slot 1

This CompactFlash slot is a fixed part of an PPC800 system and is internally connected with the chipset via IDE PATA. Type I CompactFlash cards are supported.

CompactFlash slot (CF1)		
Connection	PATA master	
CompactFlash Type	Type I	
Model number	**Short description**	
	CompactFlash	
5CFCRD.0512-06	CompactFlash 512 MB B&R	
5CFCRD.1024-06	CompactFlash 1024 MB B&R	
5CFCRD.2048-06	CompactFlash 2048 MB B&R	
5CFCRD.4096-06	CompactFlash 4096 MB B&R	
5CFCRD.8192-06	CompactFlash 8192 MB B&R	
5CFCRD.016G-06	CompactFlash 16 GB B&R	
5CFCRD.032G-06	CompactFlash 32 GB B&R	
5CFCRD.0064-03	CompactFlash 64 MB WD	
5CFCRD.0128-03	CompactFlash 128 MB WD	
5CFCRD.0256-03	CompactFlash 256 MB WD	
5CFCRD.0512-03	CompactFlash 512 MB WD	
5CFCRD.1024-03	CompactFlash 1024 MB WD	
5CFCRD.2048-03	CompactFlash 2048 MB WD	
5CFCRD.4096-03	CompactFlash 4096 MB WD	
5CFCRD.8192-03	CompactFlash 8192 MB WD	

Table 21: CompactFlash slot (CF1)

Warning!

Power must be turned off before inserting or removing CompactFlash cards.

2.6.8 CompactFlash slot 2

This CompactFlash slot is a fixed part of an PPC800 system and is internally connected with the chipset via IDE PATA. Type I CompactFlash cards are supported.

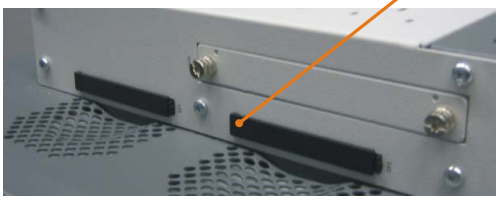
CompactFlash slot (CF2)		
Connection	PATA Slave	
CompactFlash Type	Type I	
Model number	**Short description**	
	CompactFlash	
5CFCRD.0512-06	CompactFlash 512 MB B&R	
5CFCRD.1024-06	CompactFlash 1024 MB B&R	
5CFCRD.2048-06	CompactFlash 2048 MB B&R	
5CFCRD.4096-06	CompactFlash 4096 MB B&R	
5CFCRD.8192-06	CompactFlash 8192 MB B&R	
5CFCRD.016G-06	CompactFlash 16 GB B&R	
5CFCRD.032G-06	CompactFlash 32 GB B&R	
5CFCRD.0064-03	CompactFlash 64 MB WD	
5CFCRD.0128-03	CompactFlash 128 MB WD	
5CFCRD.0256-03	CompactFlash 256 MB WD	
5CFCRD.0512-03	CompactFlash 512 MB WD	
5CFCRD.1024-03	CompactFlash 1024 MB WD	
5CFCRD.2048-03	CompactFlash 2048 MB WD	
5CFCRD.4096-03	CompactFlash 4096 MB WD	
5CFCRD.8192-03	CompactFlash 8192 MB WD	

Table 22: CompactFlash slot (CF2)

Warning!

Power must be turned off before inserting or removing CompactFlash cards.

2.6.9 MIC, Line IN, Line OUT

All PPC800 systems include an HDA compatible sound chip with access to the channels MIC, Line IN and Line OUT from the outside.

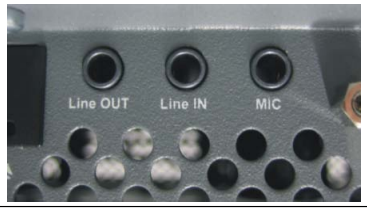
MIC, Line IN, Line OUT		
Controller	Realtek ALC 662	3.5 mm jack, female
MIC	Connection of a mono microphone with a 3.5 mm jack	
Line IN	Stereo Line IN signal supplied via a 3.5 mm jack	
Line OUT	Connection of a stereo playback device (e.g. amplifier) via a 3.5 mm jack	

Table 23: MIC, Line IN, Line OUT

Driver support

A special driver is required in order to operate the audio controller. Drivers for approved operating systems are available in the Downloads section of the B&R website (www.br-automation.com).

> **Information:**
>
> **Required drivers can only be downloaded from the B&R website, not from manufacturer websites.**

2.6.10 Add-on UPS slot

An optional Automation PC add-on UPS module can be mounted in this slot.

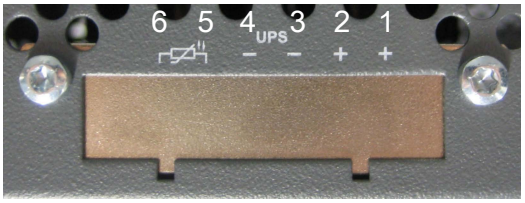
Add-on UPS slot		
Pinout with installed add-on UPS module		
1	+	
2	+	
3	-	
4	-	
5	NTC (for battery temperature measurement)	
6	NTC (for battery temperature measurement)	
Model number	**Short description**	
	Uninterruptible power supply	
5AC600.UPSI-00	Add-on UPS module	
5AC600.UPSB-00	Battery unit 5 Ah	
5CAUPS.0005-00	UPS cable 0.5 m	
5CAUPS.0030-00	UPS cable 3 m	

Table 24: Add-on UPS slot

Information about the UPS module see "Accessories" on page 256.

2.6.11 Power button

The power button provides a wide range of ATX power supply functions.

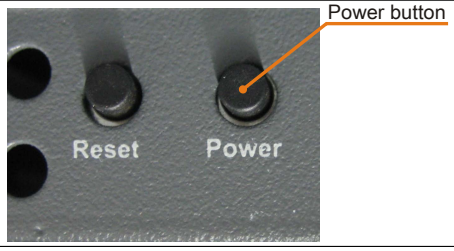
Power button	
The power button acts like the on/off switch on a normal desktop PC with an ATX power supply: **Press and release** ... Switches on the PPC800 or shuts down the operating system and switches off the PPC800 **Press and hold** ... Switches off the ATX power supply without shutting down the PPC800 (**data could be lost!**) Pressing the power button does not reset the MTCX processor.	

Table 25: Power button

2.6.12 Reset button

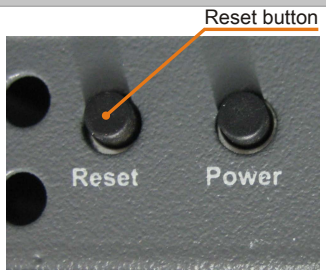
Reset button	
Pushing the reset button triggers a hardware and PCI reset. The PPC800 restarts cold. Pressing the reset button does not reset the MTCX processor.	

Table 26: Reset button

Warning!

A system reset can result in lost data!

2.6.13 Status LEDs

Status LEDs are located on the back of the system unit.

Status LEDs			
LED	**Color**	**Status**	**Description**
Power	Green	On	Supply voltage OK
	Red	On	The system is in standby mode (S5: Soft-off mode; S4: Hibernate mode - suspend-to-disk or S3: Suspend-to-RAM)
	Orange[1)]	On	Supply voltage not OK, system operating on battery power
	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.
HDD	Yellow	On	Indicates IDE drive access (CF, HDD, CD, etc.)
Link	Yellow	On	Indicates an active SDL connection on the monitor/panel connector
		Blinking	Indicates that an active SDL connection has been interrupted by a loss of power to the display unit
Run	Green	On	Application running
		Off	Application not running

Table 27: Status LEDs

1) Only lit when an add-on UPS module is installed.

2.6.14 CMOS profile switch

CMOS profile switch	
Different BIOS default value profiles can be specified using the 16-position CMOS profile switch.	
Switch position	**Description**
0	Profile 0: Default profile reserved.
1	Profile 1: Optimized for system units 5PC810.SX01-00, 5PC810.SX02-00 and 5PC810.SX03-00
2	Profile 2: Optimized for 5PC810.SX05-00 system unit
3	Profile 3: Optimized for system units 5PC820.SX01-00 and 5PC820.SX01-01
4	Profile 4: Reserved
5	**Profile 5: Optimized for system units 5PC820.1505-00 and 5PC820.1906-00**

Table 28: CMOS profile switch

Information:

The switch position that is set upon delivery represents the optimum BIOS default values for this system and should therefore not be changed.

The position of the CMOS profile switch is displayed in the BIOS setup pages and in the B&R ADI Control Center, among other places.

2.6.15 Battery

The lithium battery (3 V, 950 mAh) buffers the internal real-time clock (RTC) and individually stored BIOS settings. It is located behind the black cover on the front of the device. The battery's buffer lifespan is at least 2½ years (at 50°C, 8.5 µA for the components being supplied and a self-discharge of 40%). The battery has a limited service life and should be replaced regularly (after the specified service life at the latest).

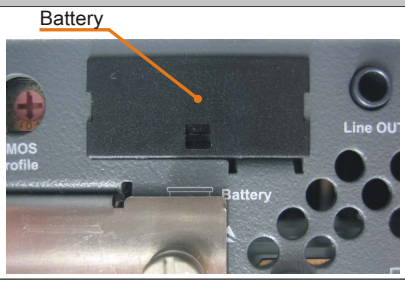
Battery		
Battery Type Removable Service life	 Renata 950 mAh Yes, accessible from the outside 2½ years[1)]	
Model number	**Short description**	
	Batteries	
0AC201.91	Lithium batteries, 4 pcs., 3 V / 950 mAh, button cell	
4A0006.00-000	Lithium battery, 1 pc., 3 V / 950 mAh, button cell	

Table 29: Battery

1) At 50°C, 8.5 µA of the supplied components and a self-discharge of 40%.

Battery status evaluation

The status of the battery is determined immediately after the device is started and subsequently checked by the system every 24 hours. During this measurement, the battery is subjected to a brief load (approximately 1 second) and then evaluated. Once determined, the battery status is displayed in BIOS (under Advanced -> OEM features -> System board features -> Voltage values) and in the B&R Control Center (ADI driver); it can also be read in a customer application using the ADI library.

Battery status	Description
N/A	The hardware or firmware being used is too old and does not support reading the battery status.
GOOD	Data buffering is intact.
BAD	From the point when battery capacity is recognized as insufficient (BAD), data buffering is intact for approximately another 500 hours

Table 30: Battery status

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

2.6.16 Slide-in compact slot

The internal connection between the slide-in compact slot and the chipset is made via SATA I.

Slide-in compact slot		
Connection	SATA I	
Model number	**Short description**	
	Adapters	
5AC803.BC02-00	PPC800 adapter: 1 compact slide-in	
	Drives	
5AC801.HDDI-00	40 GB slide-in compact SATA hard disk, 24/7 operation with extended temperature range. Note: Please see the manual for information about using this hard disk.	
5AC801.HDDI-02	160 GB slide-in compact SATA hard disk; 24/7 operation with extended temperature range. Note: Please see the manual for information about using this hard disk.	
5AC801.HDDI-03	250 GB slide-in compact SATA hard disk; 24/7 operation. Note: Please see the manual for information about using this hard disk.	
5AC801.HDDI-04	500 GB SATA hard disk, slide-in compact drive; 24/7 hard disk. Note: Please see the manual for information about using this hard disk.	
5AC801.SSDI-00	32 GB SATA SSD (SLC), slide-in compact drive	
5AC801.SSDI-01	60 GB SATA SSD (MLC), slide-in compact drive	
5AC801.SSDI-02	180 GB SATA SSD (MLC), slide-in compact drive	
5AC801.SSDI-03	60 GB SATA SSD (MLC), slide-in compact drive	

Table 31: Slide-in compact slot

Information:

The adapter 5AC803.BC02-00 is required for the use of slide-in compact drives.

Information:

The SATA I interface allows data carriers to be exchanged during operation (hot-plug). To utilize this capability, it must be supported by the operating system.

2.6.17 PCIec slot (card slot)

PCIec slots		
Model number	**Short description**	
	Adapters	
5AC803.BC01-00	PPC800 adapter: 1 compact PCI Express	
	Plug-in cards	
5ACPCC.ETH0-00	Compact PCIe Ethernet card 1x 10/100/1000	
5ACPCC.MPL0-00	PCIec POWERLINK card, 2 POWERLINK interfaces, 512 kB SRAM	

Table 32: PCIec slots

Information:

The adapter 5AC803.BC01-00 is required for the use of PCIec plug-in cards.

Information:

Only B&R PCIec cards that were specially designed for the Automation PC 820 and Panel PC 800 can be used.

For more information, see see "PCIec Insert cards" on page 79.

3 Individual components

3.1 System units

3.1.1 5PC820.1505-00

3.1.1.1 General information

- 15" TFT XGA color display
- Analog resistive touch screen
- Robust design
- Small installation depth
- Fan-free operation
- 1 optional PCI Express compact slot
- 1 optional slide-in compact slot
- Optional PCI and PCIe slots and optional slide-in drives, optional expansions available

3.1.1.2 Order data

Model number	Short description	Figure
	System units	
5PC820.1505-00	Panel PC 820 15" XGA TFT display with touch screen (resistive); connections for 1x RS232, 5x USB 2.0, Smart Display Link/DVI/Monitor, 2x Ethernet 10/100/1000, HDA sound, add-on UPS slot, expandable with 1 or 2 PCI / PCI Express slots, optional CompactPCI Express and compact slide-in slot; IP65 protection (front side); order 24 VDC plug for supply voltage separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91).	
	Required accessories	
	CPU boards	
5PC800.B945-05	Intel Atom N270 CPU board, 1.6 GHz, single-core, 533 MHz FSB, 512 kB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	
5PC800.B945-10	Intel Core Duo L2400 CPU board, 1.66 GHz, dual-core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-11	Intel Core2 Duo L7400 CPU board, 1.5 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-12	Intel Core2 Duo U7400 CPU board, 1.06 GHz, dual-core, 533 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-13	Intel Celeron M 423 CPU board, 1.06 GHz, single-core, 533 MHz FSB, 1 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-14	Intel Core2 Duo T7400 CPU board, 2.16 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
	Terminal blocks	
0TB103.9	24 VDC supply voltage plug, 3-pin female, 3.31 mm² screw clamp, protected against vibration by the screw flange	
0TB103.91	24 VDC supply voltage plug, 3-pin female, 3.31 mm² cage clamp, protected against vibration by the screw flange	
	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	
	Heat sink	
5AC803.HS00-00	PPC800 heat sink for CPU boards with dual-core processors L2400, L7400, U7500 and Celeron M 423.	
5AC803.HS00-01	PPC800 heat sink for CPU boards with dual-core processors T7400, T9400 and P8400.	
5AC803.HS00-02	PPC800 heat sink for CPU board with Atom processor N270.	
	Fan kit	
5AC803.FA01-00	PPC800 fan kit for system units without an expansion	

Table 33: 5PC820.1505-00 - Order data

Model number	Short description	Figure
	Optional accessories	
	Adapters	
5AC803.BC01-00	PPC800 adapter: 1 compact PCI Express.	
5AC803.BC02-00	PPC800 adapter: 1 compact slide-in.	
	Bus units	
5AC803.BX01-00	PPC800 bus; 1 PCI, 1 slide-in slot.	
5AC803.BX01-01	PPC800 bus; 1 PCI Express, 1 slide-in slot.	
5AC803.BX02-00	PPC800 bus; 2 PCI, 1 slide-in slot.	
5AC803.BX02-01	PPC800 bus: 1 PCI, 1 PCI Express, 1 slide-in slot	
	Plug-in cards	
5ACPCC.ETH0-00	Compact PCIe Ethernet card 1x 10/100/1000	
5ACPCC.MPL0-00	PCIec POWERLINK card, 2 POWERLINK interfaces, 512 kB SRAM	
	Expansions	
5AC803.SX01-00	PPC800 expansion; 1 PCI/PCI Express and 1 slide-in slot (bus 5AC803.BX01-00 or 5AC803.BX01-01 required)	
5AC803.SX02-00	PPC800 expansion; 2 PCI/PCI Express and 1 slide-in slot (bus 5AC803.BX02-00 or 5AC803.BX02-01 required)	
	Drives	
5AC801.ADAS-00	SATA hard disk adapter for operating a slide-in compact hard disk in a slide-in slot	
5AC801.DVDS-00	DVD-ROM slide-in SATA drive.	
5AC801.DVRS-00	DVD-R/RW DVD+R/RW slide-in SATA drive.	
5AC801.HDDI-00	40 GB slide-in compact SATA hard disk, 24/7 operation with extended temperature range. Note: Please see the manual for information about using this hard disk.	
5AC801.HDDI-04	500 GB slide-in compact SATA hard disk; 24/7 operation. Note: Please see the manual for information about using this hard disk.	
5AC801.HDDS-00	40 GB slide-in SATA hard disk; 24/7 operation with extended temperature range. Note: Please see the manual for information about using this hard disk.	
5AC801.SSDI-00	32 GB SATA SSD (SLC), slide-in compact drive.	
5AC801.SSDI-01	60 GB slide-in compact SATA SSD (MLC).	
5AC801.SSDI-02	180 GB slide-in compact SATA SSD (MLC).	
5AC801.SSDI-03	60 GB slide-in compact SATA SSD (MLC).	
	Fan kit	
5AC803.FA02-00	PPC800 fan kit for system units with expansion 5AC803.SX01-00	
5AC803.FA03-00	PPC800 fan kit for system units with expansion 5AC803.SX02-00	
	Uninterruptible power supply	
5AC600.UPSI-00	UPS module for APC620, APC810, PPC800; for system units 5PC600.SX01-00 (starting with Rev. H0), 5PC600.SX02-00 (starting with Rev. G0), 5PC600.SX02-01 (starting with Rev. H0), 5PC600.SX05-00 (starting with Rev. F0), 5PC600.SX05-01 (starting with Rev. F0), 5PC600.SF03-00 (starting with Rev. A0), 5PC810.SX*. 5PC820.1505-00, 5PC820.1906-00. Order cable (5CAUPS.0005-00 or 5CAUPS.0030-00) and battery unit (5AC600.UPSB-00) separately.	

Table 33: 5PC820.1505-00 - Order data

3.1.1.3 Interfaces

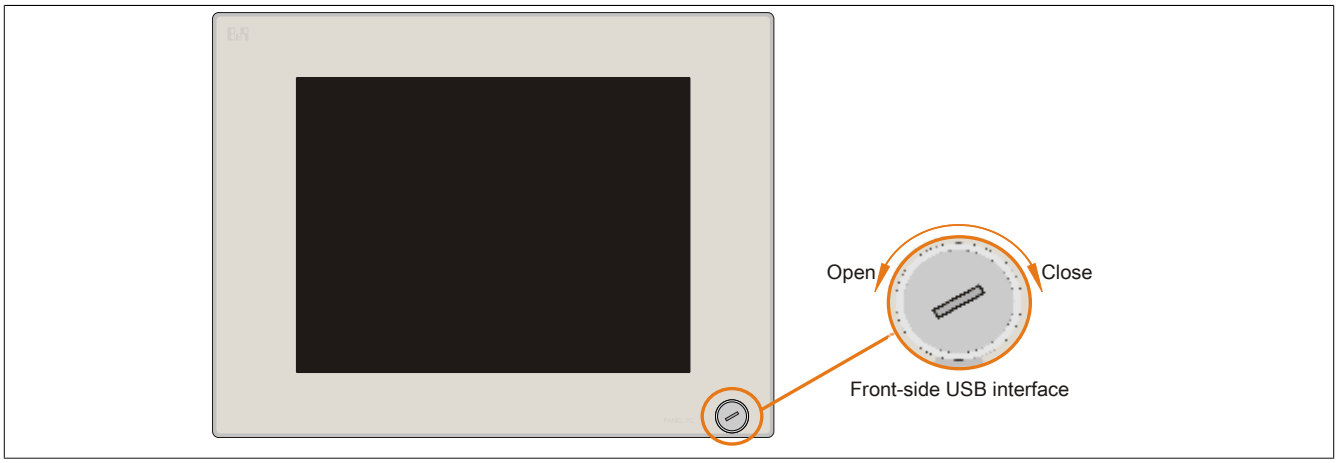


Figure 12: 5PC820.1505-00 - Front view

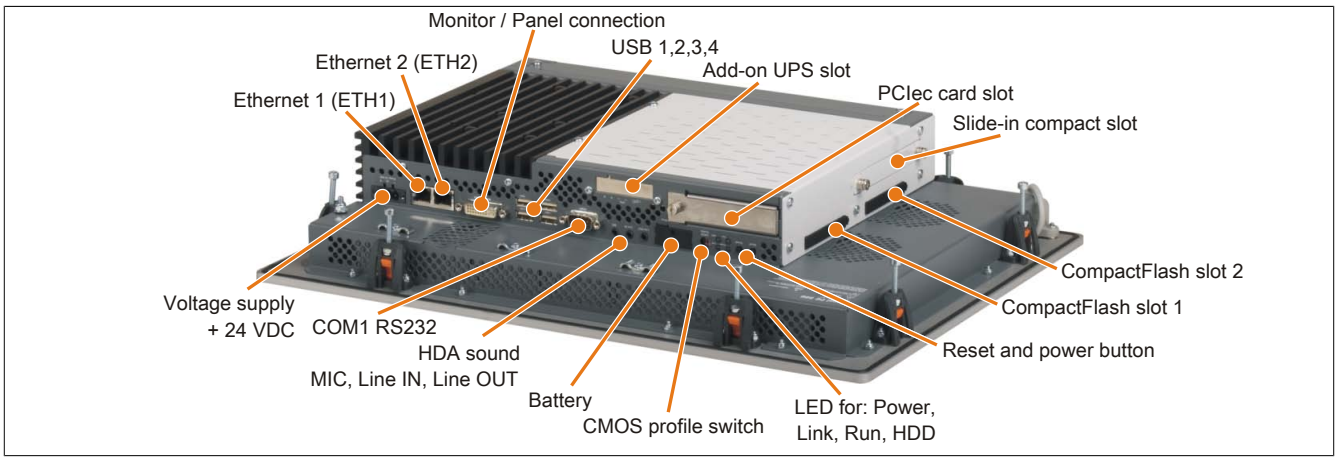


Figure 13: 5PC820.1505-00 - Rear view

Warning!

Do not remove mounting screws from the heat sink, as it is connected to the processor and chipset by a thermal coupling. Should this connection be broken, the B&R industrial PC must be sent for repair. Removal of the mounting screws, which can be determined by a broken seal, voids all warranty.

During operation, surface temperatures of the heat sink may reach 70°C (warning "hot surface").

3.1.1.4 Technical data

Product ID	5PC820.1505-00
General information	
LEDs	Power, HDD, Link, Run
B&R ID code	$AF21
Battery	
Type	Renata 950 mAh
Service life	2½ years
Removable	Yes, accessible from the outside
Design	Lithium Ion
Power button	Yes
Reset button	Yes
Buzzer	Yes
Certification	
CE	Yes
cULus	Yes
Controller	
Boot loader	BIOS
Power failure logic	
Controller	MTCX [1)]
Buffer time	10 ms

Table 34: 5PC820.1505-00 - Technical data

Product ID	5PC820.1505-00
Graphics	
Controller	Depends on the CPU board being used
Memory	
Type	Depends on the CPU board being used
Size	Depends on the CPU board being used
Interfaces	
COM1	
Type	RS232, modem-capable, not electrically isolated
Design	9-pin DSUB connector
UART	16550-compatible, 16-byte FIFO
Max. baud rate	115 kbit/s
CompactFlash slot 1	
Type	Type I
CompactFlash slot 2	
Type	Type I
USB	
Quantity	5
Type	USB 2.0
Design	Type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s)
Current load	Max. 500 mA or 1 A per connection
Ethernet	
Quantity	2
Design	Shielded RJ45 port
Transfer rate	10/100/1000 Mbit/s
Audio	
Type	HDA sound
Inputs	Microphone, Line IN
Outputs	Line OUT
Display	
Type	TFT color
Diagonal	15" (381 mm)
Colors	16 million
Resolution	XGA, 1024 x 768 pixels
Contrast	550:1
Viewing angles	
Horizontal	Direction R / Direction L = 60°
Vertical	Direction U = 45° / Direction D = 55°
Backlight	
Brightness	250 cd/m²
Half brightness time [2)]	50,000 h
Touch screen [3)]	
Type	Accu Touch
Technologies	Analog, resistive
Controller	Elo, serial, 12-bit
Transmittance	81% ±3%
Inserts	
PCI slots	
Quantity	1 or 2 (optional) [4)]
PCIe slots	
Quantity	1 [5)]
PCIec slots	
Quantity	Optional [6)]
Slide-in drives	Component-dependent (on the expansion and bus unit being used)
Slide-in compact drives	Optional [7)]
Add-on UPS slot	Yes
Insert for fan kit	Yes
Electrical characteristics	
Nominal voltage	24 VDC ±25%
Nominal current	6 A
Starting current	Typ. 10 A, max. 50 A for < 300 µs
Power consumption	Component-dependent
Electrical isolation	Yes
Operating conditions	
Height of drop	1 m on industrial surfaces (in original packaging)
Protection in accordance with EN 60529	Back-side IP20 IP65, dust and sprayed water protection (front)
Environmental conditions	
Temperature	
Operation	Component-dependent
Storage	-20 to 60°C
Transport	-20 to 60°C

Table 34: 5PC820.1505-00 - Technical data

Product ID	5PC820.1505-00
Relative humidity	
Operation	10 to 85%, non-condensing
Storage	T ≤ 40°C: 5 to 90%, non-condensing T > 40°C: <90%, non-condensing
Transport	T ≤ 40°C: 5 to 90%, non-condensing T > 40°C: <90%, non-condensing
Vibration	
Operation (continuous)	2 to 9 Hz: 1.75 mm amplitude / 9 to 150 Hz: 0.5 g
Operation (occasional)	2 to 9 Hz: 3.5 mm amplitude / 9 to 150 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
Mechanical characteristics	
Housing	
Material	Metal
Front	
Frame	Naturally anodized aluminum
Design	Gray
Panel membrane	
Material	Polyester
Light background	Similar to Pantone 427CV
Gasket	Flat gasket around display front
Dimensions	
Width	435 mm
Height	330 mm
Depth	Component-dependent
Weight	5500 g (component-dependent)

Table 34: 5PC820.1505-00 - Technical data

1) Maintenance Controller Extended.
2) At an ambient temperature of 25°C. Reducing the brightness by 50% can result in an approximately 50% increase in the half-brightness time.
3) Touch screen drivers for approved operating systems are available in the Downloads section of the B&R website.
4) The PCI slots available depend on the expansion and bus unit being used.
5) The PCIe slots available depend on the expansion and bus unit being used.
6) Optional with PCIec adapter 5AC803.BC01-00.
7) Optional with slide-in compact adapter 5AC803.BC02-00.

3.1.1.5 Dimensions

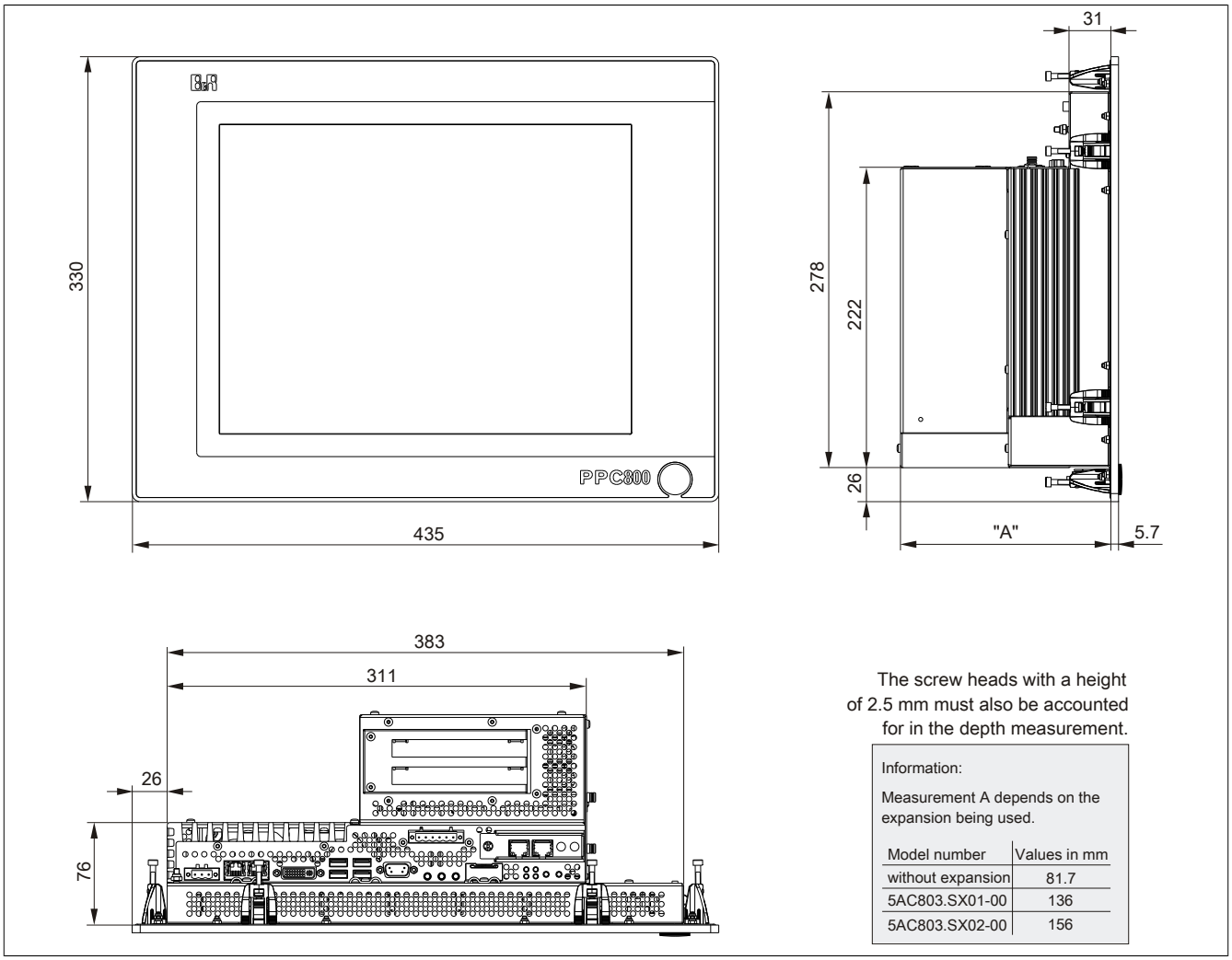


Figure 14: 5PC820.1505 - Dimensions

3.1.1.6 Cutout

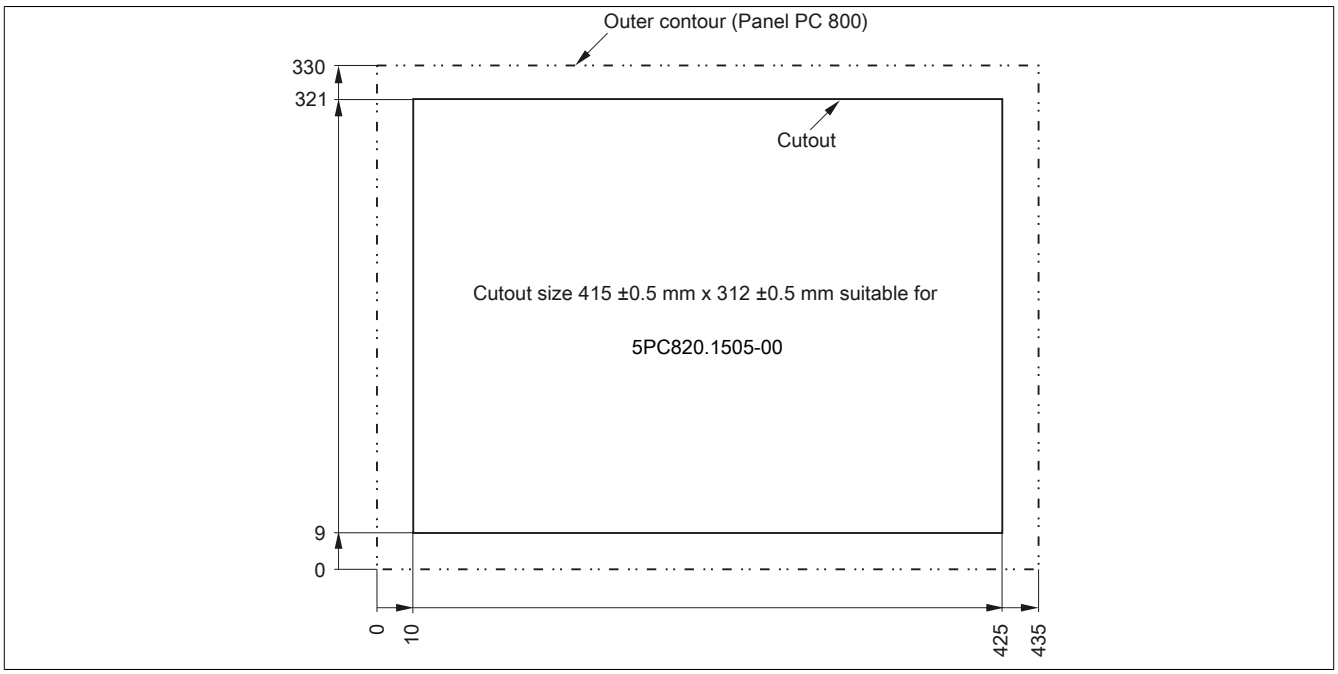


Figure 15: 5PC820.1505-00 - Cutout installation

3.1.2 5PC820.1906-00

3.1.2.1 General information

- 19" TFT SXGA color display
- Analog resistive touch screen
- Robust design
- Small installation depth
- Fan-free operation
- 1 optional PCI Express compact slot
- 1 optional slide-in compact slot
- Optional PCI and PCIe slots and optional slide-in drives, optional expansions available

3.1.2.2 Order data

Model number	Short description	Figure
	System units	
5PC820.1906-00	Panel PC 820 19" SXGA color TFT display with touch screen (resistive); connections for 1x RS232, 5x USB 2.0, Smart Display Link/DVI/Monitor, 2x Ethernet 10/100/1000, HDA sound, add-on UPS slot, expandable with 1 or 2 PCI / PCI Express slots, optional CompactPCI Express and compact slide-in slot; IP65 protection (front side); order 24 VDC plug for supply voltage separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91).	
	Required accessories	
	CPU boards	
5PC800.B945-05	Intel Atom N270 CPU board, 1.6 GHz, single-core, 533 MHz FSB, 512 kB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	
5PC800.B945-10	Intel Core Duo L2400 CPU board, 1.66 GHz, dual-core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-11	Intel Core2 Duo L7400 CPU board, 1.5 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-12	Intel Core2 Duo U7400 CPU board, 1.06 GHz, dual-core, 533 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-13	Intel Celeron M 423 CPU board, 1.06 GHz, single-core, 533 MHz FSB, 1 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-14	Intel Core2 Duo T7400 CPU board, 2.16 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
	Terminal blocks	
0TB103.9	24 VDC supply voltage plug, 3-pin female, 3.31 mm² screw clamp, protected against vibration by the screw flange	
0TB103.91	24 VDC supply voltage plug, 3-pin female, 3.31 mm² cage clamp, protected against vibration by the screw flange	
	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	
	Heat sink	
5AC803.HS00-00	PPC800 heat sink for CPU boards with dual-core processors L2400, L7400, U7500 and Celeron M 423.	
5AC803.HS00-01	PPC800 heat sink for CPU boards with dual-core processors T7400, T9400 and P8400.	
5AC803.HS00-02	PPC800 heat sink for CPU board with Atom processor N270.	
	Fan kit	
5AC803.FA01-00	PPC800 fan kit for system units without an expansion	
	Optional accessories	
	Adapters	
5AC803.BC01-00	PPC800 adapter: 1 compact PCI Express.	
5AC803.BC02-00	PPC800 adapter: 1 compact slide-in.	
	Bus units	
5AC803.BX01-00	PPC800 bus; 1 PCI, 1 slide-in slot.	

Table 35: 5PC820.1906-00 - Order data

Model number	Short description	Figure
5AC803.BX01-01	PPC800 bus; 1 PCI Express, 1 slide-in slot.	
5AC803.BX02-00	PPC800 bus; 2 PCI, 1 slide-in slot.	
5AC803.BX02-01	PPC800 bus: 1 PCI, 1 PCI Express, 1 slide-in slot	
	Plug-in cards	
5ACPCC.ETH0-00	Compact PCIe Ethernet card 1x 10/100/1000	
5ACPCC.MPL0-00	PCIec POWERLINK card, 2 POWERLINK interfaces, 512 kB SRAM	
	Expansions	
5AC803.SX01-00	PPC800 expansion; 1 PCI/PCI Express and 1 slide-in slot (bus 5AC803.BX01-00 or 5AC803.BX01-01 required)	
5AC803.SX02-00	PPC800 expansion; 2 PCI/PCI Express and 1 slide-in slot (bus 5AC803.BX02-00 or 5AC803.BX02-01 required)	
	Drives	
5AC801.ADAS-00	SATA hard disk adapter for operating a slide-in compact hard disk in a slide-in slot	
5AC801.DVDS-00	DVD-ROM slide-in SATA drive.	
5AC801.DVRS-00	DVD-R/RW DVD+R/RW slide-in SATA drive.	
5AC801.HDDI-00	40 GB slide-in compact SATA hard disk, 24/7 operation with extended temperature range. Note: Please see the manual for information about using this hard disk.	
5AC801.HDDI-04	500 GB slide-in compact SATA hard disk; 24/7 operation. Note: Please see the manual for information about using this hard disk.	
5AC801.HDDS-00	40 GB slide-in SATA hard disk; 24/7 operation with extended temperature range. Note: Please see the manual for information about using this hard disk.	
5AC801.SSDI-00	32 GB SATA SSD (SLC), slide-in compact drive.	
5AC801.SSDI-01	60 GB slide-in compact SATA SSD (MLC).	
5AC801.SSDI-02	180 GB slide-in compact SATA SSD (MLC).	
5AC801.SSDI-03	60 GB slide-in compact SATA SSD (MLC).	
	Fan kit	
5AC803.FA02-00	PPC800 fan kit for system units with expansion 5AC803.SX01-00	
5AC803.FA03-00	PPC800 fan kit for system units with expansion 5AC803.SX02-00	
	Uninterruptible power supply	
5AC600.UPSI-00	UPS module for APC620, APC810, PPC800; for system units 5PC600.SX01-00 (starting with Rev. H0), 5PC600.SX02-00 (starting with Rev. G0), 5PC600.SX02-01 (starting with Rev. H0), 5PC600.SX05-00 (starting with Rev. F0), 5PC600.SX05-01 (starting with Rev. F0), 5PC600.SF03-00 (starting with Rev. A0), 5PC810.SX*. 5PC820.1505-00, 5PC820.1906-00. Order cable (5CAUPS.0005-00 or 5CAUPS.0030-00) and battery unit (5AC600.UPSB-00) separately.	

Table 35: 5PC820.1906-00 - Order data

3.1.2.3 Interfaces

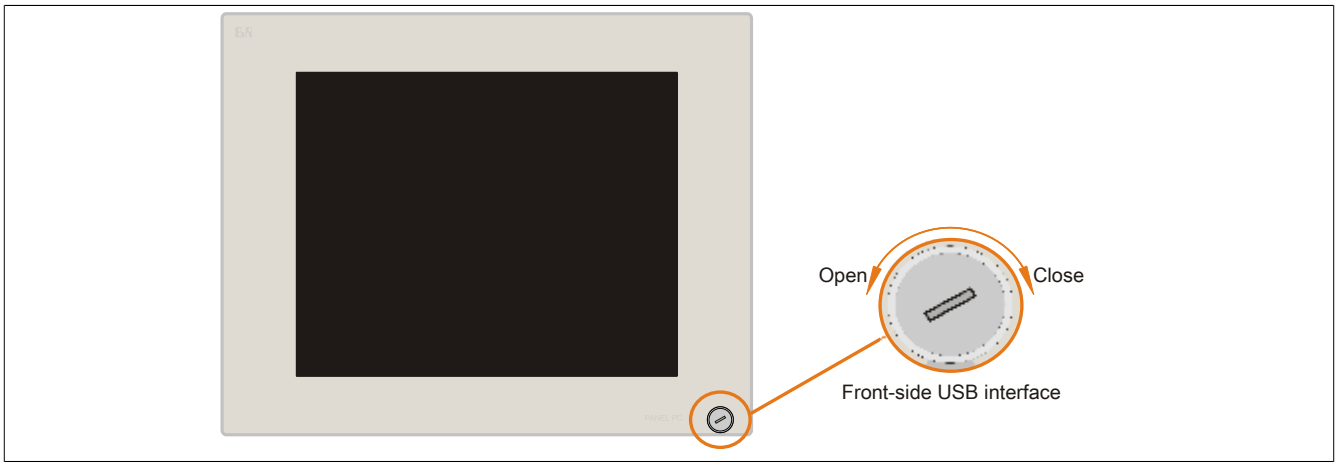


Figure 16: 5PC820.1906-00 - Front view

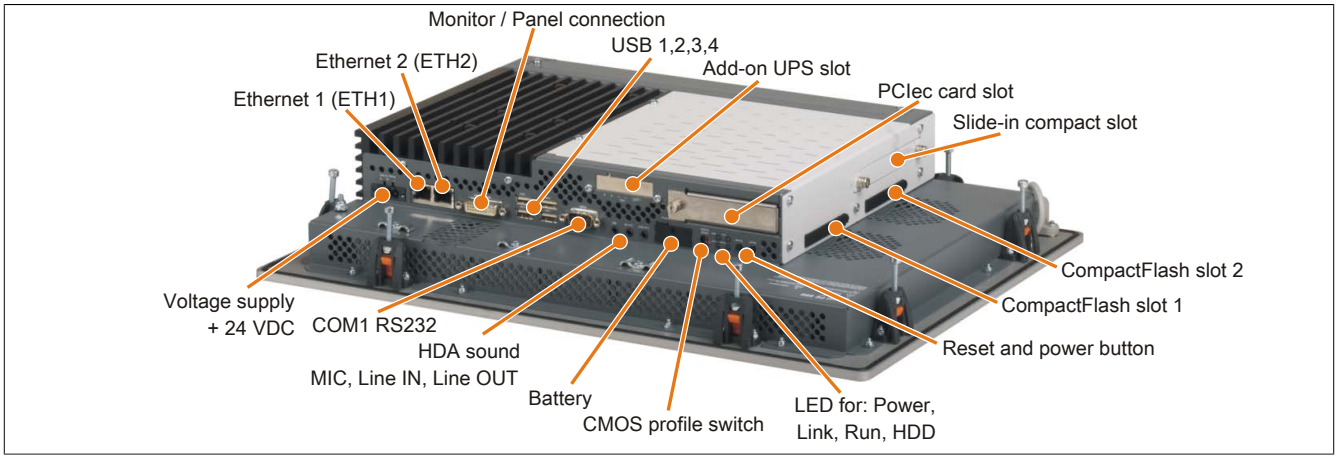


Figure 17: 5PC820.1906-00 - Rear view

Warning!

Do not remove mounting screws from the heat sink, as it is connected to the processor and chipset by a thermal coupling. Should this connection be broken, the B&R industrial PC must be sent for repair. Removal of the mounting screws, which can be determined by a broken seal, voids all warranty.

During operation, surface temperatures of the heat sink may reach 70°C (warning "hot surface").

3.1.2.4 Technical data

Product ID	5PC820.1906-00
General information	
LEDs	Power, HDD, Link, Run
B&R ID code	$AF22
Battery Type Service life Removable Design	 Renata 950 mAh 2½ years Yes, accessible from the outside Lithium Ion
Power button	Yes
Reset button	Yes
Buzzer	Yes
Certification CE cULus	 Yes Yes
Controller	
Boot loader	BIOS
Power failure logic Controller Buffer time	 MTCX [1)] 10 ms

Table 36: 5PC820.1906-00 - Technical data

Product ID	5PC820.1906-00
Graphics	
Controller	Depends on the CPU board being used
Memory	
Type	Depends on the CPU board being used
Size	Depends on the CPU board being used
Interfaces	
COM1	
Type	RS232, modem-capable, not electrically isolated
Design	9-pin DSUB connector
UART	16550-compatible, 16-byte FIFO
Max. baud rate	115 kbit/s
CompactFlash slot 1	
Type	Type I
CompactFlash slot 2	
Type	Type I
USB	
Quantity	5
Type	USB 2.0
Design	Type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s)
Current load	Max. 500 mA or 1 A per connection
Ethernet	
Quantity	2
Design	Shielded RJ45 port
Transfer rate	10/100/1000 Mbit/s
Audio	
Type	HDA sound
Inputs	Microphone, Line IN
Outputs	Line OUT
Display	
Type	TFT color
Diagonal	19" (480 mm)
Colors	16 million
Resolution	SXGA, 1280 x 1024 pixels
Contrast	900:1
Viewing angles	
Horizontal	Direction R / Direction L = 85°
Vertical	Direction U / Direction D = 85°
Backlight	
Brightness	300 cd/m²
Half brightness time [2)]	50,000 h
Touch screen [3)]	
Type	Accu Touch
Technologies	Analog, resistive
Controller	Elo, serial, 12-bit
Transmittance	81% ±3%
Inserts	
PCI slots	
Quantity	1 or 2 (optional) [4)]
PCIe slots	
Quantity	1 [5)]
PCIec slots	
Quantity	Optional [6)]
Slide-in drives	Component-dependent (on the expansion and bus unit being used)
Slide-in compact drives	Optional [7)]
Add-on UPS slot	Yes
Insert for fan kit	Yes
Electrical characteristics	
Nominal voltage	24 VDC ±25%
Nominal current	6 A
Starting current	Typ. 10 A, max. 50 A for < 300 µs
Power consumption	Component-dependent
Electrical isolation	Yes
Operating conditions	
Height of drop	1 m on industrial surfaces (in original packaging)
Protection in accordance with EN 60529	Back-side IP20 IP65, dust and sprayed water protection (front)
Environmental conditions	
Temperature	
Operation	Component-dependent
Storage	-20 to 60°C
Transport	-20 to 60°C

Table 36: 5PC820.1906-00 - Technical data

Product ID	5PC820.1906-00
Relative humidity	
Operation	10 to 85%, non-condensing
Storage	T ≤ 40°C: 5 to 90%, non-condensing T > 40°C: <90%, non-condensing
Transport	T ≤ 40°C: 5 to 90%, non-condensing T > 40°C: <90%, non-condensing
Vibration	
Operation (continuous)	2 to 9 Hz: 1.75 mm amplitude / 9 to 150 Hz: 0.5 g
Operation (occasional)	2 to 9 Hz: 3.5 mm amplitude / 9 to 150 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
Mechanical characteristics	
Housing	
Material	Metal
Front	
Frame	Naturally anodized aluminum
Design	Gray
Panel membrane	
Material	Polyester
Light background	Similar to Pantone 427CV
Gasket	Flat gasket around display front
Dimensions	
Width	527 mm
Height	421 mm
Depth	Component-dependent
Weight	10000 g (component-dependent)

Table 36: 5PC820.1906-00 - Technical data

1) Maintenance Controller Extended.
2) At an ambient temperature of 25°C. Reducing the brightness by 50% can result in an approximately 50% increase in the half-brightness time.
3) Touch screen drivers for approved operating systems are available in the Downloads section of the B&R website.
4) The PCI slots available depend on the expansion and bus unit being used.
5) The PCIe slots available depend on the expansion and bus unit being used.
6) Optional with PCIec adapter 5AC803.BC01-00.
7) Optional with slide-in compact adapter 5AC803.BC02-00.

3.1.2.5 Dimensions

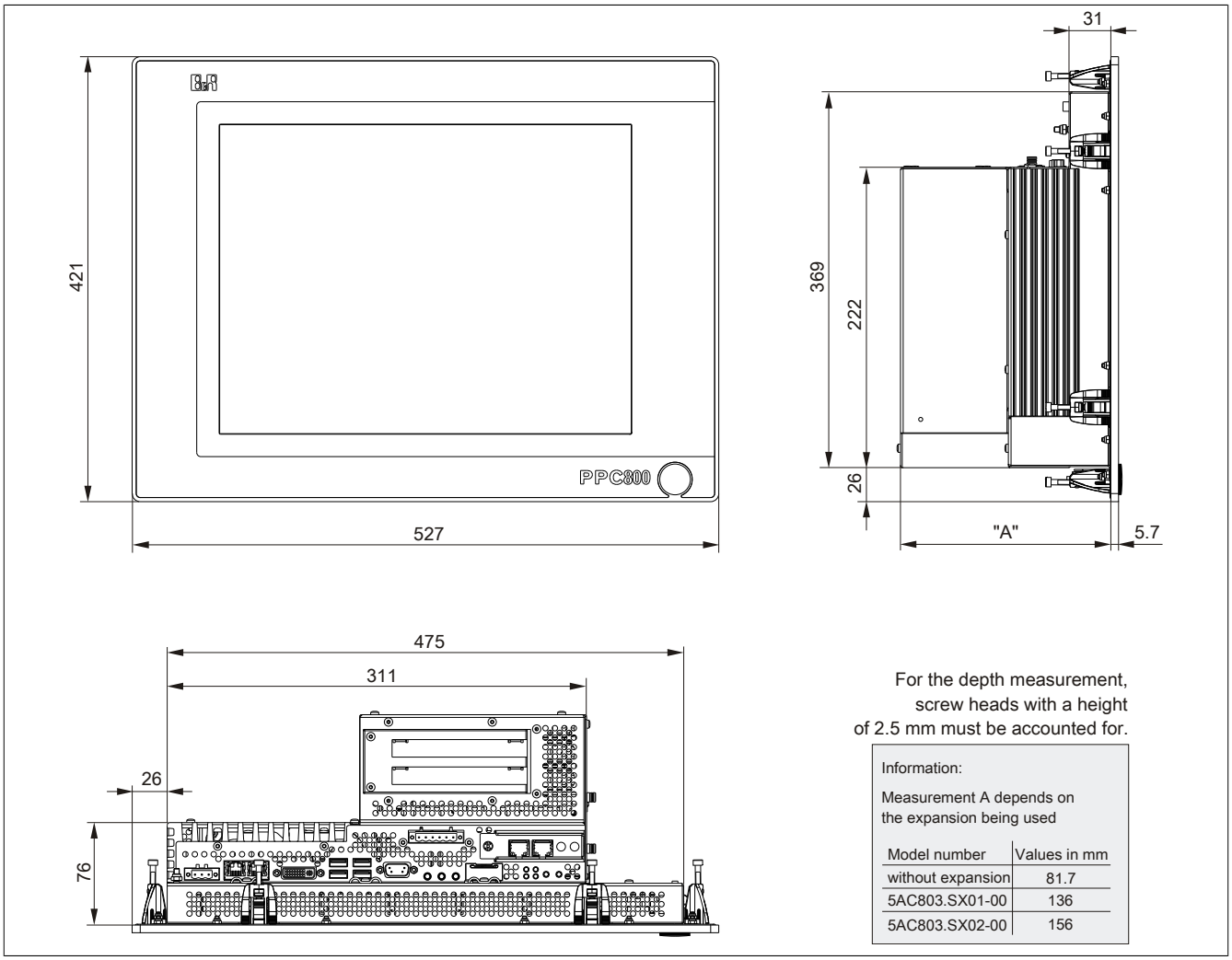


Figure 18: 5PC820.1906-00 - Dimensions

3.1.2.6 Cutout

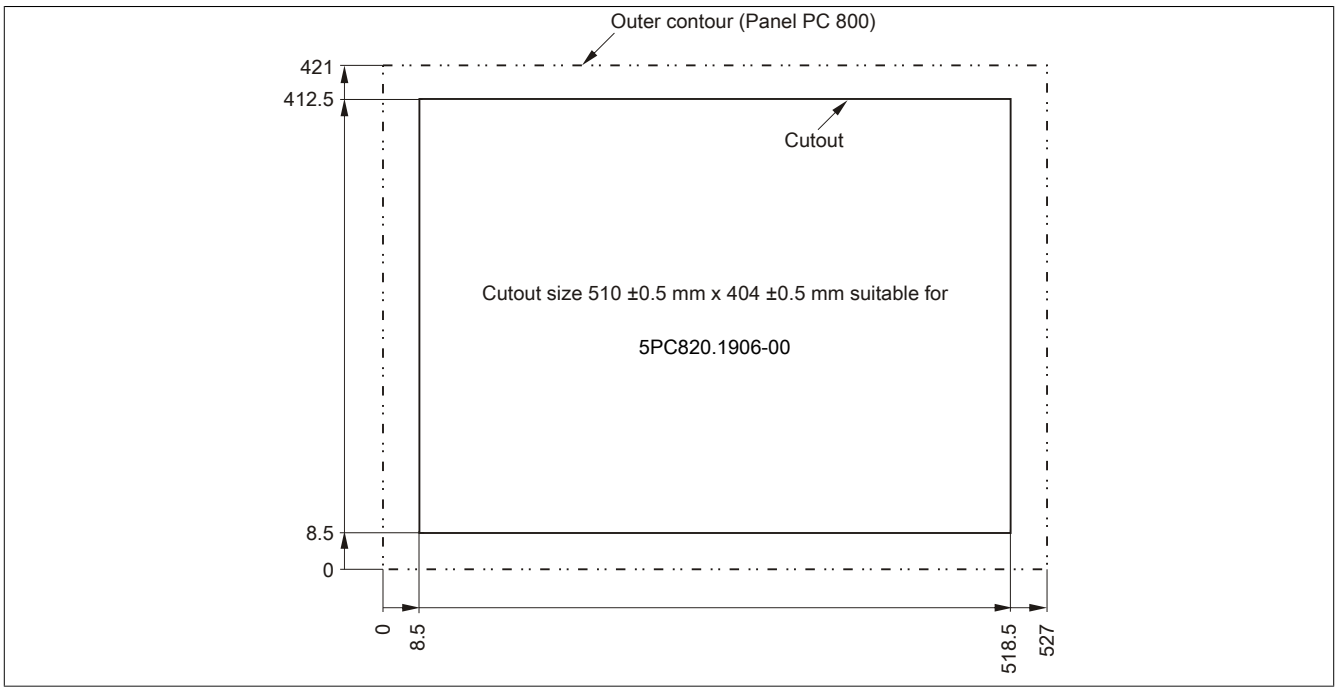


Figure 19: 5PC820.1906-00 - Cutout installation

3.2 CPU boards 945GME

3.2.1 General information

- AMI BIOS
- Intel® 945GME chipset
- 2x DDR2 memory socket
- Dual channel memory
- Intel® GMA 950
- Gigabit Ethernet

3.2.2 Order data

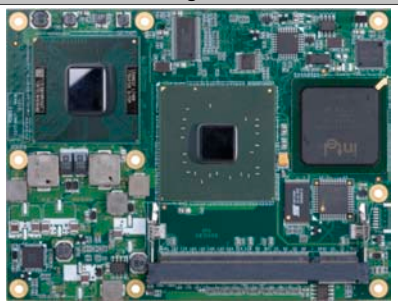
Model number	Short description	Figure
	CPU boards	
5PC800.B945-00	Intel Core Duo L2400 CPU board, 1.66 GHz, dual-core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	
5PC800.B945-01	Intel Core2 Duo L7400 CPU board, 1.5 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	
5PC800.B945-02	Intel Core2 Duo U7400 CPU board, 1.06 GHz, dual-core, 533 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	
5PC800.B945-03	Intel Celeron M 423 CPU board, 1.06 GHz, single-core, 533 MHz FSB, 1 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	
5PC800.B945-04	Intel Core2 Duo T7400 CPU board, 2.16 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	
5PC800.B945-05	Intel Atom N270 CPU board, 1.6 GHz, single-core, 533 MHz FSB, 512 kB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	
	Required accessories	
	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 37: 5PC800.B945-00, 5PC800.B945-01, 5PC800.B945-02, 5PC800.B945-03, 5PC800.B945-04, 5PC800.B945-05 - Order data

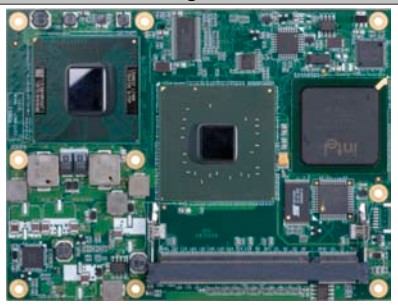
Model number	Short description	Figure
	CPU boards	
5PC800.B945-10	Intel Core Duo L2400 CPU board, 1.66 GHz, dual-core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-11	Intel Core2 Duo L7400 CPU board, 1.5 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-12	Intel Core2 Duo U7400 CPU board, 1.06 GHz, dual-core, 533 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-13	Intel Celeron M 423 CPU board, 1.06 GHz, single-core, 533 MHz FSB, 1 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-14	Intel Core2 Duo T7400 CPU board, 2.16 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
	Required accessories	
	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 38: 5PC800.B945-10, 5PC800.B945-11, 5PC800.B945-12, 5PC800.B945-13, 5PC800.B945-14 - Order data

3.2.3 5PC800.B945-0x - Technical data

Product ID	5PC800.B945-00	5PC800.B945-01	5PC800.B945-02	5PC800.B945-03	5PC800.B945-04	5PC800.B945-05
General information						
Certification						
CE	Yes					
cULus	-	-	-	-	-	Yes
GL	-	-	-	-	-	Yes
Controller						
Boot loader	Embedded AMI BIOS					
Processor						
Type	Intel® Core™ Duo L2400	Intel® Core™2 Duo L7400	Intel® Core™2 Duo U7500	Intel® Celeron® M 423,	Intel® Core™2 Duo T7400	Intel® Atom™ N270
Clock frequency	1660 MHz	1500 MHz	1060 MHz	1060 MHz	2160 MHz	1660 MHz
Number of cores	2	2	2	1	2	1
Architectures	65 nm	65 nm	65 nm	65 nm	65 nm	45 nm
L1 cache	32 kB	32 kB	32 kB	32 kB	32 kB	512 kB
L2 cache	2 MB	4 MB	2 MB	1 MB	4 MB	512 kB
External bus	667 MHz	667 MHz	533 MHz	533 MHz	667 MHz	533 MHz
Intel® 64 Architecture	No	Yes	Yes	No	Yes	No
Intel® Virtualization Technology (VT-x)	Yes	Yes	Yes	No	Yes	No
Enhanced Intel SpeedStep® Technology	Yes	Yes	Yes	No	Yes	Yes
Chipset	Intel® 945GME Intel® 82801 GHM (ICH7M-DH)					
Real-time clock						
Accuracy	At 25°C: typ. 12 ppm (1 seconds) per day					
Battery-buffered	Yes					
Memory socket						
Type	DDR2					
Size	Max. 3 GB					
Graphics						
Controller	Intel® Graphics Media Accelerator 950					
Memory	Up to 224 MB [1]					
Color depth	Max. 32-bit					
Resolution						
DVI	2x Intel compliant SDVO ports, 1920 x 1080					
RGB	400 MHz RAMDAC, resolutions up to 2048 x 1536 @ 75 Hz (QXGA) and 1920 x 1080 @ 85 Hz (HDTV)					
Mass memory management	2x SATA, 1x IDE					
Power management	ACPI 2.0, S3 Support (suspend to RAM)					

Table 39: 5PC800.B945-00, 5PC800.B945-01, 5PC800.B945-02, 5PC800.B945-03, 5PC800.B945-04, 5PC800.B945-05 - Technical data

1) Allocated in main memory

3.2.4 5PC800.B945-1x - Technical data

Product ID	5PC800.B945-10	5PC800.B945-11	5PC800.B945-12	5PC800.B945-13	5PC800.B945-14
General information					
Certification					
CE	Yes				
cULus	Yes				
Controller					
Boot loader	Embedded AMI BIOS				
Processor					
Type	Intel® Core™ Duo L2400	Intel® Core™2 Duo L7400	Intel® Core™2 Duo U7500	Intel® Celeron® M 423,	Intel® Core™2 Duo T7400
Clock frequency	1660 MHz	1500 MHz	1060 MHz	1060 MHz	2160 MHz
Number of cores	2	2	2	1	2
Architectures	65 nm				
L1 cache	32 kB				
L2 cache	2 MB	4 MB	2 MB	1 MB	4 MB
External bus	667 MHz	667 MHz	533 MHz	533 MHz	667 MHz
Intel® 64 Architecture	No	Yes	Yes	No	Yes
Intel® Virtualization Technology (VT-x)	Yes	Yes	Yes	No	Yes
Enhanced Intel SpeedStep® Technology	Yes	Yes	Yes	No	Yes
Chipset	Intel® 945GME Intel® 82801 GHM (ICH7M-DH)				
Real-time clock					
Accuracy	At 25°C: typ. 12 ppm (1 seconds) per day				
Battery-buffered	Yes				

Table 40: 5PC800.B945-10, 5PC800.B945-11, 5PC800.B945-12, 5PC800.B945-13, 5PC800.B945-14 - Technical data

Product ID	5PC800.B945-10	5PC800.B945-11	5PC800.B945-12	5PC800.B945-13	5PC800.B945-14
Memory socket					
Type	DDR2				
Size	Max. 3 GB				
Graphics					
Controller	Intel® Graphics Media Accelerator 950				
Memory	Up to 224 MB [1]				
Color depth	Max. 32-bit				
Resolution					
DVI	2x Intel compliant SDVO ports, 1920 x 1080				
RGB	400 MHz RAMDAC, resolutions up to 2048 x 1536 @ 75 Hz (QXGA) and 1920 x 1080 @ 85 Hz (HDTV)				
Mass memory management	2x SATA, 1x IDE				
Power management	ACPI 2.0, S3 Support (suspend to RAM)				

Table 40: 5PC800.B945-10, 5PC800.B945-11, 5PC800.B945-12, 5PC800.B945-13, 5PC800.B945-14 - Technical data

1) Allocated in main memory

3.3 Heat sink

3.3.1 Order data

Model number	Short description	Figure
	Heat sink	
5AC803.HS00-00	PPC800 heat sink for CPU boards with dual-core processors L2400, L7400, U7500 and Celeron M 423.	
5AC803.HS00-01	PPC800 heat sink for CPU boards with dual-core processors T7400, T9400 and P8400.	
5AC803.HS00-02	PPC800 heat sink for CPU board with Atom processor N270.	
	Required accessories	
	CPU boards	
5PC800.B945-00	Intel Core Duo L2400 CPU board, 1.66 GHz, dual-core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	
5PC800.B945-01	Intel Core2 Duo L7400 CPU board, 1.5 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	
5PC800.B945-02	Intel Core2 Duo U7400 CPU board, 1.06 GHz, dual-core, 533 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	
5PC800.B945-03	Intel Celeron M 423 CPU board, 1.06 GHz, single-core, 533 MHz FSB, 1 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	
5PC800.B945-04	Intel Core2 Duo T7400 CPU board, 2.16 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	
5PC800.B945-05	Intel Atom N270 CPU board, 1.6 GHz, single-core, 533 MHz FSB, 512 kB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	
5PC800.B945-10	Intel Core Duo L2400 CPU board, 1.66 GHz, dual-core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-11	Intel Core2 Duo L7400 CPU board, 1.5 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-12	Intel Core2 Duo U7400 CPU board, 1.06 GHz, dual-core, 533 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-13	Intel Celeron M 423 CPU board, 1.06 GHz, single-core, 533 MHz FSB, 1 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-14	Intel Core2 Duo T7400 CPU board, 2.16 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	

Table 41: Order data - 5AC803.HS00-00, 5AC803.HS00-01, 5AC803.HS00-02

3.3.2 Technical data

Product ID	5AC803.HS00-00	5AC803.HS00-01	5AC803.HS00-02
General information			
Ideal for CPU boards	5PC800.B945-00 5PC800.B945-01 5PC800.B945-02 5PC800.B945-03	5PC800.B945-04 5PC800.B945-14	5PC800.B945-05
Suitable for the following system units	5PC820.1505-00 5PC820.1906-00		
Certification CE	Yes		
Mechanical characteristics			
Material	Aluminum, black-coated with copper heat pipes		
Dimensions Width Height Depth	 143 mm 183.5 mm 60 mm		
Weight	1200 g		

Table 42: 5AC803.HS00-00, 5AC803.HS00-01, 5AC803.HS00-02 - Technical data

3.4 Main memory

3.4.1 General information

These 200-pin DDR2 main memory modules operate at 677 MHz and are available in sizes of 512 MB, 1 GB and 2 GB.

If two RAM modules with the same size (e.g. 1 GB) are inserted, then dual-channel memory technology is supported. This technology is not supported if two modules of different sizes (e.g. 1 GB and 2 GB) are inserted.

When two 2 GB modules are plugged in, only 3 GB of main memory can be used.

3.4.2 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 43: 5MMDDR.0512-01, 5MMDDR.1024-01, 5MMDDR.2048-01 - Order data

3.4.3 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
Velocity	DDR2-667 (PC2-5300)		
Certification			
CE	Yes		
cULus	Yes		
GL	Yes		

Table 44: 5MMDDR.0512-01, 5MMDDR.1024-01, 5MMDDR.2048-01 - Technical data

Information:

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

3.5 Expansions

3.5.1 General information

This is an optional expansion for the PPC800 and has inserts for up to 2 PCI/PCIe slots (only in connection with a bus unit) and a slide-in drive.

3.5.2 Order data

Model number	Short description	Figure
	Expansions	
5AC803.SX01-00	PPC800 expansion; 1 PCI/PCI Express and 1 slide-in slot (bus 5AC803.BX01-00 or 5AC803.BX01-01 required)	
5AC803.SX02-00	PPC800 expansion; 2 PCI/PCI Express and 1 slide-in slot (bus 5AC803.BX02-00 or 5AC803.BX02-01 required)	
	Required accessories	
	Bus units	
5AC803.BX01-00	PPC800 bus; 1 PCI, 1 slide-in slot.	
5AC803.BX01-01	PPC800 bus; 1 PCI Express, 1 slide-in slot.	
5AC803.BX02-00	PPC800 bus; 2 PCI, 1 slide-in slot.	
5AC803.BX02-01	PPC800 bus: 1 PCI, 1 PCI Express, 1 slide-in slot.	
	Fan kits	
5AC803.FA02-00	PPC800 fan kit for system units with expansion 5AC803.SX01-00	
5AC803.FA03-00	PPC800 fan kit for system units with expansion 5AC803.SX02-00	
	Optional accessories	
	Drives	
5AC801.ADAS-00	SATA hard disk adapter for operating a slide-in compact hard disk in a slide-in slot	
5AC801.DVDS-00	DVD-ROM slide-in SATA drive.	
5AC801.DVRS-00	DVD-R/RW DVD+R/RW slide-in SATA drive.	
5AC801.HDDS-00	40 GB slide-in SATA hard disk; 24/7 operation with extended temperature range. Note: Please see the manual for information about using this hard disk.	
5ACPCI.RAIC-05	PCI RAID system SATA 2x 250 GB; Note: Please see the manual for information about using this hard disk.	
5ACPCI.RAIC-06	PCI RAID system SATA 2x 500 GB; Note: Please see the manual for information about using this hard disk.	

Table 45: 5AC803.SX01-00, 5AC803.SX02-00 - Order data

3.5.3 Inserts

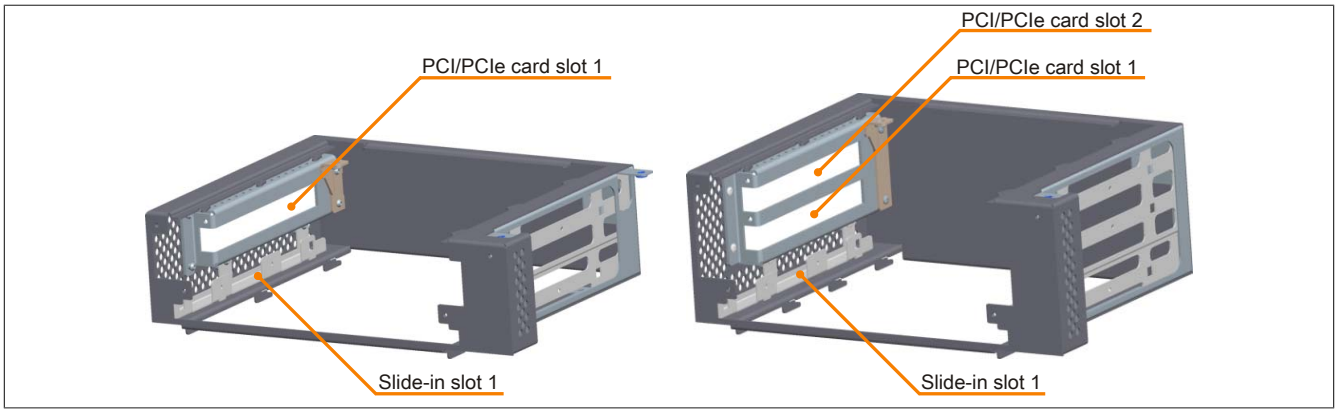


Figure 20: 5AC803.SX01-00, 5AC803.SX02-00 - Slots

3.5.4 Technical data

Product ID	5AC803.SX01-00	5AC803.SX02-00
General information		
Certification CE	Yes	
Inserts		
PCI / PCIe slots Quantity	1	2
Slide-in drives	1	

Table 46: 5AC803.SX01-00, 5AC803.SX02-00 - Technical data

Product ID	5AC803.SX01-00	5AC803.SX02-00
Mechanical characteristics		
Dimensions		
Width	167 mm	
Height	222 mm	
Depth	60 mm	80 mm
Weight	Approx. 1000 g	

Table 46: 5AC803.SX01-00, 5AC803.SX02-00 - Technical data

3.5.5 5AC803.SX01-00 - Dimensions

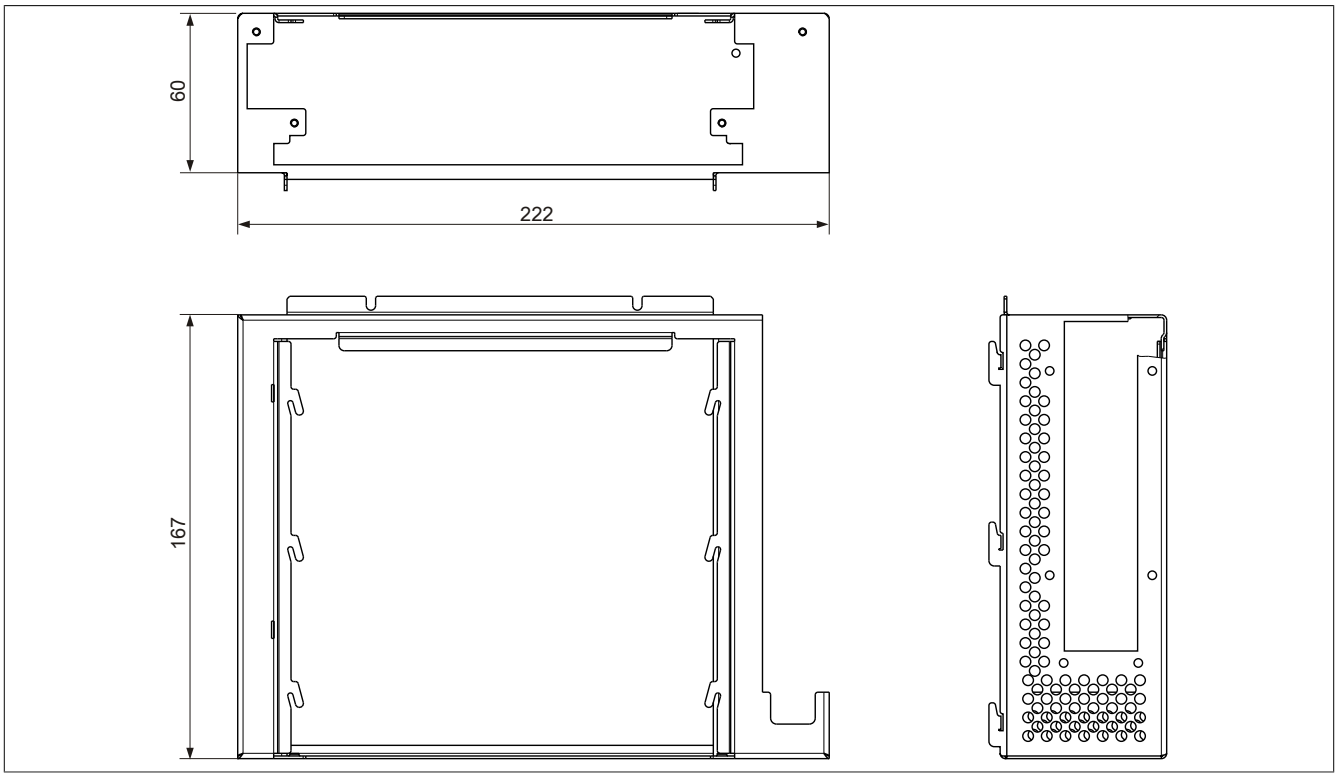


Figure 21: 5AC803.SX01-00 - Dimensions

3.5.6 5AC803.SX02-00 - Dimensions

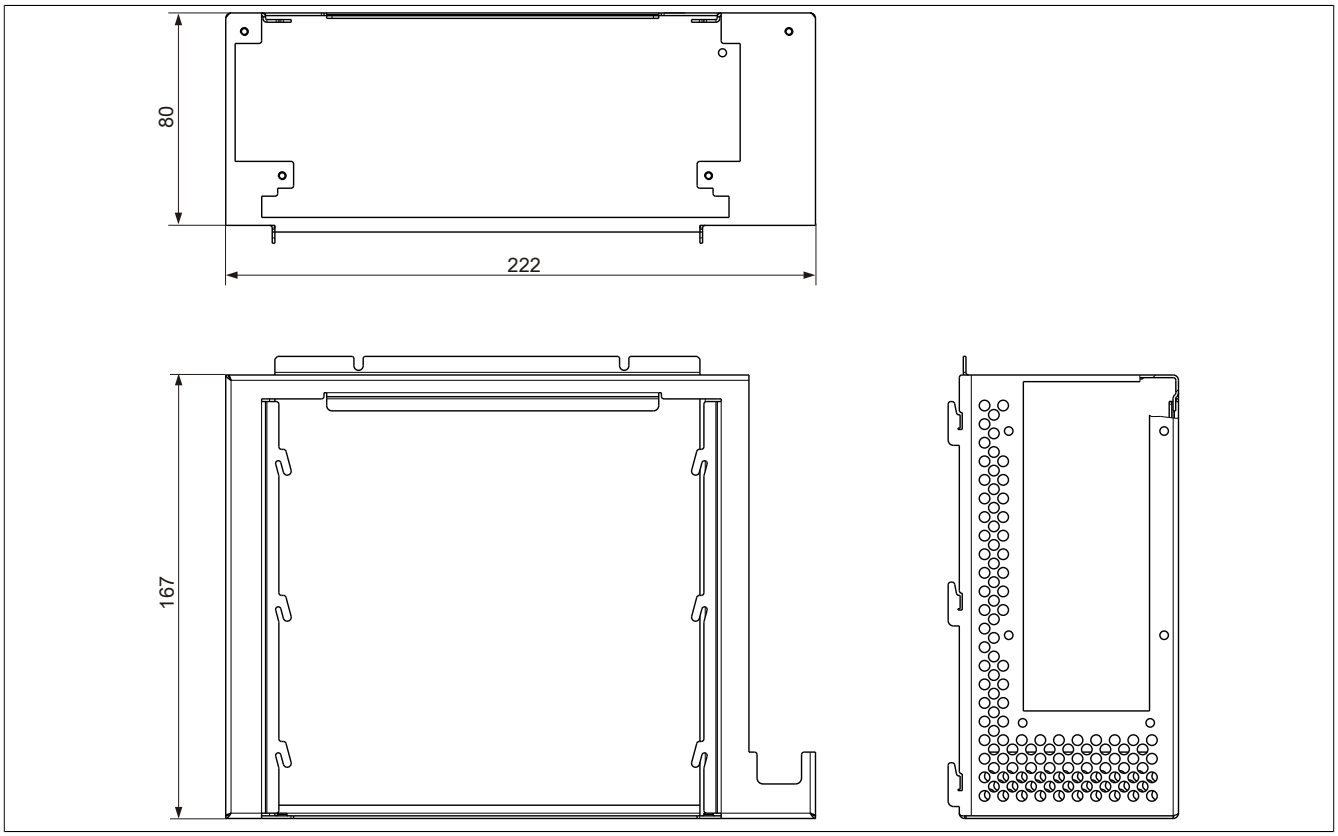


Figure 22: 5AC803.SX02-00 - Dimensions

3.5.7 Slot for bus units

3.5.7.1 Card slot (PCI / PCIe)

Standard PCI 2.2 half-size cards or PCI Express (PCIe) half-size cards can be installed depending on the type of bus unit. They cannot exceed the following dimensions.

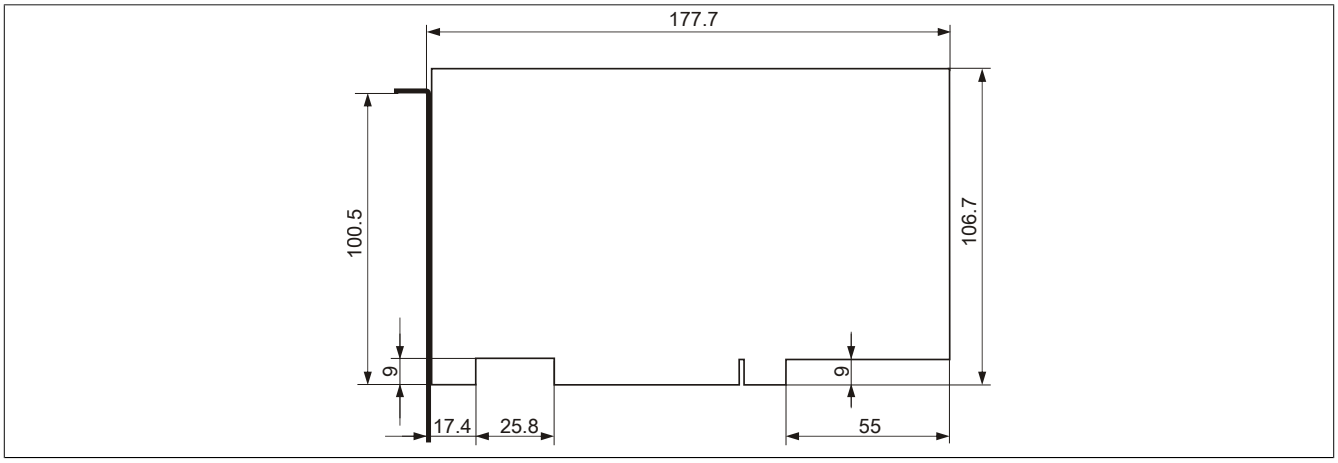


Figure 23: Dimensions - Standard half-size PCI card

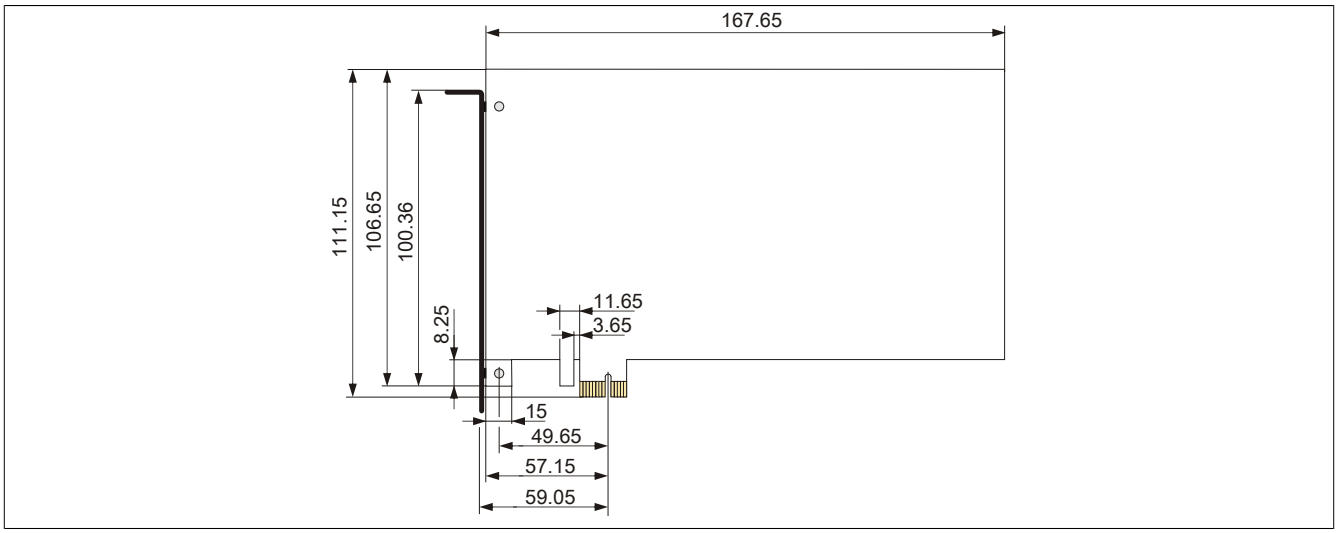


Figure 24: Dimensions - Standard half-size PCIe card

3.5.8 Slide-in slot 1

The internal connection between slide-in slot 1 and the chipset is made via SATA I and USB.

Slide-in slot 1		
Connection	SATA I and USB	
Model number	**Short description**	
	Drives	
5AC801.ADAS-00	APC810 and PPC800 slide-in compact adapter	
5AC801.HDDS-00	APC810 and PPC800 slide-in HDD EE25	
5AC801.DVRS-00	APC810 and PPC800 slide-in DVDR/RW	
5AC801.DVDS-00	APC810 and PPC800 slide-in DVDROM	

Table 47: Slide-in slot 1

Information:

The SATA I interface allows data carriers to be exchanged during operation (hot-plug). To utilize this capability, it must be supported by the operating system.

3.6 Bus units

3.6.1 General information

The bus units are compatible with the expansions in 1 or 2 PCI slot sizes, available with PCI and/or PCI Express support.

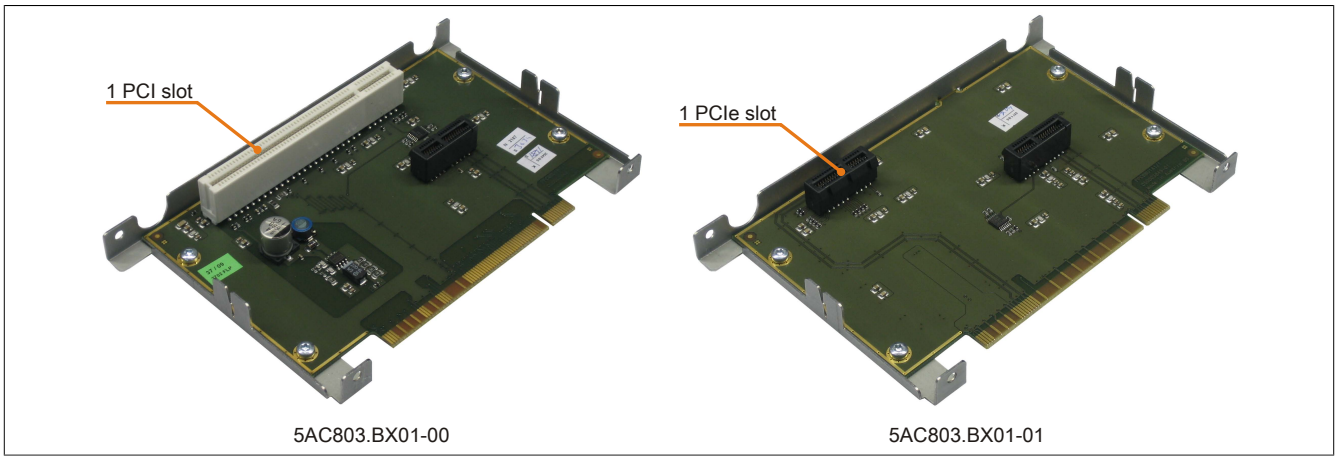


Figure 25: 1 slot bus units

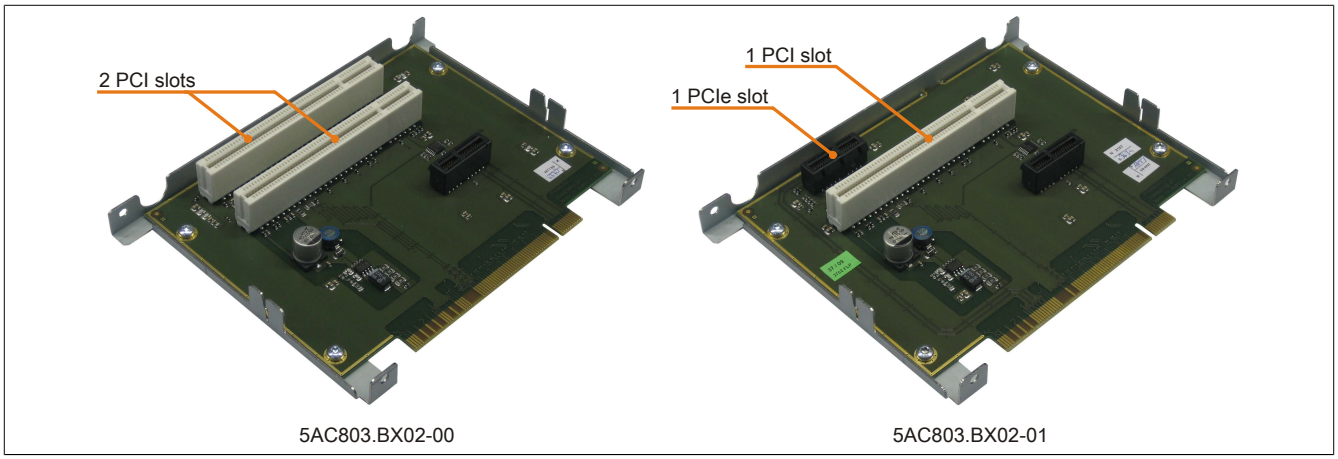


Figure 26: 2 slot bus units

3.6.2 Order data

Model number	Short description	Figure
	Bus units	
5AC803.BX01-00	PPC800 bus; 1 PCI, 1 slide-in slot.	
5AC803.BX01-01	PPC800 bus; 1 PCI Express, 1 slide-in slot.	
5AC803.BX02-00	PPC800 bus; 2 PCI, 1 slide-in slot.	
5AC803.BX02-01	PPC800 bus: 1 PCI, 1 PCI Express, 1 slide-in slot.	

Table 48: 5AC803.BX01-00, 5AC803.BX01-01, 5AC803.BX02-00, 5AC803.BX02-01 - Order data

3.6.3 Technical data

Product ID	5AC803.BX01-00	5AC803.BX01-01	5AC803.BX02-00	5AC803.BX02-01
General information				
Certification				
CE	Yes			
Inserts				
PCI slots				
Quantity	1	-	2	1
Type	32-bit	-	32-bit	32-bit
Design	PCI half-size	-	PCI half-size	PCI half-size
Standard	2.2	-	2.2	2.2
Bus speed	33 MHz	-	33 MHz	33 MHz
PCIe slots				
Quantity	-	1	-	1
Design	-	PCIe half-size	-	PCIe half-size
Standard	-	1.0 a	-	1.0 a
Bus speed	-	x1 (250 MB/s)	-	x1 (250 MB/s)

Table 49: 5AC803.BX01-00, 5AC803.BX01-01, 5AC803.BX02-00, 5AC803.BX02-01 - Technical data

3.7 Adapters

3.7.1 5AC803.BC01-00

3.7.1.1 General information

This adapter can be used to operate a PCI Express compact plug-in card in the PPC800 system unit.

3.7.1.2 Order data

Model number	Short description	Figure
	Adapter	
5AC803.BC01-00	PPC800 adapter: 1 compact PCI Express.	
	Required accessories	
	Interface cards	
5ACPCC.ETH0-00	Compact PCIe Ethernet card 1x 10/100/1000	
5ACPCC.MPL0-00	PCIec POWERLINK card, 2 POWERLINK interfaces, 512 kB SRAM	

Table 50: 5AC803.BC01-00 - Order data

3.7.2 5AC803.BC02-00

3.7.2.1 General information

This adapter can be used to operate a slide-in compact drive in the PPC800 system unit.

3.7.2.2 Order data

Model number	Short description	Figure
	Adapter	
5AC803.BC02-00	PPC800 adapter: 1 compact slide-in.	
	Required accessories	
	Drives	
5AC801.HDDI-00	40 GB slide-in compact SATA hard disk; 24/7 operation with extended temperature range. Note: Please see the manual for information about using this hard disk.	
5AC801.HDDI-04	500 GB SATA hard disk (slide-in compact); 24/7 hard disk. Note: Please see the manual for information about using this hard disk.	
5AC801.SSDI-00	32 GB SATA SSD (SLC), Slide-in compact	
5AC801.SSDI-01	60 GB slide-in compact SATA SSD (MLC).	
5AC801.SSDI-02	180 GB slide-in compact SATA SSD (MLC).	
5AC801.SSDI-03	60 GB slide-in compact SATA SSD (MLC).	

Table 51: 5AC803.BC02-00 - Order data

3.8 PCIec Insert cards

3.8.1 General information

The PCIec plug-in cards are equipped with a sensor that monitors the card's temperature. This is read out in the BIOS and in the ADI.

3.8.2 Dimensions

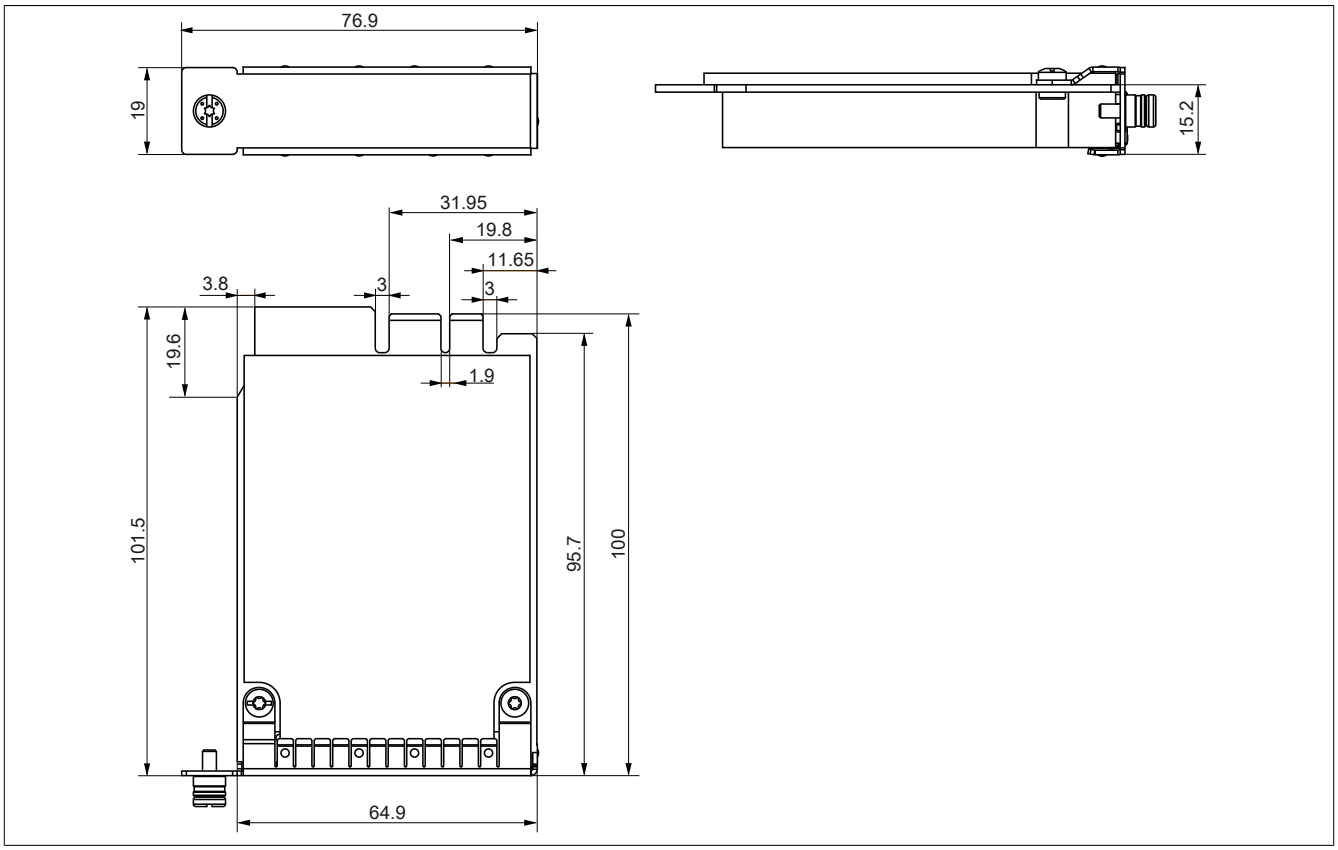


Figure 27: PCI express compact insert cards - Dimensions

Information:

Only B&R PCIec cards that were specially designed for the Automation PC 820 and Panel PC 800 can be used.

3.8.3 5ACPCC.ETH0-00

3.8.3.1 General information

The PCI Express compact Ethernet card has a 10/100/1000 Mbit/s network connection and can be inserted in a PCI Express slot and operated as an additional network interface.

- PCIec Ethernet card
- 1 network connection (10/100/1000 Mbit/s)

When used in a PPC800

Information:

The adapter 5AC803.BC01-00 is required for the use of PCIec plug-in cards.

3.8.3.2 Order data

Model number	Short description	Figure
	Interface cards	
5ACPCC.ETH0-00	Compact PCIe Ethernet card 1x 10/100/1000	

Table 52: 5ACPCC.ETH0-00 - Order data

3.8.3.3 Technical data

Product ID	5ACPCC.ETH0-00
General information	
B&R ID code	$AB25
Diagnostics	
Data transfer	Yes, using status LED
Certification	
CE	Yes
Interfaces	
Ethernet	
Quantity	1
Controller	Intel 82574
Design	Shielded RJ45 port
Transfer rate	10/100/1000 Mbit/s
Cable length	Max. 100 m between two stations (segment length)
Mechanical characteristics	
Slot	PCIec module

Table 53: 5ACPCC.ETH0-00 - Technical data

3.8.3.3.1 Ethernet port

Information:

The following characteristics, features and limit values only apply to this individual component and can deviate from those specified for the fully assembled device. For the assembled device in which this individual component is used, refer to the data given specifically for that device.

Ethernet card 1 connection		
Controller	Intel 82574	
Cabling	S/STP (Cat 5e)	
Transfer rate	10/100/1000 Mbit/s[1)]	
Cable length	Max. 100 m (min. Cat 5e)	
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)

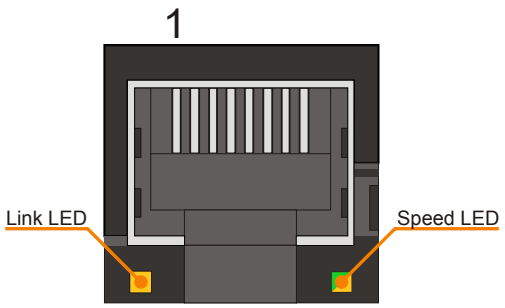


Table 54: 5ACPCC.ETH0-00 - Ethernet interface

1) Switching takes place automatically.
2) The 10 Mbit/s transfer speed / connection is only present if the IF slot Link LED is also lit at the same time.

Driver support

A special driver is required in order to operate the Intel 82574 Ethernet controller. Drivers for approved operating systems are available in the Downloads section of the B&R website (www.br-automation.com).

Information:

Required drivers can only be downloaded from the B&R website, not from manufacturer websites.

3.8.4 5ACPCC.MPL0-00

3.8.4.1 General information

The PCI Express compact POWERLINK card is equipped with two POWERLINK connections and two station number switches and a card number switch for identifying the modules. The PCI Express compact POWERLINK card can be inserted in a PCI Express compact slot and operated as an additional POWERLINK interface.

- PCIec POWERLINK card
- 2 POWERLINK connections
- 2 station number switches
- Card number switch

When used in a PPC800

Information:

The adapter 5AC803.BC01-00 is required for the use of PCIec plug-in cards.

3.8.4.2 Order data

Model number	Short description	Figure
	Interface cards	
5ACPCC.MPL0-00	PCIec POWERLINK card, 2 POWERLINK interfaces, 512 kB SRAM	

Table 55: 5ACPCC.MPL0-00 - Order data

3.8.4.3 Technical data

Product ID	5ACPCC.MPL0-00
General information	
B&R ID code	$AB27
Diagnostics Data transfer	 Yes, using status LED
Certification CE	 Yes
Controller	
SRAM Size Remanent variables in power failure mode	 512 kB 128 kB (e.g. for Automation Runtime, see AS help documentation)
Interfaces	
POWERLINK Quantity Transmission Design Transfer rate Node switch Cable length	 2 100 Base-T (ANSI/IEEE 802.3) Internal 2x hub, 2x shielded RJ45 port 100 Mbit/s 2 Max. 100 m between two stations (segment length)
Mechanical characteristics	
Slot	PCIec module

Table 56: 5ACPCC.MPL0-00 - Technical data

3.8.4.3.1 POWERLINK port

Information:

The following characteristics, features and limit values only apply to this individual component and can deviate from those specified for the fully assembled device. For the assembled device in which this individual component is used, refer to the data given specifically for that device.

POWERLINK card 2 connections		
Cabling	S/STP (Cat 5e)	
Cable length	Max. 100 m (min. Cat 5e)	
Speed LED	**On**	**Off**
Green / red	see Status / Error LED	
Link LED	**On**	**Off**
Yellow	Link (POWERLINK network connection available)	Activity (blinking - data transfer in progress)

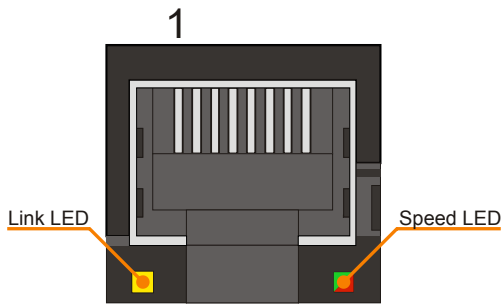


Table 57: 5ACPCC.MPL0-00 - POWERLINK interface

3.8.4.3.2 LED STATUS

The Status/Error LED has two colors, red and green. The status LEDs can have different meanings depending on operating mode.

Ethernet TCP/IP mode

The interface can be operated purely as an Ethernet TCP/IP interface.

Green - Status	Description
On	The POWERLINK interface is operated purely as an Ethernet TCP/IP interface.

Table 58: Status/Error LED - Ethernet TCP/IP operating mode

POWERLINK V1

Status LED		
Green	**Red**	**Status of the POWERLINK station**
On	Off	The POWERLINK station is running with no errors.
Off	On	A fatal system error has occurred. The error type can be read using the PLC logbook. An irreparable problem has occurred. The system cannot properly carry out its tasks. This status can only be changed by resetting the module.
Blinking alternately		The POWERLINK managing node failed. This error code can only occur in controlled node operation.
Off	Blinking	System failure. The red blinking LED signals a certain type of error using a blink code (see section "System failure error codes" on page 84).

Table 59: Status/Error LED - POWERLINK V1 operating mode

POWERLINK V2

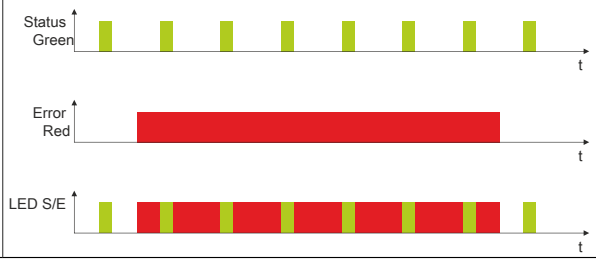
Red - Error	Description
On	The POWERLINK interface has encountered an error (failed Ethernet frames, increased number of collisions on the network, etc.). If an error occurs in the following states, then the green LED blinks over the red LED: • BASIC_ETHERNET • PRE_OPERATIONAL_1 • PRE_OPERATIONAL_2 • READY_TO_OPERATE 

Table 60: Status/Error LED as an Error LED - POWERLINK V2 operating mode

Green - status	Description
Off NOT_ACTIVE	**Managing node (MN)** 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). If POWERLINK communication is detected before this time passes, however, the interface goes directly into the BASIC_ETHERNET status (flickering). **Controlled node (CN)** 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). If POWERLINK communication is detected before this time passes, however, the interface goes directly into the PRE_OPERATIONAL_1 status (single flash).
Green flickering (approx. 10 Hz) BASIC_ETHERNET	The interface is in BASIC_ETHERNET status operated purely as an Ethernet TCP/IP interface. **Managing node (MN)** This status can only be changed by resetting the interface. **Controlled node (CN)** If POWERLINK communication is detected while in this status, the interface goes into the PRE_OPERATIONAL_1 state (single flash).
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. Once complete, 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 61: Status/Error LED as status LED - POWERLINK operating mode

System failure error codes

Incorrect configuration or defective hardware can cause a system failure error.

The error is displayed via the red error LED using four switch-on phases. The switch-on phases are either 150 ms or 600 ms long. Error code outputs are repeated cyclically after 2 seconds.

Legend:	• ...	150 ms
	− ...	600 ms
	Delay ...	2 sec. delay

Error description	Error code displayed by red status LED									
RAM error	•	•	•	-	Pause	•	•	•	-	Pause
Hardware errors	-	•	•	-	Pause	-	•	•	-	Pause

Table 62: Status/error LED as error LED - system failure error codes

3.8.4.3.3 POWERLINK station number

POWERLINK station number (x1, x16)		
Both of these hex switches (x16, x1) are used to configure the station number for the POWERLINK. Station numbers are permitted between #00 and #FD.		
Switch position		
x1	x16	Description
0	0	Operation as managing node
1 ... D	0 ... F	station number Operation as controlled node
E	F	Reserved
F	F	Reserved

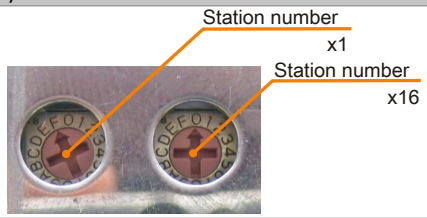


Table 63: POWERLINK station number (x1, x16)

3.8.4.3.4 card number switch

The one-digit card number ($1 – $F) is configured using the card number switch. This number is used to identify the module.

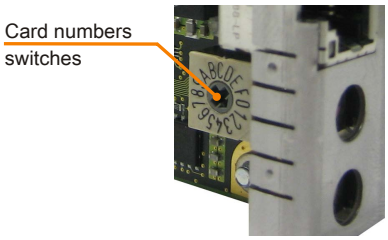


Figure 28: POWERLINK card 2-port node number switch

If the card is operated with Automation Runtime, then the card number switch must match the slot number in Automation Studio.

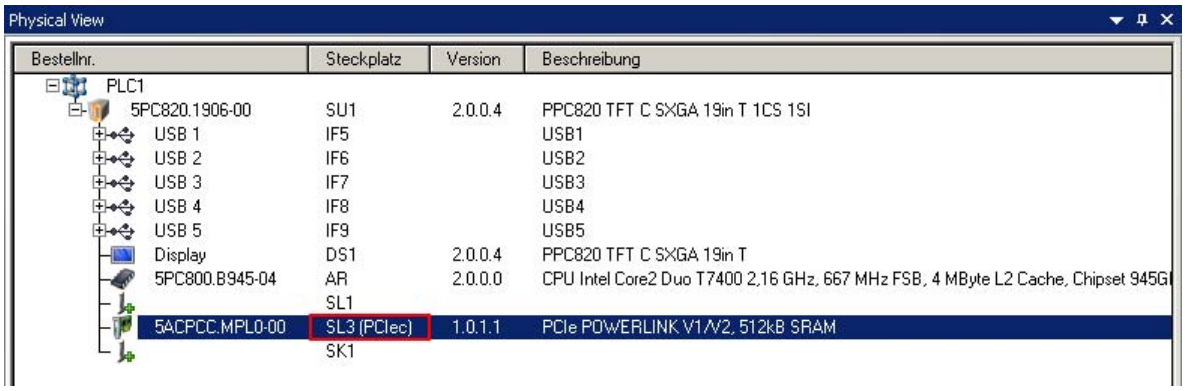


Figure 29: Integrating the POWERLINK plug-in card in Automation Studio

3.8.4.3.5 SRAM

The POWERLINK card 2-port - 5ACPCC.MPL0-00 has 512 kB SRAM.

3.9 Drives

3.9.1 5AC801.HDDI-00

3.9.1.1 General information

This 40 GB slide-in compact hard disk is specified for 24-hour operation and also provides an extended temperature specification. The slide-in compact drive can be used in APC810 and PPC800 system units.

When used in a PPC800

> **Information:**
>
> **The adapter 5AC803.BC02-00 is required for the use of slide-in compact drives.**

When inserted in the slide-in compact slot, the slide-in compact drive is referred to internally as SATA.

3.9.1.2 Order data

Model number	Short description	Figure
	Drives	
5AC801.HDDI-00	40 GB slide-in compact SATA hard disk; 24/7 operation with extended temperature range. Note: Please see the manual for information about using this hard disk.	

Table 64: 5AC801.HDDI-00 - Order data

3.9.1.3 Technical data

> **Information:**
>
> **The following characteristics, features and limit values only apply to this individual component and can deviate from those specified for the fully assembled device. For the assembled device in which this individual component is used, refer to the data given specifically for that device.**

Product ID	5AC801.HDDI-00
General information	
Certification	
CE	Yes
cULus	Yes
GL	Yes
Hard disk drive	
Capacity	40 GB
Number of heads	1
Number of sectors	78,140,160
Bytes per sector	512
Cache	8 MB
Speed	5400 rpm ±1%
Startup time	Typ. 3 s (from 0 rpm to read access)
MTBF	750,000 POH [1)]
S.M.A.R.T. Support	Yes
Interface	SATA
Access time	5.6 ms
Data transfer rate	
Internal	Max. 450 Mbits/s
To/From host	Max. 150 MB/s (Ultra DMA mode 5)

Table 65: 5AC801.HDDI-00 - Technical data

Product ID	5AC801.HDDI-00
Positioning time	
Minimum (track to track)	1 ms
Nominal (read only)	12.5 ms
Maximum (read only)	23 ms
Environmental conditions	
Temperature [2]	
Operation [3]	-30 to 85°C
24-hour operation [4]	-30 to 85°C
Storage	-40 to 95°C
Transport	-40 to 95°C
Relative humidity [5]	
Operation	5 to 90%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Vibration	
Operation	5 to 500 Hz: 2 g; no unrecoverable errors
Storage	5 to 500 Hz: 5 g; no unrecoverable errors
Transport	5 to 500 Hz: 5 g; no unrecoverable errors
Shock	
Operation	300 g and 2 ms duration; no unrecoverable errors 150 g and 11 ms duration; no unrecoverable errors
Storage	800 g and 2 ms duration; no unrecoverable errors 400 g and 0.5 ms duration; no unrecoverable errors
Transport	800 g and 2 ms duration; no unrecoverable errors 400 g and 0.5 ms duration; no unrecoverable errors
Altitude	
Operation	-300 to 5000 m
Storage	-300 to 12192 m
Mechanical characteristics	
Installation	Fixed [6]
Dimensions	
Width	13 mm
Height	98 mm
Depth	105 mm
Weight	134 g
Manufacturer information	
Manufacturer	Seagate
Manufacturer product ID	ST940817SM

Table 65: 5AC801.HDDI-00 - Technical data

1) With 8760 POH (power on hours) per year and 70°C surface temperature.
2) Temperature values at an altitude of 305 meters. The temperature specification must be reduced linearly by 1 °C every 305 meters. The temperature increase and decrease can be a maximum of 20 °C per hour.
3) Standard operation means 333 POH (power-on hours) per month.
4) 24-hour operation means 732 POH (power-on hours) per month.
5) Humidity gradient: Maximum 15% per hour.
6) Slide-in compact mounting.

3.9.1.4 Temperature humidity diagram

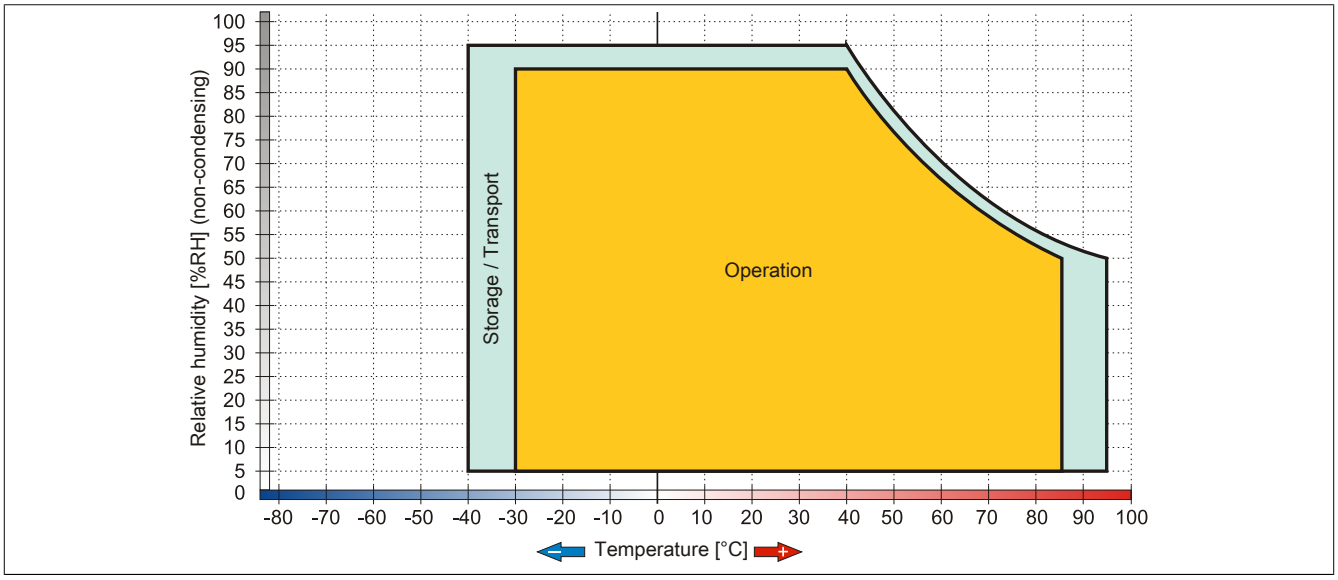


Figure 30: 5AC801.HDDI-00 - Temperature humidity diagram

3.9.2 5AC801.HDDI-02

3.9.2.1 General information

This 160 GB slide-in compact hard disk is specified for 24-hour operation (24x7) and also provides an extended temperature specification. The slide-in compact drive can be used in APC810 and PPC800 system units.

When used in a PPC800

> **Information:**
>
> **The adapter 5AC803.BC02-00 is required for the use of slide-in compact drives.**

When inserted in the slide-in compact slot, the slide-in compact drive is referred to internally as SATA.

3.9.2.2 Order data

Model number	Short description	Figure
	Drives	
5AC801.HDDI-02	160 GB slide-in compact SATA hard disk; 24/7 hard disk with extended temperature range. Note: Please see the manual for information about using this hard disk.	

Table 66: 5AC801.HDDI-02 - Order data

3.9.2.3 Technical data

> **Information:**
>
> **The following characteristics, features and limit values only apply to this individual component and can deviate from those specified for the fully assembled device. For the assembled device in which this individual component is used, refer to the data given specifically for that device.**

Product ID	5AC801.HDDI-02
General information	
Certification	
CE	Yes
GL	Yes
Hard disk drive	
Capacity	160 GB
Number of heads	3
Number of sectors	312,581,808
Bytes per sector	512
Cache	8 MB
Speed	5400 rpm ±1%
Startup time	Typ. 4 s (from 0 rpm to read access)
MTBF	300,000 POH [1)]
S.M.A.R.T. Support	Yes
Interface	SATA
Access time	12 ms
Data transfer rate	
Internal	Max. 84.6 Mbits/s
To/From host	Max. 150 MB/s (Ultra DMA mode 5)
Positioning time	
Minimum (track to track)	1.5 ms
Nominal (read only)	12 ms
Maximum (read only)	22 ms

Table 67: 5AC801.HDDI-02 - Technical data

Product ID	5AC801.HDDI-02
Environmental conditions	
Temperature [2]	
Operation	-15 to 80°C
24-hour operation [3]	-15 to 80°C
Storage	-40 to 95°C
Transport	-40 to 95°C
Relative humidity [4]	
Operation	8 to 90%, non-condensing [5]
Storage	5 to 95%, non-condensing [6]
Transport	5 to 95%, non-condensing [6]
Vibration	
Operation	5 to 500 Hz: 1 g; no unrecoverable errors
Storage	5 to 500 Hz: 5 g, no damage
Transport	5 to 500 Hz: 5 g, no damage
Shock	
Operation	325 g and 2 ms duration; no unrecoverable errors
Storage	900 g, 1 ms; no damage 120 g, 11 ms; no damage
Transport	900 g, 1 ms; no damage 120 g, 11 ms; no damage
Altitude	
Operation	-300 to 3000 m
Storage	-300 to 12192 m
Mechanical characteristics	
Installation	Fixed [7]
Dimensions	
Width	13 mm
Height	98 mm
Depth	105 mm
Weight	135 g
Manufacturer information	
Manufacturer	Fujitsu
Manufacturer product ID	MHY2160BH-ESW

Table 67: 5AC801.HDDI-02 - Technical data

1) With 8760 POH (power on hours) per year and 70°C surface temperature.
2) Standard operation means 333 POH (power-on hours) per month.
3) 24-hour operation means 732 POH (power-on hours) per month.
4) Humidity gradient: Maximum 15% per hour.
5) Maximum humidity at 29°C.
6) Maximum humidity at 40°C.
7) Slide-in compact mounting.

3.9.2.4 Temperature humidity diagram

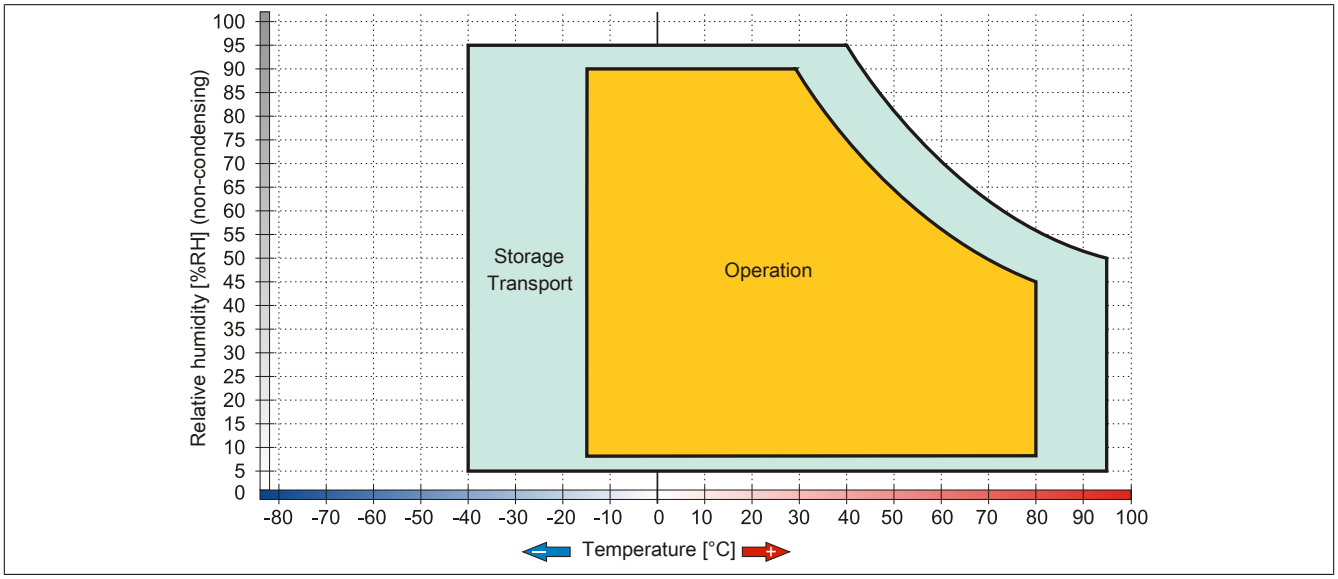


Figure 31: 5AC801.HDDI-02 - Temperature humidity diagram

3.9.3 5AC801.HDDI-03

3.9.3.1 General information

This 250 GB slide-in compact hard disk is specified for 24-hour operation and The slide-in compact drive can be used in APC810 and PPC800 system units.

When used in a PPC800

Information:

The adapter 5AC803.BC02-00 is required for the use of slide-in compact drives.

When inserted in the slide-in compact slot, the slide-in compact drive is referred to internally as SATA.

3.9.3.2 Order data

Model number	Short description	Figure
	Drives	
5AC801.HDDI-03	250 GB slide-in compact SATA hard disk, 24/7 operation. Note: Please see the manual for information about using this hard disk.	
	Optional accessories	
	Drives	
5MMHDD.0250-00	250 GB SATA hard disk replacement part for 5AC801.HDDI-03 and 5ACPCI.RAIC-05; Note: Please see the manual for information about using this hard disk.	

Table 68: 5AC801.HDDI-03 - Order data

3.9.3.3 Technical data

Information:

The following characteristics, features and limit values only apply to this individual component and can deviate from those specified for the fully assembled device. For the assembled device in which this individual component is used, refer to the data given specifically for that device.

Product ID	5AC801.HDDI-03
General information	
Certification	
CE	Yes
cULus	Yes
cULus HazLoc Class 1 Division 2	Yes
ATEX Zone 22	Yes
GL	Yes
Hard disk drive	
Capacity	250 GB
Number of heads	1
Number of sectors	488,397,168
Bytes per sector	512
Cache	8 MB
Speed	5400 rpm ±0.2%
Startup time	Typ. 3.6 s (from 0 rpm to read access)
MTBF	550,000 POH [1)]
S.M.A.R.T. Support	Yes
Interface	SATA
Access time	5.56 ms
Supported transfer modes	SATA 1.0, Serial ATA Revision 2.6 PIO mode 0-4, multiword DMA mode 0-2, UDMA mode 0-6
Data transfer rate	
Internal	Max. 1175 Mbit/s
To/From host	Max. 150 MB/s (SATA I), max. 300 MB/s (SATA II)

Table 69: 5AC801.HDDI-03 - Technical data

Product ID	5AC801.HDDI-03
Positioning time	
Minimum (track to track)	1 ms
Nominal (read only)	14 ms
Maximum (read only)	30 ms
Environmental conditions	
Temperature [2]	
Operation [3]	0 to 60°C
24-hour operation [4]	0 to 60°C
Storage	-40 to 70°C
Transport	-40 to 70°C
Relative humidity [5]	
Operation	5 to 95%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Vibration	
Operation	5 to 500 Hz: 0.5 g; no unrecoverable errors
Storage	5 to 500 Hz: 5 g; no unrecoverable errors
Transport	5 to 500 Hz: 5 g; no unrecoverable errors
Shock	
Operation	350 g and 2 ms duration; no unrecoverable errors
Storage	800 g and 2 ms duration; no unrecoverable errors 1000 g and 1 ms duration; no unrecoverable errors 600 g and 0.5 ms duration; no unrecoverable errors
Transport	800 g and 2 ms duration; no unrecoverable errors 1000 g and 1 ms duration; no unrecoverable errors 600 g and 0.5 ms duration; no unrecoverable errors
Altitude	
Operation	-300 to 3048 m
Storage	-300 to 12192 m
Mechanical characteristics	
Installation	Fixed [6]
Dimensions	
Width	13 mm
Height	98 mm
Depth	105 mm
Weight	134 g
Manufacturer information	
Manufacturer	Seagate
Manufacturer product ID	ST9250315AS

Table 69: 5AC801.HDDI-03 - Technical data

1) With 8760 POH (power on hours) per year and 25°C surface temperature.
2) Temperature values at an altitude of 305 meters. The temperature specification must be reduced linearly by 1 °C every 305 meters. The temperature increase and decrease can be a maximum of 20 °C per hour.
3) Standard operation means 333 POH (power-on hours) per month.
4) 24-hour operation means 732 POH (power-on hours) per month.
5) Humidity gradient: Maximum 30% per hour.
6) Slide-in compact mounting.

3.9.3.4 Temperature humidity diagram

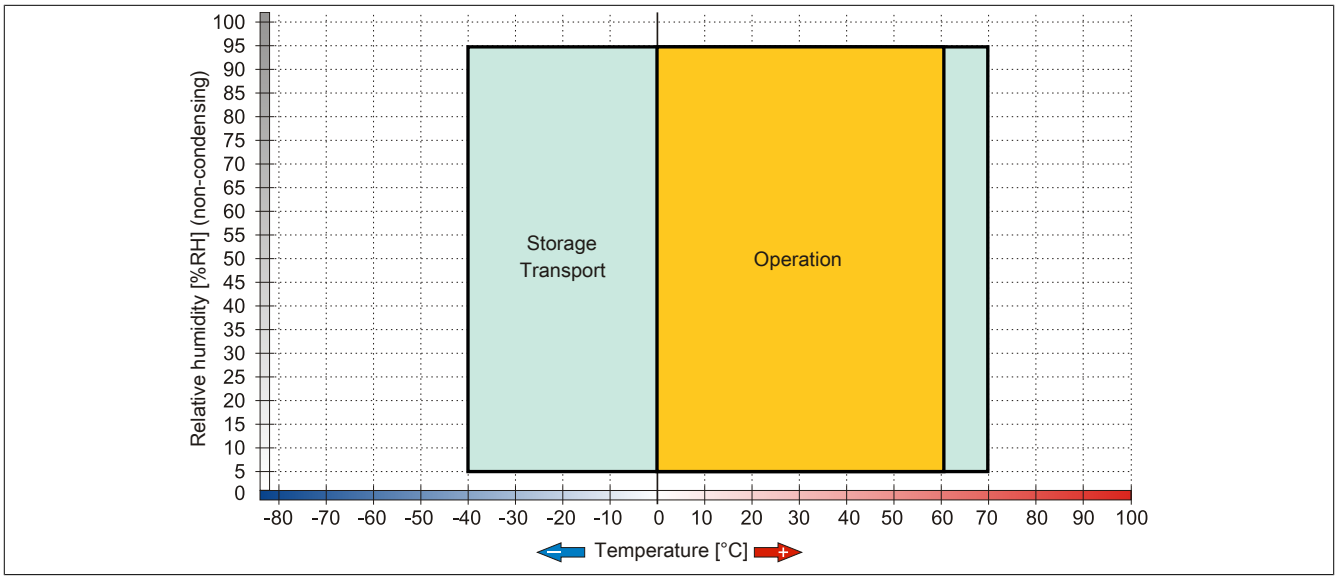


Figure 32: 5AC801.HDDI-03 - Temperature humidity diagram

3.9.4 5AC801.HDDI-04

3.9.4.1 General information

This 500 GB slide-in compact hard disk is specified for 24-hour operation. The slide-in compact drive can be used in APC810 and PPC800 system units.

- 500 GB hard disk
- Slide-in compact
- Specified for 24-hour operation
- S.M.A.R.T. Support

When used in a PPC800

> **Information:**
>
> **The adapter 5AC803.BC02-00 is required for the use of slide-in compact drives.**

When inserted in the slide-in compact slot, the slide-in compact drive is referred to internally as SATA.

3.9.4.2 Order data

Model number	Short description	Figure
	Drives	
5AC801.HDDI-04	500 GB SATA hard disk (slide-in compact); 24/7 hard disk. Note: Please see the manual for information about using this hard disk.	
	Optional accessories	
	Drives	
5MMHDD.0500-00	500 GB SATA hard disk replacement part for 5AC801.HDDI-04, 5AC901.CHDD-01 and 5ACPCI.RAIC-06; Note: Please see the manual for information about using this hard disk.	

Table 70: 5AC801.HDDI-04 - Order data

3.9.4.3 Technical data

> **Information:**
>
> **The following characteristics, features and limit values only apply to this accessory and can deviate from those specified for the fully assembled device. The data specifications for the fully assembled device take precedence over those of individual components.**

Product ID	5AC801.HDDI-04
General information	
Certification	
CE	Yes
cULus	Yes
GL	Yes
Hard disk drive	
Capacity	500 GB
Number of heads	2
Number of sectors	976,773,168
Bytes per sector	512 (logical) / 4096 (physical)
Cache	16 MB
Speed	5400 rpm ±0.2%
Startup time	Typ. 3.5 s (from 0 rpm to read access)
Service life	5 years
MTBF	1,000,000 POH [1)]
S.M.A.R.T. Support	Yes
Interface	SATA
Access time	5.5 ms
Supported transfer modes	SATA II
Data transfer rate	
Internal	Max. 147 MB/s
To/From host	Max. 150 MB/s (SATA I), max. 300 MB/s (SATA II)
Positioning time	
Nominal (read only)	11 ms
Maximum (read only)	21 ms

Table 71: 5AC801.HDDI-04 - Technical data

Product ID	5AC801.HDDI-04
Environmental conditions	
Temperature [2]	
Operation [3]	0 to 60°C
24-hour operation [4]	0 to 60°C
Storage	-40 to 70°C
Transport	-40 to 70°C
Relative humidity [5]	
Operation	5 to 95%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Vibration	
Operation (continuous)	5 to 500 Hz: 0.25 g; no unrecoverable errors
Operation (occasional)	5 to 500 Hz: 0.5 g; no unrecoverable errors
Storage	10 to 500 Hz: 5 g; no unrecoverable errors
Transport	10 to 500 Hz: 5 g; no unrecoverable errors
Shock	
Operation	400 g and 2 ms duration; no unrecoverable errors
Storage	1000 g and 2 ms duration; no unrecoverable errors
Transport	1000 g and 2 ms duration; no unrecoverable errors
Altitude	
Operation	-305 to 3048 m
Storage	-305 to 12192 m
Mechanical characteristics	
Installation	Fixed [6]
Dimensions	
Width	13 mm
Height	98 mm
Depth	105 mm
Weight	134 g
Manufacturer information	
Manufacturer	Western Digital
Manufacturer product ID	WD5000LUCT

Table 71: 5AC801.HDDI-04 - Technical data

1) With 8760 POH (power on hours) per year and 25°C surface temperature.
2) Temperature values at an altitude of 305 meters. The temperature specification must be reduced linearly by 1 °C every 305 meters. The temperature increase and decrease can be a maximum of 20 °C per hour.
3) Standard operation means 333 POH (power-on hours) per month.
4) 24-hour operation means 732 POH (power-on hours) per month.
5) Humidity gradient: Maximum 20% per hour.
6) Slide-in compact mounting.

3.9.4.4 Temperature humidity diagram

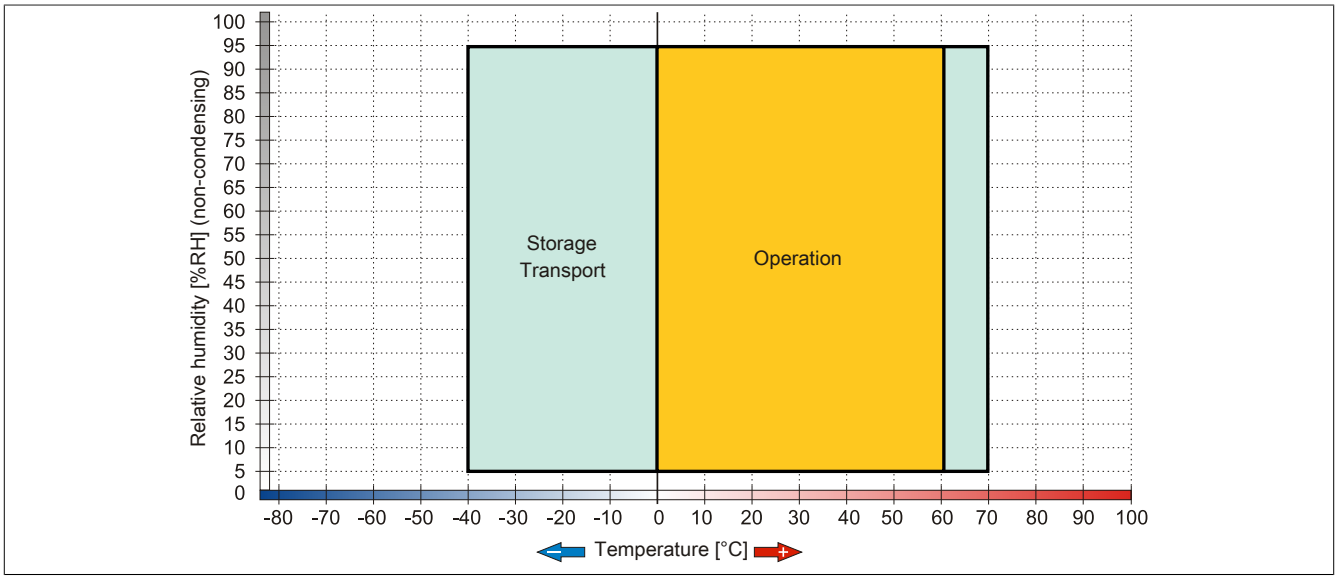


Figure 33: 5AC801.HDDI-04 - Temperature humidity diagram

3.9.5 5AC801.SSDI-00

3.9.5.1 General information

This 32 GB slide-in compact SSD (Solid State Drive) drive can be used in APC810 and PPC800 system units. SSD is based on Single Level Cell (SLC) technology.

When used in a PPC800

Information:

The adapter 5AC803.BC02-00 is required for the use of slide-in compact drives.

When inserted in the slide-in compact slot, the slide-in compact drive is referred to internally as SATA.

3.9.5.2 Order data

Model number	Short description	Figure
	Drives	
5AC801.SSDI-00	32 GB slide-in compact SATA SSD (SLC).	

Table 72: 5AC801.SSDI-00 - Order data

3.9.5.3 Technical data

Caution!

A sudden loss of power may result in data loss! In very rare cases, mass memory may also be damaged.

To prevent damage and loss of data, the use of a UPS device is recommended.

Information:

The following characteristics, features and limit values only apply to this individual component and can deviate from those specified for the fully assembled device. For the assembled device in which this individual component is used, refer to the data given specifically for that device.

Product ID	5AC801.SSDI-00
General information	
Certification	
CE	Yes
cULus	Yes
GL	Yes
Solid state drive	
Capacity	32 GB
Data reliability	< 1 unrecoverable error in 10^{15} bit read accesses
MTBF	2,000,000 hours
Power on/off cycles	50,000
S.M.A.R.T. Support	Yes
Interface	SATA
Maintenance	None
Continuous reading	Max. 250 MB/s
Continuous writing	Max. 170 MB/s
IOPS [1)]	
4k read	35,000
4k write	3,300

Table 73: 5AC801.SSDI-00 - Technical data

Product ID	5AC801.SSDI-00
Endurance	
Guaranteed data volume Guaranteed Results for 5 years	 700 TB 350 GB/day
SLC flash	Yes
Wear leveling	Static
Error correction coding (ECC)	Yes
Compatibility	SATA revision 2.6 compliant, compatible with SATA 1.5 Gbit/s and 3 Gbit/s interface rates ATA/ATAPI-7 SSD Enhanced SMART ATA feature set Native Command Queuing (NCQ)
Environmental conditions	
Temperature Operation Storage Transport	 0 to 70°C -55 to 95°C -55 to 95°C
Relative humidity Operation Storage Transport	 5 to 95%, non-condensing 5 to 95%, non-condensing 5 to 95%, non-condensing
Vibration Operation Storage Transport	 7 to 800 Hz: 2.17 g 10 to 500 Hz: 3.13 g 10 to 500 Hz: 3.13 g
Shock Operation Storage Transport	 1000 g, 0.5 ms 1000 g, 0.5 ms 1000 g, 0.5 ms
Altitude Operation Storage Transport	 -300 to 12192 m -300 to 12192 m -300 to 12192 m
Mechanical characteristics	
Installation	Fixed [2)]
Dimensions Width Height Depth	 13 mm 98 mm 105 mm
Weight	118 g
Manufacturer information	
Manufacturer	Intel
Manufacturer product ID	SSDSA2SH032G1

Table 73: 5AC801.SSDI-00 - Technical data

1) IOPS: Random read and write input/output operations per second.
2) Slide-in compact mounting.

3.9.5.4 Temperature humidity diagram

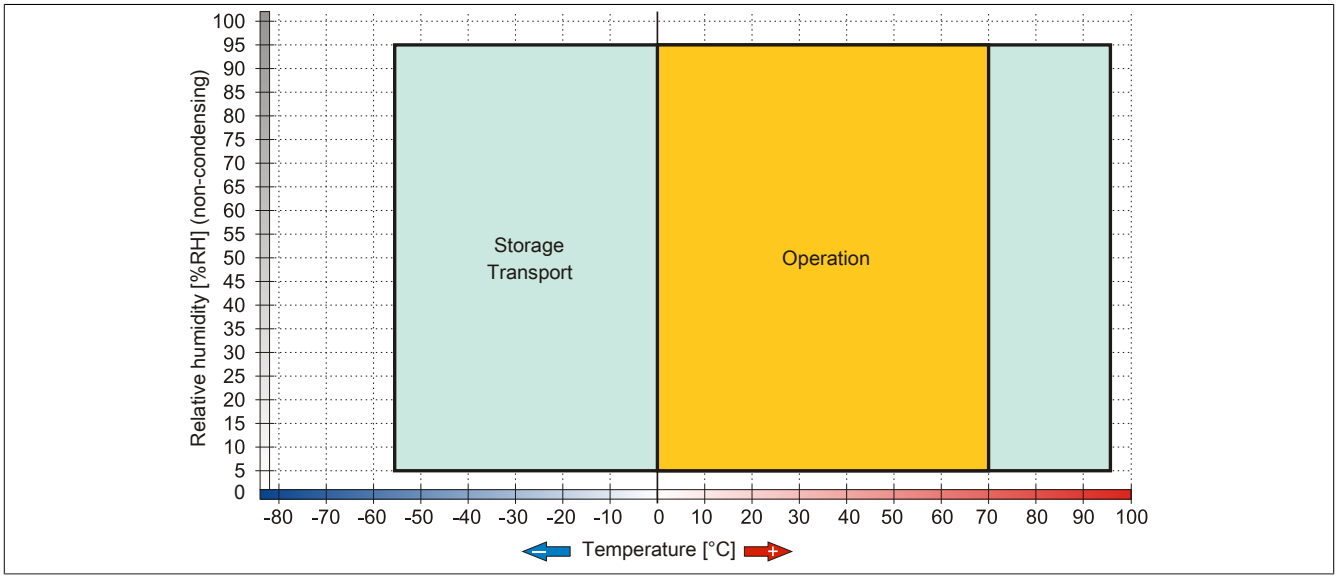


Figure 34: 5AC801.SSDI-00 - Temperature humidity diagram

3.9.5.5 Benchmark

The following two benchmarks show a comparison of the Intel Solid State Drive (5AC801.SSDI-00) and the Seagate Hard Disk (5AC801.HDDI-00) for cyclic reading and writing.

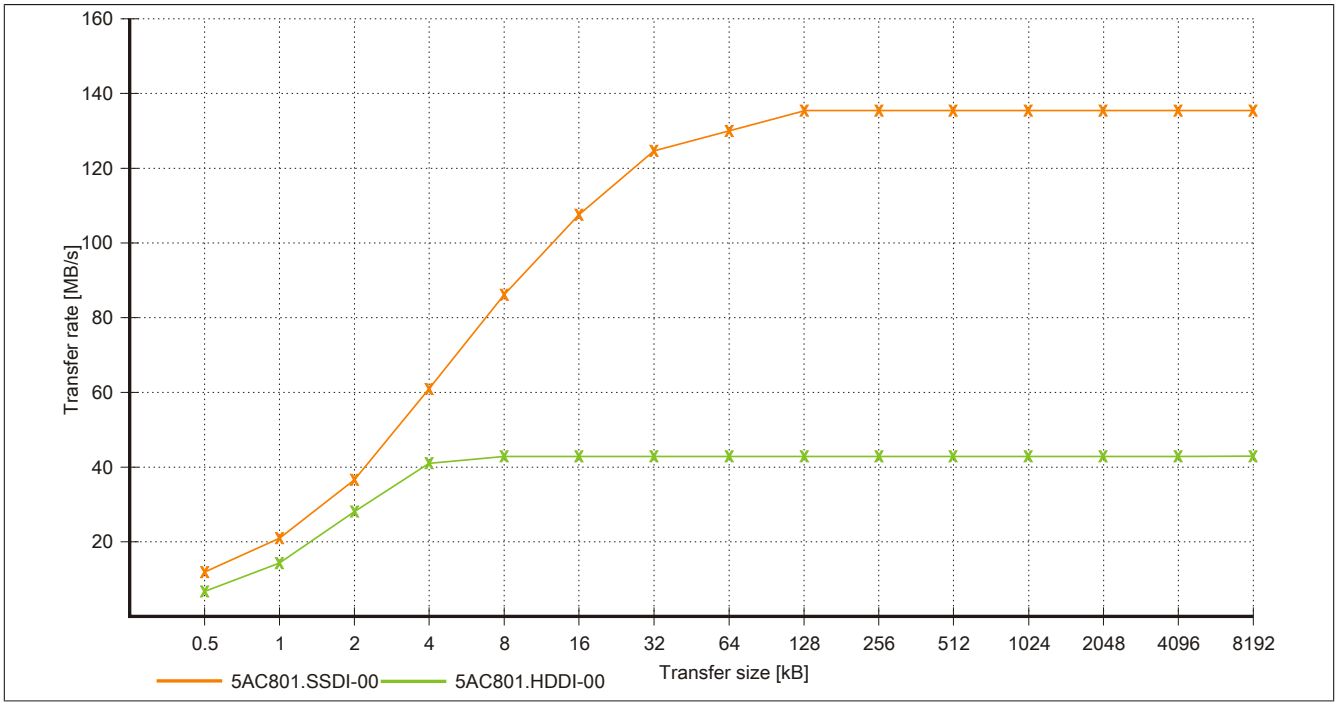


Figure 35: 5AC801.SSDI-00 - ATTO disk benchmark v2.34 - Cyclic read

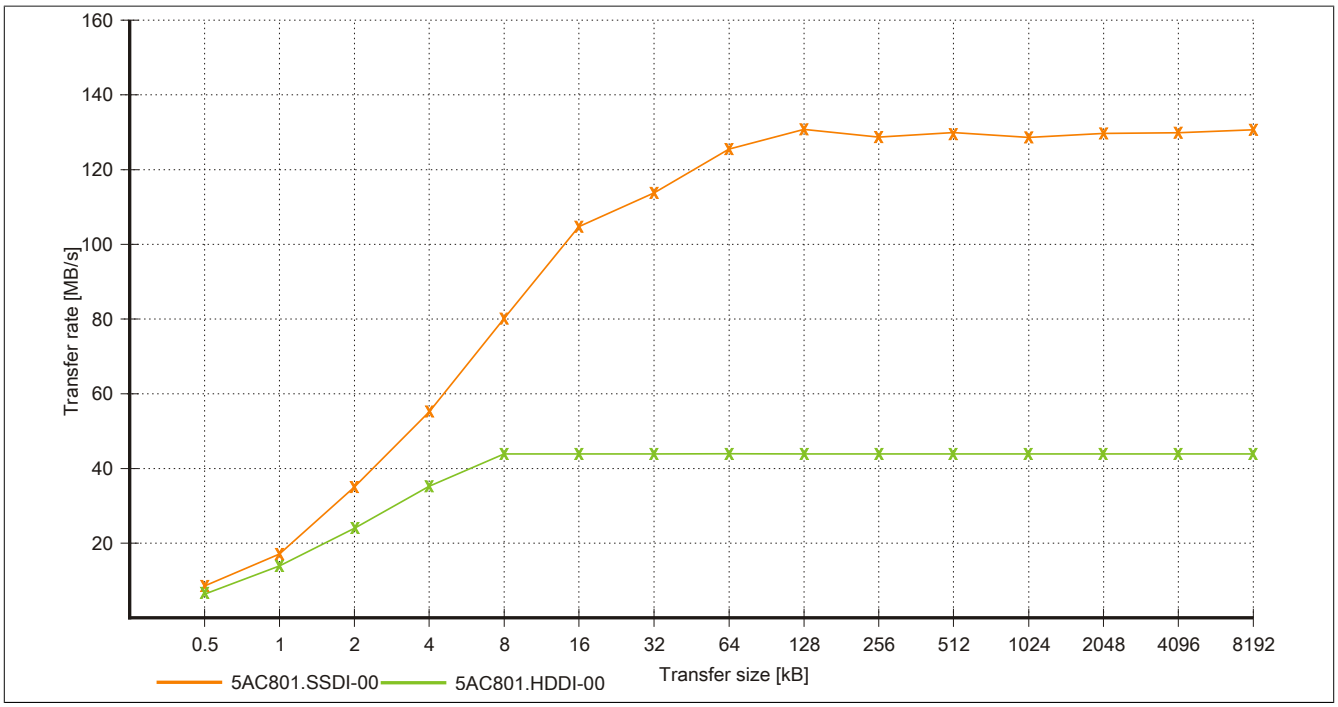


Figure 36: 5AC801.SSDI-00 - ATTO disk benchmark v2.34 - Cyclic write

3.9.6 5AC801.SSDI-01

3.9.6.1 General information

This 60 GB slide-in compact SSD (Solid State Drive) drive can be used in APC810 and PPC800 system units. SSD is based on Multi Level Cell (MLC) technology.

When used in a PPC800

Information:

The adapter 5AC803.BC02-00 is required for the use of slide-in compact drives.

When inserted in the slide-in compact slot, the slide-in compact drive is referred to internally as SATA.

3.9.6.2 Order data

Model number	Short description	Figure
	Drives	
5AC801.SSDI-01	60 GB slide-in compact SATA SSD (MLC).	
	Optional accessories	
	Drives	
5MMSSD.0060-00	60 GB SATA SSD (MLC); replacement part for 5AC801.SSDI-01 and 5AC901.CSSD-01; SSD for 5PP5IO.GMAC-00; note: Please see the manual for information about using this SSD.	

Table 74: 5AC801.SSDI-01 - Order data

3.9.6.3 Technical data

Caution!

A sudden loss of power may result in data loss! In very rare cases, mass memory may also be damaged.

To prevent damage and loss of data, the use of a UPS device is recommended.

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from those specified for the fully assembled device. The data specifications for the fully assembled device take precedence over those of individual components.

Product ID	5AC801.SSDI-01
General information	
Certification	
CE	Yes
cULus	Yes
GL	Yes
Solid state drive	
Capacity	60 GB
Data reliability	< 1 unrecoverable error in 10^{16} bit read accesses
MTBF	1,200,000 hours
S.M.A.R.T. Support	Yes
Interface	SATA
Maintenance	None
Continuous reading	Max. 550 MB/s with SATA 6 Gbit/s Max. 280 MB/s with SATA 3 Gbit/s
Continuous writing	Max. 475 MB/s with SATA 6 Gbit/s Max. 245 MB/s with SATA 3 Gbit/s

Table 75: 5AC801.SSDI-01 - Technical data

Product ID	5AC801.SSDI-01
IOPS [1]	
4k read	15,000
4k write	
Typical	23,000
Maximum	80,000
Endurance	
MLC flash	Yes
Compatibility	SATA 3.0 compliant ACS-2 SSD Enhanced SMART ATA feature set Native Command Queuing (NCQ)
Environmental conditions	
Temperature	
Operation	0 to 70°C
Storage	-55 to 95°C
Transport	-55 to 95°C
Relative humidity	
Operation	5 to 95%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Vibration	
Operation	5 to 700 Hz: 2.17 g
Storage	5 to 800 Hz: 3.13 g
Transport	5 to 800 Hz: 3.13 g
Shock	
Operation	1500 g, 0.5 ms
Storage	1500 g, 0.5 ms
Transport	1500 g, 0.5 ms
Altitude	
Operation	-300 to 12192 m
Storage	-300 to 12192 m
Transport	-300 to 12192 m
Mechanical characteristics	
Installation	Fixed [2]
Dimensions	
Width	13 mm
Height	98 mm
Depth	105 mm
Weight	118 g
Manufacturer information	
Manufacturer	Intel
Manufacturer product ID	SSDSC2CW060A3

Table 75: 5AC801.SSDI-01 - Technical data

1) IOPS: Random read and write input/output operations per second.
2) Slide-in compact mounting.

3.9.6.4 Temperature humidity diagram

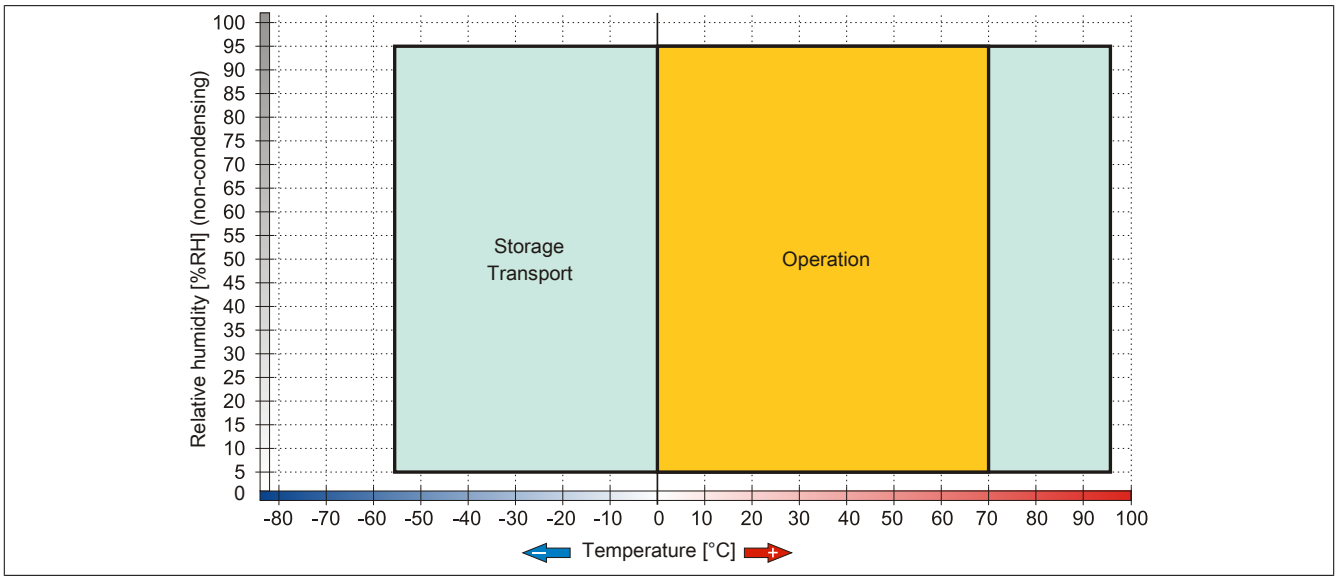


Figure 37: 5AC801.SSDI-01 - Temperature humidity diagram

3.9.7 5AC801.SSDI-02

3.9.7.1 General information

This 180 GB slide-in compact SSD (Solid State Drive) drive can be used in APC810 and PPC800 system units. SSD is based on Multi Level Cell (MLC) technology.

When used in a PPC800

Information:

The adapter 5AC803.BC02-00 is required for the use of slide-in compact drives.

When inserted in the slide-in compact slot, the slide-in compact drive is referred to internally as SATA.

3.9.7.2 Order data

Model number	Short description	Figure
	Drives	
5AC801.SSDI-02	180 GB slide-in compact SATA SSD (MLC).	
	Optional accessories	
	Drives	
5MMSSD.0180-00	180 GB SATA SSD (MLC); replacement part for 5AC801.SSDI-02 and 5AC901.CSSD-02; SSD for 5PP5IO.GMAC-00; note: Please see the manual for information about using this SSD.	

Table 76: 5AC801.SSDI-02 - Order data

3.9.7.3 Technical data

Caution!

A sudden loss of power may result in data loss! In very rare cases, mass memory may also be damaged.

To prevent damage and loss of data, the use of a UPS device is recommended.

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from those specified for the fully assembled device. The data specifications for the fully assembled device take precedence over those of individual components.

Product ID	5AC801.SSDI-02
General information	
Certification	
CE	Yes
cULus	Yes
GL	Yes
Solid state drive	
Capacity	180 GB
Data reliability	< 1 unrecoverable error in 10^{16} bit read accesses
MTBF	1,200,000 hours
S.M.A.R.T. Support	Yes
Interface	SATA
Maintenance	None
Continuous reading	Max. 550 MB/s with SATA 6 Gbit/s Max. 280 MB/s with SATA 3 Gbit/s
Continuous writing	Max. 520 MB/s with SATA 6 Gbit/s Max. 260 MB/s with SATA 3 Gbit/s

Table 77: 5AC801.SSDI-02 - Technical data

Product ID	5AC801.SSDI-02
IOPS [1]	
4k read	50,000
4k write	
Typical	60,000
Maximum	80,000
Endurance	
MLC flash	Yes
Compatibility	SATA 3.0 compliant ACS-2 SSD Enhanced SMART ATA feature set Native Command Queuing (NCQ)
Environmental conditions	
Temperature	
Operation	0 to 70°C
Storage	-55 to 95°C
Transport	-55 to 95°C
Relative humidity	
Operation	5 to 95%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Vibration	
Operation	5 to 700 Hz: 2.17 g
Storage	5 to 800 Hz: 3.13 g
Transport	5 to 800 Hz: 3.13 g
Shock	
Operation	1500 g, 0.5 ms
Storage	1500 g, 0.5 ms
Transport	1500 g, 0.5 ms
Altitude	
Operation	-300 to 12192 m
Storage	-300 to 12192 m
Transport	-300 to 12192 m
Mechanical characteristics	
Installation	Fixed [2]
Dimensions	
Width	13 mm
Height	98 mm
Depth	105 mm
Weight	118 g
Manufacturer information	
Manufacturer	Intel
Manufacturer product ID	SSDSC2CW180A3

Table 77: 5AC801.SSDI-02 - Technical data

1) IOPS: Random read and write input/output operations per second.
2) Slide-in compact mounting.

3.9.7.4 Temperature humidity diagram

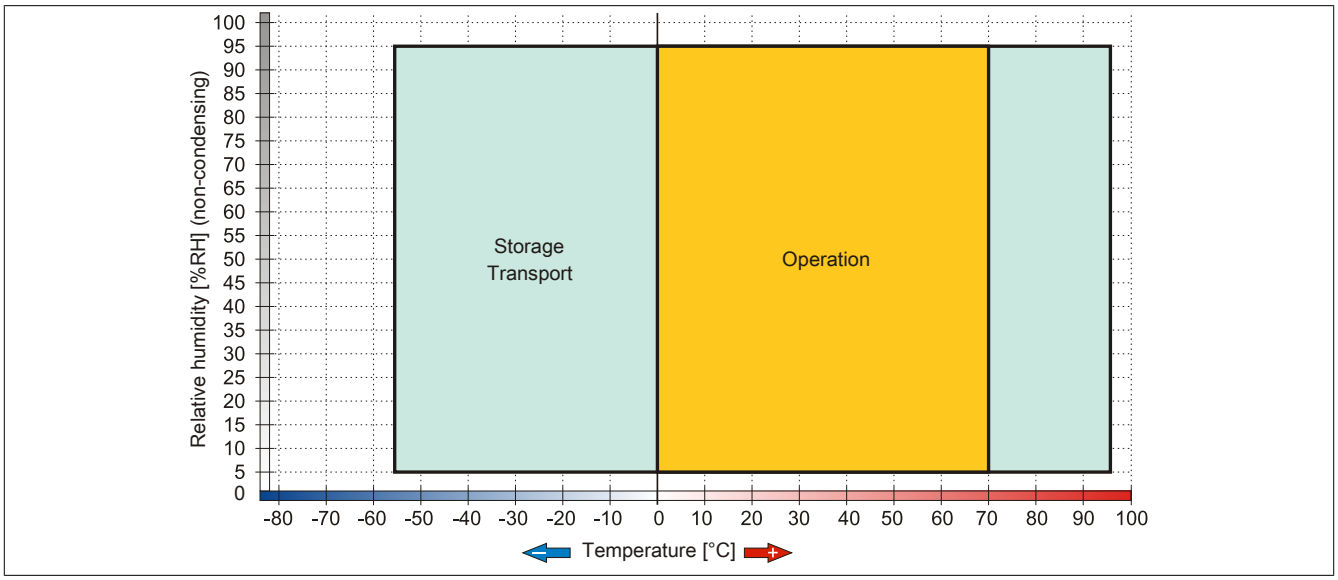


Figure 38: 5AC801.SSDI-02 - Temperature humidity diagram

3.9.8 5AC801.SSDI-03

3.9.8.1 General information

This 60 GB slide-in compact SSD (Solid State Drive) drive can be used in APC810 and PPC800 system units. SSD is based on Multi Level Cell (MLC) technology.

When used in a PPC800

Information:

The adapter 5AC803.BC02-00 is required for the use of slide-in compact drives.

When inserted in the slide-in compact slot, the slide-in compact drive is referred to internally as SATA.

3.9.8.2 Order data

Model number	Short description	Figure
	Drives	
5AC801.SSDI-03	60 GB slide-in compact SATA SSD (MLC).	
	Optional accessories	
	Drives	
5MMSSD.0060-01	60 GB SATA SSD (MLC); replacement part for 5AC801.SSDI-03 and 5AC901.CSSD-03; SSD for 5PP5IO.GMAC-00; note: Please see the manual for information about using this SSD.	

Table 78: 5AC801.SSDI-03 - Order data

3.9.8.3 Technical data

Caution!

A sudden loss of power may result in data loss! In very rare cases, mass memory may also be damaged.

To prevent damage and loss of data, the use of a UPS device is recommended.

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from those specified for the fully assembled device. The data specifications for the fully assembled device take precedence over those of individual components.

Product ID	5AC801.SSDI-03
General information	
Certification	
CE	Yes
cULus	Yes
GL	Yes
Solid state drive	
Capacity	60 GB
Data reliability	< 1 unrecoverable error in 10^{15} bit read accesses
MTBF	1,500,000 hours
S.M.A.R.T. Support	Yes
Interface	SATA
Maintenance	None
Continuous reading	Max. 510 MB/s
Continuous writing	Max. 430 MB/s
IOPS [1)]	
4k read	Max. 60,000 (random)
4k write	Max. 25,000 (random)
Endurance	
MLC flash	Yes

Table 79: 5AC801.SSDI-03 - Technical data

Product ID	5AC801.SSDI-03
Compatibility	SATA 3.0 compliant ACS-2 SSD Enhanced SMART ATA feature set Native Command Queuing (NCQ)
Environmental conditions	
Temperature	
Operation	0 to 70°C
Storage	-40 to 95°C
Transport	-40 to 95°C
Relative humidity	
Operation	8 to 95%, non-condensing
Storage	8 to 95%, non-condensing
Transport	8 to 95%, non-condensing
Vibration	
Operation	10 to 2000 Hz: 20 g
Storage	10 to 2000 Hz: 20 g
Transport	10 to 2000 Hz: 20 g
Shock	
Operation	1500 g, 0.5 ms
Storage	1500 g, 0.5 ms
Transport	1500 g, 0.5 ms
Altitude	
Operation	-300 to 12192 m
Storage	-300 to 12192 m
Transport	-300 to 12192 m
Mechanical characteristics	
Installation	Fixed [2)]
Dimensions	
Width	13 mm
Height	98 mm
Depth	105 mm
Weight	118 g
Manufacturer information	
Manufacturer	Toshiba
Manufacturer product ID	THNSNH060GBST

Table 79: 5AC801.SSDI-03 - Technical data

1) IOPS: Random read and write input/output operations per second.
2) Slide-in compact mounting.

3.9.8.4 Temperature humidity diagram

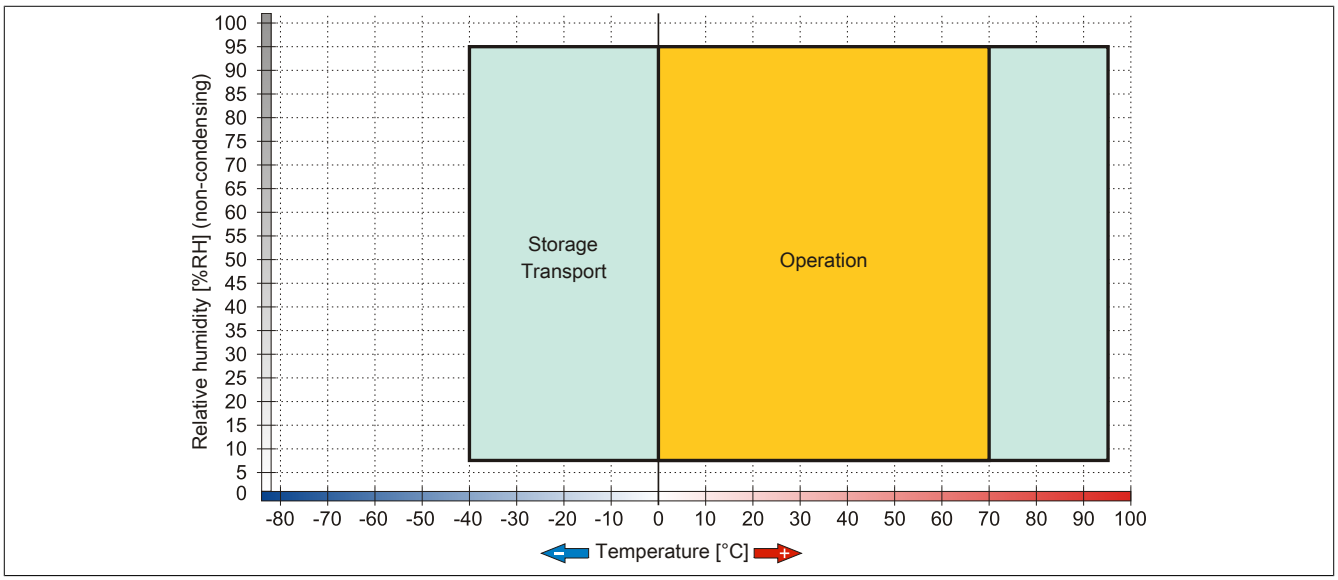


Figure 39: 5AC801.SSDI-03 - Temperature humidity diagram

3.9.9 5MMSSD.0060-00

3.9.9.1 General information

This 60 GB slide-in compact SSD (solid state drive) drive can be used as a replacement or accessory part. This SSD is based on multi-level cell (MLC) technology.

- Replacement drive for 5AC801.SSDI-01 or 5AC901.CSSD-01 SSD drives
- Accessory for the APC510 (optional SSD for I/O board)

3.9.9.2 Order data

Model number	Short description	Figure
	Drives	
5MMSSD.0060-00	60 GB SATA SSD (MLC); replacement part for 5AC801.SSDI-01 and 5AC901.CSSD-01; SSD for 5PP5IO.GMAC-00; note: Please see the manual for information about using this SSD.	

Table 80: 5MMSSD.0060-00 - Order data

3.9.9.3 Technical data

Caution!

A sudden loss of power may result in data loss! In very rare cases, mass memory may also be damaged.

To prevent damage and loss of data, the use of a UPS device is recommended.

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from those specified for the fully assembled device. The data specifications for the fully assembled device take precedence over those of individual components.

Product ID	5MMSSD.0060-00
General information	
Certification	
CE	Yes
cULus	Yes
Solid state drive	
Capacity	60 GB
Data reliability	< 1 unrecoverable error in 10^{16} bit read accesses
MTBF	1,200,000 hours
S.M.A.R.T. Support	Yes
Interface	SATA
Maintenance	None
Continuous reading	Max. 550 MB/s with SATA 6 Gbit/s Max. 280 MB/s with SATA 3 Gbit/s
Continuous writing	Max. 475 MB/s with SATA 6 Gbit/s Max. 245 MB/s with SATA 3 Gbit/s
IOPS [1)]	
4k read	15,000
4k write	
Typical	23,000
Maximum	80,000
Endurance	
MLC flash	Yes
Compatibility	SATA 3.0 compliant ACS-2 SSD Enhanced SMART ATA feature set Native Command Queuing (NCQ)

Table 81: 5MMSSD.0060-00 - Technical data

Product ID	5MMSSD.0060-00
Environmental conditions	
Temperature	
Operation	0 to 70°C
Storage	-55 to 95°C
Transport	-55 to 95°C
Relative humidity	
Operation	5 to 95%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Vibration	
Operation	5 to 700 Hz: 2.17 g
Storage	5 to 800 Hz: 3.13 g
Transport	5 to 800 Hz: 3.13 g
Shock	
Operation	1500 g, 0.5 ms
Storage	1500 g, 0.5 ms
Transport	1500 g, 0.5 ms
Altitude	
Operation	-300 to 12192 m
Storage	-300 to 12192 m
Transport	-300 to 12192 m
Mechanical characteristics	
Dimensions	
Width	9.5 mm
Height	69 mm
Depth	100 mm
Weight	78 g
Manufacturer information	
Manufacturer	Intel
Manufacturer product ID	SSDSC2CW060A3

Table 81: 5MMSSD.0060-00 - Technical data

1) IOPS: Random read and write input/output operations per second.

3.9.9.4 Temperature humidity diagram

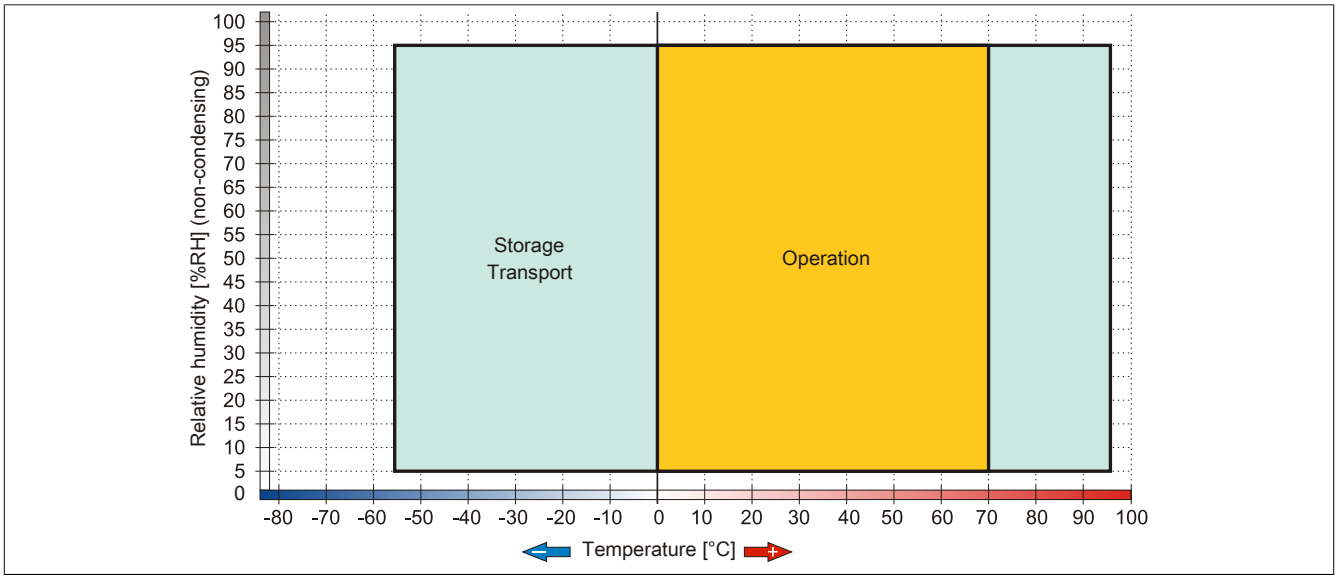


Figure 40: 5MMSSD.0060-00 - Temperature humidity diagram

3.9.10 5MMSSD.0060-01

3.9.10.1 General information

This 60 GB slide-in compact SSD (solid state drive) drive can be used as a replacement or accessory part. This SSD is based on multi-level cell (MLC) technology.

- Replacement drive for 5AC801.SSDI-03 or 5AC901.CSSD-03 SSD drives
- Accessory for the APC510 (optional SSD for I/O board)

3.9.10.2 Order data

Model number	Short description	Figure
	Drives	Image not found for 5MMSSD.0060-01!
5MMSSD.0060-01	60 GB SATA SSD (MLC); replacement part for 5AC801.SSDI-03 and 5AC901.CSSD-03; SSD for 5PP5IO.GMAC-00; note: Please see the manual for information about using this SSD.	

Table 82: 5MMSSD.0060-01 - Order data

3.9.10.3 Technical data

Caution!

A sudden loss of power may result in data loss! In very rare cases, mass memory may also be damaged.

To prevent damage and loss of data, the use of a UPS device is recommended.

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from those specified for the fully assembled device. The data specifications for the fully assembled device take precedence over those of individual components.

Product ID	5MMSSD.0060-01
General information	
Certification	
CE	Yes
cULus	Yes
Solid state drive	
Capacity	60 GB
Data reliability	< 1 unrecoverable error in 10^{15} bit read accesses
MTBF	1,500,000 hours
S.M.A.R.T. Support	Yes
Interface	SATA
Maintenance	None
Continuous reading	Max. 510 MB/s
Continuous writing	Max. 430 MB/s
IOPS [1)]	
4k read	Max. 60,000 (random)
4k write	Max. 25,000 (random)
Endurance	
MLC flash	Yes
Compatibility	SATA 3.0 compliant ACS-2 SSD Enhanced SMART ATA feature set Native Command Queuing (NCQ)
Environmental conditions	
Temperature	
Operation	0 to 70°C
Storage	-40 to 95°C
Transport	-40 to 95°C
Relative humidity	
Operation	8 to 95%, non-condensing
Storage	8 to 95%, non-condensing
Transport	8 to 95%, non-condensing
Vibration	
Operation	10 to 2000 Hz: 20 g
Storage	10 to 2000 Hz: 20 g
Transport	10 to 2000 Hz: 20 g

Table 83: 5MMSSD.0060-01 - Technical data

Product ID	5MMSSD.0060-01
Shock	
Operation	1500 g, 0.5 ms
Storage	1500 g, 0.5 ms
Transport	1500 g, 0.5 ms
Altitude	
Operation	-300 to 12192 m
Storage	-300 to 12192 m
Transport	-300 to 12192 m
Mechanical characteristics	
Dimensions	
Width	9.5 mm
Height	69 mm
Depth	100 mm
Weight	78 g
Manufacturer information	
Manufacturer	Toshiba
Manufacturer product ID	THNSNH060GBST

Table 83: 5MMSSD.0060-01 - Technical data

1) IOPS: Random read and write input/output operations per second.

3.9.10.4 Temperature humidity diagram

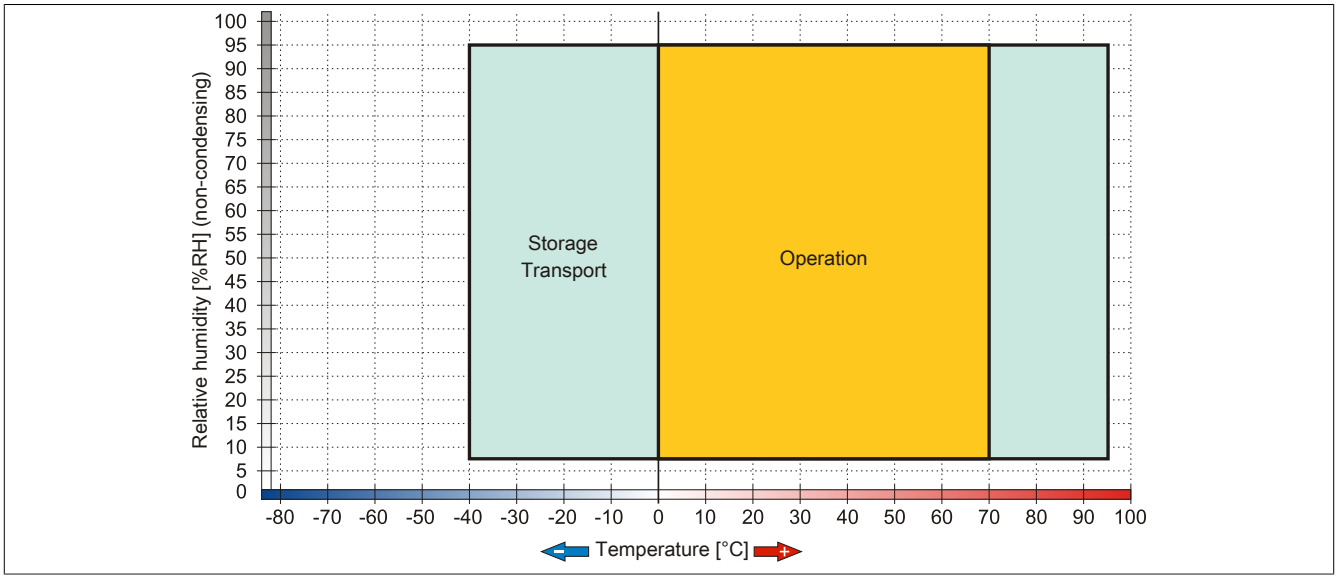


Figure 41: 5MMSSD.0060-01 - Temperature humidity diagram

3.9.11 5MMSSD.0180-00

3.9.11.1 General information

This 180 GB slide-in compact SSD (solid state drive) drive can be used as a replacement or accessory part. SSD is based on Multi Level Cell (MLC) technology.

- Replacement drive for 5AC801.SSDI-02 or 5AC901.CSSD-02 SSD drives
- Accessory for the APC510 (optional SSD for I/O board)

3.9.11.2 Order data

Model number	Short description	Figure
	Drives	
5MMSSD.0180-00	180 GB SATA SSD (MLC); replacement part for 5AC801.SSDI-02 and 5AC901.CSSD-02; SSD for 5PP5IO.GMAC-00; note: Please see the manual for information about using this SSD.	

Table 84: 5MMSSD.0180-00 - Order data

3.9.11.3 Technical data

Caution!

A sudden loss of power may result in data loss! In very rare cases, mass memory may also be damaged.

To prevent damage and loss of data, the use of a UPS device is recommended.

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from those specified for the fully assembled device. The data specifications for the fully assembled device take precedence over those of individual components.

Product ID	5MMSSD.0180-00
General information	
Certification	
CE	Yes
cULus	Yes
Solid state drive	
Capacity	180 GB
Data reliability	< 1 unrecoverable error in 10^{16} bit read accesses
MTBF	1,200,000 hours
S.M.A.R.T. Support	Yes
Interface	SATA
Maintenance	None
Continuous reading	Max. 550 MB/s with SATA 6 Gbit/s Max. 280 MB/s with SATA 3 Gbit/s
Continuous writing	Max. 520 MB/s with SATA 6 Gbit/s Max. 260 MB/s with SATA 3 Gbit/s
IOPS [1)]	
4k read	50,000
4k write	
Typical	60,000
Maximum	80,000
Endurance	
MLC flash	Yes
Compatibility	SATA 3.0 compliant ACS-2 SSD Enhanced SMART ATA feature set Native Command Queuing (NCQ)

Table 85: 5MMSSD.0180-00 - Technical data

Product ID	5MMSSD.0180-00
Environmental conditions	
Temperature	
Operation	0 to 70°C
Storage	-55 to 95°C
Transport	-55 to 95°C
Relative humidity	
Operation	5 to 95%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Vibration	
Operation	5 to 700 Hz: 2.17 g
Storage	5 to 800 Hz: 3.13 g
Transport	5 to 800 Hz: 3.13 g
Shock	
Operation	1500 g, 0.5 ms
Storage	1500 g, 0.5 ms
Transport	1500 g, 0.5 ms
Altitude	
Operation	-300 to 12192 m
Storage	-300 to 12192 m
Transport	-300 to 12192 m
Mechanical characteristics	
Dimensions	
Width	9.5 mm
Height	69 mm
Depth	100 mm
Weight	78 g
Manufacturer information	
Manufacturer	Intel
Manufacturer product ID	SSDSC2CW180A3

Table 85: 5MMSSD.0180-00 - Technical data

1) IOPS: Random read and write input/output operations per second.

3.9.11.4 Temperature humidity diagram

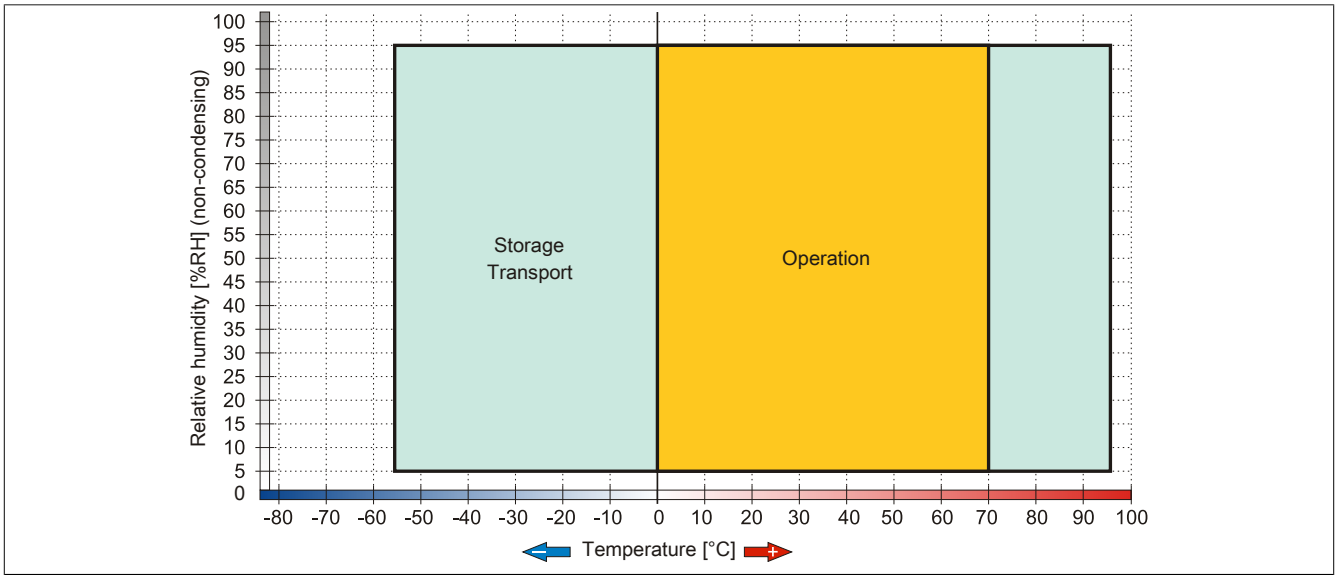


Figure 42: 5MMSSD.0180-00 - Temperature humidity diagram

3.9.12 5AC801.ADAS-00

3.9.12.1 General information

The hard disk adapter is a slide-in adapter where slide-in compact drives can be installed and then operated on the B&R industrial PC. This adapter can be used in APC810 and PPC800 system units with slide-in drive slot.

When used in a PPC800

> **Information:**
>
> **The expansion 5AC803.SX01-00 or 5AC803.SX02-00 is required in order to use slide-in drives.**

3.9.12.2 Order data

Model number	Short description	Figure
	Drives	
5AC801.ADAS-00	SATA hard disk adapter for operating a slide-in compact hard disk in a slide-in slot	

Table 86: 5AC801.ADAS-00 - Order data

3.9.12.3 Technical data

Product ID	5AC801.ADAS-00
General information	
Certification	
CE	Yes
cULus	Yes
GL	Yes
Mechanical characteristics	
Dimensions	
Width	22 mm
Height	172.5 mm
Depth	150 mm
Weight	328 g

Table 87: 5AC801.ADAS-00 - Technical data

3.9.13 5AC801.HDDS-00

3.9.13.1 General information

This 40 GB hard disk is specified for 24-hour operation (24x7) and also provides an extended temperature specification (ET). The slide-in drive can be used in APC810 and PPC800 system units with slide-in drive slot.

Information:

A slide-in drive can be added or removed at any time.

When used in a PPC800

Information:

The expansion 5AC803.SX01-00 or 5AC803.SX02-00 is required in order to use slide-in drives.

When inserted in slide-in slot 1, the slide-in drive is referred to internally as SATA and USB.

3.9.13.2 Order data

Model number	Short description	Figure
	Drives	
5AC801.HDDS-00	40 GB slide-in SATA hard disk; 24/7 operation with extended temperature range. Note: Please see the manual for information about using this hard disk.	

Table 88: 5AC801.HDDS-00 - Order data

3.9.13.3 Technical data

Information:

The following characteristics, features and limit values only apply to this individual component and can deviate from those specified for the fully assembled device. For the assembled device in which this individual component is used, refer to the data given specifically for that device.

Product ID	5AC801.HDDS-00
General information	
Certification	
CE	Yes
cULus	Yes
GL	Yes
Hard disk drive	
Capacity	40 GB
Number of heads	1
Number of sectors	78,140,160
Bytes per sector	512
Cache	8 MB
Speed	5400 rpm ±1%
Startup time	Typ. 3 s (from 0 rpm to read access)
MTBF	750,000 POH [1)]
S.M.A.R.T. Support	Yes
Interface	SATA
Access time	5.6 ms
Data transfer rate	
Internal	Max. 450 Mbits/s
To/From host	Max. 150 MB/s (Ultra DMA mode 5)

Table 89: 5AC801.HDDS-00 - Technical data

Product ID	5AC801.HDDS-00
Positioning time	
Minimum (track to track)	1 ms
Nominal (read only)	12.5 ms
Maximum (read only)	23 ms
Environmental conditions	
Temperature [2]	
Operation [3]	-30 to 85°C
24-hour operation [4]	-30 to 85°C
Storage	-40 to 95°C
Transport	-40 to 95°C
Relative humidity [5]	
Operation	5 to 90%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Vibration	
Operation	5 to 500 Hz: 2 g; no unrecoverable errors
Storage	5 to 500 Hz: 5 g; no unrecoverable errors
Transport	5 to 500 Hz: 5 g; no unrecoverable errors
Shock	
Operation	300 g and 2 ms duration; no unrecoverable errors 150 g and 11 ms duration; no unrecoverable errors
Storage	800 g and 2 ms duration; no unrecoverable errors 400 g and 0.5 ms duration; no unrecoverable errors
Transport	800 g and 2 ms duration; no unrecoverable errors 400 g and 0.5 ms duration; no unrecoverable errors
Altitude	
Operation	-300 to 5000 m
Storage	-300 to 12192 m
Mechanical characteristics	
Installation	Fixed [6]
Dimensions	
Width	22 mm
Height	172.5 mm
Depth	150 mm
Weight	387 g
Manufacturer information	
Manufacturer	Seagate
Manufacturer product ID	ST940817SM

Table 89: 5AC801.HDDS-00 - Technical data

1) With 8760 POH (power on hours) per year and 70°C surface temperature.
2) Temperature values at an altitude of 305 meters. The temperature specification must be reduced linearly by 1 °C every 305 meters. The temperature increase and decrease can be a maximum of 20 °C per hour.
3) Standard operation means 333 POH (power-on hours) per month.
4) 24-hour operation means 732 POH (power-on hours) per month.
5) Humidity gradient: Maximum 15% per hour.
6) Slide-in compact mounting.

3.9.13.4 Temperature humidity diagram

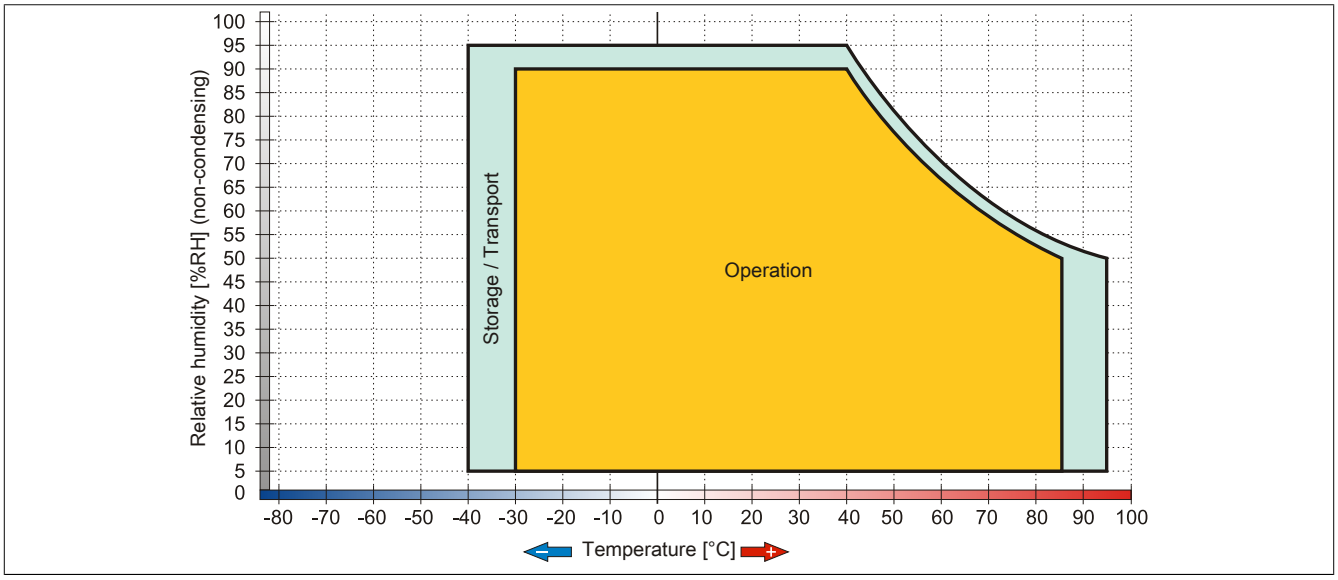


Figure 43: 5AC801.HDDS-00 - Temperature humidity diagram

3.9.14 5AC801.DVDS-00

3.9.14.1 General information

The DVD-ROM slide-in drive can be used in APC810 and PPC800 system units with slide-in drive slot.

Information:

A slide-in drive can be added or removed at any time.

When used in a PPC800

Information:

The expansion 5AC803.SX01-00 or 5AC803.SX02-00 is required in order to use slide-in drives.

When inserted in slide-in slot 1, the slide-in drive is referred to internally as SATA and USB.

3.9.14.2 Order data

Model number	Short description	Figure
	Drives	
5AC801.DVDS-00	DVD-ROM slide-in SATA drive.	

Table 90: 5AC801.DVDS-00 - Order data

3.9.14.3 Technical data

Information:

The following characteristics, features and limit values only apply to this individual component and can deviate from those specified for the fully assembled device. For the assembled device in which this individual component is used, refer to the data given specifically for that device.

Product ID	5AC801.DVDS-00
General information	
Certification	
CE	Yes
cULus	Yes
GL	Yes
CD / DVD drive	
Data transfer rate	Max. 1.5 Gbit/s
Speed	Max. 5090 rpm ±1%
Noise level	Approx. 45 dBA in a distance of 50 cm (full read access)
Compatible formats	CD-DA, CD-ROM mode 1/mode 2 CD-ROM XA mode 2 (form 1, form 2) Photo CD (single/multi-session) Enhanced CD, CD text DVD-ROM, DVD-Video (Double Layer), DVD-R (Single/Multi-border), DVD-R DL (Single/Multi-border), DVD-RW (Single/Multi-border), DVD+R (Single/Multi session), DVD+R DL (Single/Multi session), DVD+RW (Single/Multi session), DVD-RAM (4.7 GB, 2.6 GB)
Laser class	Class 1 laser
Service life	60000 POH (power-on hours)
Interface	SATA
Startup time	
CD	Max. 19 seconds (0 RPM to read access)
DVD	Max. 19 seconds (0 RPM to read access)

Table 91: 5AC801.DVDS-00 - Technical data

Product ID	5AC801.DVDS-00
Access time	
CD	Average of 130 ms
DVD	Average of 140 ms
Readable media	
CD	CD-ROM (12 cm, 8 cm), CD-A CD-R, CD-RW
DVD	DVD-ROM, DVD-R, DVD-R DL, DVD-RW, DVD+R DVD+R DL, DVD+RW, DVD-RAM
Read speed	
CD	24x
DVD	8x
Environmental conditions	
Temperature [1]	
Operation	5 to 55°C [2]
Storage	-20 to 60°C
Transport	-40 to 65°C
Relative humidity	
Operation	8 to 80%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Vibration	
Operation	5 to 500 Hz: 0.2 g
Storage	5 to 500 Hz: 2 g
Transport	5 to 500 Hz: 2 g
Shock	
Operation	5 g and 11 ms duration
Storage	60 g and 11 ms duration 200 g and 2 ms duration
Transport	60 g and 11 ms duration 200 g and 2 ms duration
Mechanical characteristics	
Dimensions	
Width	22 mm
Height	172.5 mm
Depth	150 mm
Weight	455 g

Table 91: 5AC801.DVDS-00 - Technical data

1) Temperature data is for operation at 500 meters. The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level).
2) Drive surface temperature

3.9.14.4 Temperature humidity diagram

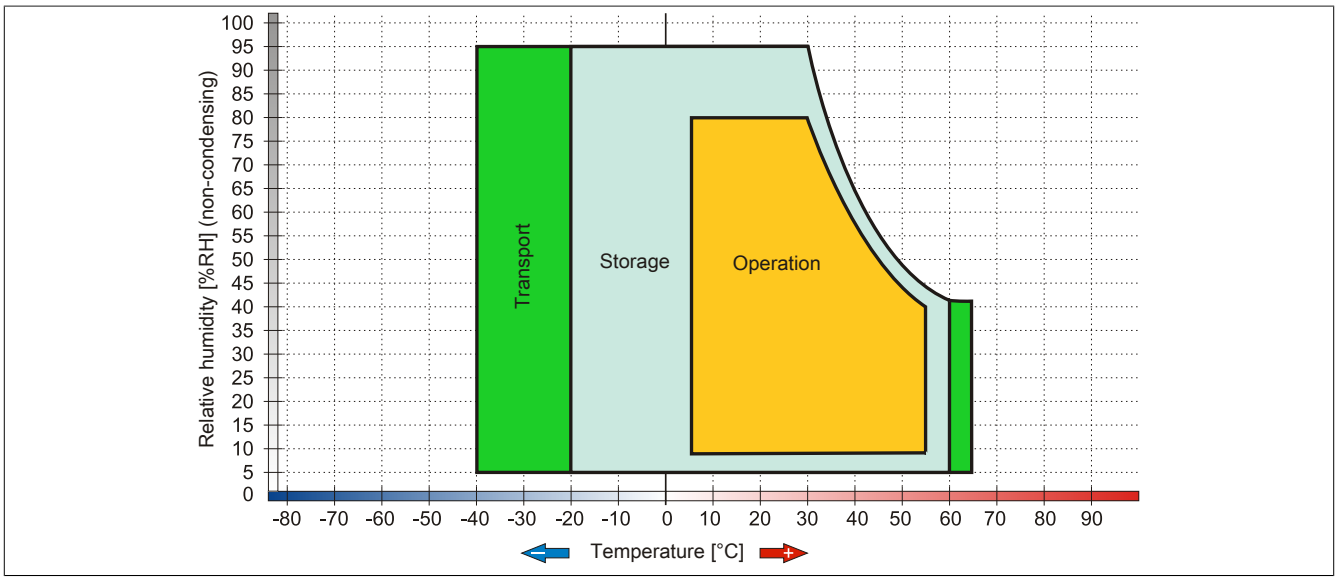


Figure 44: 5AC801.DVDS-00 - Temperature humidity diagram

3.9.14.5 Hot plug capable

Hardware revision B0 of the slide-in DVD-ROM - 5AC801.DVDS-00 does not offer SATA hot plug capability. Other hardware revisions are hot plug capable.

3.9.15 5AC801.DVRS-00

3.9.15.1 General information

The DVD-R/RW slide-in drive can be used in APC810 and PPC800 system units with slide-in drive slot.

> **Information:**
>
> **A slide-in drive can be added or removed at any time.**

When used in a PPC800

> **Information:**
>
> **The expansion 5AC803.SX01-00 or 5AC803.SX02-00 is required in order to use slide-in drives.**

When inserted in slide-in slot 1, the slide-in drive is referred to internally as SATA and USB.

3.9.15.2 Order data

Model number	Short description	Figure
	Drives	
5AC801.DVRS-00	DVD-R/RW DVD+R/RW slide-in SATA drive.	
	Optional accessories	
	Other	
5SWUTI.0000-00	OEM Nero CD-RW Software, only available with a CD writer.	

Table 92: 5AC801.DVRS-00 - Order data

3.9.15.3 Technical data

> **Information:**
>
> **The following characteristics, features and limit values only apply to this individual component and can deviate from those specified for the fully assembled device. For the assembled device in which this individual component is used, refer to the data given specifically for that device.**

Product ID	5AC801.DVRS-00
General information	
Certification	
CE	Yes
cULus	Yes
GL	Yes
CD / DVD drive	
Data buffer capacity	2 MB
Data transfer rate	Max. 33.3 MB/s
Speed	Max. 5160 rpm ±1%
Noise level	Approx. 45 dBA in a distance of 50 cm (full read access)
Compatible formats	CD-DA, CD-ROM mode 1/mode 2 CD-ROM XA mode 2 (form 1, form 2) Photo CD (single/multi-session), Enhanced CD, CD text DVD-ROM, DVD-R, DVD-R (double layer), DVD-RW, DVD-Video DVD-RAM (4.7 GB, 2.6 GB) DVD+R, DVD+R (double layer), DVD+RW
Laser class	Class 1 laser
Service life	60000 POH (power-on hours)
Interface	SATA
Startup time	
CD	Max. 14 seconds (0 RPM to read access)
DVD	Max. 15 seconds (0 RPM to read access)

Table 93: 5AC801.DVRS-00 - Technical data

Product ID	5AC801.DVRS-00
Access time	
CD	On average 140 ms (24x)
DVD	On average 150 ms (8x)
Readable media	
CD	CD/CD-ROM (12 cm, 8 cm), CD-R, CD-RW
DVD	DVD-ROM, DVD-R, DVD-R (double layer), DVD-RW. DVD-RAM, DVD+R, DVD+R (double layer),DVD+RW, DVD-RAM
Writable media	
CD	CD-R, CD-RW
DVD	DVD-R/RW, DVD-R (double layer), DVD-RAM (4.7 GB), DVD+R/RW, DVD+R (double layer)
Read speed	
CD	24x
DVD	8x
Write speed	
CD-R	24x, 16x, 10x and 4x
CD-RW	24x, 16x, 10x and 4x
DVD+R	8x, 4x and 2.4x
DVD+R (dual layer)	6x, 4x and 2.4x
DVD+RW	4x and 2x
DVD-R	8x, 4x and 2x
DVD-R (dual layer)	6x, 4x and 2x
DVD-RAM [1]	5x, 3x and 2x
DVD-RW	6x, 4x and 2x
Write methods	
CD	Disk at once, session at once, packet write, track at once
DVD	Disk at once, incremental, over-write, sequential, multi-session
Environmental conditions	
Temperature [2]	
Operation	5 to 55°C [3]
Storage	-20 to 60°C
Transport	-40 to 65°C
Relative humidity	
Operation	8 to 80%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Vibration	
Operation	5 to 500 Hz: 0.2 g
Storage	5 to 500 Hz: 2 g
Transport	5 to 500 Hz: 2 g
Shock	
Operation	At max. 5 g and 11 ms duration
Storage	At max. 60 g and 11 ms duration At max. 200 g and 2 ms duration
Transport	At max. 60 g and 11 ms duration At max. 200 g and 2 ms duration
Mechanical characteristics	
Dimensions	
Width	22 mm
Height	172.5 mm
Depth	150 mm
Weight	400 g

Table 93: 5AC801.DVRS-00 - Technical data

1) RAM drivers are not provided by the manufacturer. Support of RAM function with burning software "Nero" (model number 5SWUTI.0000-00) or other burning software packages or drivers from third-party providers.
2) Temperature specifications refer to operation at 500 meters. The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level).
3) Drive surface temperature

3.9.15.4 Temperature humidity diagram

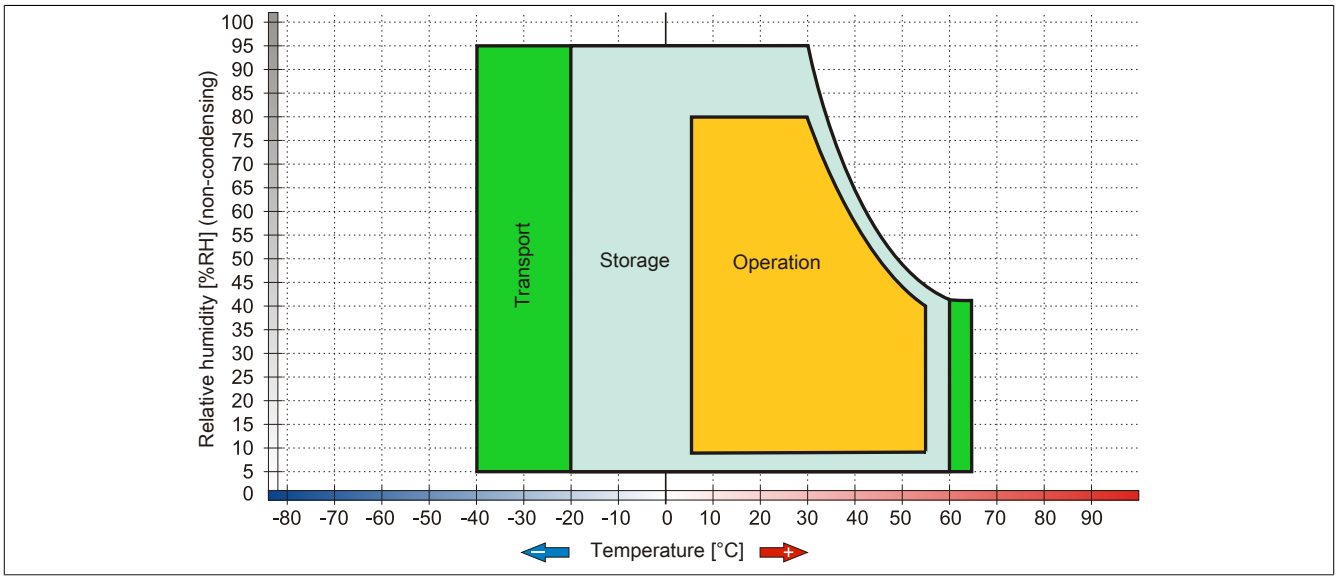


Figure 45: 5AC801.DVRS-00 - Temperature humidity diagram

3.9.16 5ACPCI.RAIC-03

3.9.16.1 General information

This SATA RAID controller supports RAID level 0 and 1 and can be inserted in a PCI slot. The hard disks being used are specified for 24-hour operation (24x7) and also provides an extended temperature specification (ET).

- SATA RAID controller
- RAID Level 0 (striped) and 1 (mirrored)
- 2 SATA hard disk drives (suitable for 24 hour operation)
- Only requires 1 PCI slot
- Transfer rates up to 150 MB/s

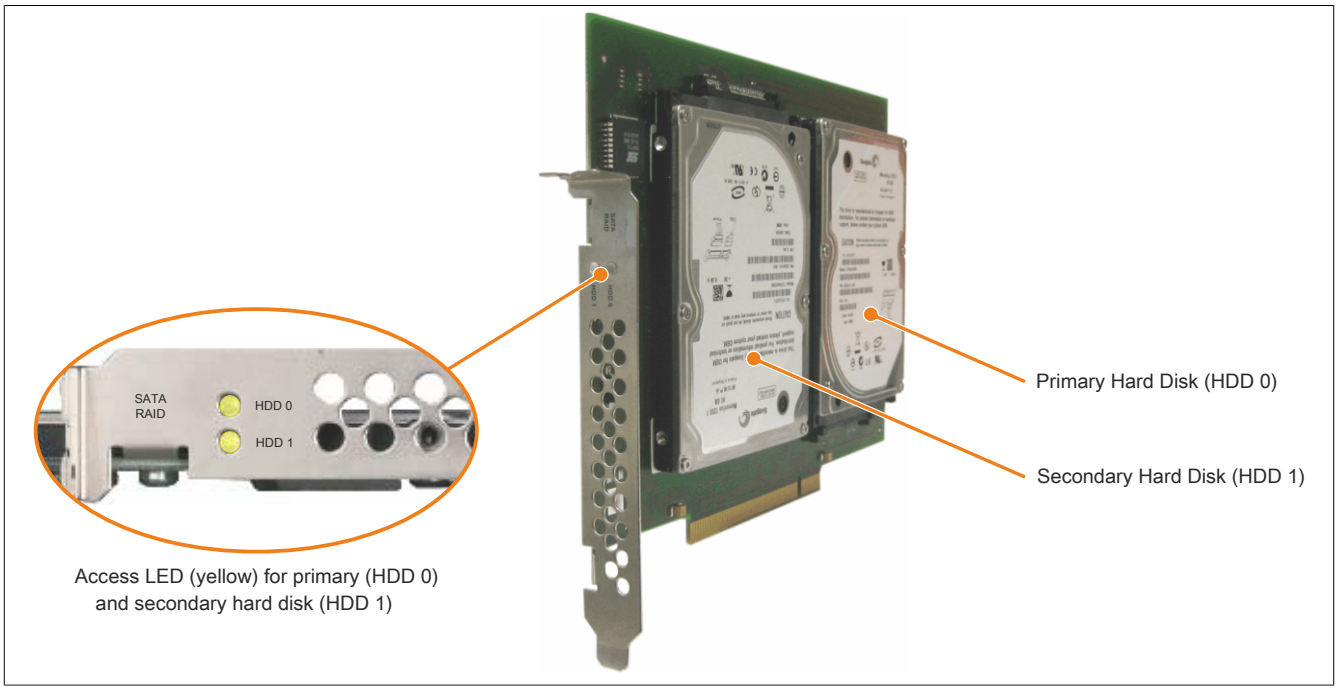


Figure 46: PCI SATA RAID controller

Information:

The PCI SATA RAID controller cannot be used in place of a Universal Power Supply (UPS). If the operating system is shut down improperly, the next time it is started it is detected as an error by the RAID 1, and a complete rebuild is executed. With a memory size of 160 GB, this generally takes at least 160 minutes to complete (configurable).

3.9.16.2 Order data

Model number	Short description	Figure
	Drives	
5ACPCI.RAIC-03	PCI RAID system SATA 2x 160 GB; Note: Please see the manual for information about using this hard disk.	
	Optional accessories	
	Drives	
5ACPCI.RAIC-04	160 GB SATA hard disk, replacement part for 5ACPCI.RAIC-03; Note: Please see the manual for information about using this hard disk.	

Table 94: 5ACPCI.RAIC-03 - Order data

3.9.16.3 Technical data

Information:

The following characteristics, features and limit values only apply to this individual component and can deviate from those specified for the fully assembled device. For the assembled device in which this individual component is used, refer to the data given specifically for that device.

Product ID	5ACPCI.RAIC-03
General information	
Number of hard disks	2
Certification CE	 Yes
Controller	
Type	SiI 3512 SATA link
Specification	Serial ATA 1.0
Data transfer rate	Max. 1.5 Gbit/s (150 MB/s)
RAID level	Supports RAID 0, 1
BIOS extension ROM requirements	Approx. 32 Kb
Hard disk drive	
Capacity	160 GB
Number of heads	3
Number of sectors	312,581,808
Bytes per sector	512
Cache	8 MB
Speed	5400 rpm ±1%
Startup time	Typ. 4 s (from 0 rpm to read access)
Service life	5 years
S.M.A.R.T. Support	Yes
Access time	5.56 ms
Supported transfer modes	SATA 1.0, PIO mode 0-4, multiword DMA mode 0-2, UDMA 0-5
Data transfer rate Internal To/From host	 Max. 84.6 Mbits/s Max. 150 MB/s
Positioning time Minimum (track to track) Nominal (read only) Maximum (read only)	 1.5 ms 12 ms 22 ms
Electrical characteristics	
Power consumption	0.3A at 3.3V (PCI bus) 1A at 5V (PCI bus)
Environmental conditions	
Temperature [1] Operation [2] 24-hour operation [3] Storage Transport	 -15 to 80°C -15 to 80°C -40 to 95°C -40 to 95°C
Relative humidity Operation Storage Transport	 8 to 90%, non-condensing [4] 5 to 95%, non-condensing [5] 5 to 95%, non-condensing [5]
Vibration [6] Operation (continuous) Operation (occasional) Storage Transport	 5 to 500 Hz: max. 0.125 g; duration 1 octave per minute; no unrecoverable errors 5 to 500 Hz: max. 0.25 g; duration 1 octave per minute; no unrecoverable errors 5 to 500 Hz: max. 5 g; duration 0.5 octaves per minute; no damage 5 to 500 Hz: max. 5 g; duration 0.5 octaves per minute; no damage
Shock Operation Storage Transport	 Max. 125 g, 2 ms; no unrecoverable errors Max. 400 g, 2 ms; no damage Max. 450 g, 1 ms; no damage Max. 200 g, 0.5 ms; no damage Max. 400 g, 2 ms; no damage Max. 450 g, 1 ms; no damage Max. 200 g, 0.5 ms; no damage
Altitude Operation Storage	 -300 to 3048 m -300 to 12192 m
Mechanical characteristics	
Installation [7]	Fixed
Dimensions Width Length Height	 70 mm 100 mm 9.5 mm

Table 95: 5ACPCI.RAIC-03 - Technical data

Product ID	5ACPCI.RAIC-03
Weight	350 g
Manufacturer information	
Manufacturer	Fujitsu
Manufacturer product ID	M120-ESW MHY2160BH-ESW

Table 95: 5ACPCI.RAIC-03 - Technical data

1) Temperature values at an altitude of 305 meters. The temperature specification must be reduced linearly by 1 °C every 305 meters. The temperature increase and decrease can be a maximum of 3°C per minute.
2) Standard operation means 333 POH (power-on hours) per month.
3) 24-hour operation means 732 POH (power-on hours) per month.
4) Maximum humidity at 29°C.
5) Maximum humidity at 40°C.
6) Operation in areas prone to vibration and shock can affect performance negatively (reduction of transfer rate).
7) Mounted on PCI insert.

3.9.16.4 Temperature humidity diagram

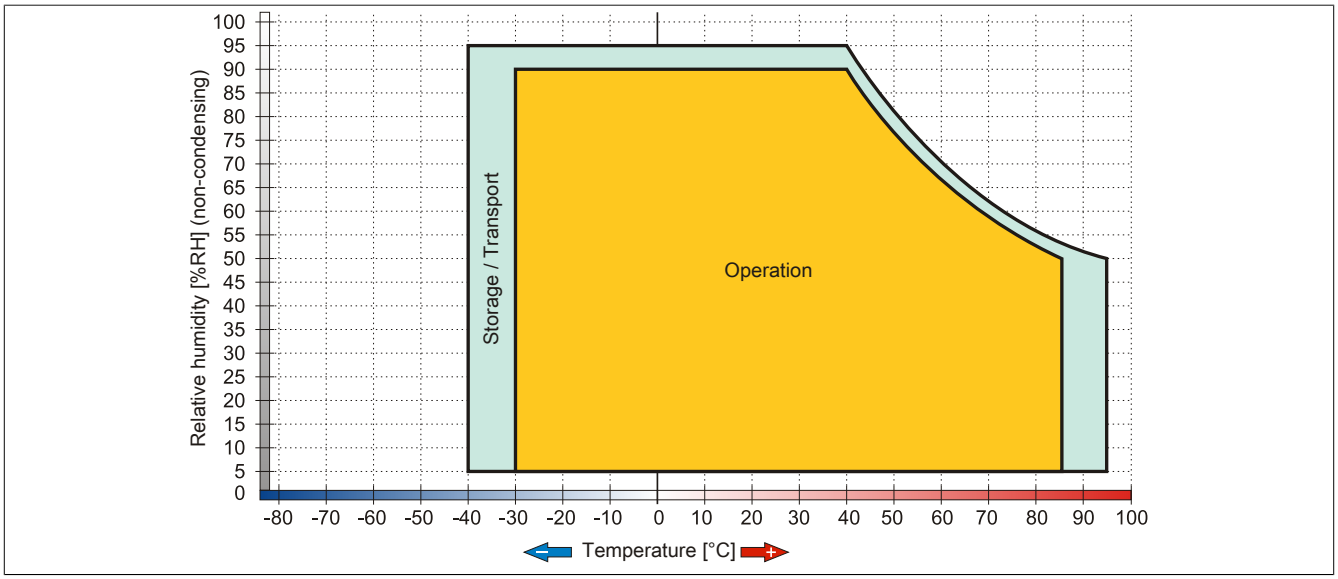


Figure 47: 5ACPCI.RAIC-03 - Temperature humidity diagram

3.9.16.5 Driver support

Special drivers are necessary for operating the PCI SATA RAID controller. Drivers for supported and approved operating systems are available in the Downloads section of the B&R website (www.br-automation.com).

The .NET-based SATA Raid™ serial ATA RAID management software can also be found on the B&R homepage.

Information:

Required drivers can only be downloaded from the B&R website, not from manufacturer websites.

3.9.16.6 Configuration

Configuring a SATA RAID network: see Chapter 3 "Installation", section 8 "Configuration of a SATA RAID array" on page 162.

3.9.16.7 Exchanging a HDD

A hard drive can be easily exchanged in the event of an error when using the RAID1 (mirroring) configuration without having to re-install the system. The replacement SATA HDD 160GB 5ACPCI.RAIC-04 is available as a replacement part for a HDD.

For instructions on exchanging the drive, see chapter Chapter 7 "Maintenance and service", section 14 "Exchanging a PCI SATA RAID hard disk in a RAID 1 system" on page 344.

3.9.17 5ACPCI.RAIC-04

3.9.17.1 General information

The hard disk can be used as replacement for a HDD in a PCI SATA RAID controller 5ACPCI.RAIC-03.

3.9.17.2 Order data

Model number	Short description	Figure
	Drives	
5ACPCI.RAIC-04	160 GB SATA hard disk, replacement part for 5ACPCI.RAIC-03; Note: Please see the manual for information about using this hard disk.	

Table 96: 5ACPCI.RAIC-04 - Order data

3.9.17.3 Technical data

Information:

The following characteristics, features and limit values only apply to this individual component and can deviate from those specified for the fully assembled device. For the assembled device in which this individual component is used, refer to the data given specifically for that device.

Product ID	5ACPCI.RAIC-04
General information	
Certification	
CE	Yes
Hard disk drive	
Capacity	160 GB
Number of heads	3
Number of sectors	312,581,808
Bytes per sector	512
Cache	8 MB
Speed	5400 rpm ±1%
Startup time	Typ. 4 s (from 0 rpm to read access)
Service life	5 years
S.M.A.R.T. Support	Yes
Access time	5.56 ms
Supported transfer modes	SATA 1.0, PIO mode 0-4, multiword DMA mode 0-2, UDMA 0-5
Data transfer rate	
Internal	Max. 84.6 Mbits/s
To/From host	Max. 150 MB/s
Positioning time	
Minimum (track to track)	1.5 ms
Nominal (read only)	12 ms
Maximum (read only)	22 ms
Electrical characteristics	
Power consumption	0.3A at 3.3V (PCI bus) 1A at 5V (PCI bus)
Environmental conditions	
Temperature [1]	
Operation [2]	-15 to 80°C
24-hour operation [3]	-15 to 80°C
Storage	-40 to 95°C
Transport	-40 to 95°C
Relative humidity	
Operation	8 to 90%, non-condensing [4]
Storage	5 to 95%, non-condensing [5]
Transport	5 to 95%, non-condensing [5]
Vibration [6]	
Operation (continuous)	5 to 500 Hz: max. 0.125 g; duration 1 octave per minute; no unrecoverable errors
Operation (occasional)	5 to 500 Hz: max. 0.25 g; duration 1 octave per minute; no unrecoverable errors
Storage	5 to 500 Hz: max. 5 g; duration 0.5 octaves per minute; no damage
Transport	5 to 500 Hz: max. 5 g; duration 0.5 octaves per minute; no damage

Table 97: 5ACPCI.RAIC-04 - Technical data

Product ID	5ACPCI.RAIC-04
Shock	
Operation	Max. 125 g, 2 ms; no unrecoverable errors
Storage	Max. 400 g, 2 ms; no damage Max. 450 g, 1 ms; no damage Max. 200 g, 0.5 ms; no damage
Transport	Max. 400 g, 2 ms; no damage Max. 450 g, 1 ms; no damage Max. 200 g, 0.5 ms; no damage
Altitude	
Operation	-300 to 3048 m
Storage	-300 to 12192 m
Mechanical characteristics	
Dimensions	
Width	70 mm
Length	100 mm
Height	9.5 mm
Weight	350 g
Manufacturer information	
Manufacturer	Fujitsu
Manufacturer product ID	M120-ESW MHY2160BH-ESW

Table 97: 5ACPCI.RAIC-04 - Technical data

1) Temperature values at an altitude of 305 meters. The temperature specification must be reduced linearly by 1 °C every 305 meters. The temperature increase and decrease can be a maximum of 3°C per minute.
2) Standard operation means 333 POH (power-on hours) per month.
3) 24-hour operation means 732 POH (power-on hours) per month.
4) Maximum humidity at 29°C.
5) Maximum humidity at 40°C.
6) Operation in areas prone to vibration and shock can affect performance negatively (reduction of transfer rate).

3.9.17.4 Temperature humidity diagram

Figure 48: 5ACPCI.RAIC-04 - Temperature humidity diagram

3.9.18 5ACPCI.RAIC-05

3.9.18.1 General information

This SATA RAID controller supports RAID level 0 and 1 and can be inserted in a PCI slot. The 250 GB hard disks that are used are specified for 24-hour operation (24x7).

- SATA RAID controller
- RAID Level 0 (striped) and 1 (mirrored)
- 2 SATA hard disk drives (suitable for 24 hour operation)
- Only requires 1 PCI slot
- Transfer rates up to 150 MB/s

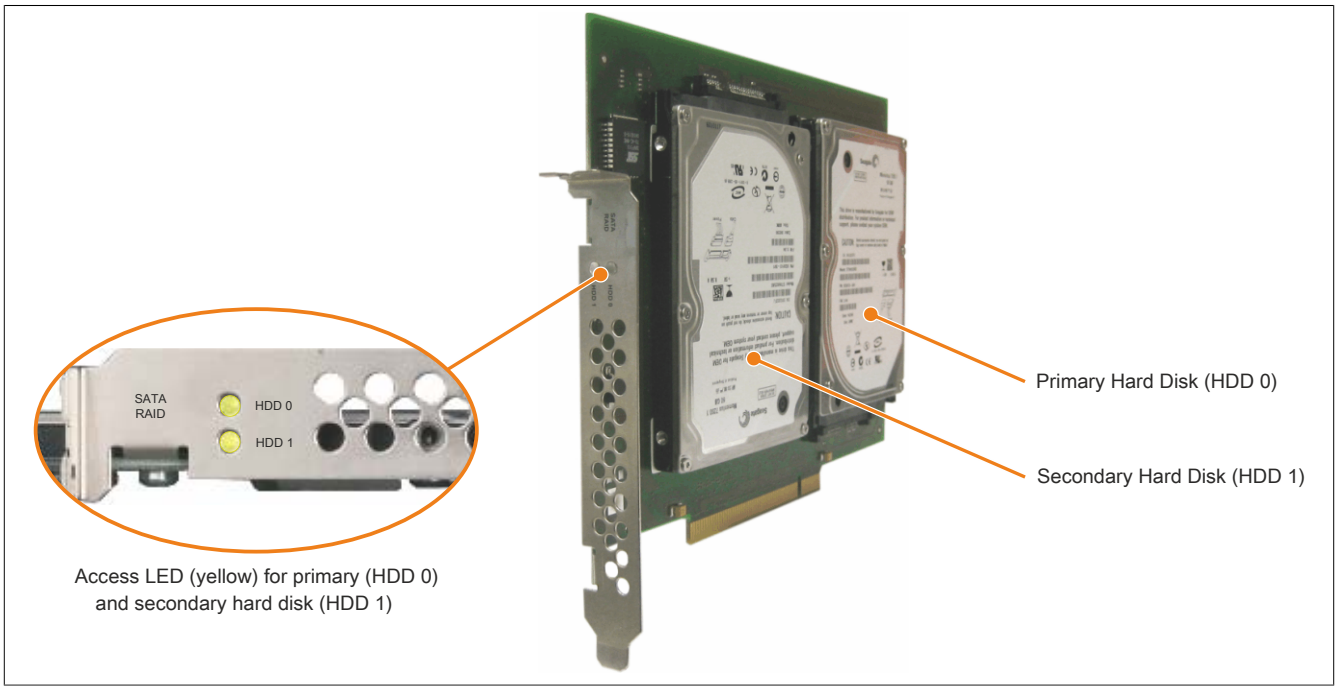


Figure 49: PCI SATA RAID controller

Information:

The PCI SATA RAID controller cannot be used in place of a Universal Power Supply (UPS). If the operating system is shut down improperly, the next time it is started it is detected as an error by the RAID 1, and a complete rebuild is executed. With a memory size of 250 GB, this generally takes at least 250 minutes to complete (configurable).

3.9.18.2 Order data

Model number	Short description	Figure
	Drives	
5ACPCI.RAIC-05	PCI RAID system SATA 2x 250 GB; Note: Please see the manual for information about using this hard disk.	
	Optional accessories	
	Drives	
5MMHDD.0250-00	250 GB SATA hard disk replacement part for 5AC801.HDDI-03 and 5ACPCI.RAIC-05; Note: Please see the manual for information about using this hard disk.	

Table 98: 5ACPCI.RAIC-05 - Order data

3.9.18.3 Technical data

Product ID	5ACPCI.RAIC-05
General information	
Number of hard disks	2
Certification CE cULus	 Yes Yes
Controller	
Type	SiI 3512 SATA link
Specification	Serial ATA 1.0
Data transfer rate	Max. 1.5 Gbit/s (150 MB/s)
RAID level	Supports RAID 0, 1
BIOS extension ROM requirements	Approx. 32 Kb
Hard disk drive	
Capacity	250 GB
Number of heads	1
Number of sectors	488,397,168
Bytes per sector	512
Cache	8 MB
Speed	5400 rpm ±0.2%
Startup time	Typ. 3.6 s (from 0 rpm to read access)
S.M.A.R.T. Support	Yes
Access time	5.56 ms
Supported transfer modes	SATA 1.0, Serial ATA Revision 2.6 PIO mode 0-4, multiword DMA mode 0-2, UDMA mode 0-6
Data transfer rate Internal To/From host	 Max. 1175 Mbit/s Max. 150 MB/s
Positioning time Minimum (track to track) Nominal (read only) Maximum (read only)	 1 ms 14 ms 30 ms
Electrical characteristics	
Power consumption	0.3A at 3.3V (PCI bus) 1A at 5V (PCI bus)
Environmental conditions	
Temperature [1] Operation [2] 24-hour operation [3] Storage Transport	 0 to 60°C 0 to 60°C -40 to 70°C -40 to 70°C
Relative humidity [4] Operation Storage Transport	 5 to 95%, non-condensing 5 to 95%, non-condensing 5 to 95%, non-condensing
Vibration [5] Operation (continuous) Operation (occasional) Storage Transport	 5 to 500 Hz: max. 0.125 g; duration 1 octave per minute; no unrecoverable errors 5 to 500 Hz: max. 0.25 g; duration 1 octave per minute; no unrecoverable errors 5 to 500 Hz: 5 g; duration 0.5 octaves per minute; no damage 5 to 500 Hz: 5 g; duration 0.5 octaves per minute; no damage
Shock [5] Operation Storage Transport	 Max. 125 g, 2 ms; no unrecoverable errors Max. 400 g, 2 ms; no damage Max. 500 g, 1 ms; no damage Max. 300 g, 0.5 ms; no damage Max. 400 g, 2 ms; no damage Max. 500 g, 1 ms; no damage Max. 300 g, 0.5 ms; no damage
Altitude Operation Storage	 - 300 to 3048 m - 300 to 12192 m
Mechanical characteristics	
Installation	Fixed [6]
Weight	350 g
Manufacturer information	
Manufacturer	Seagate
Manufacturer product ID	ST9250315AS

Table 99: 5ACPCI.RAIC-05 - Technical data

1) Temperature values at an altitude of 305 meters. The temperature specification must be reduced linearly by 1 °C every 305 meters. The temperature increase and decrease can be a maximum of 20 °C per hour.
2) Standard operation means 333 POH (power-on hours) per month.
3) 24-hour operation means 732 POH (power-on hours) per month.
4) Humidity gradient: Maximum 30% per hour.
5) Operation in areas prone to vibration and shock can affect performance negatively (reduction of transfer rate).
6) Mounted on PCI insert.

3.9.18.4 Temperature humidity diagram

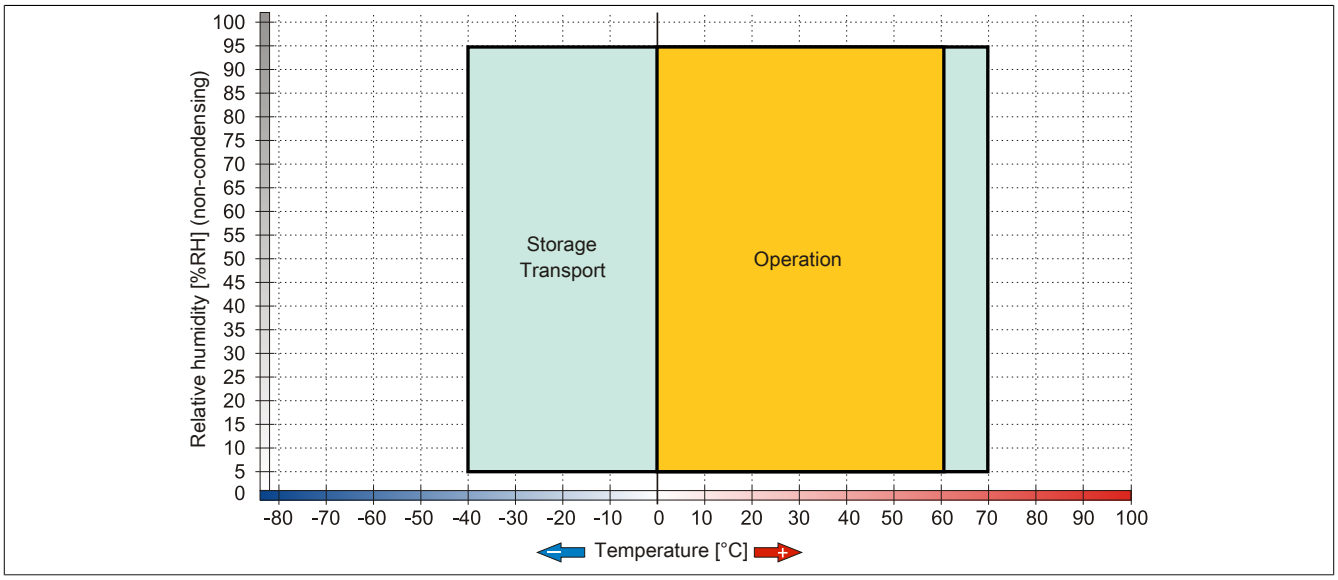


Figure 50: 5ACPCI.RAIC-05 - Temperature humidity diagram

3.9.18.5 Driver support

Special drivers are necessary for operating the PCI SATA RAID controller. Drivers for supported and approved operating systems are available in the Downloads section of the B&R website (www.br-automation.com).

The .NET-based SATA Raid™ serial ATA RAID management software can also be found on the B&R homepage.

Information:

Required drivers can only be downloaded from the B&R website, not from manufacturer websites.

3.9.18.6 Configuration

Configuring a SATA RAID network: see Chapter 3 "Installation", section 8 "Configuration of a SATA RAID array" on page 162.

3.9.18.7 Exchanging a HDD

A hard drive can be easily exchanged in the event of an error when using the RAID1 (mirroring) configuration without having to re-install the system. The replacement SATA HDD 250GB 5MMHDD.0250-00 is available as a replacement part for a HDD.

Instructions for exchanging see "Exchanging a PCI SATA RAID hard disk in a RAID 1 system" on page 344.

3.9.19 5ACPCI.RAIC-06

3.9.19.1 General information

This SATA RAID controller supports RAID level 0 and 1 and can be inserted in a PCI slot. The 500 GB hard disks that are used are specified for 24-hour operation (24x7).

- SATA RAID controller
- RAID Level 0 (striped) and 1 (mirrored)
- 2x 500 GB SATA hard disks (suitable 24 hour operation)
- Only requires 1 PCI slot
- Transfer rates up to 150 MB/s

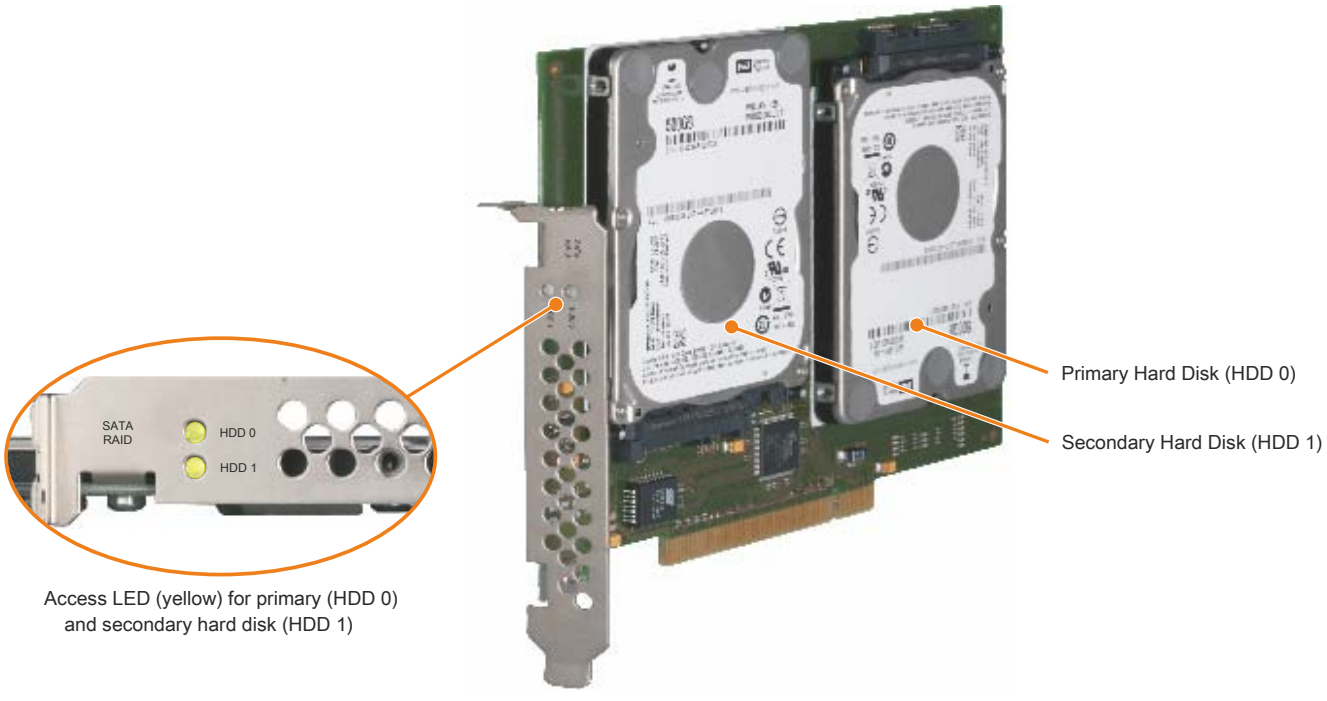


Figure 51: PCI SATA RAID controller

Information:

The PCI SATA RAID controller cannot be used in place of a Universal Power Supply (UPS). If the operating system is shut down improperly, the next time it is started it is detected as an error by the RAID 1, and a complete rebuild is executed. If 500 GB of memory are used, this generally takes approximately 500 minutes (configurable) to complete.

3.9.19.2 Order data

Model number	Short description	Figure
	Drives	
5ACPCI.RAIC-06	PCI RAID system SATA 2x 500 GB; Note: Please see the manual for information about using this hard disk.	
	Optional accessories	
	Drives	
5MMHDD.0500-00	500 GB SATA hard disk replacement part for 5AC801.HDDI-04, 5AC901.CHDD-01 and 5ACPCI.RAIC-06; Note: Please see the manual for information about using this hard disk.	

Table 100: 5ACPCI.RAIC-06 - Order data

3.9.19.3 Technical data

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from those specified for the fully assembled device. The data specifications for the fully assembled device take precedence over those of individual components.

Product ID	5ACPCI.RAIC-06
General information	
Capacity	2x 500 GB
Number of hard disks	2
Certification	
CE	Yes
cULus	Yes
Controller	
Type	SiI 3512 SATA link
Specification	Serial ATA 1.0
Data transfer rate	Max. 1.5 Gbit/s (150 MB/s)
RAID level	Supports RAID 0, 1
BIOS extension ROM requirements	Approx. 32 Kb
Hard disk drive [1]	
Capacity	500 GB
Number of heads	2
Number of sectors	976,773,168
Bytes per sector	512 (logical) / 4096 (physical)
Cache	16 MB
Speed	5400 rpm ±0.2%
Startup time	Typ. 3.5 s (from 0 rpm to read access)
Service life	5 years
MTBF	1,000,000 POH [2]
S.M.A.R.T. Support	Yes
Interface	SATA
Access time	5.5 ms
Supported transfer modes	SATA II
Data transfer rate	
Internal	Max. 147 MB/s
To/From host	Max. 150 MB/s (SATA I), max. 300 MB/s (SATA II)
Positioning time	
Nominal (read only)	11 ms
Maximum (read only)	21 ms
Environmental conditions	
Temperature [3]	
Operation [4]	0 to 60°C
24-hour operation [5]	0 to 60°C
Storage	-40 to 70°C
Transport	-40 to 70°C
Relative humidity [6]	
Operation	5 to 95%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Vibration [7]	
Operation (continuous)	5 to 500 Hz: 0.125 g; no unrecoverable errors
Operation (occasional)	5 to 500 Hz: 0.25 g; no unrecoverable errors
Storage	10 to 500 Hz: 5 g; no unrecoverable errors
Transport	10 to 500 Hz: 5 g; no unrecoverable errors
Shock	
Operation	200 g and 2 ms duration; no unrecoverable errors
Storage	1000 g and 2 ms duration; no unrecoverable errors
Transport	1000 g and 2 ms duration; no unrecoverable errors
Altitude	
Operation	-305 to 3048 m
Storage	-305 to 12192 m
Mechanical characteristics	
Installation	Fixed [8]
Weight	350 g
Manufacturer information	
Manufacturer	Western Digital
Manufacturer product ID	WD5000LUCT

Table 101: 5ACPCI.RAIC-06 - Technical data

1) Technical data for a hard disk.
2) With 8760 POH (power on hours) per year and 25°C surface temperature.
3) Temperature values at an altitude of 305 meters. The temperature specification must be reduced linearly by 1 °C every 305 meters. The temperature increase and decrease can be a maximum of 20 °C per hour.

4) Standard operation means 333 POH (power-on hours) per month.
5) 24-hour operation means 732 POH (power-on hours) per month.
6) Humidity gradient: Maximum 20% per hour.
7) Operation in areas prone to vibration and shock can affect performance negatively (reduction of transfer rate).
8) Mounted on PCI insert.

3.9.19.4 Temperature humidity diagram

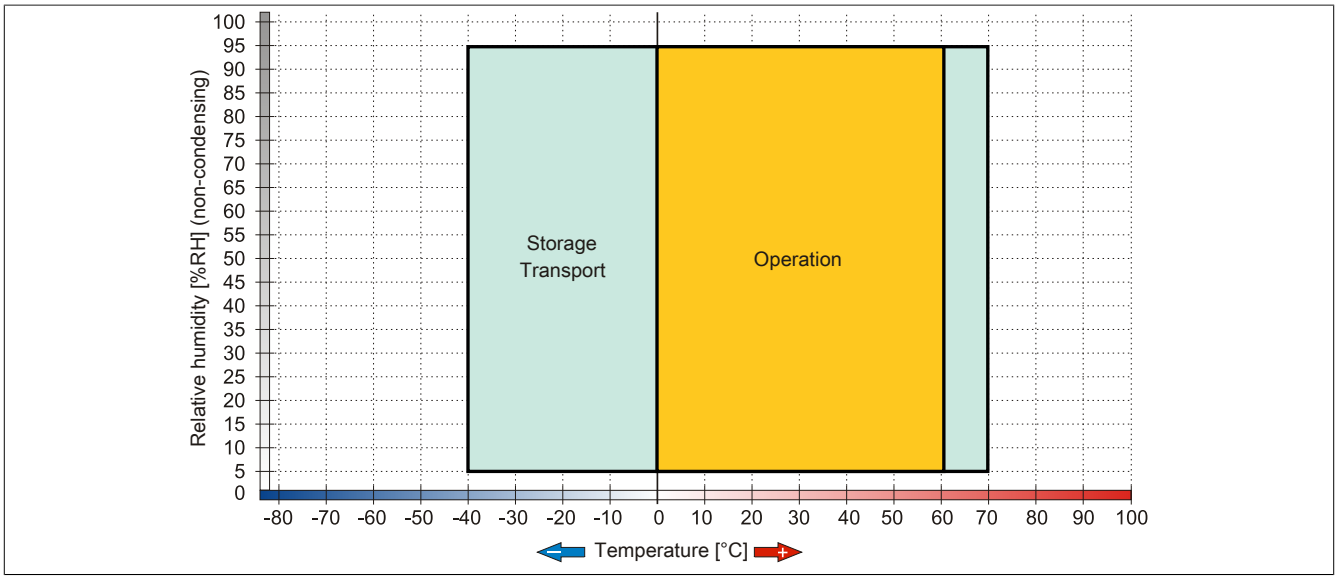


Figure 52: 5ACPCI.RAIC-06 - Temperature humidity diagram

3.9.19.5 Driver support

Special drivers are necessary for operating the PCI SATA RAID controller. Drivers for supported and approved operating systems are available in the Downloads section of the B&R website (www.br-automation.com).

The .NET-based SATA Raid™ serial ATA RAID management software can also be found on the B&R homepage.

Information:

Required drivers can only be downloaded from the B&R website, not from manufacturer websites.

3.9.19.6 Configuration

Configuring a SATA RAID network: see Chapter 3 "Installation", section 8 "Configuration of a SATA RAID array" on page 162.

3.9.19.7 Exchanging a HDD

A hard drive can be easily exchanged in the event of an error when using the RAID1 (mirroring) configuration without having to re-install the system. Here, the 500 GB 5MMHDD.0500-00 SATA HDD is available as a replacement hard disk.

Instructions for exchanging see "Exchanging a PCI SATA RAID hard disk in a RAID 1 system" on page 344.

3.9.20 5MMHDD.0250-00

3.9.20.1 General information

This 250 GB hard disk can be used as a replacement part or an accessory.

- 250 GB hard disk
- Replacement hard disk for a 5AC801.HDDI-03 hard disk or a 5ACPCI.RAIC-05 RAID controller
- APC510 accessory (optional hard disk for the I/O board)
- Specified for 24-hour operation
- S.M.A.R.T. Support

3.9.20.2 Order data

Model number	Short description	Figure
	Drives	
5MMHDD.0250-00	250 GB SATA hard disk replacement part for 5AC801.HDDI-03 and 5ACPCI.RAIC-05; Note: Please see the manual for information about using this hard disk.	

Table 102: 5MMHDD.0250-00 - Order data

3.9.20.3 Technical data

Information:

The following characteristics, features and limit values only apply to this individual component and can deviate from those specified for the fully assembled device. For the assembled device in which this individual component is used, refer to the data given specifically for that device.

Product ID	5MMHDD.0250-00
General information	
Certification	
CE	Yes
cULus	Yes
Hard disk drive	
Capacity	250 GB
Number of heads	1
Number of sectors	488,397,168
Bytes per sector	512
Cache	8 MB
Speed	5400 rpm ±0.2%
Startup time	Typ. 3.6 s (from 0 rpm to read access)
MTBF	550,000 POH [1)]
S.M.A.R.T. Support	Yes
Interface	SATA
Access time	5.56 ms
Supported transfer modes	SATA 1.0, Serial ATA Revision 2.6 PIO mode 0-4, multiword DMA mode 0-2, UDMA mode 0-6
Data transfer rate	
Internal	Max. 1175 Mbit/s
To/From host	Max. 150 MB/s (SATA I), max. 300 MB/s (SATA II)
Positioning time	
Minimum (track to track)	1 ms
Nominal (read only)	14 ms
Maximum (read only)	30 ms
Environmental conditions	
Temperature [2)]	
Operation [3)]	0 to 60°C
24-hour operation [4)]	0 to 60°C
Storage	-40 to 70°C
Transport	-40 to 70°C

Table 103: 5MMHDD.0250-00 - Technical data

Product ID	5MMHDD.0250-00
Relative humidity [5]	
Operation	5 to 95%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Vibration	
Operation	5 to 500 Hz: 0.5 g; no unrecoverable errors
Storage	5 to 500 Hz: 5 g; no unrecoverable errors
Transport	5 to 500 Hz: 5 g; no unrecoverable errors
Shock	
Operation	350 g and 2 ms duration; no unrecoverable errors
Storage	800 g and 2 ms duration; no unrecoverable errors 1000 g and 1 ms duration; no unrecoverable errors 600 g and 0.5 ms duration; no unrecoverable errors
Transport	800 g and 2 ms duration; no unrecoverable errors 1000 g and 1 ms duration; no unrecoverable errors 600 g and 0.5 ms duration; no unrecoverable errors
Altitude	
Operation	-300 to 3048 m
Storage	-300 to 12192 m
Mechanical characteristics	
Dimensions	
Width	9.5 mm
Height	69 mm
Depth	100 mm
Weight	100 g
Manufacturer information	
Manufacturer	Seagate
Manufacturer product ID	ST9250315AS

Table 103: 5MMHDD.0250-00 - Technical data

1) With 8760 POH (power on hours) per year and 25°C surface temperature.
2) Temperature values at an altitude of 305 meters. The temperature specification must be reduced linearly by 1 °C every 305 meters. The temperature increase and decrease can be a maximum of 20 °C per hour.
3) Standard operation means 333 POH (power-on hours) per month.
4) 24-hour operation means 732 POH (power-on hours) per month.
5) Humidity gradient: Maximum 30% per hour.

3.9.20.4 Temperature humidity diagram

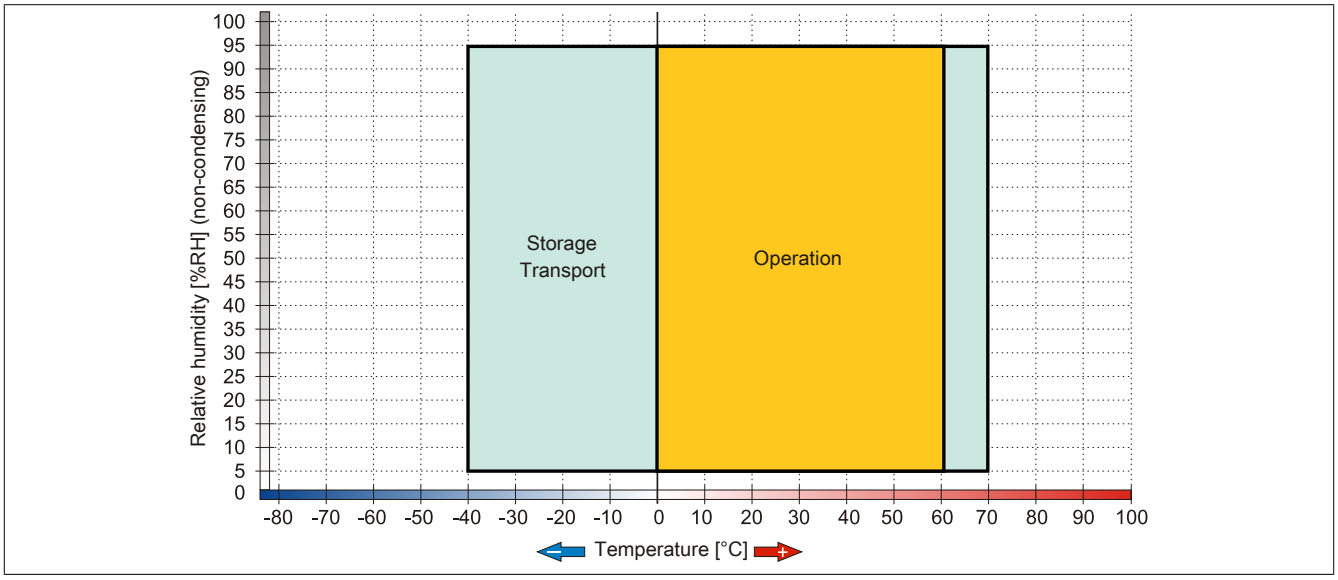


Figure 53: 5MMHDD.0250-00 - Temperature humidity diagram

3.9.21 5MMHDD.0500-00

3.9.21.1 General information

This 500 GB hard disk can be used as a replacement part or an accessory.

- 500 GB hard disk
- Replacement hard disk for a 5AC801.HDDI-04 / 5AC901.CHDD-01 hard disk or a 5ACPCI.RAIC-05 RAID controller
- APC510 accessory (optional hard disk for the I/O board)
- Specified for 24-hour operation
- S.M.A.R.T. Support

3.9.21.2 Order data

Model number	Short description	Figure
	Drives	
5MMHDD.0500-00	500 GB SATA hard disk replacement part for 5AC801.HDDI-04, 5AC901.CHDD-01 and 5ACPCI.RAIC-06; Note: Please see the manual for information about using this hard disk.	

Table 104: 5MMHDD.0500-00 - Order data

3.9.21.3 Technical data

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from those specified for the fully assembled device. The data specifications for the fully assembled device take precedence over those of individual components.

Product ID	5MMHDD.0500-00
General information	
Certification	
CE	Yes
cULus	Yes
Hard disk drive	
Capacity	500 GB
Number of heads	2
Number of sectors	976,773,168
Bytes per sector	512 (logical) / 4096 (physical)
Cache	16 MB
Speed	5400 rpm ±0.2%
Startup time	Typ. 3.5 s (from 0 rpm to read access)
Service life	5 years
MTBF	1,000,000 POH [1)]
S.M.A.R.T. Support	Yes
Interface	SATA
Access time	5.5 ms
Supported transfer modes	SATA II
Data transfer rate	
Internal	Max. 147 MB/s
To/From host	Max. 150 MB/s (SATA I), max. 300 MB/s (SATA II)
Positioning time	
Nominal (read only)	11 ms
Maximum (read only)	21 ms

Table 105: 5MMHDD.0500-00 - Technical data

Product ID	5MMHDD.0500-00
Environmental conditions	
Temperature [2]	
Operation [3]	0 to 60°C
24-hour operation [4]	0 to 60°C
Storage	-40 to 70°C
Transport	-40 to 70°C
Relative humidity [5]	
Operation	5 to 95%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Vibration	
Operation (continuous)	5 to 500 Hz: 0.25 g; no unrecoverable errors
Operation (occasional)	5 to 500 Hz: 0.5 g; no unrecoverable errors
Storage	10 to 500 Hz: 5 g; no unrecoverable errors
Transport	10 to 500 Hz: 5 g; no unrecoverable errors
Shock	
Operation	400 g and 2 ms duration; no unrecoverable errors
Storage	1000 g and 2 ms duration; no unrecoverable errors
Transport	1000 g and 2 ms duration; no unrecoverable errors
Altitude	
Operation	-305 to 3048 m
Storage	-305 to 12192 m
Mechanical characteristics	
Dimensions	
Width	7 mm
Height	69 mm
Depth	100 mm
Weight	100 g
Manufacturer information	
Manufacturer	Western Digital
Manufacturer product ID	WD5000LUCT

Table 105: 5MMHDD.0500-00 - Technical data

1) With 8760 POH (power on hours) per year and 25°C surface temperature.
2) Temperature values at an altitude of 305 meters. The temperature specification must be reduced linearly by 1 °C every 305 meters. The temperature increase and decrease can be a maximum of 20 °C per hour.
3) Standard operation means 333 POH (power-on hours) per month.
4) 24-hour operation means 732 POH (power-on hours) per month.
5) Humidity gradient: Maximum 20% per hour.

3.9.21.4 Temperature humidity diagram

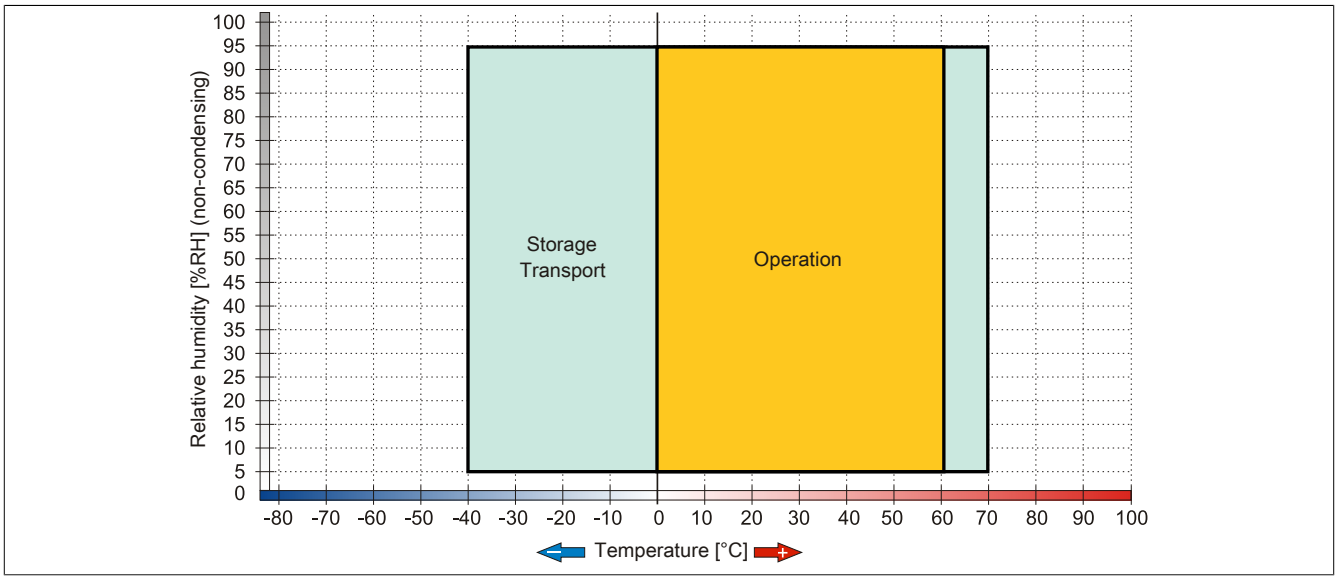


Figure 54: 5MMHDD.0500-00 - Temperature humidity diagram

3.10 Fan kit

> **Information:**
>
> **Fans are necessary when using components which must work within certain temperature limits, e.g. DVD combos, PCI cards, etc.**
>
> **The fan and dust filter are subject to wear and must be checked with appropriate frequency and cleaned or replaced when not functioning properly (e.g. due to dirt and grime).**

3.10.1 5AC803.FA01-00

3.10.1.1 General information

This fan kit is an optional addition for PPC800 system units without expansion.

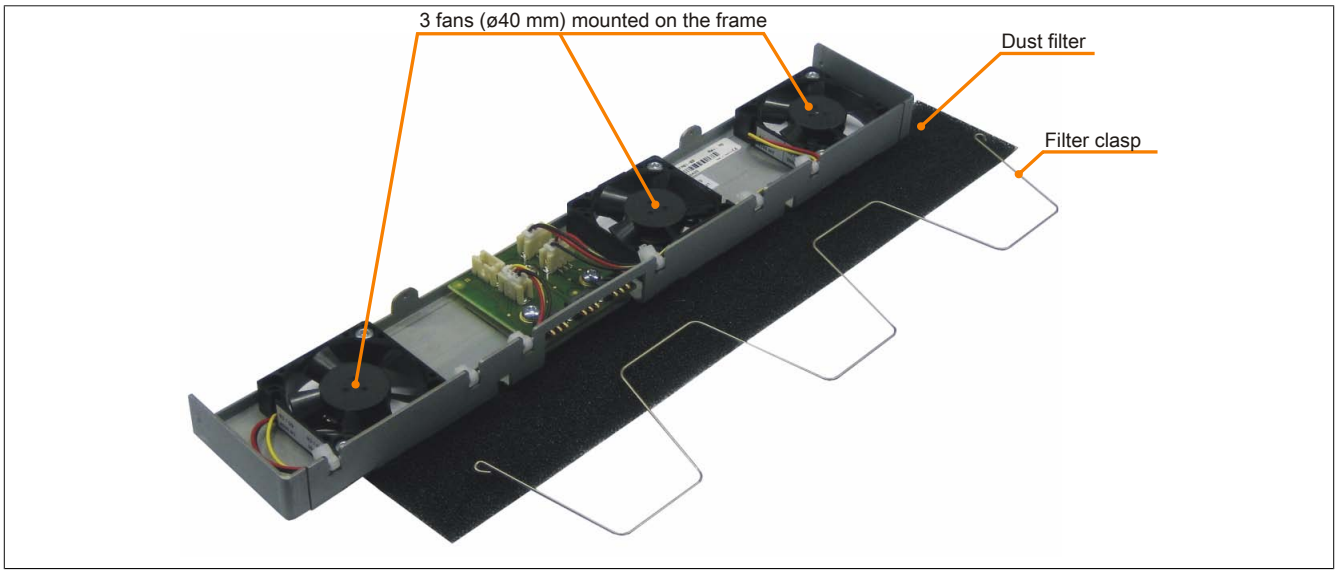


Figure 55: 5AC803.FA01-00 - Fan kit

3.10.1.2 Order data

Model number	Short description	Figure
	Fan kits	
5AC803.FA01-00	PPC800 fan kit for system units without an expansion	

Table 106: 5AC803.FA01-00 - Order data

3.10.1.3 Technical data

Product ID	5AC803.FA01-00
General information	
Number of fans	3
Speed	Max. 6100 rpm
Noise level	21 dB
Service life	29000 hours at 70 °C 95000 hours at 20 °C
Type	Double ball bearings
Certification CE	 Yes

Table 107: 5AC803.FA01-00 - Technical data

Product ID	5AC803.FA01-00
Mechanical characteristics	
Dimensions	
Fan	
Width	40 mm
Height	40 mm
Depth	10 mm

Table 107: 5AC803.FA01-00 - Technical data

3.10.2 5AC803.FA02-00

3.10.2.1 General information

This fan kit can be installed as an option on PPC800 system units with the 1-slot expansion.

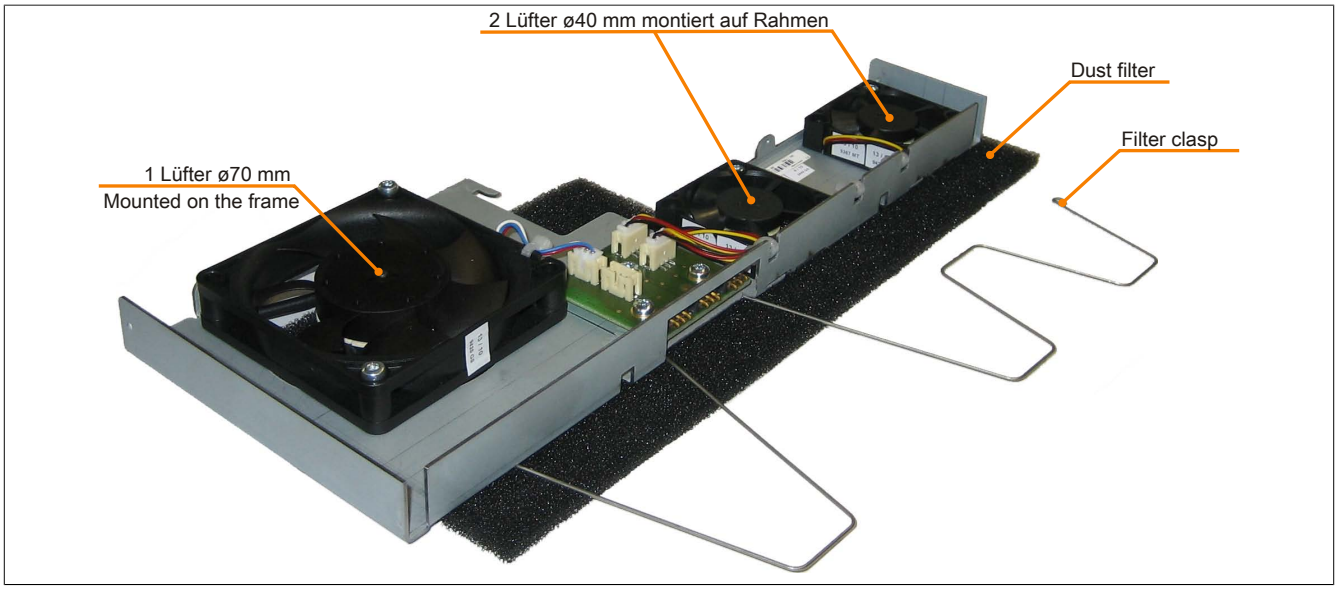


Figure 56: 5AC803.FA02-00 - Fan kit

3.10.2.2 Order data

Model number	Short description	Figure
	Fan kits	
5AC803.FA02-00	PPC800 fan kit for system units with expansion 5AC803.SX01-00	

Table 108: 5AC803.FA02-00 - Order data

3.10.2.3 Technical data

Product ID	5AC803.FA02-00
General information	
Number of fans	3
Speed	Fans 1, 2: max. 6100 rpm Fan 3: 4300 rpm ± 10%
Noise level	Fans 1, 2: 21 dB Fan 3: 5 dB
Service life	Fans 1, 2: 29,000 hours at 70°C, 95,000 hours at 20°C Fan 3: 60000 hours at 40 °C
Type	Double ball bearings
Certification	
CE	Yes

Table 109: 5AC803.FA02-00 - Technical data

Product ID	5AC803.FA02-00
Mechanical characteristics	
Dimensions	
Fan	
Width	Fans 1, 2: 40 mm Fan 3: 70 mm
Height	Fans 1, 2: 40 mm Fan 3: 70 mm
Depth	Fans 1, 2: 10 mm Fan 3: 15 mm

Table 109: 5AC803.FA02-00 - Technical data

3.10.3 5AC803.FA03-00

3.10.3.1 General information

This fan kit can be installed as an option on PPC800 system units with the 2-slot expansion.

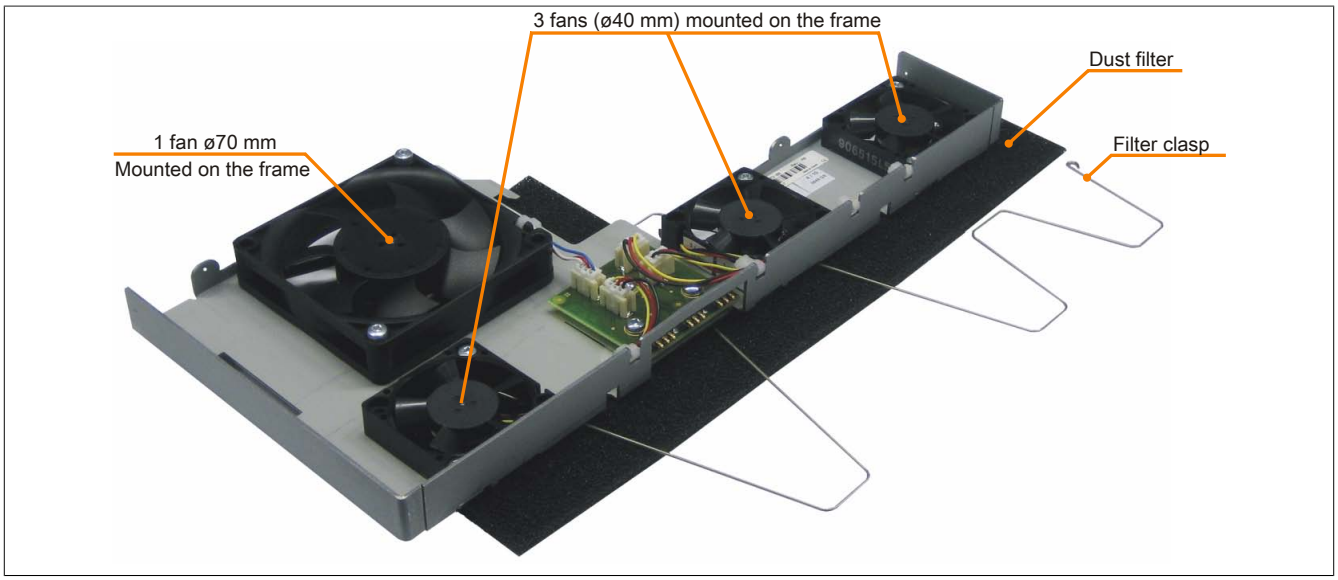


Figure 57: 5AC803.FA03-00 - Fan kit

3.10.3.2 Order data

Model number	Short description	Figure
	Fan kits	
5AC803.FA03-00	PPC800 fan kit for system units with expansion 5AC803.SX02-00	

Table 110: 5AC803.FA03-00 - Order data

3.10.3.3 Technical data

Product ID	5AC803.FA03-00
General information	
Number of fans	4
Speed	Fans 1, 2, 3: max. 6100 rpm Fan 4: 4300 rpm ± 10%
Noise level	Fan 1, 2, 3: 21 dB Fan 4: 5 dB
Service life	Fan 1, 2, 3: 29,000 hours at 70°C, 95,000 hours at 20°C Fan 4: ±60,000 at 40°C
Type	Double ball bearings
Certification CE	 Yes
Mechanical characteristics	
Dimensions Fan Width Height Depth	 Fan 1, 2, 3: 40 mm Fan 4: 70 mm Fan 1, 2, 3: 40 mm Fan 4: 70 mm Fan 1, 2, 3: 10 mm Fan 4: 15 mm

Table 111: 5AC803.FA03-00 - Technical data

Chapter 3 • Installation

1 Installation

B&R Industrial PCs are best mounted in a wall cutout using the retaining clips or clamping blocks found on the housing (designs may vary).

1.1 Important mounting information

- Environmental conditions must be taken into consideration.
- This device must be mounted to a flat surface.
- This device is only certified for operation in closed rooms.
- This device must not be subjected to direct sunlight.
- Ventilation holes must not be covered.
- This device must be mounted in one of the approved orientations.
- The wall or control cabinet must be able to withstand four times the total weight of the device.
- The flex radius of connected cables (DVI, SDL, USB, etc.) must not be exceeded.
- This device should be mounted in a position that minimizes glare on the screen.
- This device should be mounted in a position and orientation that make it as easy as possible for the operator to view it.

1.2 Mounting with clamping blocks

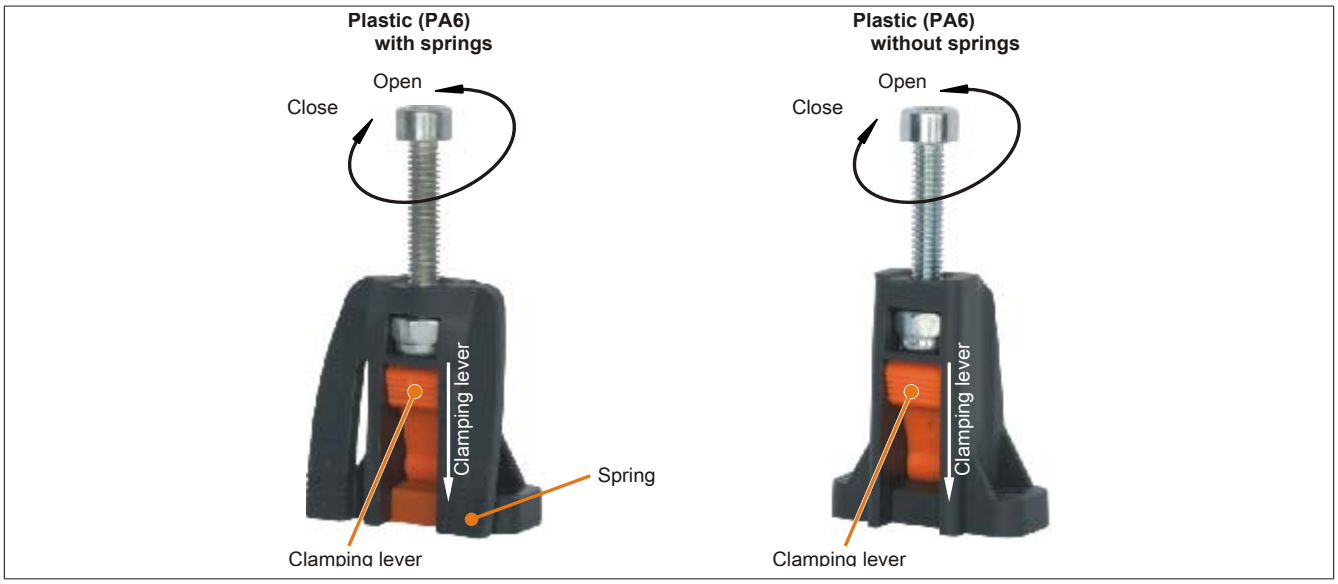


Figure 58: Clamping blocks

Clamping blocks are designed to clamp a maximum thickness of 10 mm and minimum thickness of 2 mm.

A hex key (3mm) is needed to tighten and loosen the screws. The maximum torque when tightening the clamp is 0.5Nm.

Devices must be installed on flat surface; uneven areas can cause damage to the display when the screws are tightened.

1.3 Mounting orientation

The PPC800 must be mounted as described in the following sections.

1.3.1 Mounting orientation 0° and +/- 45°

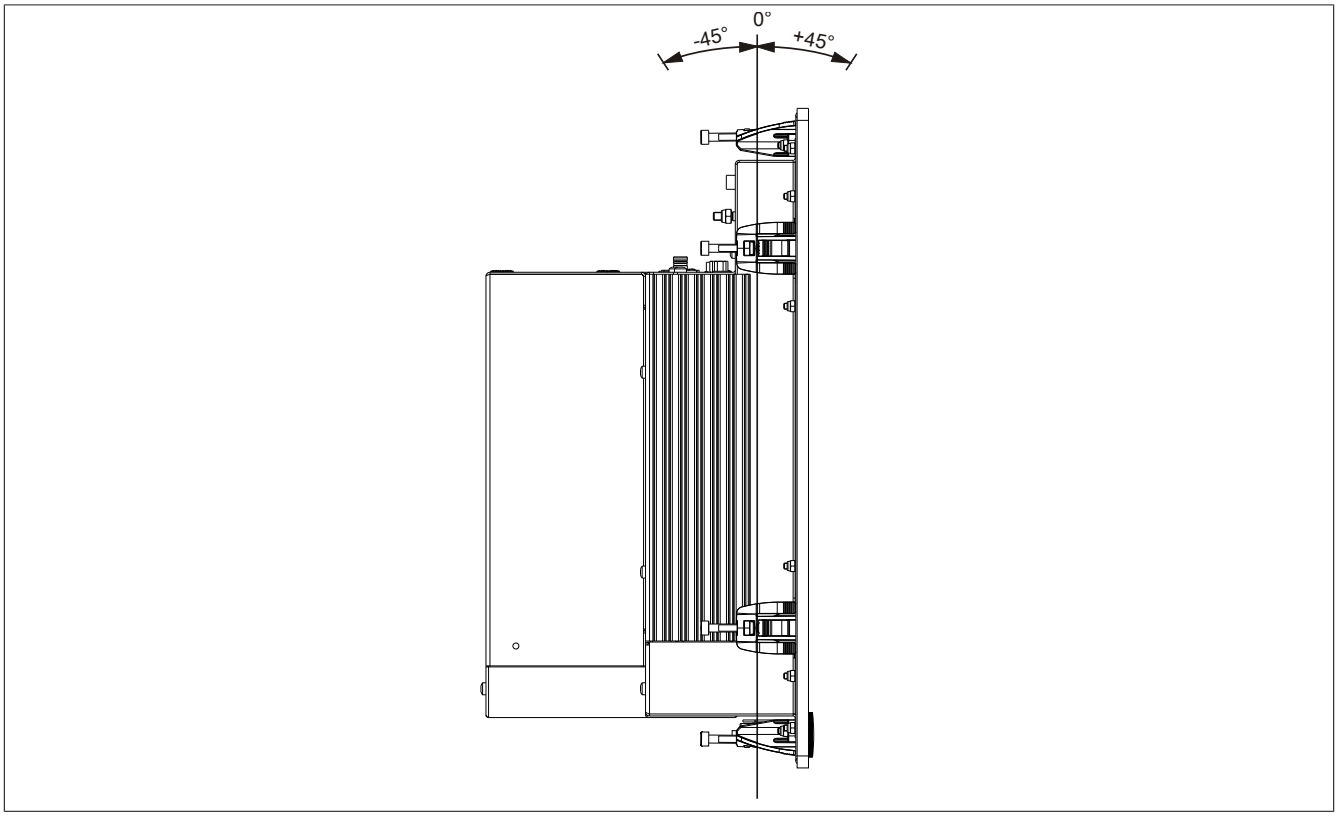


Figure 59: Mounting orientation 0° and +/- 45°

In order to facilitate natural air circulation, devices must be mounted according to the spacing indicated in the section "Air circulation spacing" on page 140.

1.3.2 Mounting orientation with 5AC801.DVRS-00

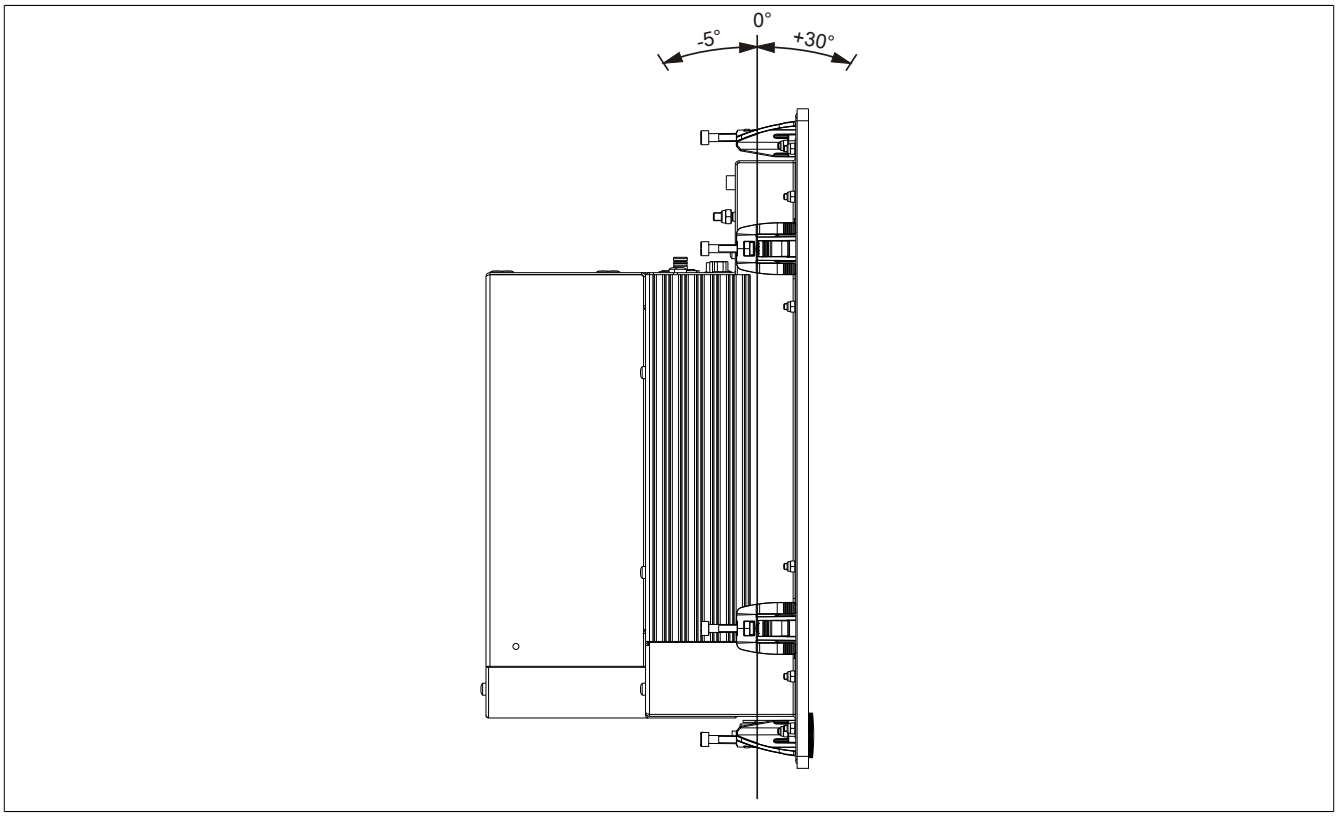


Figure 60: Mounting orientation with 5AC801.DVRS-00

In order to facilitate natural air circulation, devices must be mounted according to the spacing indicated in the section "Air circulation spacing" on page 140.

1.3.3 Mounting orientation with 5AC801.DVDS-00

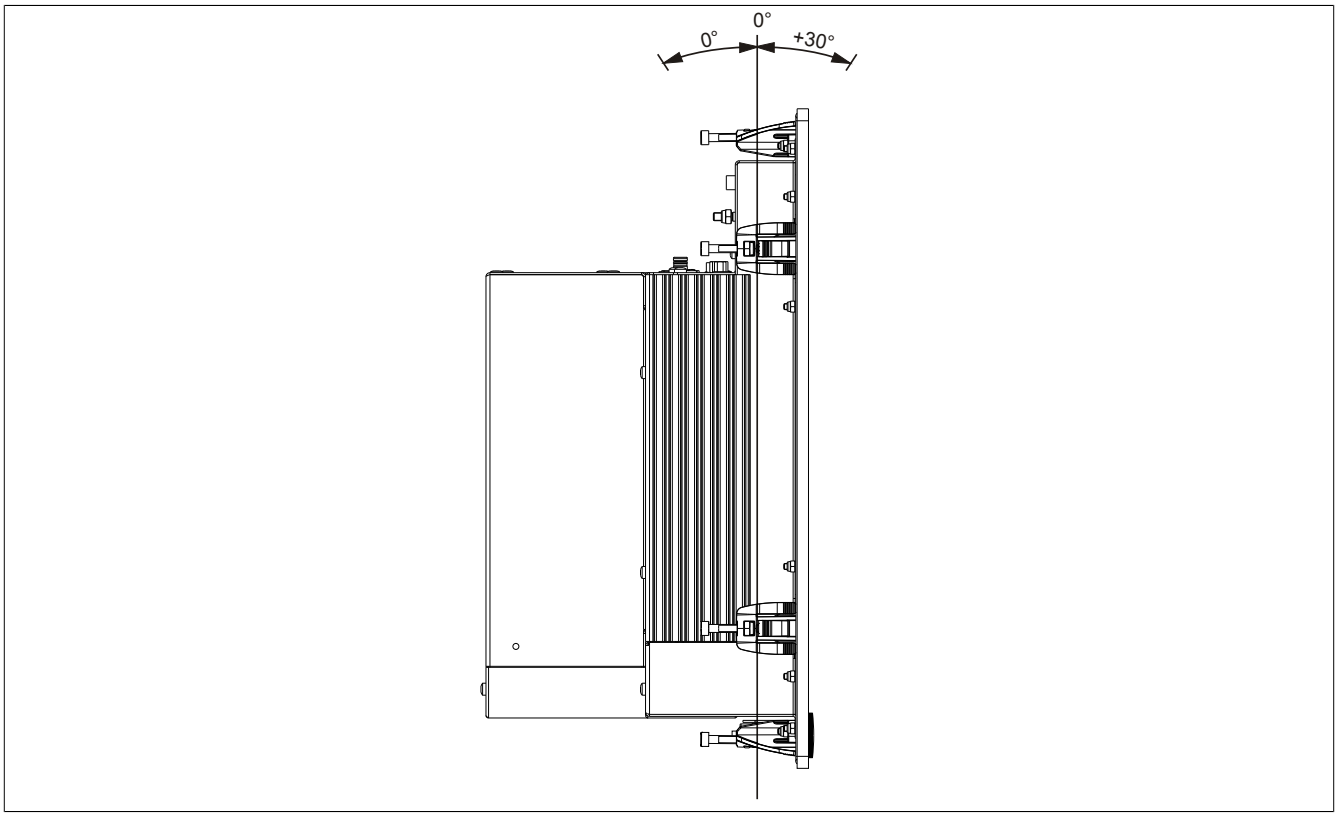


Figure 61: Mounting orientation with 5AC801.DVDS-00

In order to facilitate natural air circulation, devices must be mounted according to the spacing indicated in the section "Air circulation spacing" on page 140.

1.4 Air circulation spacing

In order to guarantee sufficient air circulation, allow the specified amount of space above, below, to the side and behind the Panel PC 800 devices. The minimum specified spacing is indicated in the following diagram. This applies to all Panel PC 800 variants.

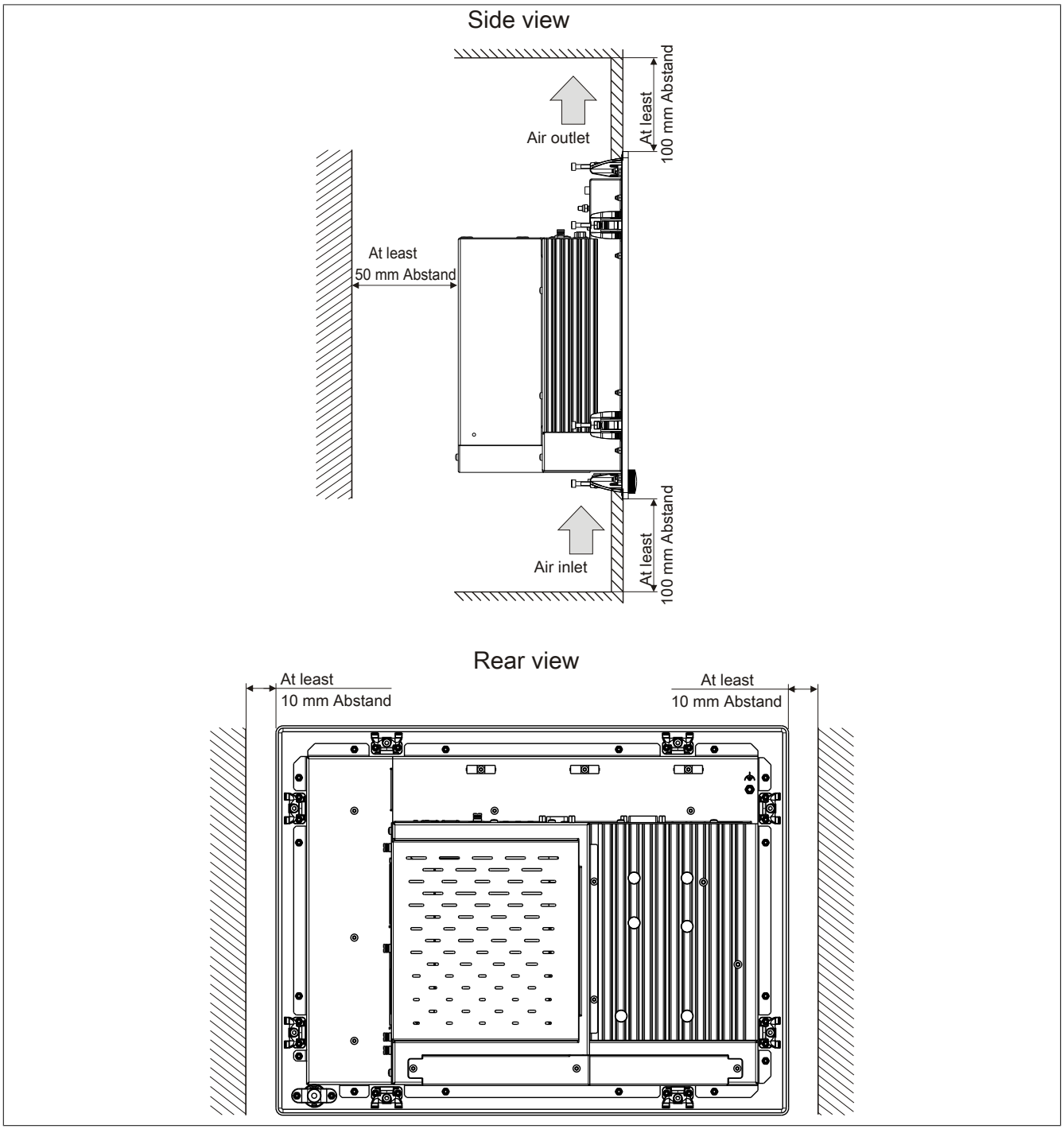


Figure 62: Spacing for air circulation

Information:

The spacing specifications for air circulation are based on the worst-case scenario for operation at the maximum specified ambient temperature (see "Temperature specifications" in the chapter "Technical data").

If the spacing specifications for air circulation cannot be adhered to, then the maximum specified temperatures for the temperature sensors (see "Temperature sensor locations" in chapter "Technical data") must be monitored by the user and appropriate measures taken if they are exceeded.

2 Cable connections

Flex radius specifications must be taken into account when laying or connecting cables.

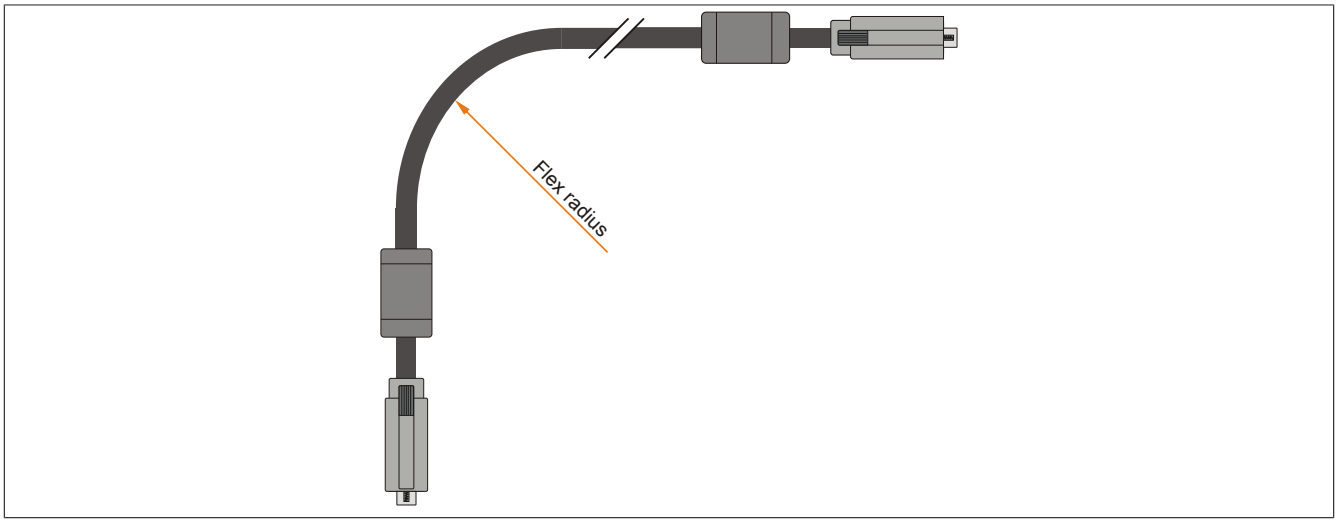


Figure 63: Flex radius - Cable connection

Information:

The specified flex radius can be found in the Automation Panel 800 or Automation Panel 900 user's manual, which can be downloaded as a PDF file from the B&R website at www.br-automation.com.

3 Grounding concept

Functional ground is a current path of low impedance between electrical circuits and ground. It is used, for example, to improve immunity to disturbances and not necessarily as a protective measure. It therefore serves only to deflect disturbances, not to provide any kind of protection against electric shock.

The functional ground on the device has 2 connections:

- Supply voltage
- Ground connection

To guarantee safe conductance of electric disturbances, the following points should be observed:

- The device should be connected to the central grounding point in the control cabinet using the shortest route possible.
- A cable with a minimum cross section of 2.5 mm² per connection should be used. If a cable with wire tip sleeves is connected to the 0TB103.9 or 0TB103.91 terminal block, then a cable with maximum 1.5 mm² per connection is possible.
- Note the line shielding concept; all connected data cables are used as shielded lines.

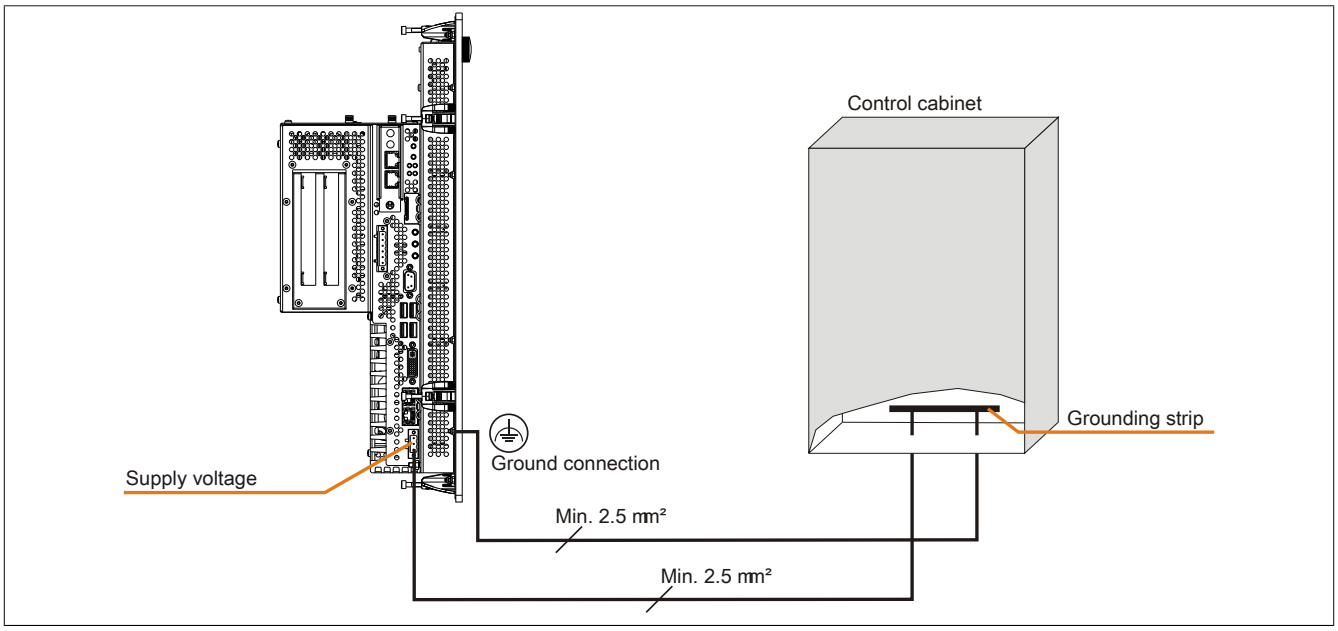


Figure 64: Grounding concept

4 General instructions for performing temperature testing

The purpose of these instructions is to explain general procedures for performing application-specific temperature tests on B&R Industrial PCs and Power Panels. Nevertheless, these instructions are meant to serve only as a guideline.

4.1 Procedure

In order to obtain accurate results, the testing conditions should match the conditions in the field. This means that for the duration of the temperature tests, the target application should be running, the PC should be installed in the control cabinet that will be used, etc.

In addition, a temperature sensor should be installed for the device being tested to provide live monitoring of the ambient temperature. In order to obtain accurate measurements, this sensor should be installed at a distance of 5 to 10 cm from the B&R industrial PC near the air intake (not near the exhaust).

All B&R Industrial PCs and Power Panels are equipped with internal temperature sensors. These are installed in different locations for each series. The number of sensors and the temperature limits also vary from series to series.

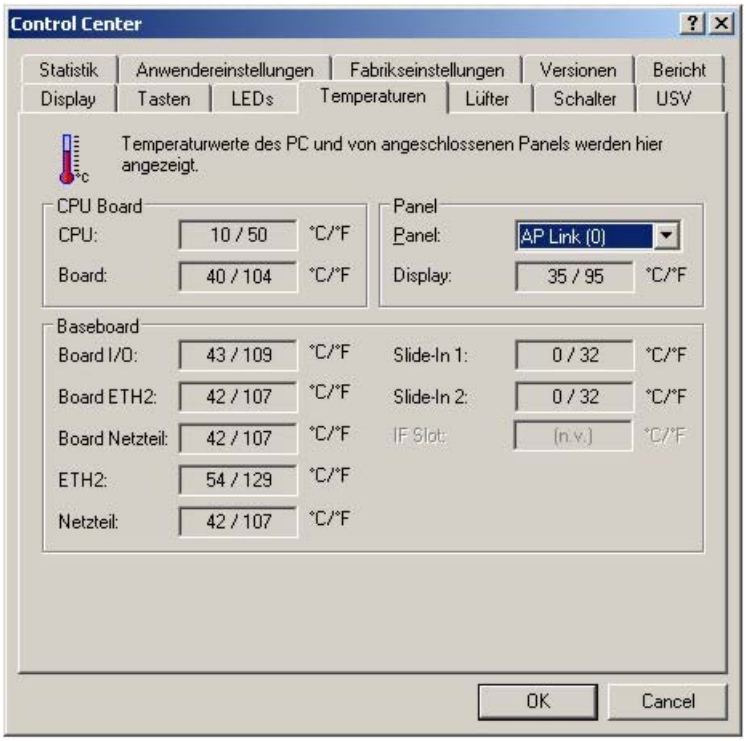
For information about the locations of temperature sensors and the maximum specified values, please see the "Temperature sensor locations" section in Chapter 2 "Technical data".

To ensure that the thermal situation is evaluated reliably, a minimum of 8 hours is recommended for testing.

4.2 Evaluating temperatures in Windows operating systems

4.2.1 Evaluating with the B&R Control Center

The B&R Control Center can be used to evaluate the temperatures. Temperatures can be viewed on the "Temperatures" property page. The B&R Control Center is available at no cost in the Downloads section of the B&R website (www.br-automation.com). The B&R Control Center uses the B&R Automation Device Interface (ADI).



A separate application can be developed if it is necessary to collect historical data.

Information:

Software development kits such as the ADI .NET SDK are available on the B&R website (www.br-automation.com).

4.2.2 Evaluating with the BurnInTest tool from Passmark

If a separate application is not created or used to evaluate the temperature, then B&R recommends using the BurnInTest software tool from Passmark.

Standard and Professional versions of BurnInTest are available. In addition to the software package, there are also various loopback plugs (serial, parallel, USB, etc.) and test CDs/DVDs available. The exact software and loopback plugs used will determine the corresponding load that can be generated on the system and peripheral devices.

Information:

Loopback plugs are also available from Passmark. More information is available at www.passmark.com.

The following screenshots are based on Passmark BurnInTest Pro V4 and a 2-slot APC810 with DVD.

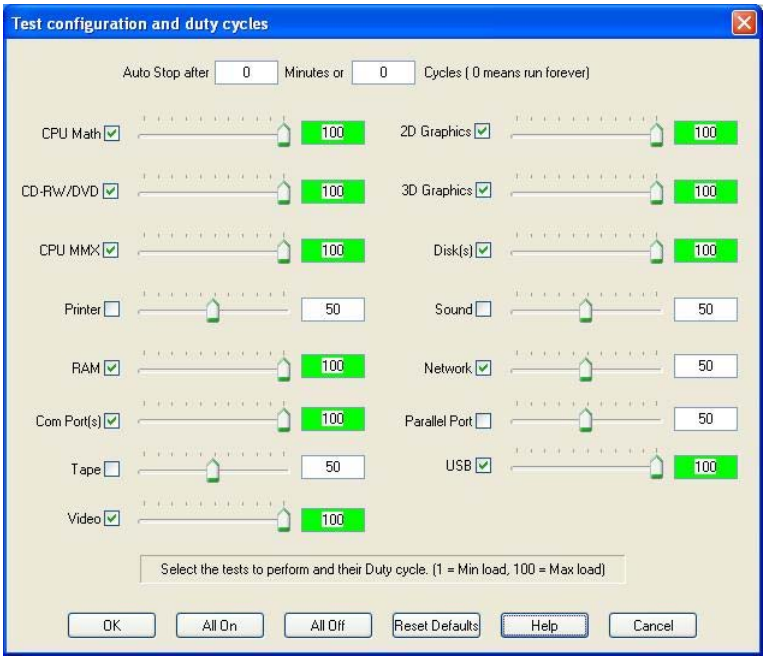


Figure 65: Settings for Passmark BurnInTest Pro V4 and a 2-slot APC810 with DVD

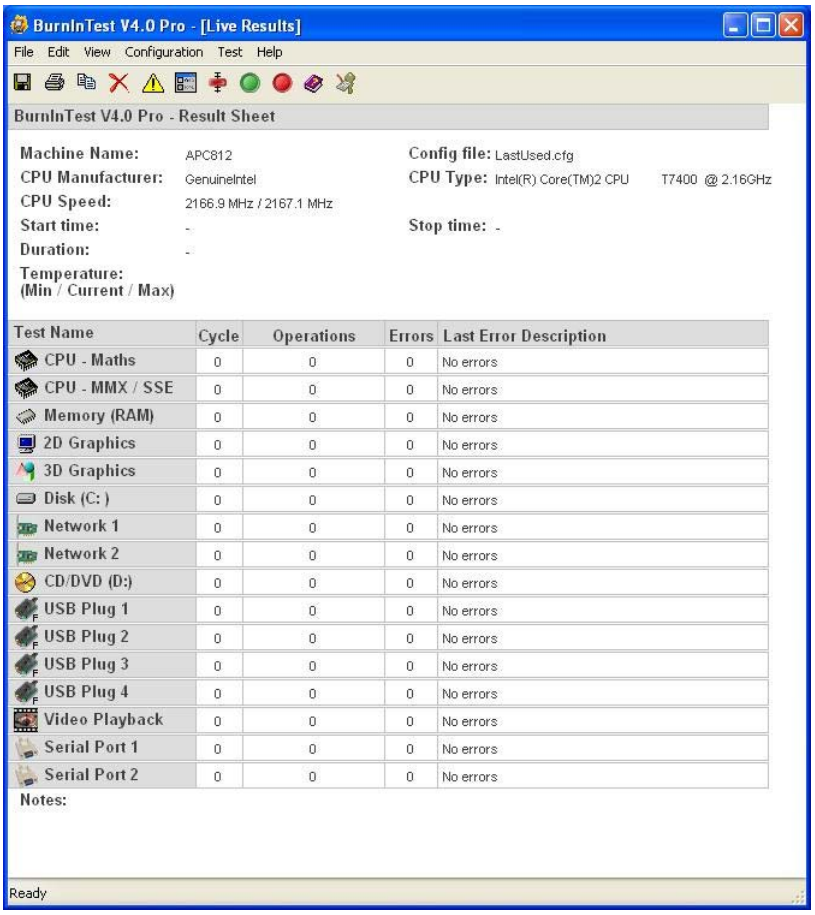


Figure 66: Test overview of a 2-slot APC810 with DVD

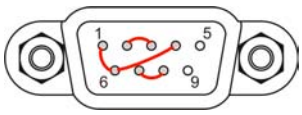
The respective test properties may need to be fine tuned depending on the availability of a loopback plug and DVDs.

Information:

USB flash drives can also be used if a USB loopback plug is not available. The USB flash drives must be detected as formatted drives in Windows. Test USB must then be deselected and the USB flash drives must be configured as the testing device in the disk properties.

Information:

Serial loopback plugs are relatively easy to create. Simply connect several pins on the serial interface with wires.



4.3 Evaluating temperatures in operating systems other than Windows

For applications that don't use Windows, temperatures can be evaluated with the help of the B&R implementation guide. In addition to the implementation guide, there are also programs available in MS-DOS.

The implementation guide only describes device-specific functions and not the main functions of the example programs.

If code from the example programs is used, it is important to observe the notes in the implementation guide regarding TODO statements, I/O access functions, etc.

> **Information:**
>
> **Example programs and implementation guides for all B&R Industrial PCs and Power Panels are available at no cost from the B&R website (www.br-automation.com).**

4.4 Evaluating the measurement results

The maximum temperature value recorded by each sensor must not exceed the temperature limits specified in the user's manuals.

If the temperature tests cannot be performed in a climate-controlled chamber, they can still be performed in an office environment. In this case, however, it is necessary to measure the ambient temperature. Experience at B&R has shown that values measured on passive systems (systems without a fan kit) can be projected linearly based on the ambient temperature. In order to be able to project the temperature values for systems with a fan kit, the fans must be running. It is also important to take values such as speed into consideration.

If the temperature tests are performed in a climate-controlled chamber with fans, the fans will cool the devices and skew the results. Measurement results for passive devices would therefore be unusable in this case. In order to obtain accurate results in climate-controlled chambers with fans, the fans must be turned off and the device must be allowed to run for a sufficient amount of time (several hours) before beginning the test.

Example using a 2-slot APC810

The following example is only valid if the instructions for installation and mounting orientation provided in the user's manual are observed.

Temperature sensor	Measured temperature	Projected temperature	
Ambient temperature	20°C	35°C	45°C
CPU	48°C	63°C	73°C
CPU board	51°C	66°C	76°C
Board I/O	51°C	66°C	76°C
Board ETH2	52°C	67°C	77°C
Board power supply	51°C	66°C	76°C
ETH2	65°C	80°C	90°C
Power supply	51°C	66°C	76°C

Table 112: Evaluation example using a 2-slot APC810

5 Connection examples

The following examples provide an overview of the configuration options for connecting Automation Panel 800 and Automation Panel 900 and/or Automation Panel 800 devices with the PPC800. The following questions will be answered:

- How are Automation Panel 900 devices connected to the monitor / panel output of the PPC800, and what needs to be considered?
- How are Automation Panel 800 devices connected to the monitor / panel output of the PPC800, and what needs to be considered?
- What are "Display Clone" and "Extended Desktop" modes?
- How many Automation Panel 900 devices can be connected per line?
- How many Automation Panel 900 devices can be connected to an Automation Panel 800 device per line?
- How are the connected devices internally numbered?
- Are there limitations to the segment length and if so, what are they?
- What cables and link modules are needed?
- Do BIOS settings have to be changed for a specific configuration?

5.1 Selecting the display units

In order to connect an Automation Panel 800 and an Automation Panel 900 on the same line, the devices must have the same display type. The following table lists the AP900 devices that can be connected on the same line with an AP800 device.

Automation Panel 800	Automation Panel 900
5AP820.1505-00	5AP920.1505-01 5AP951.1505-01 5AP980.1505-01 5AP981.1505-01
5AP880.1505-00	5AP920.1505-01 5AP951.1505-01 5AP980.1505-01 5AP981.1505-01

Table 113: Selecting the display units

5.2 One Automation Panel 900 via onboard DVI

An Automation Panel 900 with max. SXGA resolution is connected to the integrated DVI interface (onboard). As an alternative, an office TFT with a DVI interface or analog monitor (using adapter 5AC900.1000-00) can also be used. A separate cable is used for both the touch screen and USB data. If USB devices are to be operated on the Automation Panel 900, the maximum distance is 5 meters. USB devices can only be connected directly to the Automation Panel (i.e. without a hub).

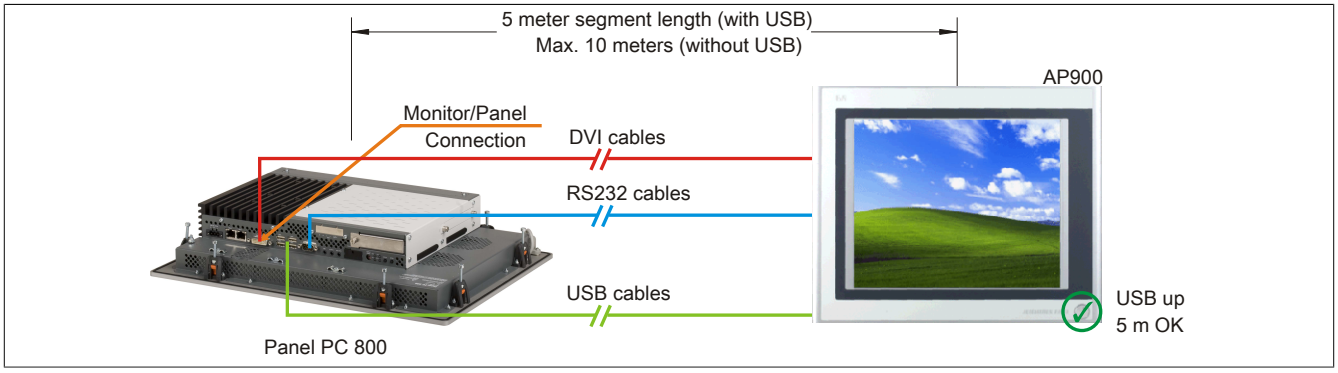


Figure 67: One Automation Panel 900 via DVI

5.2.1 Base system requirements

The following table displays the possible combinations for the PPC800 system unit with CPU board to implement the configuration shown in the figure above. If a combination results in a limitation of the maximum resolution, this is also indicated (e.g. when connecting a non-B&R Automation Panel 900 device).

CPU board	with system unit		Limitation Resolution
	5PC820.1505-00	5PC820.1906-00	
5PC800.B945-00 5PC800.B945-10	✓	✓	max. SXGA
5PC800.B945-01 5PC800.B945-11	✓	✓	max. SXGA
5PC800.B945-02 5PC800.B945-12	✓	✓	max. SXGA
5PC800.B945-03 5PC800.B945-13	✓	✓	max. SXGA
5PC800.B945-04 5PC800.B945-14	✓	✓	max. SXGA
5PC800.B945-05	✓	✓	max. SXGA

Table 114: Possible combinations of system unit and CPU board

5.2.2 Link modules

Information:

A corresponding Link module must be selected for each device used.

Model number	Description	Note
5DLDVI.1000-01	**Automation Panel Link DVI receiver** Connections for DVI-D, RS232 and USB 2.0 (Type B); 24 VDC (order screw clamp 0TB103.9 or cage clamp 0TB103.91 separately).	For Automation Panel 900

Table 115: Link modules

5.2.3 Cables

Select one Automation Panel 900 cable each from the 3 required types.

Model number	Description	Length
5CADVI.0018-00	DVI-D cable, 1.8 m	1.8 m ±50 mm
5CADVI.0050-00	DVI-D cable, 5 m	5 m ±80 mm
5CADVI.0100-00	DVI-D cable, 10 m	10 m ±100 mm
9A0014.02	RS232 extension cable for remote operation of a display unit with touch screen, 1.8 m	1.8 m ±50 mm

Table 116: Cables for DVI configurations

Model number	Description	Length
9A0014.05	RS232 extension cable for remote operation of a display unit with touch screen, 5 m	5 m ±80 mm
9A0014.10	RS232 extension cable for remote operation of a display unit with touch screen, 10 m	10 m ±100 mm
5CAUSB.0018-00	USB 2.0 connection cable Type A - Type B, 1.8 m	1.8 m ±30 mm
5CAUSB.0050-00	USB 2.0 connection cable Type A - Type B, 5 m	5 m ±50 mm

Table 116: Cables for DVI configurations

Information:

Detailed technical data about the cables can be found in the Automation Panel 900 user's manual. This can be downloaded as a PDF file from the B&R website at www.br-automation.com.

5.2.4 Possible Automation Panel devices, resolutions and segment lengths

The following Automation Panel 900 devices can be used. In rare cases, segment length is limited by the resolution.

Model number	Diagonal	Resolution	Touch screen	Keys	Max. segment length
5AP920.1043-01	10.4"	VGA	✓	-	5 m / 10 m[1)]
5AP920.1214-01	12.1"	SVGA	✓	-	5 m / 10 m[1)]
5AP920.1505-01	15.0"	XGA	✓	-	5 m / 10 m[1)]
5AP920.1706-01	17.0"	SXGA	✓	-	5 m / 10 m[1)]
5AP920.1906-01	19.0"	SXGA	✓	-	5 m / 10 m[1)]

Table 117: Possible Automation Panel devices, resolutions and segment lengths

1) USB support is not possible on the Automation Panel 900 in these cases since USB is limited to 5 m.

Information:

When transferring data via DVI, it is not possible to read statistical values from Automation Panel 900 devices.

5.2.5 BIOS settings

No special BIOS settings are necessary for operation.

5.3 One Automation Panel 900 via onboard SDL

An Automation Panel 900 is connected to the integrated SDL interface (onboard) via an SDL cable. USB devices can only be connected directly to the Automation Panel (i.e. without a hub).

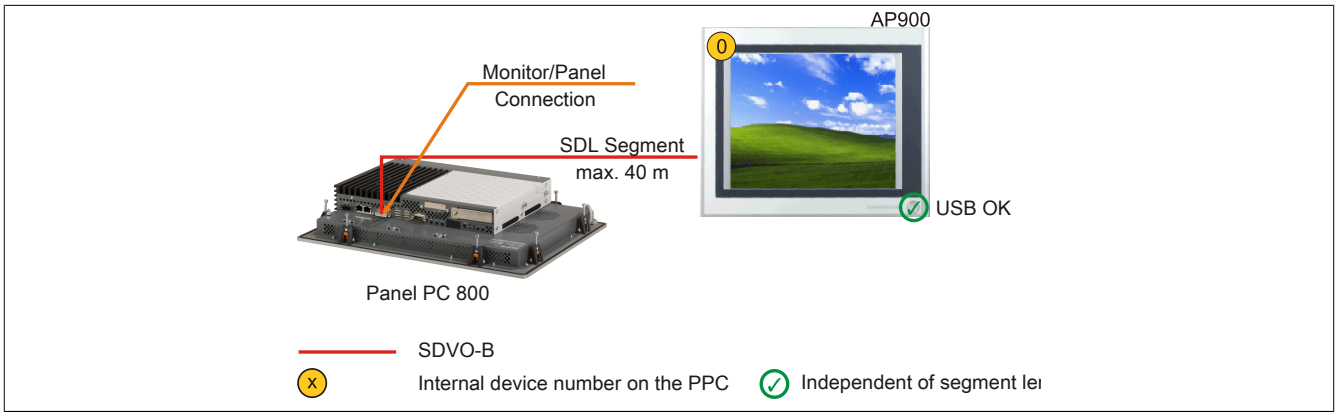


Figure 68: One Automation Panel 900 via onboard SDL

5.3.1 Base system requirements

The following table displays the possible combinations for the PPC800 system unit with CPU board to implement the configuration shown in the figure above. If a combination results in a limitation of the maximum resolution, this is also indicated (e.g. when connecting a non-B&R Automation Panel 800/900 device).

CPU board	with system unit		Limitation Resolution
	5PC820.1505-00	5PC820.1906-00	
5PC800.B945-00 5PC800.B945-10	✓	✓	max. UXGA
5PC800.B945-01 5PC800.B945-11	✓	✓	max. UXGA
5PC800.B945-02 5PC800.B945-12	✓	✓	max. UXGA
5PC800.B945-03 5PC800.B945-13	✓	✓	max. UXGA
5PC800.B945-04 5PC800.B945-14	✓	✓	max. UXGA
5PC800.B945-05	✓	✓	max. UXGA

Table 118: Possible combinations of system unit and CPU board

5.3.2 Link modules

Information:

A corresponding Link module must be selected for each device used.

Model number	Description	Note
5DLSDL.1000-00	**Automation Panel Link SDL receiver** Connection for SDL In; transmission of display, touch screen, USB 1.1, matrix key and service data; 24 VDC (order screw clamp 0TB103.9 or cage clamp 0TB103.91 separately).	For Automation Panel 900

Table 119: Link modules

5.3.3 Cables

Select an Automation Panel 900 cable from the following table.

Model number	Description	Length
5CASDL.0018-00	SDL cable, 1.8 m	1.8 m ±30 mm
5CASDL.0050-00	SDL cable, 5 m	5 m ±30 mm
5CASDL.0100-00	SDL cable, 10 m	10 m ±50 mm
5CASDL.0150-00	SDL cable, 15 m	15 m ±100 mm
5CASDL.0200-00	SDL cable, 20 m	20 m ±100 mm
5CASDL.0250-00	SDL cable, 25 m	25 m ±100 mm
5CASDL.0300-00	SDL cable, 30 m	30 m ±100 mm
5CASDL.0018-03	SDL flex cable, 1.8 m	1.8 m ±20 mm
5CASDL.0050-03	SDL flex cable, 5 m	5 m ±45 mm

Table 120: Cables for SDL configurations

Model number	Description	Length
5CASDL.0100-03	SDL flex cable, 10 m	10 m ±90 mm
5CASDL.0150-03	SDL flex cable, 15 m	15 m ±135 mm
5CASDL.0200-03	SDL flex cable, 20 m	20 m ±180 mm
5CASDL.0250-03	SDL flex cable, 25 m	25 m ±225 mm
5CASDL.0300-03	SDL flex cable, 30 m	30 m ±270 mm
5CASDL.0300-13	SDL flex cable with extender, 30 m	30 m ±280 mm
5CASDL.0400-13	SDL flex cable with extender, 40 m	40 m ±380 mm
5CASDL.0430-13	SDL flex cable with extender, 43 m	43 m ±410 mm
5CASDL.0018-01	SDL cable with 45° connector, 1.8 m	1.8 m ±30 mm
5CASDL.0050-01	SDL cable with 45° connector, 5 m	5 m ±50 mm
5CASDL.0100-01	SDL cable with 45° connector, 10 m	10 m ±100 mm
5CASDL.0150-01	SDL cable with 45° connector, 15 m	15 m ±100 mm

Table 120: Cables for SDL configurations

Information:

Detailed technical data about the cables can be found in the Automation Panel 900 user's manual. This can be downloaded as a PDF file from the B&R website at www.br-automation.com.

5.3.3.1 Cable lengths and resolutions for SDL transmission

The following table lists the relationship between segment lengths and maximum resolution depending on the SDL cable being used:

Cables Segment length [m]	Resolution				
	VGA 640 x 480	SVGA 800 x 600	XGA 1024 x 768	SXGA 1280 x 1024	UXGA 1600 x 1200
1.8	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03
5	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03
10	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03
15	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	- - -
20	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	- -
25	5CASDL.0250-00 5CASDL.0250-03	5CASDL.0250-00 5CASDL.0250-03	5CASDL.0250-00 5CASDL.0250-03	- -	- -
30	5CASDL.0300-00 5CASDL.0300-03	5CASDL.0300-00 5CASDL.0300-03	- 5CASDL.0300-13	- 5CASDL.0300-13	- -
40	5CASDL.0400-13	5CASDL.0400-13	5CASDL.0400-13	5CASDL.0400-13	-

Table 121: Cable lengths and resolutions for SDL transmission

5.3.4 BIOS settings

No special BIOS settings are necessary for operation.

For detailed information, see the user's manual for the B&R Industrial PC being used.

Touch screen functionality

COM C must be enabled in BIOS in order to operate the panel touch screen connected to the monitor/panel interface ("Advanced - Baseboard / Panel features - Legacy devices").

5.4 One Automation Panel 800 via onboard SDL

An Automation Panel 800 is connected to the integrated SDL interface (onboard) via an SDL cable. USB devices can only be connected directly to the extension keyboard (without a hub).

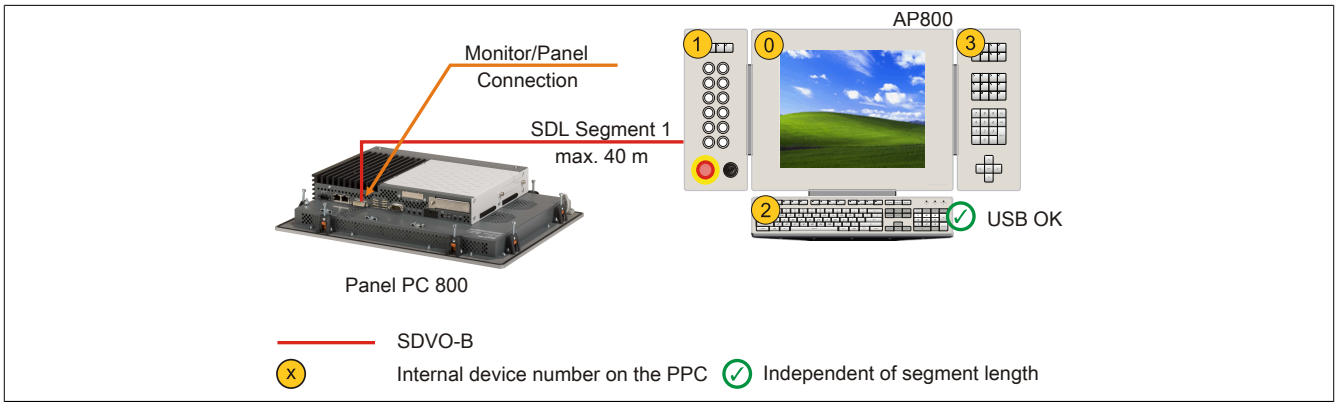


Figure 69: One Automation Panel 800 via onboard SDL

5.4.1 Base system requirements

The following table displays the possible combinations for the PPC800 system unit with CPU board to implement the configuration shown in the figure above. If a combination results in a limitation of the maximum resolution, this is also indicated (e.g. when connecting a non-B&R Automation Panel 800/900 device).

CPU board	with system unit		Limitation Resolution
	5PC820.1505-00	5PC820.1906-00	
5PC800.B945-00 5PC800.B945-10	✓	✓	max. UXGA
5PC800.B945-01 5PC800.B945-11	✓	✓	max. UXGA
5PC800.B945-02 5PC800.B945-12	✓	✓	max. UXGA
5PC800.B945-03 5PC800.B945-13	✓	✓	max. UXGA
5PC800.B945-04 5PC800.B945-14	✓	✓	max. UXGA
5PC800.B945-05	✓	✓	max. UXGA

Table 122: Possible combinations of system unit and CPU board

5.4.2 Cables

Select an Automation Panel 800 SDL cable from the following table.

Model number	Description	Length
5CASDL.0018-20	SDL cable flex for Automation Panel 800, 1.8 m.	1.8 m ±20 mm
5CASDL.0050-20	SDL cable flex for Automation Panel 800, 5 m.	5 m ±45 mm
5CASDL.0100-20	SDL cable flex for Automation Panel 800, 10 m.	10 m ±90 mm
5CASDL.0150-20	SDL cable flex for Automation Panel 800, 15 m.	15 m ±135 mm
5CASDL.0200-20	SDL cable flex for Automation Panel 800, 20 m.	20 m ±180 mm
5CASDL.0250-20	SDL cable flex for Automation Panel 800, 25 m.	25 m ±230 mm
5CASDL.0300-30	SDL cable flex for Automation Panel 800 with extender, 30 m.	30 m ±280 mm
5CASDL.0400-30	SDL cable flex for Automation Panel 800 with extender, 40 m.	40 m ±380 mm

Table 123: Cables for SDL configurations

Information:

Detailed technical data about the cables can be found in the Automation Panel 800 user's manual. This can be downloaded as a PDF file from the B&R website at www.br-automation.com.

5.4.2.1 Cable lengths and resolutions for SDL transmission

The following table lists the relationship between segment lengths and maximum resolution depending on the SDL cable being used:

Cables Segment length [m]	Resolution XGA 1024 x 768
1.8	5CASDL.0018-20
5	5CASDL.0050-20
10	5CASDL.0100-20
15	5CASDL.0150-20
20	5CASDL.0200-20
25	5CASDL.0250-20
30	5CASDL.0300-30
40	5CASDL.0400-30

Table 124: Cable lengths and resolutions for SDL transmission

5.4.3 BIOS settings

No special BIOS settings are necessary for operation.

For detailed information, see the user's manual for the B&R Industrial PC being used.

Touch screen functionality

COM C must be enabled in BIOS in order to operate the panel touch screen connected to the monitor/panel interface ("Advanced - Baseboard / Panel features - Legacy devices").

5.5 One AP900 and one AP800 via onboard SDL

An Automation Panel 900 and an Automation Panel 800 are connected to the integrated SDL interface (onboard) via SDL.

USB is supported up to a maximum distance (segment 1 + segment 2) of 30 m on the two displays. Starting at a distance of 30 m, USB is only available on the first display (front and back) up to a maximum of 40 m. USB devices can only be connected directly to the Automation Panel 900 or extension keyboard (without a hub).

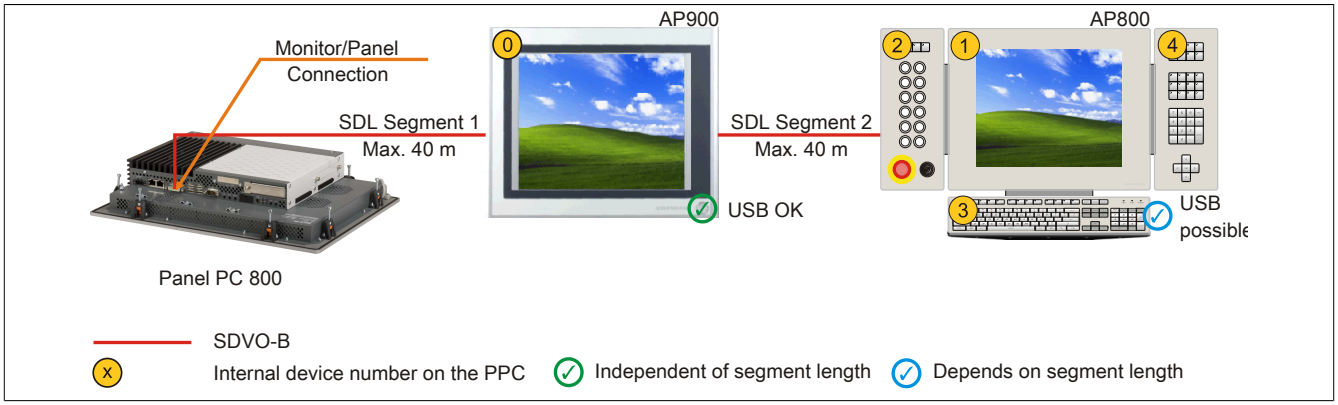


Figure 70: One AP900 and one AP800 via onboard SDL

5.5.1 Base system requirements

The following table displays the possible combinations for the PPC800 system unit with CPU board to implement the configuration shown in the figure above. If a combination results in a limitation of the maximum resolution, this is also indicated (e.g. when connecting a non-B&R Automation Panel 800/900 device).

CPU board	with system unit		Limitation Resolution
	5PC820.1505-00	5PC820.1906-00	
5PC800.B945-00 5PC800.B945-10	✓	✓	max. UXGA
5PC800.B945-01 5PC800.B945-11	✓	✓	max. UXGA
5PC800.B945-02 5PC800.B945-12	✓	✓	max. UXGA
5PC800.B945-03 5PC800.B945-13	✓	✓	max. UXGA
5PC800.B945-04 5PC800.B945-14	✓	✓	max. UXGA
5PC800.B945-05	✓	✓	max. UXGA

Table 125: Possible combinations of system unit and CPU board

5.5.2 Link modules

Information:

A corresponding Link module must be selected for each device used.

Model number	Description	Note
5DLSDL.1000-01	**Automation Panel Link SDL transceiver** Connections for SDL In and SDL Out; transmission of display, touch screen, USB 1.1, matrix key and service data; 24 VDC (order screw clamp 0TB103.9 or cage clamp 0TB103.91 separately).	For Automation Panel 900

Table 126: Link modules

5.5.3 Cables

For a selection of SDL cables for connecting the AP900 display to the AP900 display, see see "Cables" on page 150.

For a selection of SDL cables for connecting the AP800 display to the AP900 display, see see "Cables" on page 152.

Information:

For detailed information regarding cables, please see the chapter "Accessories".

5.5.4 BIOS settings

No special BIOS settings are necessary for operation.

For detailed information, see the user's manual for the B&R Industrial PC being used.

Touch screen functionality

COM C must be enabled in BIOS in order to operate the panel touch screen connected to the monitor/panel interface ("Advanced - Baseboard / Panel features - Legacy devices").

5.6 Four Automation Panel 900 units via onboard SDL

An Automation Panel 900 is connected to the integrated SDL interface (onboard) via an SDL cable. Up to three other Automation Panels of the same type are connected to this Automation Panel and operated via SDL. All four of the panels show the same content (display clone).

USB is supported up to a maximum distance (SDL segment 1 + SDL segment 2) of 30 m on the first two panels (front and back). Past a distance of 30 m, USB is only available for the first panel (front and back). USB devices can only be connected directly to the Automation Panel (i.e. without a hub).

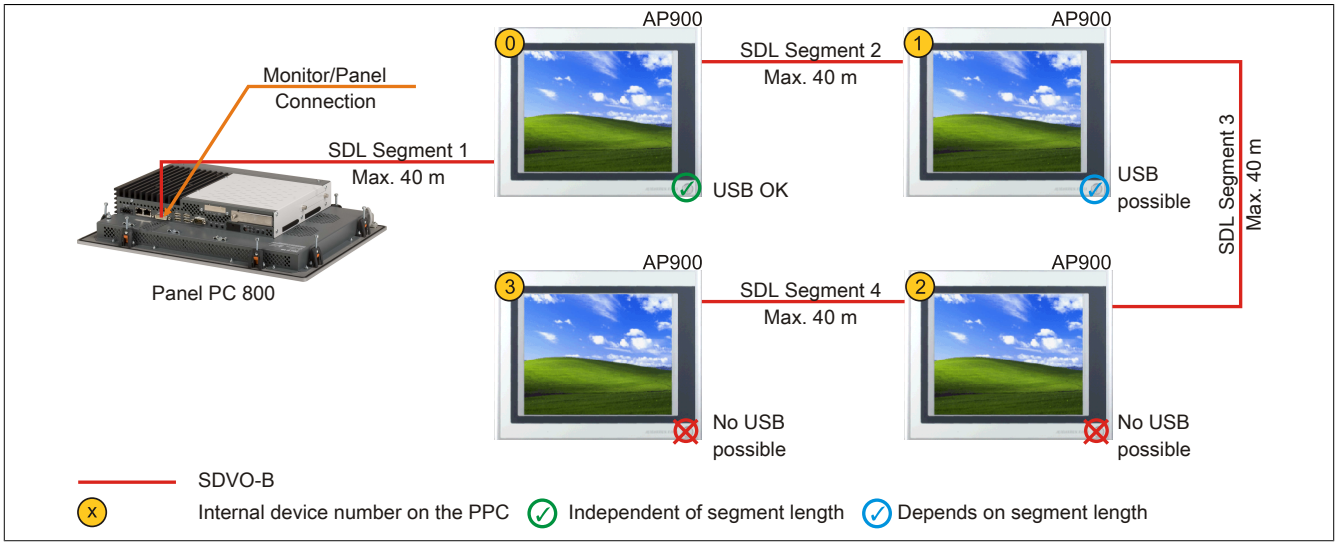


Figure 71: Four Automation Panel 900 units via onboard SDL

5.6.1 Base system requirements

The following table displays the possible combinations for the PPC800 system unit with CPU board to implement the configuration shown in the figure above. If a combination results in a limitation of the maximum resolution, this is also indicated (e.g. when connecting a non-B&R Automation Panel 800/900 device).

CPU board	with system unit		Limitation Resolution
	5PC820.1505-00	5PC820.1906-00	
5PC800.B945-00 5PC800.B945-10	✓	✓	max. UXGA
5PC800.B945-01 5PC800.B945-11	✓	✓	max. UXGA
5PC800.B945-02 5PC800.B945-12	✓	✓	max. UXGA
5PC800.B945-03 5PC800.B945-13	✓	✓	max. UXGA
5PC800.B945-04 5PC800.B945-14	✓	✓	max. UXGA
5PC800.B945-05	✓	✓	max. UXGA

Table 127: Possible combinations of system unit and CPU board

5.6.2 Link modules

Information:

A corresponding Link module must be selected for each device used.

Model number	Description	Note
5DLSDL.1000-00	**Automation Panel Link SDL receiver** Connection for SDL In; transmission of display, touch screen, USB 1.1, matrix key and service data; 24 VDC (order screw clamp 0TB103.9 or cage clamp 0TB103.91 separately).	For Automation Panel 900
5DLSDL.1000-01	**Automation Panel Link SDL transceiver** Connections for SDL In and SDL Out; transmission of display, touch screen, USB 1.1, matrix key and service data; 24 VDC (order screw clamp 0TB103.9 or cage clamp 0TB103.91 separately).	For Automation Panel 900

Table 128: Link modules

5.6.3 Cables

Select an Automation Panel 900 cable from the following table.

Model number	Description	Length
5CASDL.0018-00	SDL cable, 1.8 m	1.8 m ±30 mm
5CASDL.0050-00	SDL cable, 5 m	5 m ±30 mm
5CASDL.0100-00	SDL cable, 10 m	10 m ±50 mm
5CASDL.0150-00	SDL cable, 15 m	15 m ±100 mm
5CASDL.0200-00	SDL cable, 20 m	20 m ±100 mm
5CASDL.0250-00	SDL cable, 25 m	25 m ±100 mm
5CASDL.0300-00	SDL cable, 30 m	30 m ±100 mm
5CASDL.0018-03	SDL flex cable, 1.8 m	1.8 m ±20 mm
5CASDL.0050-03	SDL flex cable, 5 m	5 m ±45 mm
5CASDL.0100-03	SDL flex cable, 10 m	10 m ±90 mm
5CASDL.0150-03	SDL flex cable, 15 m	15 m ±135 mm
5CASDL.0200-03	SDL flex cable, 20 m	20 m ±180 mm
5CASDL.0250-03	SDL flex cable, 25 m	25 m ±225 mm
5CASDL.0300-03	SDL flex cable, 30 m	30 m ±270 mm
5CASDL.0300-13	SDL flex cable with extender, 30 m	30 m ±280 mm
5CASDL.0400-13	SDL flex cable with extender, 40 m	40 m ±380 mm
5CASDL.0430-13	SDL flex cable with extender, 43 m	43 m ±410 mm
5CASDL.0018-01	SDL cable with 45° connector, 1.8 m	1.8 m ±30 mm
5CASDL.0050-01	SDL cable with 45° connector, 5 m	5 m ±50 mm
5CASDL.0100-01	SDL cable with 45° connector, 10 m	10 m ±100 mm
5CASDL.0150-01	SDL cable with 45° connector, 15 m	15 m ±100 mm

Table 129: Cables for SDL configurations

Information:

Detailed technical data about the cables can be found in the Automation Panel 900 user's manual. This can be downloaded as a PDF file from the B&R website at www.br-automation.com.

5.6.3.1 Cable lengths and resolutions for SDL transmission

The following table lists the relationship between segment lengths and maximum resolution depending on the SDL cable being used:

Cables Segment length [m]	Resolution				
	VGA 640 x 480	SVGA 800 x 600	XGA 1024 x 768	SXGA 1280 x 1024	UXGA 1600 x 1200
1.8	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03
5	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03
10	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03
15	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	- - -
20	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	- -
25	5CASDL.0250-00 5CASDL.0250-03	5CASDL.0250-00 5CASDL.0250-03	5CASDL.0250-00 5CASDL.0250-03	- -	- -
30	5CASDL.0300-00 5CASDL.0300-03	5CASDL.0300-00 5CASDL.0300-03	- 5CASDL.0300-13	- 5CASDL.0300-13	- -
40	5CASDL.0400-13	5CASDL.0400-13	5CASDL.0400-13	5CASDL.0400-13	-

Table 130: Cable lengths and resolutions for SDL transmission

5.6.4 BIOS settings

No special BIOS settings are necessary for operation.

For detailed information, see the user's manual for the B&R Industrial PC being used.

Touch screen functionality

COM C must be enabled in BIOS in order to operate the panel touch screen connected to the monitor/panel interface ("Advanced - Baseboard / Panel features - Legacy devices").

6 Touch screen calibration

B&R touch screen devices are equipped with a touch controller that supports hardware calibration. As a result, devices are pre-calibrated when delivered. This is an advantageous feature when replacing devices of the same model or type since it avoids having to recalibrate the new device. Nevertheless, calibrating the device is still recommended in order to achieve the best results and to better adapt the touch screen to the user's preferences.

Regardless of this, the touch screen will have to be calibrated once during or following the installation of the touch screen driver.

6.1 Windows XP Professional

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

6.2 Windows XP Embedded

After starting Windows XP Embedded on the device for the first time (first boot agent), the touch screen driver must be installed in order to operate the touch screen. The necessary driver is available in the Downloads section of the B&R website (www.br-automation.com).

6.3 Windows Embedded Standard 2009

After starting Windows Embedded Standard 2009 on the device for the first time (first boot agent), the touch screen driver must be installed in order to operate the touch screen. The necessary driver is available in the Downloads section of the B&R website (www.br-automation.com).

6.4 Windows 7

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

6.5 Windows Embedded Standard 7

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

If a touch controller is not detected during Windows Embedded Standard 7 installation, or if an Automation Panel 800/900 is connected later on, then the touch screen driver will need to be installed manually. The necessary driver is available in the Downloads section of the B&R website (www.br-automation.com).

6.6 Windows CE

Windows CE starts the touch screen calibration sequence during its first boot in its default configuration (i.e. delivered state).

6.7 Automation Runtime / Visual Components

The touch screen must be calibrated once for the customer application when commissioning the device and project.

7 Connecting peripheral USB devices

Warning!

Peripheral USB devices can be connected to the USB ports on this device. Due to the vast number of USB devices available on the market, B&R cannot guarantee that they will all work. USB devices from B&R are guaranteed to work.

7.1 Locally on the PPC800

Many different peripheral USB devices can be connected to the 5 USB ports on the Panel PC 800. These can each handle a load of up to 1 A. The maximum transfer rate is USB 2.0.

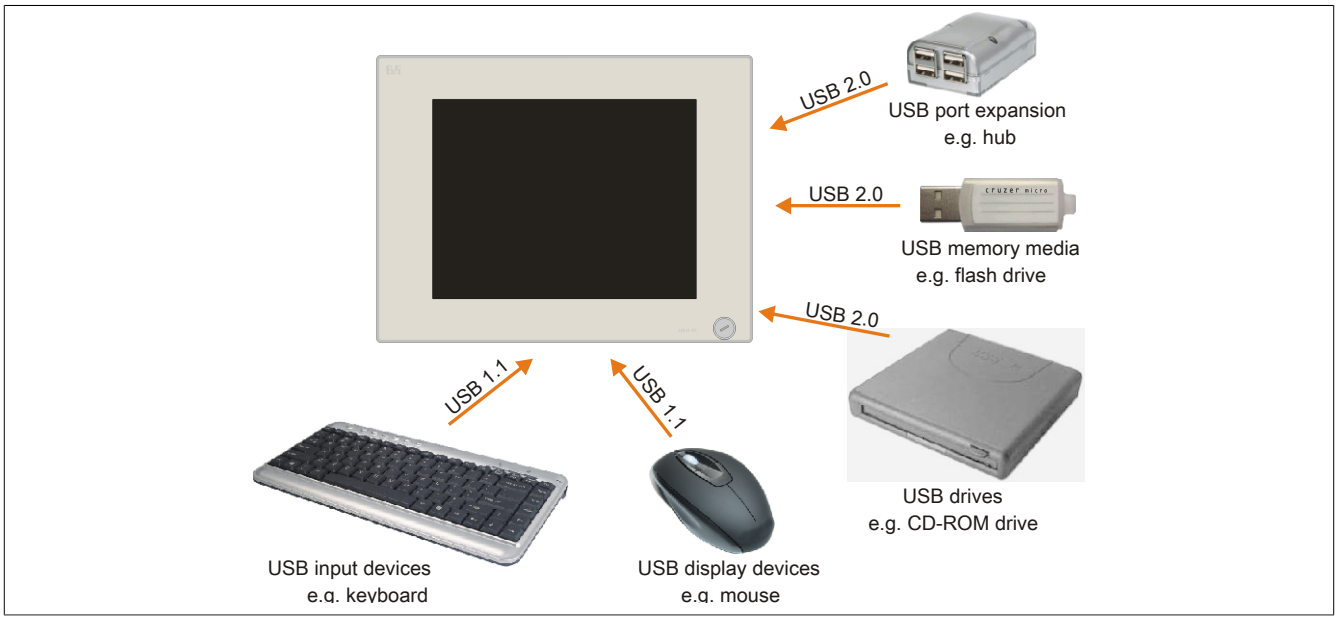


Figure 72: Local connection of USB peripheral devices on the PPC800

7.2 Remote connection to Automation Panel 900 via DVI

Many different peripheral USB devices can be connected to the 2 or 3 USB ports on the Automation Panel 900. These can each handle a load of 500 mA. The maximum transfer rate is USB 2.0.

Information:

Only end devices (not hubs) can be connected to the Automation Panel 900.

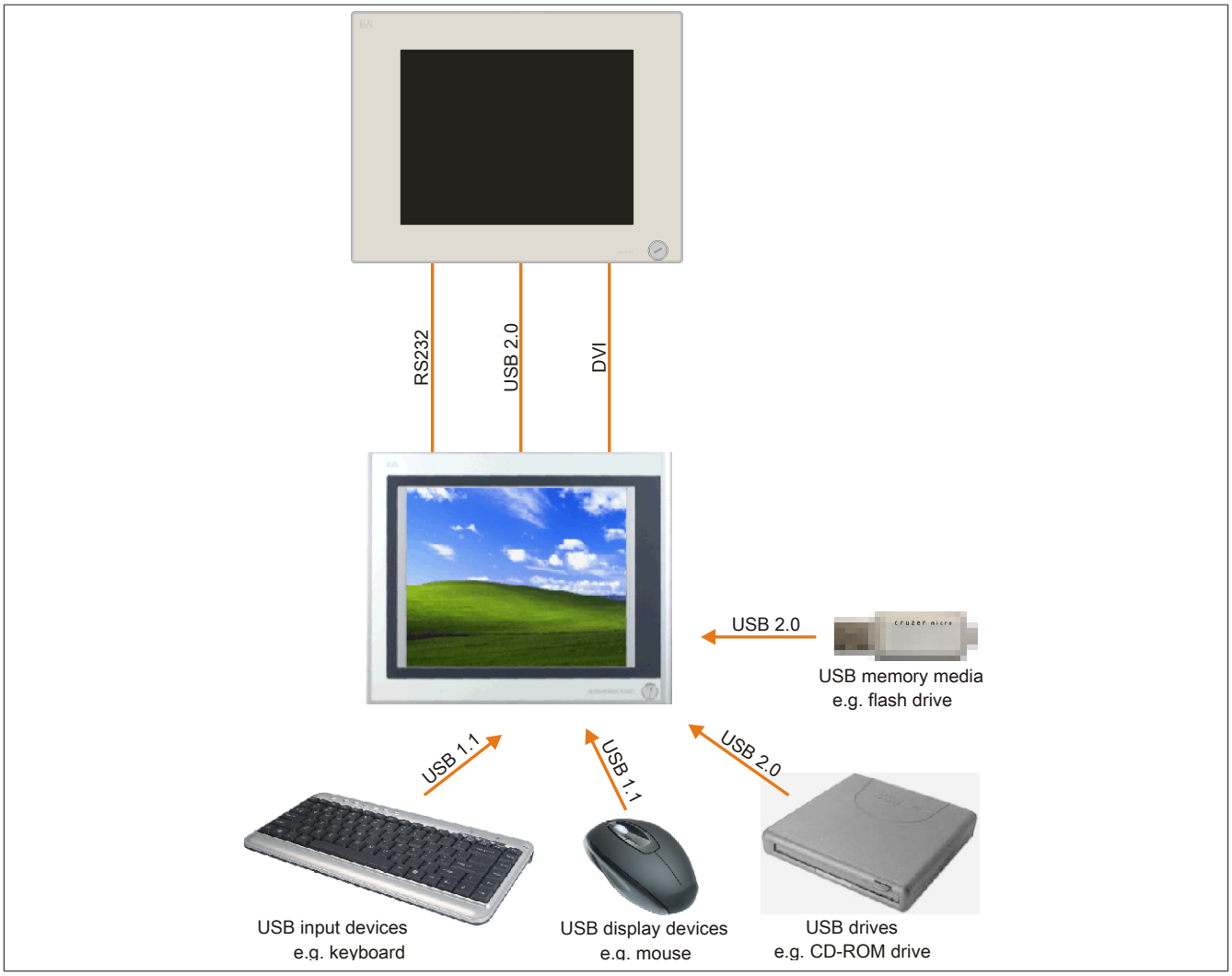


Figure 73: Remote connection of USB peripheral devices on the APC900 via DVI

7.3 Remote connection to Automation Panel 800/900 via SDL

Many different peripheral USB devices can be connected to the 2 or 3 USB ports on Automation Panel 900 or the USB interfaces on Automation Panel 800 devices. These can each handle a load of 500 mA. The maximum transfer rate is USB 1.1.

Information:

Only end devices (no hubs) can be connected to the Automation Panel 800/900.

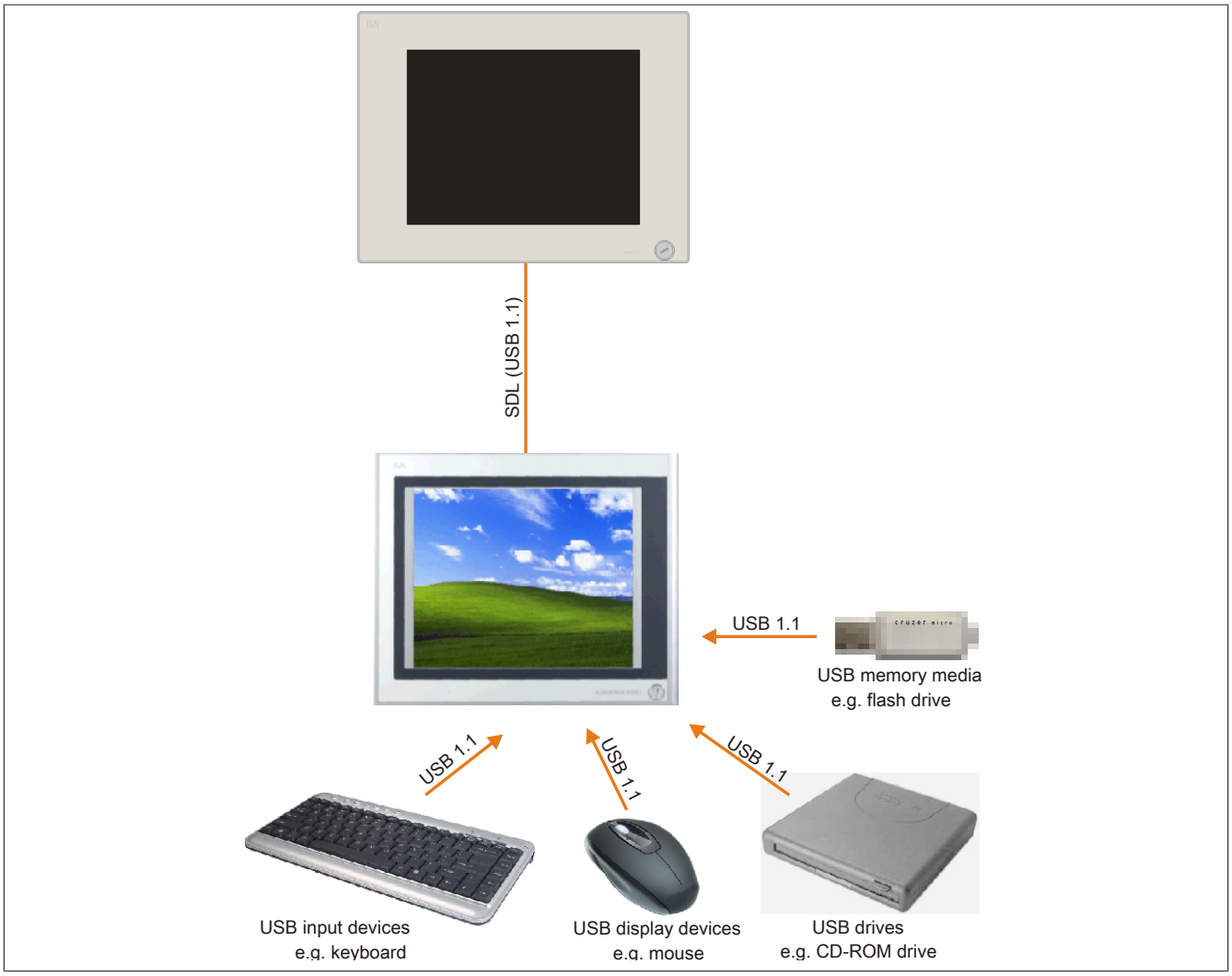


Figure 74: Remote connection of USB peripheral devices on the APC800/900 via SDL

8 Configuration of a SATA RAID array

Information:

The following software description is valid for PCI SATA controllers 5ACPCI.RAIC-01, 5ACPCI.RAIC-03, 5ACPCI.RAIC-05 and 5ACPCI.RAIC-06.

You must enter the BIOS "RAID Configuration Utility" in order to make the necessary settings. After the POST, enter <Ctrl+S> or <F4> to open RAID BIOS.

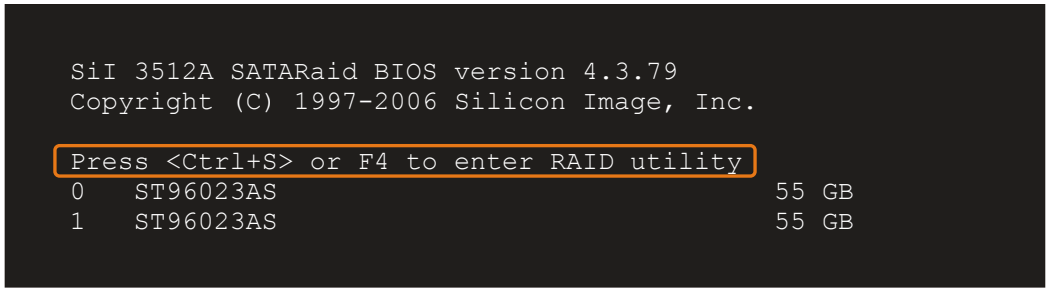


Figure 75: Open the RAID Configuration Utility

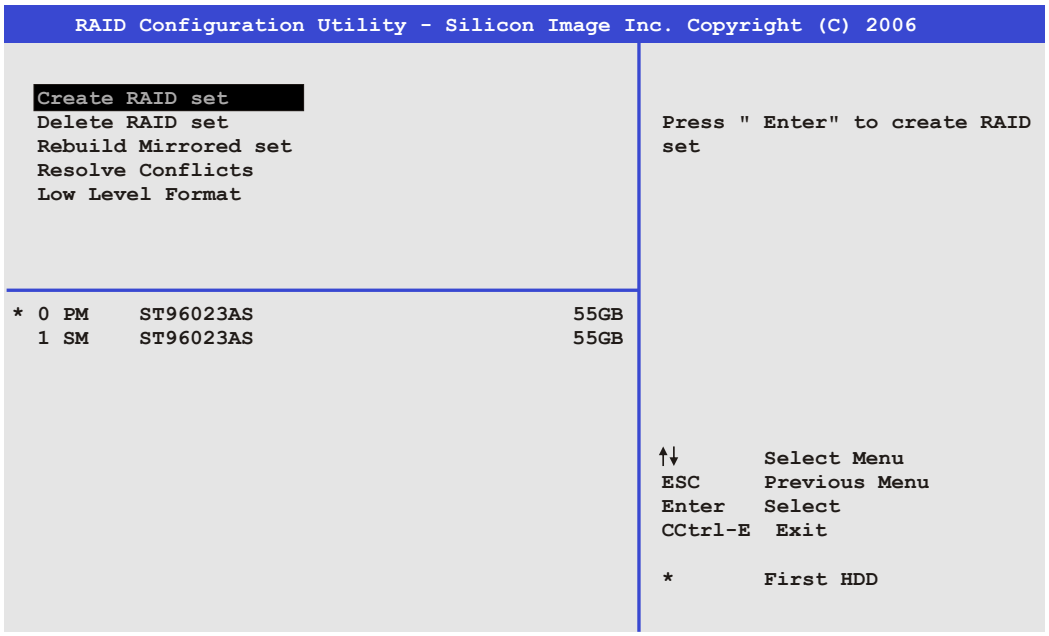


Figure 76: RAID Configuration Utility - Menu

The following keys can be used once inside BIOS Setup:

Key	Function
Cursor ↑	Moves to the previous item
Cursor ↓	Moves to the next item
Enter	Selects an item or opens a submenu
ESC	Returns to the previous menu
Ctrl+E	Saves any changed settings and exits setup

Table 131: BIOS-relevant keys in the RAID Configuration Utility

8.1 Create RAID set

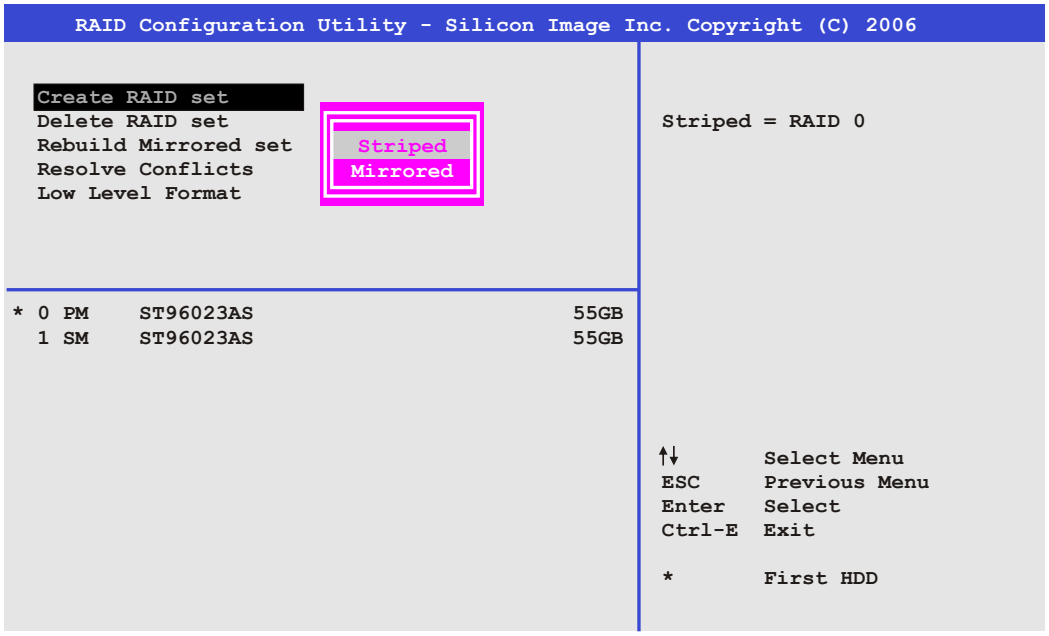


Figure 77: RAID Configuration Utility - Menu

The RAID system can be recreated as "Striped" = RAID0 or "Mirrored" = RAID1 using the menu "Create RAID set".

8.2 Create RAID set - Striped

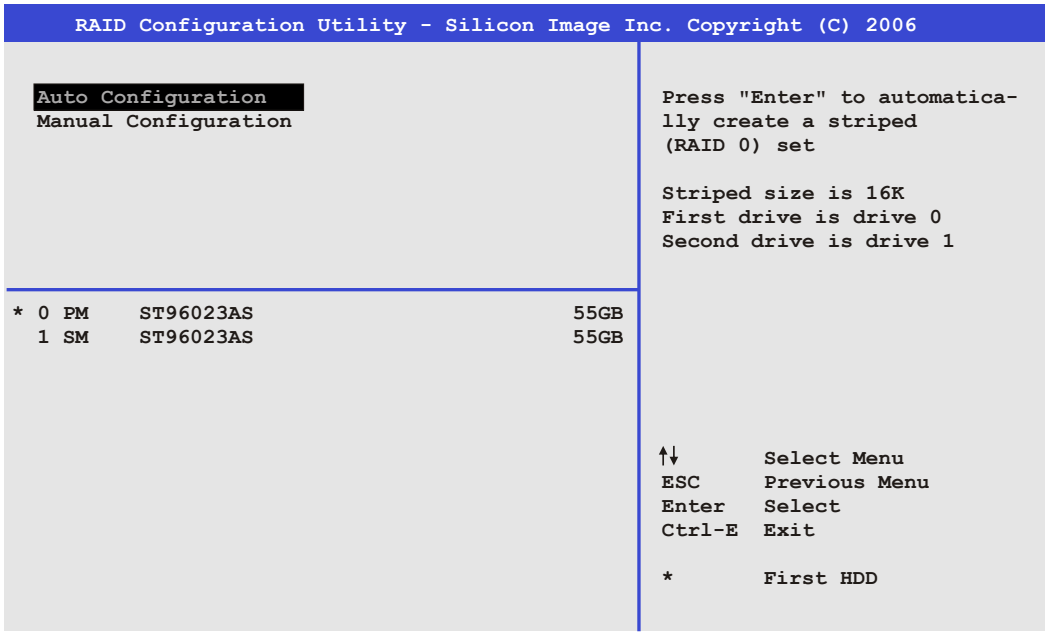


Figure 78: RAID Configuration Utility - Create RAID set - Striped

"Auto Configuration"
Auto configuration optimizes all settings.

"Manual Configuration"
It is possible to specify the first and second HDD as well as the "Chunk Size" (= block size, application-dependent).

8.3 Create RAID set - Mirrored

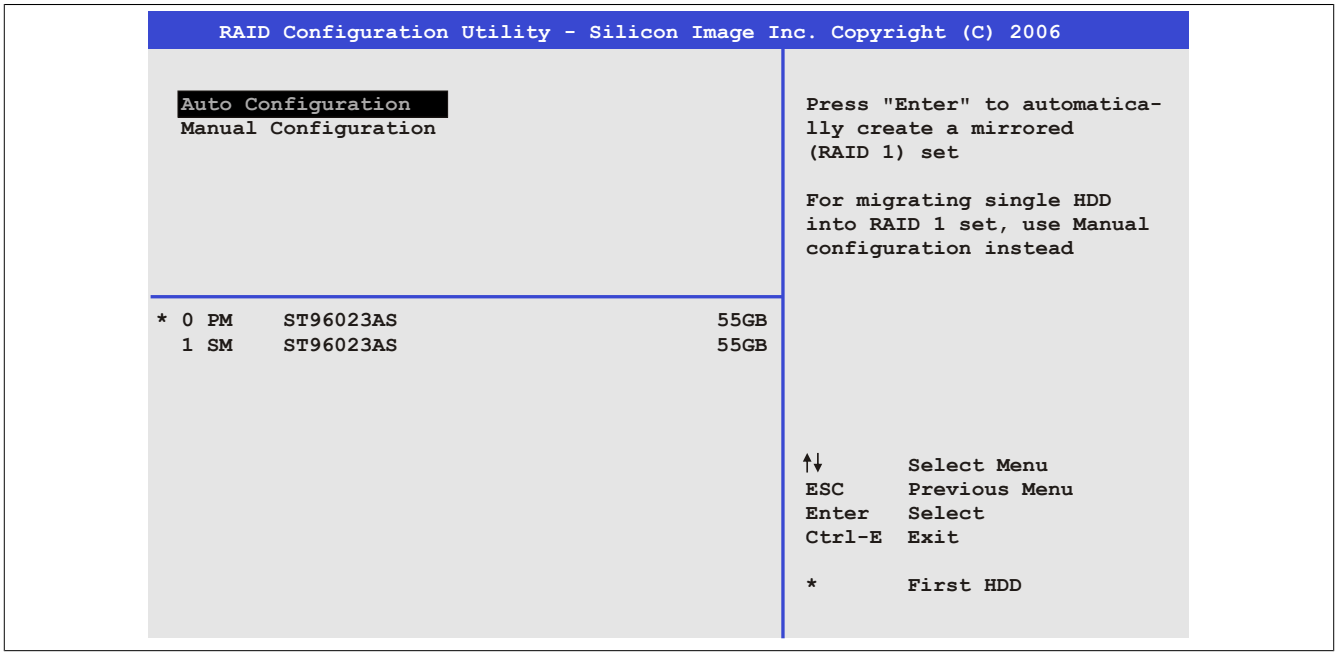


Figure 79: RAID Configuration Utility - Create RAID set - Mirrored

"Auto Configuration"
Auto configuration optimizes all settings.

"Manual Configuration"
It is possible to specify the "Source" and "Target" HDD, and also to specify whether a rebuild (mirror) should be performed immediately (approx. 50 minutes).

8.4 Delete RAID set

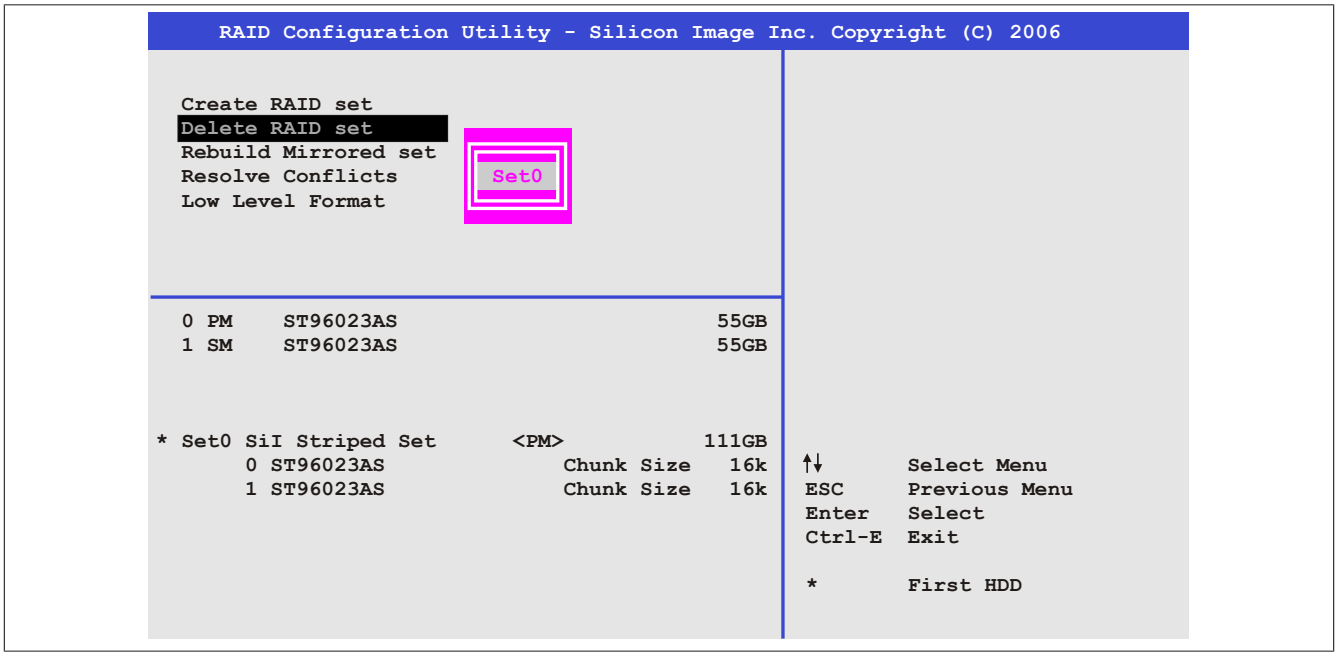


Figure 80: RAID Configuration Utility - Delete RAID set

An existing RAID set can be deleted using the menu "Delete RAID set".

8.5 Rebuild mirrored set

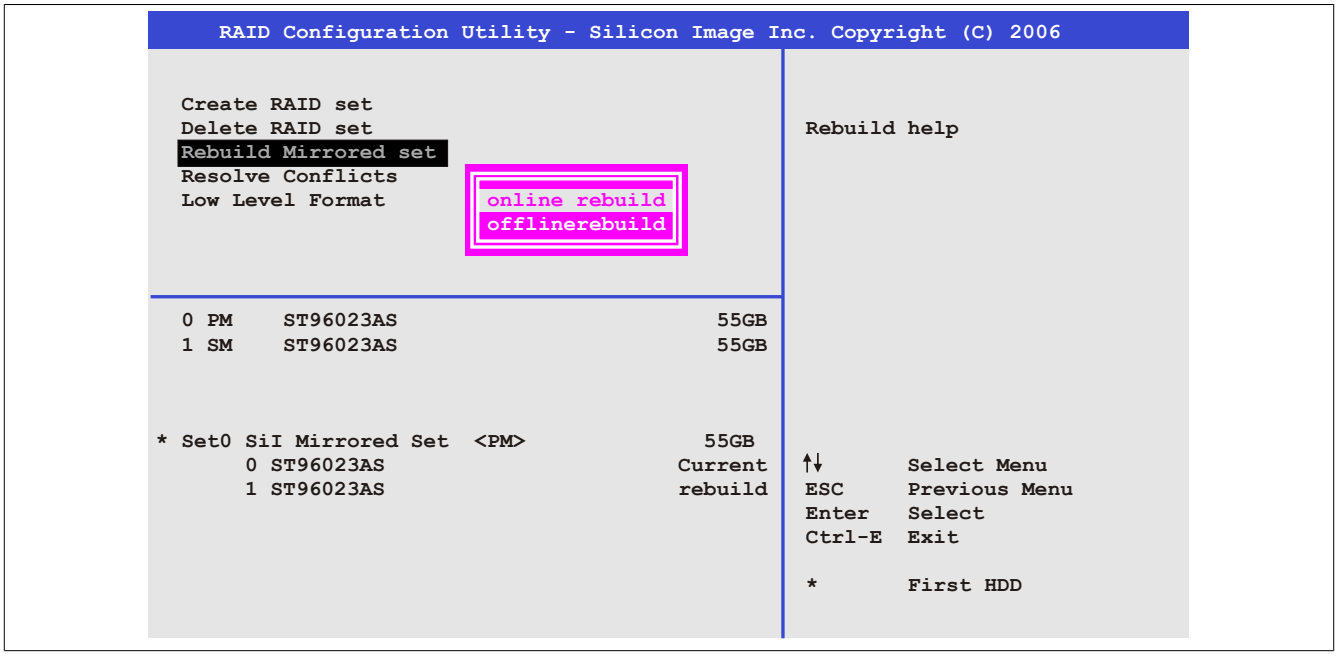


Figure 81: RAID Configuration Utility - Rebuild mirrored set

The "Rebuild mirrored set" menu can be used to restart a rebuild procedure in a RAID 1 set if an error occurs, after first interrupting the rebuild procedure or when exchanging a hard disk.

If "onlinerebuild" is selected, then the rebuild is executed during operation after the system is booted. E.g. an event pop-up is displayed by the installed SATA RAID configuration program: `SATARaid detected a new event` and the rebuild is started. The entire rebuild lasts approximately 50 minutes.

If "offlinerebuild" is selected, then a rebuild is performed immediately before starting the operating system (duration depends on the respective memory size).

8.6 Resolve Conflicts

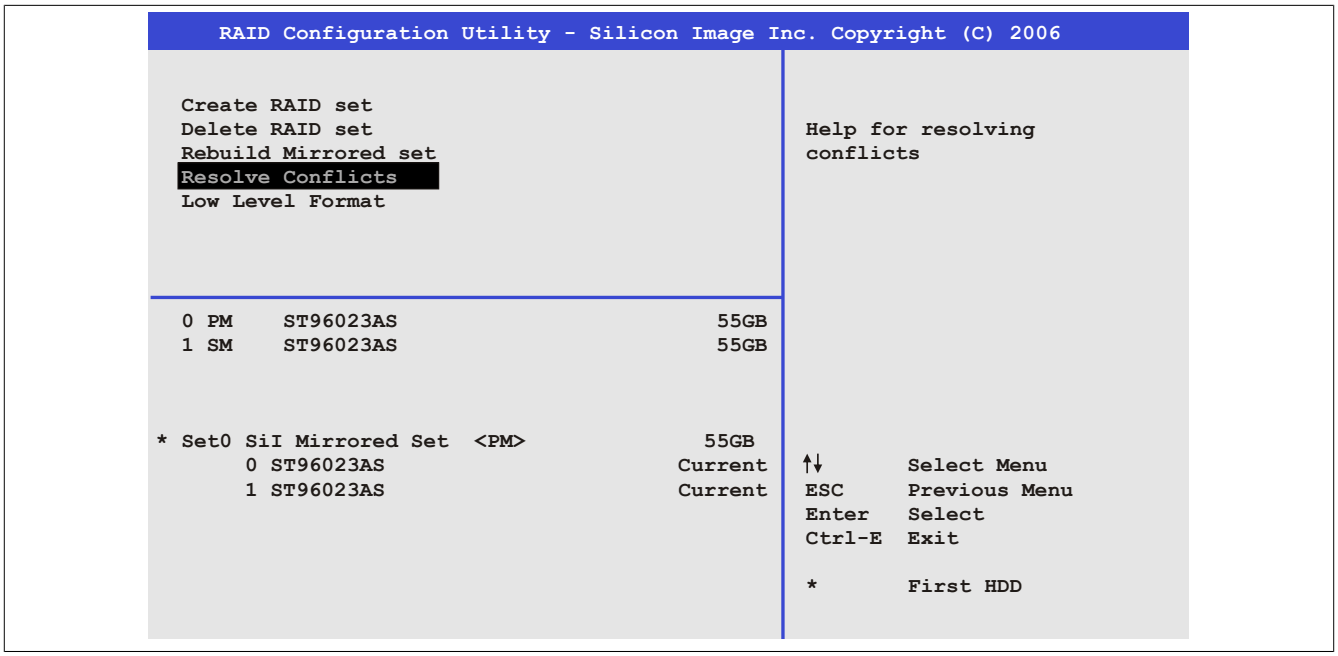


Figure 82: RAID Configuration Utility - Resolve conflicts

Conflicts in a RAID set can be resolved using the "Resolve conflicts" menu. This function is only available if the status of the hard disk is "conflict".

8.7 Low Level Format

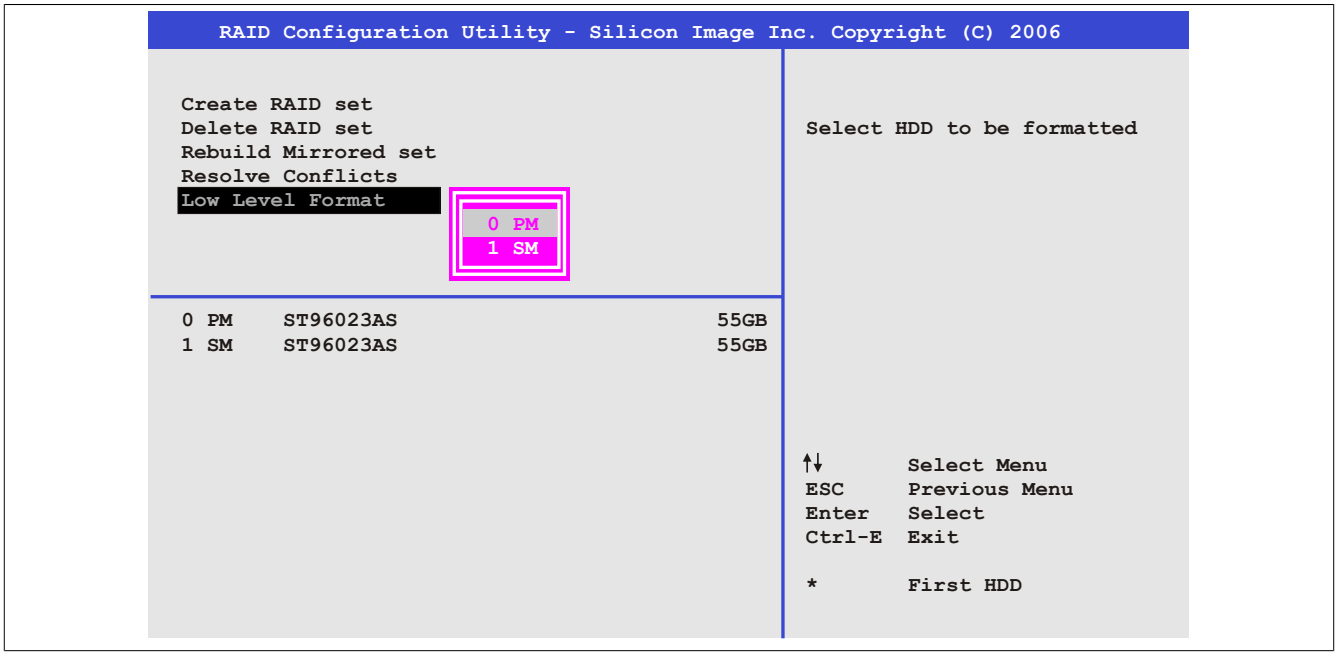


Figure 83: RAID Configuration Utility - Low level format

Individual hard disks can be configured using the "Low Level Format" menu. This can only be done if a RAID set is not configured. A low level format of a hard disk takes approx. 40 minutes.

9 Tips for extending the service life of the display

9.1 Backlight

The service life of the backlight is specified by its "half-brightness time". For example, a specified operating time of 50,000 hours means that the display would still retain 50% of its brightness after this time.

9.1.1 How can the service life of the backlight be extended?

- By setting the display brightness to the lowest value that is still comfortable for the eyes
- By using dark images
- By reducing the brightness by 50%, which can result in an approximately 50% increase in the half-brightness time

9.2 Screen burn-in

Screen burn-in refers to the "burning in" of a static image on a display after being displayed for a prolonged period of time. Nevertheless, static images are not the only cause of screen burn-in. Screen burn-in is also referred to as burn-in effect, image retention, memory effect, memory sticking or ghost image.

There are basically two types:

- Area type: This type of screen burn-in is indicated by a dark gray image. The effect will disappear if the display is switched off for a long period of time.
- Line type: This type of screen burn-in can cause lasting damage.

9.2.1 What causes screen burn-in?

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

9.2.2 How can screen burn-in be avoided?

- By constantly changing between static and dynamic images
- By avoiding excessive brightness differences between foreground and background elements
- By using colors with similar brightness
- By using complementary colors in follow-up images
- By using a screensaver

10 Pixel errors

Information:

Displays may contain defective pixels (dead/stuck pixels) that result from the manufacturing process. These flaws are not grounds for claiming reclamation or warranty.

11 Known problems / issues

The following issues for the PPC800 devices are 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. This 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 may occur never, sometimes or always.
- During daisy chain operation of multiple AP800/AP900 devices via SDL, it's possible that the touch controller status shows a red "X" in the Control Center applet for the touch screen driver when the touch controller is detected. The functionality of the touch system is not affected by this. This can be avoided by setting a panel locking time of 50 ms. The panel locking time can be configured with the B&R Key Editor.

Chapter 4 • Software

1 BIOS options

Information:

The following diagrams, BIOS menu items and their descriptions refer to BIOS version 1.18. It is therefore possible that these diagrams and BIOS descriptions will not correspond with the BIOS version actually installed.

1.1 General information

BIOS is an acronym for "Basic Input/Output System". It is the most basic standardized interface between the user and the system (hardware). The BIOS system used in this B&R Industrial PC was developed by American Megatrends Inc.

The BIOS Setup utility can be used to modify basic system configuration settings. These settings are stored in CMOS and EEPROM memory (as a backup).

CMOS data is buffered by a battery (if present) and continues to remain stored on the B&R Industrial PC even when the power is turned off (no 24 VDC supply).

1.2 BIOS setup and boot procedure

BIOS is immediately activated when switching on the power supply or pressing the power button on the B&R Industrial PC. The system checks if the setup data from EEPROM memory is "OK". If the data is "OK", then it is transferred to CMOS. If the data is "not OK", then the CMOS data is checked to see whether it is valid. An error message is output if the CMOS data contains errors, and the boot procedure can be continued by pressing <F1>. To prevent an error message from appearing at each restart, the BIOS Setup utility can be opened by pressing <Del>. The settings can then be re-saved.

BIOS reads the system configuration information, checks and configures the system with the Power-On Self-Test (POST).

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

To enter BIOS Setup, the <Del> key must be pressed after the USB controller has been initialized as soon as the following message appears on the screen (during POST): "Press DEL to run SETUP".

```
AMIBIOS(C)2003 American Megatrends, Inc.
[APC2R118] Bernecker + Rainer  Industrie-Elektronik H1.18
Serial Number     : 133453
CPU : Intel(R) Core(TM)2 CPU          T7400 @ 2.16GHz
 Speed : 2.16 Ghz

Press DEL to run Setup
Press F11 for BBS POPUP
The MCH is operating with DDR2-677/CL5 in Dual-Channel Interleaved Mode
Initializing USB Controllers .. Done
2048MB OK
USB Device(s): 1 Keyboard, 1 Hub
Auto-Detecting Sec Master..IDE Hard Disk
Auto-Detecting Sec Slave...IDE Hard Disk
Sec Master: SILICONSYSTEMS INC 4GB 240-0230
Sec Slave : SILICONSYSTEMS INC 4GB 240-0230
Auto-Detecting USB Mass Storage Devices ..
00 USB mass storage devices found an configured.
```

Figure 84: Boot screen

1.2.1 BIOS setup keys

The following keys are enabled during POST:

> **Information:**
>
> **Key signals from USB keyboards will only be registered after the USB controller has been initialized.**

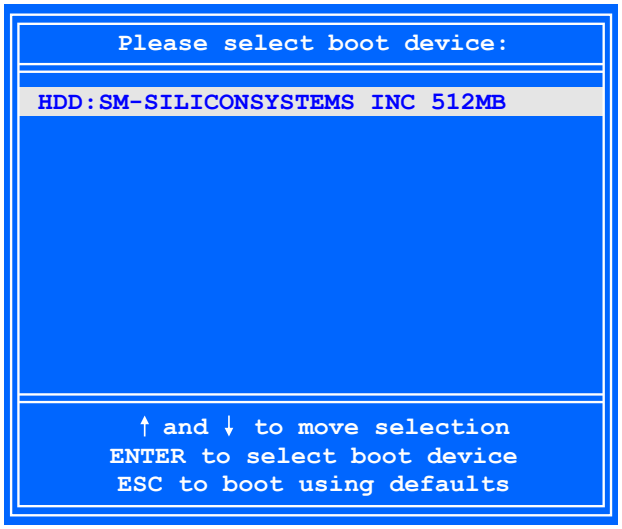
Keys	Function
Del	Opens the main BIOS Setup screen
F12	Network boot
F11	Opens the boot menu. This list all bootable devices that are connected to the system. Selecting a device with cursor ↑, cursor ↓ and the pressing <ENTER> will boot from that device. 
<Pause>	Pauses POST. Pressing any other key resumes POST.

Table 132: BIOS-relevant keys for POST

The following keys can be used once inside BIOS Setup:

Key	Function
F1	Opens general help information
Cursor ↑	Moves to the previous item
Cursor ↓	Moves to the next item
Cursor ←	Moves to the previous item
Cursor →	Moves to the next item
+-	Changes the setting for the selected function
Enter	Changes to the selected screen
Page ↑	Changes to the previous page
Page ↓	Changes to the next page
Pos 1	Jumps to the first BIOS menu item or object
End	Jumps to the last BIOS menu item or object
F2 / F3	Changes the colors of BIOS Setup
F7	Resets any changes
F9	Loads and configures CMOS default values for all BIOS settings
F10	Saves and exits
ESC	Exits a submenu

Table 133: BIOS-relevant keys

1.3 Main

The main BIOS Setup screen appears immediately after the <Del> button is pressed during startup.

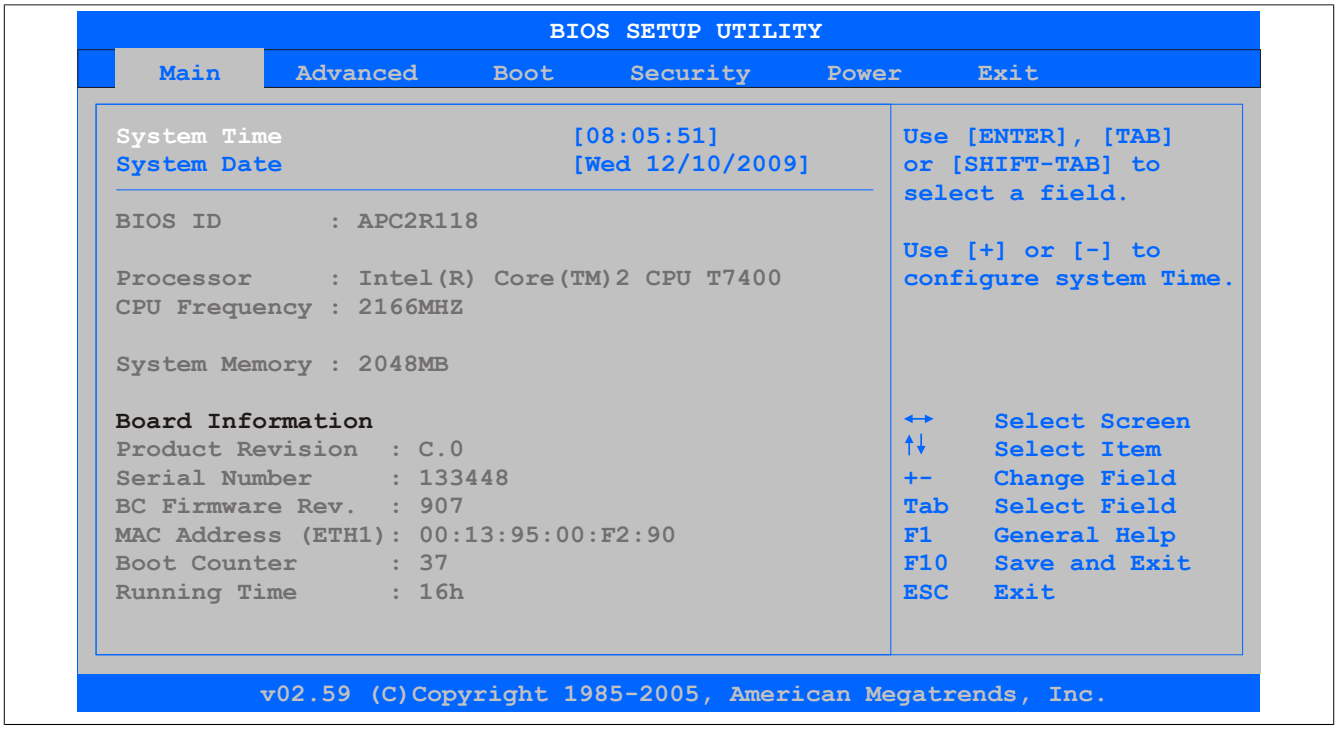


Figure 85: 945GME BIOS Main Menu

BIOS setting	Description	Configuration options	Effect
System time	The currently configured system time setting. This is buffered by the CMOS battery when the system is switched off.	Changes the system time	Sets the system time in the format Hour:Minute:Second (hh:mm:ss)
System date	The currently configured system date. This is buffered by the CMOS battery when the system is switched off.	Changes the system date	Sets the system date in the format Month:Day:Year (mm:dd:yyyy)
BIOS ID	Displays the BIOS version	None	-
Processor	Displays the processor type	None	-
CPU Frequency	Displays the processor frequency	None	-
System Memory	Displays the system memory size	None	-
Product revision	Displays the CPU board HW revision.	None	-
Serial number	Displays the CPU board serial number.	None	-
BC firmware rev.	Displays the CPU board controller firmware revision.	None	-
MAC Address (ETH1)	Displays the assigned MAC address for the ETH1 interface	None	-
Boot counter	Displays the boot counter; each restart increases the counter by one (max. 16777215)	None	-
Running time	Displays the runtime in hours (max. 65535)	None	-

Table 134: 945GME Main Menu setting options

1.4 Advanced

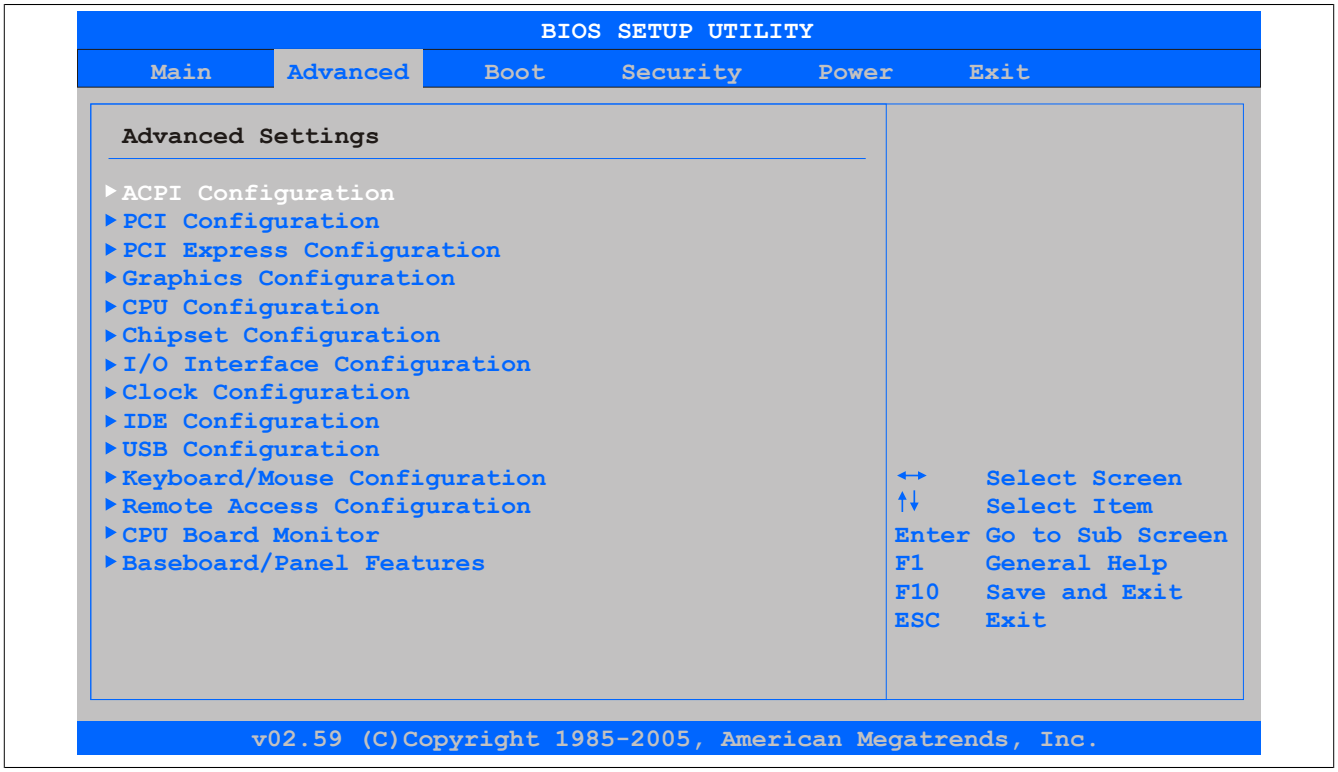


Figure 86: 945GME Advanced Menu

BIOS setting	Description	Configuration options	Effect
ACPI configuration	Configures the APCI devices.	Enter	Opens the submenu see "ACPI configuration" on page 174
PCI Configuration	Configures PCI devices	Enter	Opens the submenu see "PCI Configuration" on page 175
PCI Express Configuration	Configures PCI Express settings.	Enter	Opens the submenu see "PCI Express Configuration" on page 178
Graphics configuration	Configures graphics settings	Enter	Opens the submenu see "Graphics configuration" on page 180
CPU configuration	Configures CPU settings	Enter	Opens the submenu see "CPU configuration" on page 182
Chipset configuration	Configures the chipset functions.	Enter	Opens the submenu see "Chipset configuration" on page 183
I/O interface configuration	Configures the I/O devices.	Enter	Opens the submenu see "I/O interface configuration" on page 184
Clock configuration	Configures the clock settings.	Enter	Opens the submenu see "Clock configuration" on page 184
IDE Configuration	Configures IDE functions	Enter	Opens the submenu see "IDE Configuration" on page 185
USB Configuration	Configures USB settings	Enter	Opens the submenu see "USB Configuration" on page 190
Keyboard/mouse configuration	Configures the keyboard/mouse options.	Enter	Opens the submenu see "Keyboard/mouse configuration" on page 191
Remote access configuration	Configures the remote access settings.	Enter	Opens the submenu see "Remote access configuration" on page 192
CPU Board Monitor	Displays the current voltages and temperature of the processor in use.	Enter	Opens the submenu see "CPU Board Monitor" on page 193
Main Board/Panel Features	Displays device specific information and setup of device specific values.	Enter	Opens the submenu see "Main Board/Panel Features" on page 194

Table 135: 945GME Advanced Menu

1.4.1 ACPI configuration

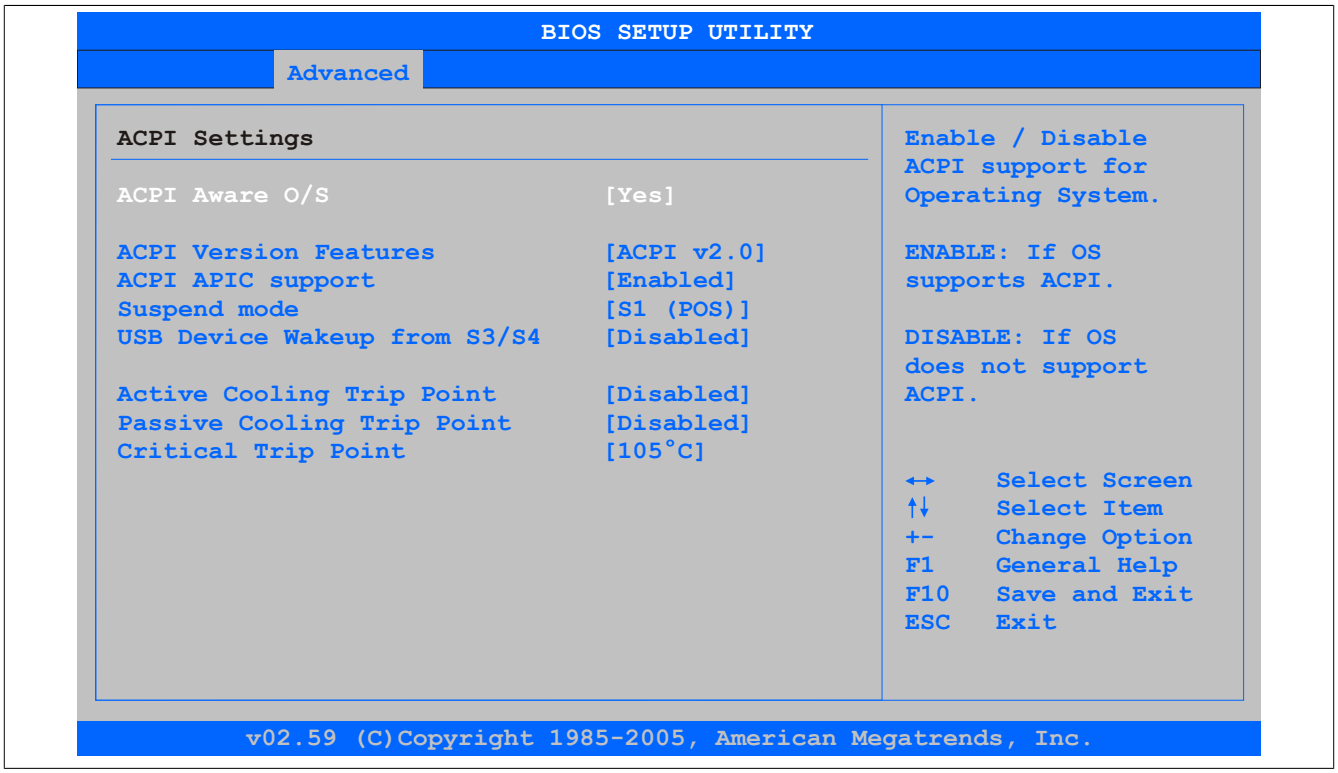


Figure 87: 945GME Advanced ACPI Configuration

BIOS setting	Description	Configuration options	Effect
ACPI Aware O/S	This function determines if the operating system supports the ACPI function (Advanced Configuration and Power Interface).	Yes	The operating system supports ACPI.
		No	The operating system does not support ACPI.
ACPI Version Features	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 v1.0	ACPI functions in accordance with v1.0
		ACPI v2.0	ACPI functions in accordance with v2.0
		ACPI v3.0	ACPI functions in accordance with v3.0
ACPI APIC support	This option controls the support of the advanced programmable interrupt controller in the processor.	Enabled	Enables this function
		Disabled	Disables the function
Suspend mode	Selects the ACPI status to be used when Suspend mode is enabled	S1 (POS)	Sets S1 as Suspend mode. Only a few functions are disabled and are available again at the touch of a button
		S3 (STR)	Sets S3 as Suspend mode. The current state of the operating system is written to RAM, which is then the only component to receive power.
USB Device Wakeup from S3/S4	This options makes it possible for activity on a connected USB device to wake the system up from the S3/S4 standby mode.	Enabled	Enables this function
		Disabled	Disables this function
Active Cooling Trip Point	With this function, an optional CPU fan above the operating system can be set to turn on when the CPU reaches the set temperature.	Disabled	Disables this function
		50°C, 60°C, 70°C, 80°C, 90°C	Temperature setting for the active cooling trip point. Can be set in 10 degree increments.
Passive Cooling Trip Point	With this function, a temperature can be set at which the CPU automatically reduces its speed.	Disabled	Disables this function
		50°C, 60°C, 70°C, 80°C, 90°C	Temperature setting for the passive cooling trip point. Can be set in 10 degree increments.
Critical trip point	Option for configuring a CPU temperature at which the operating system automatically shuts down	80°C, 85°C, 90°C, 95°C, 100°C, 105°C, 110°C	Temperature setting for the critical trip point. Can be set in 5 degree increments.

Table 136: 945GME Advanced ACPI configuration setting options

1.4.2 PCI Configuration

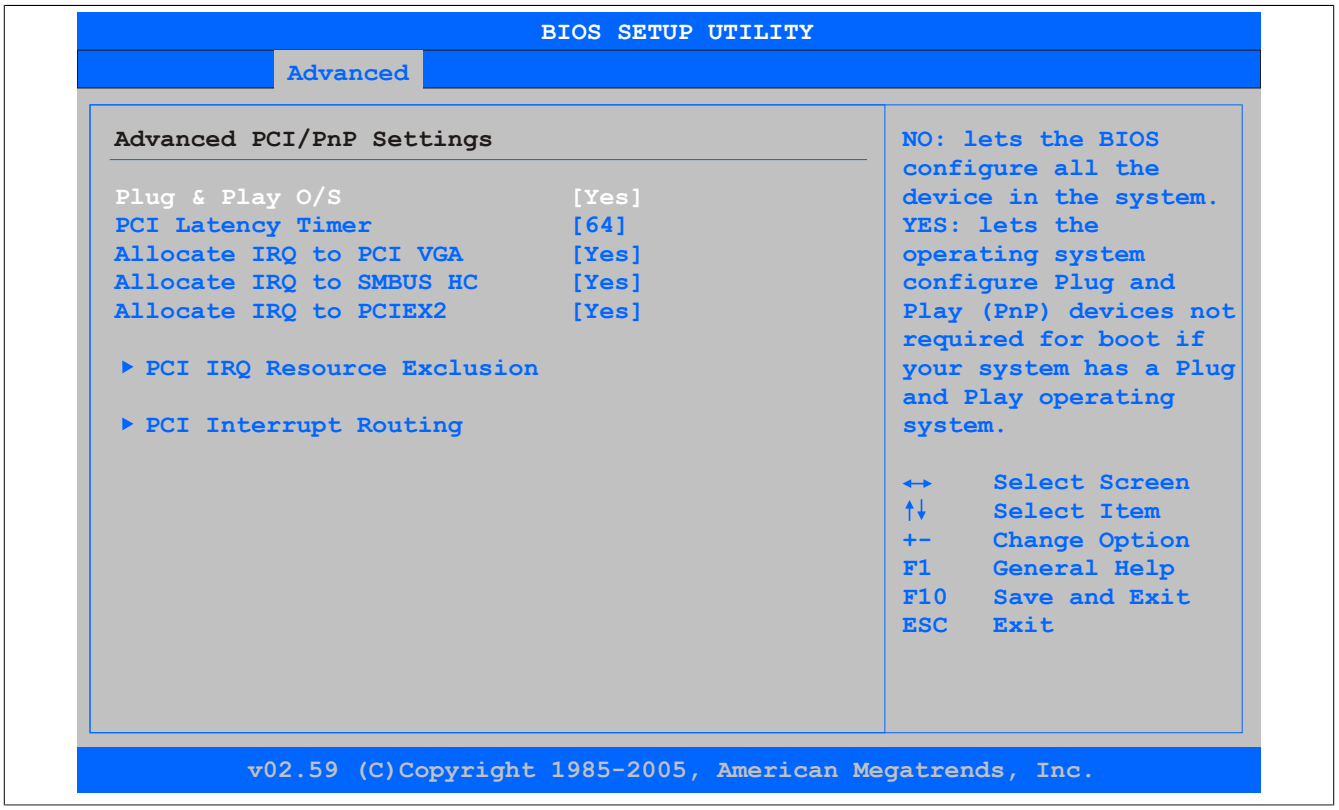


Figure 88: 945GME Advanced PCI Configuration

BIOS setting	Description	Configuration options	Effect
Plug & Play O/S	BIOS is informed if Plug & Play is capable on the operating system.	Yes	The operating system handles the distribution of resources.
		No	BIOS handles the distribution of resources.
PCI latency timer	Option for controlling how long (in PCI ticks) one PCI bus card can continue to use the master after another PCI card has requested access	32, 64, 96, 128, 160, 192, 224, 248	Manually sets the value in PCI ticks
Allocate IRQ to PCI VGA	This function is used to determine if an interrupt is assigned to the PCI VGA.	Yes	Automatic assignment of an interrupt.
		No	No assignment of an interrupt.
Allocate IRQ to SMBUS HC	Use this function to set whether or not the SM (System Management) bus controller is assigned a PCI interrupt.	Yes	Automatic assignment of a PCI interrupt.
		No	No assignment of an interrupt.
Allocate IRQ to PCIEX2	Use this function to set whether or not the PCIEX2 is assigned a PCI interrupt.	Yes	Automatic assignment of a PCI interrupt.
		No	No assignment of an interrupt.
PCI IRQ Resource Exclusion	Configures the PCI IRQ resource settings for ISA Legacy devices.	Enter	Opens the submenu see "PCI IRQ Resource Exclusion" on page 176
PCI Interrupt Routing	Configures PCI interrupt routing	Enter	Opens the submenu see "PCI Interrupt Routing" on page 177

Table 137: 945GME Advanced PCI Configuration (Setting options)

1.4.2.1 PCI IRQ Resource Exclusion

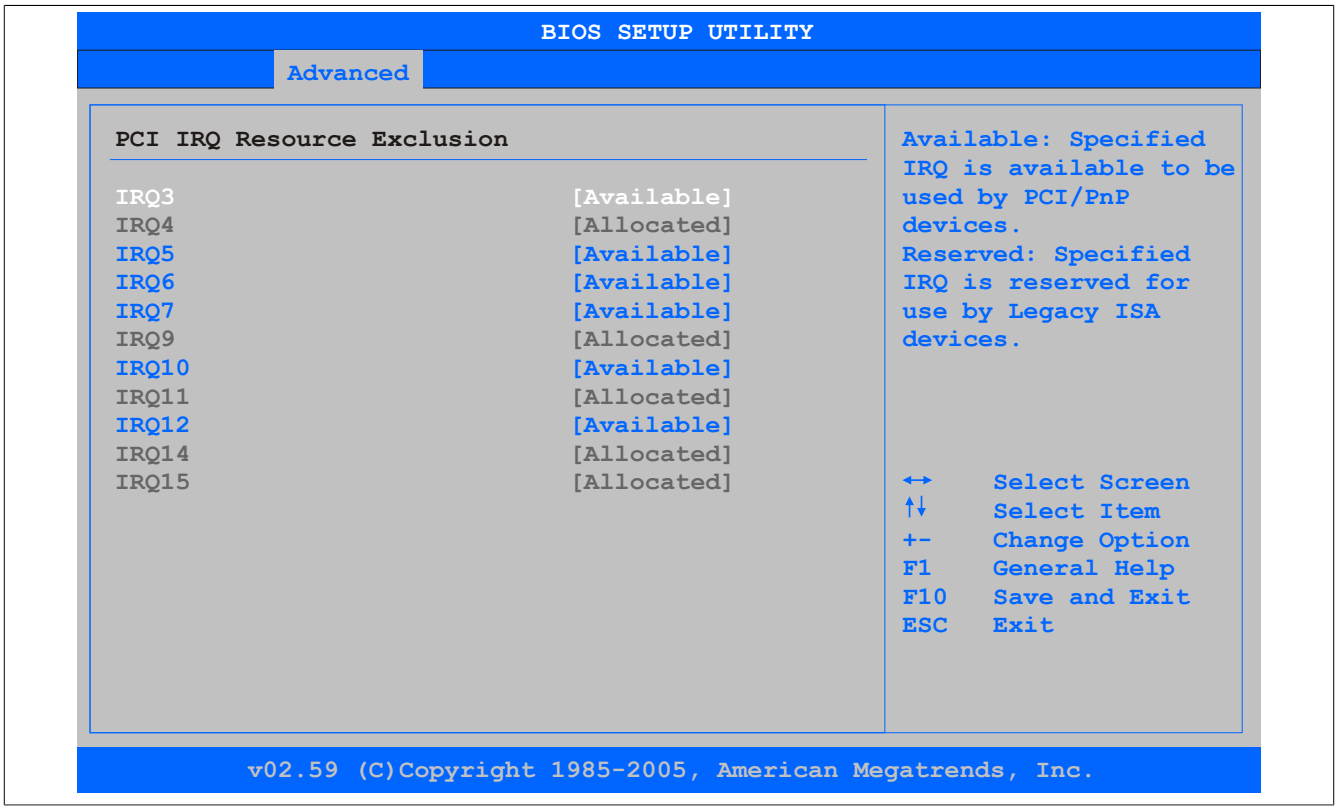


Figure 89: 945GME Advanced PCI IRQ Resource Exclusion

BIOS setting	Description	Configuration options	Effect
IRQx	IRQ interrupt routing for Legacy ISA devices.	Allocated	Allocated by the system - cannot be used.
		Available	Available - can be used.
		Reserved	Reserved - cannot be used.

Table 138: 945GME Advanced PCI IRQ Resource Exclusion setting options

1.4.2.2 PCI Interrupt Routing

```
                    BIOS SETUP UTILITY
                    Advanced

PCI Interrupt Routing                                  Select fixed IRQ or
                                                       set AUTO to let the
PIRQ A (VGA,PCIEX4,ETH2,UHCI2,HDA) [Auto]              BIOS and OS route an
PIRQ B (PCIEX1,ETH1)               [Auto]              IRQ to this line.
PIRQ C (PCIEX2,IF-Slot)            [Auto]
PIRQ D (SATA,UHCI1,SMB,PCIEX3)     [Auto]              Make sure that the
PIRQ E (INTD,UHCI3,PATA)           [Auto]              selected IRQ is not
PIRQ F (INTA)                      [Auto]              assigned to legacy IO.
PIRQ G (INTB)                      [Auto]
PIRQ H (INTC,UHCI0,EHCI)           [Auto]

1 st Exclusive PCI                 [None]
2 nd Exclusive PCI                 [None]
3 rd Exclusive PCI                 [None]

PCIEXn : PCI Express Root Port n                       ←→    Select Screen
INTn   : External PCI Bus INTn Line                    ↑↓    Select Item
PATA   : Parallel ATA in Enhanced/Native Mode          +-    Change Option
SATA   : Serial ATA in Enhanced/Native Mode            F1    General Help
SMB    : System Management Bus Controller              F10   Save and Exit
                                                       ESC   Exit

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```

Figure 90: 945GME Advanced PCI Interrupt Routing

BIOS setting	Description	Configuration options	Effect
PIRQ A (VGA,PCIEX4, ETH2,UHCI2,HDA)	Option for configuring PIRQ A	Auto	Automatic assignment by BIOS and the operating system
		5,6,7,9,10,11,12	Manual assignment
PIRQ B (PCIEX1, ETH1)	Option for configuring PIRQ B	Auto	Automatic assignment by BIOS and the operating system
		5,6,7,9,10,11,12	Manual assignment
PIRQ C (PCIEX2,IF slot)	Option for configuring PIRQ C	Auto	Automatic assignment by BIOS and the operating system
		5,6,7,9,10,11,12	Manual assignment
PIRQ D (SATA,UHCI1,SMB, PCIEX3)	Option for configuring PIRQ D	Auto	Automatic assignment by BIOS and the operating system
		5,6,7,9,10,11,12	Manual assignment
PIRQ E (INTD,UHCI3,PATA)	Option for configuring PIRQ E	Auto	Automatic assignment by BIOS and the operating system
		5,6,7,9,10,11,12	Manual assignment
PIRQ F (INTA)	Option for configuring PIRQ F	Auto	Automatic assignment by BIOS and the operating system
		5,6,7,9,10,11,12	Manual assignment
PIRQ G (INTB)	Option for configuring PIRQ G	Auto	Automatic assignment by BIOS and the operating system
		5,6,7,9,10,11,12	Manual assignment
PIRQ H (INTC,UHCI0,EHCI)	Option for configuring PIRQ H	Auto	Automatic assignment by BIOS and the operating system
		5,6,7,9,10,11,12	Manual assignment
1st Exclusive PCI	With this option you can determine if the IRQ assigned to the PIRQ x is handled exclusively (no IRQ sharing). **Information:** **Is only displayed if a PIRQ is manually set (e.g. 5).**	None	No interrupt assigned
		x	Assigns the PIRQ as 1st exclusive PCI IRQ.

Table 139: 945GME Advanced PCI Interrupt Routing - Setting options

BIOS setting	Description	Configuration options	Effect
2nd Exclusive PCI	With this option you can determine if the IRQ assigned to the PIRQ x is handled exclusively (no IRQ sharing). **Information:** **Only displayed when two PIRQs are set manually.**	None	No interrupt assigned
		x	Assigns the PIRQ as 2nd exclusive PCI IRQ.
3rd Exclusive PCI	With this option you can determine if the IRQ assigned to the PIRQ x is handled exclusively (no IRQ sharing). **Information:** **Only displayed when three PIRQs are set manually.**	None	No interrupt assigned
		x	Assigns the PIRQ as 3rd exclusive PCI IRQ.

Table 139: 945GME Advanced PCI Interrupt Routing - Setting options

1.4.2.3 PCI Express Configuration

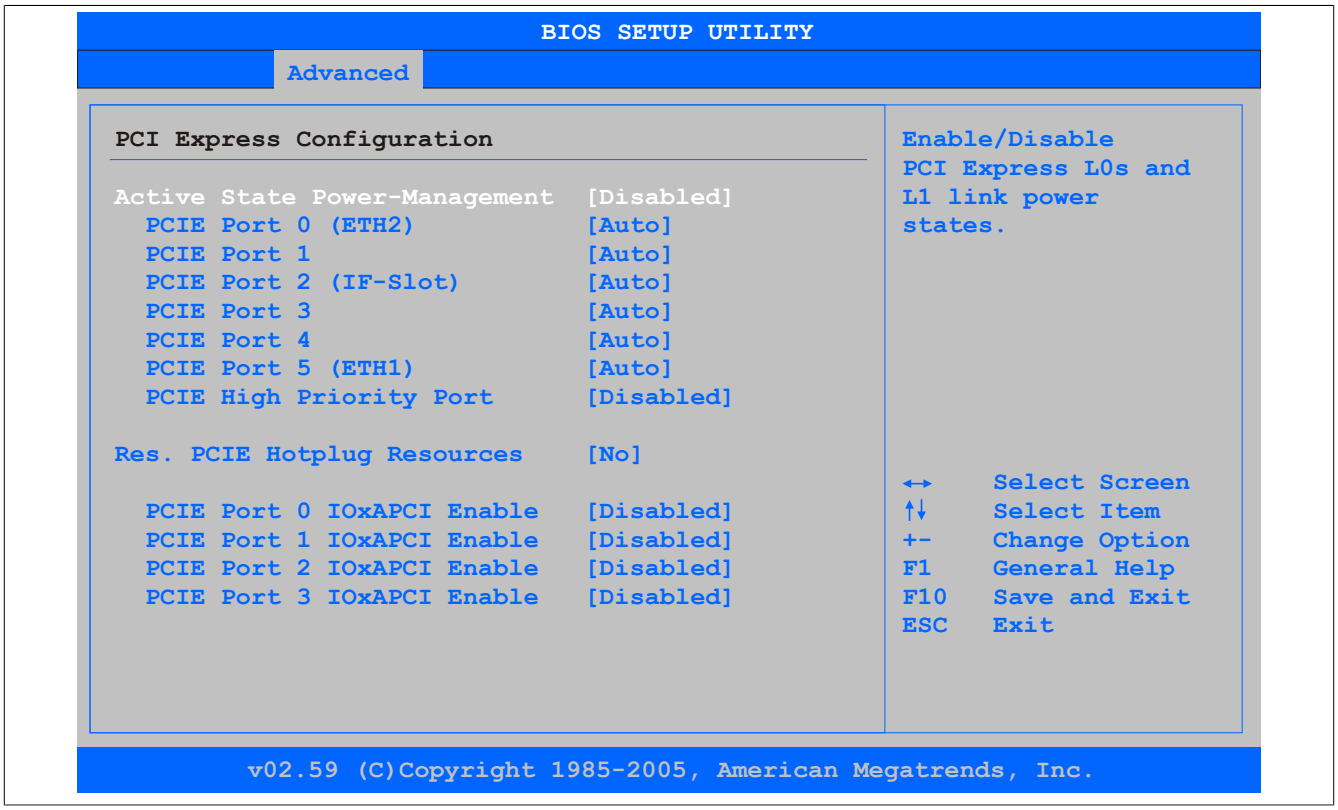

Figure 91: 945GME Advanced PCI Express Configuration

BIOS setting	Description	Configuration options	Effect
Active State Power Management	Option for setting a power saving function (L0s/L1) for PCIe slots if they do not require full power	Enabled	Enables this function
		Disabled	Disables this function
PCIE Port 0 (ETH2)	This option activates or deactivates the PCI Express connection function. **Information:** **If you are not using any PCI Express devices, this option should be deactivated.**	Auto	Automatic assignment by BIOS and the operating system
		Enabled	Enables this function
		Disabled	Disables this function
PCIE Port 1	This option activates or deactivates the PCI Express connection function. **Information:** **If you are not using any PCI Express devices, this option should be deactivated.**	Auto	Automatic assignment by BIOS and the operating system
		Enabled	Enables this function
		Disabled	Disables this function
PCIE Port 2 (IF slot)	This option activates or deactivates the PCI Express connection function.	Auto	Automatic assignment by BIOS and the operating system

Table 140: 945GME Advanced PCI Express Configuration (Setting options)

BIOS setting	Description	Configuration options	Effect
	Information: **If you are not using any PCI Express devices, this option should be deactivated.**	Enabled	Enables this function
		Disabled	Disables this function
PCIE Port 3	This option activates or deactivates the PCI Express connection function. **Information:** **If you are not using any PCI Express devices, this option should be deactivated.**	Auto	Automatic assignment by BIOS and the operating system
		Enabled	Enables this function
		Disabled	Disables this function
PCIE Port 4	This option activates or deactivates the PCI Express connection function. **Information:** **If you are not using any PCI Express devices, this option should be deactivated.**	Auto	Automatic assignment by BIOS and the operating system
		Enabled	Enables this function
		Disabled	Disables this function
PCIE Port 5 (ETH1)	This option activates or deactivates the PCI Express connection function. **Information:** **If you are not using any PCI Express devices, this option should be deactivated.**	Auto	Automatic assignment by BIOS and the operating system
		Enabled	Enables this function
		Disabled	Disables this function
PCIE High Priority Port	This option activates or deactivates the priority port for PCIE.	Disabled	Disables this function
		Port 0	Activates Port 0 as priority port.
		Port 1	Activates Port 1 as priority port.
		Port 2	Activates Port 2 as priority port.
		Port 3	Activates Port 3 as priority port.
		ETH2	Activates ETH2 as priority port.
		ETH1	Activates ETH1 as priority port.
Res. PCIE Hot Plugging Resource	This option can be used to reserve an I/O and memory resource for a free PCIE port. A PCIE port must be set to enabled and resources must be reserved to support ExpressCard hot-plugging on a port.	Yes	Resource is reserved.
		No	Resource is not reserved.
PCIE Port 0 IOxAPIC Enable	This option enables or disables the APIC (Advanced Programmable Interrupt Controller) on PCIE port 0. The IRQ resources available to the system are expanded when the APIC mode is enabled.	Enabled	Enables this function
		Disabled	Disables this function
PCIE Port 1 IOxAPIC Enable	This option enables or disables the APIC (Advanced Programmable Interrupt Controller) on PCIE port 1. The IRQ resources available to the system are expanded when the APIC mode is enabled.	Enabled	Enables this function
		Disabled	Disables this function
PCIE Port 2 IOxAPIC Enable	This option enables or disables the APIC (Advanced Programmable Interrupt Controller) on PCIE port 2. The IRQ resources available to the system are expanded when the APIC mode is enabled.	Enabled	Enables this function
		Disabled	Disables this function
PCIE Port 3 IOxAPIC Enable	This option enables or disables the APIC (Advanced Programmable Interrupt Controller) on PCIE port 3. The IRQ resources available to the system are expanded when the APIC mode is enabled.	Enabled	Enables this function
		Disabled	Disables this function

Table 140: 945GME Advanced PCI Express Configuration (Setting options)

1.4.3 Graphics configuration

```
BIOS SETUP UTILITY
Advanced

Graphics Configuration                          Select primary video
                                                adapter to be used
Primary Video Device            [Internal VGA]  during boot up.

Internal Graphics Mode Select   [Enabled, 8MB]
DVMT Mode Select                [DVMT Mode]
  DVMT/FIXED Memory             [128MB]

Boot Display Device             [Auto]
Boot Display Preference         [LFP SDVO-B SDVO-C]
Local Flat Panel Type           [Auto]
Local Flat Panel Scaling        [Expacnd Text&Graph]
                                                ←→    Select Screen
SDVO Port B Device              [DVI]           ↑↓    Select Item
SDVO Port C Device              [None]          +-    Change Option
                                                F1    General Help
SDVO/DVI Hotplug Support        [Enabled]       F10   Save and Exit
Display Mode Persistence        [Enabled]       ESC   Exit

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```

Figure 92: 945GME Advanced Graphics Configuration

BIOS setting	Description	Configuration options	Effect
Primary Video Device	Option for selecting the primary display device	Internal VGA	The internal graphics chip on the CPU board is used as video device (monitor / panel connection).
		PCI / Int. VGA	Uses the graphics chip of a connected graphics card as the display device
Internal Graphics Mode Select	Option for setting the memory size that can be used for the internal graphics controller.	Disabled	No reservation - Disables the graphics controller.
		Enabled, 1MB	1MB main memory provided.
		Enabled, 8MB	8MB main memory provided.
DVMT Mode Select	Option for determining the DVMT mode (Dynamic Video Memory Technology) of the DVMT graphics driver.	Fixed Mode	A fixed amount of memory is allocated to the graphics chip, which is no longer available to the PC.
		DVMT Mode	Memory consumption is controlled dynamically by the DVMT graphics driver. Only the amount of memory that is required is used.
		Combo Mode	The DVMT graphics driver reserves at least 64MB, but can use up to 224MB if necessary.
DVMT/FIXED Memory	Option for setting the amount of memory used for the DVMT mode.	64 MB	64MB of main memory can be used.
		128 MB	128MB of main memory can be used.
		Maximum DVMT	The remaining available main memory can be used.
Boot Display Device	Determines which video channel should be enabled for a video device during the boot procedure.	Auto	Automatic selection.
		CRT only	Only use the CRT (Cathode Ray Tube) channel.
		SDVO only	Only use the SDVO (Serial Digital Video Out) channel.
		CRT + SDVO	Use CRT and SDVO channel.
		LFP only	Only use the LFP (Local Flat Panel) channel.
		CRT + LFP	Use CRT + LFP channel.
Boot Display Preference	This option determines the order in which the devices on the connected channels LFP and SDVO should be checked and booted. **Information:** **The setting is only needed when the Boot Display Device option is set to "Auto".**	LFP SDVO-B SDVO-C	Local Flat Panel - Serial Digital Video B output - Serial Video C output.
		LFP SDVO-C SDVO-B	Local Flat Panel - Serial Digital Video C output - Serial Video B output.
		SDVO-B SDVO-C LFP	Serial Digital Video B output - Serial Digital Video C output - Local Flat Panel.
		SDVO-C SDVO-B LFP	Serial Digital Video C output - Serial Digital Video B output - Local Flat Panel.
Local Flat Panel Type	This option can be used to set a pre-defined profile for the LVDS channel.	Auto	Automatic detection and setting using the EDID data.
		VGA 1x18 (002h)	640 x 480

Table 141: 945GME Advanced Graphics Configuration - Setting options

BIOS setting	Description	Configuration options	Effect
		VGA 1x18 (013h)	640 x 480
		SVGA 1x18 (004h)	800 x 600
		XGA 1x18 (006h)	1024 x 768
		XGA 2x18 (007h)	1024 x 768
		XGA 1x24 (008h)	1024 x 768
		XGA 2x24 (012h)	1024 x 768
		SXGA 2x24 (00Ah)	1280 x 1024
		SXGA 2x24 (018h)	1280 x 1024
		UXGA 2x24 (00Ch)	1600 x 1200
		Customized EDID 1	User-defined profile
		Customized EDID 2	User-defined profile
		Customized EDID 3	User-defined profile
Local flat panel scaling	Determines the screen content should be output according to the defined Local Flat Panel Type.	Centering	The screen content is output centered on the display.
		Expand Text	The text is stretched across the entire surface of the display.
		Expand Graphics	The graphics are stretched across the entire surface of the display.
		Expand Text & Graphics	Text and graphics are stretched across the entire surface of the display.
SDVO Port B Device	Option for selecting the video device that is connected to the SDVO Port B.	None	No video device connected.
		DVI	Video signal output is optimized for a DVI-compatible video device.
		TV	Video signal output is optimized for a TV-compatible video device.
		CRT	Video signal output is optimized for a CRT-compatible video device.
		LVDS	Video signal output is optimized for a LVDS-compatible video device.
		DVI-Analog	Video signal output is optimized for an analog DVI-compatible video device.
SDVO Port C Device	Option for selecting the video device that is connected to the SDVO Port A.	None	No video device connected.
		DVI	Video signal output is optimized for a DVI-compatible video device.
		TV	Video signal output is optimized for a TV-compatible video device.
		CRT	Video signal output is optimized for a CRT-compatible video device.
		LVDS	Video signal output is optimized for a LVDS-compatible video device.
		DVI-Analog	Video signal output is optimized for an analog DVI-compatible video device.
SDVO/DVI Hot Plugging Support	If this option is set to enabled, the Windows XP graphics driver supports "hot plugging" and "configuration mode persistence" for DVI monitors connected to a DVI SDVO transmitter. "Hot plugging" support means that when a DVI monitor is connected while the operating system is running, it is detected automatically and activated. "Configuration mode persistence" means that, for example, a dual DVI configuration is automatically restored when both DVI monitors are reconnected, even if only one of them was connected and activated during a previous boot.	Enabled	"Hot plugging" and "Configuration mode persistence" mode enabled.
		Disabled	"Hot plugging" and "Configuration mode persistence" mode disabled.
Display Mode Persistence	"Display mode persistence" means that the operating system can remember and restore past display configurations. For example, a dual DVI configuration is automatically restored when both DVI monitors are reconnected, even if only one of them was connected and enabled during a previous boot.	Enabled	Enables this function
		Disabled	Disables this function

Table 141: 945GME Advanced Graphics Configuration - Setting options

1.4.4 CPU configuration

```
BIOS SETUP UTILITY
Advanced

Configure advanced CPU settings                  Select the revsion
Module Version -13.04                            of the multi processor
                                                 support interface that
Manufacturer:Intel                               should be offered by
Brand String:Intel(R) Core(TM)2 CPU      T7400   the BIOS.
Frequency    :2.16GHz
FSB Speed    :667MHz

Cache L1     :64 KB
Cache L2     :4096 KB

MPS Revision                  [1.4]              ←→    Select Screen
Max CPUID Value Limit         [Disabled]         ↑↓    Select Item
Execute Disable Bit           [Enabled]          +-    Change Option
Core Multi-Processing         [Enabled]          F1    General Help
Intel(R) SpeedStep(tm) tech.  [Automatic]        F10   Save and Exit
Max. CPU Frequency            [2166 MHz]         ESC   Exit
    C1 Config.                [Standard]
    C2 Config.                [Disabled]
    C3 Config.                [Disabled]
    C4 Config.                [Disabled]

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```

Figure 93: 945GME Advanced CPU Configuration

BIOS setting	Description	Configuration options	Effect
MPS Revision	This option supports the use of multiple CPUs (MPS=multi-processor system).	1.1	Sets MPS support Revision 1.1
		1.4	Sets MPS support Revision 1.4
Max CPUID value limit	Option for limiting the CPUID input value. This may be necessary for older operating systems.	Enabled	The processor limits the maximum CPUID input value to 03h if necessary when the the processor supports a higher value.
		Disabled	The processor returns the current maximum value upon request of the CPUID input value.
Execute disable bit	Option for enabling or disabling hardware support for prevention of data execution.	Enabled	Enables this function
		Disabled	Disables this function
Core Multi-Processing	When using a Dual Core processor, this option can be used to disable a core.	Enabled	Both cores are used in a Dual Core processor.
		Disabled	Only one core is used in a Dual Core processor.
Intel(R) Speedster(TM) tech.	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.	Automatic	The processor speed is regulated by the operating system.
		Maximum speed	The processor speed is set to a maximum.
		Minimum speed	The processor speed is set to a minimum.
		Disabled	Disables SpeedStep technology.
Max. CPU frequency	Option for setting the maximum processor speed if the value "Automatic" or "Maximum Speed" is set for the option "Intel(R) SpeedStep(TM) tech.".	xxxx MHz	The processor speed is limited to the set value.
C1 Config	Power Management for Intel Core Duo processor.	Default	Standard C1 support.
		Enhanced	Enhanced C1 support.
C2 Config	Power Management for Intel Core Duo processor.	Default	Standard C2 support.
		Enhanced	Enhanced C2 support.
		Disabled	Disabled C2 support.
C3 Config	Power Management for Intel Core Duo processor.	Default	Standard C3 support.
		Enhanced	Enhanced C3 support.
		Disabled	Disabled C3 support.
C4 Config	Power Management for Intel Core Duo processor.	Default	Standard C4 support.
		Enhanced	Enhanced C4 support.
		Disabled	Disabled C4 support.

Table 142: 945GME Advanced CPU Configuration (Setting options)

1.4.5 Chipset configuration

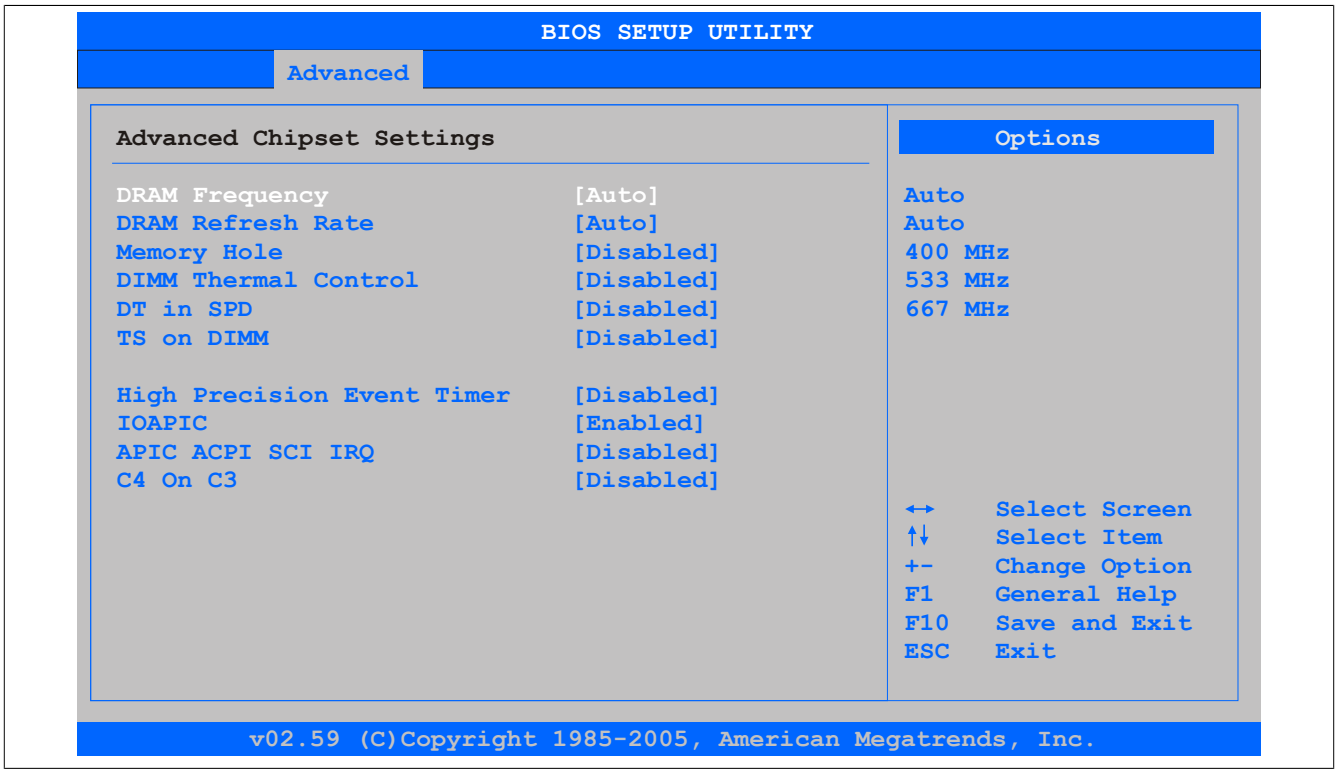

Figure 94: 945GME Advanced Chipset Configuration

BIOS setting	Description	Configuration options	Effect
DRAM Frequency	Option for setting the RAM frequency.	Auto	Frequency set automatically by the BIOS.
		400, 533, 667 MHz	Desired clock frequency set manually.
DRAM 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.
Memory Hole	Option for ISA cards with frame buffer. Not relevant for the PPC800.	Disabled	Disables this function
		15MB-16MB	This address area is reserved.
DIMM Thermal Control	Option for setting the maximum surface temperature of the DIMM module. The module is cooled by limiting the memory bandwidth if the defined surface temperature is reached.	Disabled	Surface temperature not limited.
		40°C, 50°C, 60°C, 70°C, 80°C, 85°C, 90°C	Temperature limit value for the limitation.
DT in SPD	Option to determine whether the GMCH (Graphics and Memory Controller Hub) supports DT (Delta Temperature) in the SPD (Serial Presence Detect) Management Algorithm of the DIMM module.	Enabled	Enables this function
		Disabled	Disables this function
TS on DIMM	Option to determine whether the GMCH (Graphics and Memory Controller Hub) supports TS (Thermal Sensor) in the Thermal Management Algorithm of the DIMM module.	Enabled	Enables this function
		Disabled	Disables this function
High Precision Event Timer	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
IOAPIC	This option is used to activate or deactivate the APIC (Advanced Programmable Interrupt Controller). **Information:** **The IRQ resources available to the system are expanded when the APIC mode is enabled.**	Enabled	The IRQ resources available to the system are expanded when the APIC mode is enabled.
		Disabled	Disables this function
APIC ACPI SCI IRQ	This option is used to modify the SCI IRQ when in APIC (Advanced Programmable Interrupt Controller) mode.	Enabled	IRQ20 is used for SCI.
		Disabled	Disables this function
C4 On C3	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 143: 945GME Advanced Chipset (Setting options)

1.4.6 I/O interface configuration

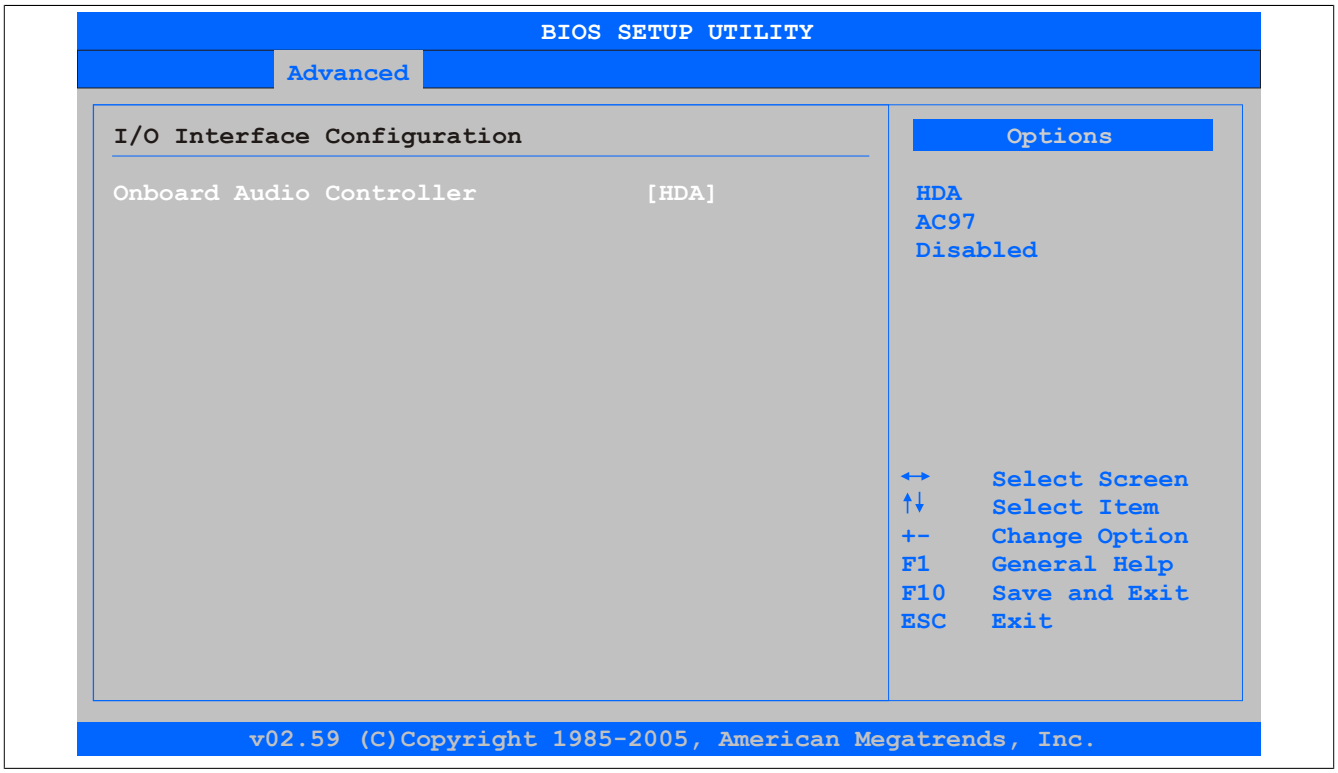

Figure 95: 945GME Advanced I/O interface configuration

BIOS setting	Description	Configuration options	Effect
Onboard Audio Controller	The audio mode can be selected or switched off here.	HDA	Enables High Definition Audio sound.
		AC97	Enables AC'97 sound.
		Disabled	Disables the audio controller

Table 144: 945GME Advanced I/O Interface Configuration (Setting options)

1.4.7 Clock configuration

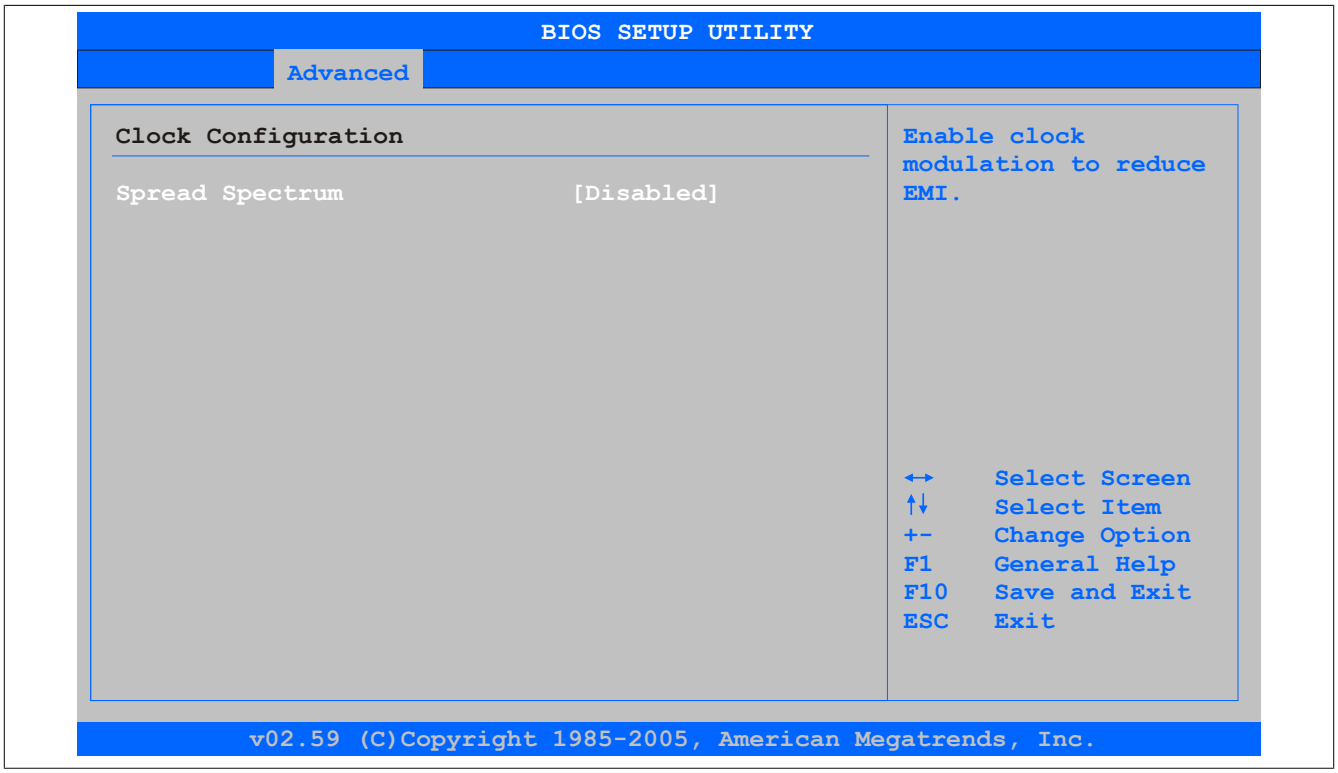

Figure 96: 945GME Advanced clock configuration

BIOS setting	Description	Configuration options	Effect
Spread spectrum	With this option, the cycle frequency can be modulated by reducing electromagnetic disturbances.	Enabled	Enables this function
		Disabled	Disables this function

Table 145: 945GME Advanced Clock Configuration (Setting options)

1.4.8 IDE Configuration

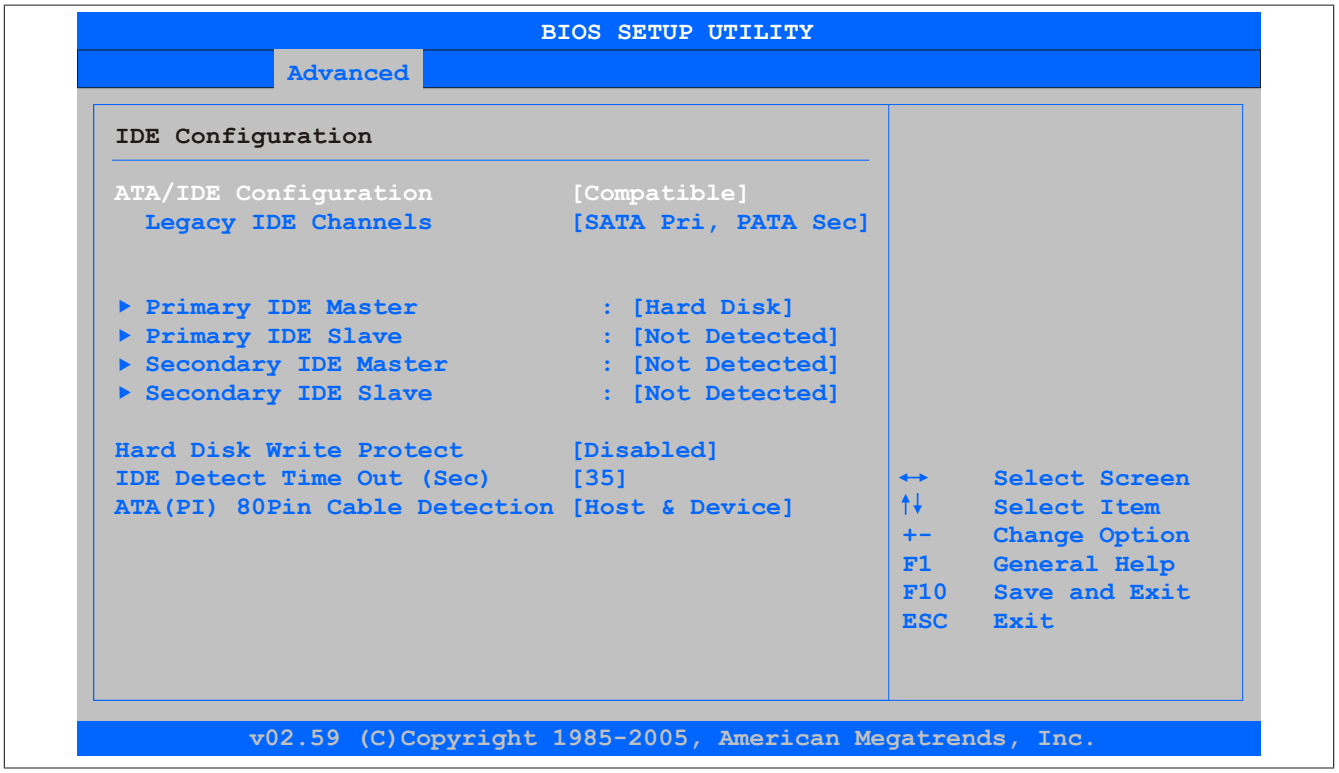

Figure 97: 945GME Advanced IDE Configuration

BIOS setting	Description	Configuration options	Effect
ATA/IDE Configuration	Option for configuring the integrated PATA and SATA controller.	Compatible	Both controllers run in Legacy or Compatible mode.
		Disabled	Both controllers disabled.
		Enhanced	Both controllers run in Enhanced or Native Mode.
Legacy IDE Channels[1)]	Option for configuring the Legacy IDE channels in Compatible mode.	SATA Pri, PATA Sec	SATA drives are address primarily and PATA drive secondarily.
		SATA only	Only use SATA drives.
		PATA only	Only use PATA drives.
Configure SATA as[2)]	The Serial ATA connections supported by the Southbridge can be defined here.	IDE	The serial ATA hard drive is used as a parallel ATA physical drive.
		RAID	RAID 0, 1, 5, 10 or Intel® Matrix Storage technology can be configured here with the serial ATA hard drive.
		AHCI	The AHCI setting enables the internal memory driver for SATA functions, which increases the storage performance for random read-write access by allowing the drive itself to determine the sequence of commands.
Configure SATA as Channels[3)]	SATA or PATA drives can be configured as primary or secondary devices.	Before PATA	The SATA drives are the Primary Devices, meaning PATA are Secondary.
		Behind PATA	The PATA drives are the Primary Devices, meaning SATA are Secondary.
AHCI/RAID SATA hot plug[4)]	Hot plugging support for AHCI/RAID systems can be set up here.	Enabled	Disables hot plug support.
		Disabled	Enables hot plug support.
Primary IDE Master	The drive in the system that is connected to the IDE primary master port is configured here.	Enter	Opens the submenu see "Primary IDE master" on page 186
Primary IDE slave	The drive in the system that is connected to the IDE primary slave port is configured here.	Enter	Opens the submenu see "Primary IDE slave" on page 187
Secondary IDE master	The drive in the system that is connected to the IDE secondary master port is configured here.	Enter	Opens the submenu see "Secondary IDE master" on page 188
Secondary IDE slave	The drive in the system that is connected to the IDE secondary slave port is configured here.	Enter	Opens the submenu see "Secondary IDE slave" on page 189
Hard disk write protect	Write protection for the hard drive can be enabled/disabled here.	Enabled	Enables this function
		Disabled	Disables this function
IDE Detect Time Out (Sec)	Configuring the time overrun limit value for the ATA/ATAPI device identification.	0, 5, 10, 15, 20, 25, 30, 35	Time setting in seconds.

BIOS setting	Description	Configuration options	Effect
ATA(PI) 80-Pin Cable Detection	Detects whether an 80 pin cable is connected to the drive, the controller or to both.	Host & device	Using both IDE controllers (motherboard, disk drive).
		Host	IDE controller motherboard used.
	Information: **This option is not available on the PPC800 CPU board. Therefore this setting is not relevant.**	Device	IDE disk drive controller used.

1) These settings are only possible if *ATA/IDE Configuration* is set to *Compatible*.
2) These settings are only possible if *ATA/IDE Configuration* is set to *Enhanced*.
3) These settings are only possible if *ATA/IDE Configuration* is set to *Enhanced* and *Configure SATA as* to *IDE*.
4) These settings are only possible if *ATA/IDE configuration* is set to *Enhanced* and *Configure SATA as* is set to *RAID* or AHCI.

1.4.8.1 Primary IDE master

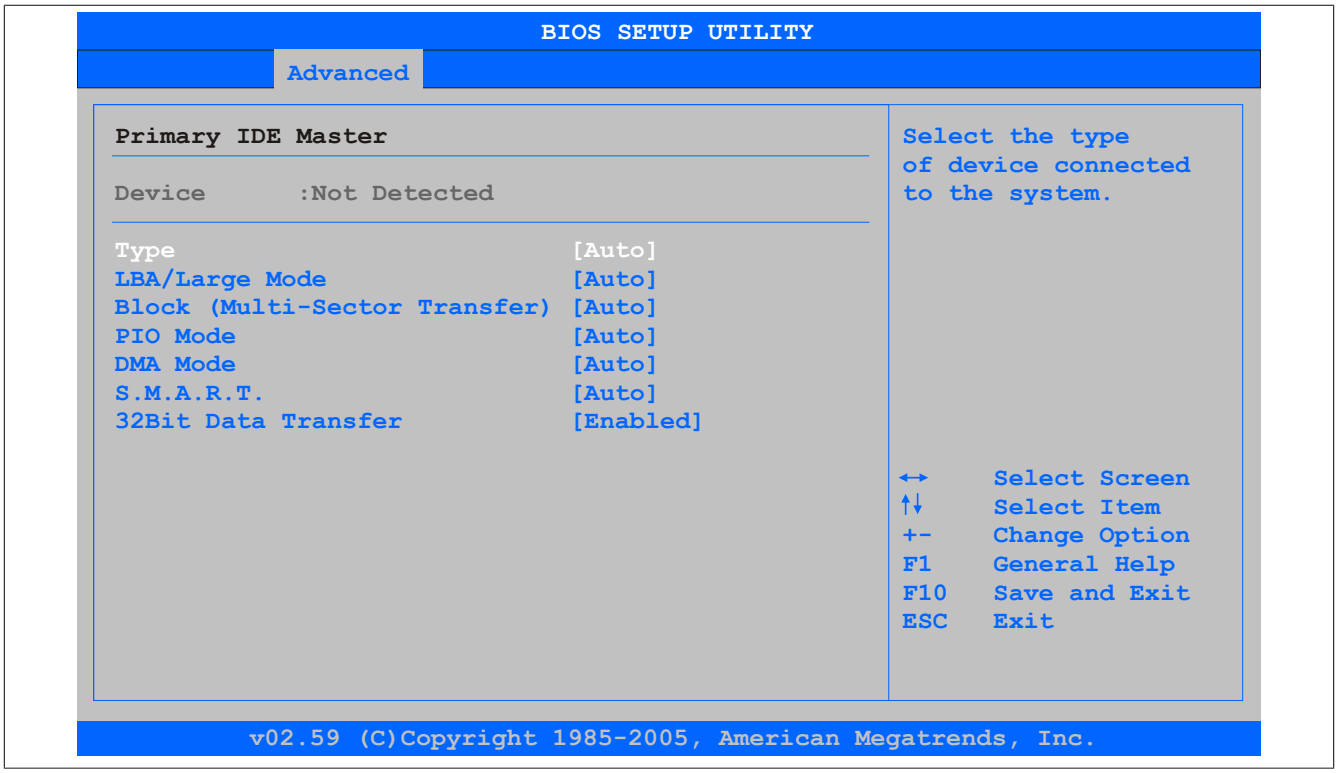

Figure 98: 945GME Primary IDE Master

BIOS setting	Description	Configuration options	Effect
Type	The type of drive connected to the primary master is configured here.	Not installed	No drive installed.
		Auto	Automatic recognition of the drive and setup of appropriate values.
		CD/DVD	CD -/ DVD drive.
		ARMD	ARMD - drive (zip drive)
LBA/Large Mode	This option activates the logical block addressing / large mode for IDE.	Disabled	Disables this function
		Auto	Automatic enabling of this function when supported by the system.
Block (Multi-Sector Transfer)	This option enables the block mode for IDE hard drives. When this option is enabled, the number of blocks per request from the configuration sector of the hard drive is read.	Disabled	Disables this function
		Auto	Automatic enabling of this function when supported by the system.
PIO Mode	The PIO mode determines the data rate of the hard drive.	Auto	Automatic configuration of PIO mode.
		0, 1, 2, 3, 4	Manual configuration of PIO mode.
DMA Mode	The data transfer rate to and from the primary master drive is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Auto	Automatic definition of the transfer rate.
		Disabled	Manual definition of the transfer rate.
S.M.A.R.T.	Monitoring function of modern hard drives (self-monitoring, analysis and reporting technology).	Auto	Automatic detection and enabling.
		Enabled	Enables this function
		Disabled	Disables this function
32 Bit Data Transfer	This function enables 32-bit data transfer.	Enabled	Enables this function
		Disabled	Disables this function

Table 146: 945GME Primary IDE Master setting options

1.4.8.2 Primary IDE slave

```
BIOS SETUP UTILITY
Advanced

Primary IDE Slave                          Select the type
                                           of device connected
Device      :Not Detected                  to the system.

Type                              [Auto]
LBA/Large Mode                    [Auto]
Block (Multi-Sector Transfer)     [Auto]
PIO Mode                          [Auto]
DMA Mode                          [Auto]
S.M.A.R.T.                        [Auto]
32Bit Data Transfer               [Enabled]

                                           ←→    Select Screen
                                           ↑↓    Select Item
                                           +-    Change Option
                                           F1    General Help
                                           F10   Save and Exit
                                           ESC   Exit

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```

Figure 99: 945GME Primary IDE Slave

BIOS setting	Description	Configuration options	Effect
Type	The type of drive connected to the primary master is configured here.	Not installed	No drive installed.
		Auto	Automatic recognition of the drive and setup of appropriate values.
		CD/DVD	CD -/ DVD drive.
		ARMD	ARMD - drive (zip drive)
LBA/Large Mode	This option activates the logical block addressing / large mode for IDE.	Disabled	Disables this function
		Auto	Automatic enabling of this function when supported by the system.
Block (Multi-Sector Transfer)	This option enables the block mode for IDE hard drives. When this option is enabled, the number of blocks per request from the configuration sector of the hard drive is read.	Disabled	Disables this function
		Auto	Automatic enabling of this function when supported by the system.
PIO Mode	The PIO mode determines the data rate of the hard drive.	Auto	Automatic configuration of PIO mode.
		0, 1, 2, 3, 4	Manual configuration of PIO mode.
DMA Mode	The data transfer rate to and from the primary master drive is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Auto	Automatic definition of the transfer rate.
		Disabled	Manual definition of the transfer rate.
S.M.A.R.T.	Monitoring function of modern hard drives (self-monitoring, analysis and reporting technology).	Auto	Automatic detection and enabling.
		Enabled	Enables this function
		Disabled	Disables this function
32 Bit Data Transfer	This function enables 32-bit data transfer.	Enabled	Enables this function
		Disabled	Disables this function

Table 147: 945GME Primary IDE Slave setting options

1.4.8.3 Secondary IDE master

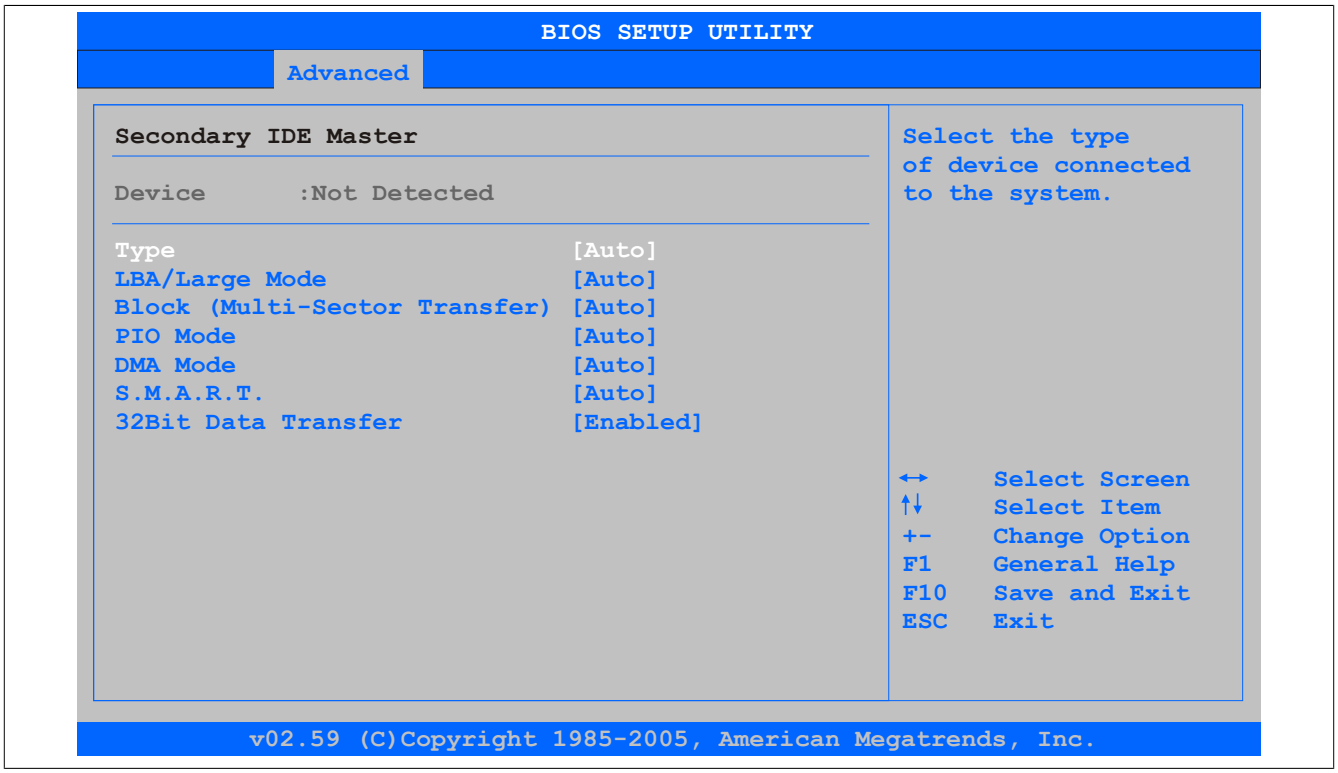

Figure 100: 945GME Secondary IDE Master

BIOS setting	Description	Configuration options	Effect
Type	The type of drive connected to the primary master is configured here.	Not installed	No drive installed.
		Auto	Automatic recognition of the drive and setup of appropriate values.
		CD/DVD	CD -/ DVD drive.
		ARMD	ARMD - drive (zip drive)
LBA/Large Mode	This option activates the logical block addressing / large mode for IDE.	Disabled	Disables this function
		Auto	Automatic enabling of this function when supported by the system.
Block (Multi-Sector Transfer)	This option enables the block mode for IDE hard drives. When this option is enabled, the number of blocks per request from the configuration sector of the hard drive is read.	Disabled	Disables this function
		Auto	Automatic enabling of this function when supported by the system.
PIO Mode	The PIO mode determines the data rate of the hard drive.	Auto	Automatic configuration of PIO mode.
		0, 1, 2, 3, 4	Manual configuration of PIO mode.
DMA Mode	The data transfer rate to and from the primary master drive is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Auto	Automatic definition of the transfer rate.
		Disabled	Manual definition of the transfer rate.
S.M.A.R.T.	Monitoring function of modern hard drives (self-monitoring, analysis and reporting technology).	Auto	Automatic detection and enabling.
		Enabled	Enables this function
		Disabled	Disables this function
32 Bit Data Transfer	This function enables 32-bit data transfer.	Enabled	Enables this function
		Disabled	Disables this function

Table 148: 945GME - Secondary IDE master - Setting options

1.4.8.4 Secondary IDE slave

```
BIOS SETUP UTILITY
Advanced

Secondary IDE Slave                          Select the type
                                             of device connected
Device        :Not Detected                  to the system.

Type                                [Auto]
LBA/Large Mode                      [Auto]
Block (Multi-Sector Transfer)       [Auto]
PIO Mode                            [Auto]
DMA Mode                            [Auto]
S.M.A.R.T.                          [Auto]
32Bit Data Transfer                 [Enabled]

                                             ←→    Select Screen
                                             ↑↓    Select Item
                                             +-    Change Option
                                             F1    General Help
                                             F10   Save and Exit
                                             ESC   Exit

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```

Figure 101: 945GME Secondary IDE Slave

BIOS setting	Description	Configuration options	Effect
Type	The type of drive connected to the primary master is configured here.	Not installed	No drive installed.
		Auto	Automatic recognition of the drive and setup of appropriate values.
		CD/DVD	CD -/ DVD drive.
		ARMD	ARMD - drive (zip drive)
LBA/Large Mode	This option activates the logical block addressing / large mode for IDE.	Disabled	Disables this function
		Auto	Automatic enabling of this function when supported by the system.
Block (Multi-Sector Transfer)	This option enables the block mode for IDE hard drives. When this option is enabled, the number of blocks per request from the configuration sector of the hard drive is read.	Disabled	Disables this function
		Auto	Automatic enabling of this function when supported by the system.
PIO Mode	The PIO mode determines the data rate of the hard drive.	Auto	Automatic configuration of PIO mode.
		0, 1, 2, 3, 4	Manual configuration of PIO mode.
DMA Mode	The data transfer rate to and from the primary master drive is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Auto	Automatic definition of the transfer rate.
		Disabled	Manual definition of the transfer rate.
S.M.A.R.T.	Monitoring function of modern hard drives (self-monitoring, analysis and reporting technology).	Auto	Automatic detection and enabling.
		Enabled	Enables this function
		Disabled	Disables this function
32 Bit Data Transfer	This function enables 32-bit data transfer.	Enabled	Enables this function
		Disabled	Disables this function

Table 149: 945GME Secondary IDE Slave - Setting options

1.4.9 USB Configuration

```
BIOS SETUP UTILITY
Advanced

USB Configuration                                   Options

USB Devices Enabled  :                              Disabled
  1 Keyboard, 1 Hub                                 2 USB Ports
                                                    4 USB Ports
USB Functions                  [8 USB Ports]        6 USB Ports
USB 2.0 Controller             [Enabled]            8 USB Ports

Legacy USB Support             [Enabled]
USB Legacy POST-Always         [Enabled]
USB Keyboard Legacy Support    [Enabled]
USB Mouse Legacy Support       [Disabled]
USB Storage Device Support     [Enabled]            ←→    Select Screen
Port 64/60 Emulation           [Disabled]           ↑↓    Select Item
USB 2.0 Controller Mode        [HiSpeed]            +-    Change Option
BIOS EHCI Hand-Off             [Disabled]           F1    General Help
USB Beep Message               [Enabled]            F10   Save and Exit
USB Stick Default Emulation    [Hard Disk]          ESC   Exit
USB Mass Storage Reset Delay   [20 Sec]
Special Delay for USB HDDs     [Disabled]

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```

Figure 102: 945GME Advanced USB Configuration

BIOS setting	Description	Configuration options	Effect
USB Function	USB ports can be enabled/disabled here. The USB numbers (e.g. USB1, USB3, etc.) are printed on the PPC800 housing).	Disabled	Disables the USB port.
		2 USB Ports	USB1, USB3 are enabled.
		4 USB Ports	USB1, USB2, USB3, USB4 are enabled.
		6 USB Ports	USB1, USB2, USB3, USB4, USB5 are enabled.
		8 USB Ports	USB1, USB2, USB3, USB4, USB5, USB are enabled on an AP via SDL.
USB 2.0 controller	Option for enabling or disabling USB 2.0 mode	Enabled	All USB ports run in USB 2.0 mode.
		Disabled	All USB ports run in USB 1.1 mode.
Legacy USB support	Legacy USB support can be enabled/disabled here. USB ports do not function during startup. USB support is available again after the operating system has started. A USB keyboard is still recognized during POST.	Enabled	Enables this function
		Disabled	Disables this function
		Auto	Automatic enabling
USB Legacy POST-Always	Option to enable Legacy USB Support during the POST (Power On Self Test) the same as the Legacy USB Support setting.	Enabled	The BIOS Setup can be called up during the POST using a USB keyboard.
		Disabled	Disables this function
USB Keyboard Legacy Support	USB keyboard support can be enabled/disabled here.	Enabled	Enables this function
		Disabled	Disables this function
USB Mouse Legacy Support	USB mouse support can be enabled/disabled here.	Enabled	Enables this function
		Disabled	Disables this function
USB Storage Device Support	USB memory device support can be enabled/disabled here.	Enabled	Enables this function
		Disabled	Disables this function
Port 64/60 Emulation	Port 64/60 emulation can be enabled/disabled here.	Enabled	USB keyboard functions in Windows NT.
		Disabled	USB keyboard functions on all systems except for Windows NT.
USB 2.0 Controller Mode	Settings can be made for the USB controller here.	Full Speed	12 MBps
		Hi Speed	480 MBps
BIOS EHCI Hand-Off	The support for the operating system can be set up without the fully automatic EHCI function.	Enabled	Enables this function
		Disabled	Disables this function
USB Beep Message	Option for emitting a tone each time a USB device is detected by BIOS during POST.	Enabled	Enables this function
		Disabled	Disables this function
USB Stick Default Emulation	You can set how the USB device is to be used.	Auto	USB devices with fewer than 530MB of memory are simulated as floppy disk drives and devices with larger capacities are simulated as hard drives.
		Hard disk drive	An HDD-formatted drive can be used as an FDD (e.g. zip drive) for starting the system.

Table 150: 945GME Advanced USB Configuration (Setting options)

BIOS setting	Description	Configuration options	Effect
USB Mass Storage Reset Delay	The waiting time that the USB device POST requires after the device start command can be set. **Information:** **The message "No USB mass storage device detected" is displayed if no USB memory device has been installed.**	10 Sec, 20 Sec, 30 Sec, 40 Sec	Value set manually.
Special Delay for USB HDDs	Option for setting a boot delay prior to counting USB 2.0 devices, which allows slow-booting USB devices (e.g. USB hard disks) to boot. **Information:** **This option should only be used when required, since it would otherwise unnecessarily extend the boot process by the configured time.**	Disabled	Disables this function No boot delay is added.
		1 Sec, 2 Sec, 3 Sec, 4 Sec, 5 Sec, 7 Sec, 10 Sec	A boot delay of 1, 2, 3, 4, 5, 7 or 10 seconds is added.

Table 150: 945GME Advanced USB Configuration (Setting options)

1.4.10 Keyboard/mouse configuration

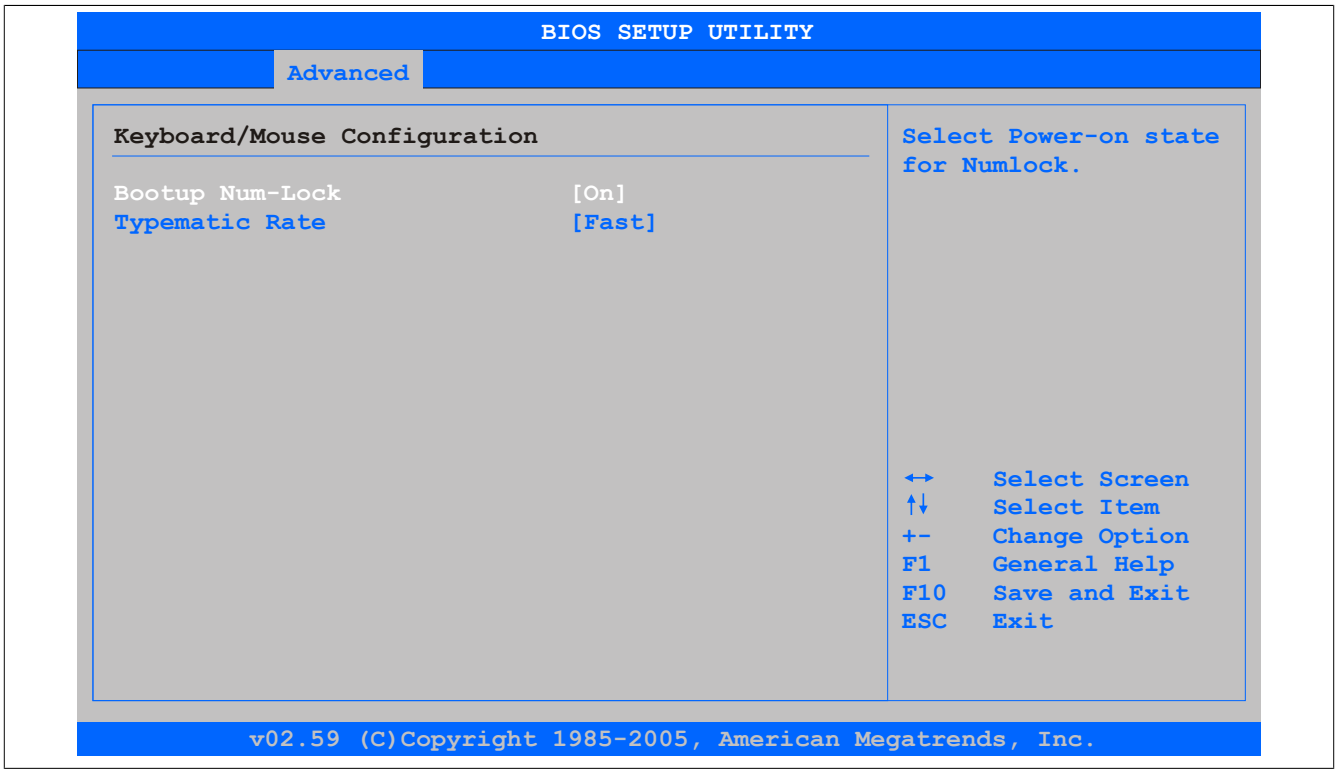

Figure 103: 945GME Advanced keyboard/mouse configuration

BIOS setting	Description	Configuration options	Effect
Boot-up Num-lock	With this field you can define the state of the Num-Lock key when booting.	Off	Only enables the cursor (movement) functions of the numeric keypad
		On	Enables the numeric keypad
Typematic rate	The key repeat function is set here.	Slow	Slow key repeat.
		Fast	Fast key repeat.

Table 151: 945GME Advanced Keyboard/Mouse Configuration (Setting options)

1.4.11 Remote access configuration

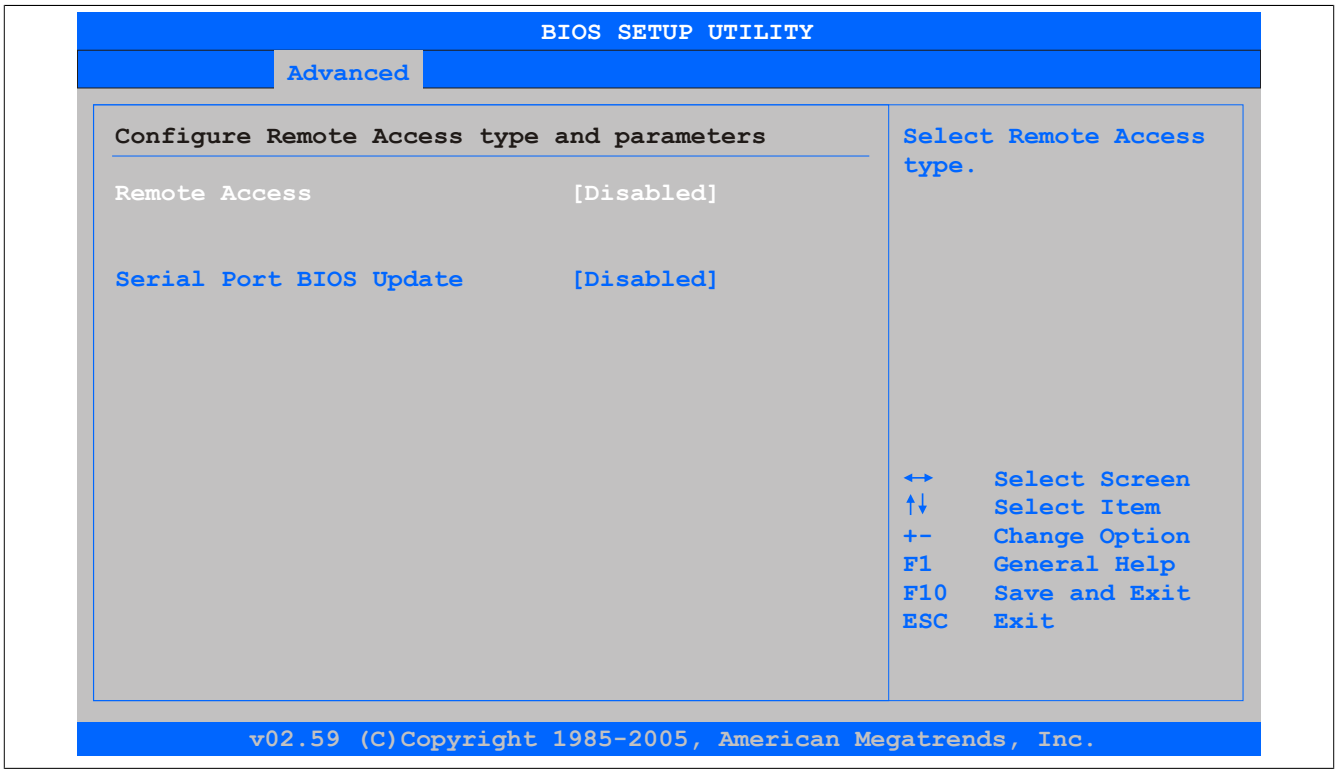

Figure 104: 945GME Advanced Remote Access Configuration

BIOS setting	Description	Configuration options	Effect
Remote access	The remote access function can be enabled/disabled here.	Enabled	Enables this function
		Disabled	Disables this function
Serial port number	The serial interface can be set using this option as long as disabled is not entered in the *Remote access* field.	COM1	Enables the COM1 interface as remote access interface.
		COM2	Enables the COM2 interface as remote access interface.
Base address, IRQ	Displays the logical address and interrupt for the serial port as long as disabled is not entered in the *Remote access* field.	None	-
Serial port mode	The serial port transfer rate is defined here as long as disabled is not entered in the *Remote access* field.	115200 8,n,1 57600 8,n,1 38400 8,n,1 19200 8,n,1 09600 8,n,1	Value set manually.
Flow control	This setting determines how the transfer is controlled via the interface. **Information:** **The setting must be the same on the terminal and the server.**	None	The interface is operated without transfer control.
		Hardware	The interface transfer control is carried out through hardware. This mode must be supported by a cable.
		Software	The interface transfer control is carried out through software.
Redirection After BIOS POST	The redirection after start up can be set here as long as disabled is not entered in the *Remote access* field.	Disabled	The redirection is switched off after start up.
		Boot loader	Redirection is enabled during system start up and charging.
		Always	Redirection is always enabled.
Terminal type	The type of connection can be chosen here, as long as disabled is not entered in the *Remote access* field.	ANSI, VT100, VT-UTF8	Manual configuration of the connection type.
VT-UTF8 combo key support	With this option, the VT-UTF8 Combo Key Support for the ANSI and VT100 connections can be enabled as long as "Disabled" is not entered in the *Remote access* field.	Enabled	Enables this function
		Disabled	Disables this function
Sredir Memory Display Delay	The memory output delay can be set using this option as long as disabled is not entered in the *Remote access* field (Sredir -> serial redirection).	No delay	No delay.
		Delay 1 sec, Delay 2 sec, Delay 4 sec	Value set manually.

Table 152: 945GME Advanced Remote Access Configuration (Setting options)

BIOS setting	Description	Configuration options	Effect
Serial port BIOS update	During system start up, the update is loaded via the serial interface in the processor. **Information:** **If this option is disabled, the boot time is reduced.**	Enabled	Enables this function
		Disabled	Disables this function

Table 152: 945GME Advanced Remote Access Configuration (Setting options)

1.4.12 CPU Board Monitor

Information:

The displayed voltage values (e.g. core voltage, battery voltage) on this BIOS Setup 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 diagnostic functions that can be applied in the event of error.

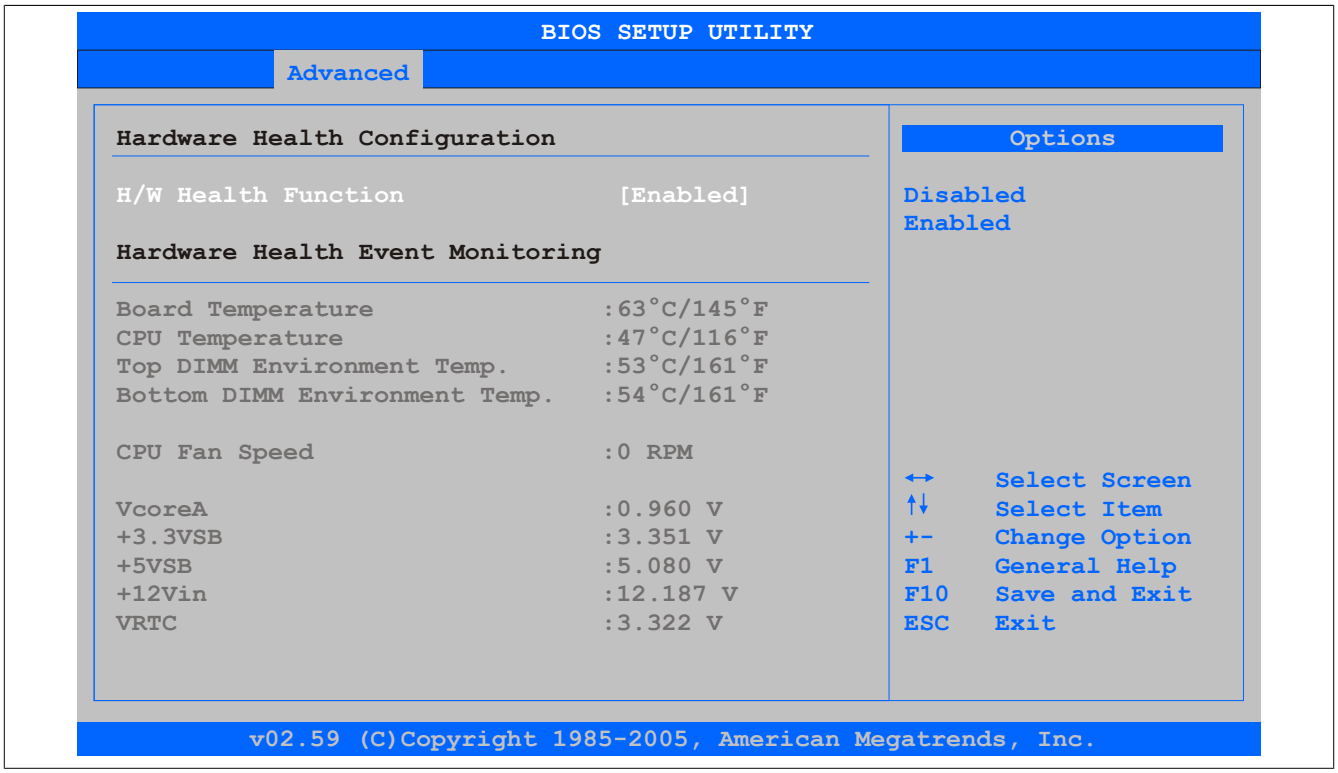

Figure 105: 945GME Advanced CPU Board Monitor

BIOS setting	Description	Configuration options	Effect
H/W Health Function	Option for displaying all values on this page.	Enabled	Displays all values.
		Disabled	No values are shown on this page.
Board temperature	Displays the board temperature in degrees Celsius and Fahrenheit.	None	-
CPU temperature	Displays the processor's temperature (in degrees Celsius and Fahrenheit).	None	-
Top DIMM Environment Temp.	Displays the temperature of the first DRAM module.	None	-
Bottom DIMM Environment Temp.	Displays the temperature of the second DRAM module.	None	-
CPU Fan Speed	Displays the rotating speed of the processor fan.	None	-
VcoreA	Displays the processor's core voltage A in volts.	None	-
+3.3VSB	Displays the current voltage of the 3.3 volt supply	None	-
+5VSB	Displays the current voltage of the 5 volt supply	None	-
+12Vin	Displays the current voltage of the 12 volt supply	None	-
VRTC	Displays the battery voltage in volts	None	-

Table 153: 945GME Advanced CPU Board Monitor (Setting options)

1.4.13 Main Board/Panel Features

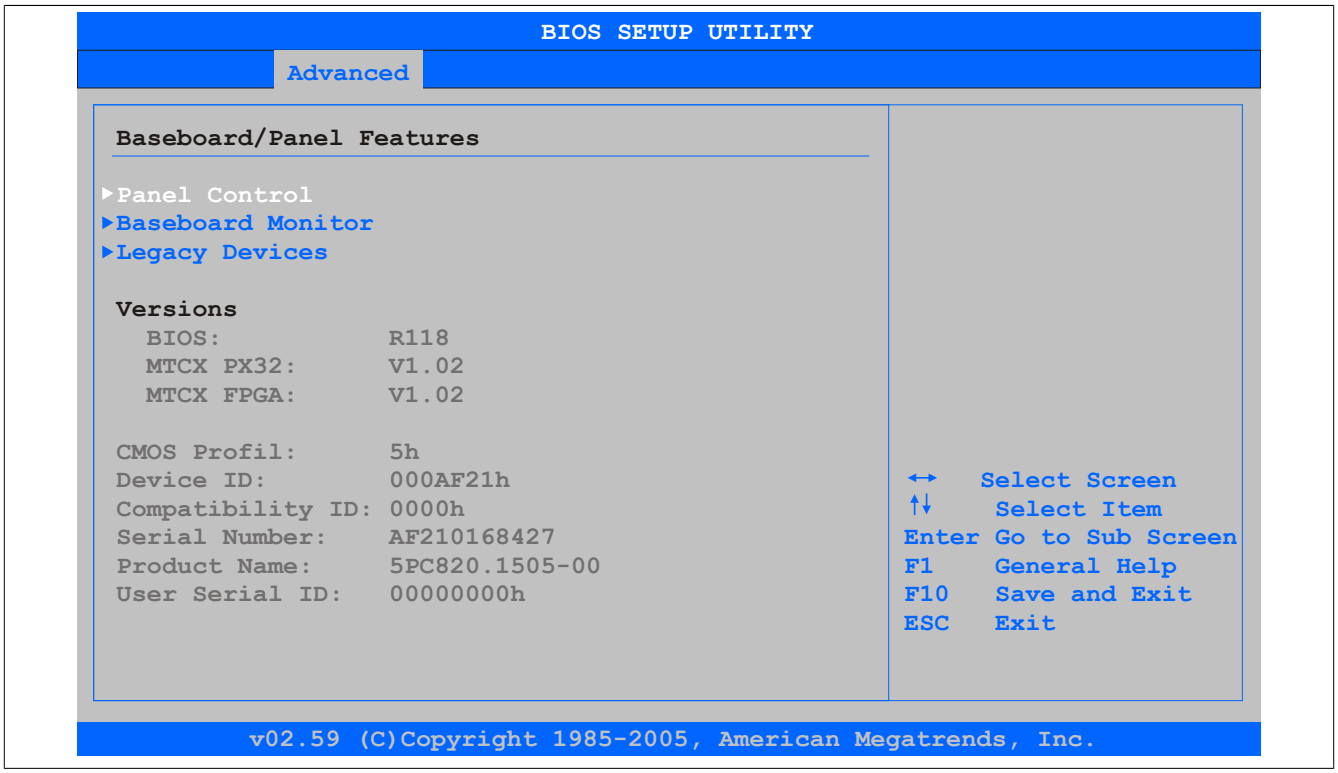

Figure 106: 945GME Advanced Baseboard/Panel Features

BIOS setting	Description	Configuration options	Effect
Panel control	For special setup of connected panels (display units).	Enter	Opens the submenu see "Panel control" on page 195
Baseboard Monitor	Display of various temperatures and fan speeds.	Enter	Opens the submenu see "Baseboard Monitor" on page 196
Legacy Devices	Special settings for the interface can be changed here.	Enter	Opens the submenu see "Legacy Devices" on page 197
BIOS	Displays the BIOS version.	None	-
MTCX PX32	Displays the MTCX PX32 firmware version.	None	-
MTCX FPGA	Displays the MTCX FPGA firmware version.	None	-
CMOS profile	Shows the CMOS profile number.	None	-
Device ID	Displays the hexadecimal value of the hardware device ID.	None	-
Compatibility ID	Displays the version of the device within the same B&R device code. This ID is needed for Automation Runtime.	None	-
Serial number	Displays the B&R serial number	None	-
Product name	Displays the B&R model number	None	-
User serial ID	Displays the user serial ID. This 8-digit hexadecimal value can be freely specified by the user (e.g. to give the device a unique ID) and can only be changed using the "B&R Control Center" included with the ADI driver.	None	-

Table 154: 945GME Advanced Baseboard/Panel Features setting options

1.4.13.1 Panel control

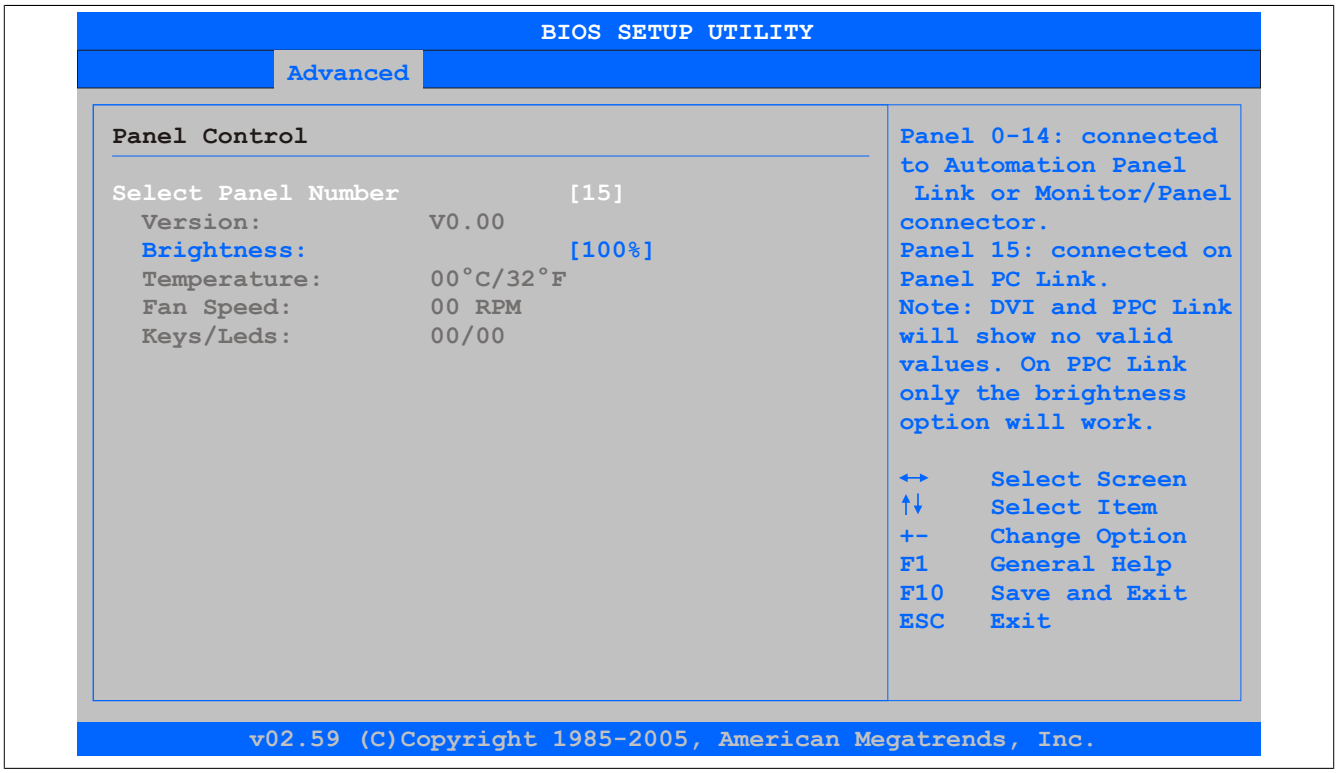

Figure 107: 945GME Panel Control

BIOS setting	Description	Configuration options	Effect
Select panel number	Selection of the panel number for which the values should be read out and/or changed.	0...15	Selection of panel 0 - 15.
Version	Displays the firmware version of the SDLR controller	None	-
Brightness	For setting the brightness of the selected panel.	0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%	Sets the brightness (in %) of the selected panel. Changes are effective immediately.
Temperature	Displays the selected panel's temperature (in degrees Celsius and Fahrenheit).	None	-
Fan speed	Displays fan speed for the selected panel.	None	-
Keys/LEDs	Displays the available keys and LEDs on the selected panel.	None	-

Table 155: 945GME Panel Control (Setting options)

1.4.13.2 Baseboard Monitor

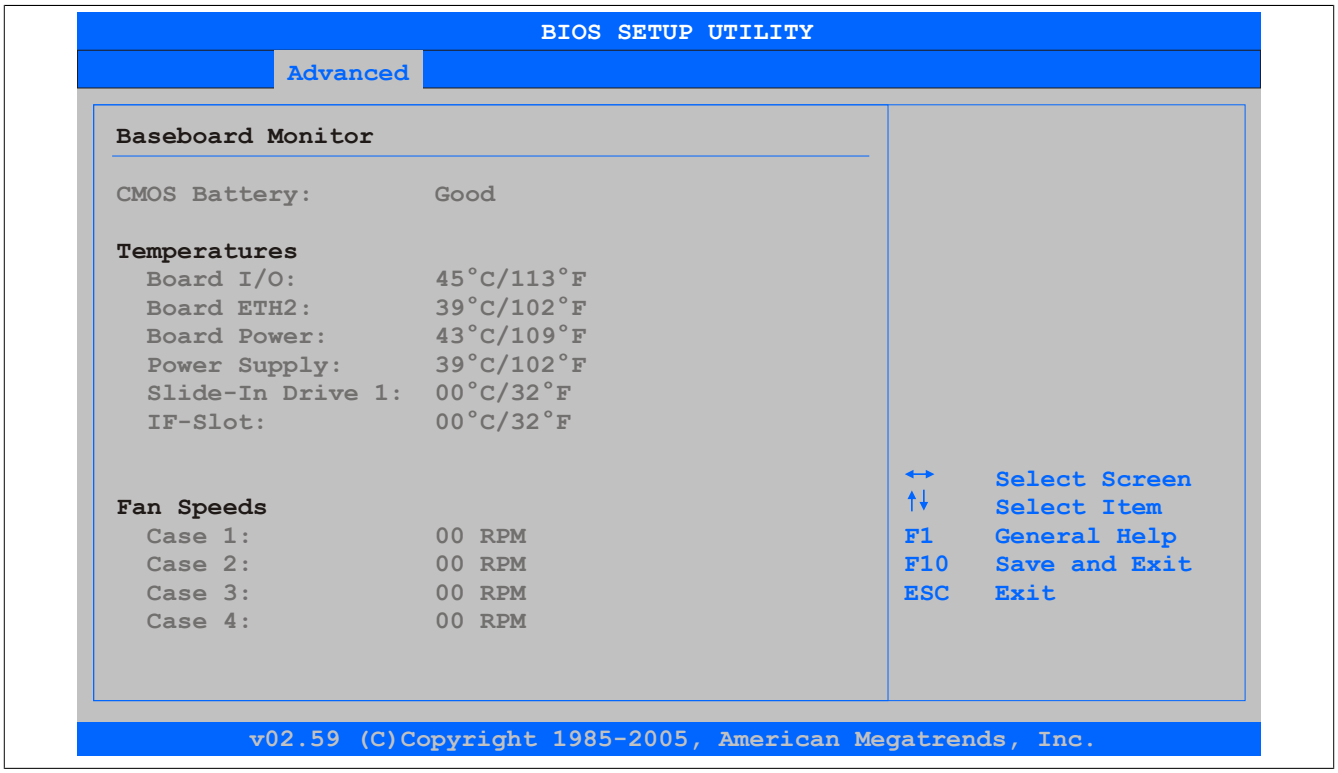

Figure 108: 945GME Baseboard Monitor

BIOS setting	Description	Configuration options	Effect
CMOS Battery	Displays the battery status. **n.a.** - Not available **Good** - Battery OK. **Bad** - Battery not OK.	None	-
Board I/O	Displays the temperature in the I/O area in degrees Celsius and Fahrenheit.	None	-
Board ETH2	Displays the temperature in the ETH2 controller chip area in degrees Celsius and Fahrenheit.	None	-
Board Power	Displays the power supply temperature in degrees Celsius and Fahrenheit.	None	-
Power Supply	Displays the temperature in the power supply in degrees Celsius and Fahrenheit.	None	-
Slide-In Drive 1	Displays the temperature of the slide-in drive 1 in degrees Celsius and Fahrenheit.	None	-
IF Slot	Displays the temperature of the IF slot in degrees Celsius and Fahrenheit.	None	-
Case 1	Displays the fan speed of housing fan 1.	None	-
Case 2	Displays the fan speed of housing fan 2.	None	-
Case 3	Displays the fan speed of housing fan 3.	None	-
Case 4	Displays the fan speed of housing fan 4.	None	-

Table 156: 945GME Baseboard Monitor (Setting options)

1.4.13.3 Legacy Devices

```
BIOS SETUP UTILITY
Advanced

Legacy Devices                                  Enable/Disable the
                                                COM 1 port.
COM A:                          [Enabled]
  Base I/O address:             [3F8]
  Interrupt:                    [IRQ 4]
COM C:                          [Enabled]
  Base I/O address:             [3E8]
  Interrupt:                    [IRQ 11]
COM D:                          [Disabled]
COM E:                          [Disabled]
                                                ←→    Select Item
ETH2 LAN controller:            [Enabled]       ↑↓    Select Screen
ETH2 MAC Address:               00:60:65:07:71:CF +-  Change Option
                                                F1    General Help
                                                F10   Save and Exit
                                                ESC   Exit

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```

Figure 109: 945GME Legacy Devices

BIOS setting	Description	Configuration options	Effect
COM A	Setting for the **COM1** serial interface in the system.	Enabled	Enables the interface
		Disabled	Disables the interface
Base I/O address	Selects the base I/O address for the COM port	238, 2E8, 2F8, 328, 338, 3E8, 3F8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM port.	IRQ 3, IRQ 4, IRQ 5, IRQ 6, IRQ 7, IRQ 10, IRQ 11, IRQ 12	Selected interrupt is assigned.
COM C	Setting the COM port for the **touch screen on the monitor/panel** connector.	Enabled	Enables the interface
		Disabled	Disables the interface
Base I/O address	Selects the base I/O address for the COM port	238, 2E8, 2F8, 328, 338, 3E8, 3F8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM port.	IRQ 3, IRQ 4, IRQ 5, IRQ 6, IRQ 7, IRQ 10, IRQ 11, IRQ 12	Selected interrupt is assigned.
COM D	Sets the COM port for the touch screen on the AP Link connector.	Enabled	Enables the interface
		Disabled	Disables the interface
Base I/O address	Selects the base I/O address for the COM port	238, 2E8, 2F8, 328, 338, 3E8, 3F8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM port.	IRQ 3, IRQ 4, IRQ 5, IRQ 6, IRQ 7, IRQ 10, IRQ 11, IRQ 12	Selected interrupt is assigned.
COM E	Configuration of the COM port on the **B&R add-on interface**.	Enabled	Enables the interface
		Disabled	Disables the interface
Base I/O address	Selects the base I/O address for the COM port	238, 2E8, 2F8, 328, 338, 3E8, 3F8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM port.	IRQ 3, IRQ 4, IRQ 5, IRQ 6, IRQ 7, IRQ 10, IRQ 11, IRQ 12	Selected interrupt is assigned.
Interrupt	Selection of the interrupt for the CAN port.	IRQ 10, NMI	Selected interrupt is assigned.
ETH2 LAN controller	Option for turning the onboard LAN controller (ETH2) on and off	Enabled	Enables the controller
		Disabled	Disables the controller
ETH2 MAC address	Displays the Ethernet 2 controller MAC address.	None	-

Table 157: 945GME Legacy Devices (Setting options)

1.5 Boot

```
BIOS SETUP UTILITY
Main   Advanced   Boot   Security   Power   Exit

Boot Priority Selection          [Type Based]

Boot Device Priority
1st Boot Device                  [Primary Master]
2nd Boot Device                  [Primary Slave]
3rd Boot Device                  [USB Floppy]
4th Boot Device                  [USB Removable Devi]
5th Boot Device                  [USB Harddisk]
6th Boot Device                  [USB CDROM]
7th Boot Device                  [Secondary Master]
8th Boot Device                  [Secondary Slave]

Boot Settings Configuration
Quick Boot                       [Enabled]
Quiet Boot                       [Disabled]
Automatic Boot List Retry        [Disabled]
AddOn ROM Display Mode           [Keep Current]
Halt On Error                    [Disabled]
Hit ´DEL´ Message Display        [Enabled]
Interrupt 19 Capture             [Disabled]
PXE Boot to LAN (ETH1)           [Disabled]
Slide-In 2 Option-ROM            [Disabled]
Power Loss Control               [Turn On]

The device based boot priority list allows to select from a list of currently detected devices.
The type based boot priority list allows to select device types even if a respective device is not (yet) present.

←→   Select Screen
↑↓   Select Item
+-   Change Option
F1   General Help
F10  Save and Exit
ESC  Exit

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```

Figure 110: 945GME Boot Menu

BIOS setting	Description	Configuration options	Effect
Boot priority selection	Option for determining the method for how drives should be booted	Device based	Only lists devices that are recognized by the system. The order of devices in this list can be changed. **Information:** **It is only possible to use either "Device based" or "Type based". Using both together is not permitted.**
		Type based	The boot sequence of a device type list can be changed. It is also possible to add device types that are not connected to this list. **Information:** **It is only possible to use either "Device based" or "Type based". Using both together is not permitted.**
1st boot device 2nd boot device 3rd boot device 4th boot device 5th boot device 6th boot device 7th boot device 8th boot device	Option for selecting drives to be used for booting	Disabled, Primary Master, Primary Slave, Secondary Master, Secondary Slave, Legacy Floppy, USB Floppy, USB Hard Disk, USB CDROM, USB Removeable Device, Onboard LAN, External LAN, PCI Mass Storage PCI SCSI Card, Any PCI BEV Device, Third Master, Third Slave, PCI RAID, Local BEV ROM	Specifies the desired boot sequence
Quick Boot	This function reduces the boot time by skipping some POST procedures.	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.
Automatic Boot List Retry	With this option, the operating system attempts to automatically restart following startup failure.	Enabled	Enables this function
		Disabled	Disables this function

Table 158: 945GME Boot Menu (Setting options)

BIOS setting	Description	Configuration options	Effect
Add-On ROM Display Mode	Sets the display mode for the ROM (during the booting procedure).	Force BIOS	An additional BIOS part can be displayed.
		Keep current	BIOS information is displayed.
Halt On Error	This option sets whether the system should pause the Power On Self Test (POST) when it encounters an error.	Enabled	The system pauses. The system pauses every time an error is encountered.
		Disabled	The system does not pause. All errors are ignored.
Hit 'DEL' Message Display	Settings can be made here for the "Hit 'DEL' Message" display. **Information:** **When quiet boot is activated the message is not displayed.**	Enabled	The message is displayed.
		Disabled	The message is not displayed.
Interrupt 19 Capture	This function can be used to incorporate the BIOS interrupt.	Enabled	Enables this function
		Disabled	Disables this function
PXE boot to LAN (ETH1)	Enables/disables the function to boot from LAN (ETH1).	Enabled	Enables this function
		Disabled	Disables this function
Slide-in 2 Optional ROM	Activation/deactivation of an optional ROM for a slide-in 2 drive.	Enabled	Enables this function
		Disabled	Disables this function
Power loss control	Specifies whether the system should be on/off following power loss	Remain off	Remains off.
		Turn on	Powers on.
		Last state	Enables the previous state

Table 158: 945GME Boot Menu (Setting options)

1.6 Security

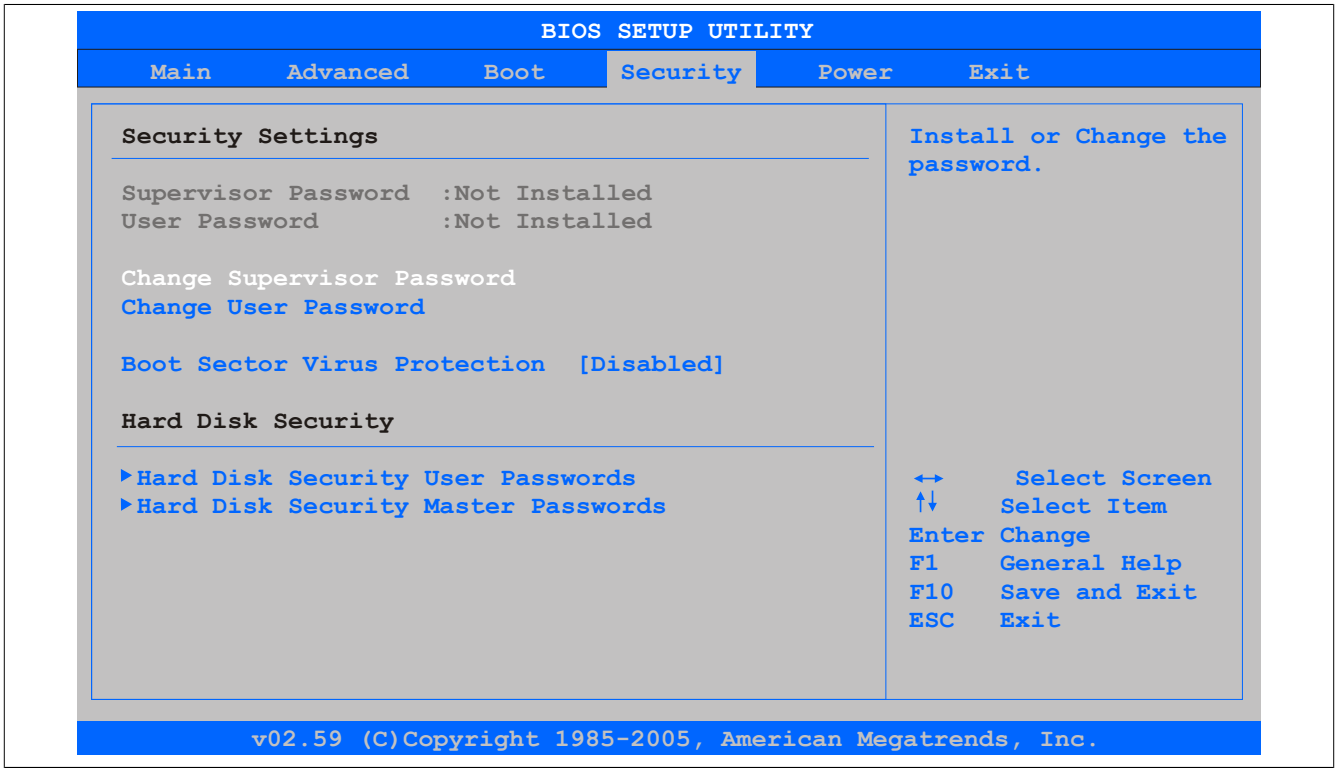

Figure 111: 945GME Security Menu

BIOS setting	Description	Configuration 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	-
Change Supervisor Password	To enter/change a supervisor password. A supervisor password is necessary to edit all BIOS settings.	Enter	Password entry
Change User Password	To enter/change a user password. A user password allows the user to edit only certain BIOS settings.	Enter	Password entry

Table 159: 945GME Security Menu (Setting options)

BIOS setting	Description	Configuration options	Effect
Boot Sector Virus Protection	With this option, a warning is issued when the boot sector is accessed through a program or virus. **Information:** **With this option, only the boot sector is protected, not the entire hard drive.**	Enabled	Enables this function
		Disabled	Disables this function
Hard Disk Security User Passwords	The hard disk security user password can be created here.	Enter	Opens the submenu see "Hard disk security user password" on page 200
Hard Disk Security Master Passwords	The hard disk security master password can be created here.	Enter	Opens the submenu see "Hard disk security master password" on page 201

Table 159: 945GME Security Menu (Setting options)

1.7 Hard disk security user password

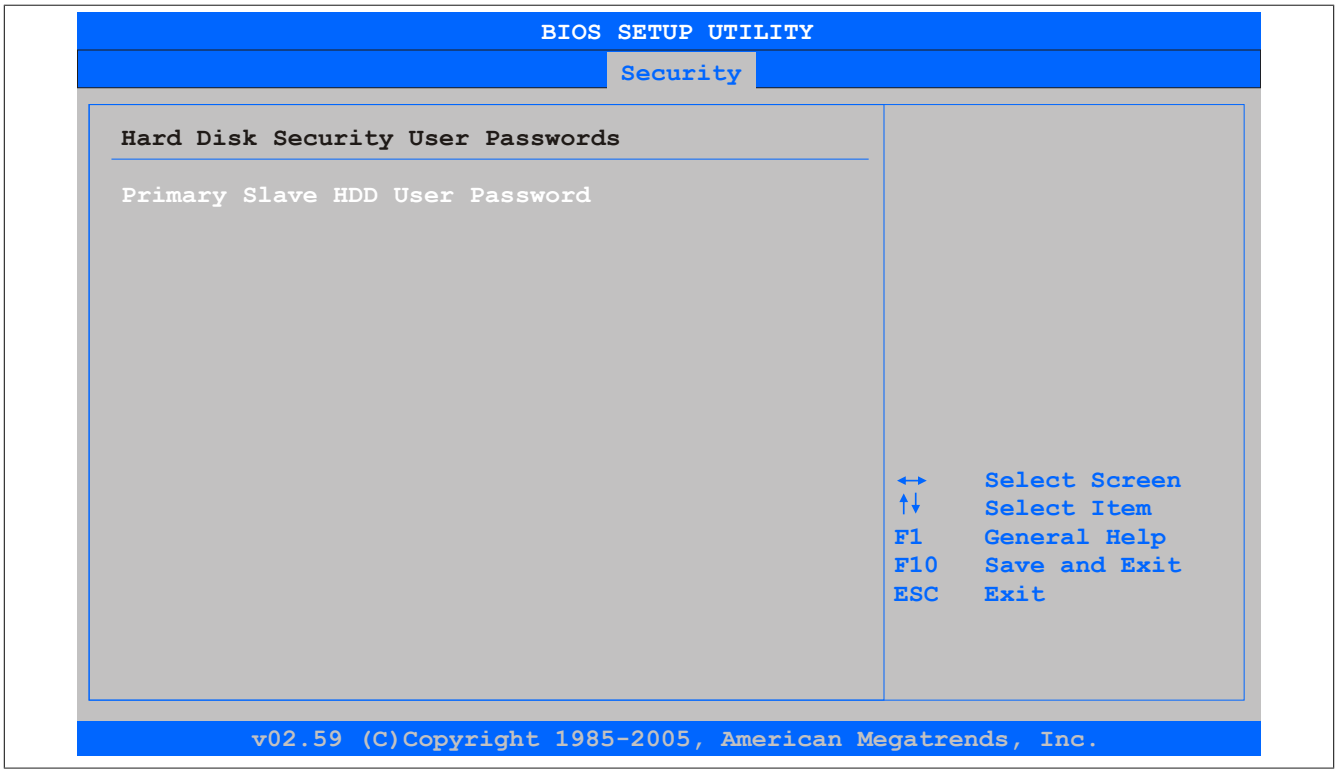

Figure 112: 945GME Hard Disk Security User Password

BIOS setting	Description	Configuration options	Effect
Primary slave HDD user password	This function makes it possible to use the user password to change or configure each hard drive without having to reboot the device. A user password allows the user to edit only certain BIOS settings.	Enter	Password entry

Table 160: 945GME Hard Disk Security User Password

1.8 Hard disk security master password

```
BIOS SETUP UTILITY
Security

Hard Disk Security Master Passwords

Primary Slave HDD Master Password

↔      Select Screen
↑↓     Select Item
F1     General Help
F10    Save and Exit
ESC    Exit

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```

Figure 113: 945GME Hard Disk Security Master Password

BIOS setting	Description	Configuration options	Effect
Primary Slave HDD Master Password	This function makes it possible to use the user password to change or configure each hard drive without having to reboot the device.	Enter	Password entry

Table 161: 945GME Hard Disk Security Master Password

1.9 Power

```
BIOS SETUP UTILITY
Main   Advanced   Boot   Security   Power   Exit

Congigure power management and control

Power Management/APM          [Enabled]
Suspend Time Out              [Disabled]
Video Power Down Mode         [Suspend]
Hard Disk Power Down Mode     [Suspend]
Keyboard & PS/2 Mouse         [MONITOR]
FDC/LPT/COM Ports             [MONITOR]
Primary Master IDE            [MONITOR]
Primary Slave IDE             [MONITOR]
Secondary Master IDE          [MONITOR]
Secondary Slave IDE           [MONITOR]

Resume On Ring                [Disabled]
Resume On PME#                [Disabled]
Resume On RTC Alarm           [Disabled]

Power Button Mode             [On/Off]

Enable or disable
APM.

↔      Select Screen
↑↓     Select Item
+-     Change Option
F1     General Help
F10    Save and Exit
ESC    Exit

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```

Figure 114: 945GME Power Menu

BIOS setting	Description	Configuration options	Effect
Power Management / APM	This option switches the APM function on or off. This is an advanced plug & play and power management functionality.	Enabled	Enables this function
		Disabled	Disables this function
Suspend Time Out	Using this option, you can configure how long the system stays inactive (all components but the CPU are shut off, if possible) before entering suspend mode.	1 min, 2 min, 4 min, 8 min, 10 min, 20 min, 30 min, 40 min, 50 min, 60 min	Value set manually.
		Disabled	Disables this function
Video Power Down Mode	This option allows you to set the energy saving mode for the monitor.	Disabled	Do not switch off the monitor.
		Standby	Monitor goes to standby mode.
		Suspend	Monitor goes to suspend mode.
Hard Disk Power Down Mode	This option allows you to set the energy saving mode for the hard drive.	Disabled	Do not switch off the monitor.
		Standby	Monitor goes to standby mode.
		Suspend	Monitor goes to suspend mode.
Keyboard & PS/2 Mouse	The monitoring of activities during power saving mode is determined here.	MONITOR	Keyboard or PS/2 mouse activities return the system to its normal state from a particular energy saving mode.
		IGNORE	Activities are ignored.
FDC/LPT/COM ports	The monitoring of activities during power saving mode is determined here.	MONITOR	Activity on the parallel port, the serial 1&2 port, or the floppy port returns the system to its normal state from an energy saving mode.
		IGNORE	Activities are ignored.
Primary master IDE	The monitoring of activities during power saving mode is determined here.	MONITOR	Activities in the IRQ of specific connections or devices return the system to its normal state from power saving mode.
		IGNORE	Activities are ignored.
Primary slave IDE	The monitoring of activities during power saving mode is determined here.	MONITOR	Activities in the IRQ of specific connections or devices return the system to its normal state from power saving mode.
		IGNORE	Activities are ignored.
Secondary master IDE	The monitoring of activities during power saving mode is determined here.	MONITOR	Activities in the IRQ of specific connections or devices return the system to its normal state from power saving mode.
		IGNORE	Activities are ignored.
Secondary slave IDE	The monitoring of activities during power saving mode is determined here.	MONITOR	Activities in the IRQ of specific connections or devices return the system to its normal state from power saving mode.
		IGNORE	Activities are ignored.
Resume On Ring	When the modem receives an incoming call, the PC is brought out of power saving mode.	Enabled	Enables this function
		Disabled	Disables this function
Resume on PME#	With this option, you can switch the PME wakeup function on or off.	Enabled	Enables this function
		Disabled	Disables this function
Resume On RTC Alarm	With this option, you can activate the alarm and enter the date and time for the system start.	Enabled	Enables this function
		Disabled	Disables this function
Power Button Mode	This function determines the function of the power button.	On/Off	Power button switches on/off.
		Suspend	Suppresses the function.

Table 162: 945GME Power Menu (Setting options)

1.10 Exit

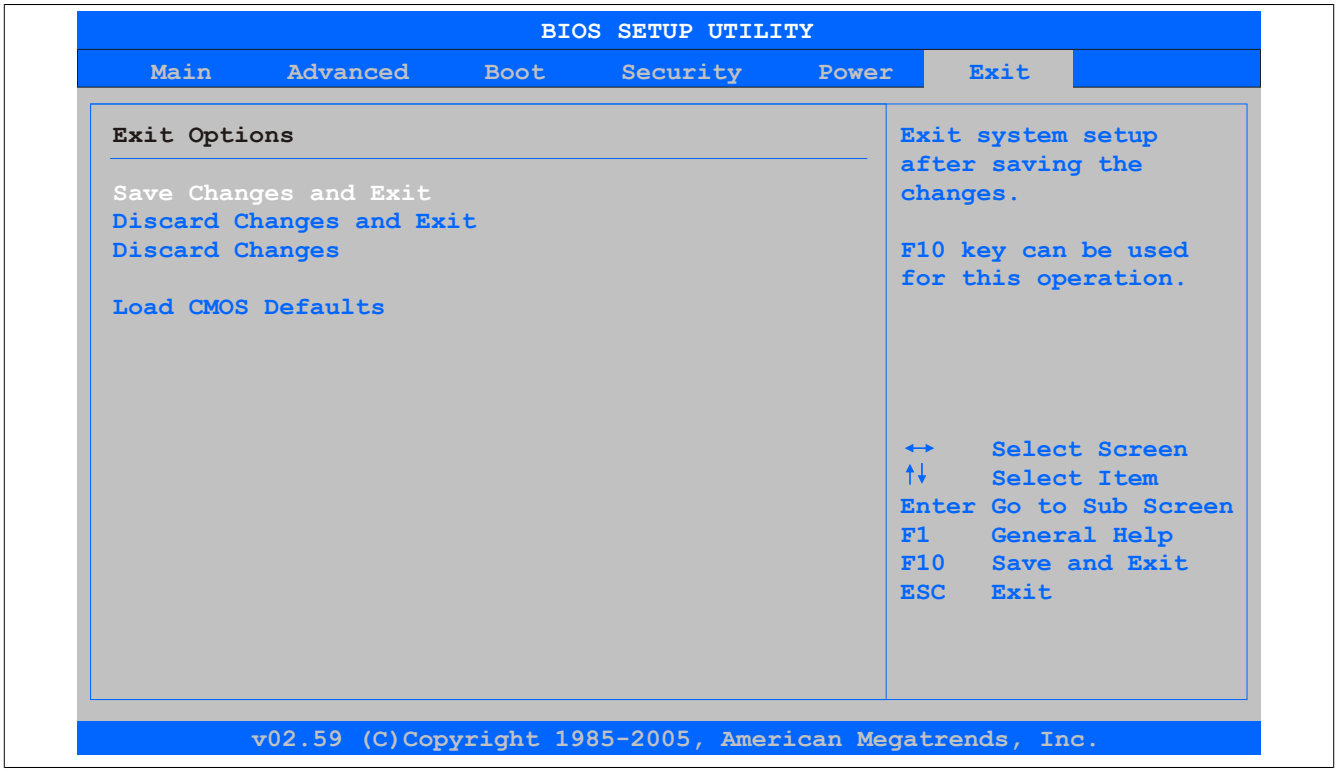


Figure 115: 945GME Exit Menu

BIOS setting	Description	Configuration options	Effect
Save changes and exit	Selecting this option closes BIOS Setup. Any changes made are saved to CMOS after confirmation, and the system is rebooted.	OK / Cancel	
Discard changes and exit	Selecting this option closes BIOS Setup without saving any changes made. The system is then rebooted.	OK / Cancel	
Discard changes	This option can be used to reset any settings that may have been made but have been forgotten in the meantime (provided they have not yet been saved).	OK / Cancel	
Load CMOS Defaults	This item loads the CMOS default values, which are defined by the DIP switch settings. These settings are loaded for all BIOS configurations.	OK / Cancel	

Table 163: 855GME (XTX) Exit Menu (Setting options)

1.11 BIOS default settings

The various positions of the CMOS profile hex switch can be used to load pre-defined BIOS profile settings.

> **Information:**
>
> **The switch position that is set upon delivery represents the optimum BIOS default values for this system and should therefore not be changed.**

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.

Profile number	Optimized for	Switch position	Note
Profile 0	Reserved	0	
Profile 1	System unit 5PC810.SX01-00 / 5PC810.SX02-00 / 5PC810.SX03-00	1	The default settings for this profile can be found in the APC810 user's manual. This can be downloaded for free from the B&R homepage.
Profile 2	5PC810.SX05-00 system unit	2	
Profile 3	System unit 5PC820.SX01-00 / 5PC820.SX01-01	3	The default settings for this profile can be found in the APC820 user's manual. This can be downloaded for free from the B&R homepage.
Profile 4	Reserved	4	
Profile 5	System unit 5PC820.1505-00 / 5PC820.1906-00	5	The default settings for this profile can be found in the PPC800 user's manual. This can be downloaded for free from the B&R homepage.

Table 164: Profile overview

The following pages provide an overview of the BIOS default settings for the different CMOS profile switch positions. Settings highlighted in yellow are variations from the BIOS default profile (=profile 0).

1.11.1 Main

Setting / Option	Profile 0	Profile 5	My setting
System time	-	-	
System date	-	-	
BIOS ID	-	-	
Processor	-	-	
CPU Frequency	-	-	
System Memory	-	-	
Product revision	-	-	
Serial number	-	-	
BC firmware rev.	-	-	
MAC Address (ETH1)	-	-	
Boot counter	-	-	
Running time	-	-	

Table 165: 945GME Main (Profile setting overview)

1.11.2 Advanced

1.11.2.1 ACPI configuration

Setting / Option	Profile 0	Profile 5	My setting
ACPI Aware O/S	Yes	Yes	
ACPI Version Features	ACPI v2.0	ACPI v2.0	
ACPI APIC support	Enabled	Enabled	
Suspend mode	S1 (POS)	S1 (POS)	
USB Device Wakeup from S3/S4	Disabled	Disabled	
Active Cooling Trip Point	Disabled	Disabled	
Passive Cooling Trip Point	Disabled	Disabled	
Critical trip point	105°C	105°C	

Table 166: 945GME Advanced - ACPI Configuration profile setting overview

1.11.2.2 PCI Configuration

Setting / Option	Profile 0	Profile 5	My setting
Plug & Play O/S	No	Yes	
PCI latency timer	64	64	
Allocate IRQ to PCI VGA	Yes	Yes	
Allocate IRQ to SMBUS HC	Yes	Yes	
Allocate IRQ to PCIEX2	Yes	Yes	

Table 167: 945GME Advanced - PCI Configuration Profile setting overview

Setting / Option	Profile 0	Profile 5	My setting
PCI IRQ Resource Exclusion			
IRQ3	Allocated	Available	
IRQ4	Allocated	Allocated	
IRQ5	Available	Available	
IRQ6	Available	Available	
IRQ7	Available	Available	
IRQ9	Allocated	Allocated	
IRQ10	Available	Available	
IRQ11	Allocated	Allocated	
IRQ12	Available	Available	
IRQ14	Allocated	Allocated	
IRQ15	Allocated	Allocated	
PCI Interrupt Routing			
PIRQ A (VGA,PCIEX4, ETH2,UHCI2,HDA)	Auto	Auto	
PIRQ B (PCIEX1, ETH1)	Auto	Auto	
PIRQ C (PCIEX2,IF slot)	Auto	Auto	
PIRQ D (SATA,UHCI1,SMB, PCIEX3)	Auto	Auto	
PIRQ E (INTD,UHCI3,PATA)	Auto	Auto	
PIRQ F (INTA)	Auto	Auto	
PIRQ G (INTB)	Auto	Auto	
PIRQ H (INTC,UHCI0,EHCI)	Auto	Auto	
1st Exclusive PCI	-	-	
2nd Exclusive PCI	-	-	
3rd Exclusive PCI	-	-	

Table 167: 945GME Advanced - PCI Configuration Profile setting overview

1.11.2.3 PCI Express Configuration

Setting / Option	Profile 0	Profile 5	My setting
Active State Power-Management	Disabled	Disabled	
PCIE Port 0 (ETH2)	Auto	Auto	
PCIE Port 1	Auto	Auto	
PCIE Port 2 (IF slot)	Auto	Auto	
PCIE Port 3	Auto	Auto	
PCIE Port 4	Auto	Auto	
PCIE Port 5 (ETH1)	Auto	Auto	
PCIE High Priority Port	Disabled	Disabled	
Res. PCIE Hot Plugging Resource	No	No	
PCIE Port 0 IOxAPIC Enable	Disabled	Disabled	
PCIE Port 1 IOxAPIC Enable	Disabled	Disabled	
PCIE Port 2 IOxAPIC Enable	Disabled	Disabled	
PCIE Port 3 IOxAPIC Enable	Disabled	Disabled	

Table 168: 945GME Advanced - PCI Express Configuration Profile setting overview

1.11.2.4 Graphics configuration

Setting / Option	Profile 0	Profile 5	My setting
Primary Video Device	Internal VGA	Internal VGA	
Internal Graphics Mode Select	Enabled, 8MB	Enabled, 8MB	
DVMT Mode Select	DVMT Mode	DVMT Mode	
DVMT/FIXED Memory	128 MB	128 MB	
Boot Display Device	Auto	Auto	
Boot Display Preference	SDVO-B SDVO-C LFP	LFP SDVO-B SDVO-C	
Local Flat Panel Type	Auto	Auto	
Local flat panel scaling	Centering	Expand Text & Graphics	
SDVO Port B Device	DVI	DVI	
SDVO Port C Device	DVI	None	
SDVO/DVI Hot Plugging Support	Enabled	Enabled	
Display mode persistence	Enabled	Enabled	

Table 169: 945GME Advanced - Graphics Configuration Profile setting overview

1.11.2.5 CPU configuration

Setting / Option	Profile 0	Profile 5	My setting
MPS Revision	1.4	1.4	
Max CPUID value limit	Disabled	Disabled	
Execute disable bit	Enabled	Enabled	
Core Multi-Processing	Enabled	Enabled	

Table 170: 945GME Advanced - CPU Configuration Profile setting overview

Setting / Option	Profile 0	Profile 5	My setting
Intel(R) SpeedStep(tm) tech.	Automatic	Automatic	
Max. CPU frequency	xxxx MHz	xxxx MHz	
C1 Config.	Default	Default	
C2 Config.	Disabled	Disabled	
C3 Config.	Disabled	Disabled	
C4 Config.	Disabled	Disabled	

Table 170: 945GME Advanced - CPU Configuration Profile setting overview

1.11.2.6 Chipset configuration

Setting / Option	Profile 0	Profile 5	My setting
DRAM Frequency	Auto	Auto	
DRAM Refresh Rate	Auto	Auto	
Memory Hole	Disabled	Disabled	
DIMM Thermal Control	Disabled	Disabled	
DT in SPD	Disabled	Disabled	
TS on DIMM	Disabled	Disabled	
High Precision Event Timer	Disabled	Disabled	
IOAPIC	Enabled	Enbled	
APIC ACPI SCI IRQ	Disabled	Disabled	
C4 On C3	Disabled	Disabled	

Table 171: 945GME Advanced - Chipset Configuration Profile setting overview

1.11.2.7 I/O interface configuration

Setting / Option	Profile 0	Profile 5	My setting
Onboard Audio Controller	AC97	HDA	

Table 172: 945GME Advanced - I/O Interface Configuration profile setting overview

1.11.2.8 Clock configuration

Setting / Option	Profile 0	Profile 5	My setting
Spread spectrum	Disabled	Disabled	

Table 173: 945GME Advanced - Clock Configuration Profile setting overview

1.11.2.9 IDE onfiguration

Setting / Option	Profile 0	Profile 5	My setting
ATA/IDE Configuration	Compatible	Compatible	
Legacy IDE Channels	SATA Pri, PATA Sec	SATA Pri, PATA Sec	
Configure SATA as	-	-	
Hard disk write protect	Disabled	Disabled	
IDE detect timeout (sec)	35	35	
ATA(PI) 80-Pin Cable Detection	Host & device	Host & device	
Primary IDE master			
Type	Auto	Auto	
LBA/Large Mode	Auto	Auto	
Block (Multi-Sector Transfer)	Auto	Auto	
PIO Mode	Auto	Auto	
DMA Mode	Auto	Auto	
S.M.A.R.T.	Auto	Auto	
32Bit data transfer	Enabled	Enabled	
Primary IDE slave			
Type	Auto	Auto	
LBA/Large Mode	Auto	Auto	
Block (Multi-Sector Transfer)	Auto	Auto	
PIO Mode	Auto	Auto	
DMA Mode	Auto	Auto	
S.M.A.R.T.	Auto	Auto	
32Bit data transfer	Enabled	Enabled	
Secondary IDE master			
Type	Auto	Auto	
LBA/Large Mode	Auto	Auto	
Block (Multi-Sector Transfer)	Auto	Auto	
PIO Mode	Auto	Auto	
DMA Mode	Auto	Auto	

Table 174: 945GME Advanced - IDE Configuration Profile setting overview

Setting / Option	Profile 0	Profile 5	My setting
S.M.A.R.T.	Auto	Auto	
32Bit data transfer	Enabled	Enabled	
Secondary IDE slave			
Type	Auto	Auto	
LBA/Large Mode	Auto	Auto	
Block (Multi-Sector Transfer)	Auto	Auto	
PIO Mode	Auto	Auto	
DMA Mode	Auto	Auto	
S.M.A.R.T.	Auto	Auto	
32Bit data transfer	Enabled	Enabled	

Table 174: 945GME Advanced - IDE Configuration Profile setting overview

1.11.2.10 USB Configuration

Setting / Option	Profile 0	Profile 5	My setting
USB Function	8 USB Ports	8 USB Ports	
USB 2.0 controller	Enabled	Enabled	
Legacy USB support	Enabled	Enabled	
USB Legacy POST-Always	Enabled	Enabled	
USB Keyboard Legacy Support	Enabled	Enabled	
USB Mouse Legacy Support	Disabled	Disabled	
USB Storage Device Support	Enabled	Enabled	
Port 64/60 Emulation	Disabled	Disabled	
USB 2.0 Controller Mode	HiSpeed	HiSpeed	
BIOS EHCI Hand-Off	Disabled	Disabled	
USB Beep Message	Enabled	Enabled	
USB Stick Default Emulation	Hard disk drive	Hard disk drive	
USB Mass Storage Reset Delay	20 Sec	20 Sec	

Table 175: 945GME Advanced - USB Configuration Profile setting overview

1.11.2.11 Keyboard/mouse configuration

Setting / Option	Profile 0	Profile 5	My setting
Boot-up Num-lock	On	On	
Typematic rate	Fast	Fast	

Table 176: 945GME Advanced Keyboard/Mouse Configuration profile setting overview

1.11.2.12 Remote access configuration

Setting / Option	Profile 0	Profile 5	My setting
Remote Access	Disabled	Disabled	
Serial port BIOS update	Disabled	Disabled	

1.11.2.13 CPU Board Monitor

Setting / Option	Profile 0	Profile 5	My setting
H/W Health Function	Enabled	Enabled	

Table 177: 945GME Advanced CPU board monitor profile setting overview

1.11.2.14 Main Board/Panel Features

Setting / Option	Profile 0	Profile 5	My setting
Panel control			
Select panel number	-	-	
Version	-	-	
Brightness	100%	100%	
Temperature	-	-	
Fan speed	-	-	
Keys/LEDs	-	-	
Baseboard Monitor			
CMOS Battery	-	-	
Board I/O	-	-	
Board ETH2	-	-	
Board Power	-	-	
Power Supply			
Slide-In Drive 1	-	-	

Table 178: 945GME Advanced - Baseboard/Panel Features profile setting overview

Setting / Option	Profile 0	Profile 5	My setting
IF Slot	-	-	
Case 1	-	-	
Case 2	-	-	
Case 3	-	-	
Case 4	-	-	
Legacy Devices			
COM A	Enabled	Enabled	
Base I/O address	3F8	3F8	
Interrupt	IRQ4	IRQ4	
COM C	Enabled	Enabled	
Base I/O address	3E8	3E8	
Interrupt	IRQ11	IRQ11	
COM D	Disabled	Disabled	
Base I/O address	-	-	
Interrupt	-	-	
COM E	Disabled	Disabled	
Base I/O address	-	-	
Interrupt	-	-	
Base I/O address	378	378	
ETH2 LAN Controller	Enabled	Enabled	
ETH2 MAC Address	-	-	

Table 178: 945GME Advanced - Baseboard/Panel Features profile setting overview

1.11.3 Boot

Setting / Option	Profile 0	Profile 5	My setting
Boot priority selection	Type based	Type based	
1st boot device	Onboard LAN	Primary Master	
2nd boot device	Primary Master	Primary Slave	
3rd boot device	Primary Slave	USB Floppy	
4th boot device	USB Floppy	USB Removable Device	
5th boot device	USB Removable Device	USB hard disk	
6th boot device	USB CDROM	USB CDROM	
7th boot device	Secondary Master	Secondary Master	
8th boot device	Secondary Slave	Secondary Slave	
Quick Boot	Enabled	Enabled	
Quiet Boot	Disabled	Disabled	
Automatic Boot List Retry	Disabled	Disabled	
Add-On ROM Display Mode	Keep current	Keep current	
Halt On Error	Disabled	Disabled	
Hit "DEL" Message Display	Enabled	Enabled	
Interrupt 19 Capture	Disabled	Disabled	
PXE boot to LAN (ETH1)	Enabled	Disabled	
Slide-in 2 optional ROM	Enabled	Disabled	
Power loss control	Turn on	Turn on	

Table 179: 945GME Boot profile setting overview

1.11.4 Security

Setting / Option	Profile 0	Profile 5	My setting
Supervisor Password	-	-	
User Password	-	-	
Boot Sector Virus Protection	Disabled	Disabled	
Hard disk security user password	-	-	
Hard disk security master password	-	-	

Table 180: 945GME Security profile setting overview

1.11.5 Power

Setting / Option	Profile 0	Profile 5	My setting
Power Management/APM	Enabled	Enabled	
Suspend Time Out	Disabled	Disabled	
Video Power Down Mode	Suspend	Suspend	
Hard Disk Power Down Mode	Suspend	Suspend	
Keyboard & PS/2 Mouse	MONITOR	MONITOR	
FDC/LPT/COM ports	MONITOR	MONITOR	
Primary master IDE	MONITOR	MONITOR	
Primary slave IDE	MONITOR	MONITOR	
Secondary master IDE	MONITOR	MONITOR	

Table 181: 945GME Power profile setting overview

Setting / Option	Profile 0	Profile 5	My setting
Secondary slave IDE	MONITOR	MONITOR	
Resume On Ring	Disabled	Disabled	
Resume on PME#	Disabled	Disabled	
Resume On RTC Alarm	Disabled	Disabled	
Power Button Mode	On/Off	On/Off	

Table 181: 945GME Power profile setting overview

1.12 BIOS error signals (Beep Codes)

While the B&R industrial PC is booting, the following messages and errors can occur with BIOS. These errors are signaled by different beeping codes.

Beeping code	Description	Necessary User Action
1x short	Memory refresh failed.	Load BIOS defaults. In the event that the error persists, send industrial PC to B&R for testing.
2x short	Parity error: POST error (error in one of the hardware testing procedures)	Check the placement of the inserted card. In the event that the error persists, send industrial PC to B&R for testing.
3x short	Base 64 Kb memory failure: Basic memory defect, RAM error within the initial 64 Kb.	Send industrial PC to B&R for checking.
4x short	Timer not operational: System timer.	Send industrial PC to B&R for checking.
5x short	Processor error: Processor defect.	Send industrial PC to B&R for checking.
6x short	8042 gate A20 failure: Keyboard controller defect (block 8042/ A20 gate). Processor cannot switch to protected mode.	Send industrial PC to B&R for checking.
7x short	Processor exception interrupt error: Virtual mode exception error (CPU generated an interrupt error).	Send industrial PC to B&R for checking.
8x short	Display memory read/write error: Video memory not accessible; graphic card defect or not built in (no fatal error).	Check inserted graphic card position and eventually exchange. In the event that the error persists, send industrial PC to B&R for testing.
9x short	ROM-checksum error: ROM-BIOS-checksum incorrect, EPROM, EEPROM or Flash-ROM component defect, BIOS defect or incorrectly updated.	Send industrial PC to B&R for checking.
10x short	CMOS shutdown register read/write error: CMOS cannot be read/ written.	Send industrial PC to B&R for checking.
11x short	Cache Error / external Cache bad: L2 - Cache on the mainboard is defected.	Send industrial PC to B&R for checking.

Table 182: BIOS post code messages BIOS 945GME

1.13 Distribution of resources

1.13.1 RAM address assignment

RAM address	Address in hexadecimal	Resource
(TOM - 192 kB) – TOM[1)]	N.A.	ACPI reclaim, MPS and NVS area[2)]
(TOM - 8 MB - 192 kB) – (TOM - 192 kB)	N.A.	VGA frame buffer[3)]
1024 kB – (TOM - 8 MB - 192 kB)	100000h - N.A.	Extended memory
869kB – 1024 kB	0E0000h - 0FFFFFh	Runtime BIOS
832kB – 869 kB	0D0000h - 0DFFFFh	Upper memory
640kB – 832 kB	0A0000h - 0CFFFFh	Video memory and BIOS
639kB – 640 kB	09FC00h - 09FFFFh	Extended BIOS data
0 – 639 kB	000000h - 09FC00h	Conventional memory

Table 183: RAM address assignment

1) TOM = Top of Memory: Max. installed DRAM
2) Only if ACPI Aware OS is set to "YES" in the setup.
3) The VGA frame buffer can be reduced to 1 MB in the setup.

1.13.2 I/O address assignments

I/O address	Resource
0000h - 00FFh	Motherboard resources
0170h - 0177h	Secondary IDE channel
01F0h - 01F7h	Primary IDE channel
0238h - 023Fh	COM5
0278h - 027Fh	Hardware Security Key (LPT2)
02E8h - 02EFh	COM4
0376h - 0376h	Secondary IDE channel command port
0377h - 0377h	Secondary IDE channel status port
0378h - 037Fh	Hardware Security Key (LPT1)
0384h - 0385h	CAN Controller
03B0h - 03DFh	Video system
03E8h - 03EFh	COM3
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 184: 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.

1.13.3 Interrupt assignments 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)					○	●	○	○	○			○	○	○					
ACPI[1)]											●								
Real-time clock										●									
Coprocessor (FPU)															●				
Primary IDE channel																●			
Secondary IDE channel																	●		
B&R	COM3 (COM C)				○	○	○	○	○			○	●	○					○
	COM5 (COM D)				○	○	○	○	○			○	○	○					●

Table 185: IRQ interrupt assignments in PIC mode

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

● ... Default setting
○ ... Optional setting

1.13.4 Interrupt assignments in APIC mode

A total of 23 IRQs are available in APIC (**A**dvanced **P**rogrammable **I**nterrupt **C**ontroller) mode. Enabling this option is only effective if done before the Windows operating system is installed.

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)					○	●	○	○	○			○	○	○													
ACPI[1]											●																
Real-time clock										●																	
Coprocessor (FPU)															●												
Primary IDE channel																●											
Secondary IDE channel																	●										
B&R	COM3 (COM C)				○	○	○	○	○			○	●	○													○
	COM5 (COM D)				○	○	○	○	○			○	○	○													●
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 186: IRQ interrupt assignments in APIC mode

1) **A**dvanced **C**onfiguration and **P**ower **I**nterface.
2) PIRQ A: for PCIe; UHCI Host controller 2, VGA controller, Intel High Definition Audio Controller, PCI Express root port 4
3) PIRQ B: for PCIe; PCI Express root port 1, onboard Gigabit LAN controller
4) PIRQ C: for PCIe; PCI express root port 2
5) PIRQ D: for PCIe; UHCI Host controller 1, SMBus controller, PCI Express root port 3, Serial ATA controller in enhanced/native mode 3
6) PIRQ E: PCI bus INTD, UHCI Host Controller 3, Parallel ATA controller in enhanced/native mode
7) PIRQ F: PCI Bus INTA
8) PIRQ G: PCI Bus INTB
9) PIRQ H: PCI bus INTC, UHCI host controller 0, EHCI host controller

● ... Default setting
○ ... Optional setting

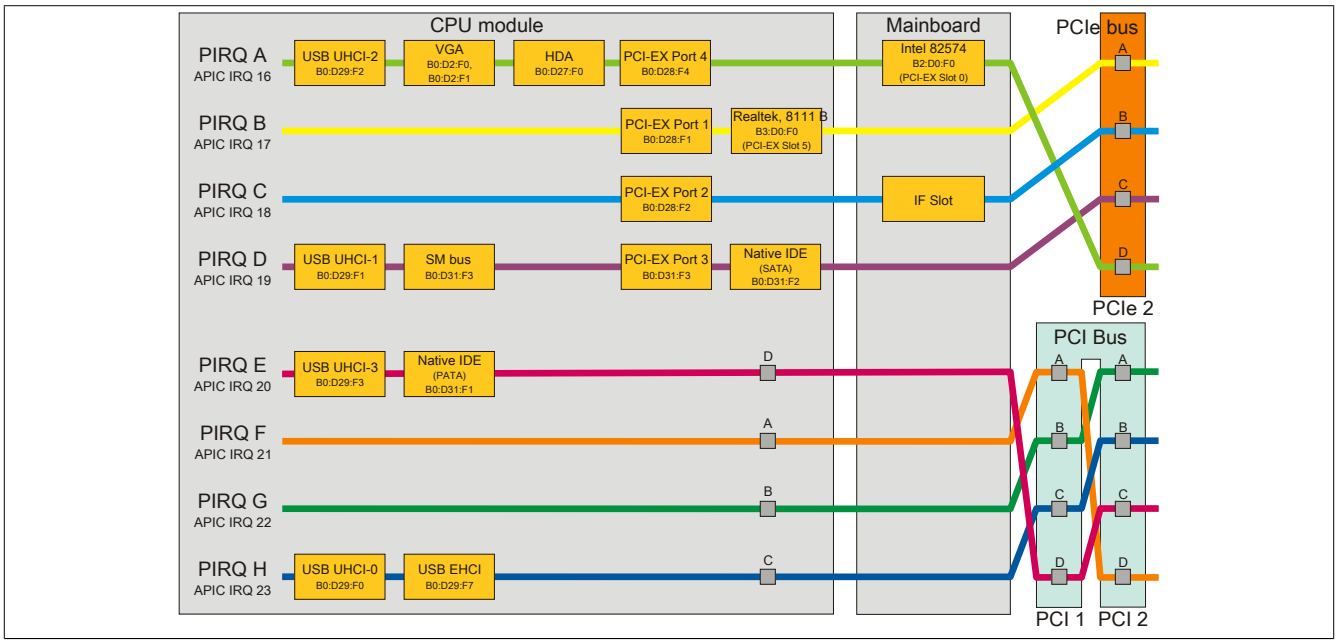


Figure 116: PCI and PCIe routing with activated APIC for CPU boards 945GME version ≥ 1.15

2 Upgrade information

> **Warning!**
>
> **The BIOS and firmware on B&R devices must be kept current. New versions can be downloaded from the B&R website (www.br-automation.com).**

2.1 BIOS upgrade

Upgrade may be necessary in order to accomplish the following:

- Updating implemented functions or adding newly implemented functions or components to BIOS Setup (information about changes can be found in the Readme file for the BIOS upgrade).

2.1.1 Important information

> **Information:**
>
> **Customized BIOS settings are deleted when upgrading BIOS.**

Before starting an upgrade, it helps to determine the various software versions.

2.1.1.1 Which BIOS version and firmware are already installed on the PPC800?

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

- After switching on the PPC800, the BIOS Setup screen can be accessed by pressing <Del>.
- From the BIOS main menu "Advanced", select "Main board/panel features".

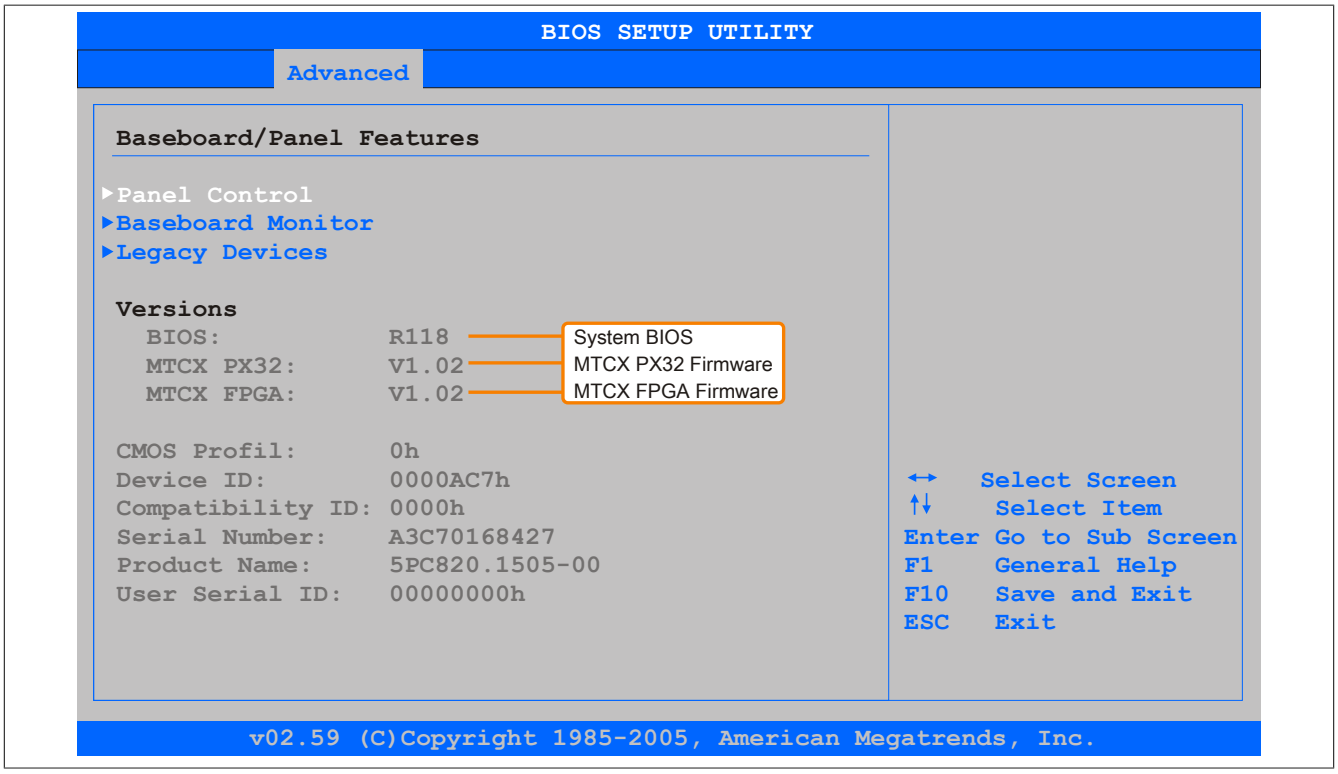


Figure 117: Software version

2.1.1.2 Which firmware is installed on the Automation Panel Link transmitter?

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

- After switching on the PPC800, the BIOS Setup screen can be accessed by pressing <Del>.
- From the BIOS main menu "Advanced", select "Main board/panel features" and then "Panel control".

Information:

The version can only be displayed when an Automation Panel with an AP Link SDL transmitter (5AC801.SDL0-00) is connected.

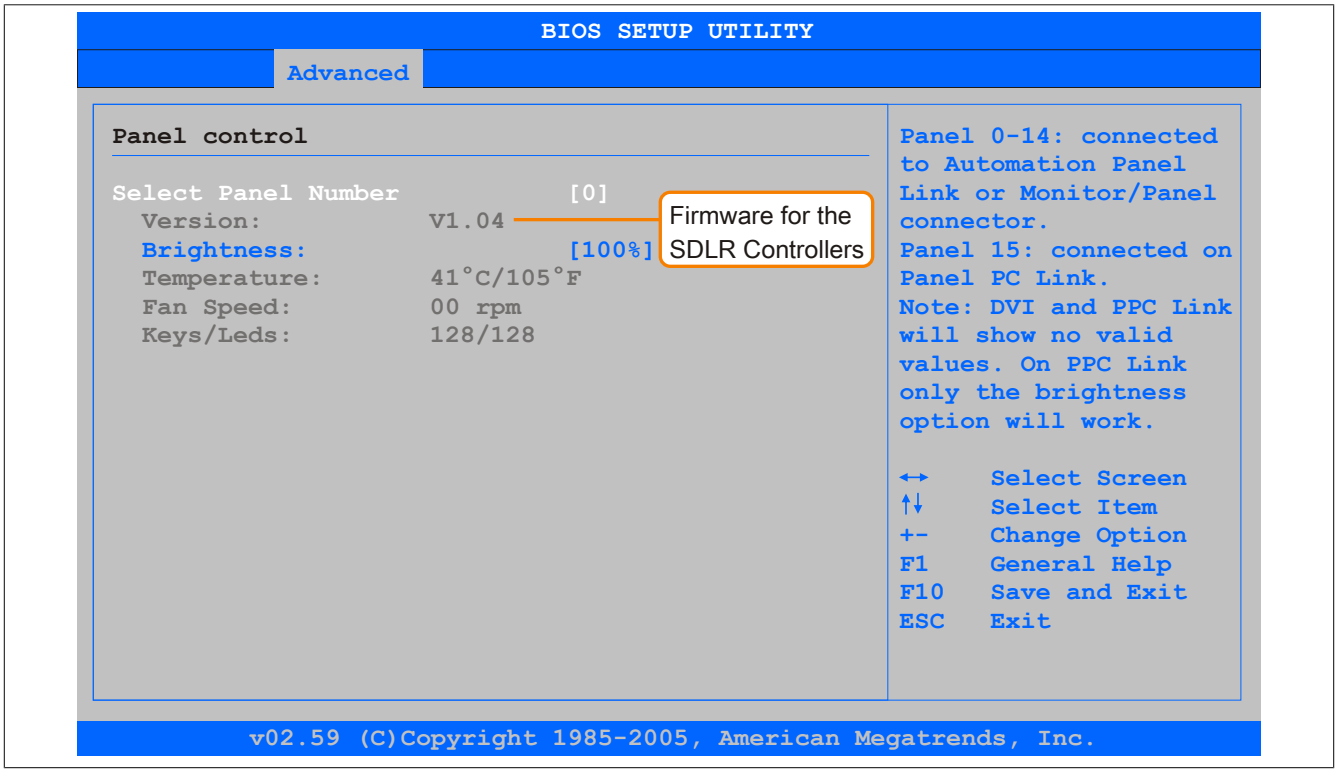


Figure 118: Firmware version of the AP Link SDL transmitter

2.1.2 Procedure with MS-DOS

1. Download the .zip file from the B&R website (www.br-automation.com).
2. Create bootable media.

Information:

In MS-DOS, Win95 and Win98, a blank HD disk can be made bootable by typing "sys a:" or "format a: /s" on the command line.
Information about creating a bootable diskette in Windows XP can be found on page 218.

Information about creating a USB flash drive for a B&R upgrade can be found on page 220.

Information on creating a CompactFlash card for a B&R upgrade can be found on page 221.

3. Copy the contents of the .zip file to the bootable media. If the B&R upgrade was already added when creating the bootable media with the B&R Embedded OS Installer, then this step is not necessary.
4. Connect the bootable media to the B&R device and reboot.
5. The following boot menu will be shown after startup:

```
1. Upgrade AMI BIOS for B945

2. Exit
```

Concerning item 1:
BIOS is automatically upgraded (default after 5 seconds).

Concerning item 2:
Returns to the shell (MS-DOS).

Information:

If you do not press a button within 5 seconds, then step 1 "Upgrade AMI BIOS for B945" is automatically carried out and the industrial PC is automatically updated.

6. The system must be rebooted after a successful upgrade.
7. Reboot and press <Del> to enter the BIOS Setup screen and load the setup defaults, then select "Save changes and exit".

2.2 Firmware upgrade

The "Firmware Upgrade (MTCX, SDLR, UPS)" software makes it possible to update the firmware for multiple controllers (MTCX, SDLR, UPS), depending on the structure of the PPC800 system.

The latest firmware upgrade can be directly downloaded from the download area of the B&R website (www.br-automation.com).

2.2.1 Procedure

To carry out a firmware upgrade, the following steps should be taken:

1. Download the .zip file from the B&R website (www.br-automation.com).
2. Create bootable media.

> **Information:**
>
> **In MS-DOS, Win95 and Win98, a blank HD disk can be made bootable by typing "sys a:" or "format a: /s" on the command line.**
> **Information about creating a bootable diskette in Windows XP can be found on page 218.**
>
> **Information about creating a USB flash drive for a B&R upgrade can be found on page 220.**
>
> **Information on creating a CompactFlash card for a B&R upgrade can be found on page 221.**

3. Copy the contents of the .zip file to the bootable media. If the B&R upgrade was already added when creating the bootable media with the B&R Embedded OS Installer, then this step is not necessary.
4. Connect the bootable media to the B&R device and reboot.
5. The following boot menu will be shown after startup:

> **Information:**
>
> **The following boot menu options including descriptions are based on Version 1.02 of the PPC800 upgrade (MTCX, SDLR, SDLT, UPSI) disk. In some cases, these descriptions might not match the version you are currently using.**

```
1. Upgrade MTCX (PPC800) PX32 and FPGA
2. Upgrade SDLR (AP800/AP900) on monitor/panel
2.1. Upgrade SDLR on AP 0 (AP800/AP900)
2.2. Upgrade SDLR on AP 1 (AP800/AP900)
2.3. Upgrade SDLR on AP 2 (AP800/AP900)
2.4. Upgrade SDLR on AP 3 (AP800/AP900)
2.5. Upgrade all SDLR (AP800/AP900)
2.6. Return to Main Menu
3. Upgrade add-on UPS (firmware and battery settings)
3.1. Upgrade Add-On UPS Firmware (5AC600.UPSI-00)
3.2. Upgrade Battery Settings (5AC600.UPSB-00)
3.3. Return to Main Menu
4. Exit
```

Concerning item 1:
Automatically upgrade PX32 and FPGA for MTCX (default after 5 seconds).

Concerning item 2:
Submenu 1 is opened for upgrading the SDLR controller on the Monitor/Panel plug.

2.1 Upgrade SDLR on AP 0 (AP800/AP900)
The SDLR controller is automatically updated on Automation Panel 0.

2.2 Upgrade SDLR on AP 1 (AP800/AP900)
The SDLR controller is automatically updated on Automation Panel 1.

2.3 Upgrade SDLR on AP 2 (AP800/AP900)
The SDLR controller is automatically updated on Automation Panel 2.

2.4 Upgrade SDLR on AP 3 (AP800/AP900)
The SDLR controller is automatically updated on Automation Panel 3.

2.5 Upgrade all SDLR (AP800/AP900)
All SDLR controllers are automatically updated on all Automation Panels on the Monitor/Panel (by default, after 5 sec).

2.6 Return to Main Menu
Returns to the main menu.

Concerning item 3:
Submenu 3 for the add-on UPS firmware and upgrade and the battery settings upgrade is opened.

3.1 Upgrade Add-on UPS Firmware (5AC600.UPSI-00)
The firmware for the add-on UPS is updated.

3.2 Upgrade Battery Settings (5AC600.UPSB-00)
The battery settings for 5AC600.UPSB-00 are automatically updated.

3.3 Return to Main Menu
Returns to the main menu.

Concerning item 4:
Returns to the shell (MS-DOS).

- The system must be rebooted after a successful upgrade.

2.2.2 Possible upgrade problems and software dependencies (for V1.02)

- The SDLR firmware can only be updated if an Automation Panel with Automation Panel Link Transceiver (5DLSDL.1000-01) and Automation Panel Link Receiver (5DLSDL.1000-00) is connected.
- Automation Panel Link transceivers (5DLSDL.1000-01) or Automation Panel Link receivers (5DLSDL.1000-00) with a Firmware version lower than or equal to V00.10 can no longer be combined with Automation Panel Link transceivers (5DLSDL.1000-01) or Automation Panel Link receivers (5DLSDL.1000-00) with a Firmware higher than or equal to V01.04. Daisy Chain mode is not possible with such a combination.
- If a UPS (e.g. 5AC600.UPSI-00) + battery unit (e.g. 5AC600.UPSB-00) is connected to the system and operable, then after an upgrade of the MTCX or SDLT you must either disconnect the battery or push the Power button (to put the system in Standby mode), before executing the required power off/on. If not, the firmware upgrade will not work because the UPS buffers the system.

2.3 Creating an MS-DOS boot diskette in Windows XP

1. Insert a blank 1.44 MB HD diskette into the disk drive.
2. Open Windows Explorer.
3. Right-click on the 3½ floppy diskette icon and select "Format".

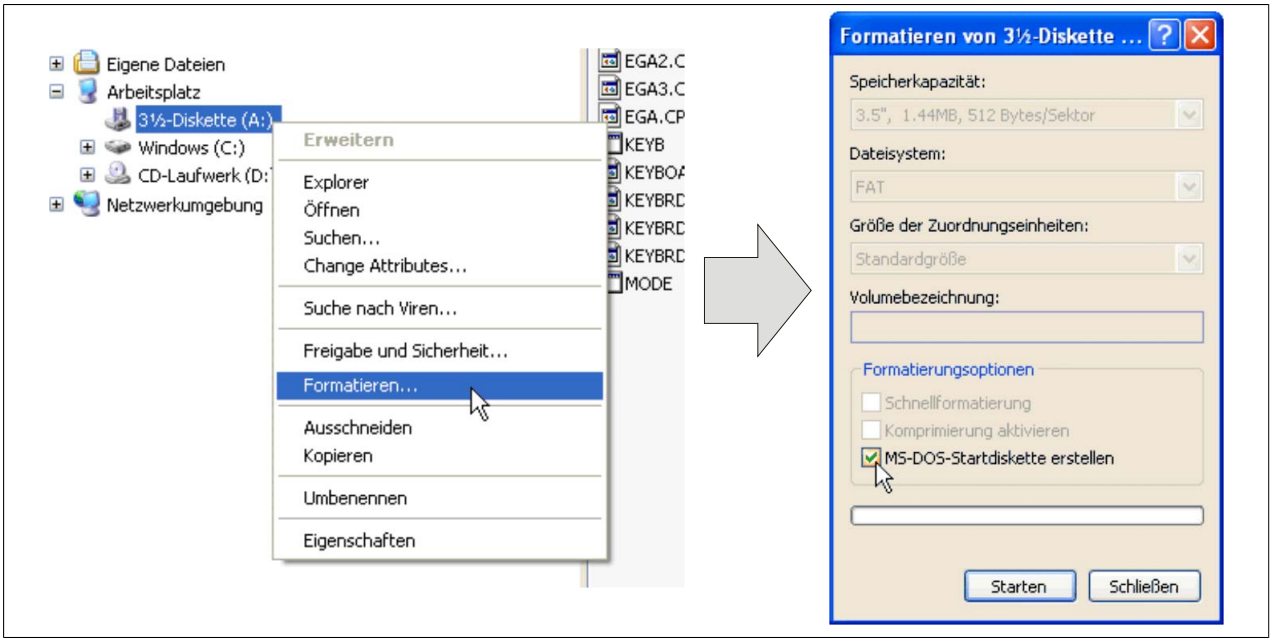


Figure 119: Creating a bootable diskette in Windows XP - Step 1

4. Select the **"Create an MS-DOS startup disk"** option, click on **"Start"** and acknowledge the warning message with "OK".

Figure 120: Creating a bootable diskette in Windows XP - Step 2

Figure 121: Creating a bootable diskette in Windows XP - Step 3

After creating the startup disk, some of the files must be deleted because of the size of the update.

To do this, all files (hidden system files, etc.) must be visible on the diskette.

In Windows Explorer, go to the "Tools" menu, select "Folder options" and open the "View" tab. Then deselect the option "Hide protected operating system files (Recommended)" (enabled by default) and enable the option "Show hidden files and folders".

before

Name	Size	Type	Date Modified
DISPLAY.SYS	17 KB	System file	6/8/2000 5:00 PM
EGA2.CPI	58 KB	CPI File	6/8/2000 5:00 PM
EGA3.CPI	58 KB	CPI File	6/8/2000 5:00 PM
EGA.CPI	58 KB	CPI File	6/8/2000 5:00 PM
KEYB.COM	22 KB	MS-DOS Application	6/8/2000 5:00 PM
KEYBOARD.SYS	34 KB	System file	6/8/2000 5:00 PM
KEYBRD2.SYS	32 KB	System file	6/8/2000 5:00 PM
KEYBRD3.SYS	31 KB	System file	6/8/2000 5:00 PM
KEYBRD4.SYS	13 KB	System file	6/8/2000 5:00 PM
MODE.COM	29 KB	MS-DOS Application	6/8/2000 5:00 PM

after

Name	Size	Type	Date Modified
AUTOEXEC.BAT	0 KB	MS-DOS Batch File	3/22/2006 10:08 AM
COMMAND.COM	91 KB	MS-DOS Application	6/8/2000 5:00 PM
CONFIG.SYS	0 KB	System file	3/22/2006 10:08 AM
DISPLAY.SYS	17 KB	System file	6/8/2000 5:00 PM
EGA2.CPI	58 KB	CPI File	6/8/2000 5:00 PM
EGA3.CPI	58 KB	CPI File	6/8/2000 5:00 PM
EGA.CPI	58 KB	CPI File	6/8/2000 5:00 PM
IO.SYS	114 KB	System file	5/15/2001 6:57 PM
KEYB.COM	22 KB	MS-DOS Application	6/8/2000 5:00 PM
KEYBOARD.SYS	34 KB	System file	6/8/2000 5:00 PM
KEYBRD2.SYS	32 KB	System file	6/8/2000 5:00 PM
KEYBRD3.SYS	31 KB	System file	6/8/2000 5:00 PM
KEYBRD4.SYS	13 KB	System file	6/8/2000 5:00 PM
MODE.COM	29 KB	MS-DOS Application	6/8/2000 5:00 PM
MSDOS.SYS	1 KB	System file	4/7/2001 1:40 PM

Figure 122: Creating a bootable diskette in Windows XP - Step 4

Name	Größe	Typ	Geändert am
AUTOEXEC	1 KB	Stapelverarbeitungsdatei für MS-DOS	04.10.2004 15:14
COMMAND	91 KB	Anwendung für MS-DOS	08.06.2000 17:00
CONFIG	1 KB	Systemdatei	04.10.2004 15:14
DISPLAY	17 KB	Systemdatei	08.06.2000 17:00
EGA2.CPI	58 KB	CPI-Datei	08.06.2000 17:00
EGA3.CPI	58 KB	CPI-Datei	08.06.2000 17:00
EGA.CPI	58 KB	CPI-Datei	08.06.2000 17:00
IO	114 KB	Systemdatei	15.05.2001 18:57
KEYB	22 KB	Anwendung für MS-DOS	08.06.2000 17:00
KEYBOARD	34 KB	Systemdatei	08.06.2000 17:00
KEYBRD2	32 KB	Systemdatei	08.06.2000 17:00
KEYBRD3	31 KB	Systemdatei	08.06.2000 17:00
KEYBRD4	13 KB	Systemdatei	08.06.2000 17:00
MODE	29 KB	Anwendung für MS-DOS	08.06.2000 17:00
MSDOS	1 KB	Systemdatei	07.04.2001 13:40

Figure 123: Creating a bootable diskette in Windows XP - Step 5

Now all files (selected) except Command.com, IO.sys and MSDOS.sys can be deleted.

2.4 Creating a bootable USB flash drive for B&R upgrade files

When used in connection with a B&R Industrial PC, it is possible to upgrade (e.g. upgrade BIOS) from one of the USB flash drives available from B&R. To do this, the USB flash drive must be prepared accordingly. This is done with the B&R Embedded OS Installer, which can be downloaded at no cost from the B&R website (www.br-automation.com).

2.4.1 Requirements

The following is required to create a bootable USB flash drive:

- B&R USB flash drive
- B&R Industrial PC
- USB media drive
- B&R Embedded OS Installer (V3.00 or higher)

2.4.2 Procedure

1. Connect the USB flash drive to the PC.
2. If the drive list is not refreshed automatically, the list can be updated using the command **Drives > Refresh**.
3. Select the desired USB flash drive in the drive list.
4. Change to the **Action** tab and select **Install a B&R update to a USB flash drive** as the type of action.
5. Enter the path to the MS-DOS operating system files. If the files are part of a .zip archive, then click on the button **From .zip file**. If the files are stored in a directory on the hard drive, then click on the button **From folder**.
6. In the **B&R upgrade** text box, it is also possible to enter the path to the .zip file for the B&R upgrade disk and select the file.
7. Click on the **Start action** button in the toolbar.

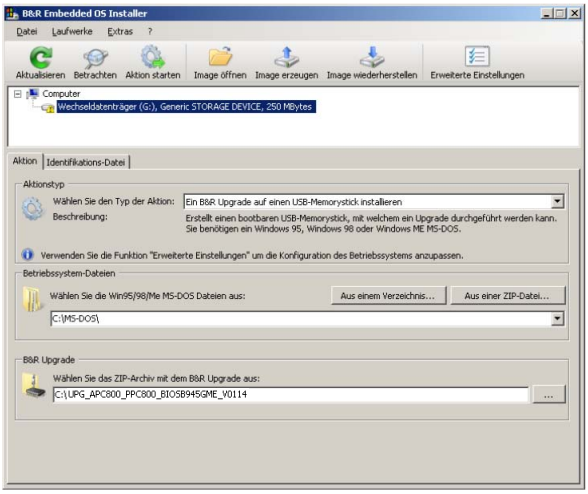


Figure 124: Creating a USB flash drive for B&R upgrade files

2.4.3 How to access MS-DOS

Information on creating an MS-DOS boot diskette can be found in section see "Creating an MS-DOS boot diskette in Windows XP" on page 218. The files from the diskette are then copied to the hard drive.

2.5 Creating a bootable CompactFlash card for B&R upgrade files

When used in connection with a B&R industrial PC, it is possible to upgrade (e.g. upgrade BIOS) from one of the CompactFlash cards available from B&R. To do this, the CompactFlash card must be prepared accordingly. This is done with the B&R Embedded OS Installer, which can be downloaded at no cost from the B&R website (www.br-automation.com).

2.5.1 Requirements

The following peripherals are required for creating a bootable CompactFlash card:

- CompactFlash card
- B&R Industrial PC
- USB media drive
- B&R Embedded OS Installer (V3.10 or higher)

2.5.2 Procedure

1. Insert the CompactFlash card in the CF slot on the industrial PC.
2. If the drive list is not refreshed automatically, the list can be updated using the command **Drives > Refresh**.
3. Select the desired CompactFlash card from the drive list.
4. Change to the **Action** tab and select **Install a B&R Update to a CompactFlash card** as the type of action.
5. Enter the path to the MS-DOS operating system files. If the files are part of a .zip archive, then click on the button **From .zip file**. If the files are stored in a directory on the hard drive, then click on the button **From folder**.
6. In the **B&R upgrade** text box, it is also possible to enter the path to the .zip file for the B&R upgrade disk and select the file.
7. Click on the **Start action** button in the toolbar.

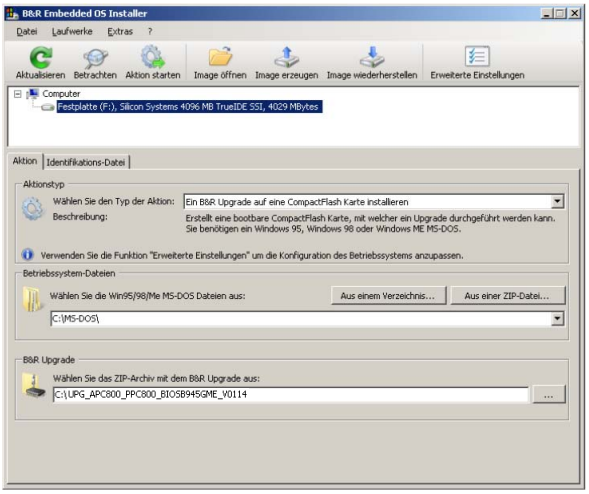


Figure 125: Creating a CompactFlash card for B&R upgrade files

2.5.3 How to access MS-DOS

Information on creating an MS-DOS boot diskette can be found in section see "Creating an MS-DOS boot diskette in Windows XP" on page 218. The files from the diskette are then copied to the hard drive.

3 Microsoft DOS

3.1 Order data

Model number	Short description	Figure
	MS-DOS	
9S0000.01-010	OEM Microsoft MS-DOS 6.22, German disks, only supplied together with a new PC.	
9S0000.01-020	OEM Microsoft MS-DOS 6.22, English disks, only supplied together with a new PC.	

Table 187: 9S0000.01-010, 9S0000.01-020 - Order data

3.2 Known problems

Either no drivers are available for the following hardware components or only with limitations:

- HDA Sound - No support
- USB 2.0 - only USB 1.1 rates can be achieved.
- "Graphics Engine 2" and therefore Extended Desktop mode also cannot be used.
- A few "ACPI control" BIOS functions cannot be used.

The following table shows the tested resolutions and color depths on the Monitor / Panel connector with 945GME CPU boards.

Resolutions for DVI	Color depth		
	8-bit	16-bit	24-bit
640 x 480	✓	✓	✓
800 x 600	✓	✓	✓
1024 x 768	✓	✓	✓
1280 x 1024	✓	✓	✓

Table 188: Tested resolutions and color depths for DVI signals

Resolutions for RGB	Color depth		
	8-bit	16-bit	24-bit
640 x 480	✓	✓	✓
800 x 600	✓	✓	✓
1024 x 768	✓	✓	✓
1280 x 1024	✓	✓	✓
1600 x 1200	✓	✓	✓
1920 x 1440	✓	✓	✓

Table 189: Tested resolutions and color depths for RGB signals

4 Windows XP Professional

4.1 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 new device.	
5SWWXP.0600-GER	Microsoft OEM Windows XP Professional Service Pack 3, CD, German. Only available with a new device.	
5SWWXP.0600-MUL	Microsoft OEM Windows XP Professional Service Pack 3, CD, Multilanguage. Only available with a new device.	
5SWWXP.0500-ENG	Microsoft OEM Windows XP Professional Service Pack 2c, CD, English. Only available with a new device.	
5SWWXP.0500-GER	Microsoft OEM Windows XP Professional Service Pack 2c, CD, German. Only available with a new device.	
5SWWXP.0500-MUL	Microsoft OEM Windows XP Professional Service Pack 2c, CD, multilingual. Only available with a new device.	

Table 190: 5SWWXP.0600-ENG, 5SWWXP.0600-GER, 5SWWXP.0600-MUL, 5SWWXP.0500-ENG, 5SWWXP.0500-GER, 5SWWXP.0500-MUL - Order data

4.2 Overview

Model number	Edition	Target system	Chipset	Service Pack	Language	Preinstalled	Memory required on the disk	Minimum amount of RAM
5SWWXP.0600-ENG	Professional	APC510 APC511 APC620 APC810 APC820 APC910 PPC700 PPC725 PPC800 PP500	945GME GM45 QM77/HM76 NM10 US15W	SP3	English	Optional	≤ 2.1 GB	128 MB
5SWWXP.0600-GER	Professional	APC510 APC511 APC620 APC810 APC820 APC910 PPC700 PPC725 PPC800 PP500	945GME GM45 QM77/HM76 NM10 US15W	SP3	German	Optional	≤ 2.1 GB	128 MB
5SWWXP.0600-MUL	Professional	APC510 APC511 APC620 APC810 APC820 APC910 PPC700 PPC725 PPC800 PP500	945GME GM45 QM77/HM76 NM10 US15W	SP3	Multilanguage	Optional	≤ 2.1 GB	128 MB
5SWWXP.0500-ENG	Professional	APC620 APC810 APC820 PPC700 PPC725 PPC800	945GME GM45	SP2c	English	Optional	≤ 2.1 GB	128 MB
5SWWXP.0500-GER	Professional	APC620 APC810 APC820 PPC700 PPC725 PPC800	945GME GM45	SP2c	German	Optional	≤ 2.1 GB	128 MB
5SWWXP.0500-MUL	Professional	APC620 APC810 APC820 PPC700 PPC725 PPC800	945GME GM45	SP2c	Multilanguage	Optional	≤ 2.1 GB	128 MB

4.3 Installation

Upon request, the required Windows XP Professional version can be preinstalled by B&R on a suitable mass storage device (e.g. CompactFlash card). All of the drivers required for operation (graphics, network, etc.) are also installed in this process.

4.3.1 Installation on a PCI SATA RAID controller - 5ACPCI.RAIC-03, 5ACPCI.RAIC-05, 5ACPCI.RAIC-06

The following steps are necessary to install Windows XP Professional on a PCI SATA RAID controller:

1. Download the RAID driver from the B&R website www.br-automation.com and copy the files to a diskette.
2. Connect the media drive (5MD900.USB2-01) to the USB port.
3. Insert the diskette and Windows XP Professional CD in the media drive and boot from the CD.
4. Press the F6 key during installation to install a third-party SCSI or driver.
5. Press the "s" key when asked about installing an additional drive. Insert the diskette into the floppy drive. Press "Enter" and select the driver.
6. Follow the installation instructions.
7. The installer will copy the files to the Windows XP Professional folder and restart the Panel PC 800.

> **Information:**
>
> - **Not all USB FDD drives are supported by the Windows XP installer (see Microsoft KB 916196).**
> - **Depending on the system, the boot order may have to be changed in BIOS.**

4.4 Drivers

Current drivers for all approved operating systems are available in the Downloads section of the B&R website www.br-automation.com.

> **Information:**
>
> **Required drivers can only be downloaded from the B&R website, not from manufacturer websites.**

5 Windows 7

5.1 General information

Windows® 7 offers a wealth of innovative features and performance improvements. The 64-bit variants can also exploit the full power of current PC architectures. 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 English and German are available in Windows® 7 Professional, while Windows® 7 Ultimate supports up to 35 different languages (up to 36 languages in Service Pack 1). 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 compared to products offered on the consumer market.

5.2 Order data

Model number	Short description	Figure
	Windows 7 Professional/Ultimate	
5SWWI7.0100-ENG	Microsoft OEM Windows 7 Professional 32-bit, DVD, English. Only available with a new device.	
5SWWI7.1100-ENG	Microsoft OEM Windows 7 Professional 32-bit, Service Pack 1, 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.	
5SWWI7.1100-GER	Microsoft OEM Windows 7 Professional 32-bit, Service Pack 1, DVD, German. Only available with a new device.	
5SWWI7.0300-MUL	Microsoft OEM Windows 7 Ultimate 32-bit, DVD, multilingual. Only available with a new device.	
5SWWI7.1300-MUL	Microsoft OEM Windows 7 Ultimate 32-bit, Service Pack 1, DVD, multilingual. Only available with a new device.	
5SWWI7.0200-ENG	Microsoft OEM Windows 7 Professional 64-bit, DVD, English. Only available with a new device.	
5SWWI7.1200-ENG	Microsoft OEM Windows 7 Professional 64-bit, Service Pack 1, DVD, English. Only available with a new device.	
5SWWI7.0200-GER	Microsoft OEM Windows 7 Professional 64-bit, DVD, German. Only available with a new device.	
5SWWI7.1200-GER	Microsoft OEM Windows 7 Professional 64-bit, Service Pack 1, DVD, German. Only available with a new device.	
5SWWI7.0400-MUL	Microsoft OEM Windows 7 Ultimate 64-bit, DVD, multilingual. Only available with a new device.	
5SWWI7.1400-MUL	Microsoft OEM Windows 7 Ultimate 64-bit, Service Pack 1, DVD, multilingual. Only available with a new device.	

Table 191: 5SWWI7.0100-ENG, 5SWWI7.1100-ENG, 5SWWI7.0100-GER, 5SWWI7.1100-GER, 5SWWI7.0300-MUL, 5SWWI7.1300-MUL, 5SWWI7.0200-ENG, 5SWWI7.1200-ENG, 5SWWI7.0200-GER, 5SWWI7.1200-GER, 5SWWI7.0400-MUL, 5SWWI7.1400-MUL - Order data

5.3 Overview

Model number	Edition	Target system	Chipset	Service Pack	Architecture	Language	Preinstalled	Minimum size of the disk	Minimum amount of RAM
5SWWI7.0100-ENG	Professional	APC510 APC511 APC810 APC910 PPC800 PP500	945GME GM45 QM77/HM76 US15W		32-bit	English	Optional	16 GB	1 GB
5SWWI7.1100-ENG	Professional	APC510 APC511 APC810 APC910 PPC800 PP500	945GME GM45 QM77/HM76 NM10 US15W	SP1	32-bit	English	Optional	16 GB	1 GB
5SWWI7.0100-GER	Professional	APC510 APC511 APC810 APC910 PPC800 PP500	945GME GM45 QM77/HM76 US15W		32-bit	German	Optional	16 GB	1 GB
5SWWI7.1100-GER	Professional	APC510 APC511 APC810 APC910 PPC800 PP500	945GME GM45 QM77/HM76 NM10 US15W	SP1	32-bit	German	Optional	16 GB	1 GB

Model number	Edition	Target system	Chipset	Service Pack	Architecture	Language	Preinstalled	Minimum size of the disk	Minimum amount of RAM
5SWWI7.0300-MUL	Ultimate	APC510 APC511 APC810 APC910 PPC800 PP500	945GME GM45 QM77/HM76 US15W		32-bit	Multilanguage	Optional	16 GB [1]	1 GB
5SWWI7.1300-MUL	Ultimate	APC510 APC511 APC810 APC910 PPC800 PP500	945GME GM45 QM77/HM76 NM10 US15W	SP1	32-bit	Multilanguage	Optional	16 GB [1]	1 GB
5SWWI7.0200-ENG	Professional	APC810 APC910 PPC800	945GME Intel® Core™2 Duo GM45 QM77/HM76		64-bit	English	Optional	20 GB	2 GB
5SWWI7.1200-ENG	Professional	APC810 APC910 PPC800	945GME Intel® Core™2 Duo GM45 QM77/HM76	SP1	64-bit	English	Optional	20 GB	2 GB
5SWWI7.0200-GER	Professional	APC810 APC910 PPC800	945GME Intel® Core™2 Duo GM45 QM77/HM76		64-bit	German	Optional	20 GB	2 GB
5SWWI7.1200-GER	Professional	APC810 APC910 PPC800	945GME Intel® Core™2 Duo GM45 QM77/HM76	SP1	64-bit	German	Optional	20 GB	2 GB
5SWWI7.0400-MUL	Ultimate	APC810 APC910 PPC800	945GME Intel® Core™2 Duo GM45 QM77/HM76		64-bit	Multilanguage	Optional	20 GB [1]	2 GB
5SWWI7.1400-MUL	Ultimate	APC810 APC910 PPC800	945GME Intel® Core™2 Duo GM45 QM77/HM76	SP1	64-bit	Multilanguage	Optional	20 GB [1]	2 GB

1) The memory used by the additional language packages is not accounted for in the minimum size of the data storage medium.

5.4 Installation

Upon request, the required Windows 7 version can be preinstalled by B&R on a suitable mass storage device (e.g. CompactFlash card). All of the drivers required for operation (graphics, network, etc.) are also installed in this process.

5.4.1 Installation on a PCI SATA RAID controller - 5ACPCI.RAIC-03, 5ACPCI.RAIC-05, 5ACPCI.RAIC-06

The following steps are necessary for installing Windows 7 on the PCI SATA RAID controller:

1. Download the RAID driver for Windows 7 from the B&R website at www.br-automation.com and copy the data to a folder on a USB flash drive.
2. Boot using the Windows 7 DVD.
3. Follow the installation steps until a page appears asking "Where do you want to install Windows?".
4. Plug the USB flash drive with the RAID drivers into an available USB port.
5. Click on "Load driver", and navigate to the directory containing the RAID drivers. Then click Next to continue.
6. Remove the USB flash drive.
7. The Windows 7 installation can now be performed as usual.

> **Information:**
>
> **Depending on the system, the boot order may have to be changed in BIOS.**

5.5 Special considerations, limitations

- Windows 7 does not contain a Beep.sys file, which means that an audible signal is no longer sounded (e.g. when pressing a key).
- There is currently no support for the Windows 7 system rating (although this does not apply to PP500, APC510, APC511, APC910 or PPC800 devices with an NM10 chipset).

5.6 Drivers

Current drivers for all approved operating systems are available in the Downloads section of the B&R website www.br-automation.com.

> **Information:**
>
> **Required drivers can only be downloaded from the B&R website, not from manufacturer websites.**

6 Windows XP Embedded

6.1 General information

Windows XP Embedded is the modular version of the desktop operating system Windows XP Professional. Windows XP Embedded is based on the same binary files as Windows XP Professional 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 XP Embedded is also based on the same reliable code as Windows XP Professional. It provides industry with leading reliability, improvements in security and performance, and the latest technology for Web browsing and extensive device support.

6.2 Order data

Model number	Short description	Figure
	Windows XP Embedded	
5SWWXP.0427-ENG	Microsoft OEM Windows XP Embedded Feature Pack 2007, English; for PPC800 with 945GME chipset; order CompactFlash separately (at least 512 MB).	
	Required accessories	
	CompactFlash	
5CFCRD.016G-06	CompactFlash 16 GB B&R (SLC)	
5CFCRD.0512-03	CompactFlash 512 MB Western Digital (SLC)	
5CFCRD.1024-03	CompactFlash 1 GB Western Digital (SLC)	
5CFCRD.1024-06	CompactFlash 1 GB B&R (SLC)	
5CFCRD.2048-03	CompactFlash 2 GB Western Digital (SLC)	
5CFCRD.2048-06	CompactFlash 2 GB B&R (SLC)	
5CFCRD.4096-03	CompactFlash 4 GB Western Digital (SLC)	
5CFCRD.4096-06	CompactFlash 4 GB B&R (SLC)	
5CFCRD.8192-03	CompactFlash 8 GB Western Digital (SLC)	
5CFCRD.8192-06	CompactFlash 8 GB B&R (SLC)	

Table 192: 5SWWXP.0427-ENG - Order data

6.3 Overview

Model number	Target system	Chipset	Language	Preinstalled	Minimum size of the disk	Minimum amount of RAM
5SWWXP.0427-ENG	PPC800	945GME	English	Yes	512 MB	128 MB

6.4 Features with FP2007 (Feature Pack 2007)

The feature list shows the most important device functions in Windows XP Embedded with Feature Pack 2007 (FP2007).

Function	Present
Enhanced Write Filter (EWF)	✓
File Based Write Filter	✓
Administrator accounts	✓
User accounts	Configurable
Explorer shell	✓
Registry filter	✓
Internet Explorer 6.0 + SP2	✓
Internet information service (IIS)	-
Terminal service	✓
Windows Firewall	✓
MSN Explorer	-
Outlook Express	-
Administrative Tools	✓
Remote Desktop	✓
Remote Assistance	-
.NET Framework	-
ASP.NET	-
Codepages / User locales / Keyboards	✓
Disk Management Service	✓
Windows Installer Service	✓
Class Installer	✓
CoDevice Installer	✓
Media Player	-
DirectX	-
Accessories	✓
Number of fonts	89

Table 193: Device functions in Windows XP Embedded with FP2007

6.5 Installation

Upon request, Windows XP Embedded can be preinstalled by B&R on a suitable CompactFlash card (min. 512 MB). The system is then automatically configured when it is switched on for the first time. This procedure takes approximately 30 minutes, with the device being rebooted a number of times.

6.6 Drivers

All drivers required for operation are preinstalled along with the operating system. If an older version of the driver is still being used, the latest version can be downloaded and installed from the B&R website (www.br-automation.com). It is important that Enhanced Write Filter (EWF) is disabled for this.

6.6.1 Touch screen driver

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 of the B&R website (www.br-automation.com). Be sure to check whether the "Enhanced Write Filter (EWF)" is enabled.

Information:

Required drivers can only be downloaded from the B&R website, not from manufacturer websites.

7 Windows Embedded Standard 2009

7.1 General information

Windows® Embedded Standard 2009 is the modular version of Windows® XP Professional. It is used if XP applications should be executed with a minimal operating system size. Together with CompactFlash 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 a multilingual version.

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, security and performance improvements as well as the latest technology for web browsing and extensive device support.

7.2 Order data

Model number	Short description	Figure
	Windows Embedded Standard 2009	
5SWWXP.0727-ENG	Microsoft OEM Windows Embedded Standard 2009, English; for PPC800 with 945GME chipset; order CompactFlash separately (min. 1 GB)	
	Required accessories	
	CompactFlash	
5CFCRD.016G-06	CompactFlash 16 GB B&R (SLC)	
5CFCRD.032G-06	CompactFlash 32 GB B&R (SLC)	
5CFCRD.1024-06	CompactFlash 1 GB B&R (SLC)	
5CFCRD.2048-06	CompactFlash 2 GB B&R (SLC)	
5CFCRD.4096-06	CompactFlash 4 GB B&R (SLC)	
5CFCRD.8192-06	CompactFlash 8 GB B&R (SLC)	

Table 194: 5SWWXP.0727-ENG - Order data

7.3 Overview

Model number	Target system	Chipset	Language	Preinstalled	Minimum size of the disk	Minimum amount of RAM
5SWWXP.0727-ENG	PPC800	945GME	English	Yes	1 GB	256 MB

7.4 Features with WES2009 (Windows Embedded Standard 2009)

The following list of features shows the most important device functions included in Windows Embedded Standard 2009.

Function	Present
Enhanced Write Filter (EWF)	✓
File-Based Write Filter (FBWF)	✓
Page file	Configurable
Administrator accounts	✓
User accounts	Configurable
Explorer shell	✓
Registry filter	✓
Internet Explorer 7.0	✓
Internet information service (IIS)	-
Terminal service	✓
Windows Firewall	✓
MSN Explorer	-
Outlook Express	-
Administrative Tools	✓
Remote Desktop	✓
Remote Assistance	-
.NET Framework	-
ASP.NET	-

Table 195: Device functions in Windows Embedded Standard 2009

Function	Present
Local network bridge	✓
Codepages / User locales / Keyboards	✓
Disk Management Service	✓
Windows Installer Service	✓
Class Installer	✓
CoDevice Installer	✓
Media Player 6.4	✓
DirectX 9.0c	✓
Accessories	✓
Number of fonts	89

Table 195: Device functions in Windows Embedded Standard 2009

7.5 Installation

Upon request, Windows Embedded Standard 2009 can be preinstalled by B&R on a suitable CompactFlash card (min. 1 GB). The system is then automatically configured when it is switched on for the first time. This procedure takes approximately 10 minutes, with the device being rebooted a number of times.

7.6 Drivers

All drivers required for operation are preinstalled along with the operating system. If an older version of the driver is still being used, the latest version can be downloaded and installed from the B&R website (www.br-automation.com). It is important that Enhanced Write Filter (EWF) is disabled for this.

7.6.1 Touch screen driver

In order to operate Automation Panel 800 or Automation Panel 900 touch screen devices, you need to either install the touch screen driver manually and update the touch screen interface in the device manager. The driver can be downloaded from the Download area of the B&R website (www.br-automation.com). Be sure to check whether the Enhanced Write Filter (EWF) is enabled.

Information:

Required drivers can only be downloaded from the B&R website, not from manufacturer websites.

8 Windows Embedded Standard 7

8.1 General information

The successor to Windows® XP Embedded is Windows® Embedded Standard 7. As with previous versions, this embedded operating system offers full system support for B&R Industrial PCs. In addition to brand new features that are also included in Windows® 7 Professional, Windows® Embedded Standard 7 includes embedded 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 multilingual 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 made substantial improvements in the area of security. The AppLocker program, available in the premium version, can prevent the execution of unknown or potentially undesired applications that are being 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), installation 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 a 32-bit and 64-bit version.[3)] This ensures that even the most demanding applications have the level of support they need.

8.2 Order data

Model number	Short description	Figure
	Windows Embedded Standard 7	
5SWWI7.0527-ENG	Microsoft OEM Windows Embedded Standard 7 32-bit, English; for PPC800 with 945GME chipset; order CompactFlash separately (at least 8 GB).	
5SWWI7.1527-ENG	Microsoft OEM Windows Embedded Standard 7 32-bit, Service Pack 1, English; for PPC800 with 945GME chipset; order CompactFlash separately (at least 16 GB).	
5SWWI7.0627-ENG	Microsoft OEM Windows Embedded Standard 7 64-bit, English; for PPC800 with 945GME chipset; order CompactFlash separately (at least 16 GB).	
5SWWI7.1627-ENG	Microsoft OEM Windows Embedded Standard 7 64-bit, Service Pack 1, English; for PPC800 with 945GME chipset; order CompactFlash separately (at least 16 GB).	
5SWWI7.0727-MUL	Microsoft OEM Windows Embedded Standard 7 Premium 32-bit, multilingual; for PPC800 with 945GME chipset; order CompactFlash separately (at least 8 GB).	
5SWWI7.1727-MUL	Microsoft OEM Windows Embedded Standard 7 Premium 32-bit, Service Pack 1, Multilanguage; for PPC800 with 945GME chipset; order CompactFlash separately (min. 16 GB).	
5SWWI7.0827-MUL	Microsoft OEM Windows Embedded Standard 7 Premium 64-bit, multilingual; for PPC800 with 945GME chipset; order CompactFlash separately (at least 16 GB).	
5SWWI7.1827-MUL	Microsoft OEM Windows Embedded Standard 7 Premium 64-bit, Service Pack 1, Multilanguage; for PPC800 with 945GME chipset; order CompactFlash separately (min. 16 GB).	
	Required accessories	
	CompactFlash	
5CFCRD.016G-06	CompactFlash 16 GB B&R (SLC)	
5CFCRD.032G-06	CompactFlash 32 GB B&R (SLC)	
5CFCRD.8192-06	CompactFlash 8 GB B&R (SLC)	
	Optional accessories	
	Windows Embedded Standard 7	
5SWWI7.0900-MUL	Microsoft OEM Windows Embedded Standard 7 32-bit, Language Pack DVD	
5SWWI7.1000-MUL	Microsoft OEM Windows Embedded Standard 7 64-bit, Language Pack DVD	
5SWWI7.1900-MUL	Microsoft OEM Windows Embedded Standard 7 32-bit, Service Pack 1, Language Pack DVD	
5SWWI7.2000-MUL	Microsoft OEM Windows Embedded Standard 7 64-bit, Service Pack 1, Language Pack DVD	

Table 196: 5SWWI7.0527-ENG, 5SWWI7.1527-ENG, 5SWWI7.0627-ENG, 5SWWI7.1627-ENG, 5SWWI7.0727-MUL, 5SWWI7.1727-MUL, 5SWWI7.0827-MUL, 5SWWI7.1827-MUL - Order data

[3)] 64-bit versions are not supported by all systems

8.3 Overview

Model number	Edition	Target system	Chipset	Service Pack	Architecture	Language	Preinstalled	Minimum size of the disk	Minimum amount of RAM
5SWWI7.0527-ENG	Embedded	PPC800	945GME		32-bit	English	Optional	8 GB	1 GB
5SWWI7.1527-ENG	Embedded	PPC800	945GME	SP1	32-bit	English	Optional	16 GB	1 GB
5SWWI7.0627-ENG	Embedded	PPC800	945GME Intel® Core™2 Duo		64-bit	English	Optional	16 GB	1 GB
5SWWI7.1627-ENG	Embedded	PPC800	945GME Intel® Core™2 Duo	SP1	64-bit	English	Optional	16 GB	2 GB
5SWWI7.0727-MUL	Premium	PPC800	945GME		32-bit	Multilanguage	Optional	8 GB [1)]	1 GB
5SWWI7.1727-MUL	Premium	PPC800	945GME	SP1	32-bit	Multilanguage	Optional	16 GB [1)]	1 GB
5SWWI7.0827-MUL	Premium	PPC800	945GME Intel® Core™2 Duo		64-bit	Multilanguage	Optional	16 GB [1)]	1 GB
5SWWI7.1827-MUL	Premium	PPC800	945GME Intel® Core™2 Duo	SP1	64-bit	Multilanguage	Optional	16 GB [1)]	2 GB

1) The memory used by the additional language packages is not accounted for in the minimum size of the data storage medium.

8.4 Features with WES7 (Windows Embedded Standard 7)

The following list of features shows the most important device functions included in Windows Embedded Standard 7.

Function	Windows Embedded Standard 7	Windows Embedded Standard 7 Premium
Enhanced Write Filter (EWF)	✓	✓
File-Based Write Filter (FBWF)	✓	✓
Administrator accounts	✓	✓
User accounts	Configurable	Configurable
Windows Explorer shell	✓	✓
Registry filter	✓	✓
Internet Explorer 8.0	✓	✓
Internet Information Service (IIS) 7.0	✓	✓
Anti-malware (Windows Defender)	-	✓
Add-ons (Snipping Tool, Sticky Notes)	-	✓
Windows Firewall	✓	✓
.NET Framework 3.5	✓	✓
32-bit and 64-bit	✓	✓
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 flash drive	✓	✓
Accessories	✓	✓
Page file	Configurable	Configurable
Number of fonts	134	134

Table 197: Device functions in Windows Embedded Standard 7

8.5 Installation

Upon request, Windows Embedded Standard 7 can be preinstalled by B&R on a suitable CompactFlash card (32-bit: min. 8 GB, 64-bit: min. 16 GB). The system is then automatically configured when it is switched on for the first time. This procedure takes approximately 30 minutes, with the device being rebooted a number of times.

8.6 Drivers

All drivers required for operation are preinstalled along with the operating system. If an older version of the driver is still being used, the latest version can be downloaded and installed from the B&R website (www.br-automation.com). It is important that Enhanced Write Filter (EWF) is disabled for this.

8.6.1 Touch screen driver

A touch screen driver will be installed automatically if a touch controller is detected during the Windows Embedded Standard 7 installation. If a touch controller is not detected during Windows Embedded Standard 7 installation, or if an Automation Panel 800/900 is connected later on, then the touch screen driver needs to be installed manually or the additional touch screen interface must be selected in the touch screen settings in the Windows Control Panel. The driver can be downloaded from the Download area of the B&R website (www.br-automation.com). It is important that both the Enhanced Write Filter (EWF) and the File Based Write Filter (FBWF) are disabled for this.

Information:

Required drivers can only be downloaded from the B&R website, not from manufacturer websites.

9 Windows CE

9.1 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.

9.2 Order data

Model number	Short description	Figure
	Windows CE 6.0	
5SWWCE.0827-ENG	Microsoft OEM Windows CE 6.0 Professional, English; for PPC800 with 945GME chipset; order CompactFlash separately (at least 128 MB).	
	Required accessories	
	CompactFlash	
5CFCRD.0128-03	CompactFlash 128 MB Western Digital (SLC)	
5CFCRD.016G-06	CompactFlash 16 GB B&R (SLC)	
5CFCRD.0256-03	CompactFlash 256 MB Western Digital (SLC)	
5CFCRD.0512-03	CompactFlash 512 MB Western Digital (SLC)	
5CFCRD.1024-03	CompactFlash 1 GB Western Digital (SLC)	
5CFCRD.1024-06	CompactFlash 1 GB B&R (SLC)	
5CFCRD.2048-03	CompactFlash 2 GB Western Digital (SLC)	
5CFCRD.2048-06	CompactFlash 2 GB B&R (SLC)	
5CFCRD.4096-03	CompactFlash 4 GB Western Digital (SLC)	
5CFCRD.4096-06	CompactFlash 4 GB B&R (SLC)	
5CFCRD.8192-03	CompactFlash 8 GB Western Digital (SLC)	
5CFCRD.8192-06	CompactFlash 8 GB B&R (SLC)	

Table 198: 5SWWCE.0827-ENG - Order data

9.3 Overview

Model number	Target system	Chipset	Language	Preinstalled	Minimum size of the disk	Minimum amount of RAM
5SWWCE.0827-ENG	PPC800	945GME	English	Yes	128 MB	128 MB

9.4 Windows CE 6.0 features

Detailed information about Windows CE for B&R devices is available in the Downloads section of the B&R website (www.br-automation.com).

Features	Windows CE 6.0
Supported screen resolutions	VGA (TFT), SVGA (TFT), XGA (TFT)
Chipset	Intel 945GME
Color depth	16-bit or 65,536 colors[1)]
Graphics card driver	Intel(R) embedded graphics driver
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. 38 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	3
DirectX	No
Audio ports	"Line OUT" and "Line IN" are supported. "MIC" is not supported

Table 199: 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.

9.5 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)

9.6 Installation

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

9.7 B&R Embedded OS Installer

The B&R Embedded OS Installer allows you to install existing B&R Windows CE images. The 4 files NK.BIN, BLDR, LOGOXRES.BMP and LOGOQVGA.BMP must be available from an already functioning B&R Windows CE installation.

The B&R Embedded OS installer is available in the Downloads section of the B&R website (www.br-automation.com). Further information is available in the online help for the B&R Embedded OS Installer.

10 Automation Runtime

10.1 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 and jitter tolerance violations
- 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.).

10.2 Order data

Model number	Short description	Figure
	Accessories	
9A0003.02U	USB port button holder DS9490B	
1A4600.10	B&R Automation Runtime ARwin, incl. license sticker and copy protection	
1A4600.10-2	B&R Automation Runtime ARwin, ARNC0	
1A4600.10-3	B&R Automation Runtime ARwin+PVIControls incl. license sticker and copy protection	
1A4600.10-4	B&R Automation Runtime ARwin+ARNC0+PVIControls	

Table 200: 9A0003.02U, 1A4600.10, 1A4600.10-2, 1A4600.10-3, 1A4600.10-4 - Order data

10.3 Automation Runtime Windows (ARwin)

The system is supported by ARwin with an AS 3.0.90 / AR 3.06 upgrade.

An Automation Runtime dongle (USB port button holder with Automation Runtime ARwin dongle) must be connected to run ARwin on a Panel PC 800, see "Order data" on page 237.

Information:

An Automation Runtime dongle is no longer required in AS 3.0.90 / AR4.00.

10.4 Automation Runtime Embedded (ARemb)

The system is supported by ARemb with an AS 3.0.90 / AR 4.00 upgrade. An Automation Runtime dongle is not required.

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

The ADI (Automation Device Interface) enables access to specific functions on B&R devices. Settings for devices can be read and configured using the B&R Control Center applet in the Control Panel.

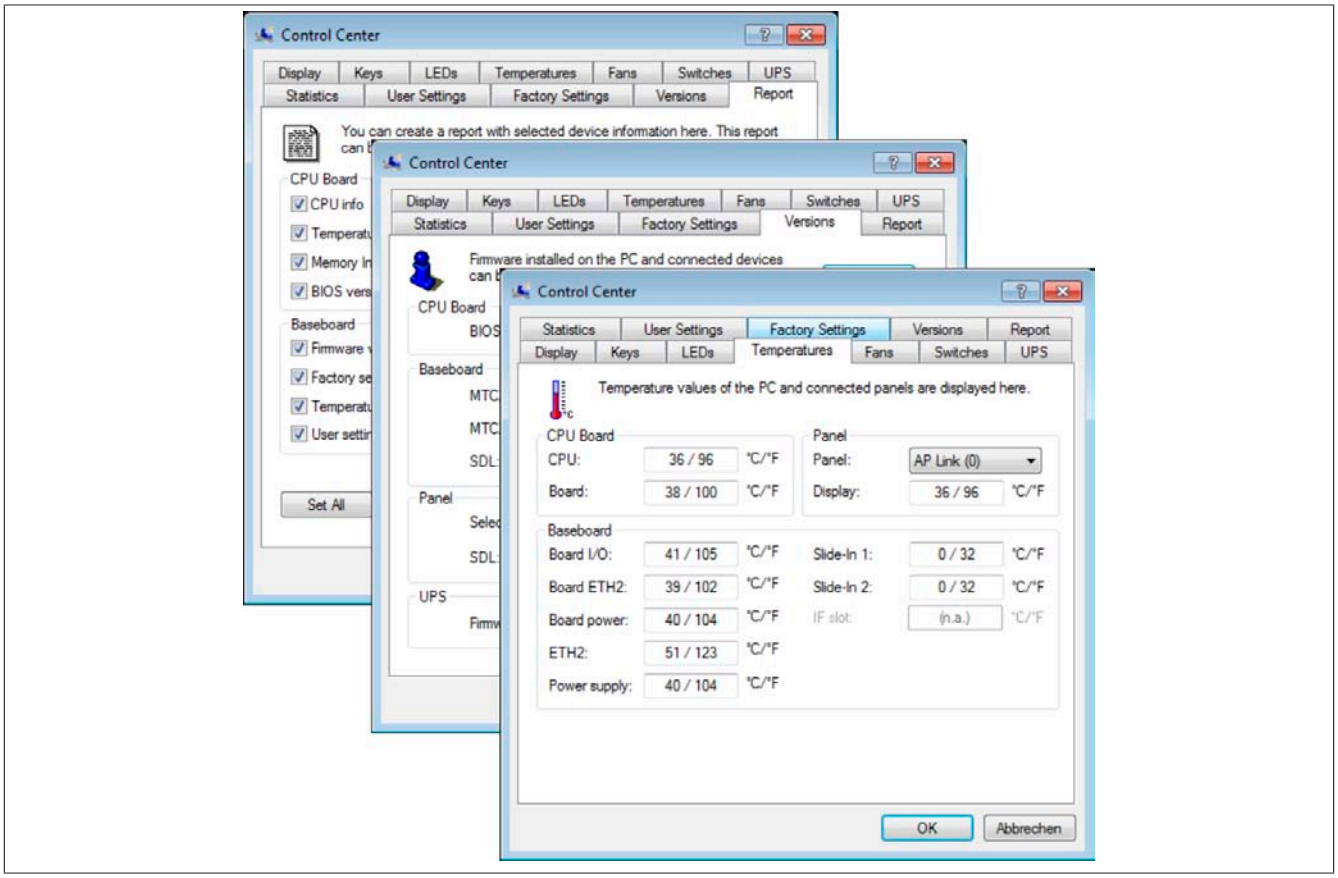


Figure 126: ADI Control Center screenshots - Examples

Information:

The temperature and voltage values (e.g. CPU temperature, core voltage, battery voltage) displayed in the corresponding ADI window represent uncalibrated values for informational purposes. They cannot be used to draw any conclusions about hardware alarms or error conditions. The hardware components used have automatic diagnostic functions that can be applied in the event of error.

11.1 Functions

Information:

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

- Changing display-specific parameters
- Reading device-specific keys
- Updating the key configuration
- Enabling device-specific LEDs on a membrane keypad
- Reading and calibrating input devices (e.g. key switches, handwheels, joysticks, potentiometers)
- Reading temperatures, fan speeds, statistical data and switch settings
- Read the operating hours (power on hours)
- Reading user and factory settings
- Reading software versions
- Updating and backing up BIOS and firmware
- Creating reports about the current system (support assistance)
- Setting the SDL equalizer value when adjusting SDL cables
- Changing the user serial ID

Supports the following systems:

- Automation PC 510
- Automation PC 511
- Automation PC 620
- Automation PC 810
- Automation PC 820
- Automation PC 910
- Panel PC 300
- 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
- Connected Automation Panel 800
- Connected Automation Panel 900

11.2 Installation

A detailed description of the Control Center can be found in the integrated online help documentation. The B&R Automation Device Interface (ADI) driver (also contains Control Center) is available in the Downloads section of the B&R website (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).

Information:

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

If a more current ADI driver version exists (see the Downloads section of the B&R website), it can be installed later. It is important that Enhanced Write Filter (EWF) is disabled for this.

11.3 SDL Equalizer settings

1. Open the **Control Center** in the **Control Panel**.
2. Select **Display** tab.
3. Click on **Settings**. This opens the following dialog box:

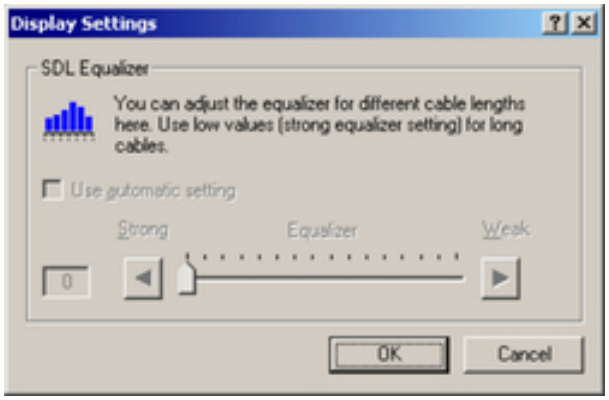


Figure 127: ADI Control Center - SDL equalizer settings

You can change the display's SDL equalizer settings in this dialog box. The equalizer is integrated into Automation Panel devices and adapts the DVI signal to various cable lengths. The equalizer value is automatically calculated based on the cable length. It is possible to set a different equalizer value in order to obtain the best possible display quality (e.g. in case of low-quality cables or poor DVI signal quality).

The value is optimally defined for the cable length when using the "Automatic setting".

The equalizer value can only be changed if the function is supported by Automation Panel 900 (starting with Panel Firmware version 1.04 or higher).

11.4 UPS configuration

Here you can view the status values for an optionally installed B&R add-on UPS as well as change, update or save the battery settings for the UPS. You can also configure the system settings for the UPS.

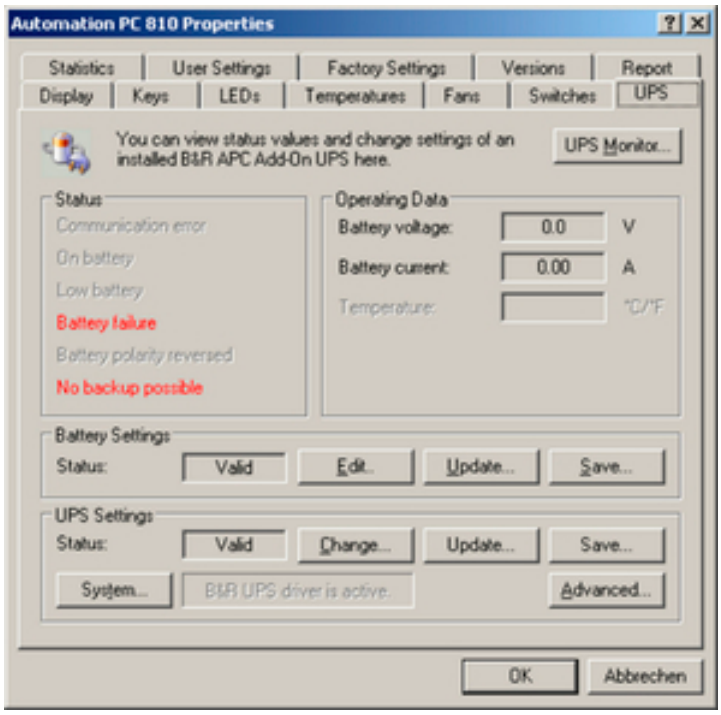


Figure 128: ADI Control Center - UPS settings

Caution!

The installed UPS must be selected and configured in the Control Panel using the energy options in order for battery operation to be supported.

Information:

The UPS service is supported starting with B&R Windows Embedded Version 2.10 or higher.

11.4.1 Installing the UPS service for the B&R add-on UPS

1. Open the **Control Center** in the **Control Panel**.
2. Select the **UPS** tab.
3. Under **UPS settings**, click on **System**. This opens the **Power Options** in the Control Panel. (The **Power Options** can also be opened directly from the **Control Panel**.)
4. Go to the **UPS** tab and click **Select...**.
5. Choose 'Bernecker + Rainer' as the manufacturer and 'APC Add-on UPS' as the model and then click **Finish**. The value for the COM connection is only required for a serially connected UPS and is ignored by the APC add-on UPS driver.
6. Click on **Apply** to start the UPS service. After a few seconds the UPS status and details are displayed.
7. Click **OK**.

The text field beside **System** (on the **UPS** tab in the **Control Center**) also indicates whether the B&R UPS driver is active.

Information:

Administrator rights are required in order to change the energy options or display the UPS status.

11.4.2 Displaying the UPS default values

1. Open the **Control Center** in the **Control Panel**.
2. Select the **UPS** tab.

The displayed values are updated automatically.

Information:

The status "reversed battery polarity" is only displayed in UPS firmware Version 1.08 or higher.

In UPS firmware Version 1.07 or smaller, a change between battery operation and normal operation can lead to communication errors.

3. Select UPS monitor to display UPS status changes since the last time the system or UPS driver was started.

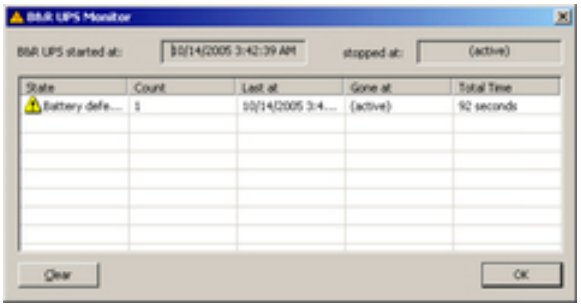


Figure 129: ADI Control Center - UPS monitor

The dialog box is updated automatically when the status changes.

To remove a status from the list, click on **Delete**.

Information:

The current status of the UPS is also displayed when the UPS service is started in the Windows Control Panel on the UPS page in the energy options.

Information:

In a German version of Windows XP Professional the battery status is displayed as "low" in the energy options, even if the battery is OK (Windows error). In an English version, three battery status levels are displayed: unknown, OK, replace A low battery status is never displayed.

11.4.3 Changing UPS battery settings

1. Open the **Control Center** in the **Control Panel**.
2. Select the **UPS** tab.
3. Under **Battery settings**, click on **Edit**. This opens the "Open" dialog box.
4. Select and **open** the file containing the battery settings.

Figure 130: ADI Control Center - UPS battery settings

In this dialog box you can change the settings for the UPS battery.

Click **OK** to write the changed settings to the file. The battery settings for the UPS can then be updated with this file.

Information:

To make settings for batteries not from B&R, it is best to make a copy of a file with battery settings from B&R under a new name and make adjust the settings in this file for the battery being used.

Current files with settings for batteries from B&R can be updated using B&R's "Upgrade PPC800 MTCX" software.

Information:

- **The current UPS firmware version 1.10 does not use charge end voltage, deep discharge voltage, lifespan and deep discharge cycles.**
- **Lifespan is only included in version 2 (and higher) of the UPS battery settings and only valid for B&R UPS batteries at 25°C ambient temperature.**
- **Deep discharge cycles are only included in version 3 (and higher) of the UPS battery settings and only valid for B&R UPS batteries.**

Information:

If you would like to change the current battery settings on the UPS, they must first be saved in a file.

11.4.4 Updating the UPS battery settings

1. Open the **Control Center** in the **Control Panel**.
2. Select the **UPS** tab.
3. Under **Battery settings**, click on **Update**. Clicking on "Open" opens a dialog box.
4. Select and **open** the file containing the battery settings. The "Download" dialog box is opened.

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

Information:

- **The UPS cannot be operated while updating the battery settings.**
- **If the transfer is interrupted, then the procedure must be repeated until the battery settings have been updated successfully. Otherwise battery operation will no longer be possible.**

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.

Information:

The UPS is automatically restarted after a successful download. This can cause a brief failure in the UPS communication.

11.4.5 Saving the UPS battery settings

1. Open the **Control Center** in the **Control Panel**.
2. Select the **UPS** tab.
3. Under Battery settings, click on **Save**. "Save under" dialog box opened.
4. Enter a file name or select an existing file and click on **Save**.

Information:

UPS settings can only be saved using UPS firmware version 1.10 and higher.

The transfer can be aborted by clicking on **Cancel** in the Download dialog box.

11.4.6 Configuring UPS system settings

1. Open the **Control Center** in the **Control Panel**.
2. Select the **UPS** tab.
3. Under **UPS settings**, click on **Change**. This opens the following dialog box:

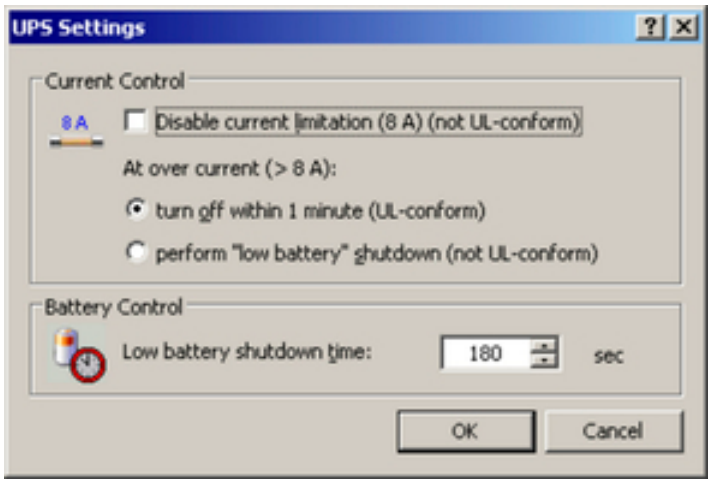


Figure 131: ADI Control Center - UPS settings

Further information regarding the UPD system settings can be found in the Windows help.

Information:

- **UPS settings can only be changed using UPS firmware version 1.10 and higher. If there are no changed settings on the UPS, then the factory or default settings are used.**
- **The UPS is automatically restarted after UPS settings have been changed. This can cause a brief disruption in communication with the UPS.**
- **Administrator rights are required in order to change the energy options or display the UPS status.**

11.4.6.1 Disabling 8 A current limitation

> **Information:**
>
> **It is not UL compliant to switch off the 8 A current limitation on devices during battery operation!**
>
> **"Low Battery" shutdown caused by an overcurrent > 8 A on devices during battery operation is not UL compliant!**

Select the checkbox **Disable current limitation (8 A)**.

If current limitation is enabled (checkbox deselected), then the UPS uses battery operation to check whether the UPS battery is discharged with 8 A for longer than 16 seconds. If so, then an overcurrent alarm is sent to the PC.

> **Information:**
>
> **Current limitation is only supported with UPS firmware version 1.10 and higher.**

Enabling one of the two following options determines how the UPS should perform when an overcurrent alarm occurs:

If **Turn-off within 1 minute** is selected, then the UPS will turn-off within one when an overcurrent alarm occurs.

> **Warning!**
>
> **The operating system will not be properly shut down if an overcurrent alarm occurs!**

If **Perform "low battery" shutdown** is selected, then the UPS will also signal a "Low battery alarm" in addition to the overcurrent alarm and will turn off after the defined **Low battery shutdown time**. This will allow the operating system to shut down properly when UPS service is enabled.

11.4.6.2 Changing the shutdown time of the UPS when the battery is low

Enter the **"Low Battery" shutdown time** in seconds. This is the amount of time that the UPS will wait before shutting off the power supply when the battery level is low.

This prevents the UPS battery from becoming too discharged if the Windows UPS service is not enabled and the UPS is therefore not turned off by the operating system.

If the UPS service is enabled, then the UPS will be turned off by the operating system when the battery level is low, based on the Windows UPS service **Shutdown time** (see "Changing additional UPS settings" on page 245). The **Low Battery shutdown time** will then be ignored.

> **Information:**
>
> - **The low battery shutdown time must be set to at least 60 seconds, so that the operating system has enough time to send the shutdown command to the UPS when the battery level is low (normally occurs after approximately 30 seconds).**
> - **The low battery shutdown time can only be set in UPS firmware version 1.10 and later. UPS firmware version 1.08 always uses a turn off delay time of 180 seconds. UPS firmware versions earlier than 1.08 do not shut down automatically when the battery level is low.**

11.4.7 Changing additional UPS settings

1. Open the **Control Center** in the **Control Panel**.
2. Select the **UPS** tab.
3. Under **UPS settings**, click on **Advanced**. This opens the following dialog box:

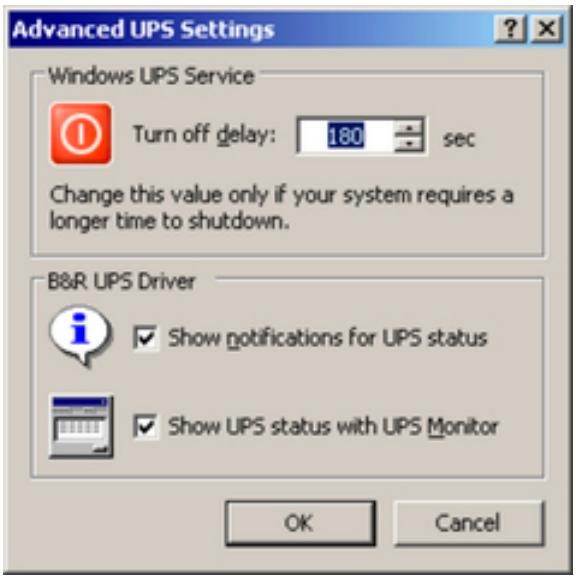


Figure 132: ADI Control Center - Advanced UPS settings

Information:

Administer rights are required in order to display this dialog box.

11.4.7.1 Changing the UPS shutdown time

Under **Windows UPS service** you can enter the **shutdown time** in seconds. This is the length of time that the UPS waits before switching off the power supply. When a critical alarm occurs (e.g. at low battery level), the Windows UPS service will send a shutdown command with the turn off delay time to the UPS and will shut down the system.

Information:

This time is evaluated by the Windows UPS Service, but can not be set in the UPS system settings of the energy options. This value should only be changed if the system requires longer than the default setting of 180 seconds to shut down.

Caution!

The time entered must be longer than the time required to shut down the operating system.

11.4.7.2 Activate UPS messages

Under **B&R UPS driver**, activate the checkbox **UPS status messages**. Any changes to the UPS status will then trigger a message from the B&R UPS driver.

Information:

Shutting down the system is only reported by the Windows UPS Service. The UPS Service also sends other messages if they are activated in the UPS system settings energy options. These messages are only displayed when the Windows Alerter (Messenger)[4] is active and the PC is connected to a network. Additionally, some conditions of the B&R add-on UPS are not detected by the Windows UPS Service, and therefore do not trigger messages (e.g. when there are no battery settings on the UPS). The Windows services can be found by opening the Control Panel and selecting "Services" from the Administrative Tools.

If the checkbox **Display UPS status with UPS monitor** is also activated, a new message is not displayed for every change, but only a general message and request for you to start the B&R UPS monitor. As long as the UPS monitor is active, no new messages are displayed.

Information:

Regardless of these options, all changes to the UPS status are logged in Windows event protocol (under "Application").

[4] **The Windows Alerter is supported starting with B&R Windows Embedded Version 2.20 or higher.**

11.4.8 Procedure following power failure

11.4.8.1 Overcurrent Shutdown

If an overcurrent > 8 A is present during battery operation for a duration of 16 seconds, the overcurrent shutdown is executed. A turn-off time of one minute is available to the system.

If the supply is regenerated during this time, then the shut down process is aborted.

> **Information:**
>
> **The overcurrent shutdown has the highest priority.**

11.4.8.2 Low Battery Shutdown

If the LowBatteryFlag is set during power failure, then the "Low Battery" shutdown is executed, preventing the battery from fully discharging. Once the turn-off time expires (3 minutes by default), the UPS shuts down.

If an "overcurrent" shutdown or "standard" shutdown is detected during the shutdown process, the "low battery" shutdown is replaced by the respective process.

11.4.8.3 Standard Shutdown

The standard shutdown is effective when the UPS service is active, the turn-off time is 3 minutes by default.

If the supply voltage returns during the turn-off time, then the shutdown procedure will be stopped.

If the supply voltage returns during the shutdown process, then the shutdown timer will run until the B&R industrial PC enters standby mode and will then reboot the system.

12 B&R Automation Device Interface (ADI) Development Kit

This software can be used to access B&R Automation Device Interface (ADI) functions directly from Windows applications created in one of the following development environments:

- Microsoft Visual C++ 6.0
- Microsoft Visual Basic 6.0
- Microsoft Embedded Visual C++ 4.0
- Microsoft Visual Studio 2005 (or newer)

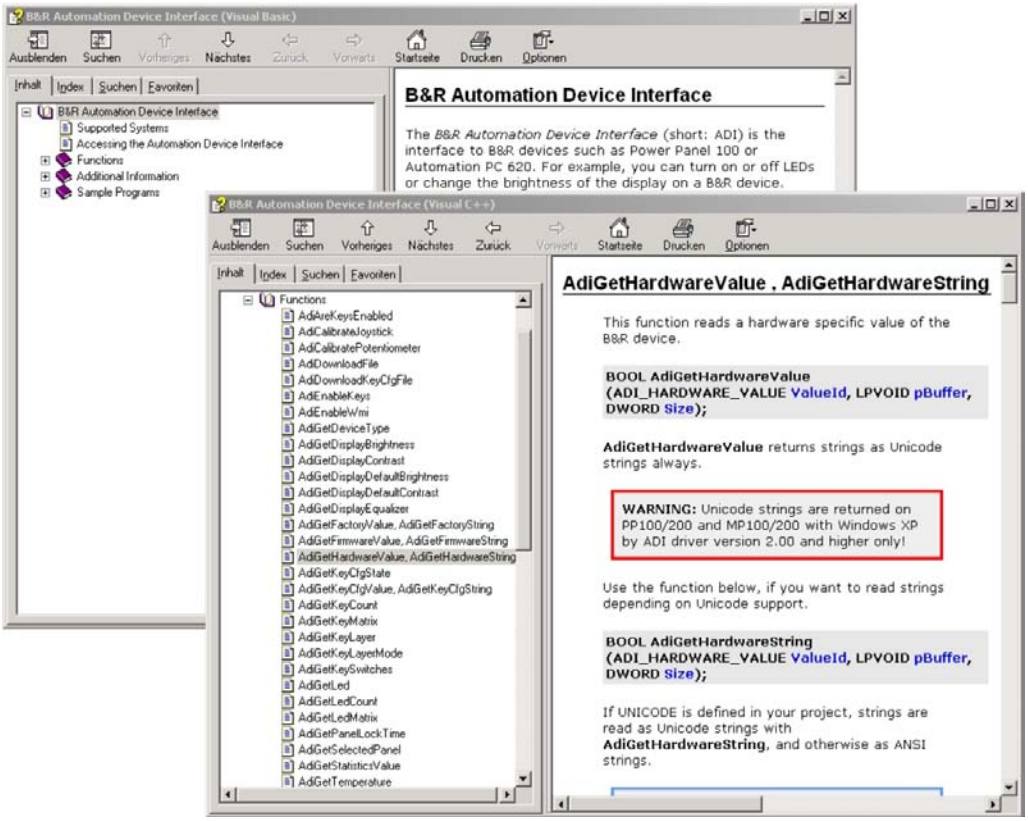


Figure 133: ADI Development Kit screenshots (version 3.40)

Features:

- One Microsoft Visual Basic module with ADI function declarations
- 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 application testing if no ADI driver is installed)

Supports the following systems (version 3.40 and higher):

- Automation PC 510
- Automation PC 511
- Automation PC 620
- Automation PC 810
- Automation PC 820
- Automation PC 910
- Panel PC 300
- Panel PC 700
- Panel PC 800
- Power Panel 100/200
- Power Panel 300/400
- Power Panel 500
- Mobile Panel 40/50

- Mobile Panel 100/200

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

A detailed description of how to use ADI functions can be found in the online help documentation.

The B&R Automation Device Interface (ADI) development kit is available at no cost in the Downloads section of the B&R website (www.br-automation.com).

13 B&R Automation Device Interface (ADI) .NET SDK

This software can be used to access B&R Automation Device Interface (ADI) functions directly from .NET applications created using Microsoft Visual Studio 2005 or later.

Supported programming languages:

- Visual Basic
- Visual C++
- Visual C#

System requirements

- Development system: PC with Windows XP/7 and
  - Microsoft Visual Studio 2005 (or newer)
  - Microsoft .NET Framework 2.0 and/or Microsoft .NET Compact Framework 2.0 (or newer)

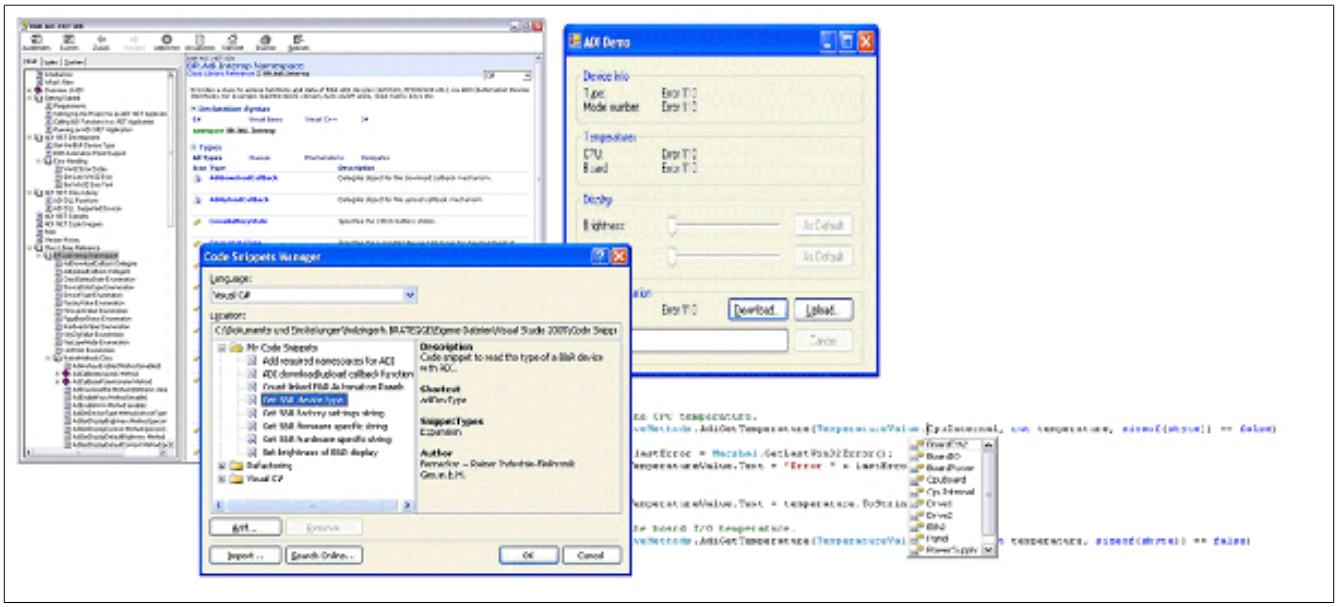


Figure 134: ADI .NET SDK screenshots (version 1.80)

Features (version 1.80 and higher)

- ADI .NET class library
- Help files in HTML Help 1.0 format (.chm file) and MS Help 2.0 format (.HxS file). (Help documentation is in English)
- Sample projects and code snippets for Visual Basic, Visual C++ and Visual C#
- ADI DLL (for application testing if no ADI driver is installed)

Supports the following systems (version 1.80 and higher):

- Automation PC 510
- Automation PC 511
- Automation PC 620
- Automation PC 810
- Automation PC 820
- Automation PC 910
- Panel PC 300
- Panel PC 700
- Panel PC 800
- Power Panel 100/200
- Power Panel 300/400
- Power Panel 500
- Mobile Panel 40/50
- Mobile Panel 100/200

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

A detailed description of how to use ADI functions can be found in the online help documentation.

The ADI .NET SDK is available in the Downloads section of the B&R website (www.br-automation.com).

14 B&R Key Editor

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

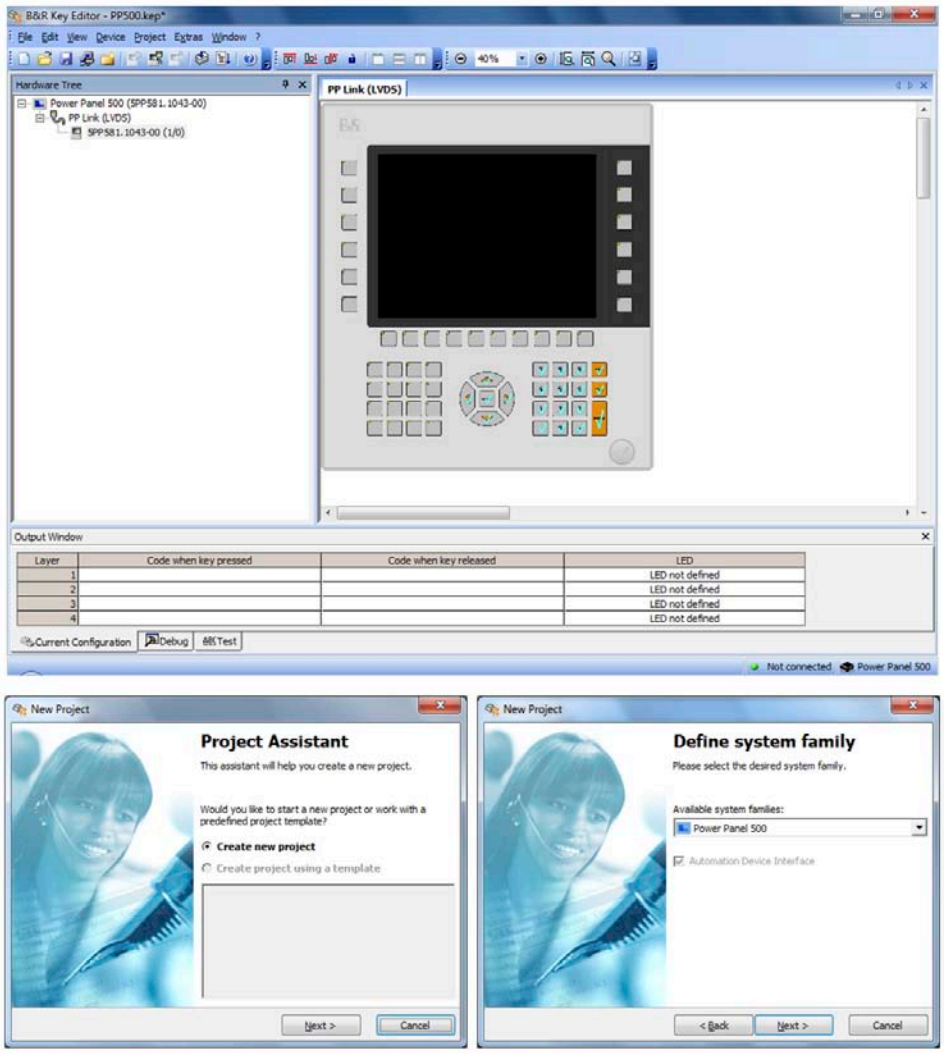


Figure 135: B&R Key Editor screenshots (version 3.30)

Features:

- Configuration of normal keyboard keys (A, B, C, etc.)
- Keyboard shortcuts (CTRL+C, SHIFT+DEL, etc.) using only one key
- Special key functions (change brightness, etc.)
- Assigning functions to LEDs (HDD access, power, etc.)
- 4 assignments possible per key (using layers)
- Configuration of the panel locking time when multiple Automation Panel 900 devices are connected to Automation PC and Panel PC devices.

Supports the following systems (version 3.30):

- Automation PC 510
- Automation PC 511
- Automation PC 620
- Automation PC 810
- Automation PC 820
- Automation PC 910
- Automation Panel 800
- Automation Panel 830
- 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

A detailed guide for configuring keys and LEDs can be found in the B&R Key Editor's online help documentation. The B&R Key Editor is available at no cost in the Downloads section of the B&R website (www.br-automation.com). It can also be found on the B&R HMI Drivers & Utilities DVD (model number 5SWHMI.0000-00).

Chapter 5 • Standards and certifications

1 Standards and guidelines

1.1 CE mark

This mark certifies that all harmonized EN standards for the applicable directives have been met for B&R products.

1.2 EMC directive

These devices meet the requirements of EC directive "2004/108/EC Electromagnetic compatibility" and are designed for the following areas:

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

1.3 Low voltage directive

These devices satisfy the requirements of EC directive "2006/95/EC Low voltage directive" and are designed for the following areas:

EN 61131-2:2007	Programmable logic controllers - Part 2: Equipment requirements and tests
EN 60204-1:2006 + A1:2009	Safety of machinery - Electrical equipment of machines - Part 1: General requirements

2 Certifications

Danger!

A fully assembled device can only receive certification if ALL of the individual components it includes have the applicable certifications. If an individual component is being used that DOES NOT have an applicable certification, then the fully assembled device will NOT RECEIVE certification.

B&R products and services comply with applicable standards. This includes 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 are committed to ensuring the reliability of our products in an industrial environment.

Unless otherwise specified, the following certifications apply:

2.1 UL certification

Products with this label have been certified by Underwriters Laboratories and are listed as "Industrial Control Equipment". This mark is valid for the USA and Canada and simplifies the certification of your machines and systems in these areas.

Underwriters Laboratories (UL) in accordance with the UL508 standard - 17th Edition
Canadian (CSA) standard in accordance with C22.2 No. 142-M1987

Chapter 6 • Accessories

The following accessories have successfully completed functional testing at B&R and are approved for use with this device. Nevertheless, it is important to observe any limitations that may apply to the fully assembled device when operated with other individual components. When operating the fully assembled device, the specifications for the individual components must be adhered to.

All components listed in this manual have been subjected to extensive system and compatibility testing and are approved for use. B&R can make no guarantee regarding the functionality of non-approved accessories.

1 Replacement CMOS batteries

1.1 0AC201.91 / 4A0006.00-000

1.1.1 General information

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

The battery is subject to wear and must be replaced when the battery power is insufficient ("Bad" status).

1.1.2 Order data

Model number	Short description	Figure
	Batteries	
0AC201.91	Lithium batteries 4 pcs., 3 V / 950 mAh button cell We hereby declare that the Lithium cells contained in this shipment qualify as "partly regulated". Handle with care. If the package is damaged, inspect cells, repack intact cells and protect cells against short circuits. For emergency information, call RENATA SA at + 41 61 319 28 27	
4A0006.00-000	Lithium battery, 3 V / 950 mAh, button cell	

Table 201: 0AC201.91, 4A0006.00-000 - Order data

1.1.3 Technical data

Warning!

The battery must be replaced by a Type CR2477N Renata battery only. The use of another battery may present a risk of fire or explosion.

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

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from those specified for the fully assembled device. The data specifications for the fully assembled device take precedence over those of individual components.

Product ID	0AC201.91	4A0006.00-000
General information		
Storage time	Max. 3 years at 30°C	
Certification CE	Yes	
Electrical characteristics		
Capacity	950 mAh	
Self-discharging	<1% per year (at 23°C)	
Voltage range	3 V	
Environmental conditions		
Temperature Storage	-20 to 60°C	

Table 202: 0AC201.91, 4A0006.00-000 - Technical data

Product ID	0AC201.91	4A0006.00-000
Relative humidity		
Operation	0 to 95%	
Storage	0 to 95%	
Transport	0 to 95%	

Table 202: 0AC201.91, 4A0006.00-000 - Technical data

2 Power connectors

2.1 0TB103.9x

2.1.1 General information

The single-row 3-pin terminal block 0TB103 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, 3.31 mm² screw clamp, protected against vibration by the screw flange	
0TB103.91	Connector, 24 VDC, 3-pin female, 3.31 mm² cage clamp, protected against vibration by the screw flange	

Table 203: 0TB103.9, 0TB103.91 - Order data

2.1.3 Technical data

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from those specified for the fully assembled device. The data specifications for the fully assembled device take precedence over those of individual components.

Product ID	0TB103.9	0TB103.91
General information		
Certification		
CE	Yes	
cULus	Yes	
GL	Yes	
Terminal block		
Note	Protected against vibration by the screw flange Nominal values according to UL	
Number of pins	3 (female)	
Type of terminal clamp	Screw clamps	Cage clamps [2]
Cable type	Only copper wires (no aluminum wires!)	
Distance between contacts	5.08 mm	
Connection cross section		
AWG wire	26 to 14 AWG	26 to 12 AWG
Wire end sleeves with plastic covering	0.20 to 1.50 mm²	
Solid wires	0.20 to 2.50 mm²	
Fine strand wires	0.20 to 1.50 mm²	0.20 to 2.50 mm²
With wire end sleeves	0.20 to 1.50 mm²	
Fastening torque	0.4 Nm	-
Electrical characteristics		
Nominal voltage	300 V	
Nominal current [1]	10 A / contact	
Contact resistance	≤ 5 mΩ	

Table 204: 0TB103.9, 0TB103.91 - Technical data

1) The limit data for each I/O module must be taken into consideration.
2) The terminal block in the cage clamp design cannot be stringed together.

3 DVI - Monitor adapter

3.1 5AC900.1000-00

3.2 General information

This adapter enables a standard monitor to be connected to the DVI-I interface.

3.3 Order data

Model number	Short description	Figure
	Miscellaneous	
5AC900.1000-00	Adapter DVI (plug) to CRT (socket). For connecting a standard monitor to a DVI-I interface.	

Table 205: 5AC900.1000-00 - Order data

4 USB interface cover

4.1 5AC900.1201-00

4.1.1 General information

Flat front-side USB interface cover for Automation Panel 900, Power Panel 500, Panel PC 700 and Panel PC 800 devices.

4.1.2 Order data

Model number	Short description	Figure
	Accessories	
5AC900.1201-00	USB interface cover M20 IP65 flat	

Table 206: 5AC900.1201-00 - Order data

4.2 5AC900.1201-01

4.2.1 General information

Round front-side knurled USB interface cover (with anti-loss strap) for Automation Panel 900, Power Panel 500, Panel PC 700 and Panel PC 800 devices.

4.2.2 Order data

Model number	Short description	Figure
	Accessories	
5AC900.1201-01	USB interface cover M20 IP65 curved	

Table 207: 5AC900.1201-01 - Order data

5 Clamping blocks

5.1 5AC900.BLOC-00

5.1.1 General information

These replacement clips are used to mount B&R panel devices.

5.1.2 Order data

Model number	Short description	Figure
	Accessories	
5AC900.BLOC-00	Terminal block with brackets, 10 pcs.; replacement part	

Table 208: 5AC900.BLOC-00 - Order data

6 Uninterruptible power supply

With an optionally integrated UPS, the B&R Industrial PC makes sure that the PC system completes write operations even when a power failure occurs. When the UPS detects a power failure, it switches to battery operation immediately without interruption. This means that all running programs are shut down properly by the UPS software. This prevents the possibility of inconsistent data (only functions if the UPC is already configured and the driver is activated).

Information:

- **The panel/monitor is not buffered by the UPS and will shut off when the power fails.**
- **More detailed information about uninterruptible power supplies can be found in the user's manual for the external UPS. This can be downloaded from the B&R website.**

Because the charging circuit is integrated in the housing of the B&R Industrial PC, installation has been simplified to merely attaching the connection cable to the battery unit mounted next to the PC.

Special emphasis was placed on ease of maintenance when the battery unit was designed. Batteries are easily accessible from the front and can be switched in just a few moments when servicing.

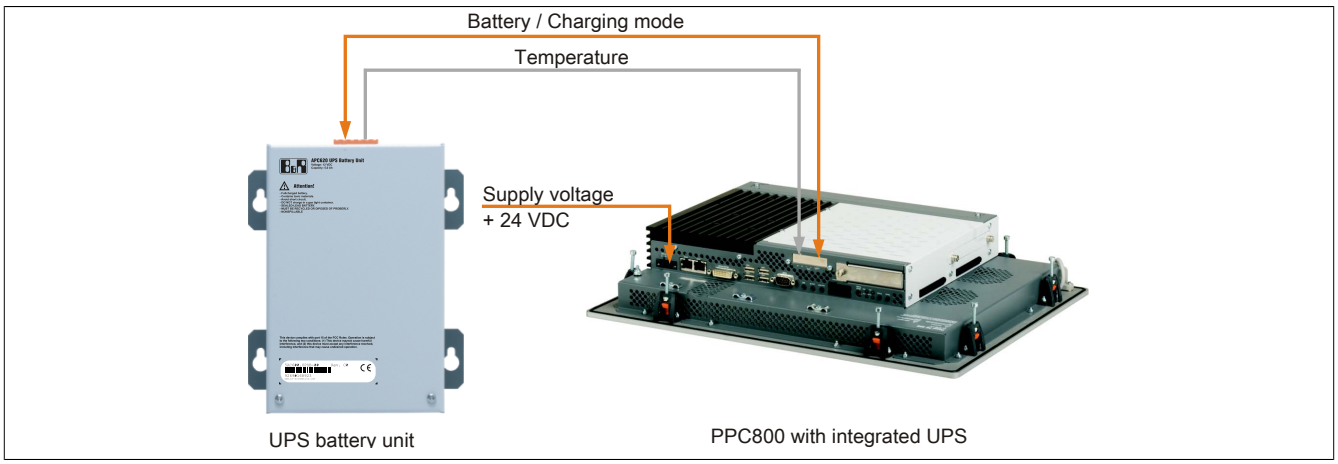


Figure 136: UPS principle

6.1 Features

- Long-lasting, maintenance-free rechargeable batteries
- Communication via integrated interfaces
- Temperature sensor
- Driver software
- Deep discharge protection

6.2 Requirements

- An appropriate system unit.
- Add-on UPS module 5AC600.UPSI-00
- Battery unit 5AC600.UPSB-00
- UPS connection cable 0.5 m (5CAUPS.0005-00) or 3 m (5CAUPS.0030-00)
- For info regarding configuration of the B&R UPS using the ADI Control Center.

6.3 5AC600.UPSI-00

6.3.1 General information

The add-on UPS module can easily be installed in an appropriate system unit (List of required revisions: see section 6.2 "Requirements" on page 262).

6.3.2 Order data

Model number	Short description	Figure
	Uninterruptible power supplies	
5AC600.UPSI-00	UPS module for APC620, APC810, PPC800; for system units 5PC600.SX01-00 (beginning with rev. H0), 5PC600.SX02-00 (beginning with rev. G0), 5PC600.SX02-01 (beginning with rev. H0), 5PC600.SX05-00 (beginning with rev. F0), 5PC600.SX05-01 (beginning with rev. F0), 5PC600.SF03-00 (beginning with rev. A0), 5PC810.SX*. 5PC820.1505-00, 5PC820.1906-00. Order cable (5CAUPS.0005-00 or 5CAUPS.0030-00) and battery unit (5AC600.UPSB-00) separately.	
	Required accessories	
	Uninterruptible power supplies	
5AC600.UPSB-00	Battery unit 5 Ah; or APC620, APC810 or PPC800 UPS.	
5CAUPS.0005-00	UPS cable 0.5 m; for UPS 5AC600.UPSI-00.	
5CAUPS.0030-00	UPS cable 3 m; for UPS 5AC600.UPSI-00.	

Table 209: 5AC600.UPSI-00 - Order data

6.3.3 Technical data

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from those specified for the fully assembled device. The data specifications for the fully assembled device take precedence over those of individual components.

Product ID	5AC600.UPSI-00
General information	
Certification	
CE	Yes
cULus	Yes
GL	Yes
Electrical characteristics	
Power consumption	Max. 7.5 watts
Power failure bypass	Max. 20min at 150W load
Deep discharge protection	Yes, at 10 V on the battery unit
Short circuit protection	No
Battery charging data	
Charging current	Max. 0.5 A
Switching threshold	
Battery operation	13 V
Mains operation	15 V

Table 210: 5AC600.UPSI-00 - Technical data

6.3.4 Installation

This module is installed using the materials included in delivery. For more information regarding installation, see Chapter 7 "Maintenance and service".

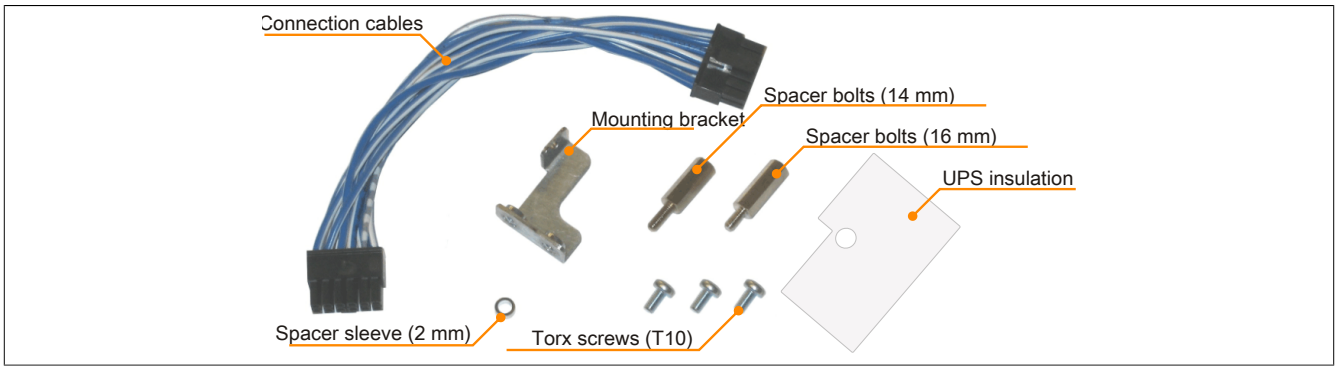


Figure 137: 5AC600.UPSI-00 Add-on UPS module – Installation materials

6.4 5AC600.UPSB-00

6.4.1 General information

The battery unit has a limited lifespan and should be replaced regularly (after the specified service life at the latest).

6.4.2 Order data

Model number	Short description	Figure
	Uninterruptible power supplies	
5AC600.UPSB-00	Battery unit 5 Ah; or APC620, APC810 or PPC800 UPS.	

Table 211: 5AC600.UPSB-00 - Order data

6.4.3 Technical data

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from those specified for the fully assembled device. The data specifications for the fully assembled device take precedence over those of individual components.

Product ID	5AC600.UPSB-00	
Revision	**D0**	**E0**
General information		
Battery		
Type	Enersys Cyclon 12 V 5 Ah (6 connected in series)	
Service life	10 years [1]	
Design	Single cell	
Temperature sensor	NTC resistance	
Maintenance interval during storage	6 month interval between charges	
Certification		
CE	Yes	
cULus	Yes	
GL	Yes	
Charge duration when battery low	Typ. 15 hours	
Electrical characteristics		
Nominal voltage	12 V	
Battery current	Max. 8 A	
Capacity	5 Ah	
Fuse [2]	No [3]	Yes
Deep discharge voltage	10 V	
Environmental conditions		
Temperature		
Charging mode	-30 to 60°C	
Operation	-40 to 80°C	
Storage	-65 to 80°C	
Transport	-65 to 80°C	
Relative humidity		
Operation	5 to 95%, non-condensing	
Storage	5 to 95%, non-condensing	
Transport	5 to 95%, non-condensing	
Altitude		
Operation	Max. 3000 m	

Table 212: 5AC600.UPSB-00, 5AC600.UPSB-00 - Technical data

Product ID	5AC600.UPSB-00
Mechanical characteristics	
Dimensions	
Width	104 mm [4]
Length	170.5 mm
Height	87.5 mm
Weight	Approx. 3200 g

Table 212: 5AC600.UPSB-00, 5AC600.UPSB-00 - Technical data

1) At 25 °C (up to 80 % battery capacity)
2) 25 A fuse. Replacement fuses can be ordered separately whenever needed.
3) The fuse can be installed later in revisions up to and including D0. More information can be found in the "Maintenance / Service" chapter of the APC810 and PPC800 user's manuals.
4) Dimensions without mounting clips

6.4.4 Temperature life span diagram up to 20% battery capacity.

Temperature	Lifespan in days
25	14600
30	9467
35	6139
40	3980
45	2581
50	1674
55	1085
60	704
65	456
70	296
75	192
80	124

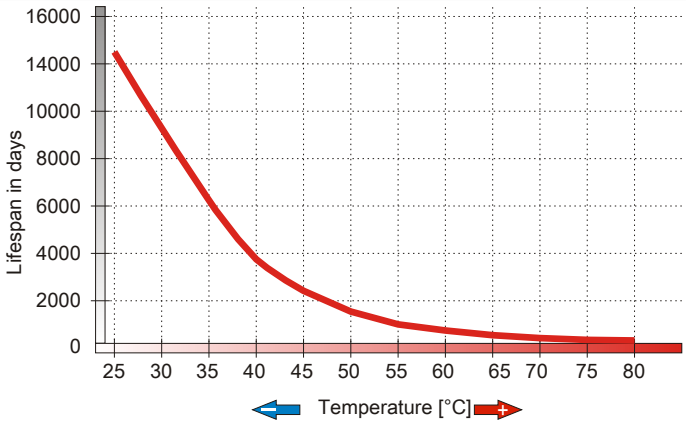


Figure 138: Temperature life span diagram

6.4.5 Deep discharge cycles

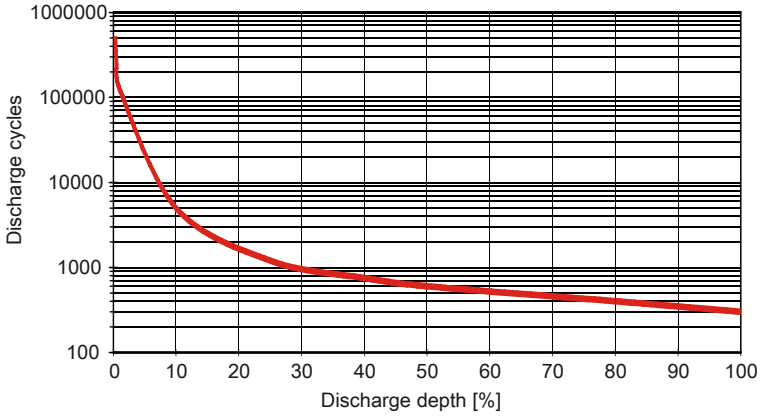


Figure 139: Deep discharge cycles

6.4.6 Dimensions

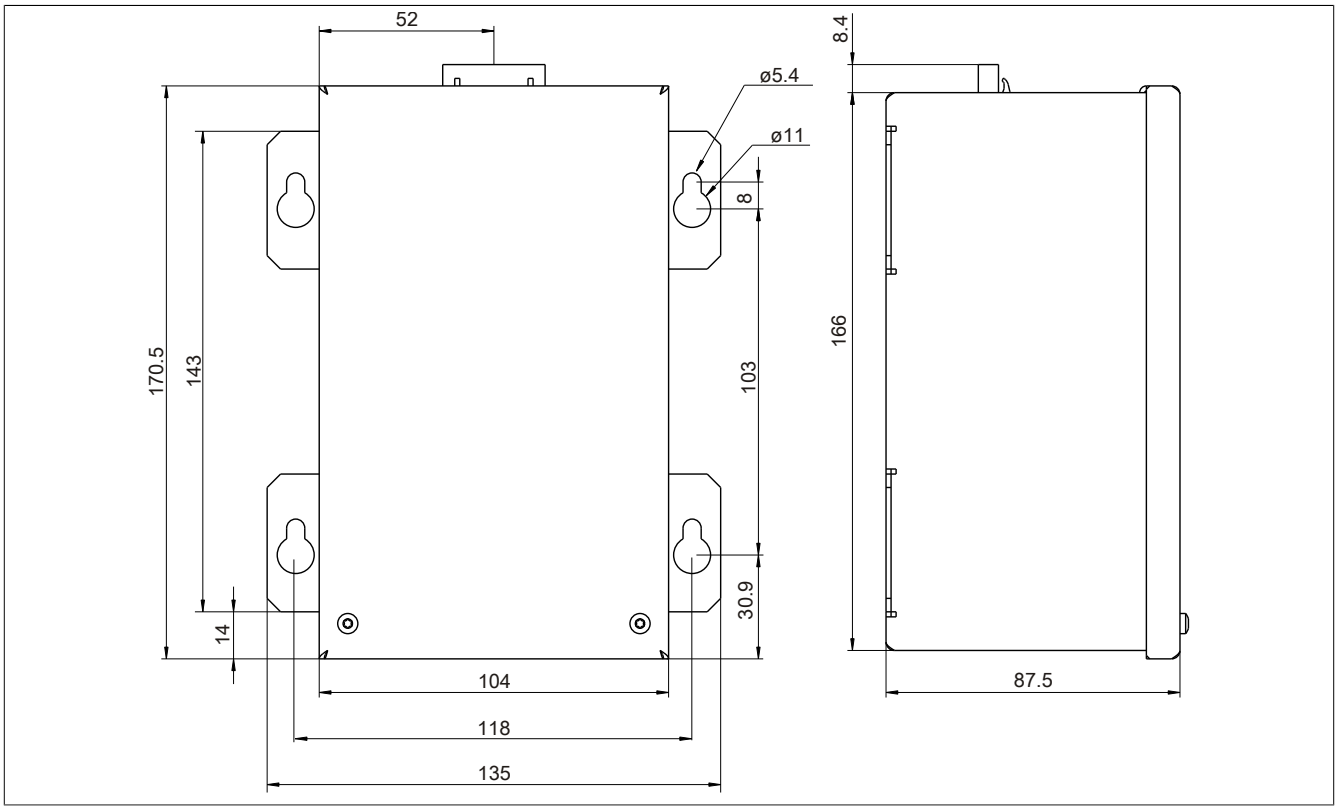


Figure 140: 5PC600.UPSB-00 - Dimensions

6.4.7 Drilling template

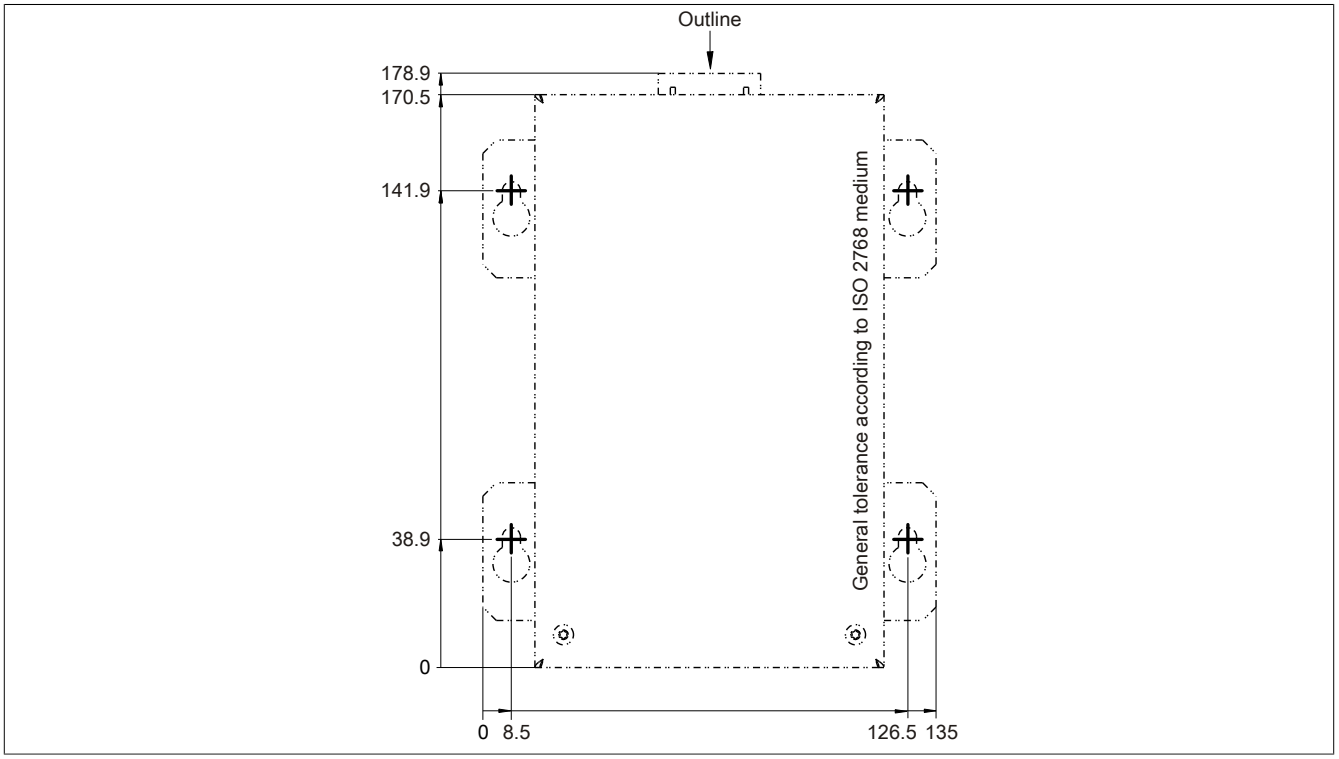


Figure 141: 5PC600.UPSB-00 - Drilling template

6.4.8 Mounting instructions

Due to the unique construction of these batteries, they can be stored and operated in any position.

6.5 5CAUPS.00xx-00

6.5.1 General information

The UPS connection cable establishes the connection between the add-on UPS module (5AC600.UPSI-00) and the battery unit (5AC600.UPSB-00). It is available in lengths of 0.5 m and 3 m.

6.5.2 Order data

Model number	Short description	Figure
	Uninterruptible power supplies	
5CAUPS.0005-00	UPS cable 0.5 m; for UPS 5AC600.UPSI-00.	
5CAUPS.0030-00	UPS cable 3 m; for UPS 5AC600.UPSI-00.	

Table 213: 5CAUPS.0005-00, 5CAUPS.0030-00 - Order data

6.5.3 Technical data

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from those specified for the fully assembled device. The data specifications for the fully assembled device take precedence over those of individual components.

Product ID	5CAUPS.0005-00	5CAUPS.0030-00
General information		
Certification		
CE	Yes	
cULus	Yes	
GL	Yes	
Cable structure		
Wire cross section	2x 0.5 mm² (AWG 20) 4x 2.5 mm² (AWG 13)	
Conductor resistance	At 0.5 mm² max. 39 Ω/km At 2.5 mm² max. 7.98 Ω/km	
Outer sheathing		
Material	Thermoplastic PVC-based material	
Color	Window gray (similar to RAL 7040)	
Connector		
Type	6-pin plug with clamping yoke / 6-pin multipoint socket with clamping yoke	
Electrical characteristics		
Operating voltage	Max. 300 V	
Peak operating voltage	Typically 12 VDC / max. 15 VDC	
Test voltage		
Wire/Wire	1500 V	
Current load	10 A at 20 °C	
Environmental conditions		
Temperature		
Moving	-5 to 80°C	
Static	-30 to 80°C	
Mechanical characteristics		
Dimensions		
Length	0.5 m	3 m
Diameter	8.5 mm ±0.2 mm	
Flex radius		
Moving	10x wire cross-section	
Fixed installation	5x wire cross-section	
Weight	Approx. 100 g	Approx. 470 g

Table 214: 5CAUPS.0005-00, 5CAUPS.0030-00 - Technical data

6.6 5AC600.UPSF-00

6.6.1 General information

The UPS fuse kit is intended to add a fuse for the battery unit 5AC600.UPSB-00.

Information about installing the 5AC600.UPSF-00 fuse kit can be found in the "Installing the UPS fuse kit on the battery unit" on page 337 section.

Information:

The 5AC600.UPSF-00 UPS fuse kit is only needed for battery units up to and including revision D0. A 25 A fuse is integrated on the connector circuit board beginning with revision E0.

6.6.2 Order data

Model number	Short description	Figure
	Uninterruptible power supplies	
5AC600.UPSF-00	UPS fuse kit for battery unit 5AC600.UPSB-00 up to revision D0.	

Table 215: 5AC600.UPSF-00 - Order data

6.7 5AC600.UPSF-01

6.7.1 General information

These 25 A fuses are replacement parts for the 5AC600.UPSB-00 battery unit beginning with revision E0 as well as the 5AC600.UPSF-00 fuse kit.

6.7.2 Order data

Model number	Short description	Figure
	Uninterruptible power supplies	
5AC600.UPSF-01	UPS fuse, 5 pcs.	

Table 216: 5AC600.UPSF-01 - Order data

7 External UPS

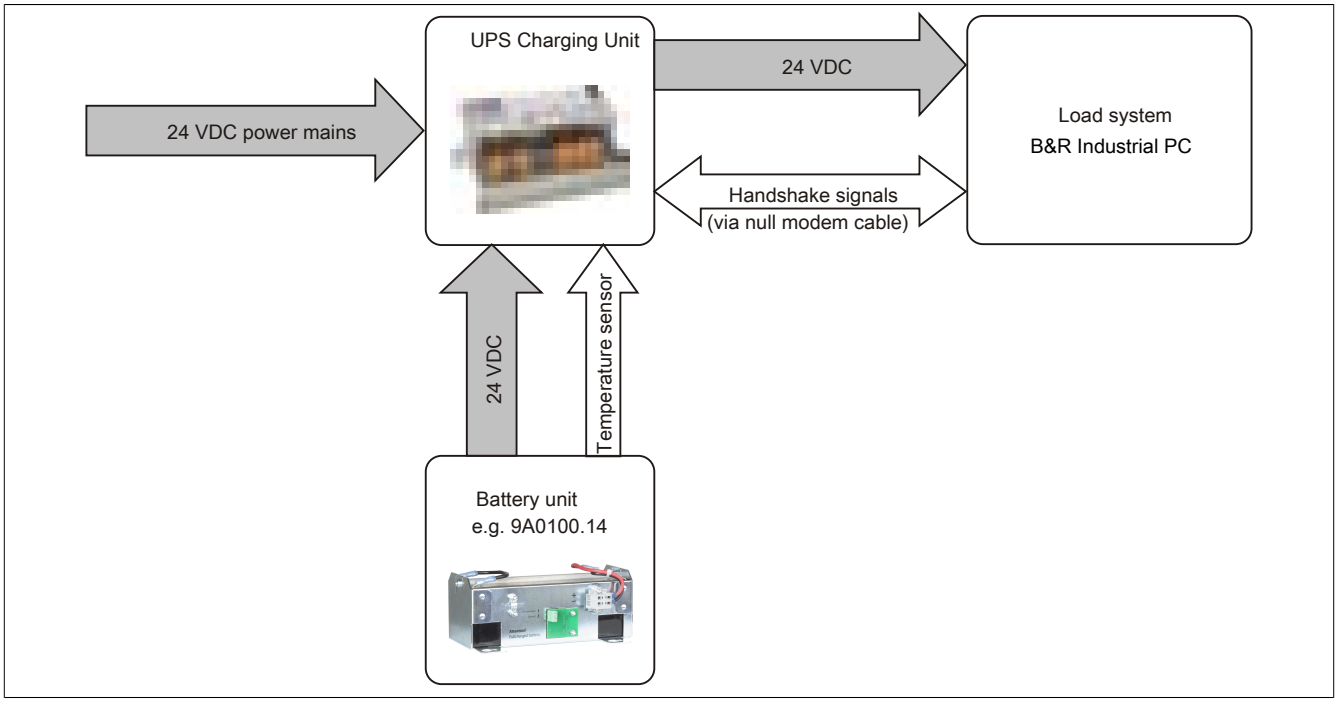


Figure 142: Block diagram of the entire system

7.1 General information

For supply with an external UPS, a UPS charging unit, a battery unit and a null modem cable are required.

In normal operation, the 24 VDC supply voltage is put straight through to the load system. If the supply voltage fails, the rechargeable UPS batteries power the PC to allow controlled shutdown without loss of data.

Data and commands are exchanged between the UPS and the load system via the handshake signals for an RS232 interface.

More information regarding the external UPS is available in the UPS user's manual, which can be downloaded from the B&R website (www.br-automation.com).

7.2 Order data

Model number	Short description	Figure
	24 VDC UPS modules	
9A0100.11	UPS 24 VDC, 24 VDC input, 24 VDC output, serial interface	
9A0100.12	UPS battery unit type A, 24 V, 7 Ah, incl. battery cage	
9A0100.13	UPS batteries type A (replacement part), 2x 12 V, 7 Ah, for battery unit 9A0100.12	
9A0100.14	UPS battery unit type B, 24 V, 2.2 Ah, incl. battery cage	
9A0100.15	UPS batteries type B (replacement part), 2x 12 V, 2.2 Ah, for battery unit 9A0100.14	
9A0100.16	UPS battery unit type C, 24 V, 4.5 Ah, incl. battery cage	
9A0100.17	UPS batteries type C (replacement part), 2x 12 V, 4.5 Ah, for battery unit 9A0100.16	
	Required accessories	
	Battery units	
9A0100.12	UPS battery unit type A, 24 V, 7 Ah, incl. battery cage	
9A0100.14	UPS battery unit type B, 24 V, 2.2 Ah, incl. battery cage	
9A0100.16	UPS battery unit type C, 24 V, 4.5 Ah, incl. battery cage	
	Cables	
9A0017.01	Null modem cable RS232, 0.6 m, for connecting UPS and IPC (9 pin D-type socket - 9 pin D-type socket)	
9A0017.02	Null modem cable RS232, 1.8 m, for connecting UPS and IPC (9 pin D-type socket - 9 pin D-type socket)	
	Optional accessories	
	Replacement batteries	
9A0100.13	UPS batteries type A (replacement part), 2x 12 V, 7 Ah, for battery unit 9A0100.12	

Table 217: 9A0100.11, 9A0100.12, 9A0100.13, 9A0100.14, 9A0100.15, 9A0100.16, 9A0100.17 - Order data

Model number	Short description	Figure
9A0100.15	UPS batteries type B (replacement part), 2x 12 V, 2.2 Ah, for battery unit 9A0100.14	
9A0100.17	UPS batteries type C (replacement part), 2x 12 V, 4.5 Ah, for battery unit 9A0100.16	

Table 217: 9A0100.11, 9A0100.12, 9A0100.13, 9A0100.14, 9A0100.15, 9A0100.16, 9A0100.17 - Order data

8 PCI Insert cards

8.1 5ACPCI.ETH1-01

8.1.1 General information

The universal (3.3 V and 5 V) half-size PCI Ethernet card has a 10/100 Mbit/s network connection and can be inserted in a 16-bit PCI slot and operated as an additional network interface.

- PCI Ethernet card
- 1 network connection (10/100 Mbit/s)

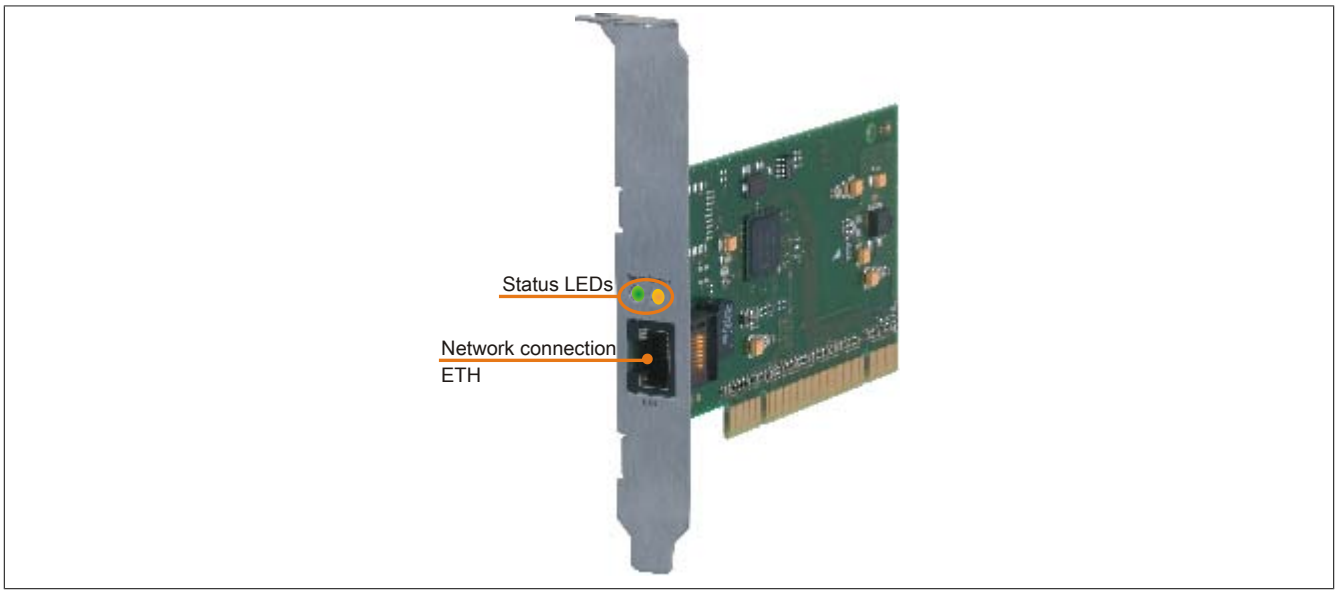


Figure 143: Order data - PCI Ethernet Card 10/100

8.1.2 Order data

Model number	Short description	Figure
	Accessories	
5ACPCI.ETH1-01	PCI Ethernet card 1x 10/100	

Table 218: 5ACPCI.ETH1-01 - Order data

8.1.3 Technical data

Product ID	5ACPCI.ETH1-01
General information	
B&R ID code	$A58A
Diagnostics Data transfer	 Yes, using status LED
Certification CE cULus GL	 Yes Yes Yes

Table 219: 5ACPCI.ETH1-01 - Technical data

Product ID	5ACPCI.ETH1-01
Interfaces	
Ethernet	
Quantity	1
Controller	Intel 82551ER
Design	Shielded RJ45 port
Transfer rate	10/100 Mbit/s
Cable length	Max. 100 m between two stations (segment length)

Table 219: 5ACPCI.ETH1-01 - Technical data

8.1.3.1 Ethernet port

Information:

The following characteristics, features and limit values only apply to this individual component and can deviate from those specified for the fully assembled device. For the assembled device in which this individual component is used, refer to the data given specifically for that device.

Ethernet interface		
Controller	Intel 82551ER	
Power supply	Universal card (2 notches) for 3.3 V or 5 V	
Cabling	S/STP (Cat 5e)	
Transfer rate	10/100 Mbit/s	
Cable length	Max. 100 m (min. Cat 5e)	
LED	**On**	**Off**
Green	100 Mbit/s	10 Mbit/s
Orange	Link (Ethernet network connection available)	Activity (blinking - data transfer in progress)

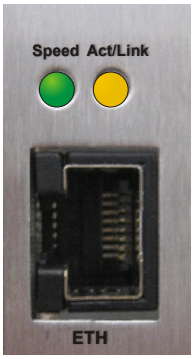


Table 220: 5ACPCI.ETH1-01 - Technical data

8.1.4 Driver support

A special driver is required in order to operate the Intel 82551ER Ethernet controller. Drivers for approved operating systems (Windows XP Professional, Windows XP Embedded and MS-DOS) are available in the Downloads section of the B&R website (www.br-automation.com).

Information:

Required drivers can only be downloaded from the B&R website, not from manufacturer websites.

8.1.5 Dimensions

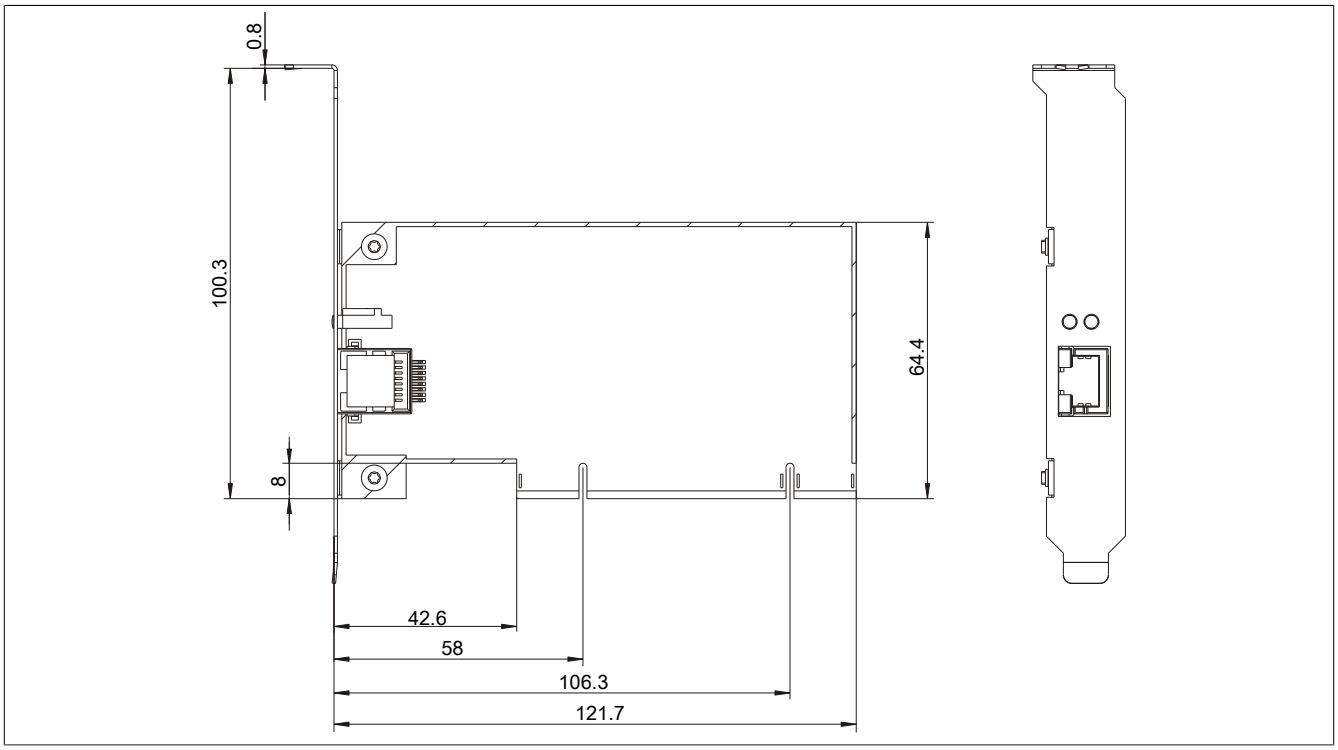


Figure 144: 5ACPCI.ETH1-01 - Dimensions

8.2 5ACPCI.ETH3-01

8.2.1 General information

The universal (3.3 V and 5 V) half-size PCI Ethernet card has three 10/100 Mbit/s network connections and can be inserted in a 16-bit PCI slot and operated as an additional network interface.

- PCI Ethernet card
- 3 network connections (10/100 Mbit/s)

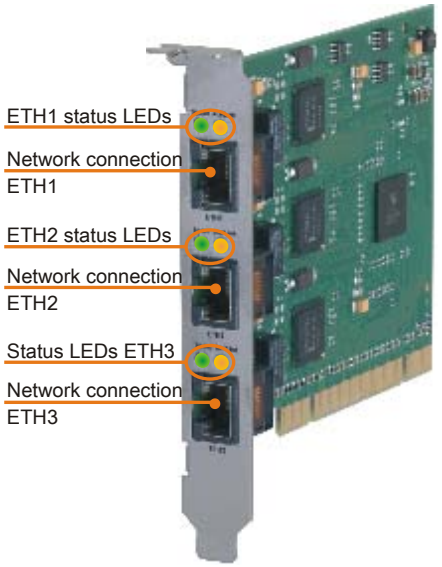


Figure 145: 5ACPCI.ETH3-01 - PCI Ethernet card 10/100

8.2.2 Order data

Model number	Short description	Figure
	Accessories	
5ACPCI.ETH3-01	PCI Ethernet card 3x 10/100	

Table 221: 5ACPCI.ETH3-01 - Order data

8.2.3 Technical data

Product ID	5ACPCI.ETH3-01
General information	
B&R ID code	$A58B
Diagnostics Data transfer	 Yes, using status LED
Certification CE cULus GL	 Yes Yes Yes

Table 222: 5ACPCI.ETH3-01 - Technical data

Product ID	5ACPCI.ETH3-01
Interfaces	
Ethernet	
Quantity	3
Controller	Intel 82551ER
Design	Shielded RJ45 port
Transfer rate	10/100 Mbit/s
Cable length	Max. 100 m between two stations (segment length)

Table 222: 5ACPCI.ETH3-01 - Technical data

8.2.3.1 Ethernet port

Information:

The following characteristics, features and limit values only apply to this individual component and can deviate from those specified for the fully assembled device. For the assembled device in which this individual component is used, refer to the data given specifically for that device.

Ethernet interfaces		
Controller	each with Intel 82551ER	
Power supply	Universal card (2 notches) for 3.3 V or 5 V	
Cabling	S/STP (Cat 5e)	
Transfer rate	10/100 Mbit/s	
Cable length	Max. 100 m (min. Cat 5e)	
LED	**On**	**Off**
Green	100 Mbit/s	10 Mbit/s
Orange	Link (Ethernet network connection available)	Activity (blinking - data transfer in progress)

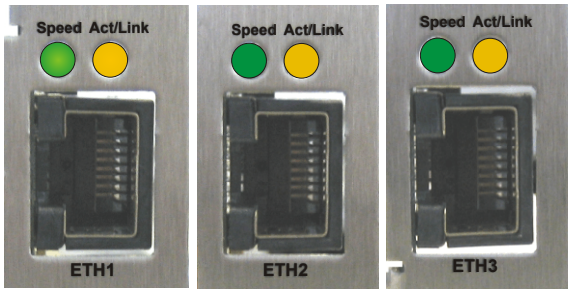


Table 223: 5ACPCI.ETH3-01 - Technical data

8.2.4 Driver support

A special driver is required in order to operate the Intel 82551ER Ethernet controller. Drivers for approved operating systems (Windows XP Professional, Windows XP Embedded and MS-DOS) are available in the Downloads section of the B&R website (www.br-automation.com).

Information:

Required drivers can only be downloaded from the B&R website, not from manufacturer websites.

8.2.5 Dimensions

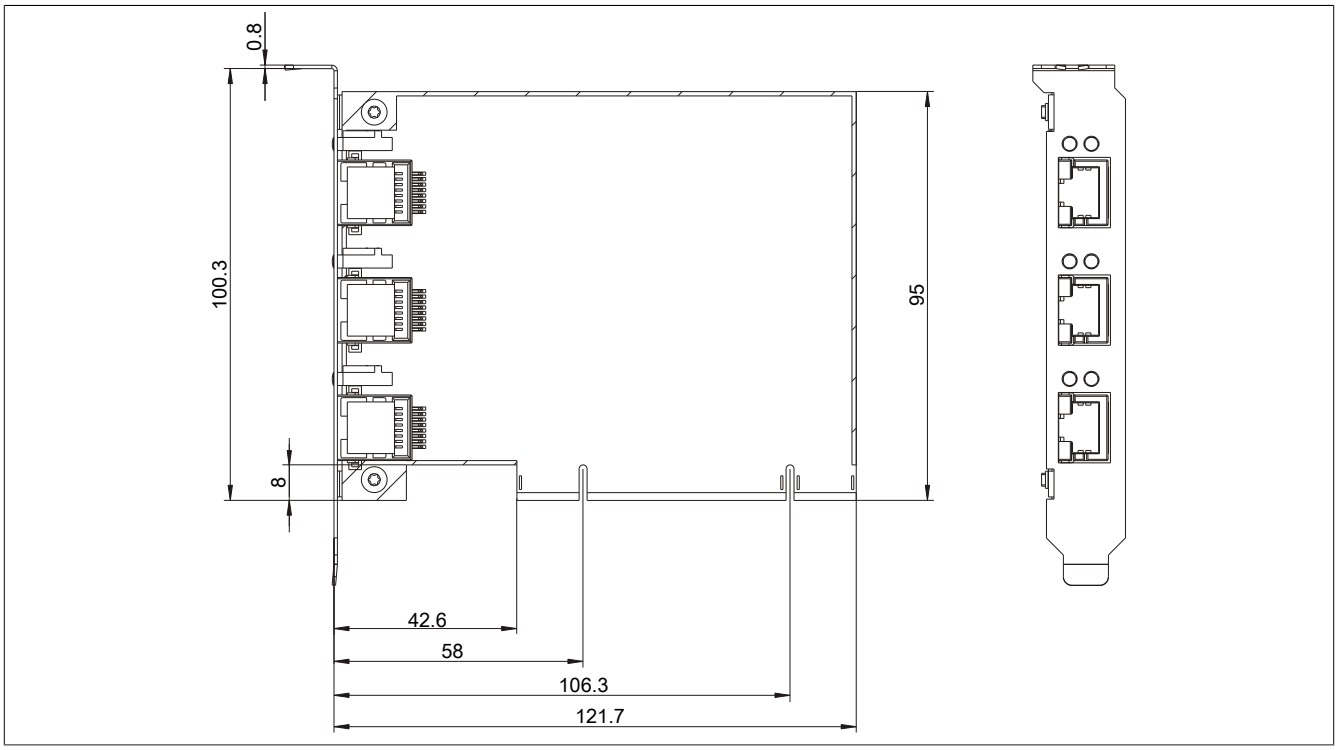


Figure 146: 5ACPCI.ETH3-01 - Dimensions

9 CompactFlash cards

9.1 General information

CompactFlash cards are storage media that are easy to replace. 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.

9.2 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

9.2.1 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.

9.2.2 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.

9.2.2.1 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.

9.2.2.2 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.

9.2.2.3 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.

9.2.3 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.

9.2.4 S.M.A.R.T. support

Self-Monitoring, Analysis and Reporting Technology (S.M.A.R.T. for short) is an industry standard for mass storage devices that has been introduced to monitor important parameters and quickly detect imminent failures. Critical performance and calibration data is monitored and stored in order to help predict the probability of errors.

9.2.5 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.

9.3 5CFCRD.xxxx-06

9.3.1 General information

Information:

B&R CompactFlash cards 5CFCRD.xxxx-06 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 291

Information:

The 5CFCRD.xxxx-06 CompactFlash cards are supported on B&R devices with WinCE version ≥ 6.0.

9.3.2 Order data

Model number	Short description	Figure
	CompactFlash	
5CFCRD.0512-06	CompactFlash 512 MB B&R (SLC)	
5CFCRD.1024-06	CompactFlash 1 GB B&R (SLC)	
5CFCRD.2048-06	CompactFlash 2 GB B&R (SLC)	
5CFCRD.4096-06	CompactFlash 4 GB B&R (SLC)	
5CFCRD.8192-06	CompactFlash 8 GB B&R (SLC)	
5CFCRD.016G-06	CompactFlash 16 GB B&R (SLC)	
5CFCRD.032G-06	CompactFlash 32 GB B&R (SLC)	

Table 224: 5CFCRD.0512-06, 5CFCRD.1024-06, 5CFCRD.2048-06, 5CFCRD.4096-06, 5CFCRD.8192-06, 5CFCRD.016G-06, 5CFCRD.032G-06 - Order data

9.3.3 Technical data

Caution!

A sudden loss of power may result in data loss! In very rare cases, mass memory may also be damaged.

To prevent damage and loss of data, the use of a UPS device is recommended.

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from those specified for the fully assembled device. The data specifications for the fully assembled device take precedence over those of individual components.

Product ID	5CFCRD. 0512-06	5CFCRD. 1024-06	5CFCRD. 2048-06	5CFCRD. 4096-06	5CFCRD. 8192-06	5CFCRD. 016G-06	5CFCRD. 032G-06
General information							
Capacity	512 MB	1 GB	2 GB	4 GB	8 GB	16 GB	32 GB
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	33 MB/s	33 MB/s	33 MB/s	33 MB/s	33 MB/s	36 MB/s	36 MB/s
Maximum	35 MB/s	35 MB/s	35 MB/s	34 MB/s	34 MB/s	37 MB/s	37 MB/s
Continuous writing							
Typical	15 MB/s	15 MB/s	15 MB/s	14 MB/s	14 MB/s	28 MB/s	28 MB/s
Maximum	18 MB/s	18 MB/s	18 MB/s	17 MB/s	17 MB/s	30 MB/s	30 MB/s

Table 225: 5CFCRD.0512-06, 5CFCRD.1024-06, 5CFCRD.2048-06, 5CFCRD.4096-06, 5CFCRD.8192-06, 5CFCRD.016G-06, 5CFCRD.032G-06 - Technical data

Product ID	5CFCRD. 0512-06	5CFCRD. 1024-06	5CFCRD. 2048-06	5CFCRD. 4096-06	5CFCRD. 8192-06	5CFCRD. 016G-06	5CFCRD. 032G-06
Certification							
CE				Yes			
cULus				Yes			
cULus HazLoc Class 1 Division 2	-	-	-	-	-	Yes	-
ATEX Zone 22	-	-	-	-	-	Yes	-
GL				Yes			
Endurance							
Guaranteed data volume							
Guaranteed [1]	50 TB	100 TB	200 TB	400 TB	800 TB	1600 TB	3200 TB
Results for 5 years [1]	27.40 GB/day	54.79 GB/day	109.9 GB/day	219.8 GB/day	438.6 GB/day	876.72 GB/day	1753.44 GB/day
Clear/Write cycles							
Guaranteed				100,000			
SLC flash				Yes			
Wear leveling				Static			
Error correction coding (ECC)				Yes			
S.M.A.R.T. Support				Yes			
Support							
Hardware				PP300/400, PP500, PPC300, PPC700, PPC725, PPC800, APC620, APC810, APC820			
Operating systems							
Windows 7 32-bit	No	No	No	No	No	Yes	Yes
Windows 7 64-bit	No	No	No	No	No	No	Yes
Windows Embedded Standard 7, 32-bit	No	No	No	No	Yes	Yes	Yes
Windows Embedded Standard 7, 64-bit	No	No	No	No	No	Yes	Yes
Windows XP Professional	No	No	No	Yes	Yes	Yes	Yes
Windows XP Embedded				Yes			
Windows Embedded Standard 2009	No	Yes	Yes	Yes	Yes	Yes	Yes
Windows CE 6.0	Yes	Yes	Yes	Yes	Yes	Yes [2]	Yes [2]
Windows CE 5.0				No			
Software							
PVI Transfer	≥ V3.2.3.8 (part of PVI Development Setup ≥ V2.06.00.3011)	≥ V3.2.3.8 (part of PVI Development Setup ≥ V2.06.00.3011)	≥ V3.2.3.8 (part of PVI Development Setup ≥ V2.06.00.3011)	≥ V3.2.3.8 (part of PVI Development Setup ≥ V2.06.00.3011)	≥ V3.2.3.8 (part of PVI Development Setup ≥ V2.06.00.3011)	≥ V3.6.8.40 (part of PVI Development Setup ≥ V3.0.0.3020)	≥ V4.0.0.8 (part of PVI Development Setup ≥ V3.0.2.3014)
B&R Embedded OS Installer	≥ V3.10	≥ V3.10	≥ V3.10	≥ V3.10	≥ V3.10	≥ V3.20	≥ V3.21
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 5 times (JEDEC JESD22, method B110) 30 g, 11 ms 1 times (IEC 68-2-27)			
Storage				1.5 kg peak, 0.5 ms 5 times (JEDEC JESD22, method B110) 30 g, 11 ms 1 times (IEC 68-2-27)			
Transport				1.5 kg peak, 0.5 ms 5 times (JEDEC JESD22, method B110) 30 g, 11 ms 1 times (IEC 68-2-27)			
Altitude							
Operation				Max. 4572 m			
Mechanical characteristics							
Dimensions							
Width				42.8 ±0.10mm			
Length				36.4 ±0.15mm			
Height				3.3 ±0.10mm			
Weight				10 g			

Table 225: 5CFCRD.0512-06, 5CFCRD.1024-06, 5CFCRD.2048-06, 5CFCRD.4096-06, 5CFCRD.8192-06, 5CFCRD.016G-06, 5CFCRD.032G-06 - Technical data

1) Endurance of B&R CFs (with linear written block size ≥ 128 kB)
2) Not supported by the B&R Embedded OS installer.

9.3.4 Temperature humidity diagram

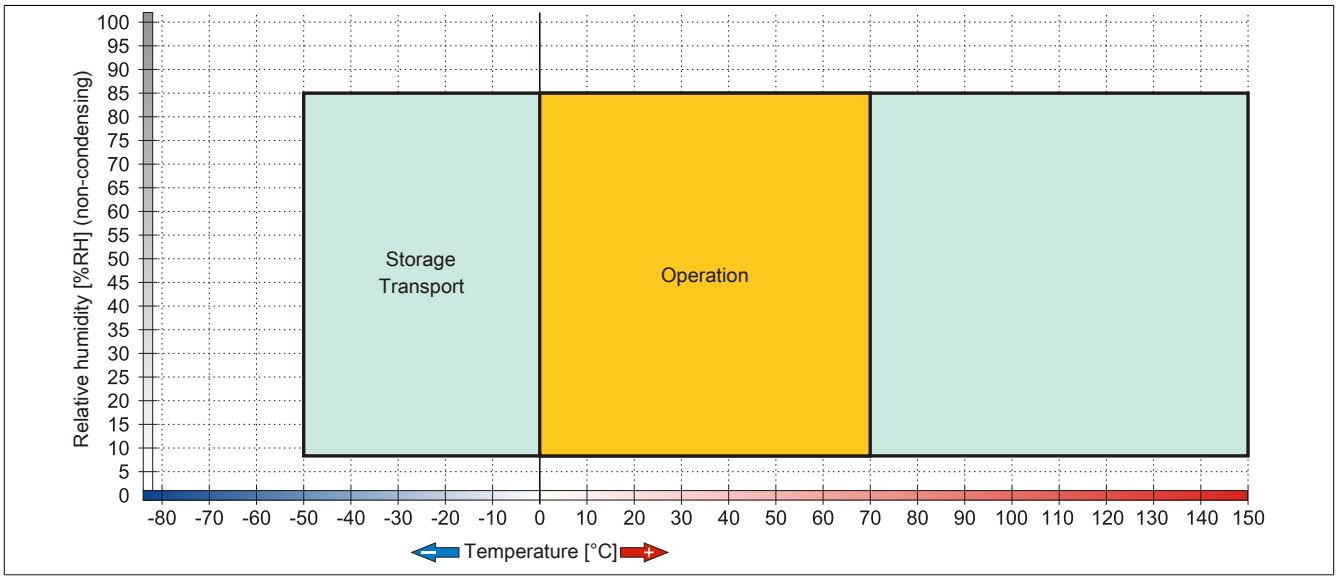


Figure 147: 5CFCRD.xxxx-06 CompactFlash cards - Temperature humidity diagram

9.3.5 Dimensions

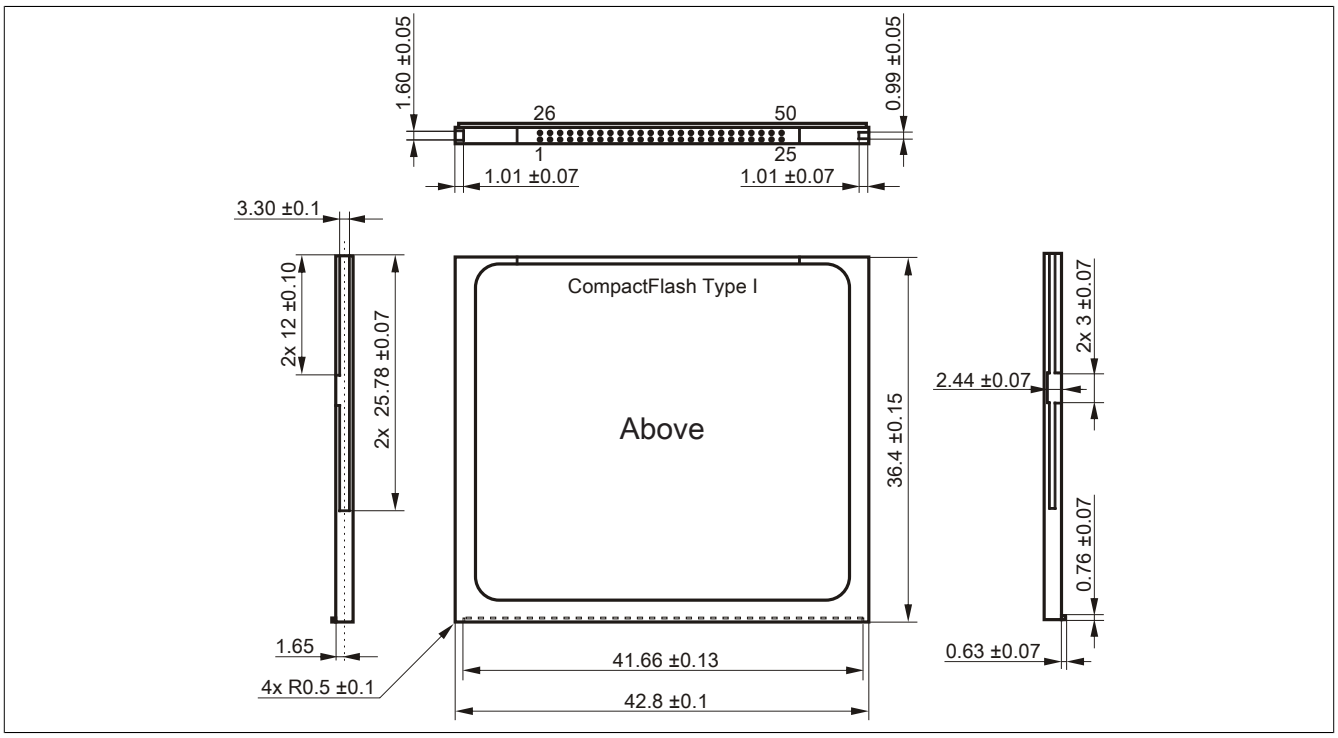


Figure 148: Dimensions - CompactFlash card Type I

9.3.6 Benchmark

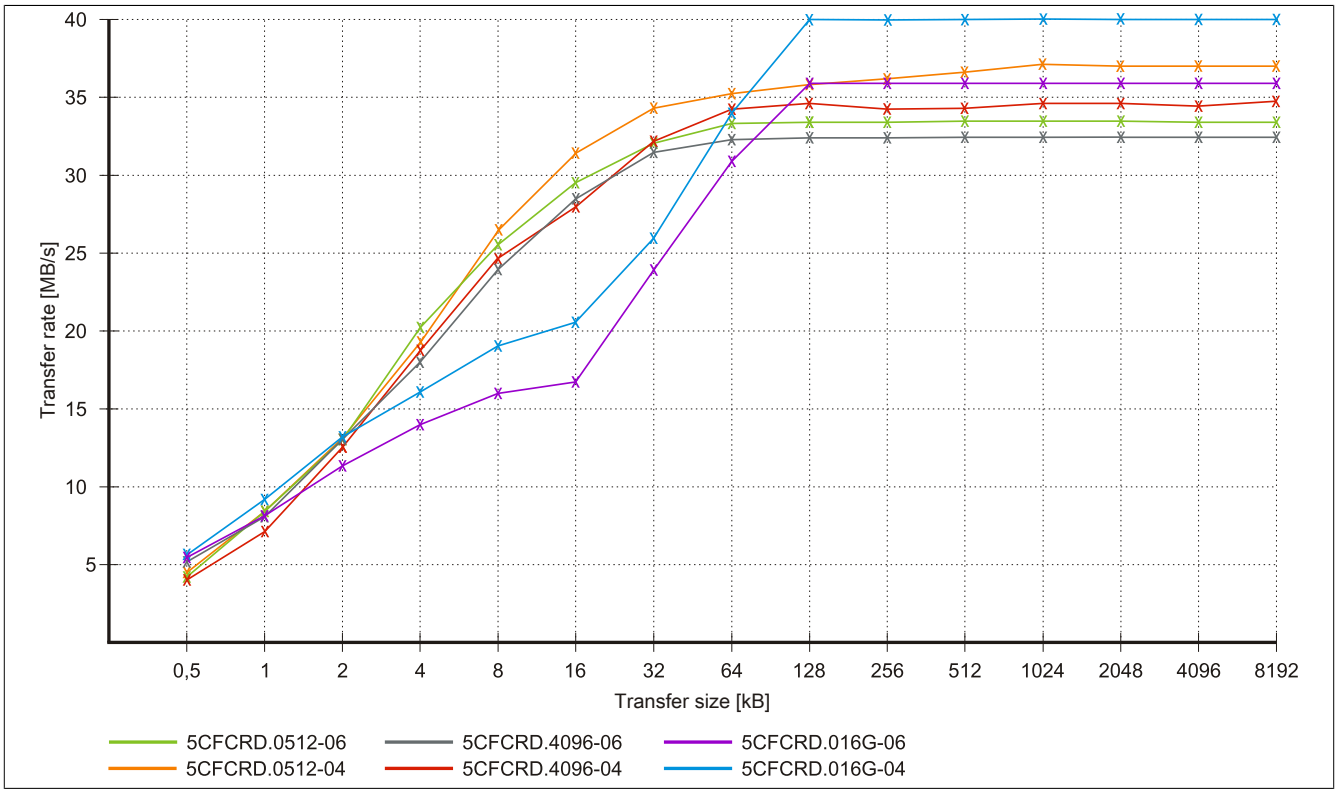


Figure 149: ATTO Disk Benchmark v2.34 comparison when reading - 5CFCRD.xxxx-04 with 5CFCRD.xxxx-06

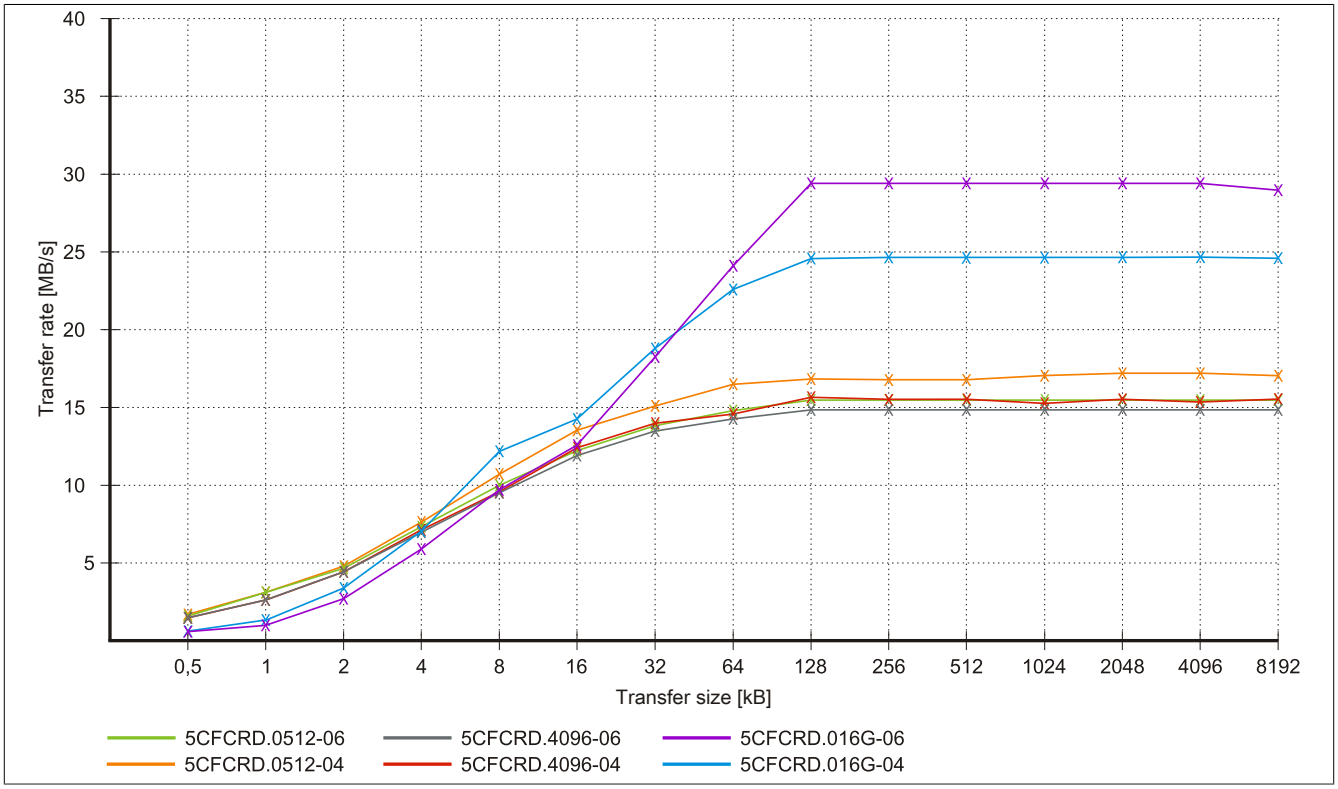


Figure 150: ATTO Disk Benchmark v2.34 comparison when writing - 5CFCRD.xxxx-04 with 5CFCRD.xxxx-06

9.4 5CFCRD.xxxx-04

9.4.1 General information

Information:

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 291

Information:

The 5CFCRD.xxxx-04 CompactFlash cards are supported on B&R devices with WinCE version ≥ 6.0.

9.4.2 Order data

Model number	Short description	Figure
	CompactFlash	
5CFCRD.0512-04	CompactFlash 512 MB B&R (SLC)	
5CFCRD.1024-04	CompactFlash 1 GB B&R (SLC)	
5CFCRD.2048-04	CompactFlash 2 GB B&R (SLC)	
5CFCRD.4096-04	CompactFlash 4 GB B&R (SLC)	
5CFCRD.8192-04	CompactFlash 8 GB B&R (SLC)	
5CFCRD.016G-04	CompactFlash 16 GB B&R (SLC)	

Table 226: 5CFCRD.0512-04, 5CFCRD.1024-04, 5CFCRD.2048-04, 5CFCRD.4096-04, 5CFCRD.8192-04, 5CFCRD.016G-04 - Order data

9.4.3 Technical data

Caution!

A sudden loss of power may result in data loss! In very rare cases, mass memory may also be damaged.

To prevent damage and loss of data, the use of a UPS device is recommended.

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from those specified for the fully assembled device. The data specifications for the fully assembled device take precedence over those of individual components.

Product ID	5CFCRD.0512-04	5CFCRD.1024-04	5CFCRD.2048-04	5CFCRD.4096-04	5CFCRD.8192-04	5CFCRD.016G-04
General information						
Capacity	512 MB	1 GB	2 GB	4 GB	8 GB	16 GB
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]	35 MB/s (240X) [1]	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]	37 MB/s (260X) [1]	37 MB/s (260X) [1]	34 MB/s (226X) [1]	28 MB/s (186X) [1]	37 MB/s (247X) [1]

Table 227: 5CFCRD.0512-04, 5CFCRD.1024-04, 5CFCRD.2048-04, 5CFCRD.4096-04, 5CFCRD.8192-04, 5CFCRD.016G-04 - Technical data

Product ID	5CFCRD.0512-04	5CFCRD.1024-04	5CFCRD.2048-04	5CFCRD.4096-04	5CFCRD.8192-04	5CFCRD.016G-04
Continuous writing						
Typical	17 MB/s (110X)	17 MB/s (110X)	17 MB/s (110X)	16 MB/s (106X)	15 MB/s (100X)	18 MB/s (120X)
Maximum	20 MB/s (133X)	20 MB/s (133X)	20 MB/s (133X)	18 MB/s (120X)	17 MB/s (110X)	19 MB/s (126X)
Certification						
CE	Yes					
cULus	Yes					
GL	Yes					
Endurance						
Guaranteed data volume						
Guaranteed [2]	50 TB	100 TB	200 TB	400 TB	800 TB	1600 TB
Results for 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					
S.M.A.R.T. Support	No					
Support						
Hardware	PP300/400, PP500, PPC300, PPC700, PPC725, PPC800, APC620, APC810, APC820					
Operating systems						
Windows 7 32-bit	No	No	No	No	No	Yes
Windows 7 64-bit	No					
Windows Embedded Standard 7, 32-bit	No	No	No	No	Yes	Yes
Windows Embedded Standard 7, 64-bit	No	No	No	No	No	Yes
Windows XP Professional	No	No	No	Yes	Yes	Yes
Windows XP Embedded	Yes					
Windows Embedded Standard 2009	No	Yes	Yes	Yes	Yes	Yes
Windows CE 6.0	Yes	Yes	Yes	Yes	Yes	Yes [4]
Windows CE 5.0	No					
Software						
PVI Transfer	≥ V3.2.3.8 (part of PVI Development Setup ≥ V2.06.00.3011)	≥ V3.2.3.8 (part of PVI Development Setup ≥ V2.06.00.3011)	≥ V3.2.3.8 (part of PVI Development Setup ≥ V2.06.00.3011)	≥ V3.2.3.8 (part of PVI Development Setup ≥ V2.06.00.3011)	≥ V3.2.3.8 (part of PVI Development Setup ≥ V2.06.00.3011)	≥ V3.6.8.40 (part of PVI Development Setup ≥ V3.0.0.3020)
B&R Embedded OS Installer	≥ V3.10	≥ V3.10	≥ V3.10	≥ V3.10	≥ V3.10	≥ V3.20
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 5 times (JEDEC JESD22, method B110) 30 g, 11 ms 1 times (IEC 68-2-27)					
Storage	1.5 kg peak, 0.5 ms 5 times (JEDEC JESD22, method B110) 30 g, 11 ms 1 times (IEC 68-2-27)					
Transport	1.5 kg peak, 0.5 ms 5 times (JEDEC JESD22, method B110) 30 g, 11 ms 1 times (IEC 68-2-27)					
Altitude						
Operation	Max. 4572 m					

Table 227: 5CFCRD.0512-04, 5CFCRD.1024-04, 5CFCRD.2048-04, 5CFCRD.4096-04, 5CFCRD.8192-04, 5CFCRD.016G-04 - Technical data

Product ID	5CFCRD.0512-04	5CFCRD.1024-04	5CFCRD.2048-04	5CFCRD.4096-04	5CFCRD.8192-04	5CFCRD.016G-04
Mechanical characteristics						
Dimensions						
Width	42.8 ±0.10mm					
Length	36.4 ±0.15mm					
Height	3.3 ±0.10mm					
Weight	10 g					

Table 227: 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.
4) Not supported by the B&R Embedded OS installer.

9.4.4 Temperature humidity diagram

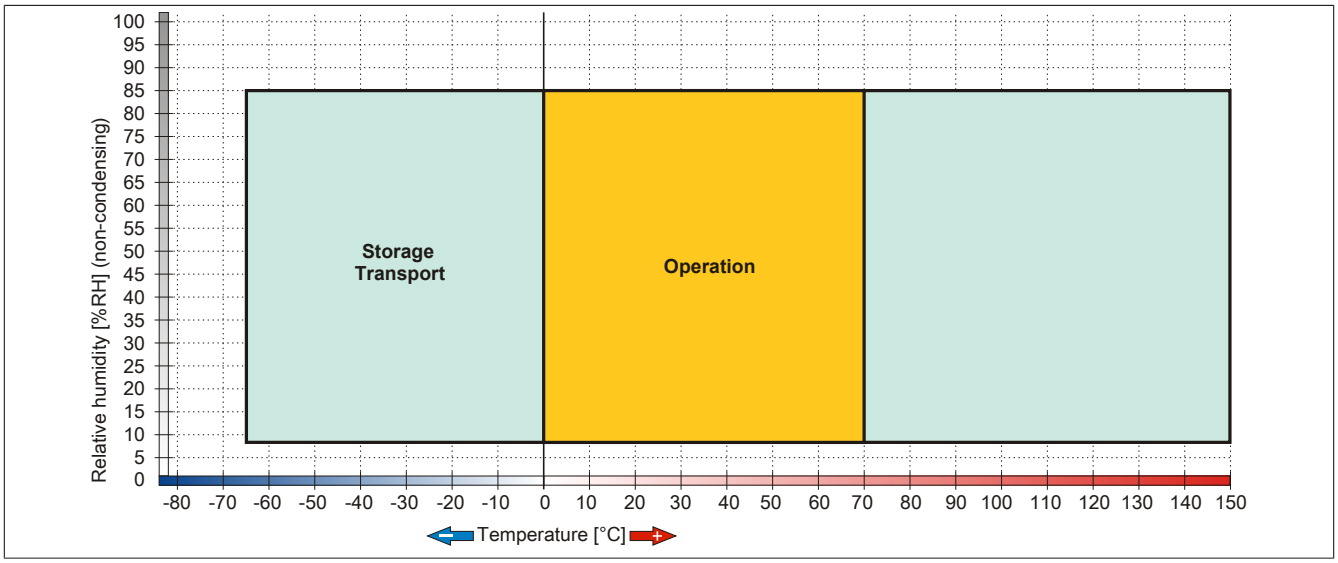


Figure 151: 5CFCRD.xxxx-04 CompactFlash cards - Temperature humidity diagram

9.4.5 Dimensions

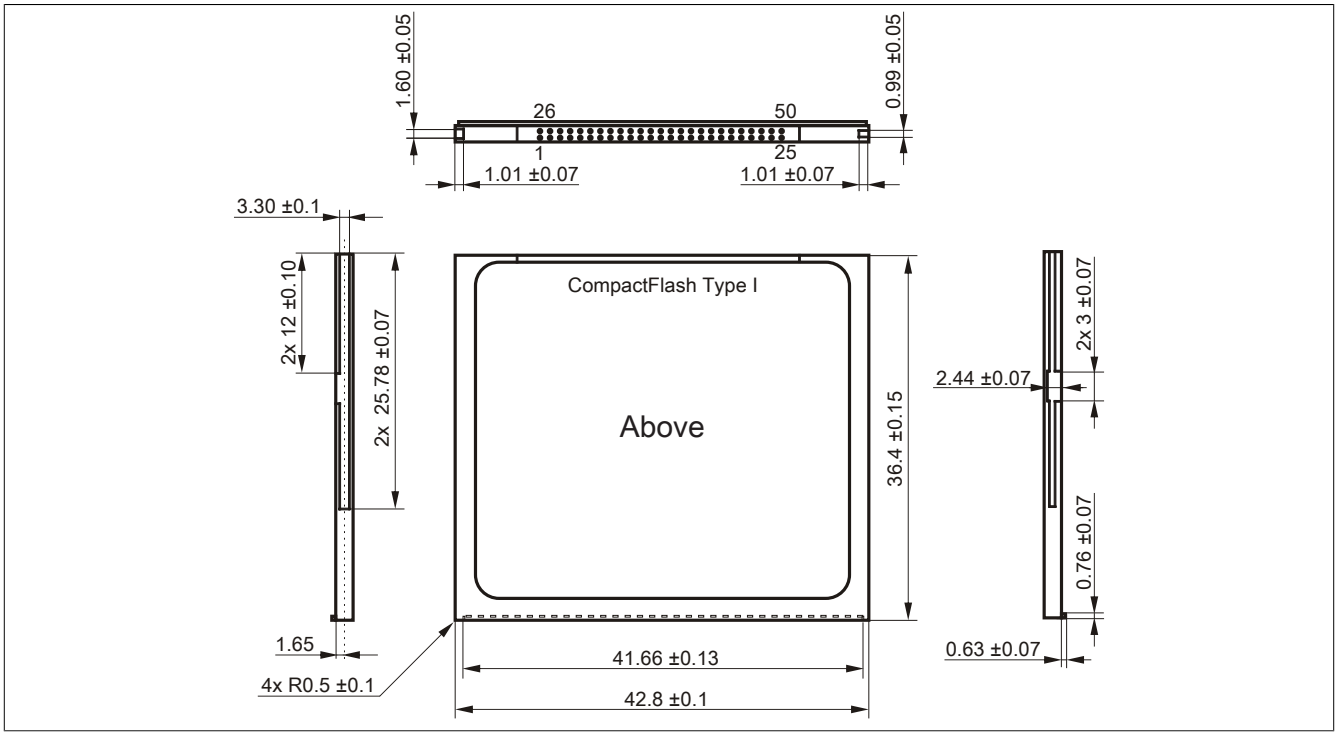


Figure 152: Dimensions - CompactFlash card Type I

9.4.6 Benchmark

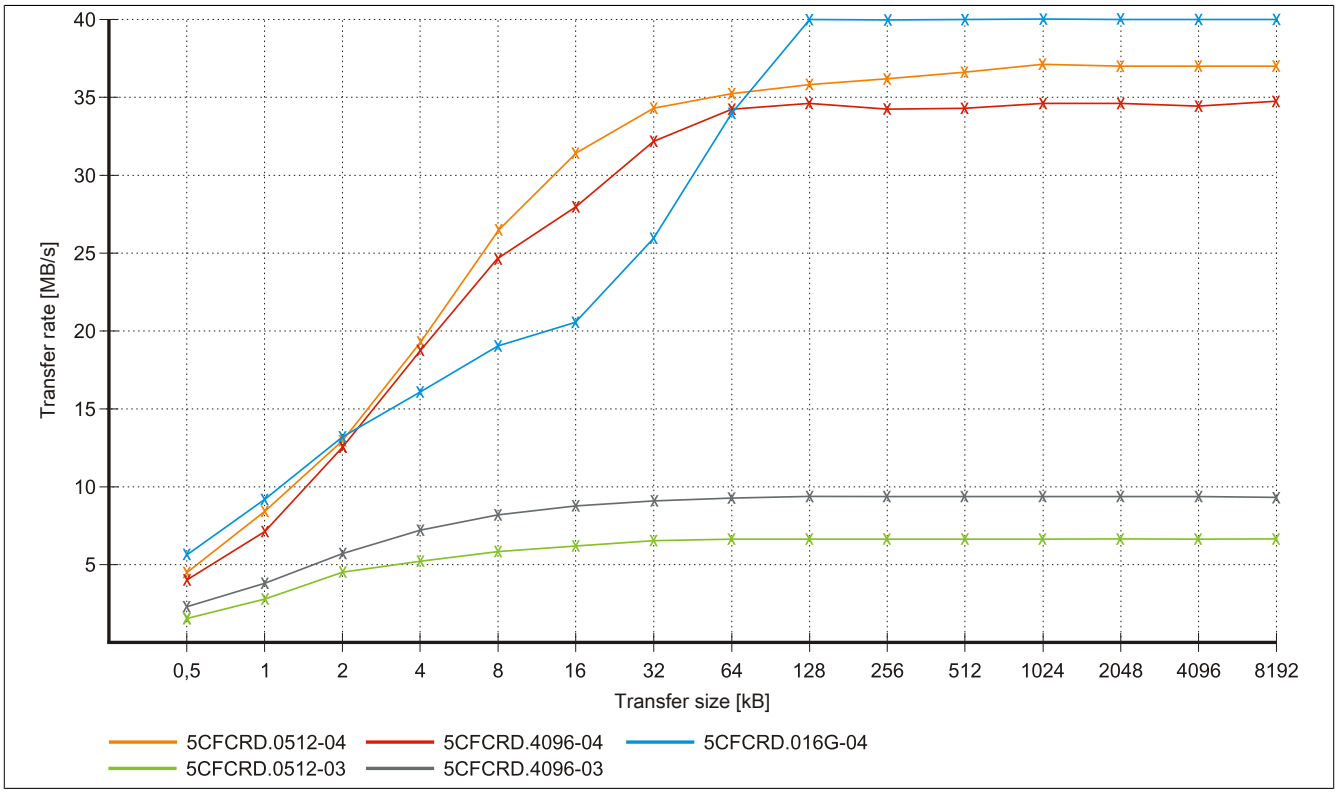


Figure 153: ATTO Disk Benchmark v2.34 comparison when reading - 5CFCRD.xxxx-03 with 5CFCRD.xxxx-04

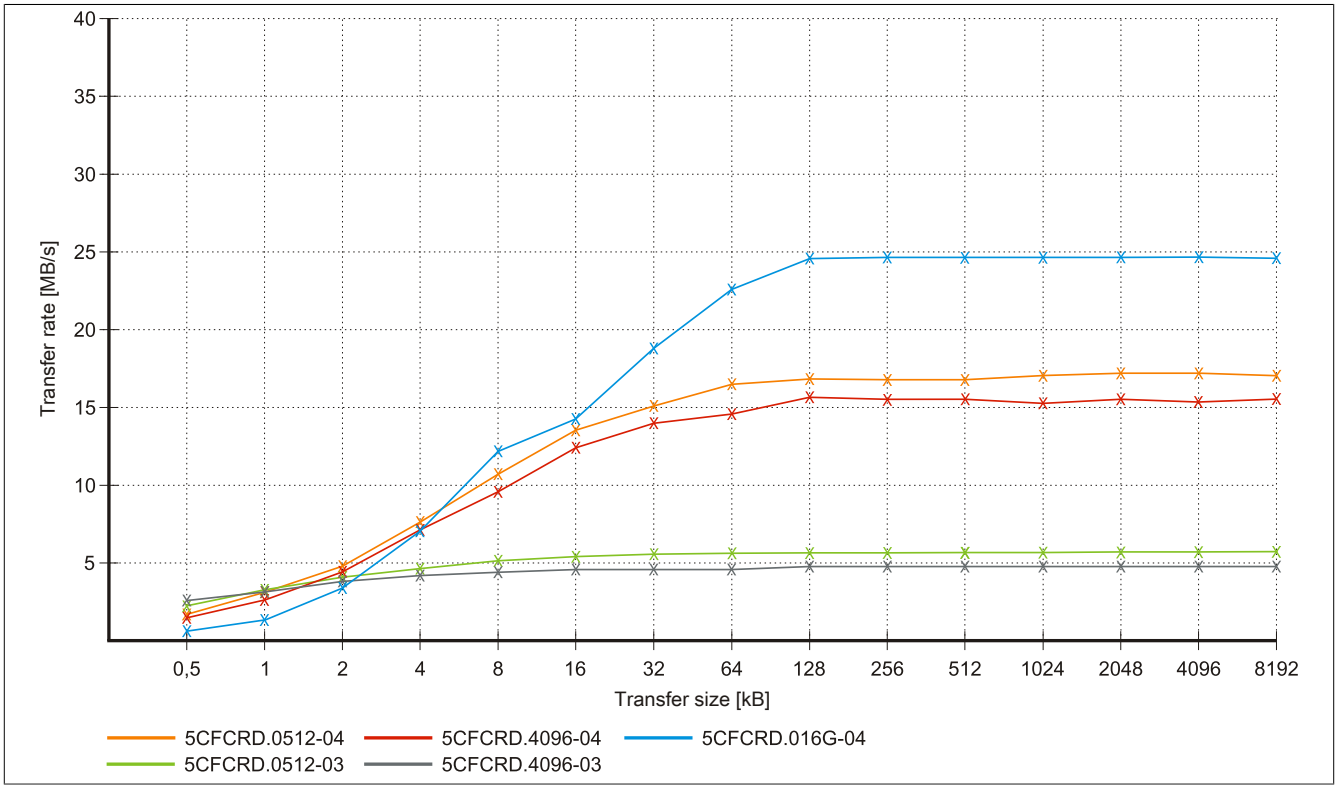


Figure 154: ATTO Disk Benchmark v2.34 comparison when writing - 5CFCRD.xxxx-03 with 5CFCRD.xxxx-04

9.5 5CFCRD.xxxx-03

9.5.1 General information

Information:

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 291

Information:

On Windows CE 5.0 devices, 5CFCRD.xxxx-03 CompactFlash cards up to 1GB are supported.

Information:

On CompactFlash cards 5CFCRD.xxxx-03, only the sticker and the description have changed. The technical data has not bee changed.

9.5.2 Order data

Model number	Short description	Figure
	CompactFlash	
5CFCRD.0064-03	CompactFlash 64 MB Western Digital (SLC)	
5CFCRD.0128-03	CompactFlash 128 MB Western Digital (SLC)	
5CFCRD.0256-03	CompactFlash 256 MB Western Digital (SLC)	
5CFCRD.0512-03	CompactFlash 512 MB Western Digital (SLC)	
5CFCRD.1024-03	CompactFlash 1 GB Western Digital (SLC)	
5CFCRD.2048-03	CompactFlash 2 GB Western Digital (SLC)	
5CFCRD.4096-03	CompactFlash 4 GB Western Digital (SLC)	
5CFCRD.8192-03	CompactFlash 8 GB Western Digital (SLC)	

Table 228: 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

9.5.3 Technical data

Caution!

A sudden loss of power may result in data loss! In very rare cases, the mass storage device may also become damaged.

To prevent damage and loss of data, B&R recommends that you use a UPS device.

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from those specified for the fully assembled device. The data specifications for the fully assembled device take precedence over those of individual components.

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								
Capacity	64 MB	128 MB	256 MB	512 MB	1 GB	2 GB	4 GB	8 GB
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)							

Table 229: 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
Maintenance	None							
Supported operating modes	PIO Mode 0-4, Multiword DMA Mode 0-2							
Continuous reading								
Typical	8 MB/s							
Continuous writing								
Typical	6 MB/s							
Certification								
CE	Yes							
cULus	Yes							
GL	Yes							
Endurance								
Clear/Write cycles								
Typical	>2,000,000							
SLC flash	Yes							
Wear leveling	Static							
Error correction coding (ECC)	Yes							
S.M.A.R.T. Support	No							
Support								
Hardware	MP100/200, PP100/200, PP300/400, PP500, PPC300, PPC700, PPC725, PPC800, Provit 2000, Provit 5000, APC620, APC680, APC810, APC820							
Operating systems								
Windows 7 32-bit	No							
Windows 7 64-bit	No							
Windows Embedded Standard 7, 32-bit	No	No	No	No	No	No	No	Yes
Windows Embedded Standard 7, 64-bit	No							
Windows XP Professional	No	No	No	No	No	No	Yes	Yes
Windows XP Embedded	No	No	No	Yes	Yes	Yes	Yes	Yes
Windows Embedded Standard 2009	No	No	No	No	Yes	Yes	Yes	Yes
Windows CE 6.0	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes [1]
Windows CE 5.0	Yes	Yes	Yes	Yes	Yes	No	No	No
Software								
PVI Transfer	≥ 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. 24383 m							
Mechanical characteristics								
Dimensions								
Width	42.8 ±0.10mm							
Length	36.4 ±0.15mm							
Height	3.3 ±0.10mm							
Weight	11.4 g							

Table 229: 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

1) Not supported by the B&R Embedded OS installer.

9.5.4 Temperature humidity diagram

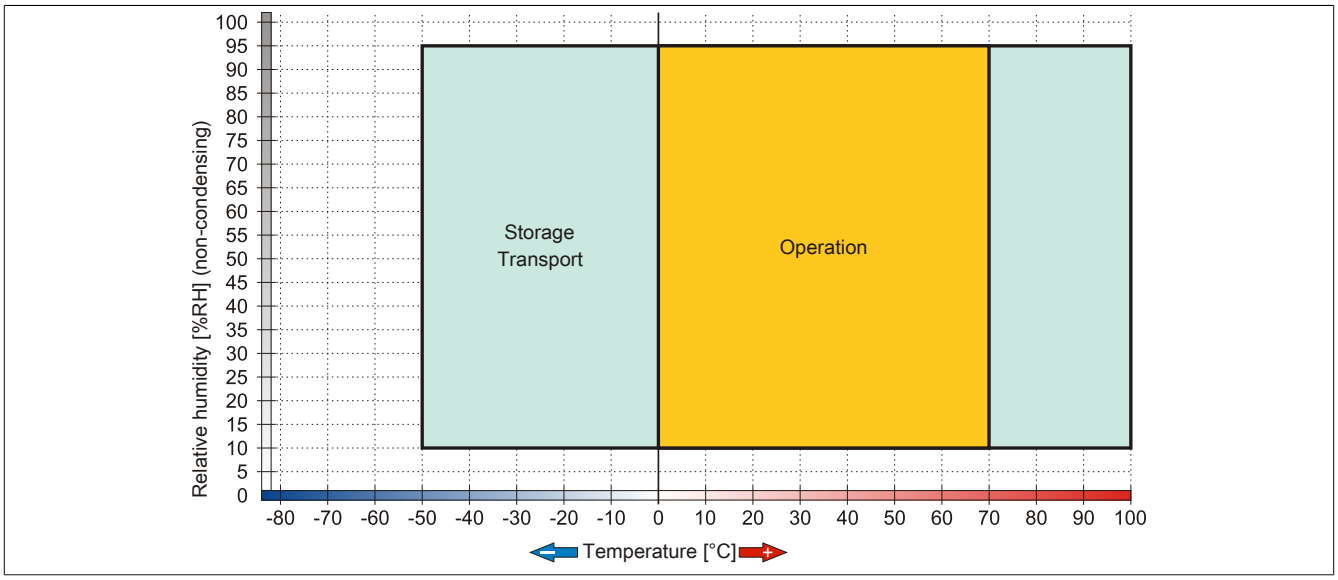


Figure 155: 5CFCRD.xxxx-03 CompactFlash cards - Temperature humidity diagram

9.5.5 Dimensions

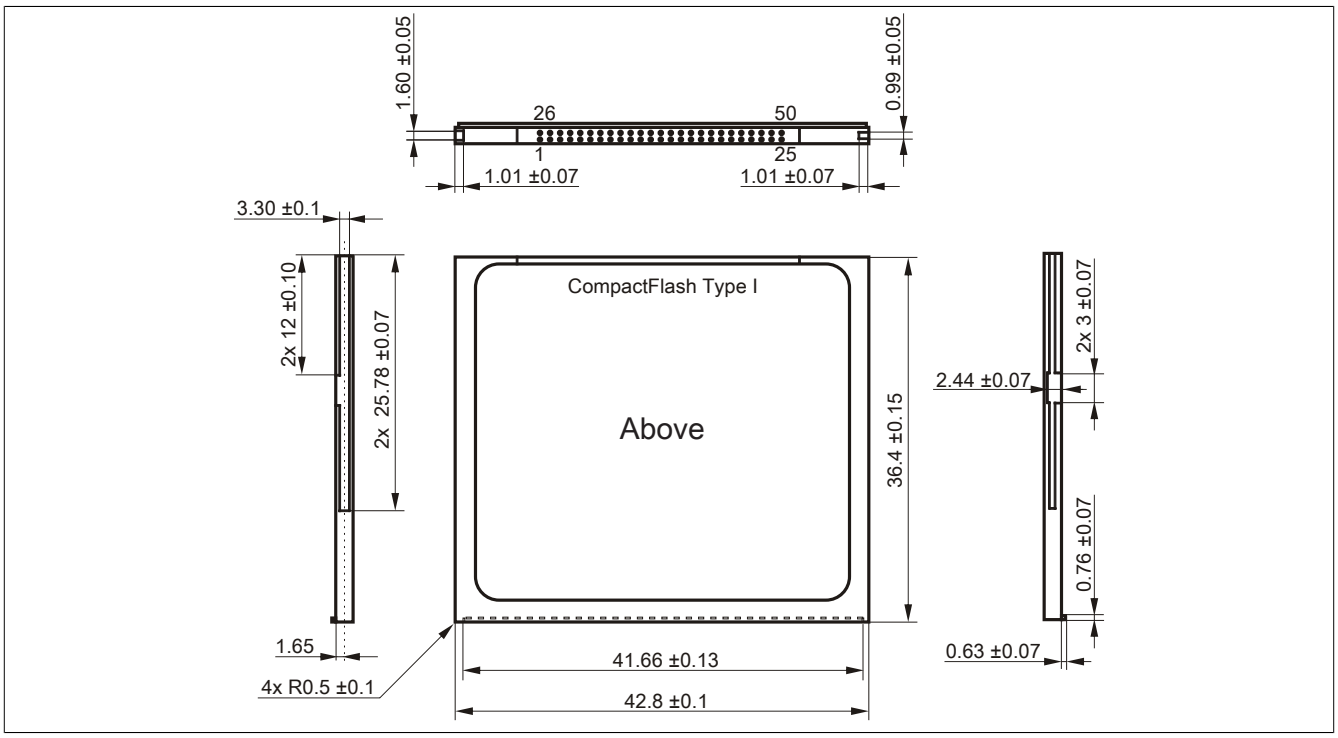


Figure 156: Dimensions - CompactFlash card Type I

9.6 Known problems / issues

The following is a known issue for devices with two CompactFlash slots:

- 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. This 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 may occur never, sometimes or always.

10 USB flash drives

10.1 5MMUSB.2048-00

10.1.1 General information

USB flash drives are storage media that are easy to replace. Because of their fast data transfer (USB 2.0), USB flash drives are ideal for use as portable data storage. Without requiring additional drivers ("hot plugging", except in the case of Windows 98SE), the USB flash drive can immediately act as an additional drive where data can be read or written. Only USB flash drives from storage specialists SanDisk are used.

Information:

Due to the vast quantity of USB flash drives available on the market as well as their short product life cycle, we reserve the right to supply alternative products at any time. The following measures may therefore be necessary in order to boot from these flash drives as well:

- **The flash drive must be reformatted or in some cases even repartitioned (set active partition).**
- **The flash drive must be the first bootable device in the BIOS boot order; alternatively, the IDE controllers can be disabled in BIOS. This can be avoided in most cases if a "fdisk /mbr" command is also executed on the USB flash drive.**

10.1.2 Order data

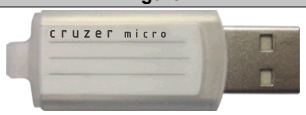
Model number	Short description	Figure
	USB accessories	
5MMUSB.2048-00	USB 2.0 flash drive, 2048 MB	

Table 230: 5MMUSB.2048-00 - Order data

10.1.3 Technical data

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from those specified for the fully assembled device. The data specifications for the fully assembled device take precedence over those of individual components.

Product ID	5MMUSB.2048-00
General information	
Data retention	10 years
LEDs	1 LED (green) [1]
MTBF	100,000 hours (at 25 °C)
Type	USB 1.1, USB 2.0
Maintenance	None
Certification	
CE	Yes
Interfaces	
USB	
Type	USB 1.1, USB 2.0
Connection	To any USB Type A interface
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s)
Sequential reading	Max. 8.7 MB/s
Sequential writing	Max. 1.7 MB/s
Support	
Operating systems	
Windows XP Professional	Yes
Windows XP Embedded	Yes
Windows ME	Yes
Windows 2000	Yes
Windows CE 5.0	Yes
Windows CE 4.2	Yes
Electrical characteristics	
Power consumption	650 µA sleep mode, 150 mA read/write

Table 231: 5MMUSB.2048-00 - Technical data

Product ID	5MMUSB.2048-00
Environmental conditions	
Temperature	
Operation	0 to 45°C
Storage	-20 to 60°C
Transport	-20 to 60°C
Relative humidity	
Operation	10 to 90%, non-condensing
Storage	5 to 90%, non-condensing
Transport	5 to 90%, non-condensing
Vibration	
Operation	10 to 500 Hz: 2 g (19.6 m/s² 0-peak), oscillation rate 1/minute
Storage	10 to 500 Hz: 2 g (19.6 m/s² 0-peak), oscillation rate 1/minute
Transport	10 to 500 Hz: 2 g (19.6 m/s² 0-peak), oscillation rate 1/minute
Shock	
Operation	Max. 40 g (392 m/s² 0-peak) and 11 ms length
Storage	Max. 80 g (784 m/s² 0-peak) and 11 ms length
Transport	Max. 80 g (784 m/s² 0-peak) and 11 ms length
Altitude	
Operation	Max. 3,048 m
Storage	Max. 12,192 m
Transport	Max. 12,192 m
Mechanical characteristics	
Dimensions	
Width	19 mm
Length	52.2 mm
Height	7.9 mm

Table 231: 5MMUSB.2048-00 - Technical data

1) Indicates data being transferred (sending and receiving)

10.1.4 Temperature humidity diagram

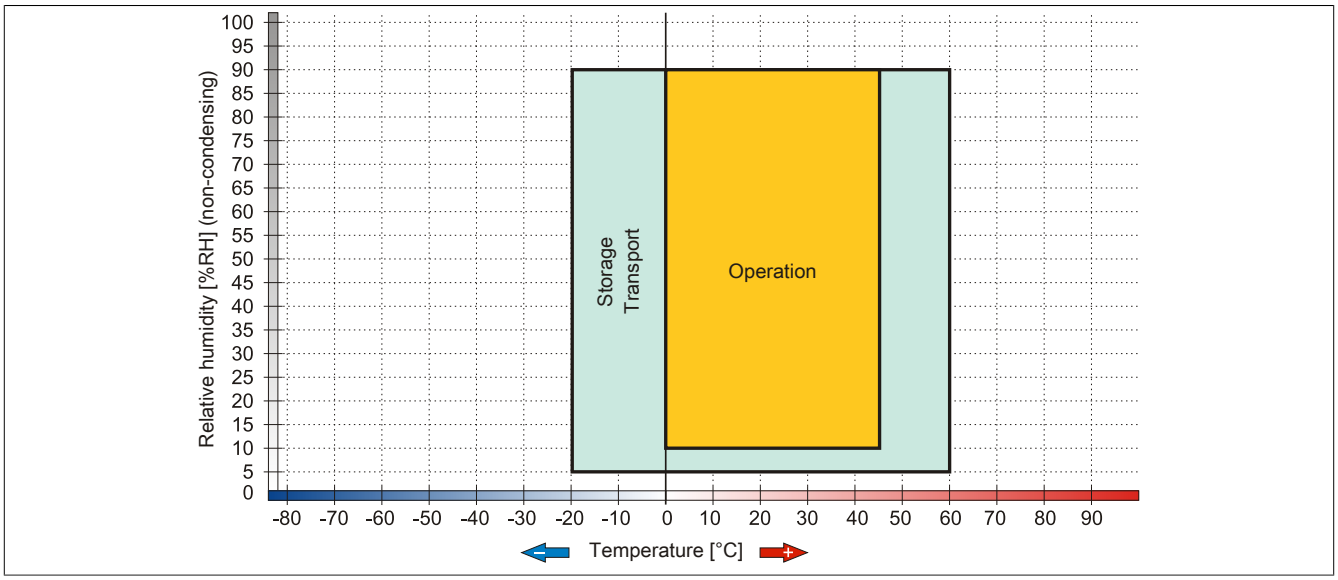


Figure 157: 5MMUSB.2048-00 - Temperature humidity diagram

10.2 5MMUSB.2048-01

10.2.1 General information

USB flash drives are storage media that are easy to replace. Because of their fast data transfer (USB 2.0), USB flash drives are ideal for use as portable data storage. Without requiring additional drivers ("hot plugging", except in the case of Windows 98SE), the USB flash drive can immediately act as an additional drive where data can be read or written.

Information:

Due to the vast quantity of USB flash drives available on the market as well as their short product life cycle, we reserve the right to supply alternative products at any time. The following measures may therefore be necessary in order to boot from these flash drives as well:

- **The flash drive must be reformatted or in some cases even repartitioned (set active partition).**
- **The flash drive must be the first bootable device in the BIOS boot order; alternatively, the IDE controllers can be disabled in BIOS. This can be avoided in most cases if the "fdisk /mbr" command is additionally executed on the USB flash drive.**

- USB 1.1, USB 2.0
- High transfer rate
- High data retention
- Ambient temperature during operation: 0 to 70°C

10.2.2 Order data

Model number	Short description	Figure
	USB accessories	
5MMUSB.2048-01	USB 2.0 flash drive, 2048 MB, B&R	

Table 232: 5MMUSB.2048-01 - Order data

10.2.3 Technical data

Product ID	5MMUSB.2048-01
General information	
Data retention	>10 years
LEDs	1 LED (green) [1)]
MTBF	>3,000,000 hours
Type	USB 1.1, USB 2.0
Maintenance	None
Certification	
CE	Yes
Interfaces	
USB	
Type	USB 1.1, USB 2.0
Connection	To any USB Type A interface
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s)
Sequential reading	Max. 31 MB/s
Sequential writing	Max. 30 MB/s
Support	
Operating systems	
Windows 7	Yes
Windows XP Professional	Yes
Windows XP Embedded	Yes
Windows ME	Yes
Windows 2000	Yes
Windows CE 5.0	Yes
Windows CE 4.2	Yes
Electrical characteristics	
Power consumption	Max. 500 µA sleep mode, max. 120 mA read/write
Environmental conditions	
Temperature	
Operation	0 to 70°C
Storage	-50 to 100°C
Transport	-50 to 100°C

Table 233: 5MMUSB.2048-01 - Technical data

Product ID	5MMUSB.2048-01
Relative humidity	
Operation	85%, non-condensing
Storage	85%, non-condensing
Transport	85%, non-condensing
Vibration	
Operation	20 to 2000 Hz: 20 g (peak)
Storage	20 to 2000 Hz: 20 g (peak)
Transport	20 to 2000 Hz: 20 g (peak)
Shock	
Operation	Max. 1500 g (peak)
Storage	Max. 1500 g (peak)
Transport	Max. 1500 g (peak)
Altitude	
Operation	Max. 3,048 m
Storage	Max. 12,192 m
Transport	Max. 12,192 m
Mechanical characteristics	
Dimensions	
Width	17.97 mm
Length	67.85 mm
Height	8.35 mm

Table 233: 5MMUSB.2048-01 - Technical data

1) Indicates data being transferred (sending and receiving)

10.2.4 Temperature humidity diagram

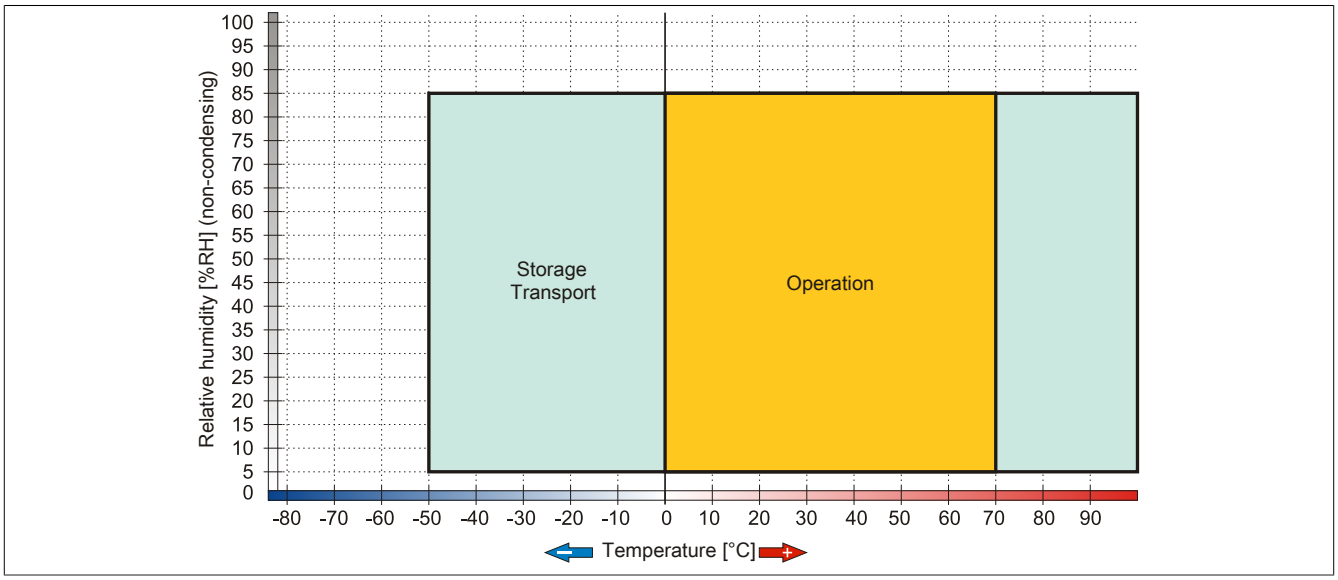


Figure 158: 5MMUSB.2048-01 - Temperature humidity diagram

11 USB media drive

11.1 5MD900.USB2-02

11.1.1 General information

The USB media drive features a DVD-R/RW DVD+R/RW drive, a CompactFlash slot and one USB port on both the front and back. It is connected to the USB port on the B&R Industrial PC.

- Desktop or rack-mounted operation (mounting rail brackets)
- Integrated DVD-R/RW DVD+R/RW drive
- Integrated IDE/ATAPI CompactFlash slot (hot pluggable)
- Integrated USB 2.0 connection
- +24 VDC supply (back)
- USB 2.0 connection (back)
- Optional front cover

11.1.2 Order data

Model number	Short description	Figure
	USB accessories	
5MD900.USB2-02	USB 2.0 drive combination, consists of DVD-R/RW DVD+R/RW, CompactFlash slot (Type II), USB connection (Type A on the front, Type B on the back); 24V DC (order screw clamp terminal 0TB103.9 or cage clamp terminal 0TB103.91 separately)	
	Required accessories	
	Other	
5SWUTI.0000-00	OEM Nero CD-RW Software, only available with a CD writer.	
	Terminal blocks	
0TB103.9	Connector, 24 VDC, 3-pin female, screw clamps 3.31 mm², protected against vibration by the screw flange	
0TB103.91	Connector, 24 VDC, 3-pin female, 3.31 mm² cage clamp, protected against vibration by the screw flange	
	USB cable	
5CAUSB.0018-00	USB 2.0 connection cable type A - type B, 1.8 m.	
5CAUSB.0050-00	USB 2.0 connection cable type A - type B, 5 m.	

Table 234: 5MD900.USB2-02 - Order data

11.1.3 Interfaces

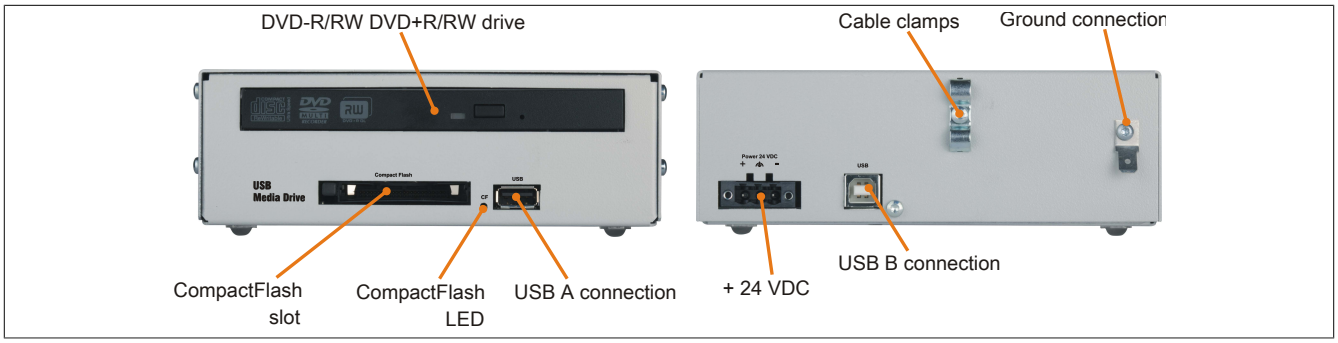


Figure 159: 5MD900.USB2-02 - Interfaces

11.1.4 Technical data

Product ID	5MD900.USB2-02
General information	
Max. cable length	5m (not including hub)
Certification	
CE	Yes
cULus	Yes
Interfaces	
CompactFlash slot 1	
Type	Type I
Connection	IDE/ATAPI
Activity LED	Signals read or write access to an inserted CompactFlash card

Table 235: 5MD900.USB2-02 - Technical data

Product ID	5MD900.USB2-02
USB	
Type	USB 2.0
Design	Type A front Type B back
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s)
Current load	Max. 500 mA
CD / DVD drive	
Data buffer capacity	2 MB
Data transfer rate	Max. 33.3 MB/s
Speed	Max. 5090 rpm ±1%
Noise level	Approx. 45 dBA in a distance of 50 cm (full read access)
Compatible formats	CD-DA, CD-ROM mode 1/mode 2 CD-ROM XA mode 2 (form 1, form 2) Photo CD (single/multi-session), Enhanced CD, CD text DVD-ROM, DVD-R, DVD-RW, DVD-Video DVD-RAM (4.7 GB, 2.6 GB) DVD+R, DVD+R (double layer), DVD+RW
Laser class	Class 1 laser
Service life	60000 POH (power-on hours)
Interface	IDE (ATAPI)
Startup time	
CD	Max. 14 seconds (0 RPM to read access)
DVD	Max. 15 seconds (0 RPM to read access)
Access time	
CD	Typ. 140 ms (24x)
DVD	Typ. 150 ms (8x)
Readable media	
CD	CD/CD-ROM (12 cm, 8 cm), CD-R, CD-RW
DVD	DVD-ROM, DVD-R, DVD-RW. DVD-RAM, DVD+R, DVD+R (double layer), DVD+RW
Writable media	
CD	CD-R, CD-RW
DVD	DVD-R/RW, DVD-RAM (4.7 GB), DVD+R/RW, DVD+R (double layer)
Read speed	
CD	24x
DVD	8x
Write speed	
CD-R	10 to 24x
CD-RW	10 to 24x
DVD+R	3.3 to 8x
DVD+R (dual layer)	2.4 to 4x
DVD+RW	3.3 to 8x
DVD-R	2 to 6x
DVD-R (dual layer)	2 to 4x
DVD-RAM	3 to 5x
DVD-RW	2 to 6x
Write methods	
CD	Disk at once, session at once, packet write, track at once
DVD	Disk at once, incremental, overwrite, sequential
Electrical characteristics	
Nominal voltage	24 VDC ±25%
Operating conditions	
Protection in accordance with EN 60529	IP65 on the front (only with optional front cover), IP20 on the back
Environmental conditions	
Temperature [1)]	
Operation	5 to 45°C
Storage	-20 to 60°C
Transport	-40 to 60°C
Relative humidity	
Operation	20 to 80%
Storage	5 to 90%
Transport	5 to 95%
Vibration	
Operation	5 to 500 Hz: 0.3 g (2.9 m/s² 0-peak)
Storage	10 to 100 Hz: 2 g (19.6 m/s² 0-peak)
Transport	10 to 100 Hz: 2 g (19.6 m/s² 0-peak)
Shock	
Operation	5 g, 11 ms
Storage	60 g, 11 ms
Transport	60 g, 11 ms
Altitude	
Operation	Max. 3000 m

Table 235: 5MD900.USB2-02 - Technical data

Product ID	5MD900.USB2-02
Mechanical characteristics	
Dimensions	
Width	156 mm
Height	52 mm
Depth	140 mm
Weight	Approx. 1100 g (without front cover)

Table 235: 5MD900.USB2-02 - Technical data

1) Temperature specifications refer to operation at 500 meters. The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level).

11.1.5 Dimensions

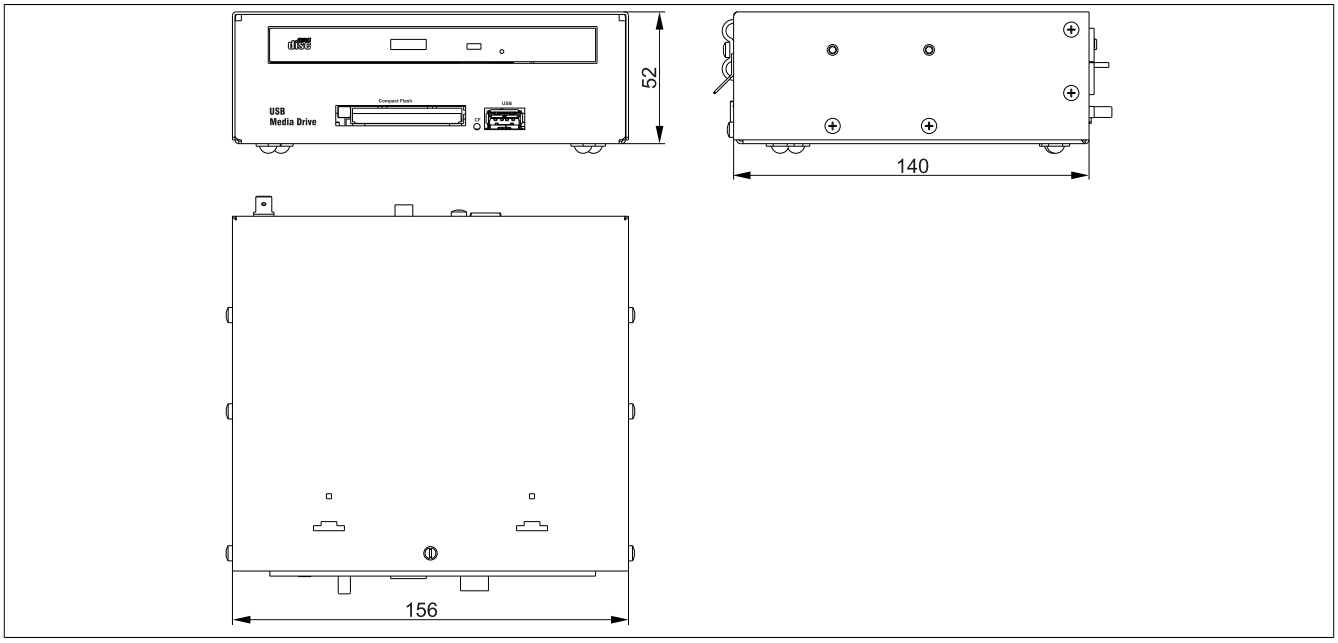


Figure 160: 5MD900.USB2-02 - Dimensions

11.1.6 Dimensions with front cover

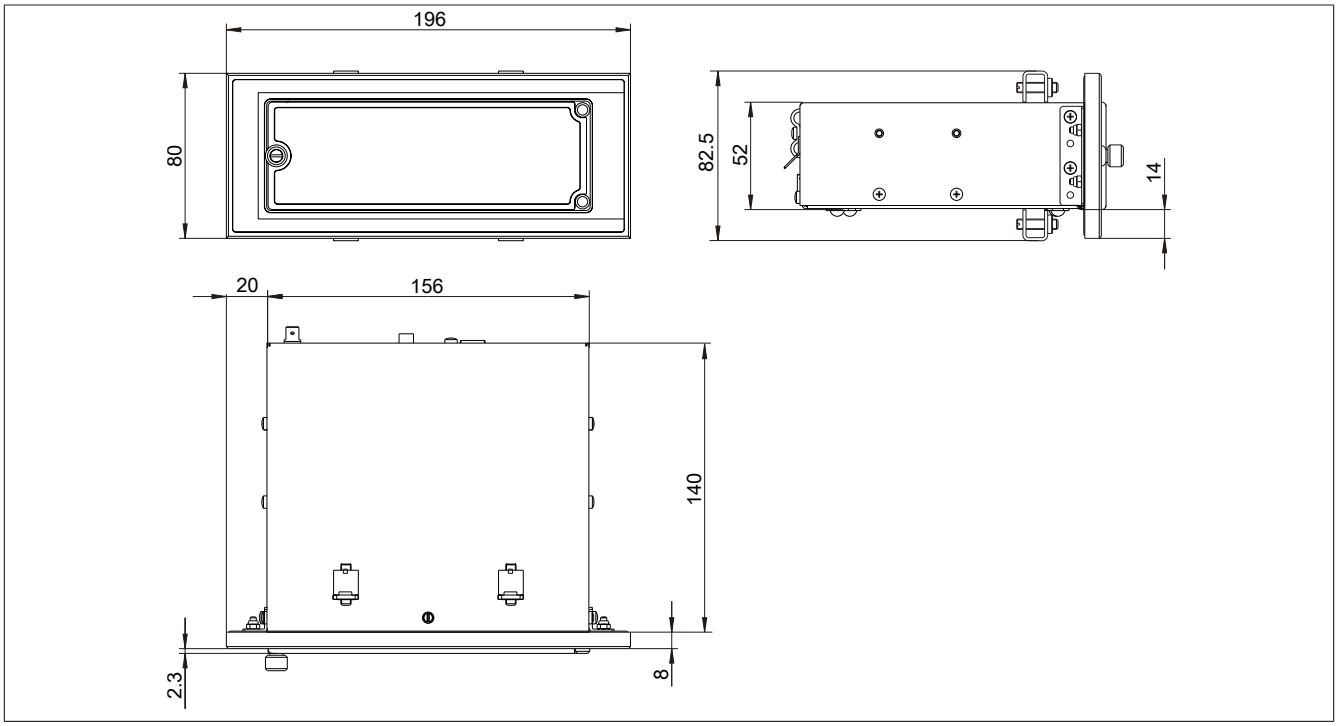


Figure 161: Dimensions - USB media drive with front cover

11.1.7 Cutout installation

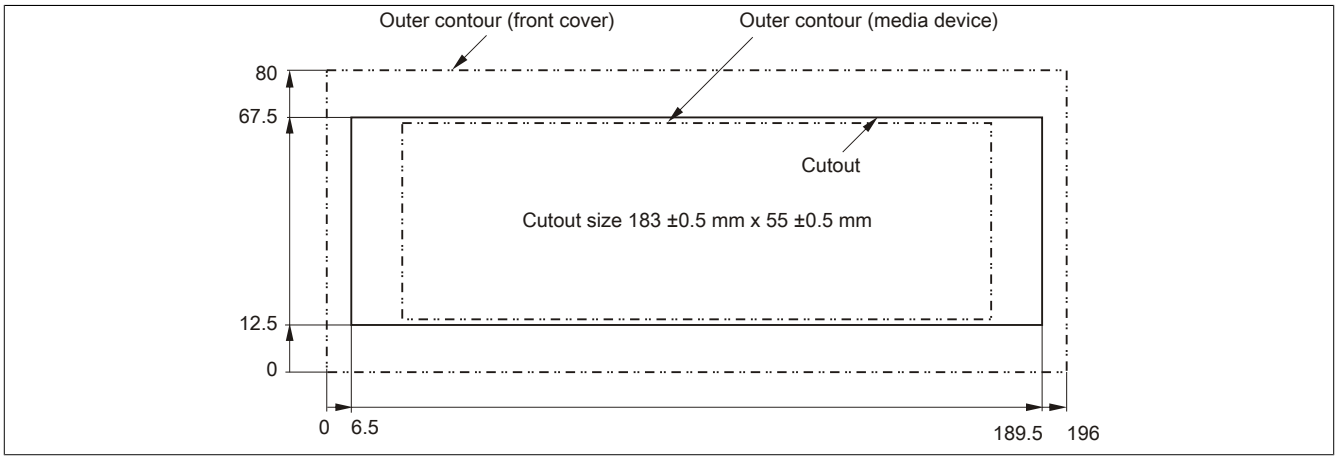


Figure 162: Installation cutout - USB media drive with front cover

11.1.8 Content of delivery

Quantity	Component
1	USB media drive
2	Mounting rail brackets

Table 236: 5MD900.USB2-02 - Contents of delivery

11.1.9 Installation

The USB media drive can be operated as a desktop device (rubber feet) or as a rack-mounted device (2 mounting rail brackets included).

11.1.9.1 Mounting orientation

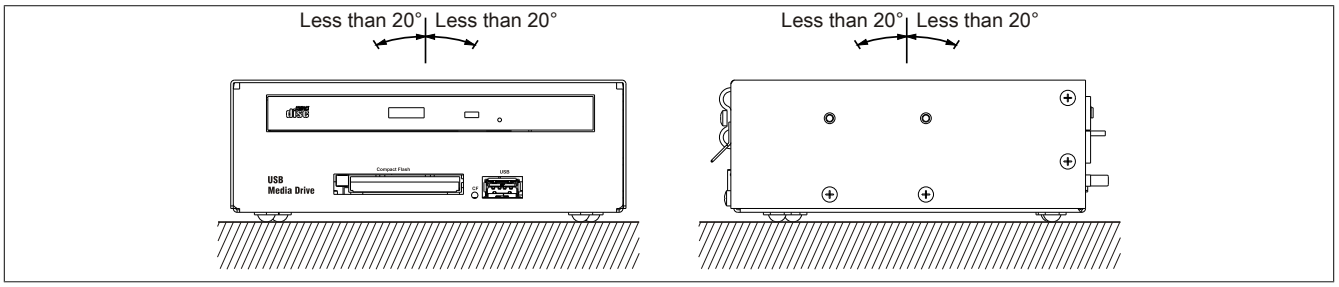


Figure 163: 5MD900.USB2-02 - Mounting orientation

11.2 5A5003.03

11.2.1 General information

This front cover can also be mounted on the front of the USB media drive (model number 5MD900.USB2-00, 5MD900.USB2-01 or 5MD900.USB2-02) to protect the interface.

11.2.2 Order data

Model number	Short description	Figure
	USB accessories	
5A5003.03	Front cover, for Remote CD-ROM drive 5A5003.02 and USB 2.0 drive combination 5MD900.USB2-00, 5MD900.USB2-01 and 5MD900.USB2-02.	

Table 237: 5A5003.03 - Order data

11.2.3 Technical data

Product ID	5A5003.03
General information	
Certification	
CE	Yes
cULus	Yes
Mechanical characteristics	
Front	
Panel membrane	
Light background	Similar to Pantone 427CV
Dimensions	
Width	196 mm
Height	80 mm
Depth	8 mm

Table 238: 5A5003.03 - Technical data

11.2.4 Dimensions

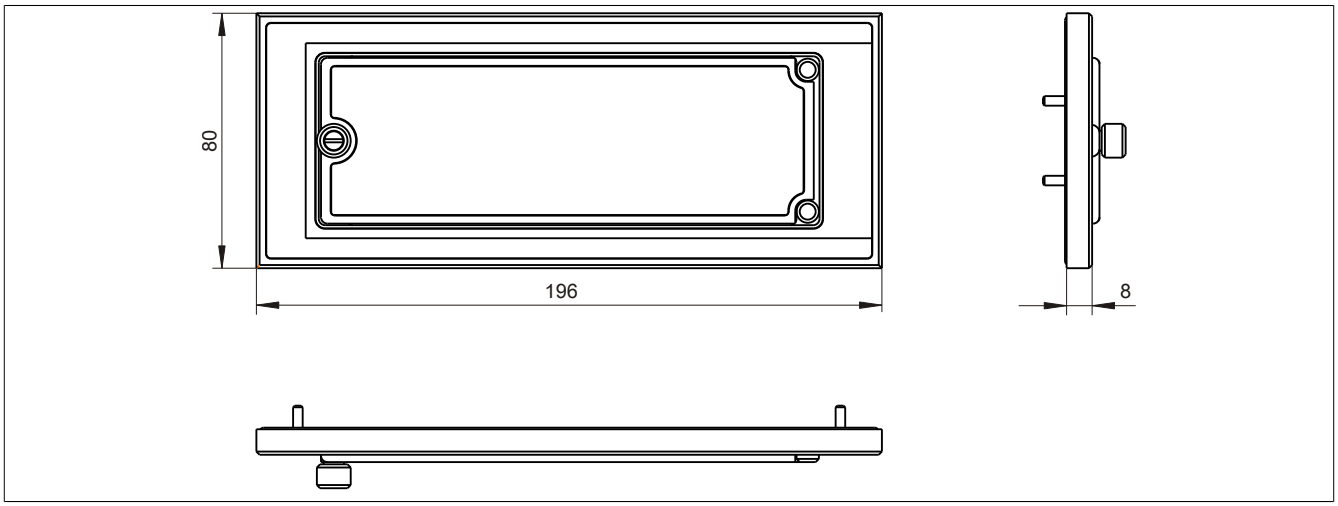


Figure 164: 5A5003.03 - Dimensions

11.2.5 Content of delivery

Quantity	Component
1	Front cover 5A5003.03 for the USB media drive
4	M3 locknut
4	Cover retaining clip

Table 239: 5A5003.03 - Contents of delivery

11.2.6 Installation

The front cover is attached with 2 mounting rail brackets (included with the USB media drive) and 4 M3 locknuts. The 4 retaining clips provided can be used to mount the USB media drive and front cover as a whole, for example in a control cabinet door.

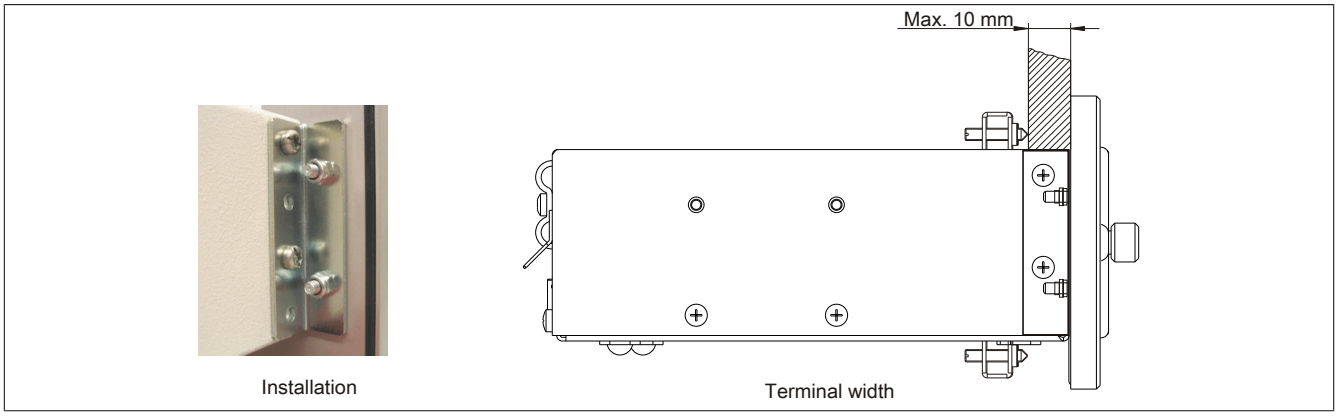


Figure 165: Front cover mounting and installation depth

11.2.6.1 Cutout installation

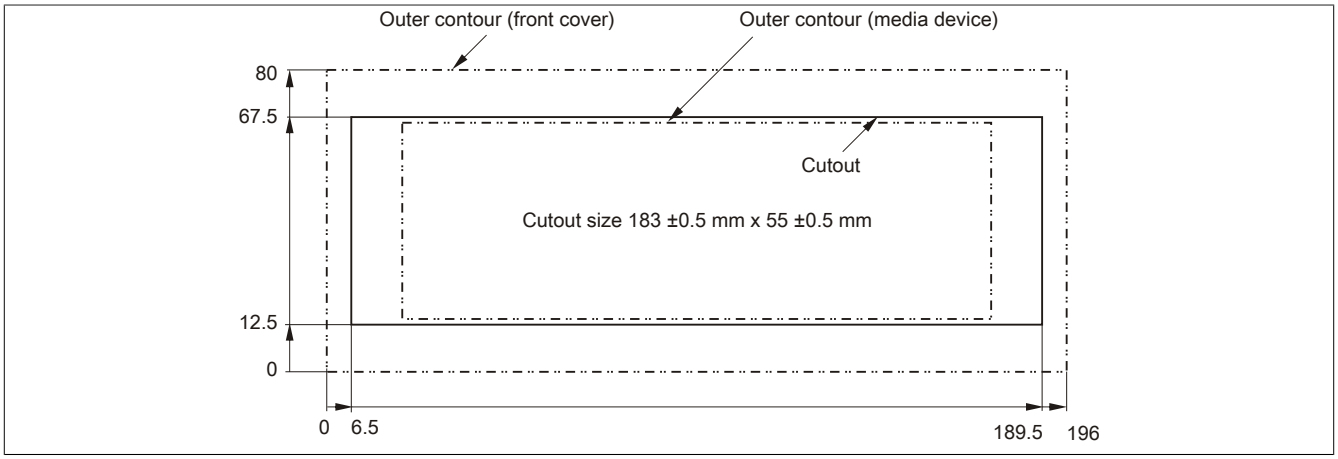


Figure 166: Installation cutout - USB media drive with front cover

12 HMI Drivers & Utilities DVD

12.1 5SWHMI.0000-00

12.1.1 General information

This DVD contains drivers, utilities, software upgrades and user's manuals for B&R panel system products (see the "Industrial PCs" or "Visualization and operation" section of the B&R website at www.br-automation.com).

At the time of its creation, the content of the DVD is identical to the files found in the download area of the B&R homepage (under Service - "Material Related Downloads").

12.1.2 Order data

Model number	Short description	Figure
	Other	
5SWHMI.0000-00	HMI Drivers & Utilities DVD	

Table 240: 5SWHMI.0000-00 - Order data

12.1.3 Contents (V2.10)

BIOS product upgrades

- Automation PC 620 / Panel PC 700 CPU Board 815E and 855GME BIOS
- Automation PC 620 / Panel PC 700 CPU Board X855GME BIOS
- Automation PC 620 / Panel PC 700 CPU Board 945GME N270 BIOS
- Automation PC 680
- Automation PC 810 / Automation PC 820 / Panel PC 800 B945GME BIOS
- Automation PC 810 / Panel PC 800 945GME N270 CPU Board BIOS
- Automation PC 810 / Panel PC 800 GM45 CPU Board BIOS
- Provit 2000 product family - IPC2000/2001/2002
- Provit 5000 product family - IPC5000/5600/5000C/5600C
- Power Panel 100 BIOS devices
- Mobile Panel 100 BIOS devices
- Power Panel 100 / Mobile Panel 100 user boot logo
- Power Panel 100 / Mobile Panel 100 REMHOST utility
- Power Panel 300/400 BIOS devices
- Power Panel 300/400 BIOS user boot logo
- Panel PC 310

Device drivers

- Automation Device Interface (ADI)
- Audio
- Chipset
- CD-ROM
- LS120
- Graphics
- Network

- PCI / SATA RAID controller
- Touch screen
- Touchpad
- Interface board

Firmware upgrades

- Automation PC 620 / Panel PC 700 (MTCX, SDLR, SDLT)
- Automation PC 810 (MTCX, SDLR, SDLT)
- Automation PC 820 (MTCX, SDLR, SDLT)
- Mobile Panel 100 (SMCX)
- Panel PC 300 (MTCX)
- Power Panel 100 (aPCI)
- Power Panel 300/400 (aPCI)
- Power Panel 300/400 (MTCX)
- Panel PC 800 (MTCX, SDLR, SDLT)
- UPS firmware

Utilities / Tools

- B&R Embedded OS Installer
- Windows CE Tools
- User boot logo conversion program
- SATA RAID Installation Utility
- Automation Device Interface (ADI)
- CompactFlash service life calculator (Silicon Systems)
- Miscellaneous
- MTC utilities
- B&R Key Editor
- MTC & Mkey utilities
- Mkey utilities
- UPS configuration software
- ICU ISA configuration
- Intel PCI NIC boot ROM
- Diagnostic programs

Windows

- Windows CE 6.0
- Windows CE 5.0
- Windows CE 4.2
- Windows CE 4.1
- Windows CE Tools
- Windows Embedded Standard 2009
- Thin client
- Windows NT Embedded
- Windows XP Embedded
- VNC viewer

MCAD templates for

- Industrial PCs
- Visualization and operating devices
- Legend strip templates
- Custom designs

ECAD templates for

- Industrial PCs
- Automation PCs
- Automation Panel 900
- Panels (Power Panel)

Documentation for

- Automation PC 620
- Automation PC 680
- Automation PC 810
- Automation PC 820
- Automation Panel 800
- Automation Panel 900
- Panel PC 310
- Panel PC 700
- Panel PC 725
- Panel PC 800
- Power Panel 15/21/35/41
- Power Panel 100/200
- Power Panel 300/400
- Mobile Panel 40/50
- Mobile Panel 100/200
- Mobile Panel connection box
- Provit 2000
- Provit 3030
- Provit 4000
- Provit 5000
- Provit Benchmark
- Provit Mkey
- Windows CE 5.0 Help
- Windows CE 6.0 Help
- Windows NT Embedded application guide
- Windows XP Embedded application guide
- Uninterruptible power supply
- Implementation guides
- B&R Hilscher fieldbus cards (CANopen, DeviceNet, PROFIBUS, PROFINET)

Service tools

- Acrobat Reader 5.0.5 (freeware in German, English and French)
- Power Archiver 6.0 (freeware in German, English and French)
- Internet Explorer 5.0 (German and English)
- Internet Explorer 6.0 (German and English)

13 Cables

13.1 DVI cables

13.1.1 5CADVI.0xxx-00

13.1.1.1 General information

5CADVI.0xxx-00 DVI cables are designed for use in inflexible applications.

> **Caution!**
>
> **Power must be turned off before plugging in and unplugging cables.**

13.1.1.2 Order data

Model number	Short description	Figure
	DVI cable	
5CADVI.0018-00	DVI-D cable, 1.8 m	
5CADVI.0050-00	DVI-D cable, 5 m	
5CADVI.0100-00	DVI-D cable, 10 m	

Table 241: 5CADVI.0018-00, 5CADVI.0050-00, 5CADVI.0100-00 - Order data

13.1.1.3 Technical data

Product ID	5CADVI.0018-00	5CADVI.0050-00	5CADVI.0100-00
General information			
Certification			
CE	Yes		
cULus	Yes		
GL	Yes		
Cable structure			
Wire cross section	AWG 28		
Shield	Individual cable pairs and entire cable		
Cable shielding	Tinned Cu mesh, optical coverage > 86%		
Outer sheathing			
Material	PVC		
Color	Beige		
Labeling	AWM STYLE 20276 80°C 30V VW1 DVI DIGITAL SINGLE LINK DER AN		
Connector			
Type	2x DVI-D (18+1), male		
Connection cycles	100		
Electrical characteristics			
Conductor resistance	Max. 237 Ω/km		
Insulation resistance	Min. 100 MΩ/km		
Mechanical characteristics			
Dimensions			
Length	1.8 m ±50 mm	5 m ±80 mm	10 m ±100 mm
Diameter	Max. 8.5 mm		
Flex radius	≥ 5x cable diameter (connector - ferrite bead and ferrite bead - ferrite bead)		
Weight	Approx. 260 g	Approx. 460 g	Approx. 790 g

Table 242: 5CADVI.0018-00, 5CADVI.0050-00, 5CADVI.0100-00 - Technical data

13.1.1.4 Flex radius specifications

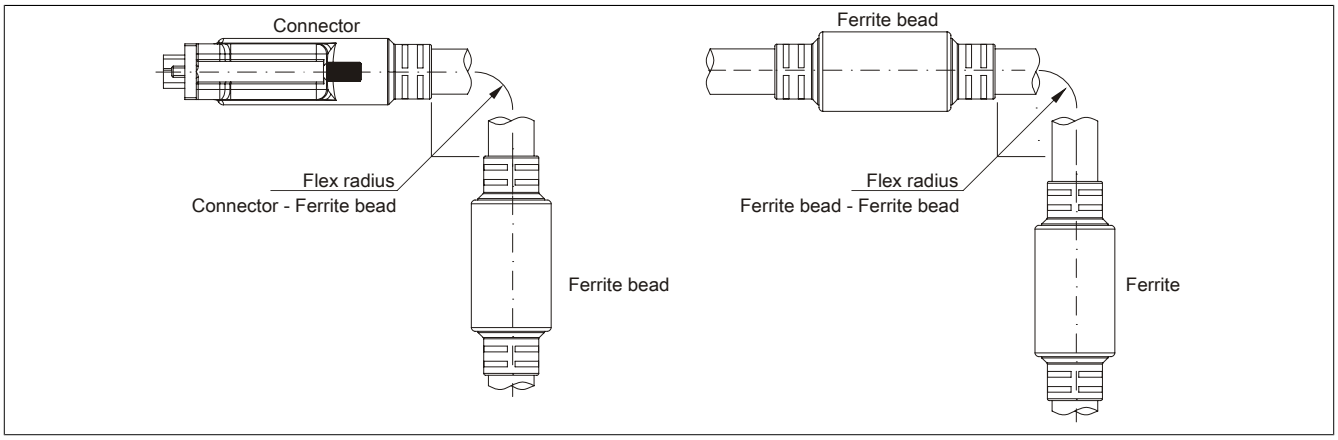


Figure 167: Flex radius specifications

13.1.1.5 Dimensions

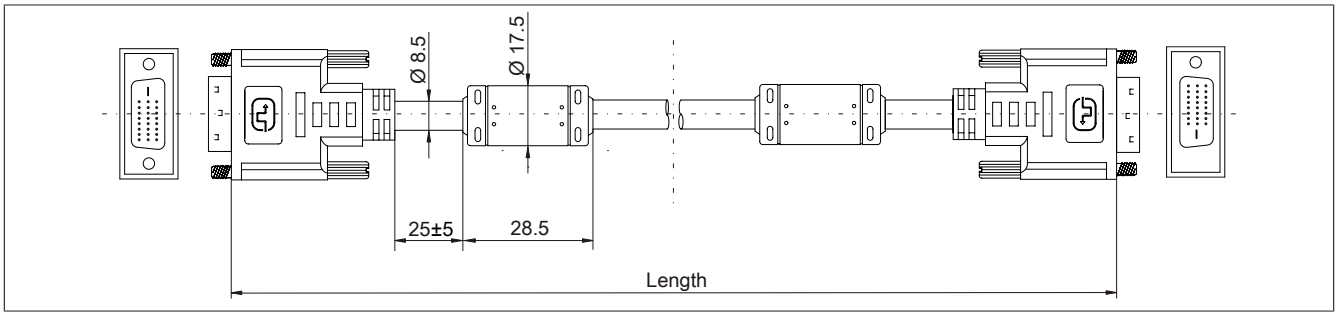


Figure 168: 5CADVI.0xxx-00 - Dimensions

13.1.1.6 Cable pinout

Warning!

If you choose to make a suitable cable yourself, it should be wired according to these specifications.

If a self-made cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly.

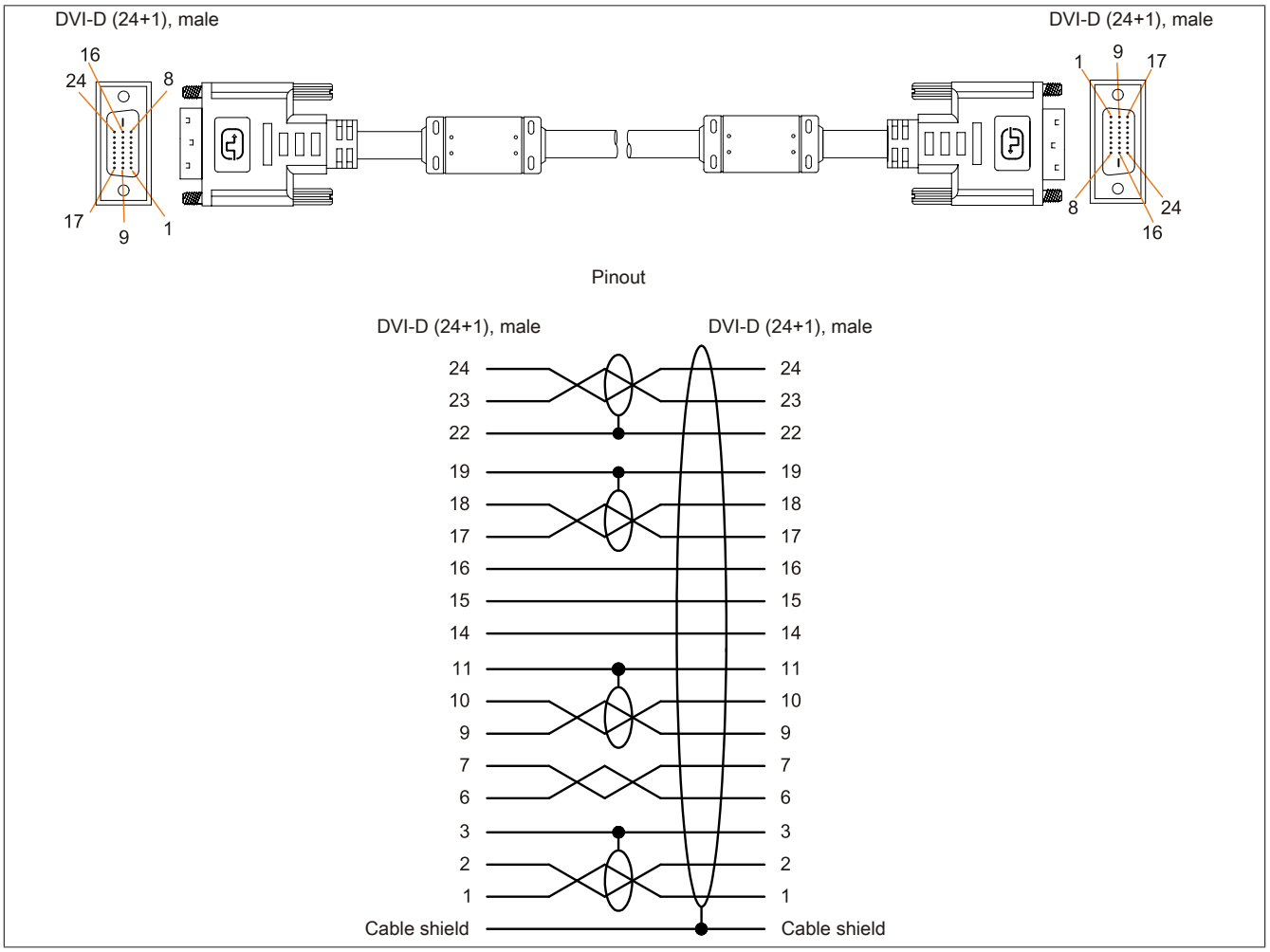


Figure 169: 5CADVI.0xxx-00 - Pinout

13.2 SDL cables

13.2.1 5CASDL.0xxx-00

13.2.1.1 General information

5CASDL.0xxx-00 SDL cables are designed for use in inflexible applications. SDL flex cables 5CASDL.0xxx-03 are required for flexible applications (e.g. swing arm systems).

> **Caution!**
>
> **Power must be turned off before plugging in and unplugging cables.**

13.2.1.2 Order data

Model number	Short description	Figure
	SDL cables	
5CASDL.0018-00	SDL cable, 1.8 m	
5CASDL.0050-00	SDL cable, 5 m	
5CASDL.0100-00	SDL cable, 10 m	
5CASDL.0150-00	SDL cable, 15 m	
5CASDL.0200-00	SDL cable, 20 m	
5CASDL.0250-00	SDL cable, 25 m	
5CASDL.0300-00	SDL cable, 30 m	

Table 243: 5CASDL.0018-00, 5CASDL.0050-00, 5CASDL.0100-00, 5CASDL.0150-00, 5CASDL.0200-00, 5CASDL.0250-00, 5CASDL.0300-00 - Order data

13.2.1.3 Technical data

Product ID	5CASDL. 0018-00	5CASDL. 0050-00	5CASDL. 0100-00	5CASDL. 0150-00	5CASDL. 0200-00	5CASDL. 0250-00	5CASDL. 0300-00
General information							
Certification							
CE	Yes						
cULus	Yes						
GL	Yes						
Cable structure							
Wire cross section	AWG 28		AWG 24				
Shield	Individual cable pairs and entire cable						
Cable shielding	Tinned Cu mesh, optical coverage > 85%						
Outer sheathing							
Material	PVC						
Color	Black						
Labeling	E74020-C (UL) AWM STYLE 20176 80°C 30V VW-1 DVI DIGITAL LINK						
Connector							
Type	2x DVI-D (24+1), male						
Connection cycles	100						
Contacts	Gold-plated						
Mechanical protection	Metal cover with crimped stress relief						
Electrical characteristics							
Conductor resistance							
AWG 24	-		≤93 Ω/km				
AWG 28	≤237 Ω/km		-				
Insulation resistance	Min. 10 MΩ/km						
Mechanical characteristics							
Dimensions							
Length	1.8 m ±30 mm	5 m ±30 mm	10 m ±50 mm	15 m ±100 mm	20 m ±100 mm	25 m ±100 mm	30 m ±100 mm
Diameter	Typ. 8.6 ±0.2 mm Max. 9 mm		Typ. 11 ±0.2 mm Max. 11.5 mm				
Flex radius	≥ 5x cable diameter (connector - ferrite bead and ferrite bead - ferrite bead)						
Flexibility	Limited flexibility; valid for ferrite bead - ferrite bead (tested 100 cycles with 5x cable diameter, 20 cycles / minute)						
Weight	Approx. 300 g	Approx. 580 g	Approx. 1500 g	Approx. 2250 g	Approx. 2880 g	Approx. 4800 g	Approx. 5520 g

Table 244: 5CASDL.0018-00, 5CASDL.0050-00, 5CASDL.0100-00, 5CASDL.0150-00, 5CASDL.0200-00, 5CASDL.0250-00, 5CASDL.0300-00 - Technical data

13.2.1.4 Flex radius specifications

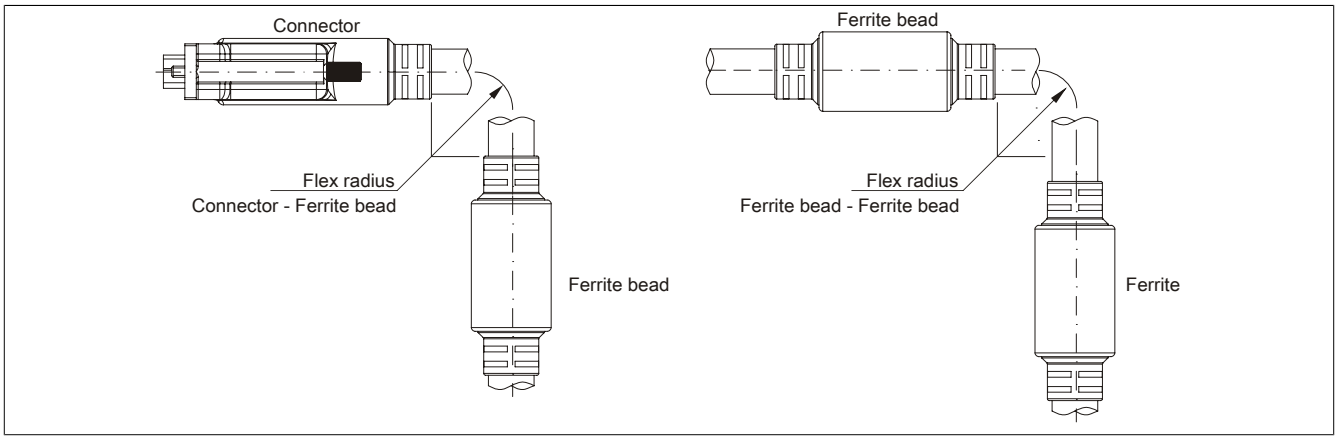


Figure 170: Flex radius specifications

13.2.1.5 Dimensions

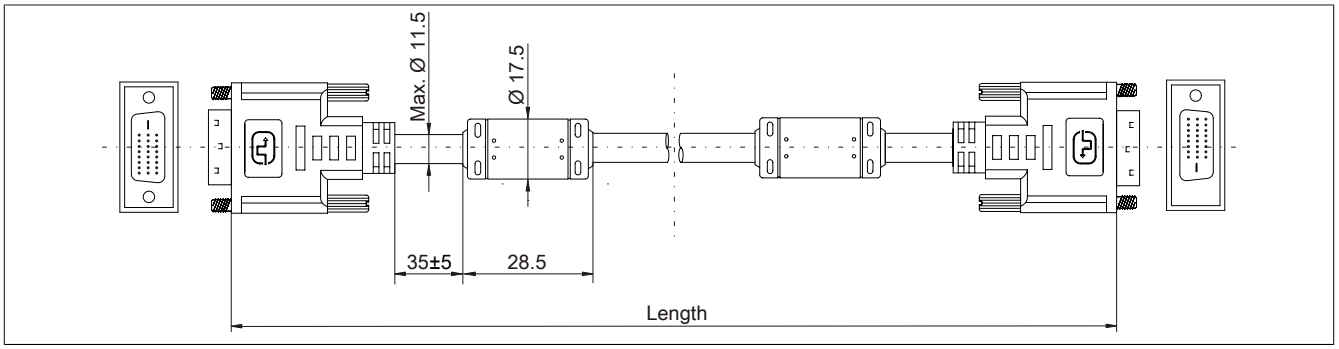


Figure 171: 5CASDL.0xxx-00- Dimensions

13.2.1.6 Cable pinout

Warning!

If you choose to make a suitable cable yourself, it should be wired according to these specifications.

If a self-made cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly.

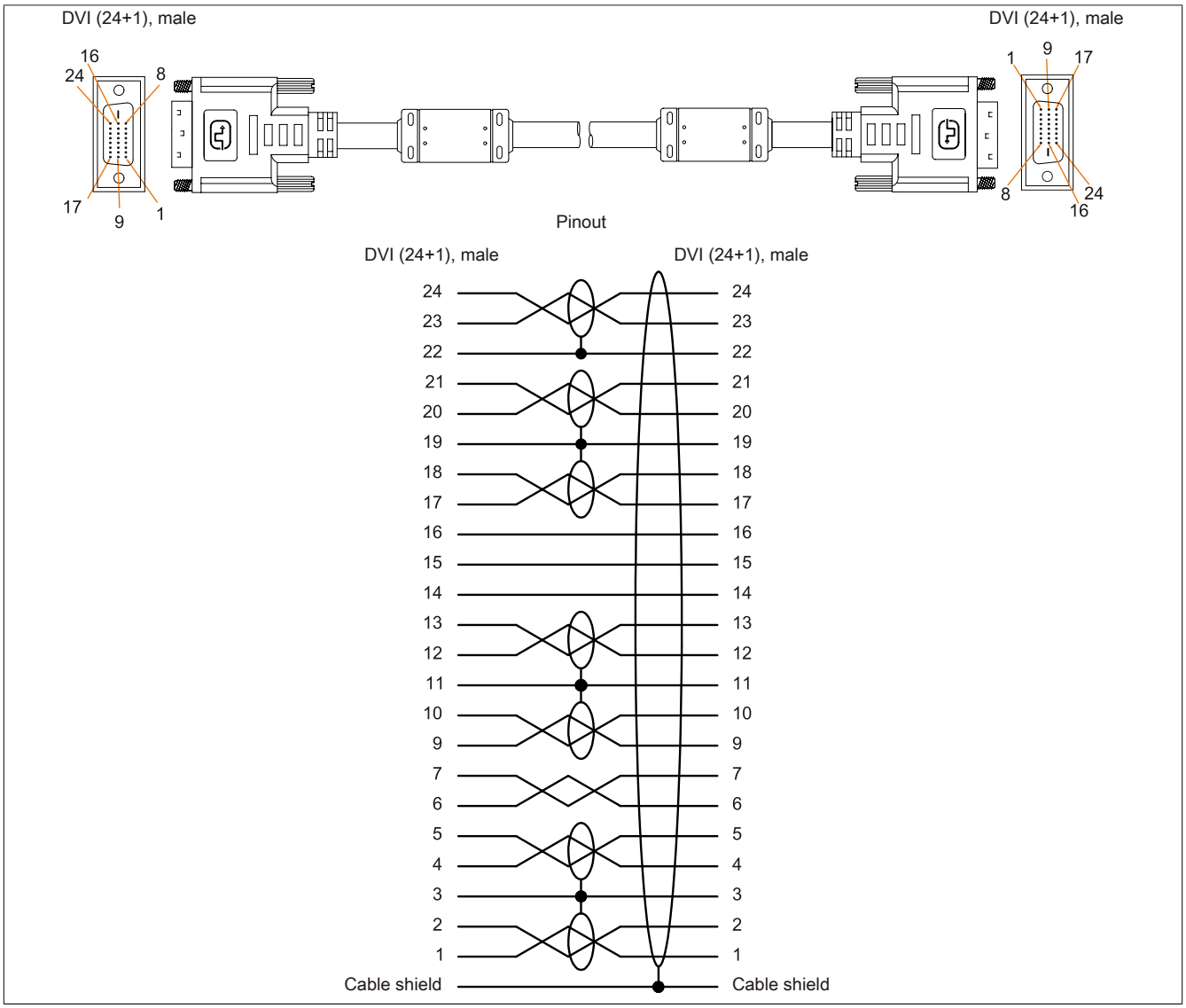


Figure 172: 5CASDL.0xxx-00 - Pinout

13.3 SDL cables with 45° connector

13.3.1 5CASDL.0xxx-01

13.3.1.1 General information

5CASDL.0xxx-01 SDL cables with a 45° connector are designed for use in inflexible applications.

> **Caution!**
>
> **Power must be turned off before plugging in and unplugging cables.**

13.3.1.2 Order data

Model number	Short description	Figure
	SDL cable - 45° connector	
5CASDL.0018-01	SDL cable with 45° connector, 1.8 m	
5CASDL.0050-01	SDL cable with 45° connector, 5 m	
5CASDL.0100-01	SDL cable with 45° connector, 10 m	
5CASDL.0150-01	SDL cable with 45° connector, 15 m	

Table 245: 5CASDL.0018-01, 5CASDL.0050-01, 5CASDL.0100-01, 5CASDL.0150-01 - Order data

13.3.1.3 Technical data

Product ID	5CASDL.0018-01	5CASDL.0050-01	5CASDL.0100-01	5CASDL.0150-01
General information				
Certification				
CE	Yes			
cULus	Yes			
GL	Yes			
Cable structure				
Wire cross section	AWG 28		AWG 24	
Shield	Individual cable pairs and entire cable			
Cable shielding	Tinned Cu mesh, optical coverage > 85%			
Outer sheathing				
Material	PVC			
Color	Black			
Connector				
Type	2x DVI-D (24+1), male			
Connection cycles	100			
Contacts	Gold-plated			
Mechanical protection	Metal cover with crimped stress relief			
Electrical characteristics				
Conductor resistance				
AWG 24	-		≤93 Ω/km	
AWG 28	≤237 Ω/km		-	
Insulation resistance	Min. 10 MΩ/km			
Mechanical characteristics				
Dimensions				
Length	1.8 m ±30 mm	5 m ±50 mm	10 m ±100 mm	15 m ±100 mm
Diameter	Max. 9 mm		Max. 11.5 mm	
Flex radius				
Fixed installation	≥ 5x cable diameter (connector - ferrite bead and ferrite bead - ferrite bead)			
Flexibility	Limited flexibility; valid for ferrite bead - ferrite bead (tested 100 cycles with 5x cable diameter, 20 cycles / minute)			
Weight	Approx. 300 g	Approx. 590 g	Approx. 2800 g	Approx. 2860 g

Table 246: 5CASDL.0018-01, 5CASDL.0050-01, 5CASDL.0100-01, 5CASDL.0150-01 - Technical data

13.3.1.4 Flex radius specifications

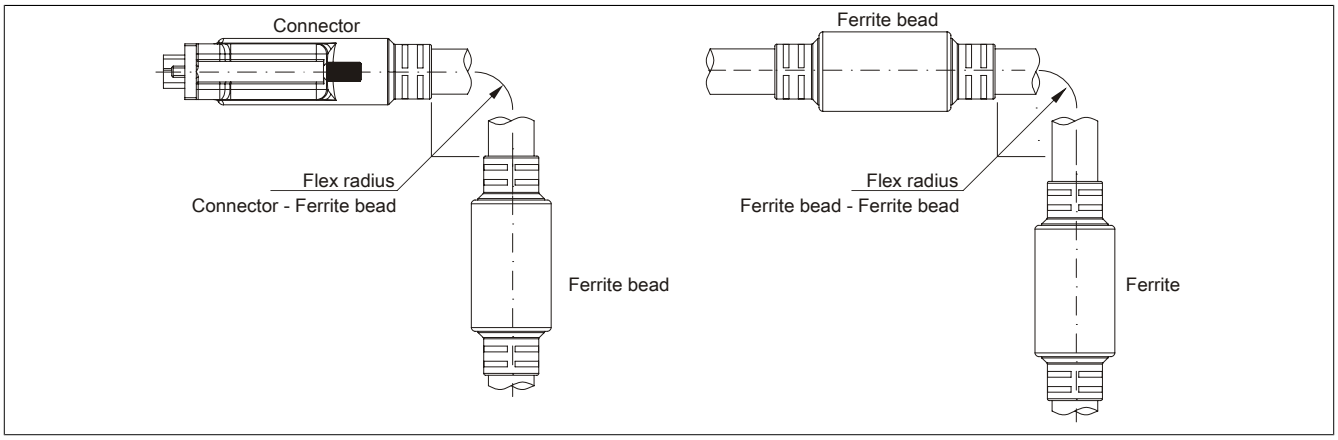


Figure 173: Flex radius specifications

13.3.1.5 Dimensions

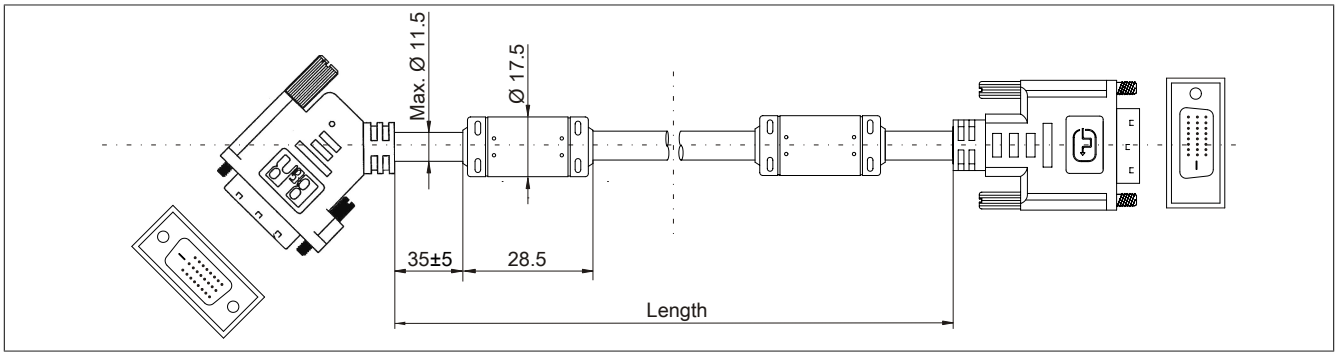


Figure 174: 5CASDL.0xxx-01 - Dimensions

13.3.1.6 Cable pinout

Warning!

If you choose to make a suitable cable yourself, it should be wired according to these specifications.

If a self-made cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly.

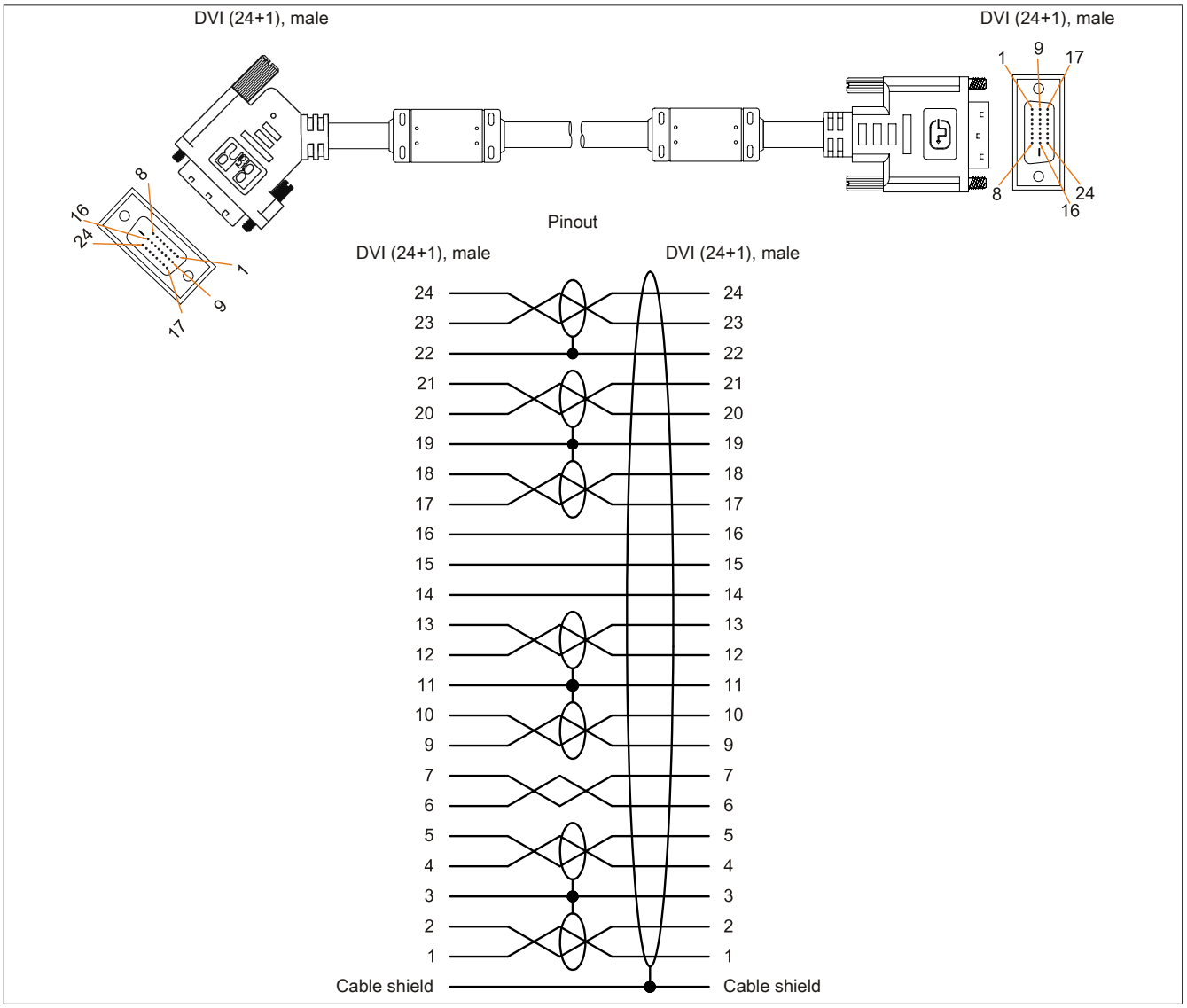


Figure 175: 5CASDL.0xxx-01 - Pinout

13.4 SDL flex cables

13.4.1 5CASDL.0xxx-03

13.4.1.1 General information

5CASDL.0xxx-03 SDL flex cables are designed for use in both inflexible and flexible applications (e.g. swing arm systems).

> **Caution!**
>
> **Power must be turned off before plugging in and unplugging cables.**

13.4.1.2 Order data

Model number	Short description	Figure
	SDL flex cable	
5CASDL.0018-03	SDL flex cable, 1.8 m	
5CASDL.0050-03	SDL flex cable, 5 m	
5CASDL.0100-03	SDL flex cable, 10 m	
5CASDL.0150-03	SDL flex cable, 15 m	
5CASDL.0200-03	SDL flex cable, 20 m	
5CASDL.0250-03	SDL flex cable, 25 m	
5CASDL.0300-03	SDL flex cable, 30 m	

Table 247: 5CASDL.0018-03, 5CASDL.0050-03, 5CASDL.0100-03, 5CASDL.0150-03, 5CASDL.0200-03, 5CASDL.0250-03, 5CASDL.0300-03 - Order data

13.4.1.3 Technical data

Product ID	5CASDL. 0018-03	5CASDL. 0050-03	5CASDL. 0100-03	5CASDL. 0150-03	5CASDL. 0200-03	5CASDL. 0250-03	5CASDL. 0300-03
General information							
Certification							
CE	Yes						
cULus	Yes						
GL	Yes						
Cable structure							
Wire cross section	AWG 24 (control wires) AWG 26 (DVI, USB, data)						
Properties	Free of halogen and silicon						
Shield	Individual cable pairs and entire cable						
Cable shielding	Aluminum foil clad + tinned copper mesh						
Outer sheathing							
Material	Special TMPU - semi gloss						
Color	Black						
Labeling	(B&R) SDL Cable (UL) AWM 20236 80°C 30V E 63216						
Connector							
Type	2x DVI-D (24+1), male						
Connection cycles	Min. 200						
Contacts	Gold-plated						
Mechanical protection	Metal cover with crimped stress relief						
Electrical characteristics							
Operating voltage	≤30 V						
Test voltage							
Wire/Wire	1 kV						
Wire/Shield	0.5 kV						
Wave impedance	100 ±10 Ω						
Conductor resistance							
AWG 24	≤95 Ω/km						
AWG 26	≤145 Ω/km						
Insulation resistance	>200 MΩ/km						
Operating conditions							
Approbation	UL AWM 20236 80 °C 30 V						
Flame resistant	In accordance with UL758 (cable vertical flame test)						
Oil and hydrolysis resistance	According to VDE 0282-10						

Table 248: 5CASDL.0018-03, 5CASDL.0050-03, 5CASDL.0100-03, 5CASDL.0150-03, 5CASDL.0200-03, 5CASDL.0250-03, 5CASDL.0300-03 - Technical data

Product ID	5CASDL. 0018-03	5CASDL. 0050-03	5CASDL. 0100-03	5CASDL. 0150-03	5CASDL. 0200-03	5CASDL. 0250-03	5CASDL. 0300-03
Environmental conditions							
Temperature							
Storage	-20 to 80°C						
Moving	-5 to 60°C						
Fixed installation	-20 to 80°C						
Mechanical characteristics							
Dimensions							
Length	1.8 m ±20 mm	5 m ±45 mm	10 m ±90 mm	15 m ±135 mm	20 m ±180 mm	25 m ±225 mm	30 m ±270 mm
Diameter	Max. 12 mm						
Flex radius							
Fixed installation	≥6x cable diameter (connector - ferrite bead) ≥10x cable diameter (from ferrite bead - ferrite bead)						
Flexible installation	≥15x cable diameter (from ferrite bead - ferrite bead)						
Flexibility	Flexible; valid for ferrite bead - ferrite bead (tested 300,000 cycles with 15x cable diameter, 4800 cycles/hour)						
Drag chain data							
Flex cycles	300,000						
Velocity	4800 cycles/hour						
Flex radius	180 mm; 15x cable diameter						
Hub	460 mm						
Weight	Approx. 460 g	Approx. 1020 g	Approx. 1940 g	Approx. 2840 g	Approx. 3740 g	Approx. 4560 g	Approx. 5590 g
Tension							
During operation	≤50 N						
During installation	≤400 N						

Table 248: 5CASDL.0018-03, 5CASDL.0050-03, 5CASDL.0100-03, 5CASDL.0150-03, 5CASDL.0200-03, 5CASDL.0250-03, 5CASDL.0300-03 - Technical data

13.4.1.4 Flex radius specifications

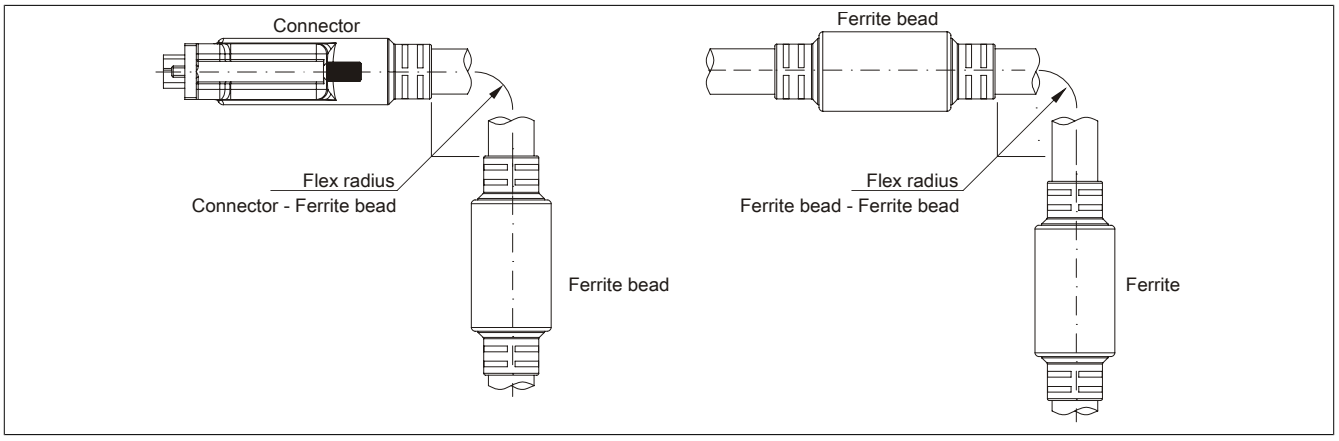


Figure 176: Flex radius specifications

13.4.1.5 Dimensions

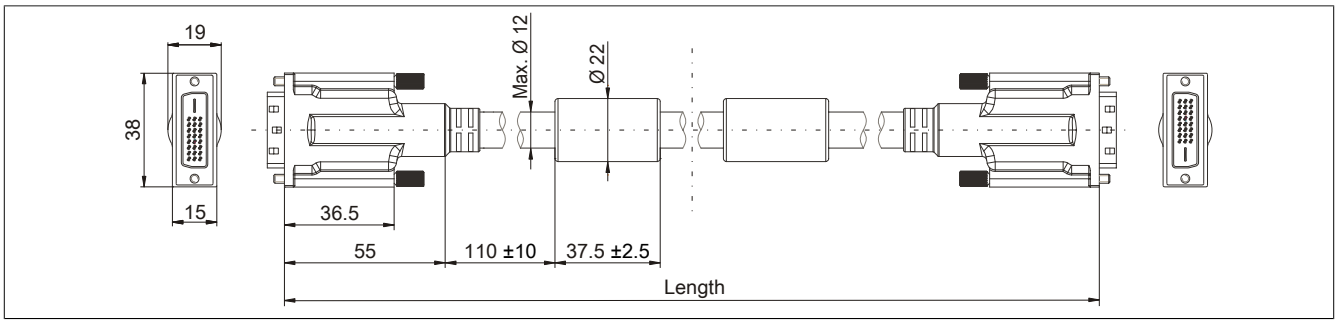


Figure 177: 5CASDL.0xxx-03 - Dimensions

13.4.1.6 Structure

Element	Assignment	Cross section
DVI	TMDS data 0	26 AWG
	TMDS data 1	26 AWG
	TMDS data 2	26 AWG
	TMDS cycle	26 AWG
USB	XUSB0	26 AWG
	XUSB1	26 AWG
Data	SDL	26 AWG
Control wires	DDC cycle	24 AWG
	DDC data	24 AWG
	+5 V	24 AWG
	Mass	24 AWG
	Hot plug detect	24 AWG

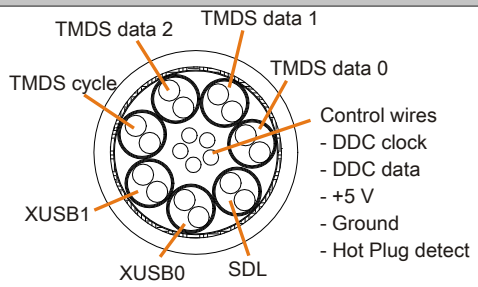


Table 249: 5CASDL.0xxx-03 SDL flex cables - Structure

13.4.1.7 Cable pinout

Warning!

If you choose to make a suitable cable yourself, it should be wired according to these specifications.

If a self-made cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly.

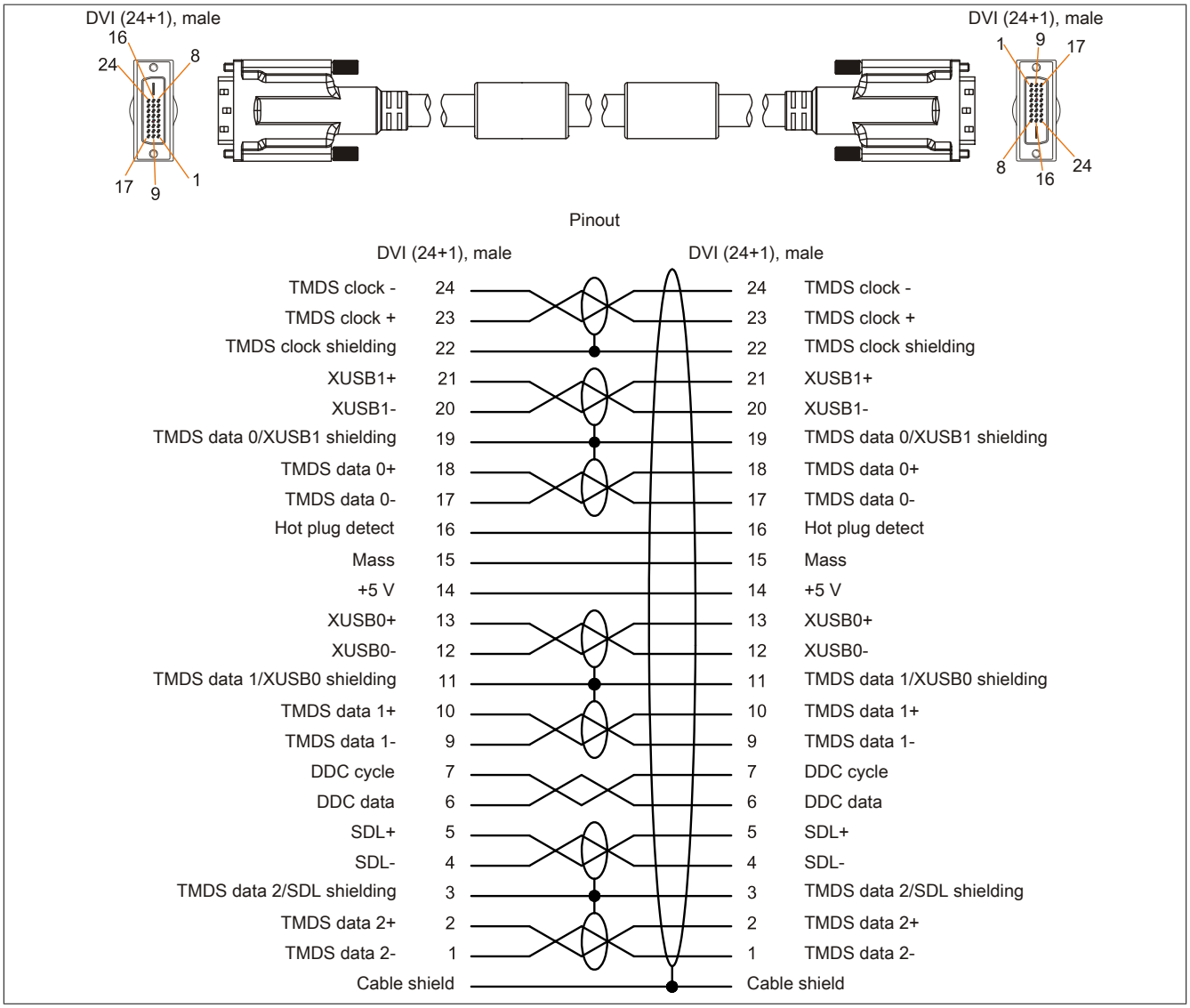


Figure 178: 5CASDL.0xxx-03 - Pinout

13.5 SDL flex cables with extender

13.5.1 5CASDL.0xx0-13

13.5.1.1 General information

5CASDL.0xx0-13 SDL flex cables with an extender are designed for use in both inflexible and flexible applications (e.g. swing arm systems).

> **Caution!**
>
> **Power must be turned off before plugging in and unplugging cables.**

13.5.1.2 Order data

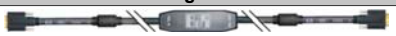
Model number	Short description	Figure
	SDL flex cable	
5CASDL.0300-13	SDL flex cable with extender, 30 m	
5CASDL.0400-13	SDL flex cable with extender, 40 m	
5CASDL.0430-13	SDL flex cable with extender, 43 m	

Table 250: 5CASDL.0300-13, 5CASDL.0400-13, 5CASDL.0430-13 - Order data

13.5.1.3 Technical data

Product ID	5CASDL.0300-13	5CASDL.0400-13	5CASDL.0430-13
General information			
Certification			
CE		Yes	
cULus		Yes	
GL		Yes	
Cable structure			
Wire cross section		AWG 24 (control wires) AWG 26 (DVI, USB, data)	
Properties		Free of halogen and silicon	
Shield		Individual cable pairs and entire cable	
Cable shielding		Aluminum foil clad + tinned copper mesh	
Outer sheathing			
Material		Special TMPU - semi gloss	
Color		Black	
Labeling		(B&R) SDL cable (UL) AWM 20236 80°C 30V E63216	
Connector			
Type		2x DVI-D (24+1), male	
Connection cycles		Min. 200	
Contacts		Gold-plated	
Mechanical protection		Metal cover with crimped stress relief	
Electrical characteristics			
Operating voltage		≤30 V	
Test voltage			
Wire/Wire		1 kV	
Wire/Shield		0.5 kV	
Wave impedance		100 ±10 Ω	
Conductor resistance			
AWG 24		≤95 Ω/km	
AWG 26		≤145 Ω/km	
Insulation resistance		>200 MΩ/km	
Operating conditions			
Approbation		UL AWM 20236 80 °C 30 V	
Flame resistant		In accordance with UL758 (cable vertical flame test)	
Oil and hydrolysis resistance		According to VDE 0282-10	
Environmental conditions			
Temperature			
Storage		-20 to 60°C	
Moving		-5 to 60°C	
Fixed installation		-20 to 60°C	

Table 251: 5CASDL.0300-13, 5CASDL.0400-13, 5CASDL.0430-13 - Technical data

Product ID	5CASDL.0300-13	5CASDL.0400-13	5CASDL.0430-13
Mechanical characteristics			
Dimensions			
Length	30 m ±280 mm	40 m ±380 mm	43 m ±410 mm
Diameter		Max. 12 mm	
Extender box			
Width		35 mm	
Length		125 mm	
Height		18.5 mm	
Flex radius			
Fixed installation		≥6x cable diameter (connector - ferrite bead) ≥10x cable diameter (from ferrite bead - ferrite bead)	
Flexible installation		≥15x cable diameter (from ferrite bead - ferrite bead)	
Flexibility		Flexible; valid for ferrite bead - ferrite bead (tested 300,000 cycles with 15x cable diameter, 4800 cycles/hour)	
Drag chain data			
Flex cycles		300,000	
Velocity		4800 cycles/hour	
Flex radius		180 mm; 15x cable diameter	
Hub		460 mm	
Weight	Approx. 5430 g	Approx. 7200 g	Approx. 7790 g
Tension			
During operation		≤50 N	
During installation		≤400 N	

Table 251: 5CASDL.0300-13, 5CASDL.0400-13, 5CASDL.0430-13 - Technical data

13.5.1.4 Flex radius specifications

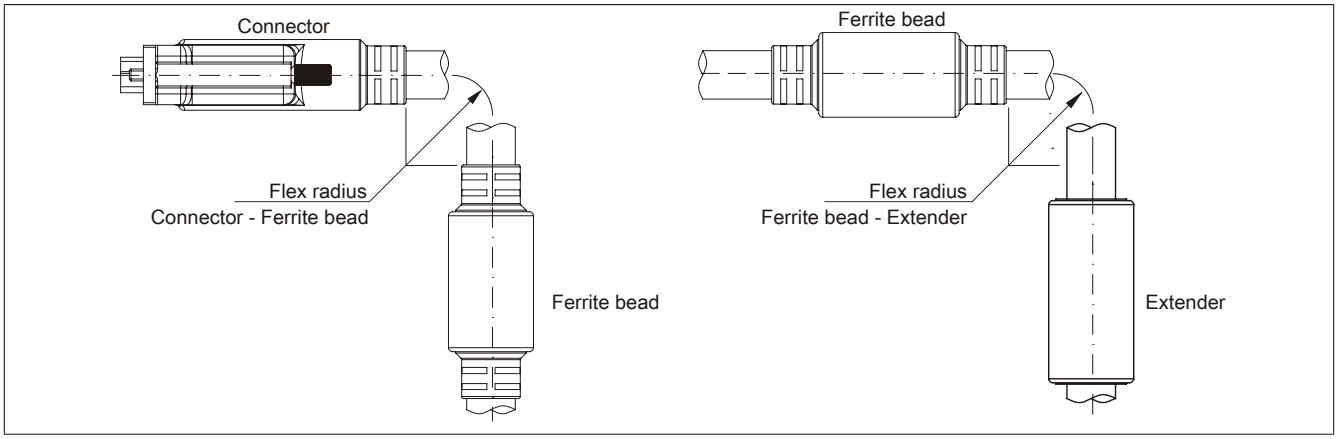


Figure 179: Flex radius specification with extender

13.5.1.5 Dimensions

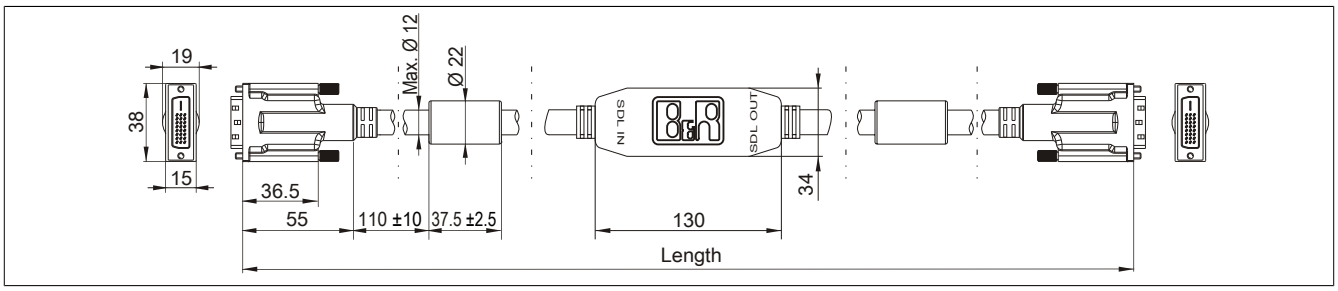


Figure 180: 5CASDL.0xx0-13 - Dimensions

13.5.1.6 Cable pinout

Warning!

If you choose to make a suitable cable yourself, it should be wired according to these specifications.

If a self-made cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly.

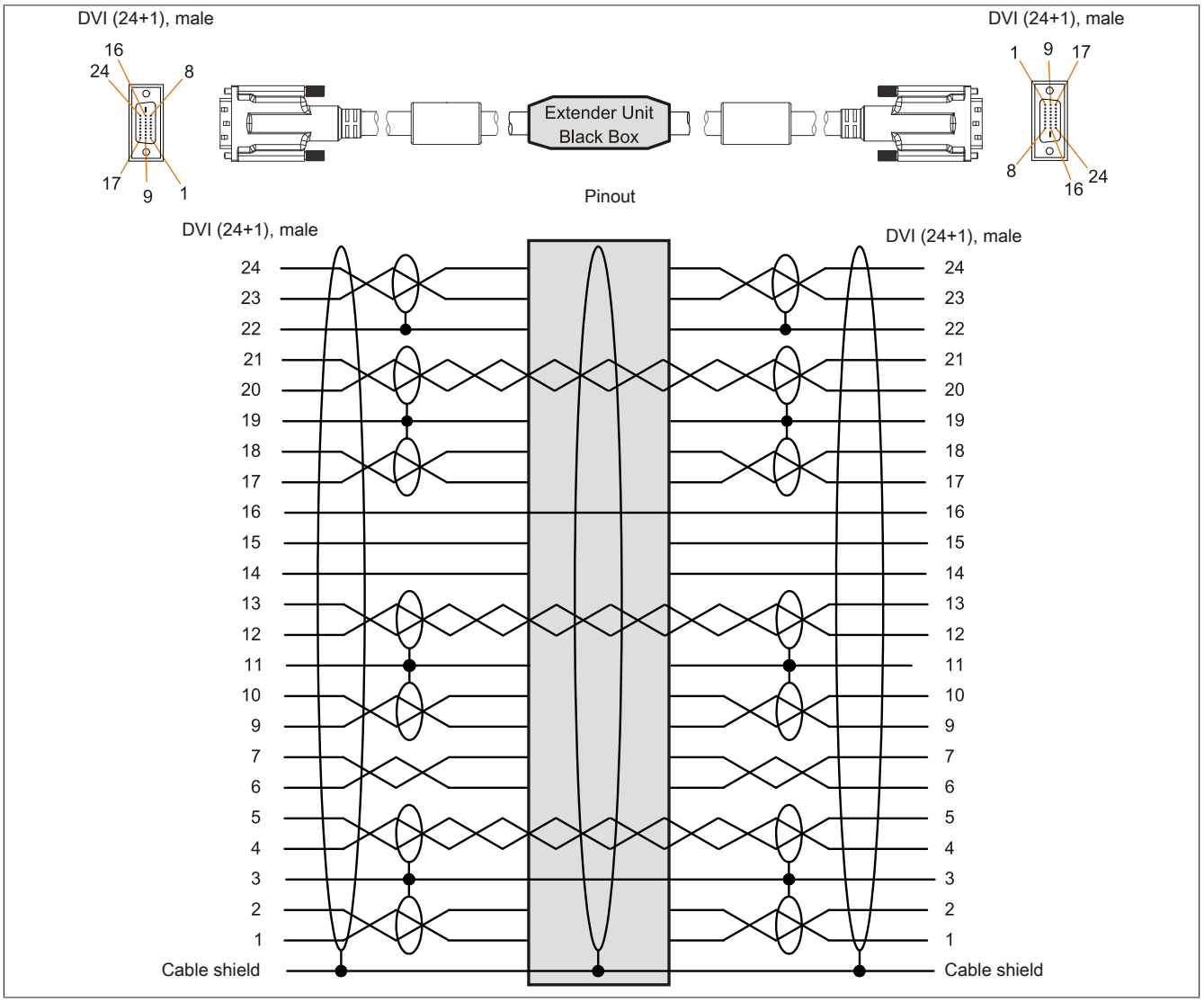


Figure 181: 5CASDL.0xx0-13 - Pinout

13.5.1.7 Cable connection

SDL flex cables with an extender must be connected between the B&R Industrial PC and the Automation Panel display unit in the correct direction. The proper signal direction is indicated on the extender.

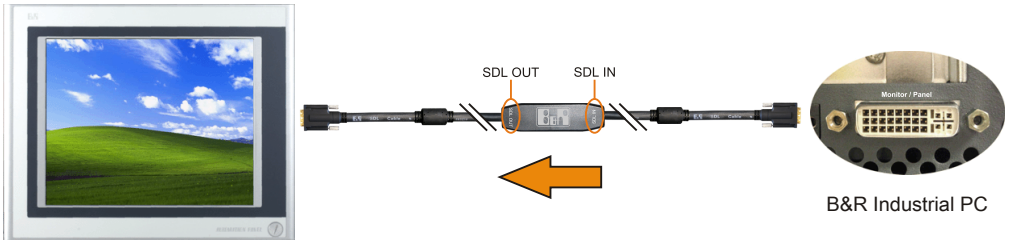


Figure 182: Example of the signal direction for an SDL flex cable with extender

13.6 USB cables

13.6.1 5CAUSB.00xx-00

13.6.1.1 General information

USB cables are designed to achieve USB 2.0 transfer speeds.

13.6.1.2 Order data

Model number	Short description	Figure
	USB cable	
5CAUSB.0018-00	USB 2.0 connection cable type A - type B, 1.8 m.	
5CAUSB.0050-00	USB 2.0 connection cable type A - type B, 5 m.	

Table 252: 5CAUSB.0018-00, 5CAUSB.0050-00 - Order data

13.6.1.3 Technical data

Product ID	5CAUSB.0018-00	5CAUSB.0050-00
General information		
Certification		
CE	Yes	
cULus	Yes	
Cable structure		
Wire cross section	AWG 24, 28	
Shield	Entire cable	
Outer sheathing		
Color	Beige	
Connector		
Type	USB type A male and USB type B male	
Mechanical characteristics		
Dimensions		
Length	1.8 m ±30 mm	5 m ±50 mm
Diameter	Max. 5 mm	
Flex radius	Min. 100 mm	

Table 253: 5CAUSB.0018-00, 5CAUSB.0050-00 - Technical data

13.6.1.4 Cable pinout

Warning!

If you choose to make a suitable cable yourself, it should be wired according to these specifications.

If a self-made cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly.

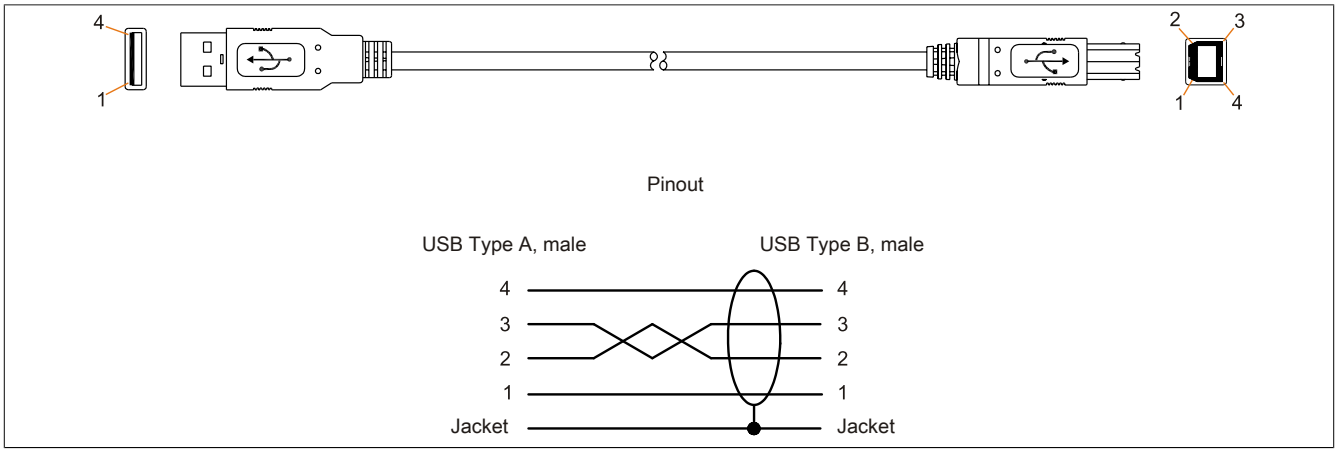


Figure 183: 5CAUSB.00xx-00 USB cables - Pinout

13.7 RS232 cables

13.7.1 9A0014.xx

13.7.1.1 General information

RS232 cables are used as extension cables between two RS232 interfaces.

13.7.1.2 Order data

Model number	Short description	Figure
	RS232 cable	
9A0014.02	RS232 extension cable for remote operation of a display unit with touch screen, 1.8 m	
9A0014.05	RS232 extension cable for remote operation of a display unit with touch screen, 5 m	
9A0014.10	RS232 extension cable for remote operation of a display unit with touch screen, 10 m	

Table 254: 9A0014.02, 9A0014.05, 9A0014.10 - Order data

13.7.1.3 Technical data

Product ID	9A0014.02	9A0014.05	9A0014.10
General information			
Certification CE		Yes	
Cable structure			
Wire cross section		AWG 26	
Shield		Entire cable	
Outer sheathing Color		Beige	
Connector			
Type		9-pin DSUB socket, male / female	
Mechanical characteristics			
Dimensions Length Diameter	1.8 m ±50 mm	5 m ±80 mm Max. 5 mm	10 m ±100 mm
Flex radius		Min. 70 mm	

Table 255: 9A0014.02, 9A0014.05, 9A0014.10 - Technical data

13.7.1.4 Cable pinout

Warning!

If you choose to make a suitable cable yourself, it should be wired according to these specifications.

If a self-made cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly.

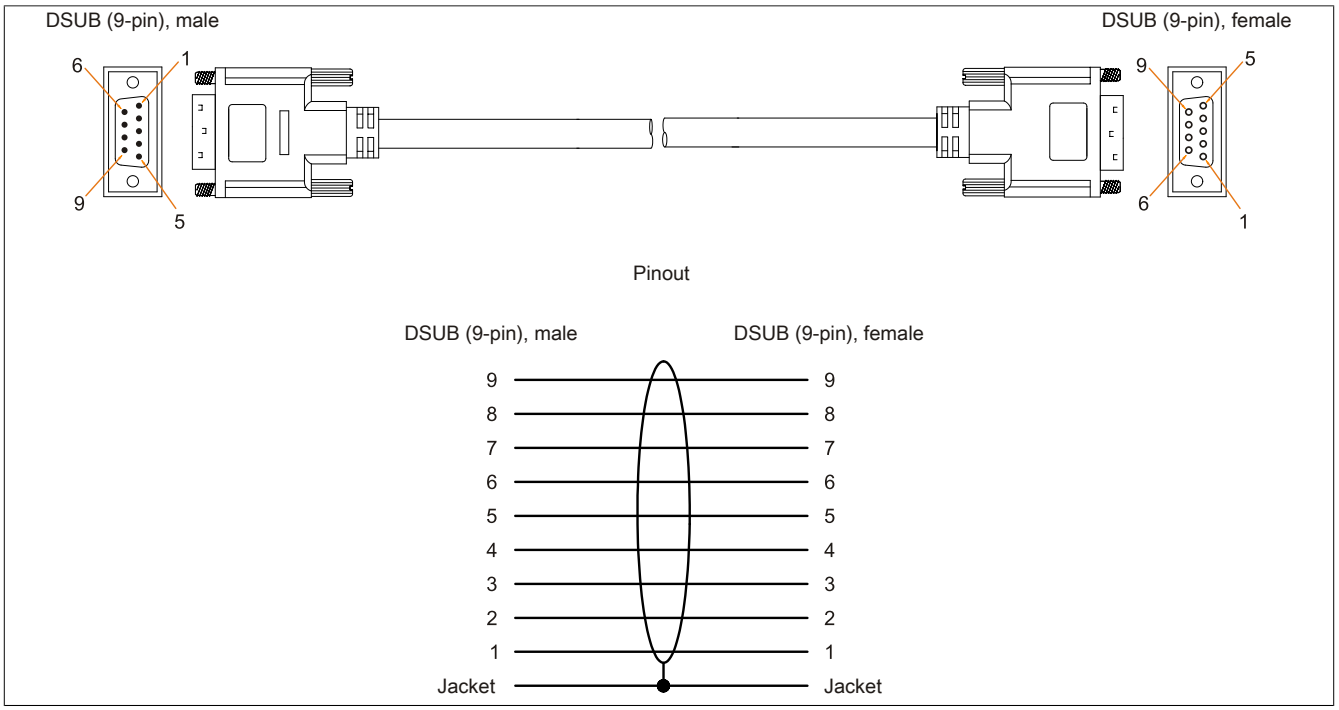


Figure 184: 9A0014.xx RS232 cables - Pinout

13.8 Internal supply cable

13.8.1 5CAMSC.0001-00

13.8.1.1 General information

This supply cable is used internally, for example to supply special PCI cards. It is connected to the mainboard. For requirements and procedures, see "Connecting an external device to the mainboard" on page 348.

> **Caution!**
>
> **Power must be turned off before plugging in and unplugging cables.**

13.8.1.2 Order data

Model number	Short description	Figure
	Accessories	
5CAMSC.0001-00	Internal supply cable	

Table 256: 5CAMSC.0001-00 - Order data

13.8.1.3 Technical data

Product ID	5CAMSC.0001-00
General information	
Certification CE	 Yes
Cable structure	
Wire cross section	AWG 22
Connector	
Type	1x 4-pin male disk drive power plug, 1x 4-pin female plug housing
Mechanical characteristics	
Dimensions Length	 100 mm ±5 mm
Flexibility	Flexible

Table 257: 5CAMSC.0001-00 - Technical data

Chapter 7 • Maintenance and service

This chapter describes service/maintenance work that can be carried out by a qualified end user.

1 Changing the battery

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

Information:

- **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!

The battery must be replaced by a Type CR2477N Renata battery only. The use of another battery may present a risk of fire or explosion.

The battery may explode if handled improperly. 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.).

1.1 Battery status evaluation

The status of the battery is determined immediately after the device is started and subsequently checked by the system every 24 hours. During this measurement, the battery is subjected to a brief load (approximately 1 second) and then evaluated. Once determined, the battery status is displayed in BIOS (under Advanced -> OEM features -> System board features -> Voltage values) and in the B&R Control Center (ADI driver); it can also be read in a customer application using the ADI library.

Battery status	Description
N/A	The hardware or firmware being used is too old and does not support reading the battery status.
GOOD	Data buffering is intact.
BAD	From the point when battery capacity is recognized as insufficient (BAD), data buffering is intact for approximately another 500 hours

Table 258: Battery status

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

1.2 Procedure

- Disconnect the power supply to the B&R Industrial PC.
- Touch the housing or ground connection 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 strip.

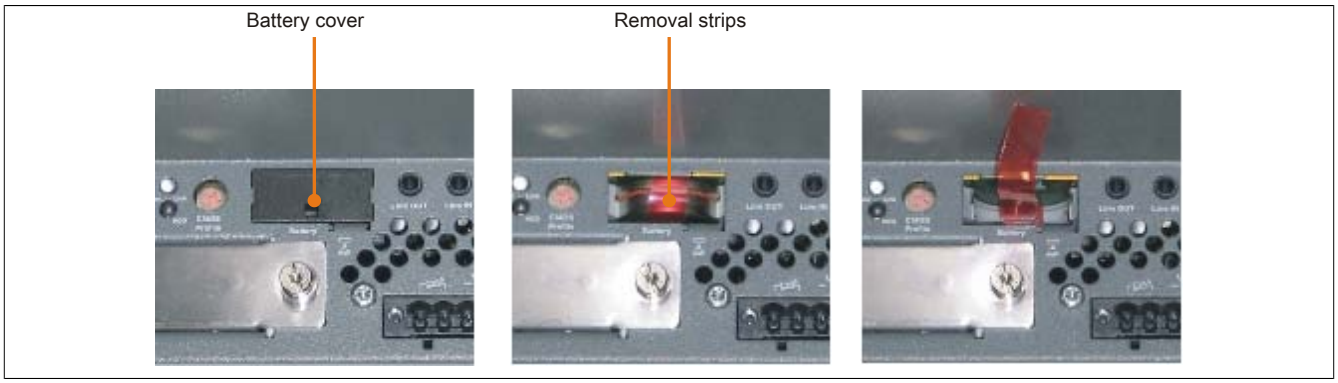


Figure 185: Remove battery

- The battery should not be held by its edges. Insulated tweezers may also be used to insert the battery.

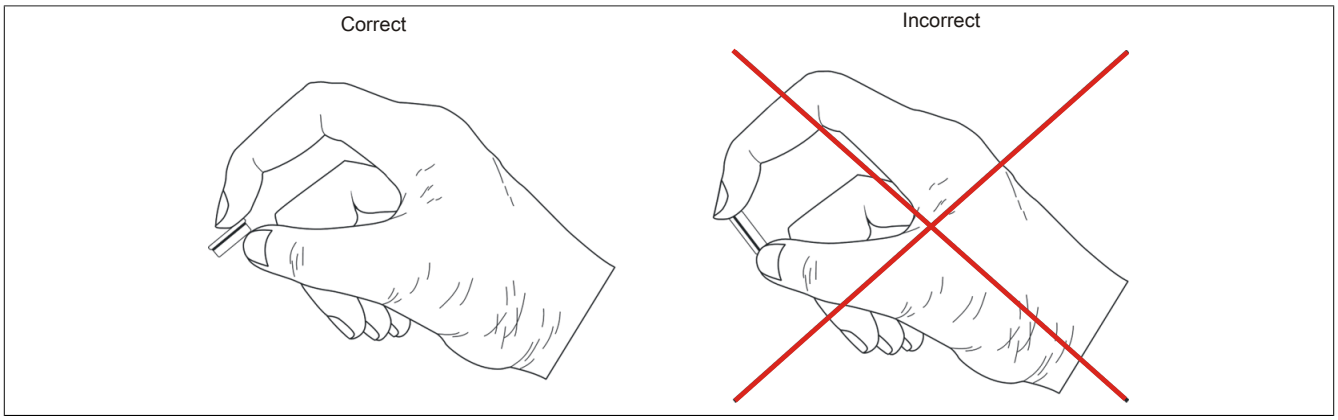


Figure 186: Battery handling

- Insert the new battery with the correct polarity.

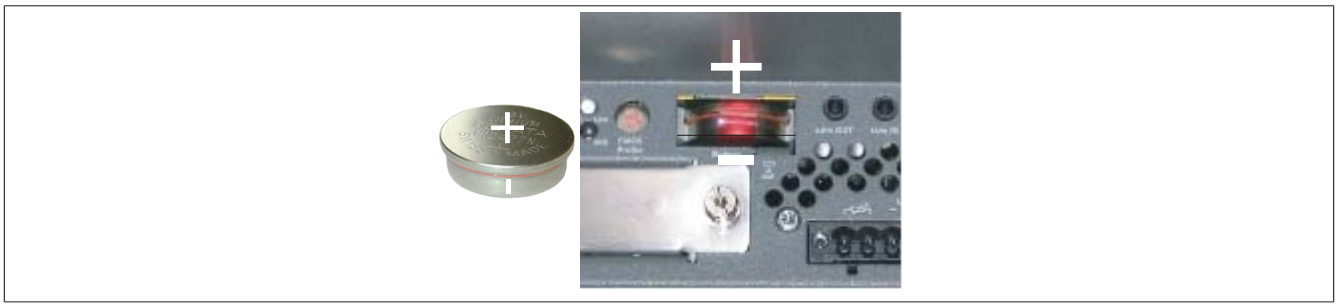


Figure 187: Battery polarity

- To make the next battery change easier, be sure the removal strip is in place when inserting the battery.
- Reconnect the power supply to the B&R Industrial PC (plug in the power cable).
- Reset the date and time in BIOS.

Warning!

Lithium batteries are considered hazardous waste. Used batteries should be disposed of in accordance with applicable local regulations.

2 Cleaning

Danger!

This device can only be cleaned when switched off in order to prevent unintended functions from being triggered when handling the touch screen or pressing keys.

This device should be cleaned with a moist cloth. The cloth should be moistened with water and detergent, a screen cleaning agent or alcohol (ethanol). The cleaning agent should be applied to the cloth beforehand, not sprayed directly on the device! Aggressive solvents, chemicals, scouring agents, pressurized air or steam jets should never be used.

Information:

Displays with a touch screen should be cleaned regularly.

3 Switching the CompactFlash

Caution!

Power must be turned off before replacing CompactFlash cards.

The CompactFlash card can be replaced quickly and easily by pressing the ejector (see image) with a pointed object such as a pen.

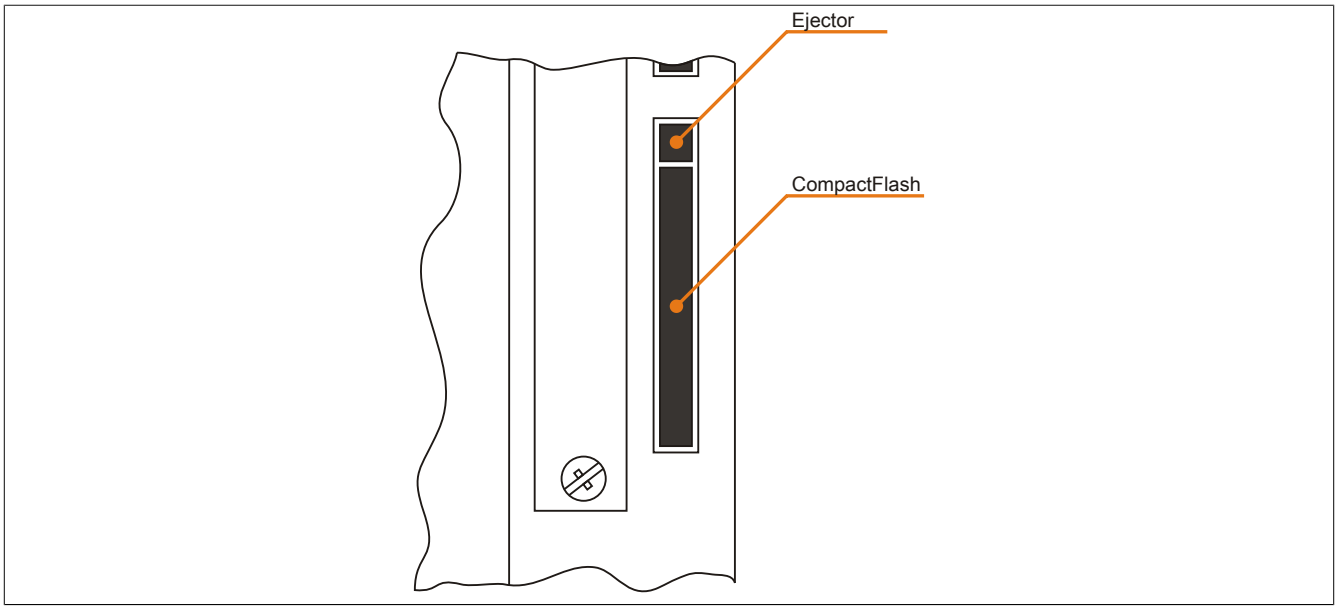


Figure 188: CompactFlash + ejector (sample photo)

4 Installing / exchanging a slide-in compact drive

Information:

The SATA I interface allows data carriers to be exchanged during operation (hot-plug). To utilize this capability, it must be supported by the operating system.

4.1 Procedure

1. Loosen and remove the two ¼ turn screws on the protective cover / slide-in compact drive.

Figure 189: Loosening the ¼ turn screws

2. Insert the compact SATA drive and tighten the ¼ turn screws.

Figure 190: Inserting the compact SATA drive

5 Installing / exchanging a slide-in slot drive

Slide-in drives can be installed and exchanged in system units with 1 or 2 card slot expansion.

5.1 Procedure

1. Disconnect the power supply to the B&R Industrial PC.
2. Touch the housing or ground connection in order to discharge any electrostatic charge from your body.
3. Remove the dummy slide-in module or slide-in drive by unscrewing the two ¼ turn screws.

Figure 191: Loosening the ¼ turn screws

4. Insert the slide-in drive and tighten with the two ¼ turn screws.

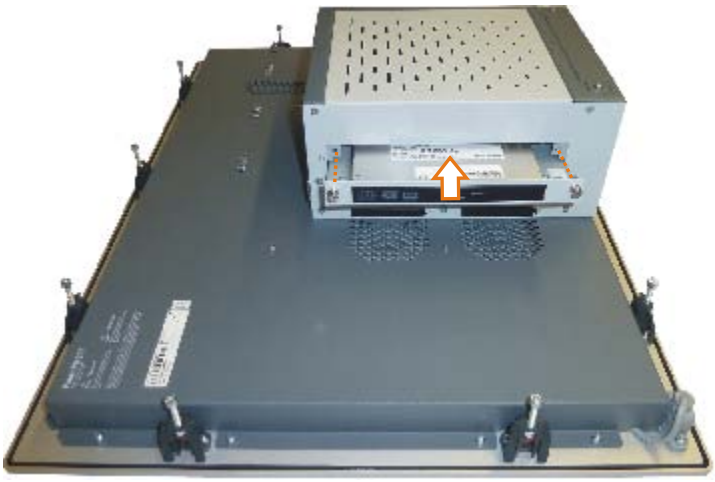


Figure 192: Installing the slide-in drive

6 Installing the slide-in compact adapter

Slide-in compact adapters can be installed and exchanged in system units with 1 or 2 card slot expansion. A slide-in compact drive (e.g. slide-in compact HDD) can be installed in a slide-in slot using the slide-in compact adapter.

6.1 Procedure

1. Disconnect the power supply to the B&R Industrial PC.
2. Touch the housing or ground connection in order to discharge any electrostatic charge from your body.
3. Remove the dummy slide-in module or slide-in drive by unscrewing the two ¼ turn screws.

Figure 193: Loosening the ¼ turn screws

4. Insert the slide-in compact adapter and tighten the two ¼ turn screws.

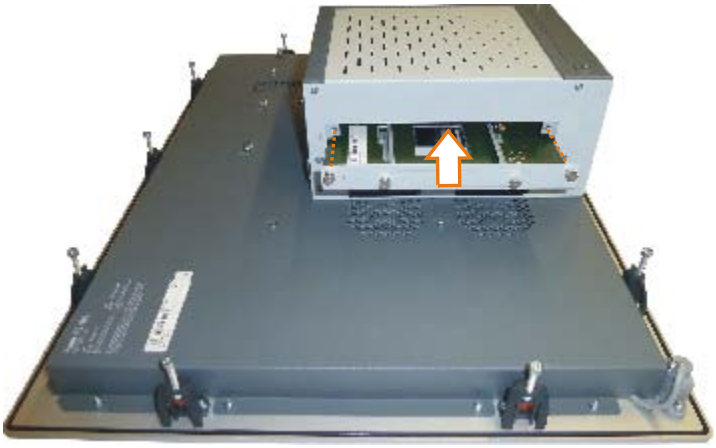


Figure 194: Installing the slide-in compact adapter

5. Once the adapter has been installed, the slide-in compact drive can be inserted.

Figure 195: Inserting the slide-in compact drive

7 Installing / exchanging the fan kit

Information:

The following section illustrates a characteristic example of a PPC800 model without expansion. The only difference in this procedure compared to models with expansion is the number of combi-torx screws to loosen.

7.1 Procedure

1. Loosen the indicated combi-torx screws (T10) and remove fan kit cover.

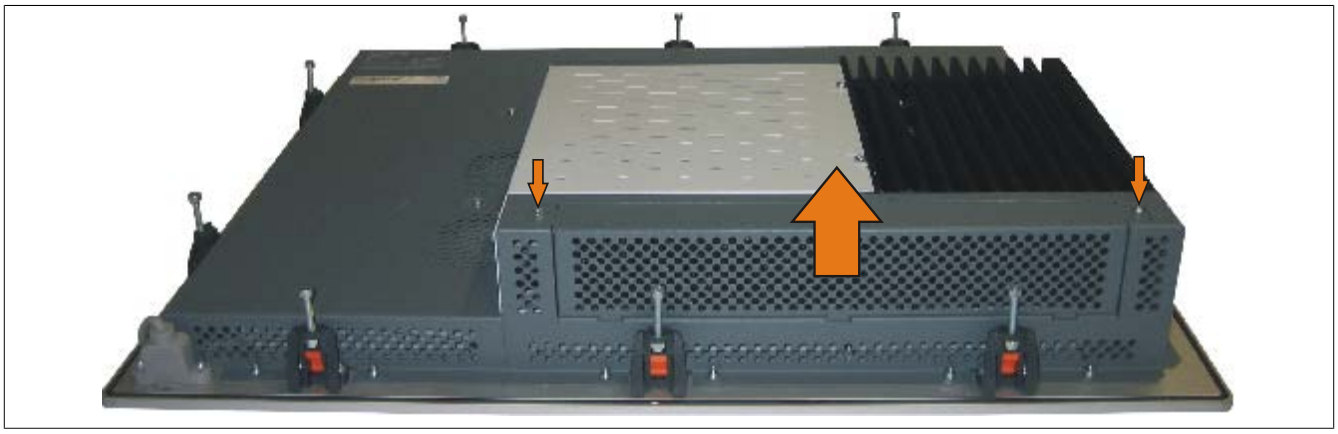


Figure 196: Remove the fan kit cover

2. Insert fan kit frame and press down until it is fully fastened into the terminal.

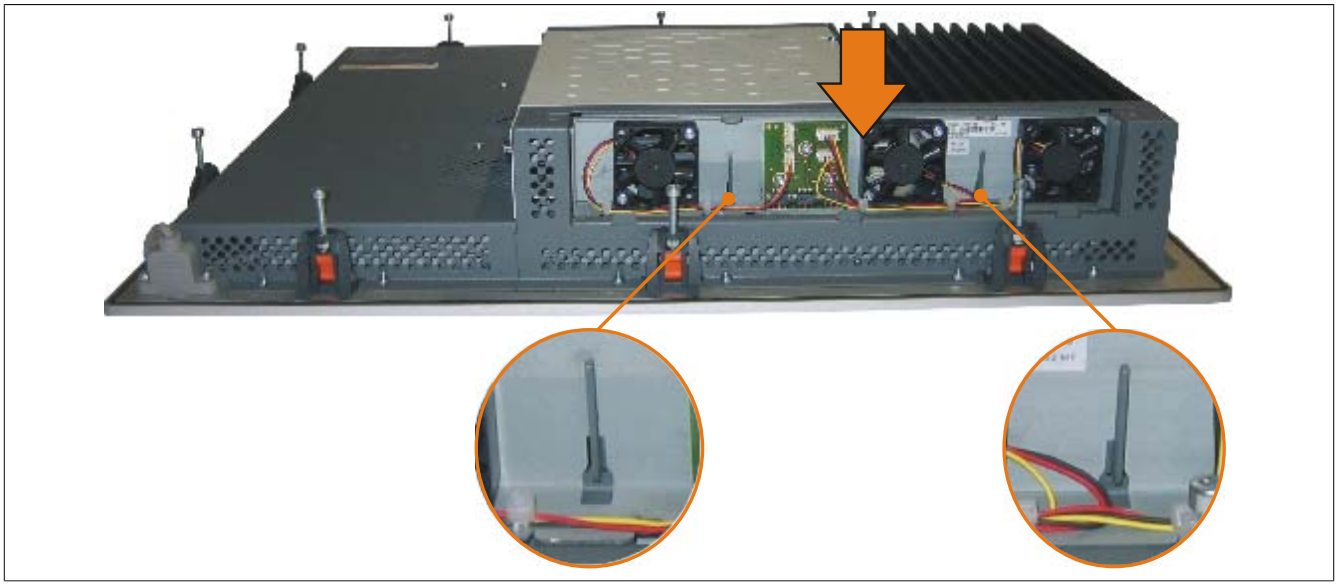


Figure 197: Insert the fan kit

3. Place the dust filter in the fan kit cover and secure with the filter clasp.

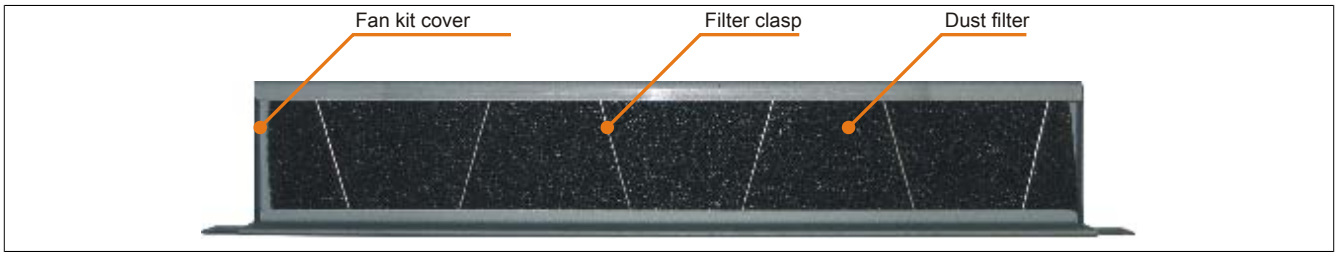


Figure 198: Secure the dust filter and filter clasp

4. Place the fan kit cover in the housing and fasten using the Torx screws removed earlier.

Information:

Regular control of the dust filter depending on area of use and degree of dirtiness.

8 Installing the UPS module

The module is installed using the materials included in the delivery.

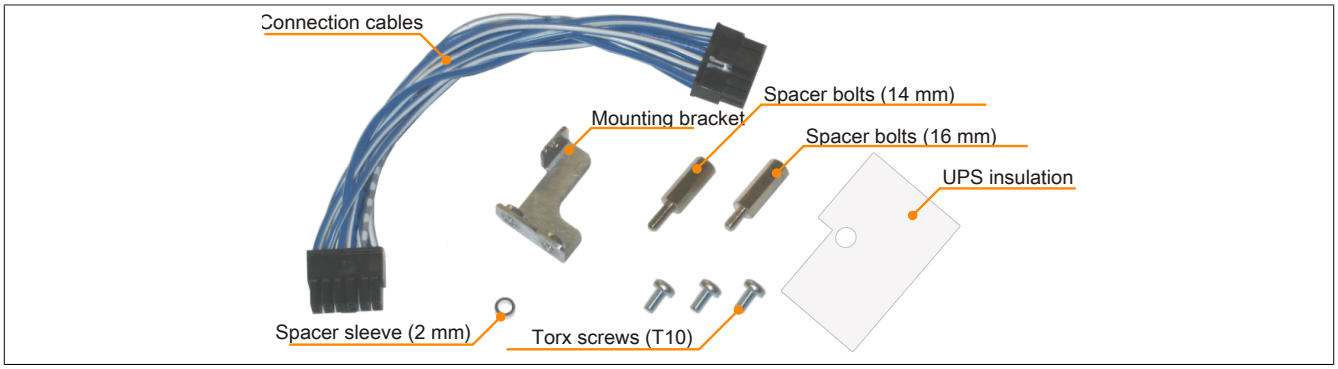


Figure 199: 5AC600.UPSI-00 Add-on UPS module – Installation materials

8.1 Installation guidelines

1. Remove the side cover (see "Mounting the side cover" on page 343).
2. Remove UPS module cover by removing the 2 marked Torx screws (T10).

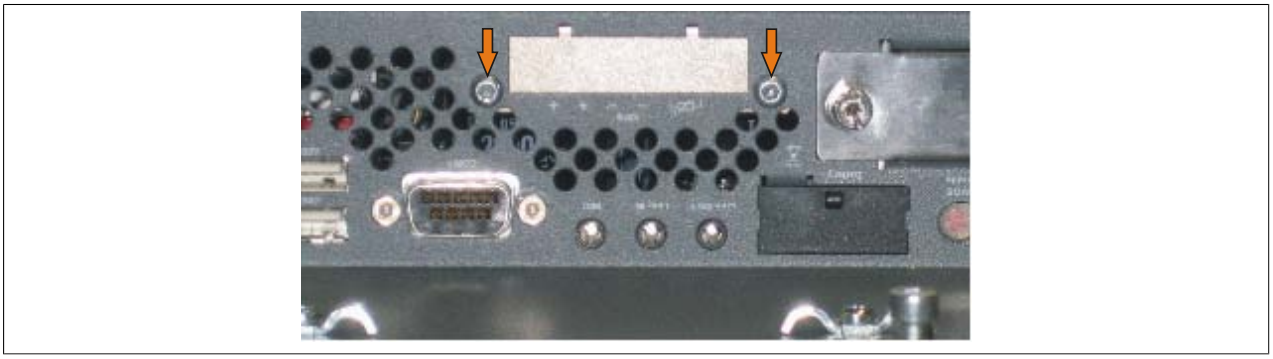


Figure 200: Removing the UPS module cover

3. Install the UPS module using 2 Torx screws (T10) on the housing and 1 Torx screw (T10) on the main board (spacing bolt). Use the previously removed Torx screws and/or the Torx screws from the mounting materials.

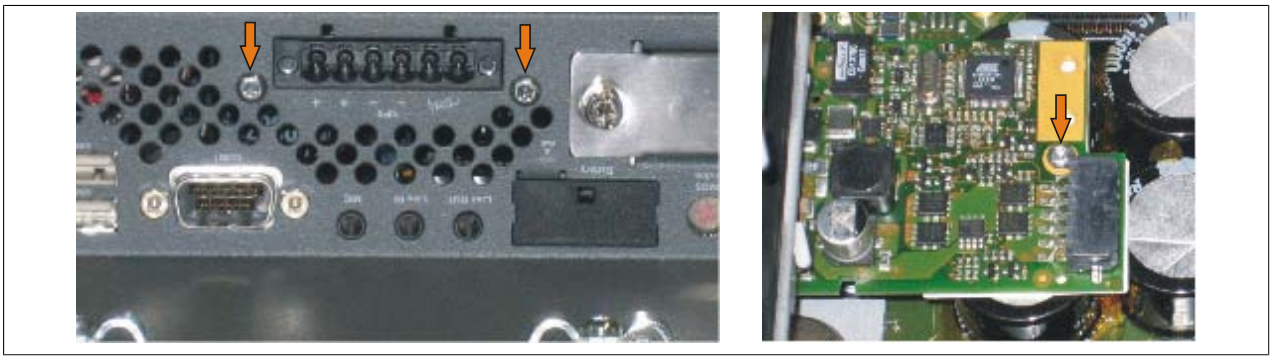


Figure 201: Installing the UPS module

4. Plug in the connection cable (see marked socket).

Figure 202: Plugging in the connection cable

Information:

When connecting the cable, make sure that the connector locks into place.

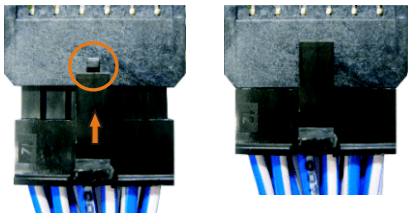


Figure 203: Connector locking mechanism

5. Attach the side cover.

9 Installing the UPS fuse kit on the battery unit

Information:

The 5AC600.UPSF-00 UPS fuse kit is only needed for battery units up to and including revision D0. A 25 A fuse is integrated on the connector circuit board beginning with revision E0.

9.1 Procedure

1. Power to the 5AC600.UPSB-00 battery unit must be disconnected by unplugging the UPS connection cable from the B&R Industrial PC.
2. Remove the cover on the battery unit. This is done by unscrewing the two Torx screws (T10) so that the cover can be removed by sliding it towards the orange connector.

Figure 204: Removing the cover for the battery unit

3. To install the fuse, the red cable must be disconnected from the battery circuit board.

Figure 205: Disconnecting the cable

4. The male fuse kit connector must be connected to the female connector on the red cable (1). The female fuse kit connector must be connected to the male connector on the battery circuit board (2).

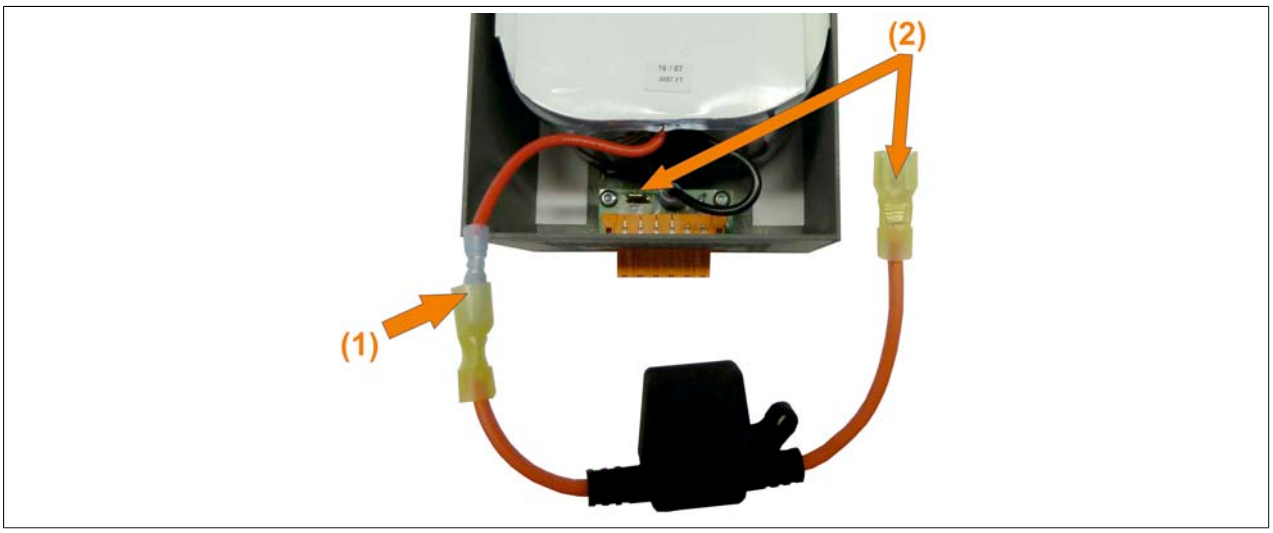


Figure 206: Connecting the fuse

5. The fuse can then be secured in the battery unit.

Figure 207: Securing the fuse

6. The cover for the battery unit can now be reattached. Insert the clips on the cover into the notch on the battery unit and tighten down the cover with the Torx screws removed previously.
7. Reconnect the 5AC600.UPSB-00 battery unit to the B&R Industrial PC.

10 Installing / exchanging the bus unit

Bus units can be installed and exchanged in system units with 1 or 2 card slot expansion.

10.1 Procedure

1. Disconnect the power supply to the Panel PC 800.
2. Touch the housing or ground connection in order to discharge any electrostatic charge from your body.
3. Remove the side cover (see "Mounting the side cover" on page 343).
4. Loosen the Torx screws (T10) mounted to the main board.

Figure 208: Removing the screws

5. Plug the bus unit into the bus unit slot and fasten using three Torx screws (T10).

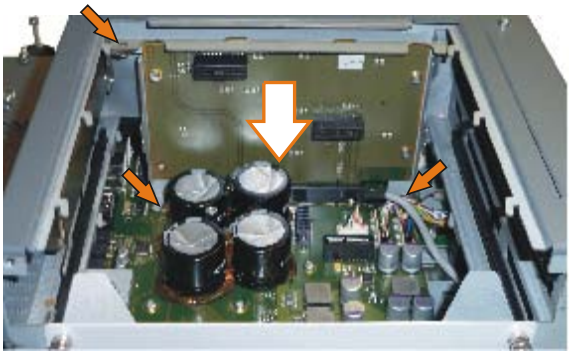


Figure 209: Install bus unit

6. Attach the side cover.

11 Installing / exchanging an adapter

1. Remove the side cover (see "Mounting the side cover" on page 343).
2. Remove 1 card slot or 2 card slot expansion if present.

11.1 Procedure for the adapter 5AC803.BC01-00

1. Loosen the Torx screws (T10) mounted to the main board.

Figure 210: Removing the screws

2. Place adapter and guide rails in the intended positions and fasten using the Torx screws (T10) removed earlier.

Figure 211: Installing the 5AC803.BC01-00 adapter

3. Attach the side cover.

11.2 Procedure for the adapter 5AC803.BC02-00

1. Plug adapter into the intended slot.

Figure 212: Installing the 5AC803.BC02-00 adapter

2. Attach the side cover.

12 Installing / exchanging PCIec plug-in card

12.1 Procedure

1. Loosen the ¼ turn screws and remove PCIec module cover.

Figure 213: Removing the PCIec module cover

2. Slide PCIec plug-in card into place.

Figure 214: Insert PCIec plug-in card

3. Fasten PCIec plug-in card using the ¼ turn screws.

13 Mounting the side cover

The side cover can be easily removed by loosening the Torx (T10) screws. The number of Torx screws can vary depending on the system.

13.1 PPC800 without expansion

1. Disconnect the power supply to the Panel PC 800.
2. Touch the housing or ground connection in order to discharge any electrostatic charge from your body.
3. Loosen the indicated Combi-Torx screws (T10).
4. After loosening the screws, the side cover can be removed (by sliding off of heat sink).

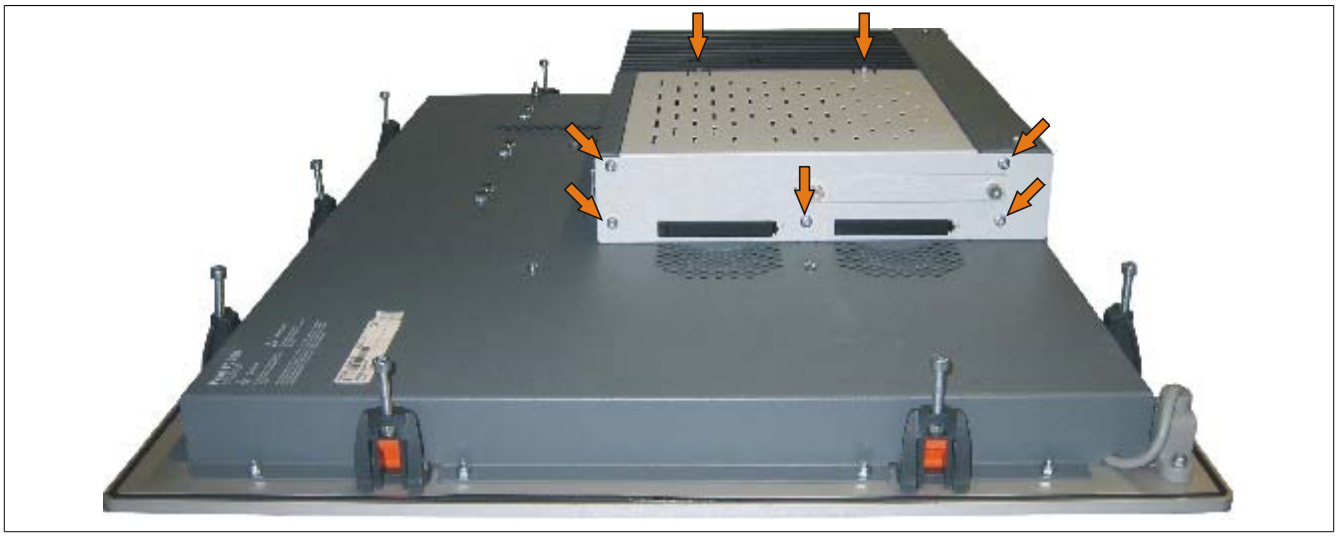


Figure 215: Mounting the side cover on a PPC800 without expansion

13.2 PPC800 with expansion

1. Disconnect the power supply to the Panel PC 800.
2. Touch the housing or ground connection in order to discharge any electrostatic charge from your body.
3. Loosen the indicated Combi-Torx screws (T10).
4. After loosening the screws, the side cover can be removed (by sliding off of heat sink).

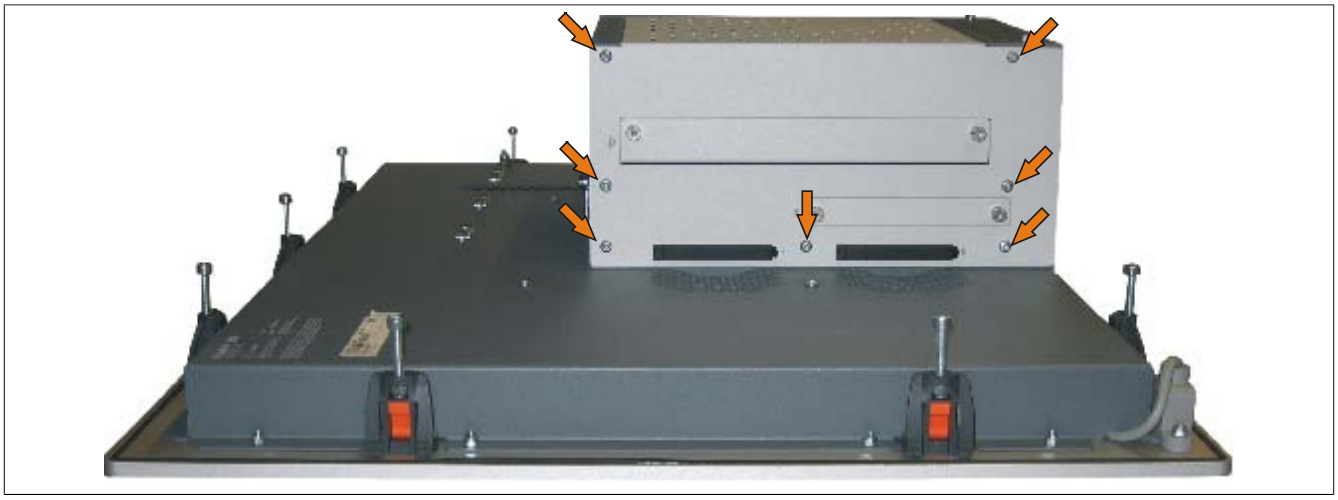


Figure 216: Mounting the side cover on a PPC800 with expansion (1 slot expansion shown in image)

14 Exchanging a PCI SATA RAID hard disk in a RAID 1 system

In the example, the assumption is made that the secondary hard disk (HDD1) is defective in a RAID 1 configuration. In such a case, the defective hard disk can be replaced by the replacement drive SATA hard disk.

Model number - PCI SATA RAID controller	Model number of required replacement SATA HDD	Note
5ACPCI.RAIC-01	5ACPCI.RAIC-02	60 GB hard disk
5ACPCI.RAIC-03	5ACPCI.RAIC-04	160 GB hard disk
5ACPCI.RAIC-05	5MMHDD.0250-00	250 GB hard disk
5ACPCI.RAIC-06	5MMHDD.0500-00	500 GB hard disk

Table 259: Overview of required replacement SATA HDD for PCI SATA HDD RAID controller

A size 10 Torx screwdriver is needed for exchanging the hard disk.

14.1 Procedure

1. Disconnect the power supply.
2. Touch the housing or ground connection in order to discharge any electrostatic charge from your body.
3. Remove the side cover.
4. Remove the SATA RAID insert.
5. Loosen the 4 appropriate mounting screws (M3x5).

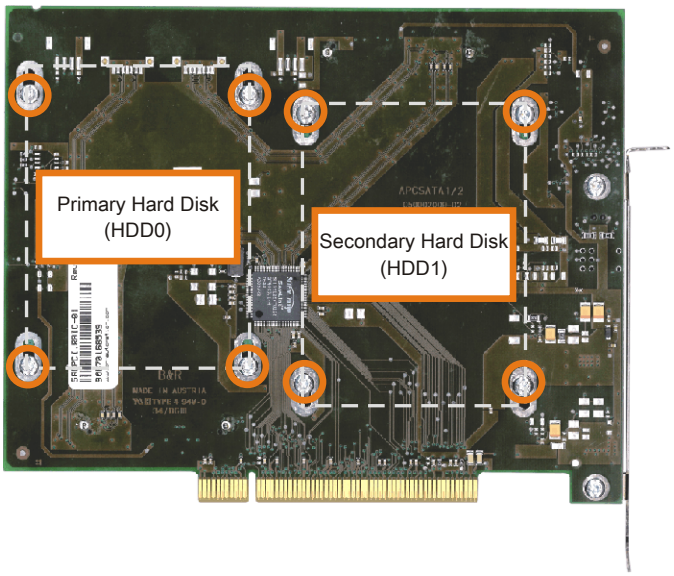


Figure 217: Screw layout on the back side of the SATA RAID controller 5ACPCI.RAIC-03

6. On the front side, slide the hard disk down and away (Figure 218: Hard disk exchange - left image).
7. Insert the new hard disk carefully into the connector (Figure 218: Hard disk exchange - right image), being careful to only touch it on the front, and not on the top.

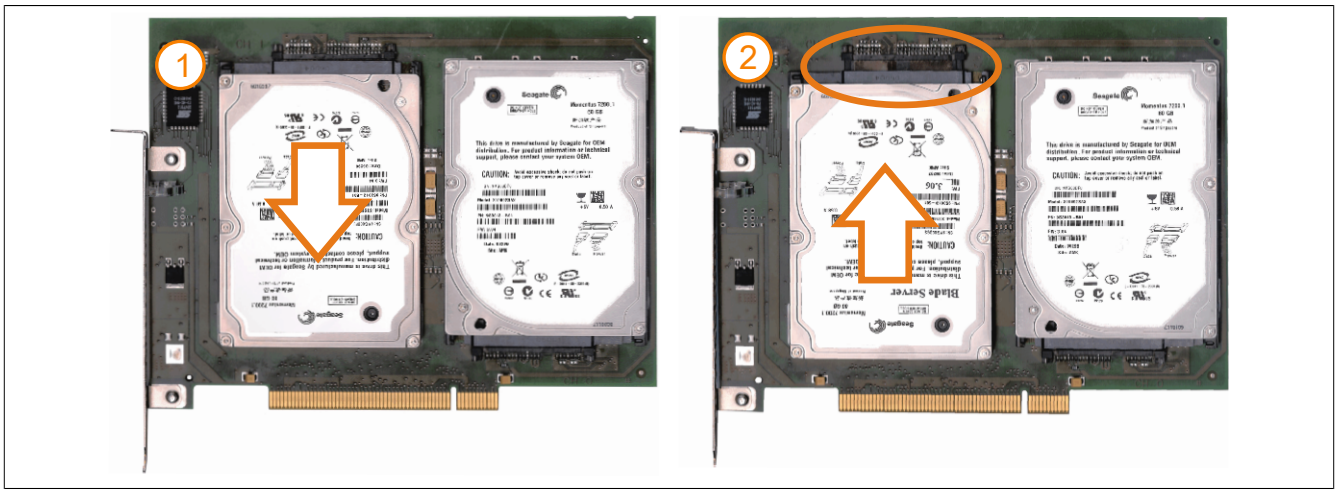


Figure 218: Hard disk exchange

8. Re-secure the hard disk using the 4 fastening screws (M3x5) used earlier.
9. Reassemble device in the reverse order.
10. An error message is output by the RAID BIOS after starting the system "RAID1 set is in Rebuild status. The rebuild will continue after boot sequence is complete".
11. A rebuild can be performed immediately in SATA RAID BIOS, or the rebuild is performed after the PC is booted - see "Rebuild mirrored set" on page 165.

Appendix A

1 Maintenance Controller Extended (MTCX)

The MTCX controller (FPGA processor) is located on the main board (part of every system unit).

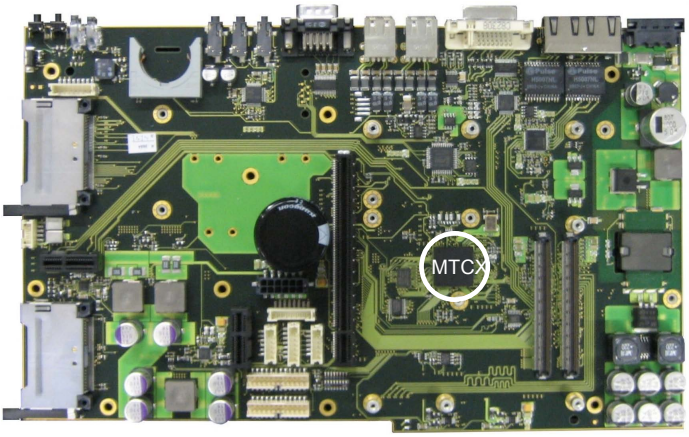


Figure 219: MTCX controller location

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

- Power on (power OK sequencing) and power fail logic
- Watchdog handling (NMI and reset handling)
- Temperature monitoring
- Fan control
- Key handling / coordination (matrix keyboard on Automation Panel 900 devices configurable using B&R Key Editor, PS/2 keyboard)
- LED handling (matrix keyboard with LEDs on Automation Panel 900 devices configurable using B&R Key Editor)
- Advanced desktop operation (USB forwarding)
- Daisy chain display operation (touch screen, USB forwarding)
- Panel locking mechanism (can be configured using B&R Control Center - ADI driver)
- Backlight control for a connected B&R display
- Statistical data recording (power cycles - each power on, power on and fan hours are recorded - every full hour is counted e.g. 50 minutes no increase)
- SDL data transfer (display, matrix keyboard, touch screen, service data, USB)
- Status LEDs (HDD, Link, Run)

Extended MTCX functions are available by upgrading firmware [1)]. The version can be read in BIOS (menu item "advanced" - baseboard/panel features) or in approved Microsoft Windows operating systems, using B&R Control Center.

1.1 Temperature monitoring - Fan control

The MTCX constantly monitors the temperature using temperature sensors, which directly determine how the fan is controlled. The RPM depends on the temperature measured. The limit values depend on the MTCX firmware version being used.

[1)] Available in the Downloads section of the B&R website (www.br-automation.com).

Sensor range	Start-up temperature	Max fan speed at:
Board I/O	60°C	76°C
Board ETH2	60°C	76°C
Board Power	60°C	76°C
Power Supply	60°C	76°C
Slide-in drive 1	44°C	60°C
IF Slot	65°C	81°C

Table 260: Temperature limits of the fan (MTCX PX32 V1.01).

Once the start-up temperature is reached, the device is started at the minimum fan speed. The maximum fan speed is reached at a start-up temperature of 16°C. The fan speed in this area is controlled depending on the temperature.

For example, slide-in 1: 44°C + 16°C = 60°C --> maximum fan speed

The fans are first switched off again if the evaluated temperature remains 6°C lower than the start-up temperature for a time span of 30 minutes (=lag-time).

2 Connecting an external device to the mainboard

A plug on the main board enables branching of +5 VDC and +12 VDC for the internal supply of e.g. special PCI cards.

This voltage can be accessed using the "5CAMSC.0001-00" on page 324. The connector is located near the reset or power button (see image). In order to reach the connector, the side cover (see "Mounting the side cover" on page 343) of the PPC800 as well as any slide-in drives and PCIec and PCI insert cards must be removed.

Figure 220: Connector location for external devices

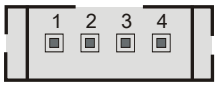
Connector for the external devices			
Pin	Assignment	Power	4-pin connector, male
1	+12 VDC	Max. 10 watts	
2	GND		
3	GND	Max. 5 watts	
4	+5 VDC		

Table 261: Pinout - Connector on main board

Connections are protected with a 1A multi-fuse.

3 Touch Screen AMT 5-wire

3.1 Technical data

Information:

The following characteristics, features and limit values only apply to this individual component and can deviate from those specified for the fully assembled device. For the assembled device in which this individual component is used, refer to the data given specifically for that device.

Product ID	Touch Screen AMT 5-wire
General information	
Certification CE c-UL-us	 Yes Yes
Manufacturer	AMT
Release pressure	≤ 1 N
Light permeability	81 ±3%
Environmental conditions	
Temperature Operation Storage Transport	 - 20 to 70°C - 40 to 80°C - 40 to 80°C
Relative humidity Operation Storage Transport	 90% at max. 50°C 90% RH at max. 60°C for 504 hours 90% RH at max. 60°C for 504 hours
Operating conditions	
Service life	36 million touch operations at the same position (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 for approved operating systems are available in the Downloads section of the B&R website (www.br-automation.com).

Table 262: Technical data - Touch Screen AMT 5-wire

1) The active area of the touch screen is resistant to these chemicals for a period of one hour at 25°C.

3.2 Temperature humidity diagram

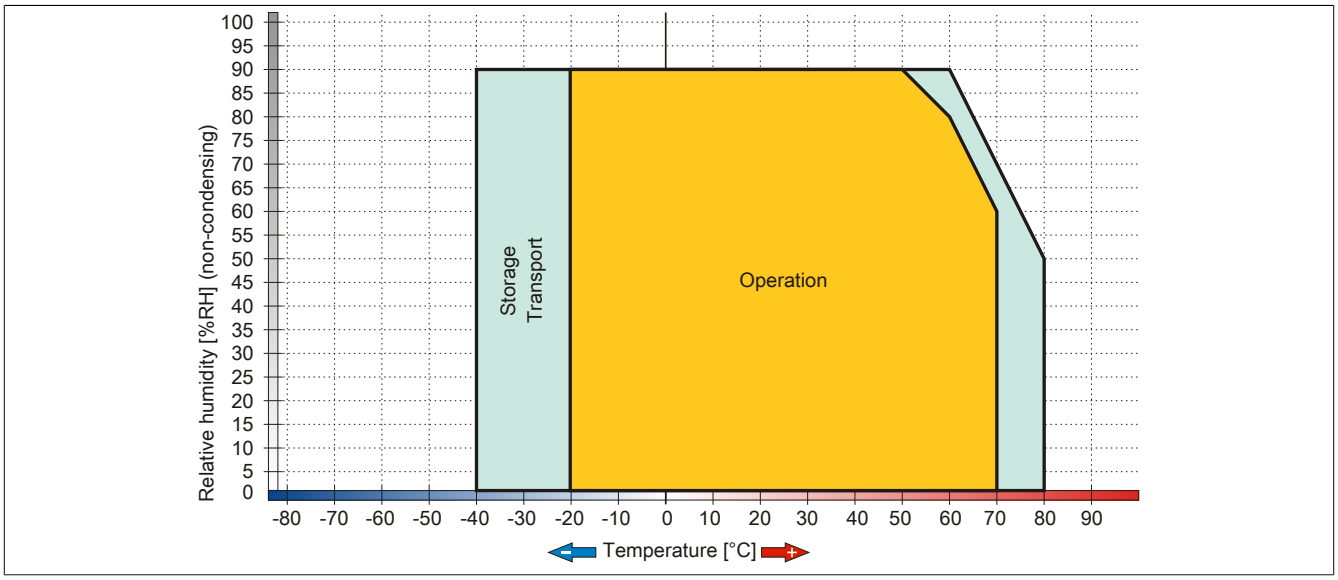


Figure 221: Temperature humidity diagram - AMT touch screen 5-wire

3.3 Cleaning

Danger!

This device can only be cleaned when switched off in order to prevent unintended functions from being triggered when handling the touch screen or pressing keys.

This device should be cleaned with a moist cloth. The cloth should be moistened with water and detergent, a screen cleaning agent or alcohol (ethanol). The cleaning agent should be applied to the cloth beforehand, not sprayed directly on the device! Aggressive solvents, chemicals, scouring agents, pressurized air or steam jets should never be used.

Information:

Displays with a touch screen should be cleaned regularly.

4 Panel membrane

The panel membrane conforms to DIN 42115 (Part 2). This means it is resistant to exposure to the following chemicals for a 24-hour period with no visible signs of damage:

Information:

The following characteristics, features and limit values only apply to this individual component and can deviate from those specified for the fully assembled device.

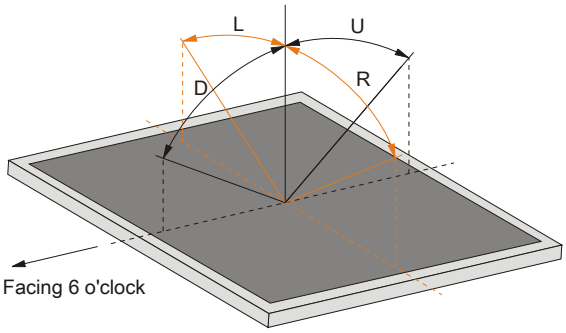
Ethanol Cyclohexanol Diacetone alcohol Glycol Isopropanol Glycerine Methanol Triacetin Dowandol DRM/PM	Formaldehyde 37 to 42% Acetaldehyde Aliphatic hydrocarbons Toluene Xylene White spirits	Trichloroethane Ethyl acetate Diethyl ether N-Butyl acetate Amyl acetate Butylcellosolve Ether
Acetone Methyl ethyl ketone Dioxan Cyclohexanone MIBK Isophorone	Formic acid < 50% Acetic acid < 50% Phosphoric acid < 30% Hydrochloric acid < 36% Nitric acid < 10% Trichloracetic acid < 50% Sulphuric acid < 10%	Sodium hypochlorite < 20% Hydrogen peroxide < 25% Potassium carbonate Washing agents Tenside Fabric conditioner Ferrous chloride ($FeCl_2$) Ferrous chloride ($FeCl_3$) Dibutyl phthalate Dioctyl phthalate Sodium carbonate
Ammonia < 40% Caustic soda < 40% Potassium hydroxide Alkali carbonate Bichromate Potassium Acetonitrile Sodium bisulphate	Cutting oil Diesel oil Linseed oil Paraffin oil Blown castor oil Silicon oil Turpentine oil substitute Brake fluid Aviation fuel Gasoline Water Sea water Decon	

Table 263: Chemical resistance of the panel membrane

The panel membrane conforms to DIN 42115 section 2 for exposure to glacial acetic acid for less than one hour without visible damage.

5 Viewing angles

Viewing angle specifications (R, L, U, D) for the display types are listed in the technical data for each device.



6 Mounting compatibility

This section describes the compatibility of the installation dimensions for Power Panel 100/200, Power Panel 300/400, Power Panel 500, Automation Panel 900, Automation Panel 700 and Panel PC 800 devices according to 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 264: Product abbreviations

6.1 Compatibility overview

The following table offers an overview of the PP100/200, PP300/400, PP500, AP900, PPC700 and PPC800 devices. Detailed information can be found in the section 6.2 "Compatibility details" on page 354.

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	●	●	▲	▲	▲	-
	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 265: Device compatibility overview

6.2 Compatibility details

6.2.1 Example

The measurement values (all in mm) shown in this image apply to the other figures below.

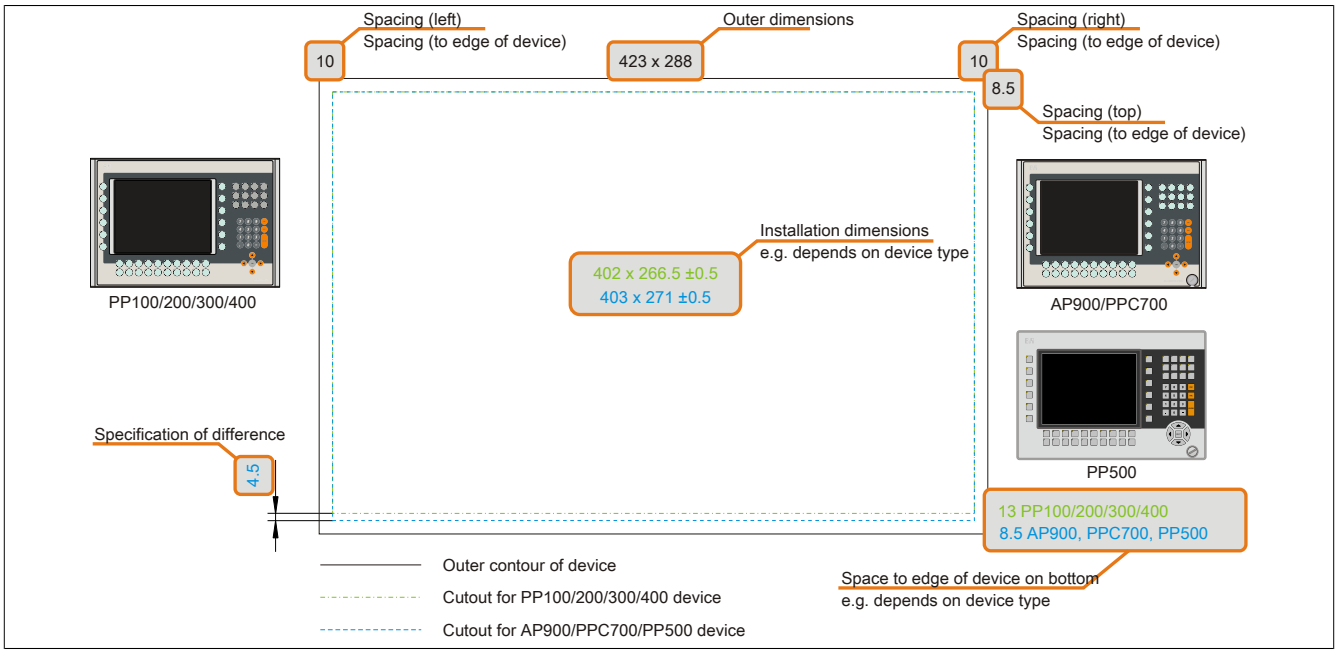


Figure 222: Overview of compatibility figures

6.2.2 5.7" devices

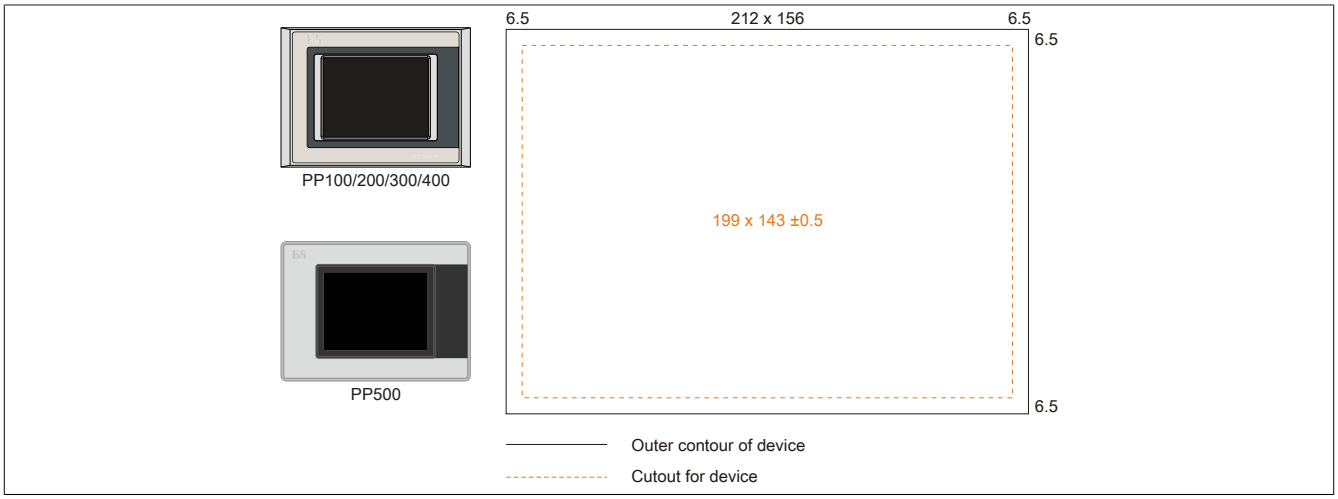


Figure 223: Mounting compatibility - 5.7" device - Horizontal1

5.7" Power Panel 500 devices and Power Panel 100/200/300/400 devices are 100% mounting compatible in the Horizontal1 format.

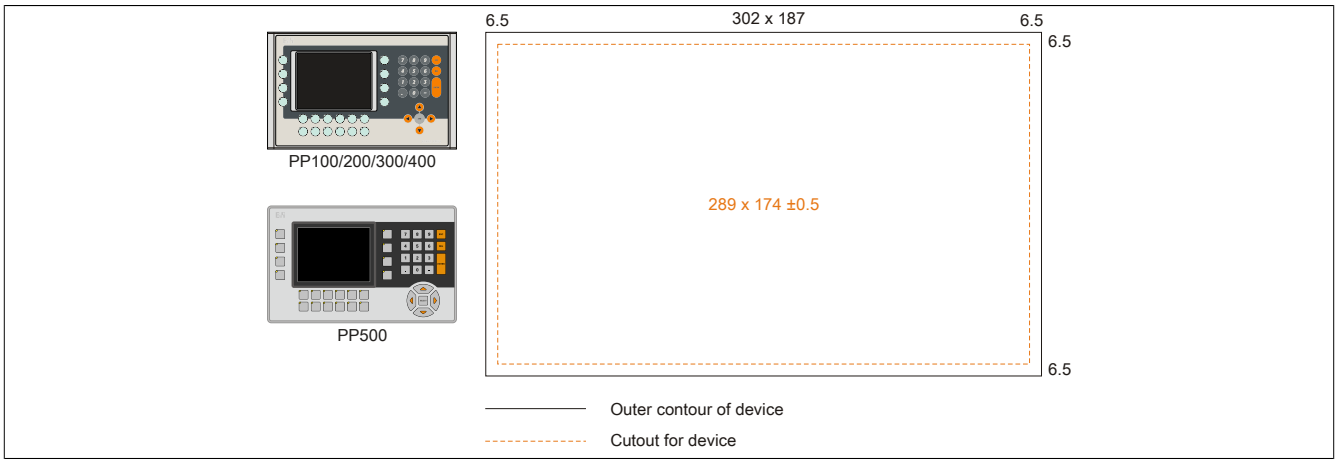


Figure 224: Mounting compatibility - 5.7" device - Horizontal2

5.7" Power Panel 500 devices and Power Panel 100/200300/400 devices are 100% mounting compatible in the Horizontal2 format.

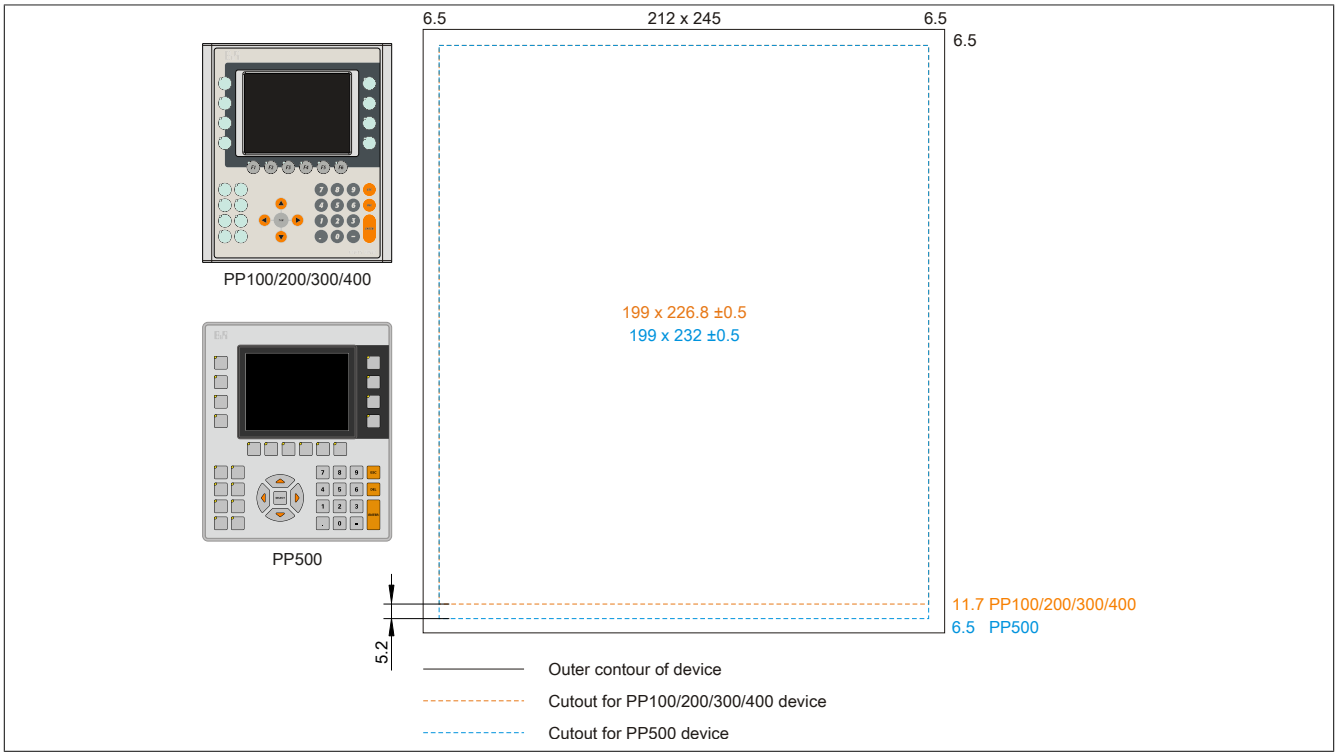


Figure 225: Mounting compatibility - 5.7" device - Vertical1

5.7" Power Panel 500 devices are not 100% mounting compatible with Power Panel 100/200/300/400 devices in the Vertical1 format. Power Panel 500 devices require a cutout that is 5.2 mm higher (bottom edge).

The larger cutout can be used for all devices under certain conditions:

- 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).

6.2.3 10.4" devices

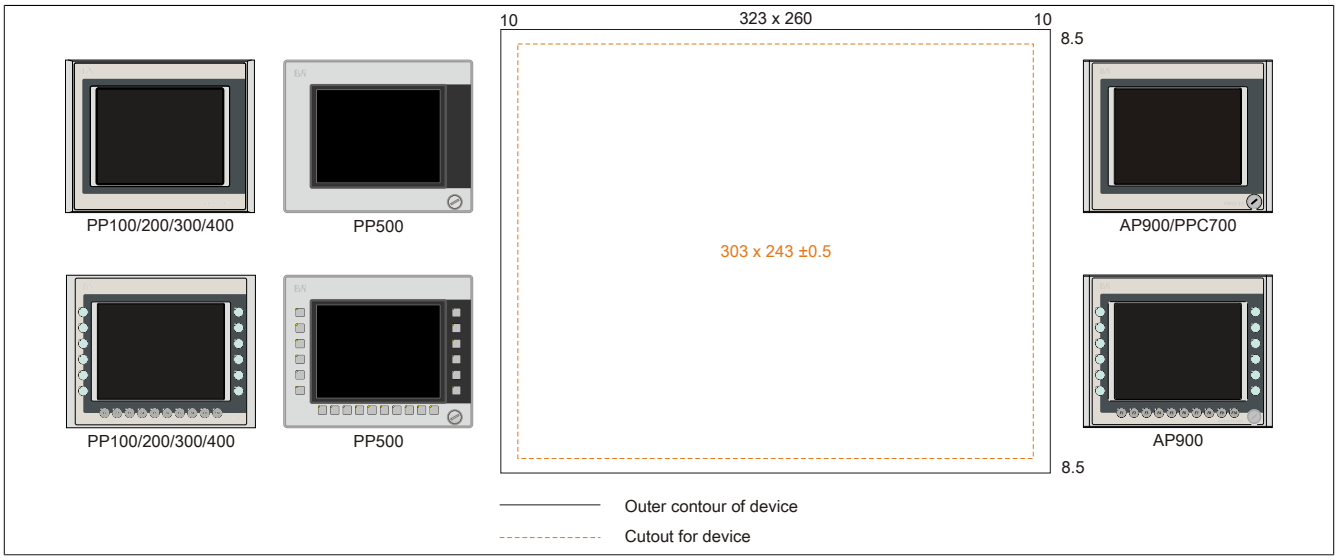


Figure 226: Mounting compatibility - 10.4" device - Horizontal1

10.4" Power Panel 500 devices and Power Panel 100/200/300/400 devices are 100% mounting compatible in the Horizontal1 format.

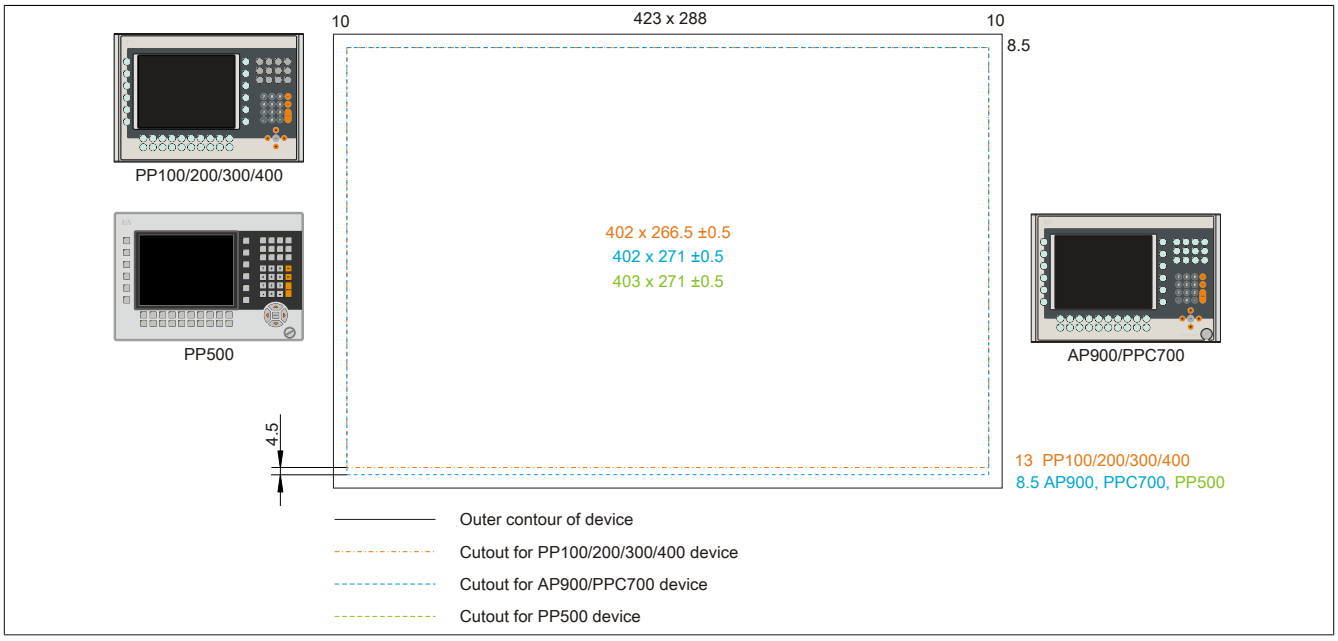


Figure 227: Mounting compatibility - 10.4" device - Horizontal2

10.4" Power Panel 500, Automation Panel 900 and Panel PC 700 devices are not 100% mounting compatible with Power Panel 100/200/300/400 devices in the Horizontal2 format. 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 be used for all devices under certain conditions:

- 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).

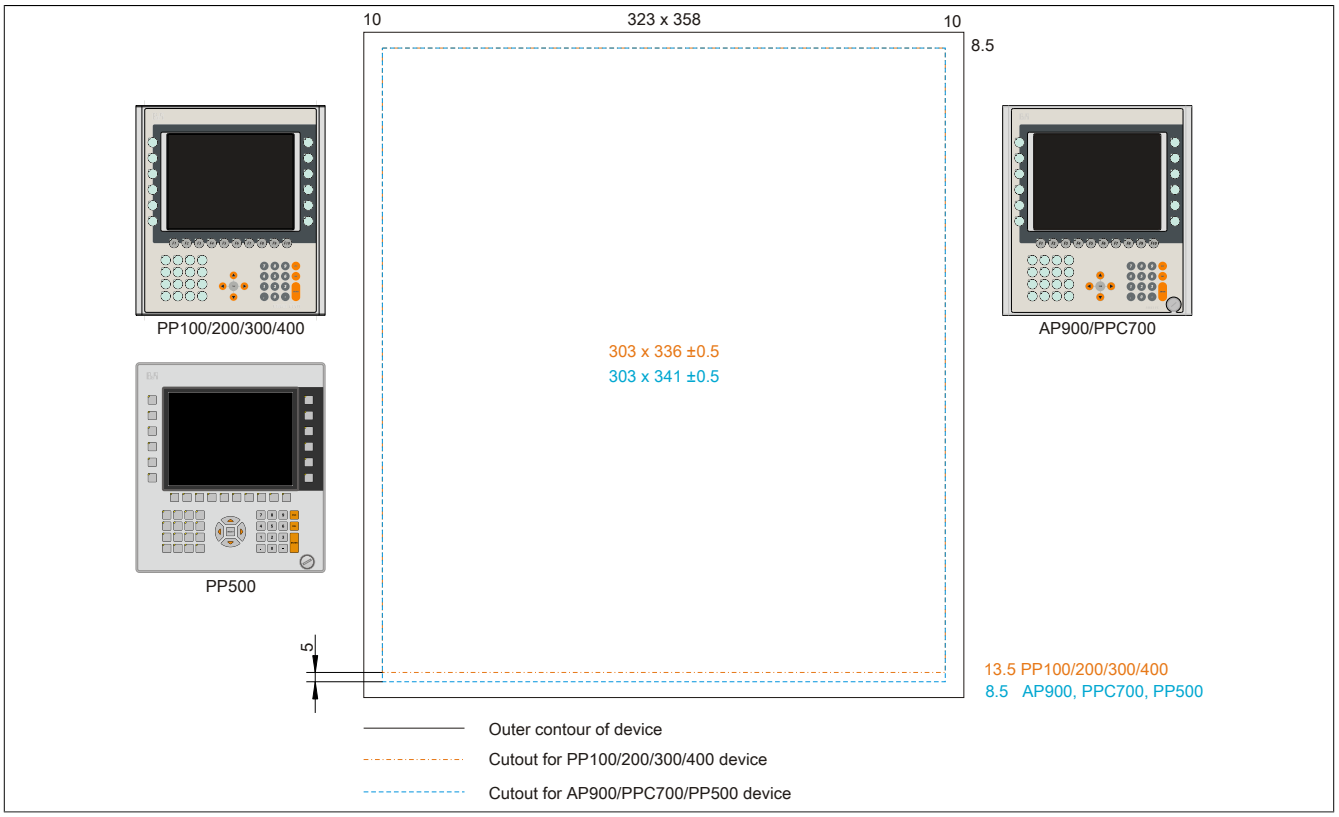


Figure 228: Mounting compatibility - 10.4" device - Vertical1

10.4" Power Panel 500, Automation Panel 900 and Panel PC 700 devices are not 100% mounting compatible with Power Panel 100/200/300/400 devices in Vertical1 format. 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 be used for all devices under certain conditions:

- 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).

6.2.4 12.1" devices

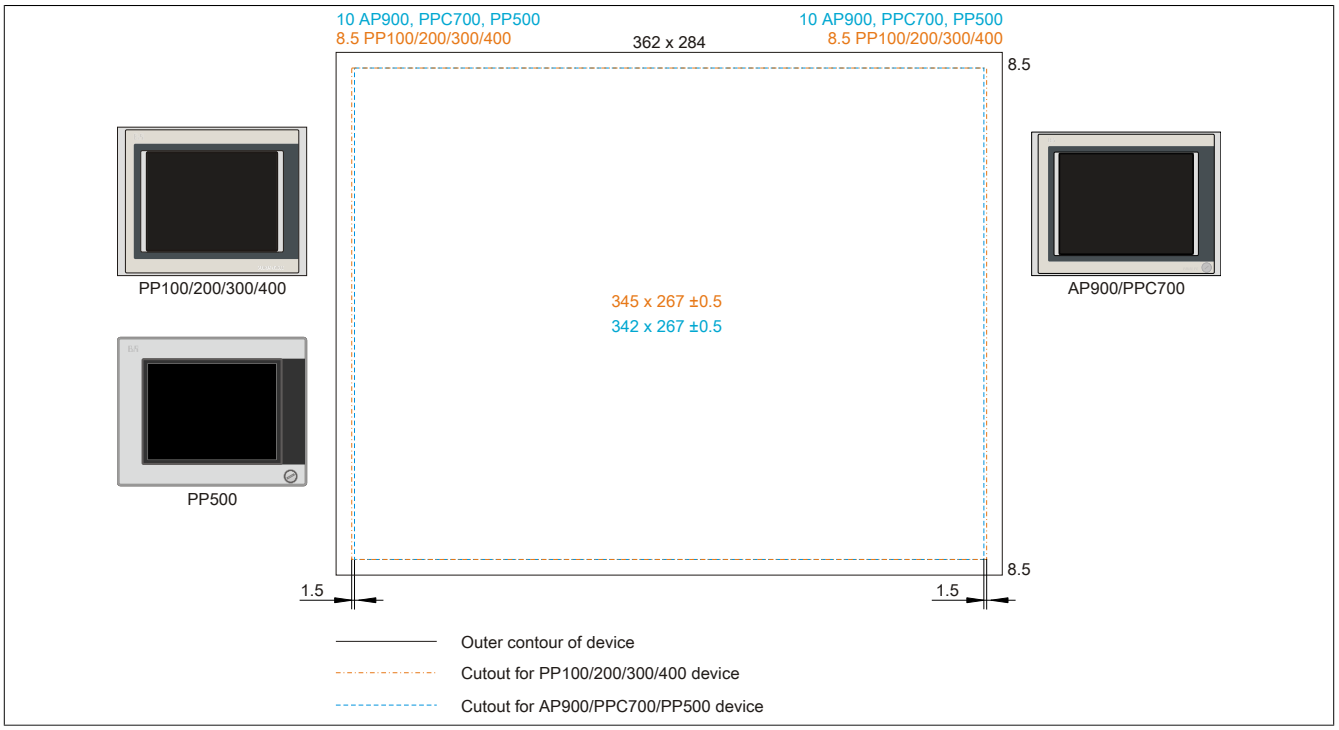


Figure 229: Mounting compatibility - 12.1" device - Horizontal1

12.1" Power Panel 500, Automation Panel 900 and Panel PC 700 devices are not 100% mounting compatible with Power Panel 100/200/300/400 devices in Horizontal1 format. 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 be used for all devices under certain conditions:

- When mounting, make sure that the PP500, AP900 and PPC700 devices are mounted as close to the center of the cutout as possible.

6.2.5 15" devices

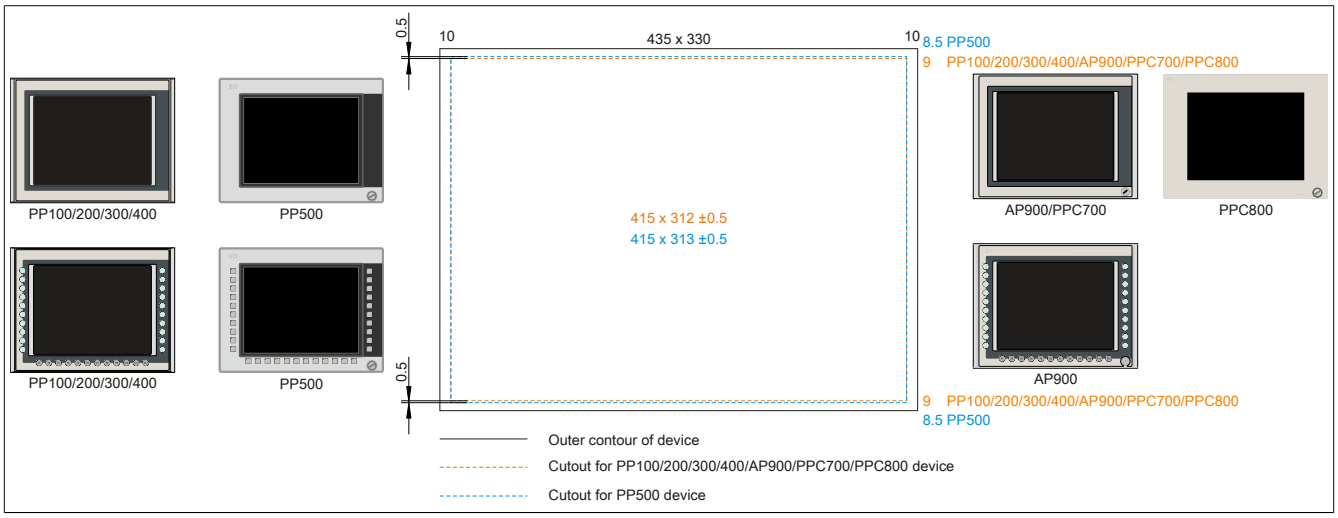


Figure 230: Mounting compatibility - 15" device - Horizontal1

15" Power Panel 500 devices are not 100% mounting compatible with Power Panel 100/200/300/400, Automation Panel 900, Panel PC 700 and Panel PC 800 devices in the Vertical1 format. The Power Panel 500 devices require a cutout that is 0.5 mm higher (top and bottom edge).

The larger cutout can be used for all devices under certain conditions:

- When mounting, make sure that the PP100/200, PP300/400, 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).

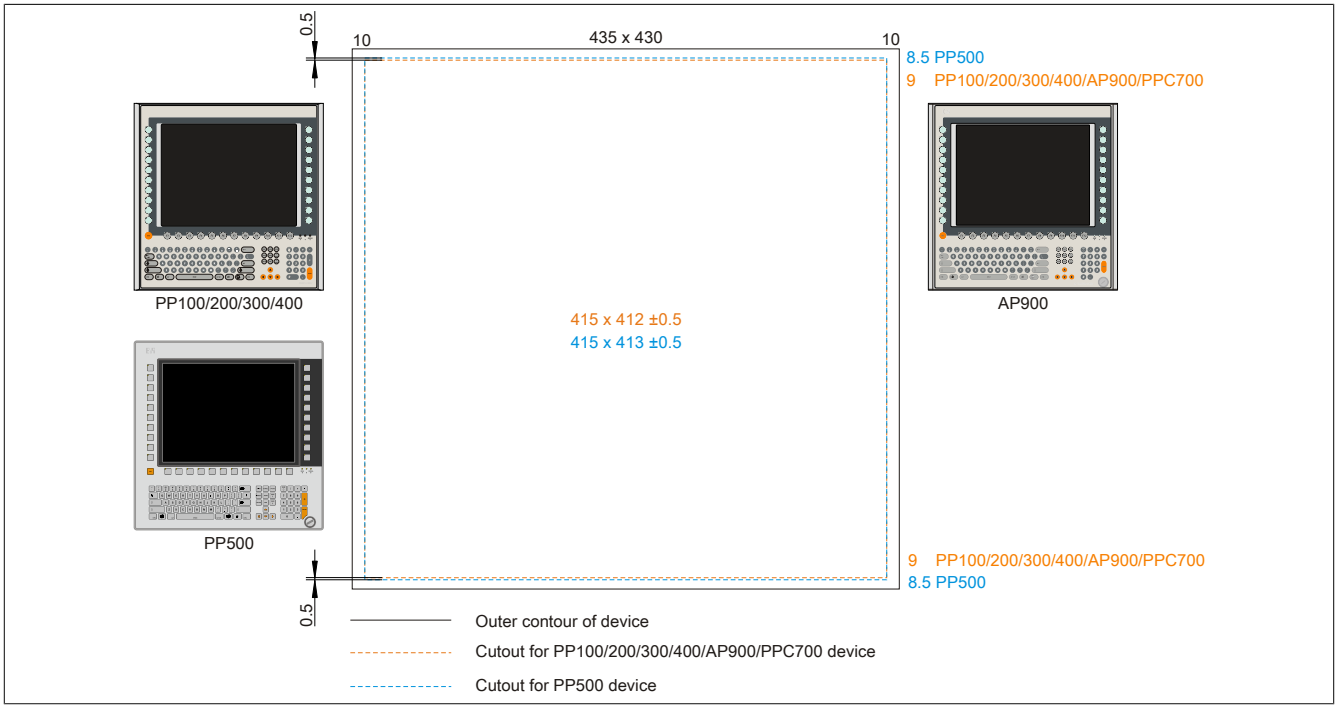


Figure 231: Mounting compatibility - 15" device - Vertical1

15" Power Panel 500 devices are not 100% mounting compatible with Power Panel 100/200/300/400, Automation Panel 900 and Panel PC 700 devices in the Vertical1 format. The Power Panel 500 devices require a cutout that is 0.5 mm higher (top and bottom edge).

The larger cutout can be used for all devices under certain conditions:

- When mounting, make sure that the PP100/200, PP300/400, AP900 and PPC700 devices are 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).

6.2.6 17" devices

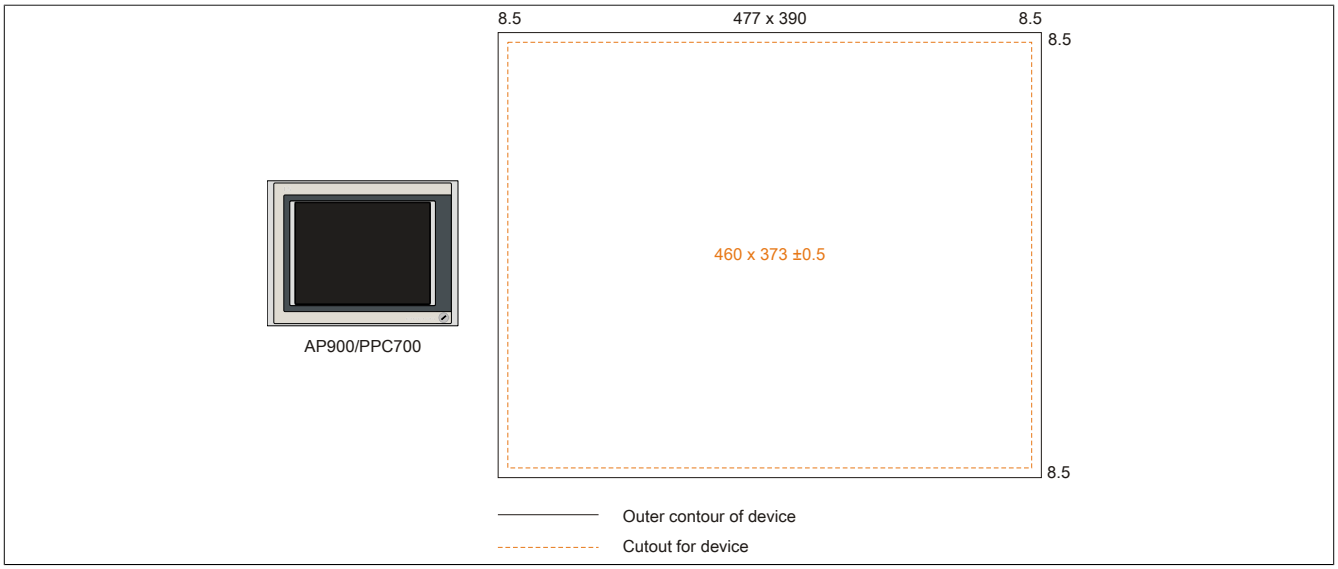


Figure 232: Mounting compatibility - 17" device - Horizontal1

17" Automation Panel 900 devices are 100% mounting compatible with Panel PC 700 devices in the Horizontal1 format.

6.2.7 19" devices

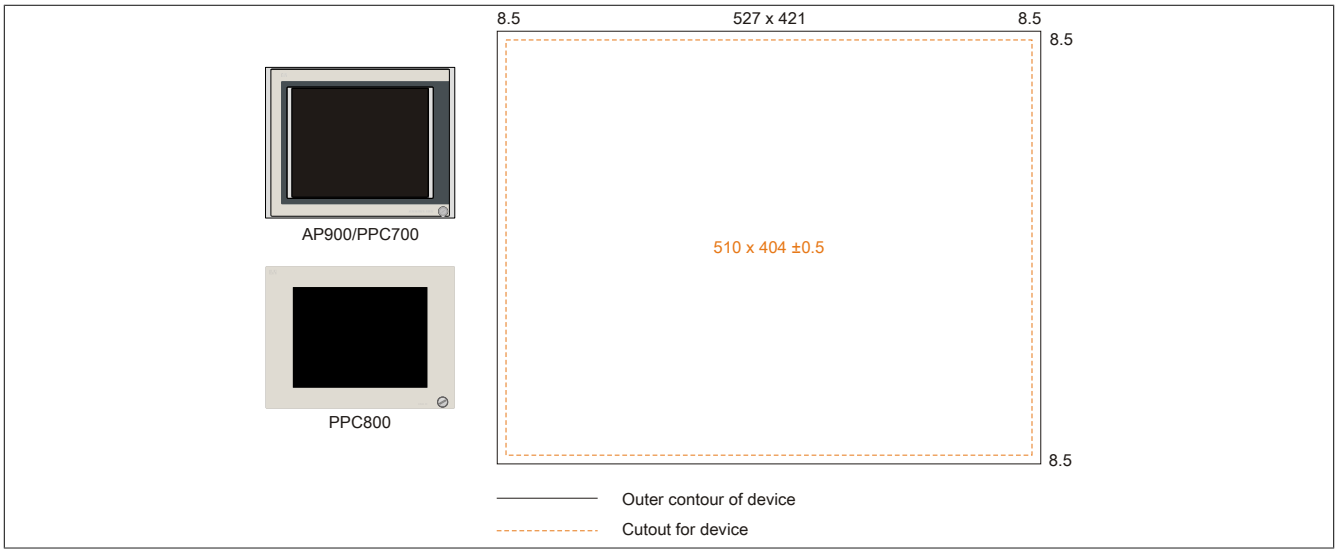


Figure 233: Mounting compatibility - 19" device - Horizontal1

19" Automation Panel 900, Panel PC 700 and Panel PC 800 are 100% mounting compatible in the Horizontal1 format.

6.2.8 21.3" devices

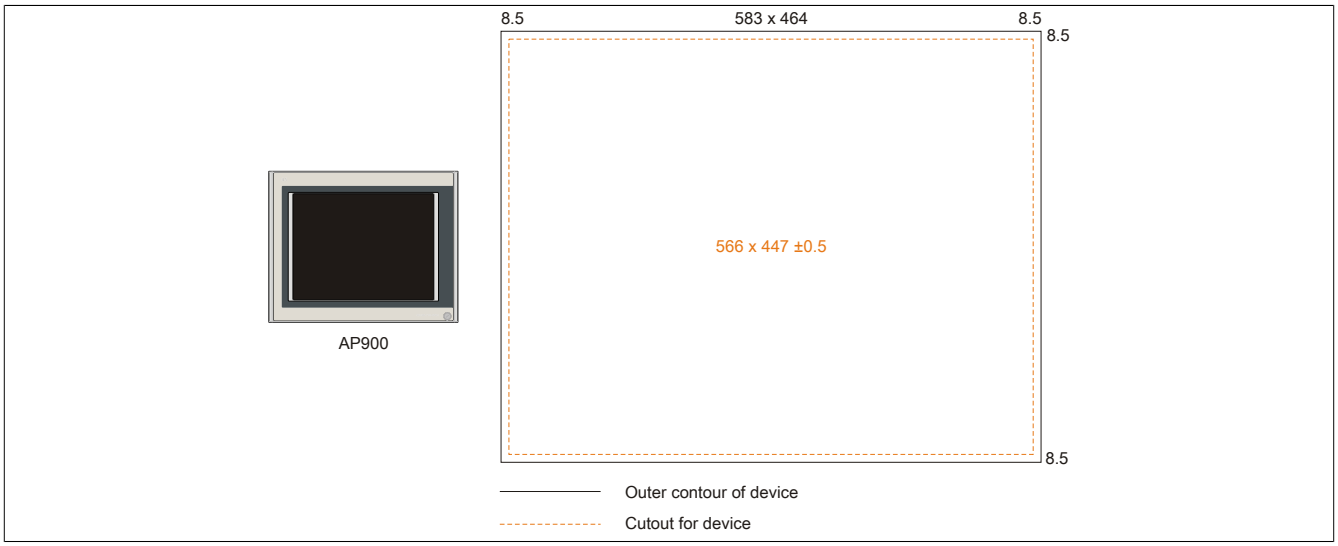


Figure 234: Mounting compatibility - 21.1" device - Horizontal1

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. *Discreteness:* An algorithm is made up of a finite series of steps. *Determinacy:* Under the same start conditions, it always creates the same end result. *Clearness:* The series of steps is clearly defined. *Finiteness:* It ends after a finite number of steps. 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.
APC	Abbreviation for »Automation PC«
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.

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