

Panel PC 800 with GM45 CPU board

User's Manual

Version: **1.00 (April 2012)**
Order no.: **MAPPC800A-ENG**

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Chapter 1 • General information

1 Manual history

Version	Date	Change
1.00	24-Apr-12	• First version

Table 1: Manual history

2 Safety notices

2.1 Intended use

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

2.2 Protection against electrostatic discharge

Electrical components that can be damaged by electrostatic discharge (ESD) must be handled accordingly.

2.2.1 Packaging

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

2.2.2 Guidelines for ESD handling

Electrical components with housing

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

Electrical components without housing

The following applies in addition to "Electrical components with housing"

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

Individual components

- ESD protective measures for individual components are thoroughly integrated at B&R (conductive floors, footwear, arm bands, etc.).
- The increased ESD protective measures for individual components are not necessary for our customers for handling B&R products.

2.3 Policy and procedures

Electronic devices are never completely failsafe. In the event of a failure on the programmable control system, operating or monitoring device, or uninterruptible power supply, the user is responsible for ensuring that other devices that may be connected, e.g. motors, are in a secure state.

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

All tasks such as installation, commissioning and maintenance are only permitted to be carried out by qualified personnel. Qualified personnel are persons familiar with transport, mounting, installation, commissioning, and operation of the product who also have the respective qualifications (e.g. IEC 60364). National accident prevention guidelines must be followed.

The safety 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 impermissible stress (mechanical loads, temperature, humidity, aggressive atmospheres, etc.).

2.5 Installation

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

2.6 Operation

2.6.1 Protection against touching electrical parts

To operate programmable logic controllers, operating and monitoring devices or uninterruptible power supplies, certain components must carry dangerous voltage levels of over 42 VDC. 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, the operating and monitoring devices and the uninterruptible power supply, ensure that the housing is properly grounded (PE rail). The ground connection must be established when testing the operating and monitoring devices or the uninterruptible power supply, even when operating them for only a short time.

Before turning the device on, 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

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

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

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

2.6.3 Programs, viruses, and dangerous programs

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

2.7 Environmentally-friendly disposal

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

2.7.1 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 and monitoring devices Uninterruptible power supply Batteries & 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 the respective legal regulations.

3 Organization of safety notices

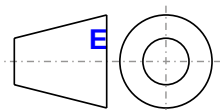
The safety notices in this manual are organized as follows:

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

Table 3: Organization of safety notices

4 Guidelines

All dimensions in mm.



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

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

Table 4: Nominal measurement areas

5 Overview

Product ID	Short description	on page
1A4600.10-2	B&R Automation Runtime ARwin, ARNC0	196
1A4600.10-3	B&R Automation Runtime ARwin+PVIControls incl. License Label and Security Key	196
1A4600.10-4	B&R Automation Runtime ARwin+ARNC0+PVIControls	196
5CAMSC.0001-00	APC620 internal power supply cable - Customized -	286
5CFCRD.016G-04	B&R CompactFlash 16 GB	252
5CFCRD.0512-04	B&R CompactFlash 512 MB	252
5CFCRD.1024-04	B&R CompactFlash 1 GB	252
5CFCRD.2048-04	B&R CompactFlash 2 GB	252
5CFCRD.4096-04	B&R CompactFlash 4 GB	252
5CFCRD.8192-04	B&R CompactFlash 8 GB	252
5MMUSB.2048-00	USB Memory Stick 2048MB	260
9A0003.02U	USB Port Button Holder DS9490B	196
24 VDC UPS modules		
9A0100.11	UPS 24 VDC, 24 VDC input, 24 VDC output, serial interface	239
Accessories		
5AC900.1201-00	USB Cover M20 IP65 flat	229
5AC900.1201-01	USB Cover M20 IP65 raised	229
5AC900.BLOC-00	Mounting block with wings 10pcs Spare part.	230
Batteries		
0AC201.91	Lithium batteries 4 pcs., 3 V / 950 mAh button cell We hereby state 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	226
4A0006.00-000	Lithium battery, 3 V / 950 mAh, button cell	226
Battery units		
9A0100.12	UPS battery unit type A, 24 V, 7 Ah, incl. battery cage	239
9A0100.14	UPS battery unit type B, 24 V, 2.2 Ah, incl. battery cage	239
9A0100.16	UPS battery unit type C, 24 V, 4.5 Ah, incl. battery cage	239
Bus units		
5AC803.BX01-00	PPC800 bus 1 PCI, 1 slide-in slot.	66
5AC803.BX01-01	PPC800 bus 1 PCI Express, 1 slide-in slot.	66
5AC803.BX02-00	PPC800 bus 2 PCI slots, 1 slide-in slot.	66
5AC803.BX02-01	PPC800 bus with 1 PCI, 1 PCI Express, 1 slide-in slot.	66
CPU boards		
5PC800.BM45-00	CPU Board Intel Core2 Duo T9400, 2.53 GHz, 1066 MHz FSB, 6 MB L2 cache; chipset GM45; 2 sockets for SO-DIMM DDR3 RAM modules	59
5PC800.BM45-01	CPU Board Intel Core2 Duo P8400, 2.26 GHz, 1066 MHz FSB, 3 MB L2 Cache; chipset GM45; 2 sockets for SO-DIMM DDR3 RAM modules	59
CompactFlash		
5CFCRD.0064-03	CompactFlash 64 MB Western Digital	256
5CFCRD.0128-03	CompactFlash 128 MB Western Digital	256
5CFCRD.016G-06	B&R CompactFlash 16 GB	248
5CFCRD.0256-03	CompactFlash 256 MB Western Digital	256
5CFCRD.0512-03	CompactFlash 512 MB Western Digital	256
5CFCRD.0512-06	B&R CompactFlash 512 MB	248
5CFCRD.1024-03	CompactFlash 1 GB Western Digital	256
5CFCRD.1024-06	B&R CompactFlash 1 GB	248
5CFCRD.2048-03	CompactFlash 2 GB Western Digital	256
5CFCRD.2048-06	B&R CompactFlash 2 GB	248
5CFCRD.4096-03	CompactFlash 4 GB Western Digital	256
5CFCRD.4096-06	B&R CompactFlash 4 GB	248
5CFCRD.8192-03	CompactFlash 8 GB Western Digital	256
5CFCRD.8192-06	B&R CompactFlash 8 GB	248
DVI cables		
5CADVI.0018-00	DVI-D Cable, 1.8 m.	267
5CADVI.0050-00	DVI-D Cable, 5 m.	267
5CADVI.0100-00	DVI-D Cable, 10 m.	267
Drives		
5AC801.HDDI-03	250 GB SATA hard disk (slide-in compact); 24/7 hard disk. Remark: Please see manual for proper use of the hard disk.	80
5ACPCI.RAIC-05	PCI RAID System SATA 2x 250 GB; Remark: Please see manual for proper use of the hard disk.	99
5MMHDD.0250-00	250 GB SATA Hard Disk Spare part for 5AC801.HDDI-03 and 5ACPCI.RAIC-05; Remark: Please see manual for proper use of the hard disk.	102
Einsteckkarten		
5ACPCC.ETH0-00	PClec Ethernet Card 10/100/1000	70
5ACPCC.MPL0-00	PClec POWERLINK MN 2port	72
Expansions		
5AC803.SX01-00	PPC800 expansion 1 PCI/PCI Express and 1 Slide-in (bus 5AC803.BX01-00 or 5AC803.BX01-01 necessary).	62
5AC803.SX02-00	PPC800 expansion 2 PCI/PCI Express and 1 Slide-in (bus 5AC803.BX02-00 or 5AC803.BX02-01 necessary).	62
Fan kits		
5AC803.FA01-00	PPC800 fan kit for system units without expansion.	104
5AC803.FA02-00	PPC800 fan kit for system units with the expansion 5AC803.SX01-00.	105
5AC803.FA03-00	PPC800 fan kit for system units with the expansion 5AC803.SX02-00.	106

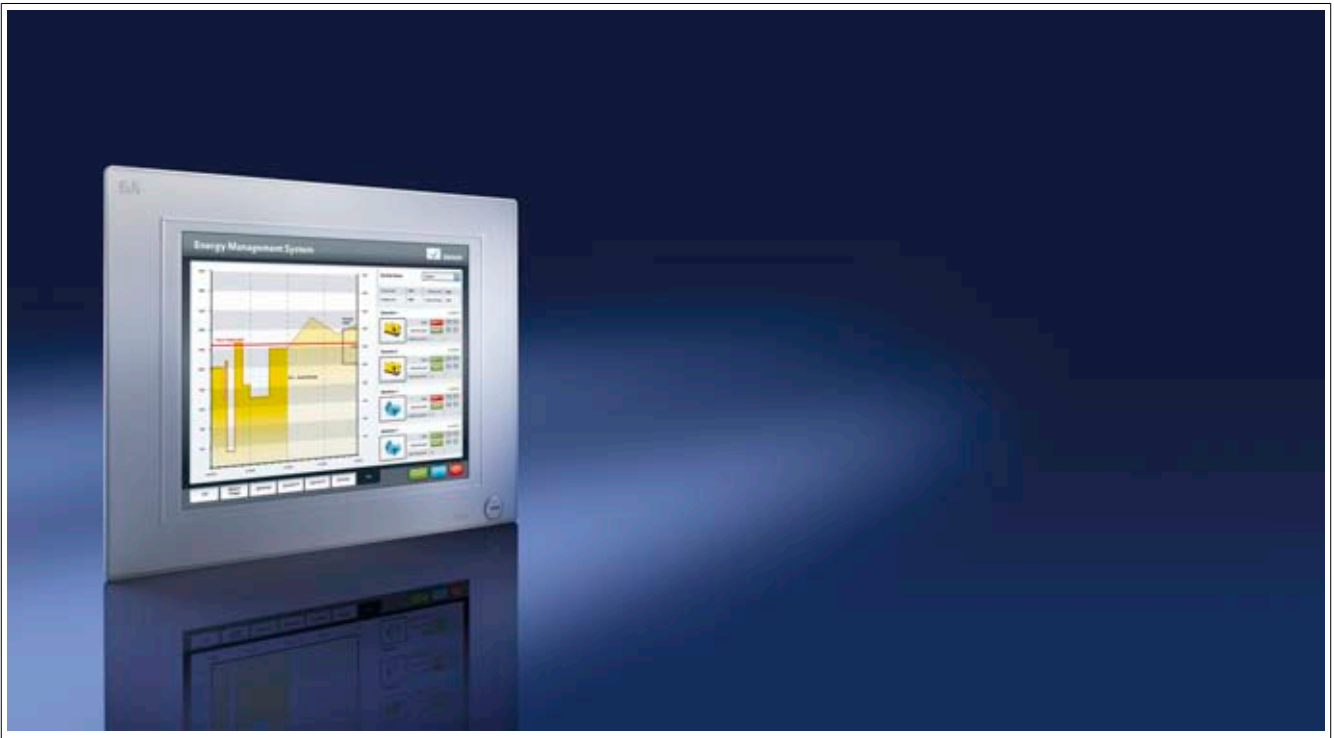
Product ID	Short description	on page
Heat sinks		
5AC803.HS00-01	PPC800 heat sink for CPU boards with Dual Core processor T7400, T9400 and P8400.	60
Laufwerke		
5AC801.ADAS-00	APC810 Slide-In-C Adapter	85
5AC801.DVDS-00	APC810 Slide-In DVD-ROM	88
5AC801.DVRS-00	APC810 Slide-In DVD-R/RW	90
5AC801.HDDI-00	APC810 Slide-In-C HDD 40GB (EE25)	76
5AC801.HDDI-02	APC810 Slide-In-C HDD 160GB (M120)	78
5AC801.HDDS-00	APC810 Slide-In HDD 40GB (EE25)	86
5AC801.SSDI-00	APC810 Slide-In-C SSD SLC 32GB (X25E)	82
5ACPCI.RAIC-03	PCI RAID System SATA 2x160GB (M120)	93
5ACPCI.RAIC-04	Ersatz SATA-HDD 160GB (M120)	97
MS-DOS		
9S0000.01-010	OEM Microsoft MS-DOS 6.22, German Floppy disks, only available with a new PC.	187
9S0000.01-020	OEM Microsoft MS-DOS 6.22, English Floppy disks, only available with a new PC.	187
Main memory for GM45 CPU boards		
5MMDDR.2048-02	SO-DIMM DDR3 RAM 2048 MB PC3-8500	61
5MMDDR.4096-02	SO-DIMM DDR3 RAM 4096 MB PC3-8500	61
Miscellaneous		
5SWHMI.0000-00	HMI Drivers & Utilities DVD	264
Options		
5AC803.BC01-00	PPC800 option 1 PCI Express compact.	68
5AC803.BC02-00	PPC800 option 1 Slide-in compact.	68
RS232 cables		
9A0014.02	RS232 extension cable for remote operating of a display unit with touch screen, 1.8 m.	284
9A0014.05	RS232 extension cable for remote operating of a display unit with touch screen, 5 m.	284
9A0014.10	RS232 extension cable for remote operating of a display unit with touch screen, 10 m.	284
Replacement batteries		
9A0100.13	UPS batteries type A (spare part), 2x 12 V, 7 Ah, for battery unit 9A0100.12	239
9A0100.15	UPS batteries type B (spare part), 2x 12 V, 2.2 Ah, for battery unit 9A0100.14	239
9A0100.17	UPS batteries type C (spare part), 2x 12 V, 4.5 Ah, for battery unit 9A0100.16	239
SDL cables		
5CASDL.0018-00	SDL cable, 1.8 m.	270
5CASDL.0050-00	SDL cable, 5 m.	270
5CASDL.0100-00	SDL cable, 10 m.	270
5CASDL.0150-00	SDL cable, 15 m.	270
5CASDL.0200-00	SDL cable, 20 m.	270
5CASDL.0250-00	SDL cable, 25 m.	270
5CASDL.0300-00	SDL cable, 30 m.	270
SDL cables: 45° connectors		
5CASDL.0018-01	SDL cable; 45° connector, 1.8 m.	273
5CASDL.0050-01	SDL cable; 45° connector, 5 m.	273
5CASDL.0100-01	SDL cable; 45° connector, 10 m.	273
5CASDL.0150-01	SDL cable; 45° connector, 15 m.	273
SDL flex cables		
5CASDL.0018-03	SDL flex cable, 1.8 m.	276
5CASDL.0050-03	SDL flex cable, 5 m.	276
5CASDL.0100-03	SDL flex cable, 10 m.	276
5CASDL.0150-03	SDL flex cable, 15 m.	276
5CASDL.0200-03	SDL flex cable, 20 m.	276
5CASDL.0250-03	SDL flex cable, 25 m.	276
5CASDL.0300-03	SDL flex cable, 30 m.	276
5CASDL.0300-13	SDL cable with extender, 30 m.	279
5CASDL.0400-13	SDL flex cable with extender, 40 m.	279
5CASDL.0430-13	SDL flex cable with extender, 43 m.	279
Sonstiges		
5AC900.1000-00	Adapter DVI: CRT DVI-I/m: DB15HD/f	228
System units		
5PC820.1505-00	Panel PC 820 15" XGA 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 PCI Express compact and slide-in compact slot, IP65 protection (front side); 24 VDC Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91).	47
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 PCI Express compact and slide-in compact slot, IP65 protection (front side); 24 VDC Plug for power supply must be ordered separately (screw clamps: 0TB103.9; cage clamps: 0TB103.91).	53
Terminal blocks		
0TB103.9	Connector, 24 VDC, 3-pin female, screw clamps 3.31 mm ² , protected against vibration by the screw flange	227
0TB103.91	Connector, 24 VDC, 3-pin female, cage clamps 3.31 mm ² , protected against vibration by the screw flange	227
USB accessories		
5MMUSB.2048-01	USB 2.0 flash drive 2048 MB B&R	262
USB cables		
5CAUSB.0018-00	USB 2.0 connecting cable type A - type B, 1.8 m.	283
5CAUSB.0050-00	USB 2.0 connecting cable type A - type B, 5 m.	283

Product ID	Short description	on page
Uninterruptible power supplies		
5CAUPS.0005-00	UPS cable 0.5 m; for USV 5AC600.UPSI-00.	238
5CAUPS.0030-00	UPS cable 3 m; for USV 5AC600.UPSI-00.	238
Unterbrechungsfreie Stromversorgung		
5AC600.UPSB-00	APC Add-On USV Batterieeinheit 5Ah	235
5AC600.UPSI-00	APC Add-On USV Modul 80W	233
Windows 7		
5SWWI7.0100-ENG	Microsoft OEM Windows 7 Professional 32-bit, DVD, English. Only available with a new device.	190
5SWWI7.0100-GER	Microsoft OEM Windows 7 Professional 32-bit, DVD, German. Only available with a new device.	190
5SWWI7.0200-ENG	Microsoft OEM Windows 7 Professional 64-bit, DVD, English. Only available with a new device.	190
5SWWI7.0200-GER	Microsoft OEM Windows 7 Professional 64-bit, DVD, German. Only available with a new device.	190
5SWWI7.0300-MUL	Microsoft OEM Windows 7 Ultimate 32-bit, DVD, multilaguange. Only available with a new device.	190
5SWWI7.0400-MUL	Microsoft OEM Windows 7 Ultimate 64-bit, DVD, multilaguange. Only available with a new device.	190
Windows Embedded Standard 2009		
5SWWXP.0734-ENG	Microsoft OEM Windows Embedded Standard 2009, English; for PPC800 with GM45 chipset; please order CompactFlash separately (minimum 1 GB).	192
Windows Embedded Standard 7		
5SWWI7.0534-ENG	Microsoft OEM Windows Embedded Standard 7 32-bit, English; for PPC800 with GM45 chipset; please order CompactFlash separately (minimum 8 GB).	194
5SWWI7.0634-ENG	Microsoft OEM Windows Embedded Standard 7 64-bit, English; for PPC800 with GM45 chipset; please order CompactFlash separately (minimum 16 GB).	194
5SWWI7.0734-MUL	Microsoft OEM Windows Embedded Standard 7 Premium 32-bit, multilanguage; for PPC800 with GM45 chipset; please order CompactFlash separately (minimum 8 GB).	194
5SWWI7.0834-MUL	Microsoft OEM Windows Embedded Standard 7 Premium 64-bit, multilanguage; for PPC800 with GM45 chipset; please order CompactFlash separately (minimum 16 GB).	194
Windows XP Professional		
5SWWXP.0500-ENG	Microsoft OEM Windows XP Professional Service Pack 2c, CD, English. Only available with a B&R device.	188
5SWWXP.0500-GER	Microsoft OEM Windows XP Professional Service Pack 2c, CD, German. Only available with a B&R device.	188
5SWWXP.0500-MUL	Microsoft OEM Windows XP Professional Service Pack 2c, CD, Multilaguange Only available with a B&R device..	188
5SWWXP.0600-ENG	Microsoft OEM Windows XP Professional Service Pack 3, CD, English. Only available with a B&R device.	188
5SWWXP.0600-GER	Microsoft OEM Windows XP Professional Service Pack 3, CD, German. Only available with a device.	188
5SWWXP.0600-MUL	Microsoft OEM Windows XP Professional Service Pack 3, CD, multilanguage. Only available with a B&R device..	188
Windows-based Runtime		
1A4600.10	B&R Automation Runtime ARwin, incl. License Label and Security Key	196
Zubehör		
5ACPCI.ETH1-01	PCI Ethernet Card 10/100	241
5ACPCI.ETH3-01	PCI Ethernet Card 10/100 3port	244

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. Therefore, many options can be implemented on the cost-optimized 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 technology - Core 2 Duo
- Up to 8 GB main memory (Dual Channel Memory Support)
- 1 CompactFlash slot (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 option)
- 1 optional slide-in compact slot (can be expanded with option)
- 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-buffered)
- Easy slide-in drive exchange (SATA hot plug capable)
- 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
- Fan kits
- Drive (mass memory such as CompactFlash card or hard disk) for the operating system
- Software

1.2.1 Configuration - Basic system

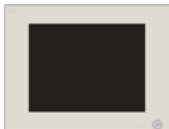
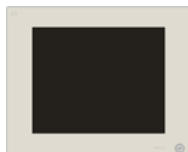
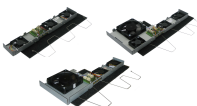
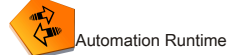
Configuration - Basic system			
System unit	Select 1		
	 5PC820.1505-00	 5PC820.1906-00	
Fan kits	Select 1		
	5AC803.FA01-00	5AC803.FA02-00	5AC803.FA03-00
CPU board - Heat sink - Main memory			
CPU board	Select 1		
	5PC800.BM45-00 5PC800.BM45-01		
Heat sink	Select 1		
	5AC803.HS00-01		
Main memory	Select 1 or 2		
	5MMDDR.2048-02 5MMDDR.4096-02		

Image 1: Configuration - Basic system

1.2.2 Configuration - Optional components

Configuration - Optional components			
Configuration of a system unit with option			
Option ¹⁾	Select 1 or both		
	5AC803.BC01-00 ↓	5AC803.BC02-00 ↓	
	PClec plug-in cards, select 1		Slide-in compact drives, select 1
	5ACPCC.ETH0-00 (PClec Ethernet card 10/100/1000) 5ACPCC.MPL0-00 (PClec POWERLINK MN 2-port)		5AC801.HDDI-00 (40 GB) 5AC801.HDDI-03 (250 GB) 5AC801.SSDI-00 (32 GB)
Configuration of a system unit with expansion			
Expansion	No expansion	1 PCI/PCIe slot + Slide-in slot	2 PCI/PCIe slots + Slide-in slot
		5AC803.SX01-00	5AC803.SX02-00
Bus units		Select 1	Select 1
		5AC803.BX01-00 5AC803.BX01-01	5AC803.BX02-00 5AC803.BX02-01
Slide-in drive		Select 1	
		5AC801.HDDS-00 (40 GB) 5AC801.DVDS-00 (DVD drive) 5AC801.DVRS-00 (DVD writer) 5AC801.ADAS-00 (adapter)	
CompactFlash	Select 1		
	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 1		
	5AC600.UPSI-00 (add-on UPS module), 5AC600.UPSB-00 (UPS battery unit) APC connection cable -> Battery: 5CAUPS.0005-00 (0.5 meters) or 5CAUPS.0030-00 (3 meters)		
Software	Select 1		
 Microsoft Windows XP	Windows XP 5SWWXP.0500-ENG 5SWWXP.0500-GER 5SWWXP.0500-MUL 5SWWXP.0600-ENG 5SWWXP.0600-GER 5SWWXP.0600-MUL	Windows Embedded Standard 2009 5SWWXP.0734-ENG	Microsoft DOS 9S0000.01-010 9S0000.01-020
 Windows Embedded Standard 2009			
 Windows Embedded Standard 7			
 Windows 7	Windows 7 5SWWI7.0100-ENG 5SWWI7.0100-GER 5SWWI7.0200-ENG 5SWWI7.0200-GER 5SWWI7.0300-MUL 5SWWI7.0400-MUL	Windows Embedded Standard 7 5SWWI7.0534-ENG 5SWWI7.0634-ENG 5SWWI7.0734-MUL 5SWWI7.0834-MUL	Automation Runtime 1A4601.06 1A4601.06-2 1A4600.10 1A4600.10-2 1A4600.10-3 1A4600.10-4
 Automation Runtime			
Terminal blocks	Select 1		
	0TB103.9 (screw clamps) 0TB103.91 (cage clamps)		

1) If both options are used, then a PClec plug-in card and a slide-in compact drive can also be operated in a device.

1) If both options are used, then a PCle plug-in card and a slide-in compact drive can also be operated in a device.

Image 2: Configuration - Optional components

2 Entire 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 various configurations result in varying maximum possible ambient temperatures, which can be seen in the following tables.

Information:

The maximum specified ambient temperatures for operation with a fan kit were determined under worst-case conditions. Experience has shown that higher ambient temperatures can be reached under typical conditions, e.g. using Microsoft Windows. The testing and evaluation is to be done on-site by the user (temperatures can be read in BIOS or using the B&R Control Center).

Information regarding worst-case conditions

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

2.1.1 Maximum ambient temperature

Information:

Only specified mounting orientations are permitted. See chapter "Commissioning", section "Mounting orientation" on page 108.

		All temperature values in degrees Celsius (°C) at 500 meters above sea level.	5PC800.BM45-00	5PC800.BM45-01	Temperature limits	Location of sensor(s)
		The maximum ambient temperature must typically be derated by 1°C per 1000 meters (starting at 500 meters above sea level).				
		Maximum ambient temperature				
		What else can be operated at the max. ambient temperature, or are there any limits?				
Compact slide-in drives	Onboard CompactFlash1	✓	✓	80	I/O	
	5AC801.HDDI-00	✓	✓	80		
	5AC801.HDDI-02	✓	✓	80		
	5AC801.HDDI-03	✓	✓	60		
	5AC801.SSDI-00	✓	✓	70		
Slide-in drives	5AC801.HDDS-00	✓	✓	80	Slide-in drive 1	
	5AC801.DVDS-00	✓	✓	50		
	5AC801.DVRS-00	✓	✓	50		
Main memory	5MMDDR.2048-02	✓	✓	-	-	
	5MMDDR.4096-02	✓	✓	-		
System units	5PC820.1505-00	✓	✓	80	Power supply	
	5PC820.1906-00	✓	✓	80		
Additional insert cards PClec cards	5ACPCC.ETH0-00	✓	✓	-	-	
	5ACPCC.MPL0-00	✓	✓	-		
	5ACPCI.RAIC-03 (24 hours / default)	✓	✓	-		
	5ACPCI.RAIC-04 (24 hours / default)	✓	✓	-		
	5ACPCI.RAIC-05 (24 hours / default)	✓	✓	-		

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

Table 5: Ambient temperature with a fan kit

2.1.2 Minimum ambient temperature

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 How is the the maximum ambient temperature determined?

1. Selection of the CPU board (use with or without fan kit).
2. The "Maximum ambient temperature" row shows the maximum ambient temperature for the system as a whole, including the respective CPU board.

Information:

Maximum temperature data is for operation at 500 meters. The maximum ambient temperature must typically be 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 "✓" (checkmark) next to the component, it can be used at the maximum ambient temperature of the whole system without problems.

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

2.1.4 Temperature monitoring

Sensors monitor temperature values in various places (board I/O, board ETH2, board power, power supply, slide-in drive 1, IF slot) in the PPC800. The locations of the temperature sensors can be found in the figure "Image 3: Temperature sensor locations" on page 26. The value listed in the table represents the defined maximum temperature for this measurement point. An alarm is not triggered when this temperature is exceeded. The temperatures¹⁾⁾ 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.

Additionally, 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, for example the temperature, using software (e.g. HDD thermometer - freeware) in approved Microsoft operating systems (except Windows CE).

¹⁾⁾ The measured temperature approximates the immediate ambient temperature, but can be influenced by neighboring components.

2.1.5 Temperature sensor locations

Sensors monitor temperature values in many different areas 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 Center²⁾⁾.

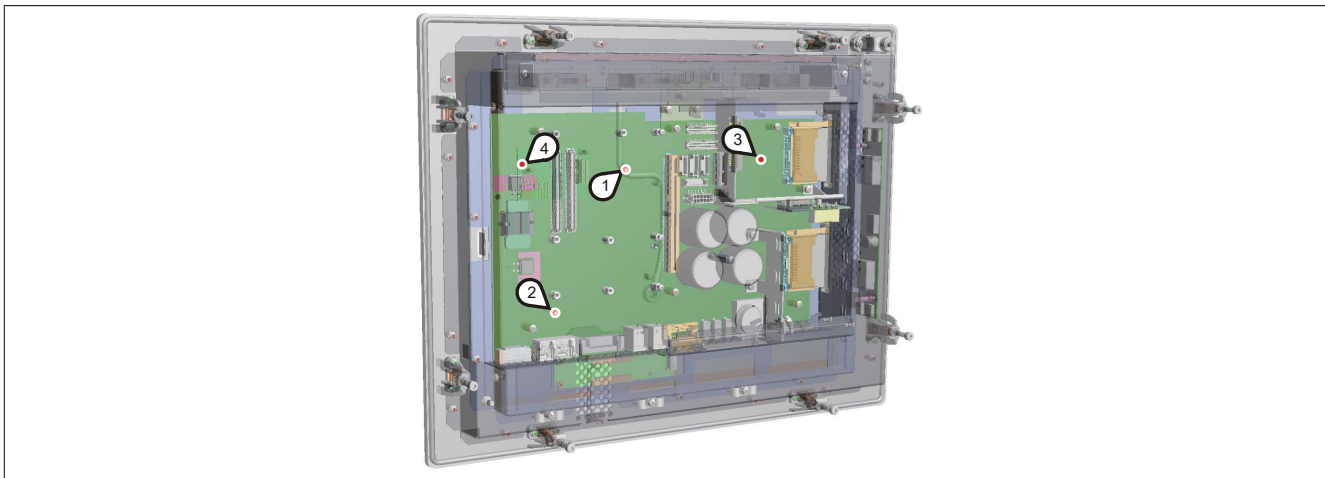


Image 3: Temperature sensor locations

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 baseboard).	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 PCIe slot; the sensor is located directly on the plug-in card.	Depending on the plug-in cards used

Table 6: Temperature sensor locations

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

Component		Operation	Storage / Transport
CPU boards GM45 COM Express		10 to 90%	5 to 95%
Main memory for CPU boards		10 to 90%	5 to 95%
Compact slide-in drives Slide-in 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.SSDI-00	5 to 95%	5 to 95%
	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 / default)	8 to 90%	5 to 95%
	5ACPCI.RAIC-04 (24 hours / default)	8 to 90%	5 to 95%
	5ACPCI.RAIC-05 (24 hours / default)	5 to 95%	5 to 95%
	5MMHDD.250-00 (24 hours / default)	5 to 95%	5 to 95%
Accessories	CompactFlash cards - 5CFCRD.xxxx-06	85%	85%
	CompactFlash cards 5CFCRD.xxxx-04	85%	85%
	CompactFlash cards - 5CFCRD.xxxx-03	8 to 95%	8 to 95%
	Flash drive 5MMUSB.2048-01	10 to 90%	5 to 90%
	USB Media Drive 5MD900.USB2-01	20 to 80%	5 to 90%

Table 7: Overview of humidity specifications for individual components

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

2.3 Power management

2.3.1 Block diagram - Supply voltage

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

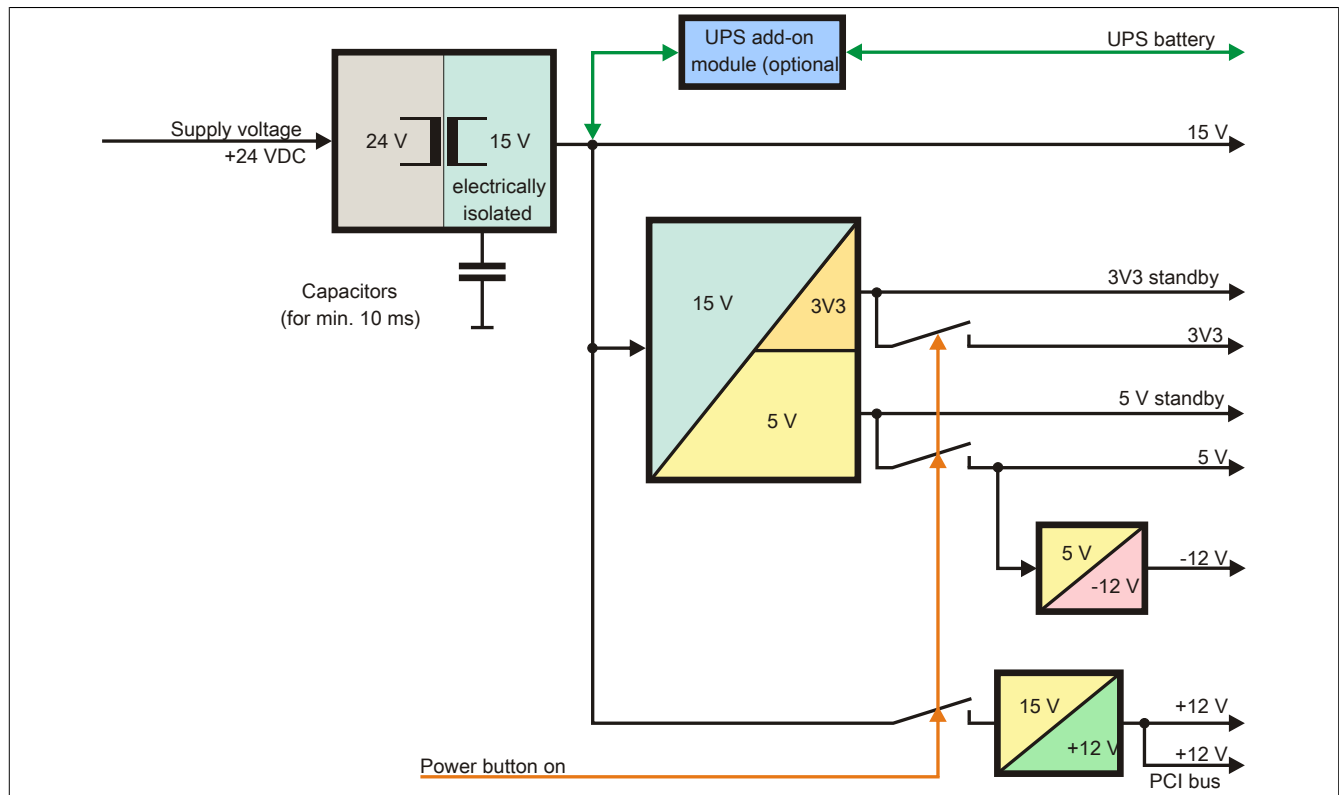


Image 4: Block diagram - Supply voltage

Description

The supply voltage is converted to 15 V with a DC/DC converter. These electrically isolated 15 V feed further DC/DC converters, which generate the remaining voltages.

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

The optional Add-on UPS (with battery unit) is supplied with 15 V and provides an uninterrupted power supply from the 15 V bus during power failures.

2.3.2 Power calculation with 5PC820.1505-00

Information:				CPU board		Current system
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.				5PC800.BM45-00	5PC800.BM45-01	Enter values in this column
Total power supply power (maximum)						130
Total power supply	+12 V	Add-on UPS module, optional		7.5	7.5	
		Backlight Display 15"		14	14	
		Maximum possible at +12V				75
		CPU board, permanent consumers		43	36	
		2048 MB RAM, max. 2 with 3 W each				
		4096 MB RAM, max. 2 with 4 W each				
		Fan kit, optional		2.4	2.4	
		Power consumption of the PClec cards, optional, max. 4 W ²⁾				
		PCI card limit, optional (max. 3 W without fan kit, max. 6 W with fan kit) ¹⁾				
		PCIe x1 card limit, optional (max. 3 W without fan kit, max. 20 W with fan kit) ¹⁾				
		Consumers +12 V Σ				
	+5 V	Maximum possible at +5V				65
		System unit, permanent consumers		4	4	
		Hard disk (slide-in compact)		4	4	
		Slide-in drive (hard disk, DVD-ROM, etc.)		4	4	
		USB peripherals USB1 and USB3 with 2.5 W each				
		USB peripherals USB2, USB4 and USB5 with 5 W each				
		Power consumption of the PClec cards, optional, max. 4 W ²⁾				
		PCI card limit, optional (max. 3 W without fan kit, max. 20 W with fan kit) ¹⁾				
		Maximum possible at -12V				1.2
		PCI card limit, optional (max. 1.2 W with or without fan kit) ¹⁾				
		Consumers -12 V Σ				
	-12 V	Consumers +5 V Σ				
		Maximum possible at 3V3				40
		System unit, permanent consumers		9	9	
		CompactFlash, 1 W each				
		Power consumption of the PClec cards, optional, max. 4 W ²⁾				
		PCI card limit, optional (max. 3 W without fan kit, max. 15 W with fan kit) ¹⁾				
		PCIe x1 card limit, optional (max. 3 W without fan kit, max. 10 W with fan kit) ¹⁾				
		Consumers 3V3 Σ				
		Consumers Σ				

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

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

Table 8: Power calculation for PPC800 15"

Information:

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

2.3.3 Power calculation with 5PC820.1906-00

Information:		CPU board		Current system		
		5PC800.BM45-00	5PC800.BM45-01	Enter values in this column		
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.						
		Total power supply power (maximum)		130		
Total power supply		Add-on UPS module, optional	7.5	7.5		
		Backlight Display 19"	32	32		
			Maximum possible at +12V		75	
	+12 V		CPU board, permanent consumers	43	36	
			2048 MB RAM, max. 2 with 3 W each			
			4096 MB RAM, max. 2 with 4 W each			
			Fan kit, optional	2.4	2.4	
			Power consumption of the PCIe cards, optional, max. 4 W ²⁾			
			PCI card limit, optional (max. 3 W without fan kit, max. 6 W with fan kit) ¹⁾			
			PCIe x1 card limit, optional (max. 3 W without fan kit, max. 20 W with fan kit) ¹⁾			
			Consumers +12 V ∑			
			Maximum possible at +5V		65	
	+5 V		System unit, permanent consumers	12	12	
			Hard disk (slide-in compact)	4	4	
			Slide-in drive (hard disk, DVD-ROM, etc.)	4	4	
			USB peripherals USB1 and USB3 with 2.5 W each			
			USB peripherals USB2, USB4 and USB5 with 5 W each			
			Power consumption of the PCIe cards, optional, max. 4 W ²⁾			
			PCI card limit, optional (max. 3 W without fan kit, max. 20 W with fan kit) ¹⁾			
			Maximum possible at -12V		1.2	
	-12 V		PCI card limit, optional (max. 1.2 W with or without fan kit) ¹⁾			
				Consumers -12 V ∑		
			Consumers +5 V ∑			
			Maximum possible at 3V3		40	
	3V3		System unit, permanent consumers	9	9	
			CompactFlash, 1 W each			
		Power consumption of the PCIe cards, optional, max. 4 W ²⁾				
		PCI card limit, optional (max. 3 W without fan kit, max. 15 W with fan kit) ¹⁾				
		PCIe x1 card limit, optional (max. 3 W without fan kit, max. 10 W with fan kit) ¹⁾				
		Consumers 3V3 ∑				
		Consumers ∑				

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

2) The total performance of one PClec card per PClec 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 19"

Information:

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

2.4 Block diagram

The following block diagrams show the simplified structure of system units (5PC820.1505 / 5PC820.1906-00) with a GM45 CPU board that depend on different bus units.

2.4.1 Bus unit 5AC803.BX01-00

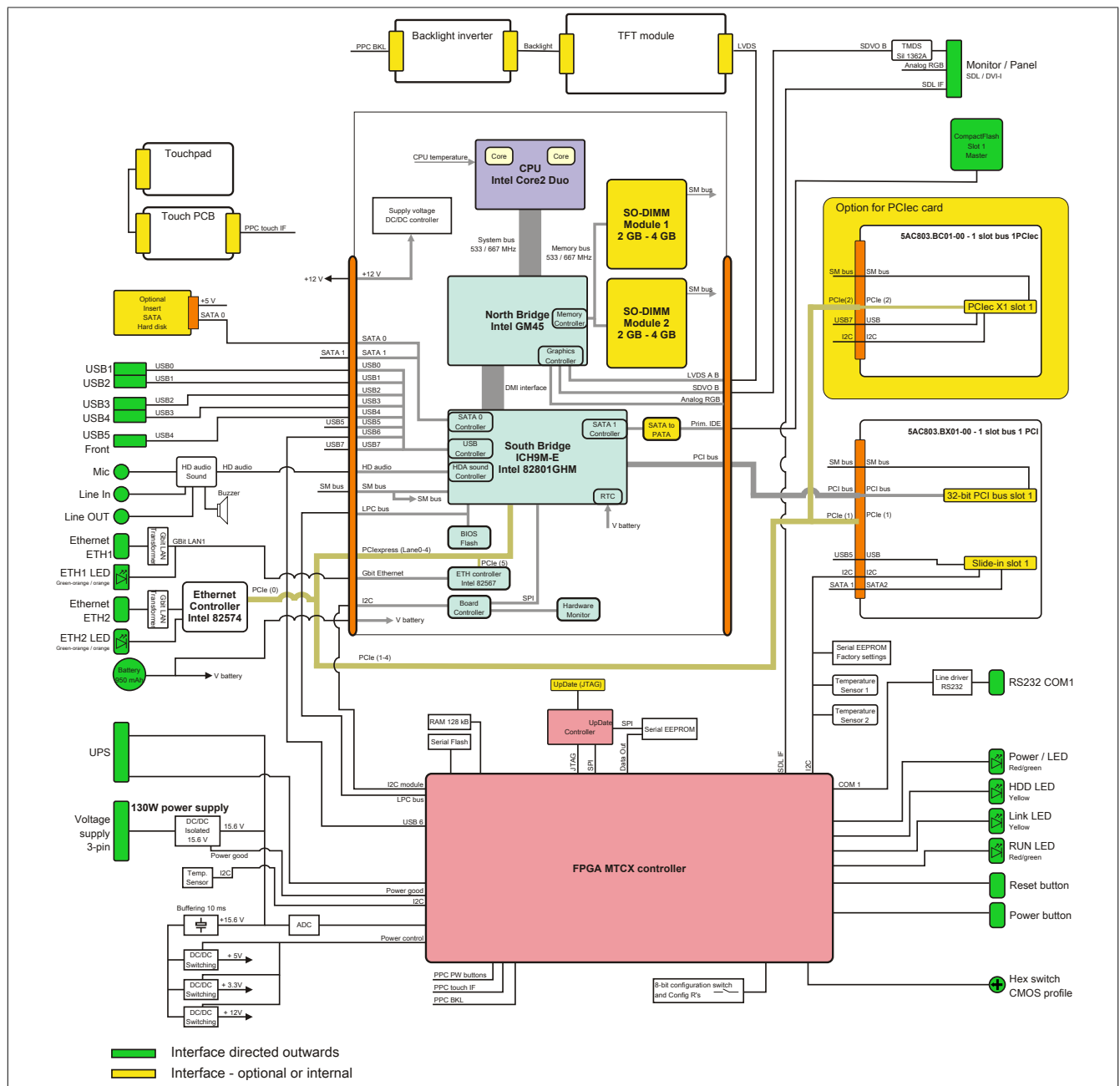


Image 5: Block diagram with bus unit 5AC803.BX01-00

2.4.2 Bus unit 5AC803.BX01-01

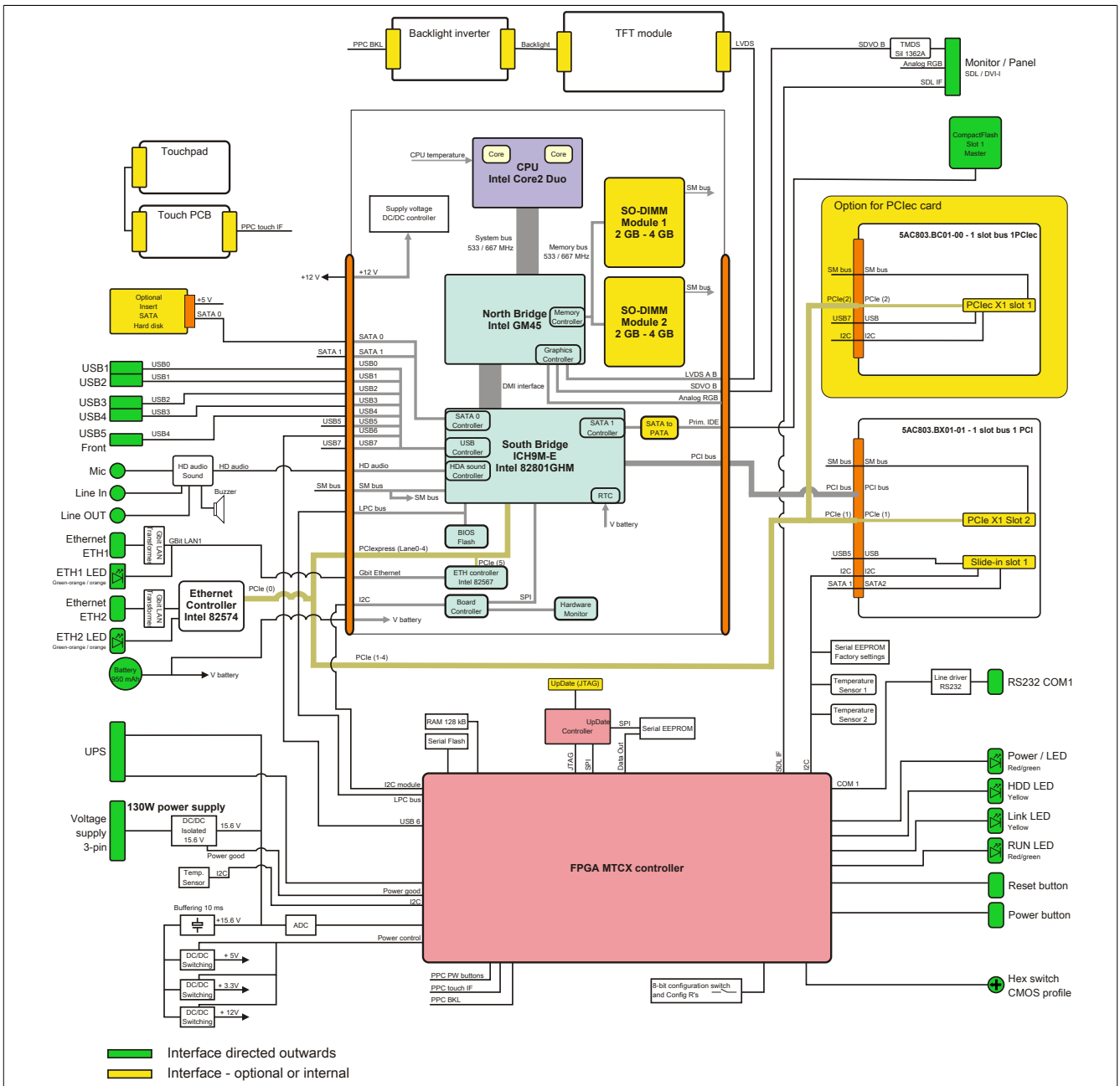


Image 6: Block diagram with bus unit 5AC803.BX01-01

2.4.3 Bus unit 5AC803.BX02-00

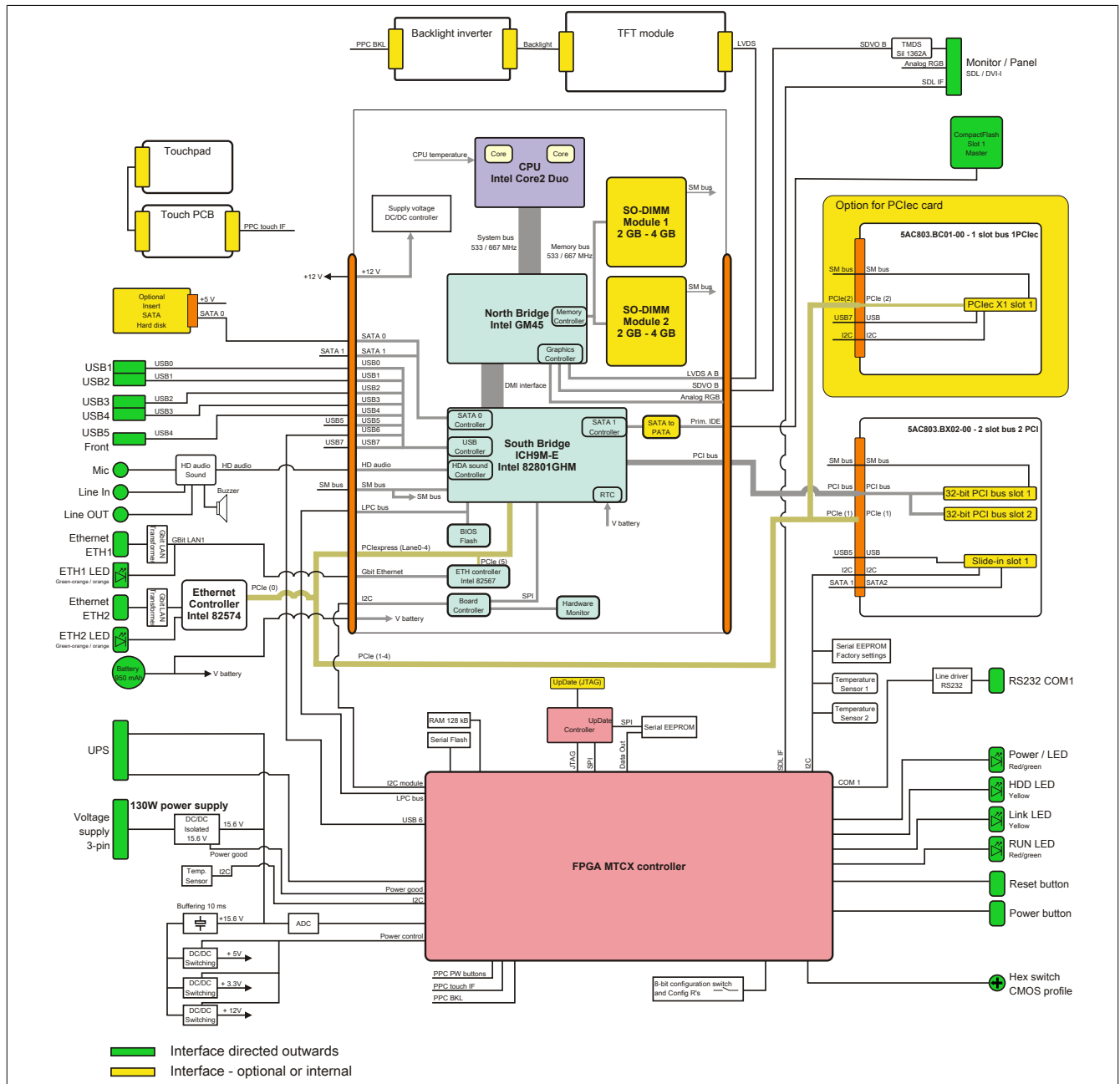


Image 7: Block diagram with bus unit 5AC803.BX02-00

2.4.4 Bus unit 5AC803.BX02-01

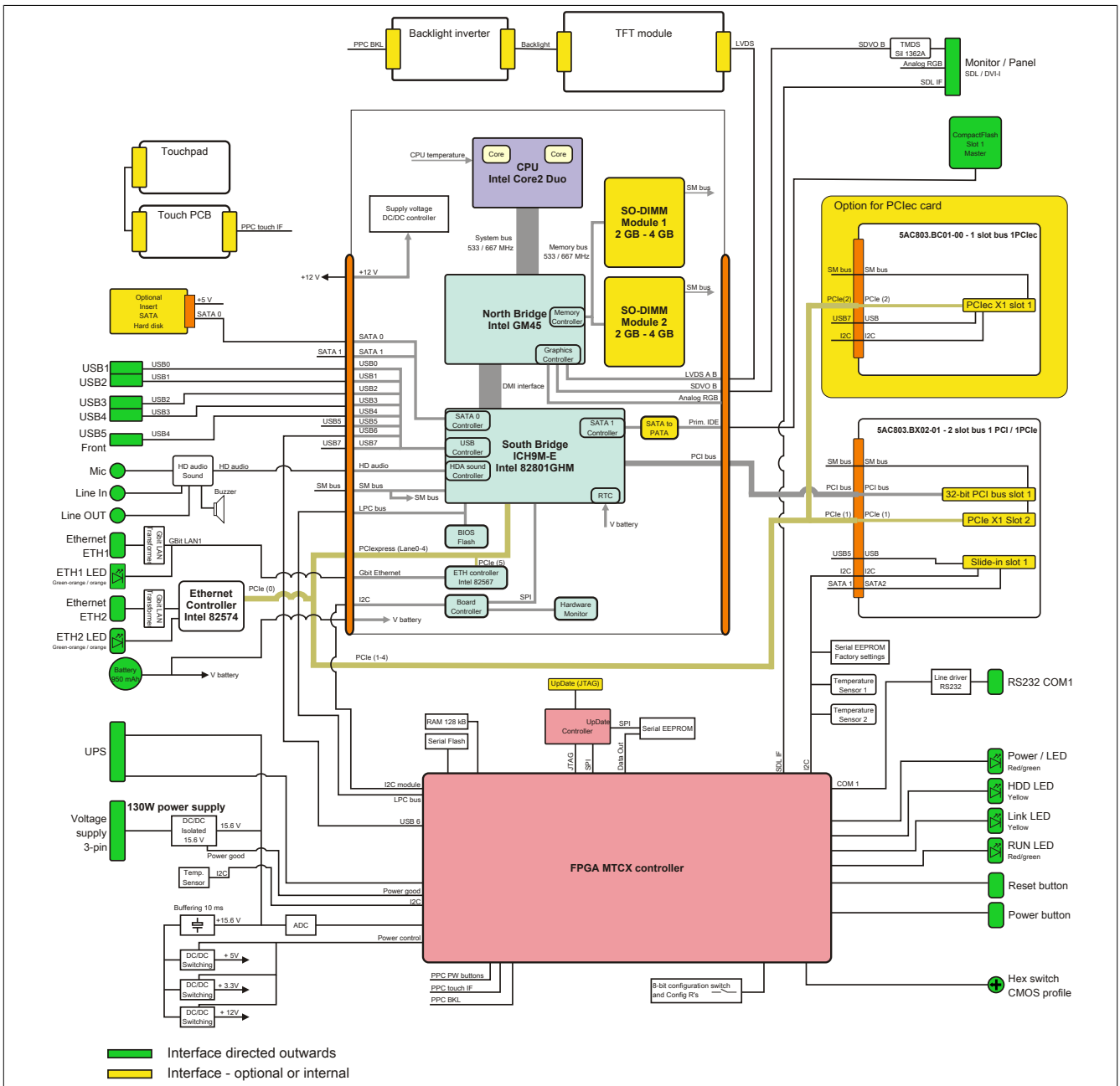


Image 8: Block diagram with bus unit 5AC803.BX02-01

2.5 Serial number sticker

Each B&R device is assigned a unique serial number label with a bar code (type 128), which allows the device to be clearly identified. This serial number represents all of the components built into the system (model number, name, revision, serial number, delivery date and duration of warranty).



Image 9: Serial number sticker (back)

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

 A screenshot of the B&R website's search interface. The 'Suche' (Search) field is highlighted with a red circle, and the serial number 'AF210168454' is entered. A red arrow points from the text 'serial number is entered e.g. AF210168454' to this field. Below the search field, a table titled 'REKLAMATION ERSTELLEN' shows the search results. A red arrow points from the text 'List of installed components shown after searching serial number' to this table.

Serialnummer	Materialnummer	Rev	Auslieferungsdatum	Gewährleistungsende
B15B0168428	SPC820.1505-00	A2	0000-00-00	0000-00-00
AF210168454	SPC820.1505-00	A2	0000-00-00	0000-00-00
AF210168454	SPC820.1505-00	A2	0000-00-00	0000-00-00
AF210168454	SPC820.1505-00	A2	0000-00-00	0000-00-00
A3CA0169483	SPC800.B945-00	C0	0000-00-00	0000-00-00
A3E50168807	5MMDOR.0512-01	B0	0000-00-00	0000-00-00
AF210168430	5AC803.SX01-00	A0	0000-00-00	0000-00-00
AF210168515	5AC803.BX01-00	A5	0000-00-00	0000-00-00
AF300168465	5AC803.FA02-00	A0	0000-00-00	0000-00-00
AF230168467	5AC803.HS00-00	A5	0000-00-00	0000-00-00

Image 10: Example of serial number search

2.6 Device interfaces

2.6.1 Supply voltage (+24 VDC)

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

The pin assignments can be found either in the following table or printed on the PPC800 housing. The supply voltage is protected internally by a soldered fuse (15 A, fast-acting), so that the device cannot be damaged if there is an overload (fuse replacement necessary) or if the voltage supply is connected incorrectly (reverse polarity protection - fuse replacement not necessary). The device must be returned to B&R for repairs if the fuse is blown because of an error.

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

3-pin, male

+ 24 VDC supply voltage



Table 10: Supply voltage connection + 24 VDC

Ground

Caution!

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

The grounding connection is located on the top right on the back of the PPC800 system.

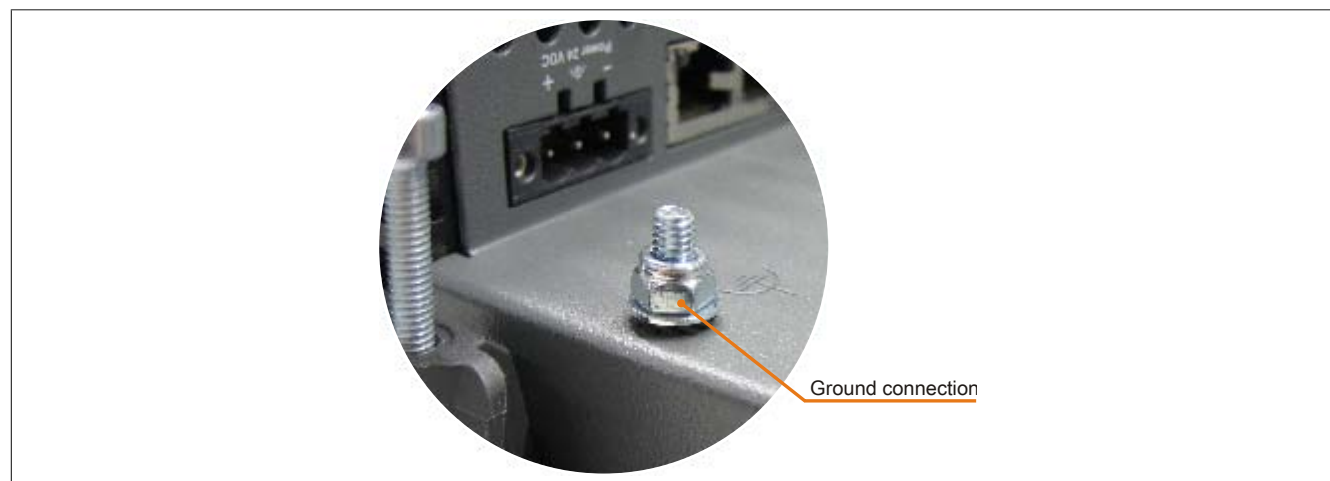


Image 11: Ground connection

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

2.6.2 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 variations
5PC800.BM45-00	RGB, DVI, SDL
5PC800.BM45-01	RGB, DVI, SDL



Table 11: Monitor / Panel connection - RGB, DVI, SDL

2.6.3 Serial interface COM1

Serial interface COM1 ¹⁾	
	RS232
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

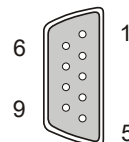


Table 12: Pin assignments - COM1

- 1) The interfaces, etc. available on the device or module were numbered accordingly for easy identification. This numbering can differ from the numbering used by the particular operating system.

2.6.4 Ethernet 1 (ETH1)

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

Ethernet 1 connection (ETH1) ¹⁾		
Controller	Intel 82567	
Cabling	S/STP (Cat5e)	
Transfer rate	10/100/1000 Mbit/s ²⁾	
Cable length	max. 100 m (min. Cat5e)	
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)

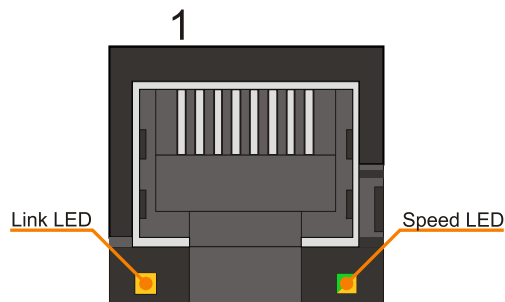


Table 13: Ethernet connection (ETH1)

- 1) The interfaces, etc. available on the device or module were numbered accordingly for easy identification. This numbering can differ from the numbering used by the particular operating system.
- 2) Switching takes place automatically.
- 3) The 10 Mbit/s transfer speed / connection is only present if the Link LED is simultaneously active.

Driver support

A special driver is required in order to operate the Intel Ethernet controller 82567. The necessary drivers are available in the Downloads area of the B&R website (www.br-automation.com).

Information:

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

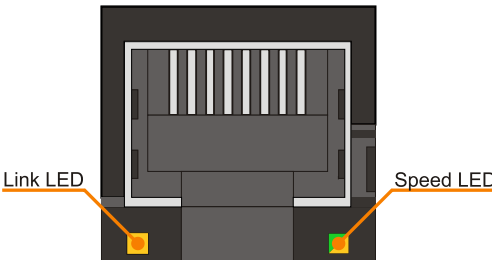
2.6.5 Ethernet 2 (ETH2)

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

Ethernet 2 connection (ETH2 ¹⁾)		
Controller	Intel 82574	
Cabling	S/STP (Cat5e)	
Transfer rate	10/100/1000 Mbit/s ²⁾	
Cable length	max. 100 m (min. Cat5e)	
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)

RJ45 twisted pair (10BaseT/100BaseT), female

1



The diagram shows a top-down view of an RJ45 port. The port is a rectangular socket with eight vertical pins. Below the pins are two small square LEDs. The left LED is labeled 'Link LED' with an orange line pointing to it. The right LED is labeled 'Speed LED' with an orange line pointing to it. The LEDs are currently both lit: the Link LED is orange and the Speed LED is green. A large number '1' is positioned above the port.

Table 14: Ethernet connection (ETH2)

- 1) The interfaces, etc. available on the device or module were numbered accordingly for easy identification. This numbering can differ from the numbering used by the particular operating system.
- 2) Switching takes place automatically.
- 3) The 10 Mbit/s transfer speed / connection is only present if the Link LED is simultaneously active.

Driver support

A special driver is required in order to operate the Intel Ethernet controller 82574. The necessary drivers are available in the Downloads area of the B&R website (www.br-automation.com).

Information:

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

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

PPC800 devices have a USB 2.0 (Universal Serial Bus) host controller with multiple USB ports, five of which are on the outside for easy access.

Warning!

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

Caution!

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

USB1,2,3,4

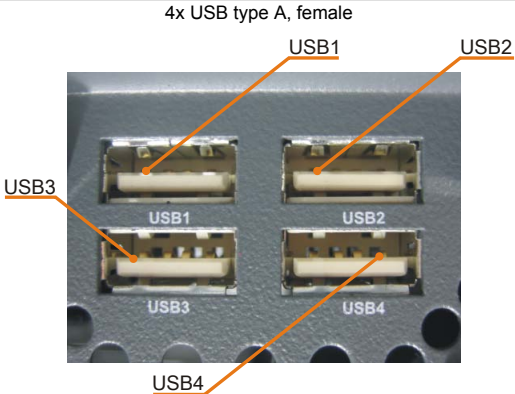
Universal Serial Bus (USB1, USB2, USB3, USB4 ¹⁾)		4x USB type A, female
Type	USB 2.0	
Design	Type A	
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), to high speed (480 Mbit/s)	
Current load ²⁾ USB1, USB3 USB2, USB4	Max. 1 A Max. 500 mA	
Cable length	Max. 5 m (without hub)	

Table 15: USB1, USB2, USB3, USB4 connection

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

USB5

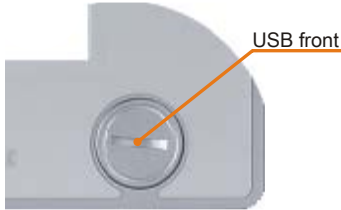
Universal Serial Bus (USB5 ¹⁾)		1x USB type A, female
Type	USB 2.0	
Design	Type A	
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), to high speed (480 Mbit/s)	
Current load ²⁾ USB5	Max. 1 A	
Cable length	Max. 5 m (without hub)	

Table 16: USB5 connection

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

2.6.7 CompactFlash slot 1

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

CompactFlash slot (CF1)	
Connection	SATA to PATA
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



Table 17: CompactFlash slot (CF1)

Warning!

Turn off power before inserting or removing the CompactFlash card!

2.6.8 CompactFlash slot 2

Since the Intel GM45 chipset used on 5PC800.BM45-0x doesn't support an IDE (PATA) channel, the CF2 slot is not supported.

CompactFlash slot (CF2)


Table 18: CompactFlash slot (CF2)

Warning!

Turn off power before inserting or removing the CompactFlash card!

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 stereo (headphone) jack.	
Line IN	Stereo Line IN signals supplied via a 3.5 mm jack.	
Line OUT	Connection of a stereo sound device (e.g. amplifier) via a 3.5 mm jack.	

Table 19: MIC, Line IN, Line OUT

Driver support

A special driver is necessary for operating the audio controller. The necessary drivers are available in the Downloads area of the B&R website (www.br-automation.com).

Information:

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

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	
Pin assignments with mounted 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 20: Add-on UPS slot

Information about the UPS module see " Accessories" on page 226.

2.6.11 Power button

The power button has a variety of functions due to full ATX power supply support.

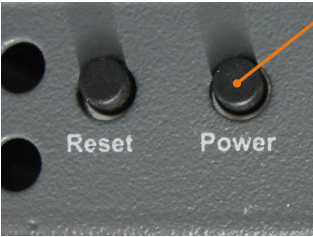
Power button	
The power button acts like the on/off switch on a normal desktop PC with ATX power supply: Press and release ... Switches on PPC800 or shuts down the operating system and switches off the PPC800. Press and hold ... ATX power supply switches off without shutting down the PPC8000 (data could be lost!). Pressing the power button does not reset the MTCX processor.	

Table 21: Power button

2.6.12 Reset button

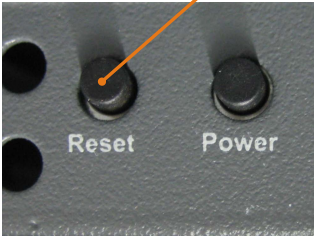
Reset button	
Pushing the reset button triggers a hardware and PCI reset. The PPC800 is restarted (cold restart). The MTCX processor is not reset when the reset button is pressed.	

Table 22: Reset button

Warning!
A system reset can cause data to be lost!

2.6.13 Status LEDs

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

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

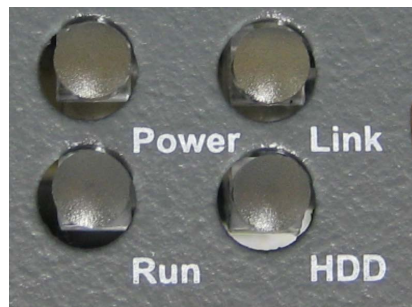


Table 23: Status LEDs

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 defined 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 24: 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) as well as the individually saved BIOS settings and is located behind the black cover. The buffer duration of the battery is at least 2½ years (at 50°C, 8.5 µA current requirements of the supplied components and a self discharge of 40%). The battery has a limited lifespan and should be replaced regularly (at least following the specified lifespan).

Battery	
Battery Type	Renata 950 mAh
Removable	Yes, accessible from the outside
Service life	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 pcs., 3 V, 950 mAh, button cell

Battery



Table 25: Battery

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

Battery status evaluation

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

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

Table 26: Meaning of battery status

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

2.6.16 Slide-in compact slot

The slide-in compact slot is internally connected with the chipset via SATA I.

Slide-in compact slot		
Connection	SATA I	
Model number	Short description	
	Option	
5AC803.BC02-00	PPC800 option: 1 compact slide-in	
	Drives	
5AC801.HDDI-00	40 GB SATA hard disk (slide-in compact); 24/7 hard disk with extended temperature range. Note: Please consult the manual for info on using the hard disk.	
5AC801.HDDI-02	160 GB SATA hard disk (slide-in compact); 24/7 hard disk with extended temperature range. Note: Please consult the manual for info on using the hard disk.	
5AC801.HDDI-03	250 GB SATA hard disk (slide-in compact); 24/7 hard disk. Note: Please consult the manual for info on using the hard disk.	
5AC801.SSDI-00	32 GB SATA SSD (SLC) (slide-in compact).	



Table 27: Slide-in compact slot

Information:

The option 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 PClec slot (card slot)

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



Table 28: PClec slots

Information:

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

Information:

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

For more information, see "PClec Plug-in cardn" on page 69.

3 Individual components

3.1 System units

3.1.1 5PC820.1505-00

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

Order data

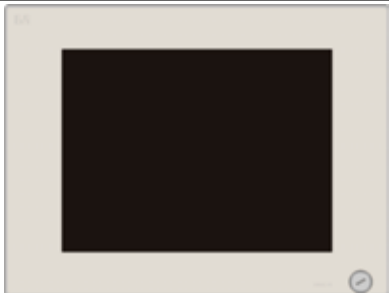
Model number	Short description	Figure
	System units	
5PC820.1505-00	Panel PC 820 15" XGA color TFT display with touch screen (resistive); connections for 1x RS232, 5x USB 2.0, Smart Display Link/DVI/Monitor, 2x Ethernet 10/100/1000, HDA Sound, add-on UPS slot, expandable with 1 or 2 PCI / PCI express slots, optional PCI Express compact and slide-in compact slot; IP65 protection (front side); 24 VDC Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91).	
	Mandatory accessories	
	CPU boards	
5PC800.B945-05	CPU board Intel Atom N270, 1.6 GHz, 533 MHz FSB, 512 kB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 RAM modules (total memory max. 3 GB)	
5PC800.B945-10	CPU board Intel Core Duo L2400, 1.66 GHz, 667 MHz FSB, 2 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111C.	
5PC800.B945-11	CPU board Intel Core2 Duo L7400, 1.5 GHz, 667 MHz FSB, 4 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111C.	
5PC800.B945-12	CPU board Intel Core2 Duo U7500, 1.06 GHz, 533 MHz FSB, 2 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111C.	
5PC800.B945-13	CPU board Intel Celeron M 423, 1.06 GHz, 533 MHz FSB, 1 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111C.	
5PC800.B945-14	CPU board Intel Core2 Duo T7400, 2.16 GHz, 667 MHz FSB, 4 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111C.	
5PC800.BM45-00	CPU Board Intel Core2 Duo T9400, 2.53 GHz, 1066 MHz FSB, 6 MB L2 cache; chipset GM45; 2 sockets for SO-DIMM DDR3 RAM modules	
5PC800.BM45-01	CPU Board Intel Core2 Duo P8400, 2.26 GHz, 1066 MHz FSB, 3 MB L2 Cache; chipset GM45; 2 sockets for SO-DIMM DDR3 RAM modules	
	Fan kits	
5AC803.FA01-00	PPC800 fan kit for system units without expansion.	
	Heat sinks	
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 processor T7400, T9400 and P8400.	
5AC803.HS00-02	PPC800 heat sink for CPU board with Atom processor N270.	
	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	
	Main memory for GM45 CPU boards	

Table 29: 5PC820.1505-00 - Order data

Model number	Short description	Figure
5MMDDR.2048-02	SO-DIMM DDR3 RAM 2048 MB PC3-8500	
5MMDDR.4096-02	SO-DIMM DDR3 RAM 4096 MB PC3-8500	
	Terminal blocks	
0TB103.9	Connector, 24 VDC, 3-pin female, screw clamps 3.31 mm ² , protected against vibration by the screw flange	
0TB103.91	Connector, 24 VDC, 3-pin female, cage clamps 3.31 mm ² , protected against vibration by the screw flange	
	Optional 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 slots, 1 slide-in slot.	
5AC803.BX02-01	PPC800 bus with 1 PCI, 1 PCI Express, 1 slide-in slot.	
	Drives	
5AC801.ADAS-00	SATA hard disk adapter to operate a slide-in compact hard disk in a slide-in slot.	
5AC801.DVDS-00	DVD-ROM SATA drive (slide-in).	
5AC801.DVRS-00	DVD-R/RW DVD+R/RW SATA drive (slide-in).	
5AC801.HDDI-00	40 GB SATA hard disk (slide-in compact); 24/7 hard disk with extended temperature range. Remark: Please see manual for proper use of the hard disk.	
5AC801.HDDI-03	250 GB SATA hard disk (slide-in compact); 24/7 hard disk. Remark: Please see manual for proper use of the hard disk.	
5AC801.HDDS-00	40 GB SATA hard disk (slide-in); 24/7 hard disk with extended temperature range. Remark: Please see manual for proper use of the hard disk.	
5AC801.SSDI-00	32 GB SATA SSD (SLC) (slide-in compact).	
	Expansions	
5AC803.SX01-00	PPC800 expansion 1 PCI/PCI Express and 1 Slide-in (bus 5AC803.BX01-00 or 5AC803.BX01-01 necessary).	
5AC803.SX02-00	PPC800 expansion 2 PCI/PCI Express and 1 Slide-in (bus 5AC803.BX02-00 or 5AC803.BX02-01 necessary).	
	Fan kits	
5AC803.FA02-00	PPC800 fan kit for system units with the expansion 5AC803.SX01-00.	
5AC803.FA03-00	PPC800 fan kit for system units with the expansion 5AC803.SX02-00.	
	Interface cards	
5ACPCC.ETH0-00	PClec Ethernet card 1x 10/100/1000	
5ACPCC.MPL0-00	PClec POWERLINK card, 2 POWERLINK interfaces, 512 kB SRAM	
	Options	
5AC803.BC01-00	PPC800 option 1 PCI Express compact.	
5AC803.BC02-00	PPC800 option 1 Slide-in compact.	
	Uninterruptible power supplies	
5AC600.UPSB-00	Battery unit 5Ah; for APC620, APC800 or PPC800 UPS.	
5AC600.UPSI-00	UPS module for APC620, APC810, PPC800; for system units 5PC600.SX01-00 (from Rev. H0), 5PC600.SX02-00 (from Rev. G0), 5PC600.SX02-01 (from Rev. H0), 5PC600.SX05-00 (from Rev. F0), 5PC600.SX05-01 (from Rev. F0), 5PC600.SF03-00 (from Rev. A0), 5PC810.SX*. 5PC820.1505-00, 5PC820.1906-00. Cable (5CAUPS.0005-00 or 5CAUPS.0030-00) and battery unit (5AC600.UPSB-00) have to be ordered separately.	
5CAUPS.0005-00	UPS cable 0.5 m; for USV 5AC600.UPSI-00.	
5CAUPS.0030-00	UPS cable 3 m; for USV 5AC600.UPSI-00.	
5CAUPS.0030-P00	USV Kabel 3 m; für USV 5AC600.UPSI-P00 - kundenspezifisch -	

Table 29: 5PC820.1505-00 - Order data

Interfaces

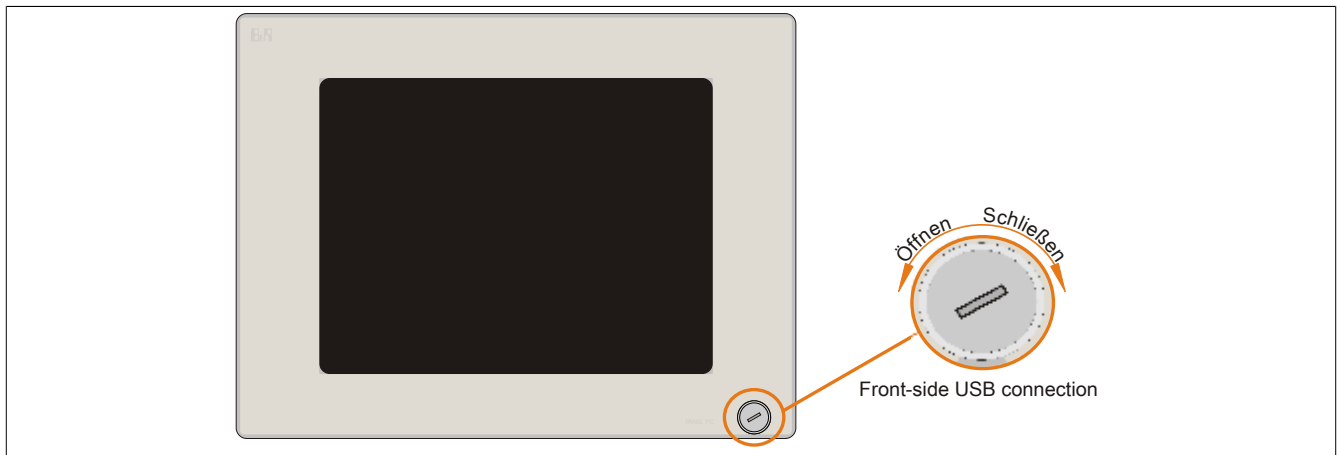


Image 12: 5PC820.1505-00 - Front view

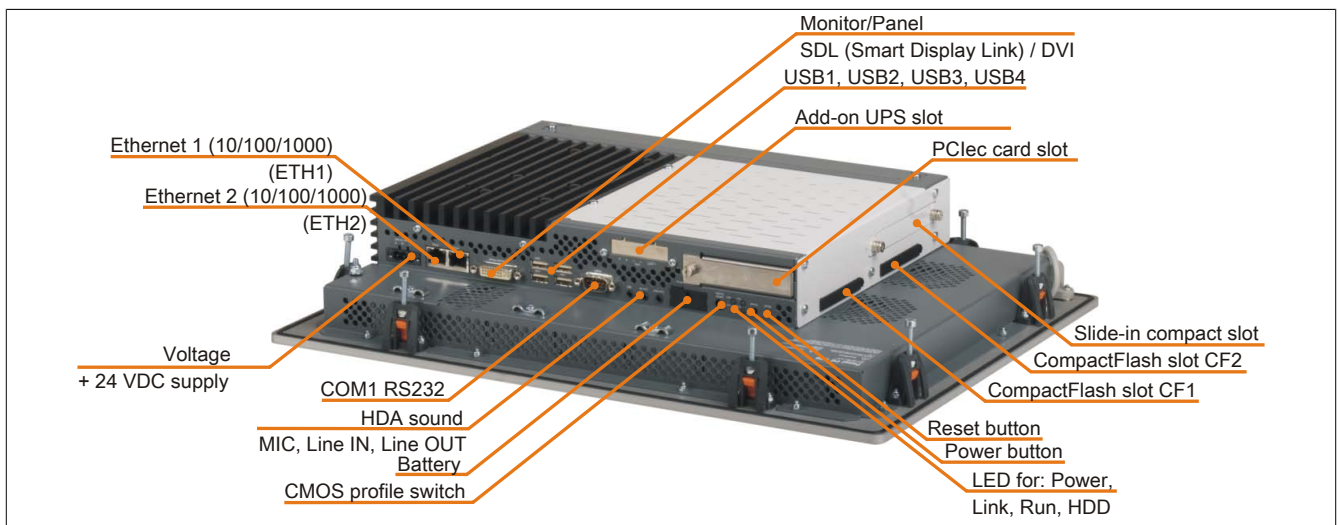


Image 13: 5PC820.1505-00 - Rear view

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").

Technical data

Product ID	5PC820.1505-00
General information	
LEDs	Power, HDD, Link, Run
B&R ID code	\$AF21
Battery	
Type	Renata 950 mAh
Lifespan	2½ years
Removable	Yes, accessible from the outside
Design	Lithium ion
Power button	Yes
Reset button	Yes
Buzzer	Yes
Certification types	
CE	Yes
c-UL-us	Yes
Controllers	
Bootloader	BIOS
Power failure logic	

Table 30: 5PC820.1505-00 - Technical data

Product ID	5PC820.1505-00
Controllers	MTCX ¹⁾
Buffer time	10 ms
Graphics	
Controllers	Depending on the CPU board used
Memory	
Type	Depending on the CPU board used
Size	Depending on the CPU board used
Interfaces	
COM1	
Type	RS232, modem-capable, not electrically isolated
Design	9-pin DSUB plug
UART	16550-compatible, 16-byte FIFO
Max. baud rate	115 kbit/s
CompactFlash slot 1	
Type	Type I
CompactFlash slot 2	
Type	Type I
USB	
Amount	5
Type	USB 2.0
Design	Type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), to high speed (480 Mbit/s)
Current load	Max. 500 mA or 1 A per connection
Ethernet	
Amount	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	Color TFT
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°
Background lighting	
Brightness	250 cd/m²
Half-brightness time ²⁾	50,000 h
Touch screen ³⁾	
Type	Accu Touch
Technology	Analog, resistive
Controllers	Elo, serial, 12-bit
Degree of transmission	81% ±3%
Inserts	
PCI slots	
Amount	1 or 2 (optional) ⁴⁾
PCIe slots	
Amount	1 ⁵⁾
PClec slots	
Amount	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 properties	
Rated voltage	24 VDC ±25%
Rated current	6 A
Starting current	Typ. 10 A, max. 50 A for < 300 µs
Power consumption	Component-dependent
Electrical isolation	Yes
Operating conditions	
Drop height	1 m to industrial floor
EN 60529 protection	IP20 (back) IP65 / NEMA 250 type 4X, dust and sprayed water protection (front)
Environmental conditions	
Temperature	
Operation	Component-dependent
Storage	-20 to 60°C
Transport	-20 to 60°C

Table 30: 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
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 30: 5PC820.1505-00 - Technical data

- 1) Maintenance controller extended.
- 2) At 25°C ambient temperature. Reducing the brightness by 50% can result in an approximate 50% increase of the half-brightness time.
- 3) Touch screen drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).
- 4) The PCI slots are dependent on the expansion and bus unit used.
- 5) The PCIe slots are dependent on the expansion and bus unit used.
- 6) Optional with PCIe option 5AC803.BC01-00.
- 7) Optional with slide-in compact option 5AC803.BC02-00.

Dimensions

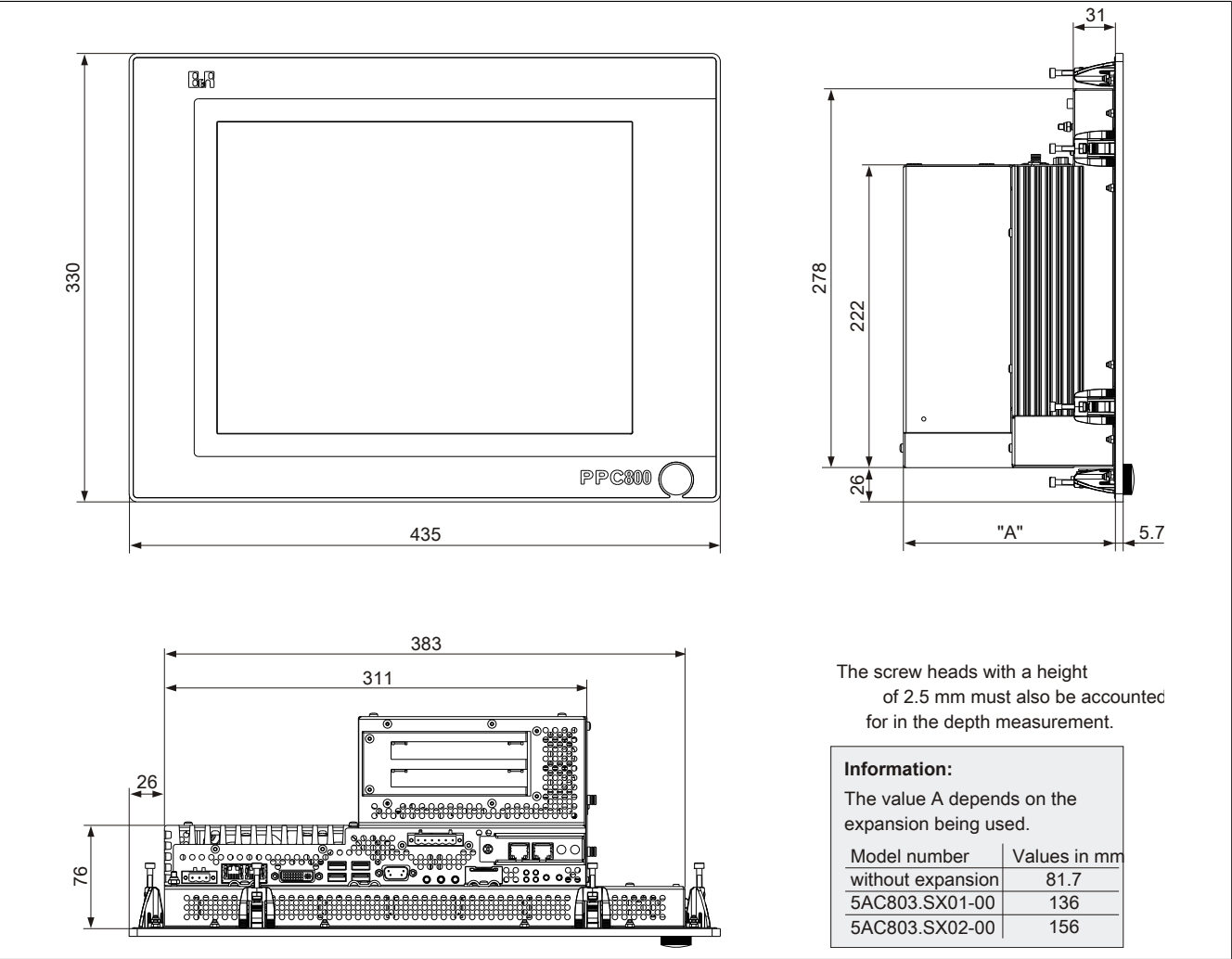


Image 14: 5PC820.1505 - Dimensions

Cutout

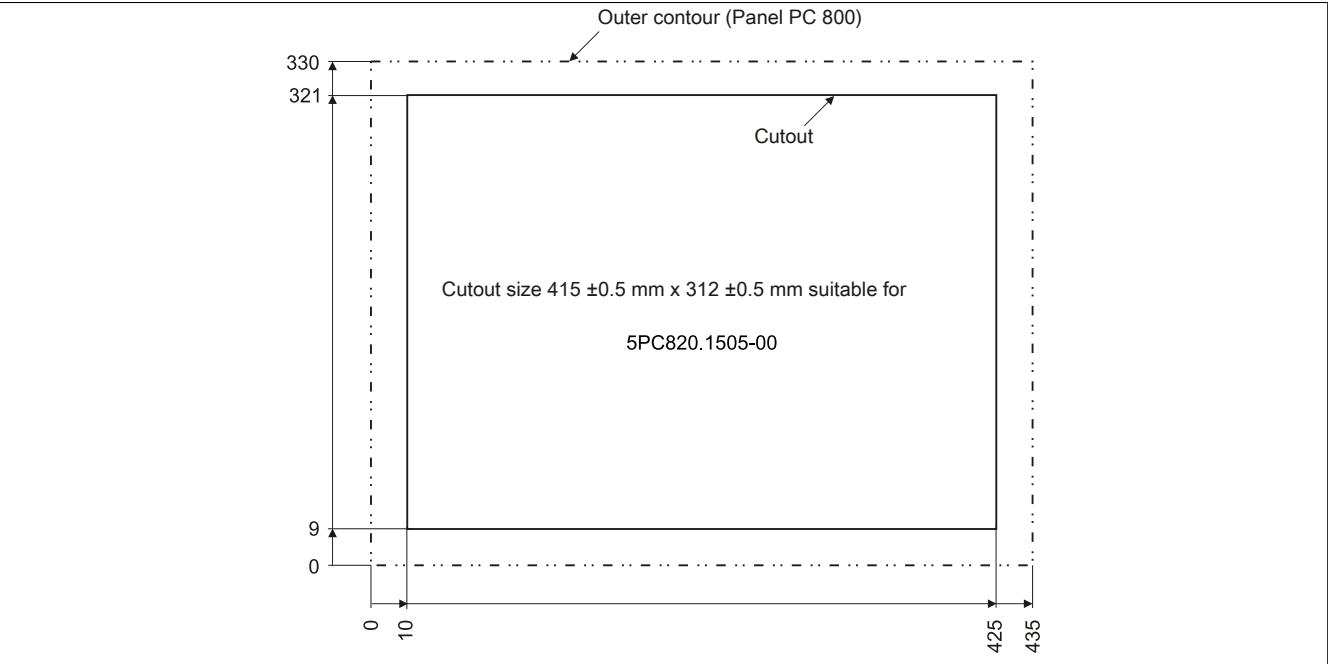


Image 15: 5PC820.1505-00 - Cutout installation

3.1.2 5PC820.1906-00

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

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 PCI Express compact and slide-in compact slot, IP65 protection (front side); 24 VDC Plug for power supply must be ordered separately (screw clamps: 0TB103.9; cage clamps: 0TB103.91).	
	Mandatory accessories	
	CPU boards	
5PC800.B945-05	CPU board Intel Atom N270, 1.6 GHz, 533 MHz FSB, 512 kB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 RAM modules (total memory max. 3 GB)	
5PC800.B945-10	CPU board Intel Core Duo L2400, 1.66 GHz, 667 MHz FSB, 2 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111C.	
5PC800.B945-11	CPU board Intel Core2 Duo L7400, 1.5 GHz, 667 MHz FSB, 4 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111C.	
5PC800.B945-12	CPU board Intel Core2 Duo U7500, 1.06 GHz, 533 MHz FSB, 2 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111C.	
5PC800.B945-13	CPU board Intel Celeron M 423, 1.06 GHz, 533 MHz FSB, 1 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111C.	
5PC800.B945-14	CPU board Intel Core2 Duo T7400, 2.16 GHz, 667 MHz FSB, 4 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111C.	
5PC800.BM45-00	CPU Board Intel Core2 Duo T9400, 2.53 GHz, 1066 MHz FSB, 6 MB L2 cache; chipset GM45; 2 sockets for SO-DIMM DDR3 RAM modules	
5PC800.BM45-01	CPU Board Intel Core2 Duo P8400, 2.26 GHz, 1066 MHz FSB, 3 MB L2 Cache; chipset GM45; 2 sockets for SO-DIMM DDR3 RAM modules	
	Fan kits	
5AC803.FA01-00	PPC800 fan kit for system units without expansion.	
	Heat sinks	
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 processor T7400, T9400 and P8400.	
5AC803.HS00-02	PPC800 heat sink for CPU board with Atom processor N270.	
	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	
	Main memory for GM45 CPU boards	
5MMDDR.2048-02	SO-DIMM DDR3 RAM 2048 MB PC3-8500	
5MMDDR.4096-02	SO-DIMM DDR3 RAM 4096 MB PC3-8500	
	Terminal blocks	
0TB103.9	Connector, 24 VDC, 3-pin female, screw clamps 3.31 mm ² , protected against vibration by the screw flange	

Table 31: 5PC820.1906-00 - Order data

Model number	Short description	Figure
0TB103.91	Connector, 24 VDC, 3-pin female, cage clamps 3.31 mm ² , protected against vibration by the screw flange	
	Optional 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 slots, 1 slide-in slot.	
5AC803.BX02-01	PPC800 bus with 1 PCI, 1 PCI Express, 1 slide-in slot.	
	Drives	
5AC801.ADAS-00	SATA hard disk adapter to operate a slide-in compact hard disk in a slide-in slot.	
5AC801.DVDS-00	DVD-ROM SATA drive (slide-in).	
5AC801.DVRS-00	DVD-R/RW DVD+R/RW SATA drive (slide-in).	
5AC801.HDDI-00	40 GB SATA hard disk (slide-in compact); 24/7 hard disk with extended temperature range. Remark: Please see manual for proper use of the hard disk.	
5AC801.HDDI-03	250 GB SATA hard disk (slide-in compact); 24/7 hard disk. Remark: Please see manual for proper use of the hard disk.	
5AC801.HDDS-00	40 GB SATA hard disk (slide-in); 24/7 hard disk with extended temperature range. Remark: Please see manual for proper use of the hard disk.	
5AC801.SSDI-00	32 GB SATA SSD (SLC) (slide-in compact).	
	Expansions	
5AC803.SX01-00	PPC800 expansion 1 PCI/PCI Express and 1 Slide-in (bus 5AC803.BX01-00 or 5AC803.BX01-01 necessary).	
5AC803.SX02-00	PPC800 expansion 2 PCI/PCI Express and 1 Slide-in (bus 5AC803.BX02-00 or 5AC803.BX02-01 necessary).	
	Fan kits	
5AC803.FA02-00	PPC800 fan kit for system units with the expansion 5AC803.SX01-00.	
5AC803.FA03-00	PPC800 fan kit for system units with the expansion 5AC803.SX02-00.	
	Interface cards	
5ACPCC.ETH0-00	PClec Ethernet card 1x 10/100/1000	
5ACPCC.MPL0-00	PClec POWERLINK card, 2 POWERLINK interfaces, 512 kB SRAM	
	Options	
5AC803.BC01-00	PPC800 option 1 PCI Express compact.	
5AC803.BC02-00	PPC800 option 1 Slide-in compact.	
	Uninterruptible power supplies	
5AC600.UPSB-00	Battery unit 5Ah; for APC620, APC800 or PPC800 UPS.	
5AC600.UPSI-00	UPS module for APC620, APC810, PPC800; for system units 5PC600.SX01-00 (from Rev. H0), 5PC600.SX02-00 (from Rev. G0), 5PC600.SX02-01 (from Rev. H0), 5PC600.SX05-00 (from Rev. F0), 5PC600.SX05-01 (from Rev. F0), 5PC600.SF03-00 (from Rev. A0), 5PC810.SX*. 5PC820.1505-00, 5PC820.1906-00. Cable (5CAUPS.0005-00 or 5CAUPS.0030-00) and battery unit (5AC600.UPSB-00) have to be ordered separately.	
5CAUPS.0005-00	UPS cable 0.5 m; for USV 5AC600.UPSI-00.	
5CAUPS.0030-00	UPS cable 3 m; for USV 5AC600.UPSI-00.	
5CAUPS.0030-P00	USV Kabel 3 m; für USV 5AC600.UPSI-P00 - kundenspezifisch -	

Table 31: 5PC820.1906-00 - Order data

Interfaces

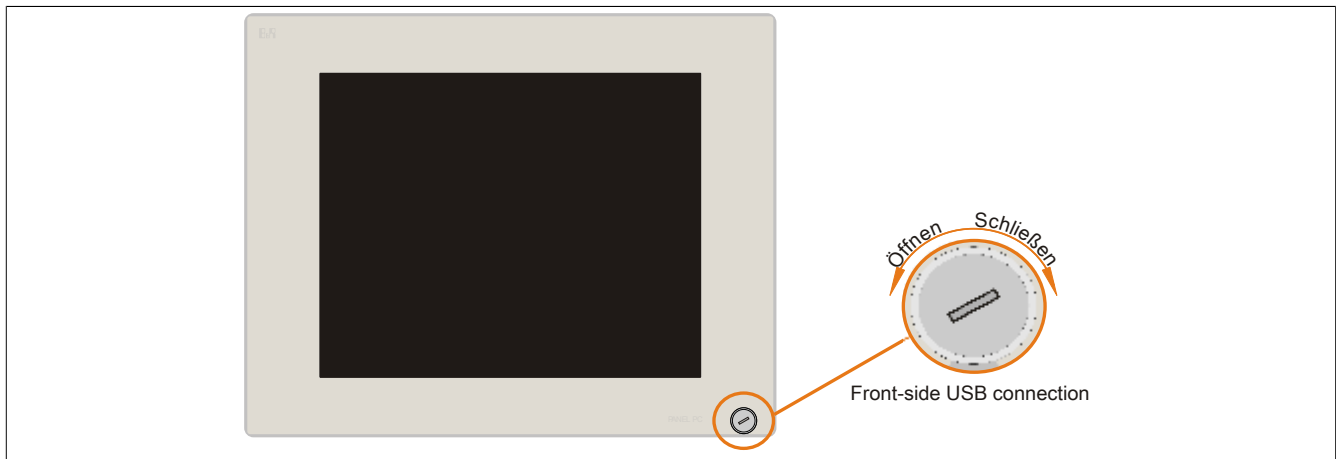


Image 16: 5PC820.1906-00 - Front view

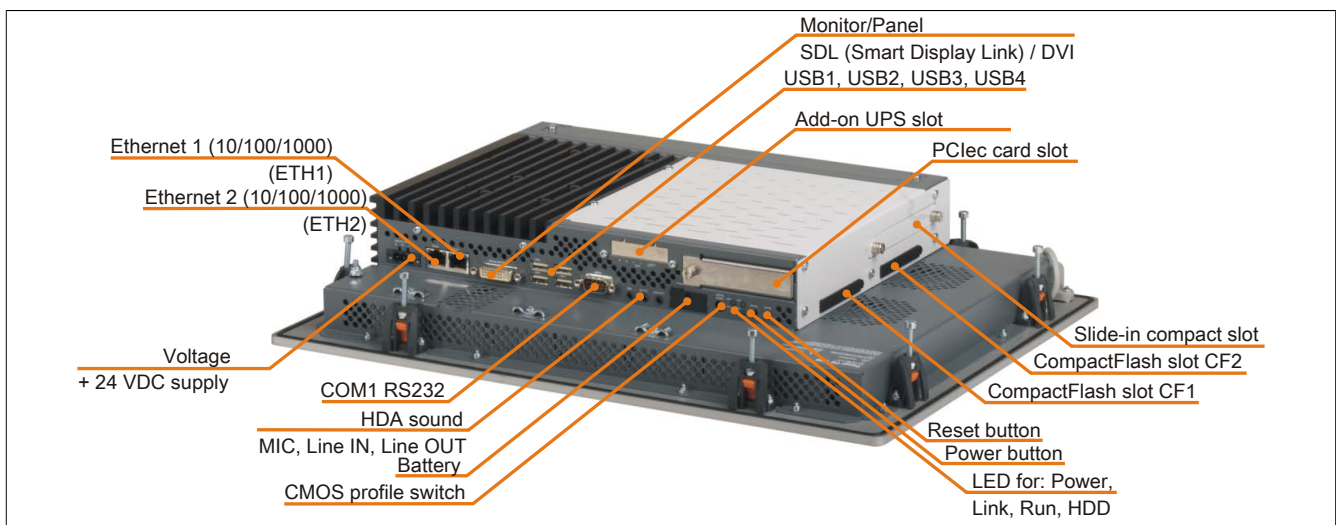


Image 17: 5PC820.1906-00 - Rear view

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").

Technical data

Product ID	5PC820.1906-00
General information	
LEDs	Power, HDD, Link, Run
B&R ID code	\$AF22
Battery	
Type	Renata 950 mAh
Lifespan	2½ years
Removable	Yes, accessible from the outside
Design	Lithium ion
Power button	Yes
Reset button	Yes
Buzzer	Yes
Certification types	
CE	Yes
c-UL-us	Yes
Controllers	
Bootloader	BIOS
Power failure logic	

Table 32: 5PC820.1906-00 - Technical data

Product ID	5PC820.1906-00
Controllers	MTCX ¹⁾
Buffer time	10 ms
Graphics	
Controllers	Depending on the CPU board used
Memory	
Type	Depending on the CPU board used
Size	Depending on the CPU board used
Interfaces	
COM1	
Type	RS232, modem-capable, not electrically isolated
Design	9-pin DSUB plug
UART	16550-compatible, 16-byte FIFO
Max. baud rate	115 kbit/s
CompactFlash slot 1	
Type	Type I
CompactFlash slot 2	
Type	Type I
USB	
Amount	5
Type	USB 2.0
Design	Type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), to high speed (480 Mbit/s)
Current load	Max. 500 mA or 1 A per connection
Ethernet	
Amount	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	Color TFT
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°
Background lighting	
Brightness	300 cd/m²
Half-brightness time ²⁾	50,000 h
Touch screen ³⁾	
Type	Accu Touch
Technology	Analog, resistive
Controllers	Elo, serial, 12-bit
Degree of transmission	81% ±3%
Inserts	
PCI slots	
Amount	1 or 2 (optional) ⁴⁾
PCIe slots	
Amount	1 ⁵⁾
PClec slots	
Amount	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 properties	
Rated voltage	24 VDC ±25%
Rated current	6 A
Starting current	Typ. 10 A, max. 50 A for < 300 µs
Power consumption	Component-dependent
Electrical isolation	Yes
Operating conditions	
Drop height	1 m to industrial floor
EN 60529 protection	IP20 (back) IP65 / NEMA 250 type 4X, dust and sprayed water protection (front)
Environmental conditions	
Temperature	
Operation	Component-dependent
Storage	-20 to 60°C
Transport	-20 to 60°C

Table 32: 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
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	10,000 g (component-dependent)

Table 32: 5PC820.1906-00 - Technical data

- 1) Maintenance controller extended.
- 2) At 25°C ambient temperature. Reducing the brightness by 50% can result in an approximate 50% increase of the half-brightness time.
- 3) Touch screen drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).
- 4) The PCI slots are dependent on the expansion and bus unit used.
- 5) The PCIe slots are dependent on the expansion and bus unit used.
- 6) Optional with PCIe option 5AC803.BC01-00.
- 7) Optional with slide-in compact option 5AC803.BC02-00.

Dimensions

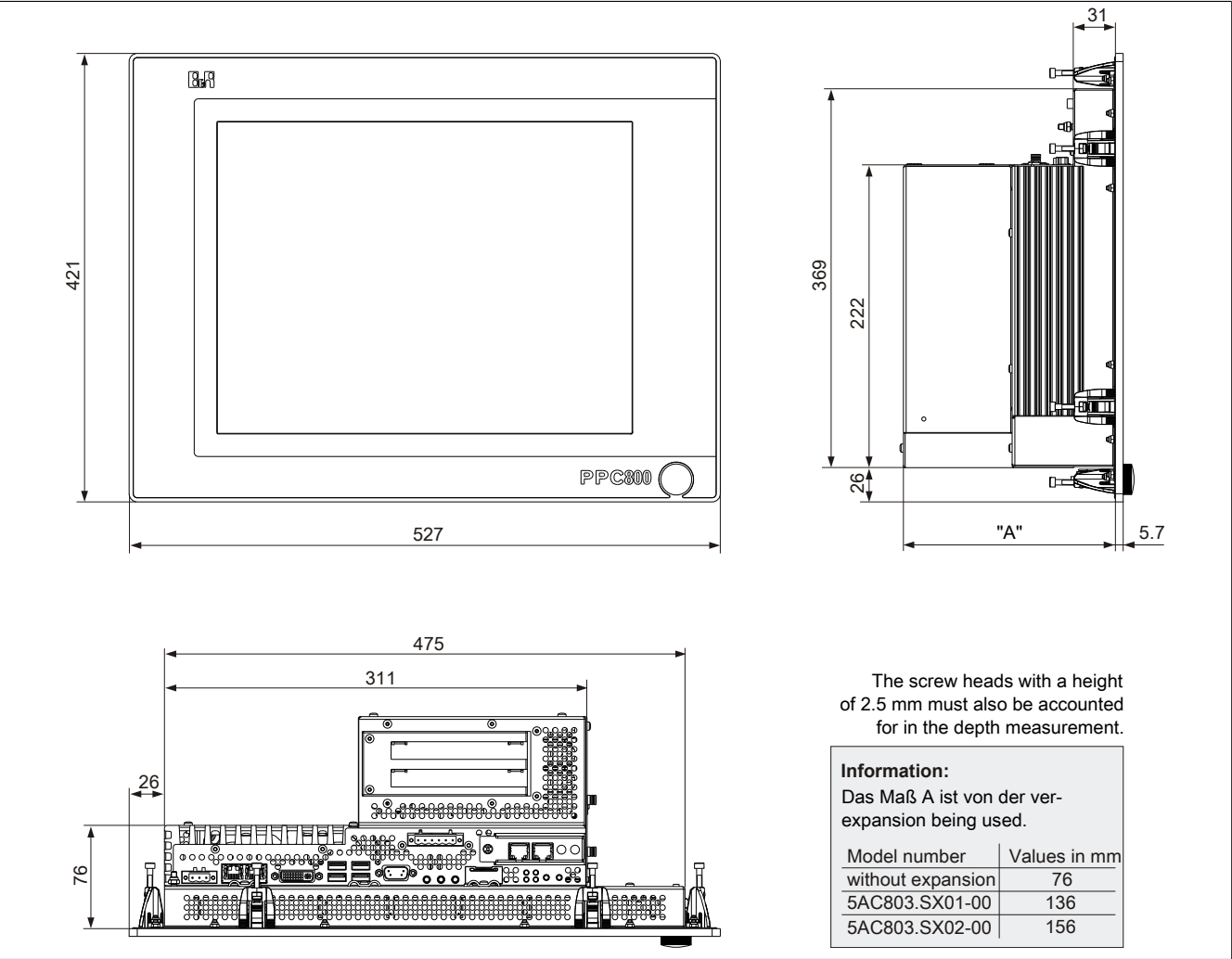


Image 18: 5PC820.1906-00 - Dimensions

Cutout

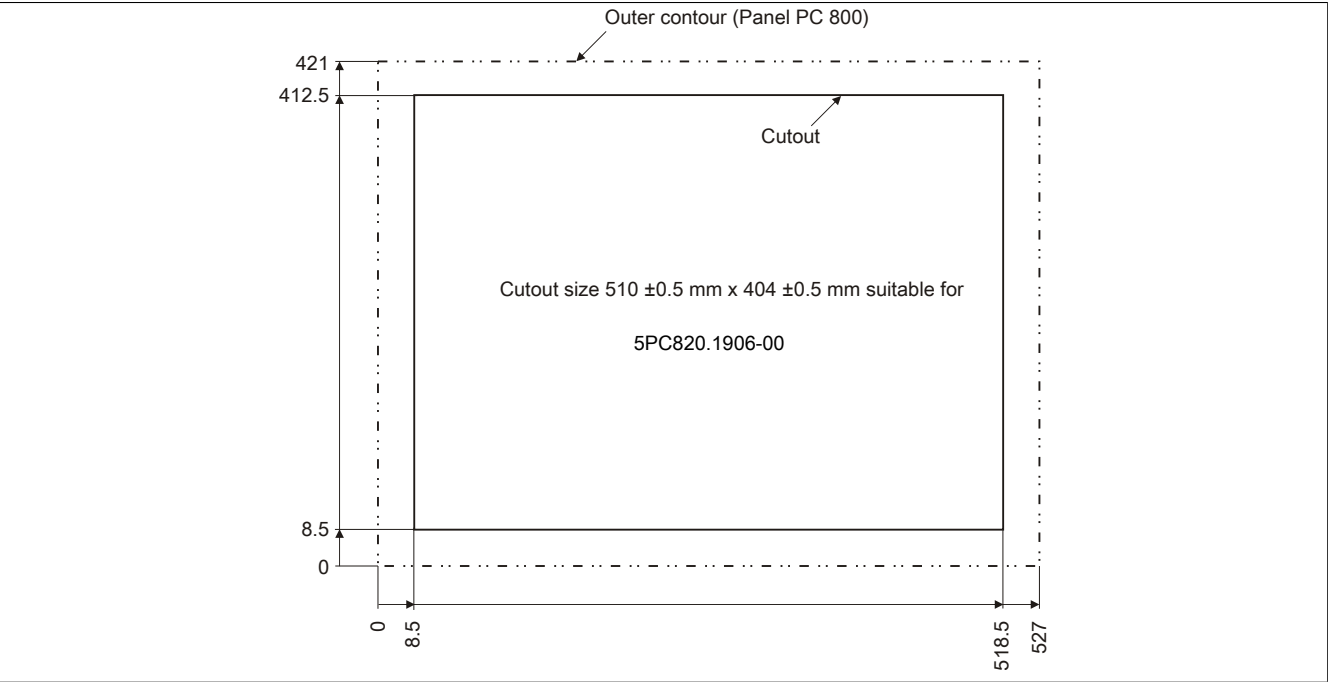


Image 19: 5PC820.1906-00 - Cutout installation

3.2 GM45 CPU boards

3.2.1 General information

The GM45 CPU boards contain two DDR3 memory sockets for a maximum of 8 GB and support dual channel memory technology. Additionally, the Intel® GMA 4500MDH is integrated with 384 MB memory and a maximum resolution of 2048 x 1537 pixels (QXGA).

- AMI BIOS
- Intel® GM45 chipset
- 2x DDR3 memory socket
- Dual channel memory
- Intel® GMA 4500MDH
- Gigabit Ethernet
- Intel® Core™ 2 Duo T9400, 2.53 GHz

3.2.2 Order data

Model number	Short description	Figure
	CPU boards	
5PC800.BM45-00	CPU Board Intel Core2 Duo T9400, 2.53 GHz, 1066 MHz FSB, 6 MB L2 cache; chipset GM45; 2 sockets for SO-DIMM DDR3 RAM modules	
5PC800.BM45-01	CPU Board Intel Core2 Duo P8400, 2.26 GHz, 1066 MHz FSB, 3 MB L2 Cache; chipset GM45; 2 sockets for SO-DIMM DDR3 RAM modules	
	Mandatory accessories	
	Main memory for GM45 CPU boards	
5MMDR.2048-02	SO-DIMM DDR3 RAM 2048 MB PC3-8500	
5MMDR.4096-02	SO-DIMM DDR3 RAM 4096 MB PC3-8500	

Table 33: 5PC800.BM45-00, 5PC800.BM45-01 - Order data

3.2.3 Technical data

Product ID	5PC800.BM45-00	5PC800.BM45-01														
General information																
Certification types CE	Yes															
Controllers																
Bootloader	Embedded AMI BIOS															
Processor	<table><tr><td>Intel® Core™2 Duo T9400 2530 MHz</td><td>Intel® Core™2 Duo P8400 2260 MHz</td></tr><tr><td></td><td>45 nm</td></tr><tr><td></td><td>32 kB</td></tr><tr><td>6 MB</td><td>3 MB</td></tr><tr><td></td><td>1066 MHz</td></tr><tr><td>Yes</td><td>-</td></tr><tr><td colspan="2">Intel® virtualization technology, G4 architecture, Enhanced SpeedStep technology SSE, SSE2, SSE3, Intel® 64 architecture</td></tr></table>		Intel® Core™2 Duo T9400 2530 MHz	Intel® Core™2 Duo P8400 2260 MHz		45 nm		32 kB	6 MB	3 MB		1066 MHz	Yes	-	Intel® virtualization technology, G4 architecture, Enhanced SpeedStep technology SSE, SSE2, SSE3, Intel® 64 architecture	
Intel® Core™2 Duo T9400 2530 MHz	Intel® Core™2 Duo P8400 2260 MHz															
	45 nm															
	32 kB															
6 MB	3 MB															
	1066 MHz															
Yes	-															
Intel® virtualization technology, G4 architecture, Enhanced SpeedStep technology SSE, SSE2, SSE3, Intel® 64 architecture																
Chipset	Intel® GM45 Intel® 82801 (ICH9M-E)															
Real-time clock																
Accuracy	At 25°C: typ. 12 ppm (1 seconds) per day ¹⁾															
Battery-buffered	Yes															
Memory socket																
Type	DDR3															
Size	Max. 8 GB															
Graphics																
Controllers	Intel® Graphics Media Accelerator 4500MDH															
Memory	Up to 384 MB ²⁾															
Color depth	Max. 32-bit															
Resolution																
DVI	2x Intel compliant SDVO ports															
RGB	300 MHz RAMDAC, resolutions up to 2048 x 1536 @ 70 Hz (QXGA)															
Mass memory management	4x SATA															
Power management	ACPI 3.0 with battery support															

Table 34: 5PC800.BM45-00, 5PC800.BM45-01 - Technical data

1) At max. specified ambient temperature: typ. 58 ppm (5 seconds) - worst-case 220 ppm (19 seconds).

2) Allocated in main memory

3.3 Heat sink

3.3.1 5AC803.HS00-01

Order data

Model number	Short description	Figure
	Heat sinks	
5AC803.HS00-01	PPC800 heat sink for CPU boards with Dual Core processor T7400, T9400 and P8400.	
	Mandatory accessories	
	CPU boards	
5PC800.B945-04	CPU Board Intel Core2 Duo T7400, 2.16 GHz, 667 MHz FSB, 4 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111B.	
5PC800.B945-14	CPU board Intel Core2 Duo T7400, 2.16 GHz, 667 MHz FSB, 4 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111C.	
5PC800.BM45-00	CPU Board Intel Core2 Duo T9400, 2.53 GHz, 1066 MHz FSB, 6 MB L2 cache; chipset GM45; 2 sockets for SO-DIMM DDR3 RAM modules	
5PC800.BM45-01	CPU Board Intel Core2 Duo P8400, 2.26 GHz, 1066 MHz FSB, 3 MB L2 Cache; chipset GM45; 2 sockets for SO-DIMM DDR3 RAM modules	

Table 35: 5AC803.HS00-01 - Order data

Technical data

Product ID	5AC803.HS00-01
General information	
Ideal for CPU boards	5PC800.B945-04 5PC800.B945-14 5PC800.BM45-00 5PC800.BM45-01
Suitable for the following system units	5PC820.1505-00 5PC820.1906-00
Mechanical characteristics	
Material	Aluminum, black-coated with copper heat pipes
Dimensions	
Width	143 mm
Height	183.5 mm
Depth	60 mm
Weight	1200 g

Table 36: 5AC803.HS00-01 - Technical data

3.4 Main memory

3.4.1 General information

These 204-pin DDR3 main memory modules operate at 1066 MHz and are available in the sizes 2 GB and 4 GB. If two RAM modules with the same size (e.g. 2 GB) are plugged in to the CPU board, then dual-channel memory technology is supported. This technology is not supported when two RAM modules of different sizes (e.g. 2 GB and 4 GB) are plugged in.

If two 2 GB modules or one 4 GB module are installed on a 32-bit operating system, only 3 GB main memory can be used. With a 64-bit operating system, max. 8 GB main memory can be used.

3.4.2 Order data

Model number	Short description	Figure
	Main memory for GM45 CPU boards	
5MMDDR.2048-02	SO-DIMM DDR3 RAM 2048 MB PC3-8500	
5MMDDR.4096-02	SO-DIMM DDR3 RAM 4096 MB PC3-8500	

Table 37: 5MMDDR.2048-02, 5MMDDR.4096-02 - Order data

3.4.3 Technical data

Product ID	5MMDDR.2048-02	5MMDDR.4096-02
General information		
Type	SO-DIMM DDR3 SDRAM	
Memory size	2 GB	4 GB
Construction	204-pin	
Organization	256M x 64-bit	512M x 64-bit
Speed	DDR3-1066 (PC3-8500)	
Certification types CE	Yes	

Table 38: 5MMDDR.2048-02, 5MMDDR.4096-02 - Technical data

Information:

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

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 (bus 5AC803.BX01-00 or 5AC803.BX01-01 necessary).	
5AC803.SX02-00	PPC800 expansion 2 PCI/PCI Express and 1 Slide-in (bus 5AC803.BX02-00 or 5AC803.BX02-01 necessary).	
	Mandatory 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.	
	Fan kits	
5AC803.FA02-00	PPC800 fan kit for system units with the expansion 5AC803.SX01-00.	
	Optional accessories	
	Drives	
5AC801.ADAS-00	SATA hard disk adapter to operate a slide-in compact hard disk in a slide-in slot.	
5AC801.DVDS-00	DVD-ROM SATA drive (slide-in).	
5AC801.DVRS-00	DVD-R/RW DVD+R/RW SATA drive (slide-in).	
5AC801.HDDS-00	40 GB SATA hard disk (slide-in); 24/7 hard disk with extended temperature range. Remark: Please see manual for proper use of the hard disk.	
5ACPCI.RAIC-05	PCI RAID System SATA 2x 250 GB; Remark: Please see manual for proper use of the hard disk.	
	Mandatory accessories	
	Bus units	
5AC803.BX02-00	PPC800 bus 2 PCI slots, 1 slide-in slot.	
5AC803.BX02-01	PPC800 bus with 1 PCI, 1 PCI Express, 1 slide-in slot.	
	Fan kits	
5AC803.FA03-00	PPC800 fan kit for system units with the expansion 5AC803.SX02-00.	

Table 39: 5AC803.SX01-00, 5AC803.SX02-00 - Order data

3.5.3 Inserts

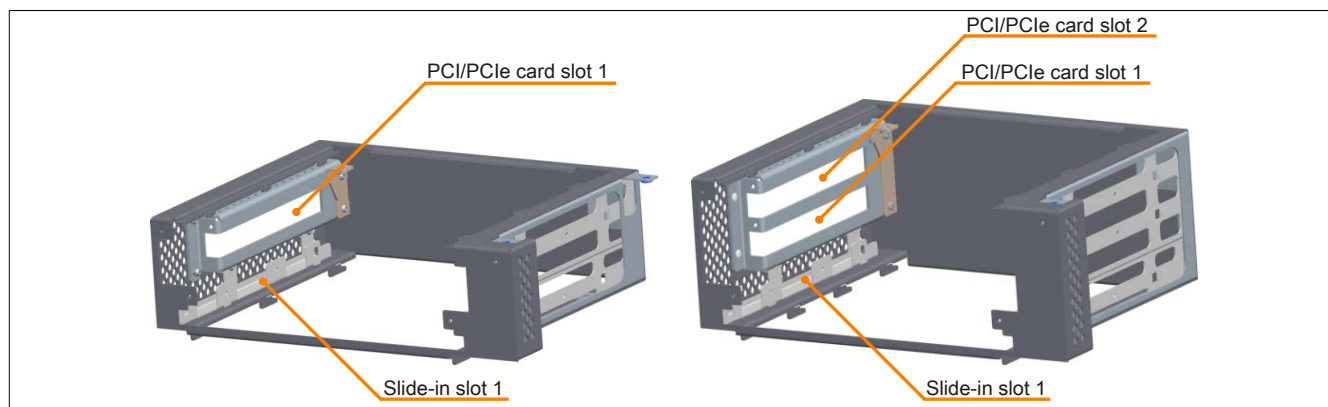


Image 20: 5AC803.SX01-00, 5AC803.SX02-00 - Inserts

3.5.4 Technical data

Product ID	5AC803.SX01-00	5AC803.SX02-00
Inserts		
PCI / PCIe slots		
Amount	1	2
Slide-in drives		1
Mechanical characteristics		
Dimensions		

Table 40: 5AC803.SX01-00, 5AC803.SX02-00 - Technical data

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

Table 40: 5AC803.SX01-00, 5AC803.SX02-00 - Technical data

3.5.5 Dimensions - 5PC803.SX01-00

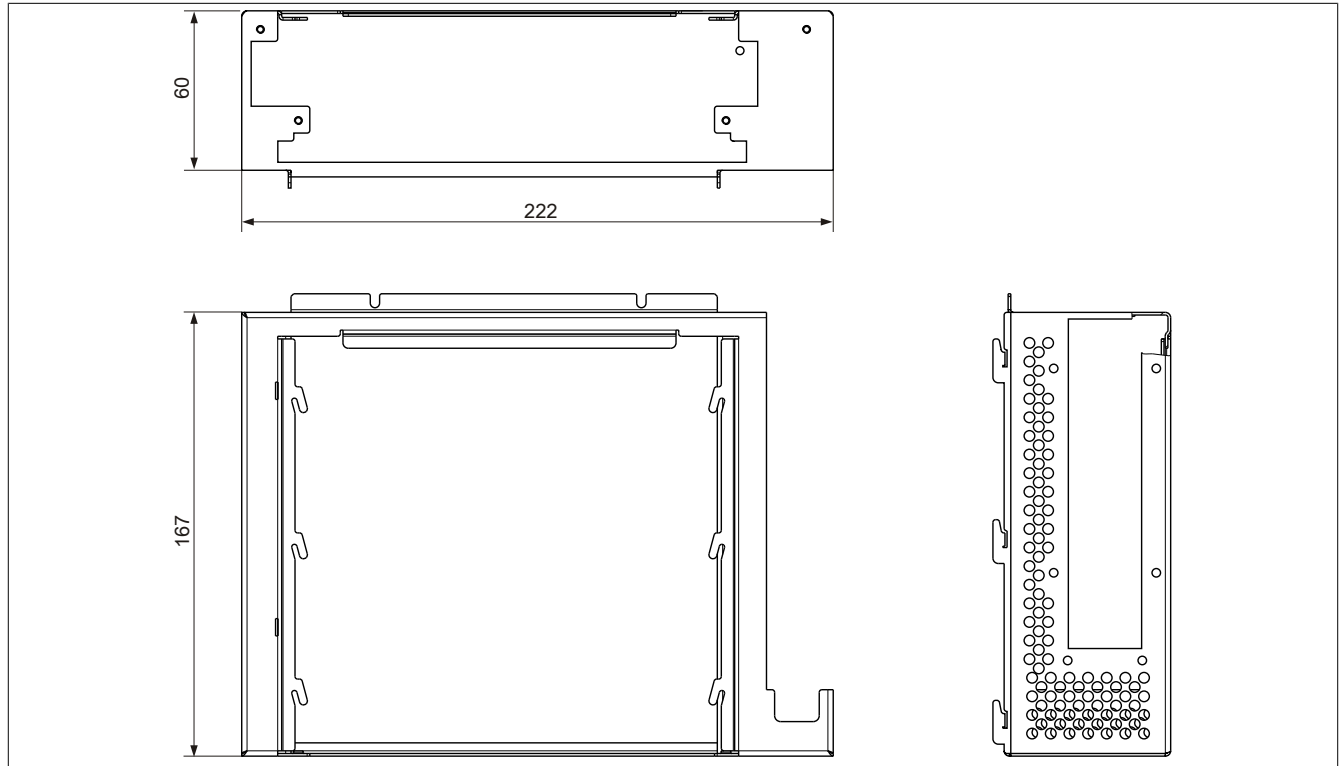


Image 21: 5AC803.SX01-00 - Dimensions

3.5.6 Dimensions - 5PC803.SX02-00

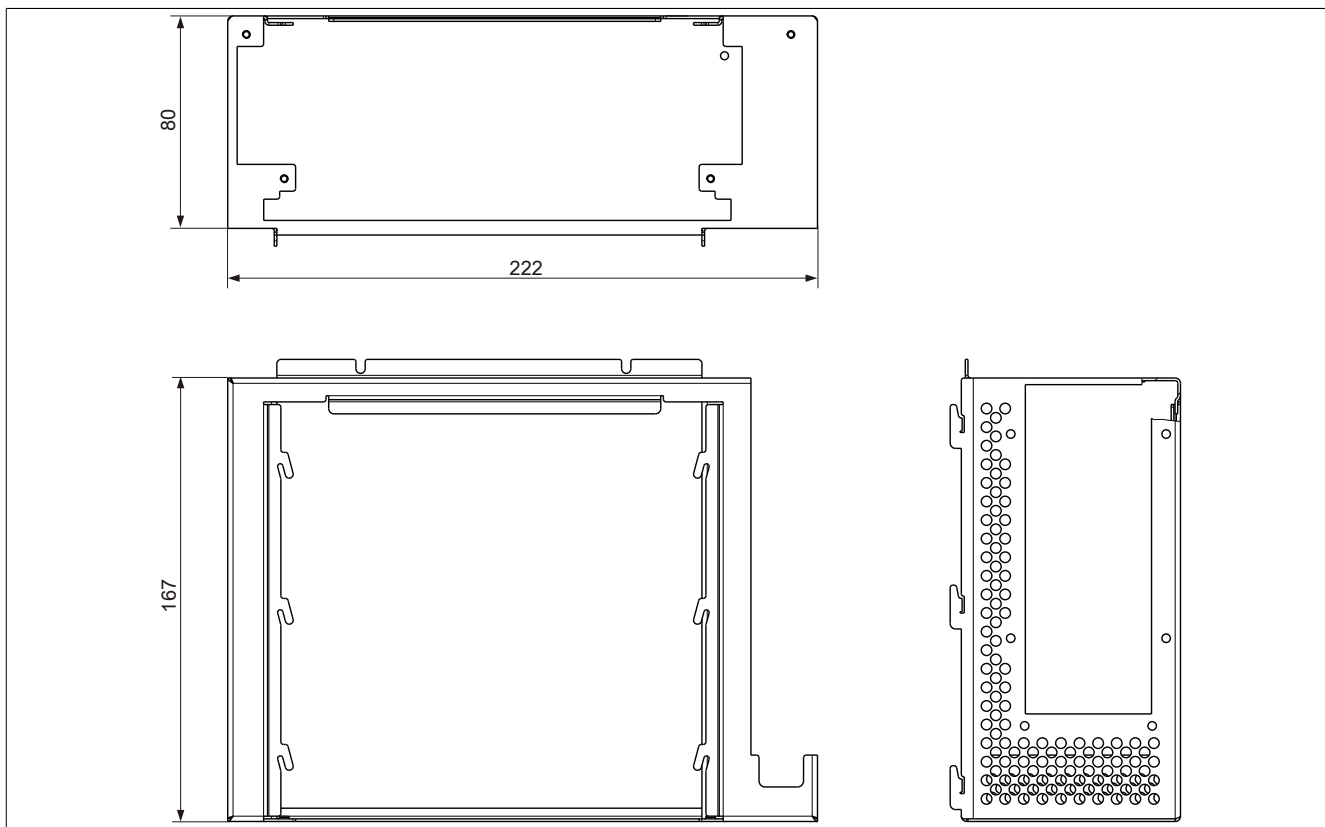


Image 22: 5AC803.SX02-00 - Dimensions

3.5.7 Slot for bus units

Card slot (PCI / PCIe)

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

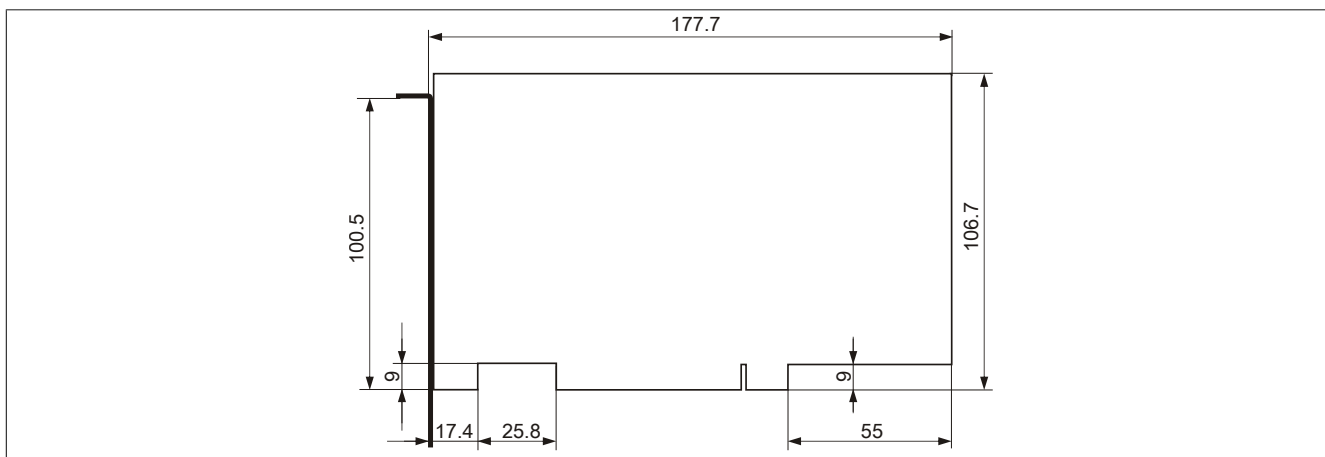


Image 23: Dimensions - Standard half-size PCI card

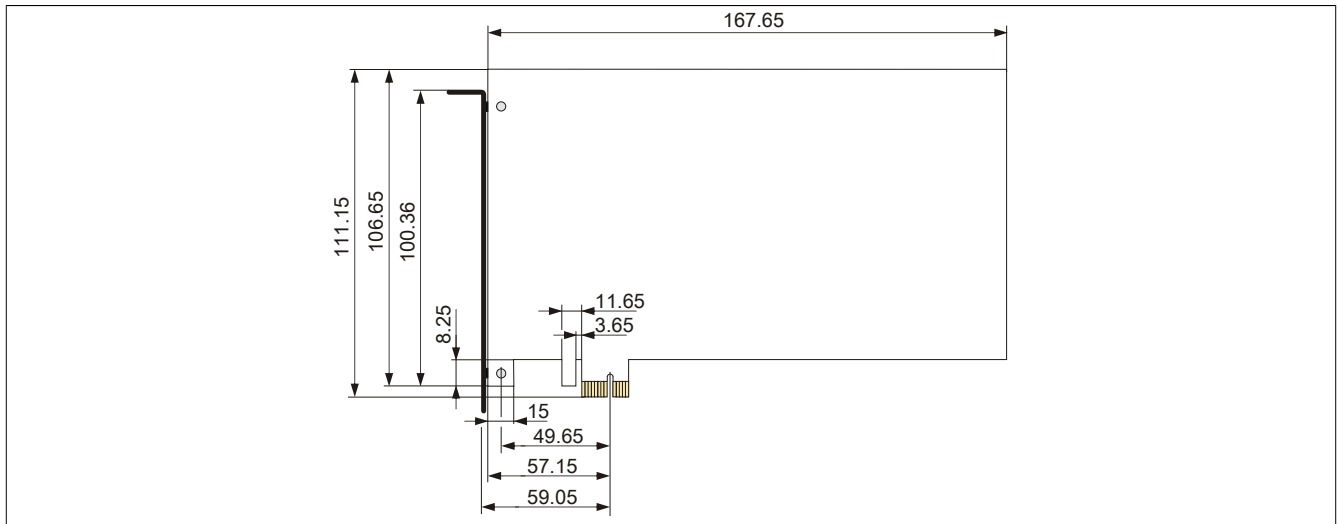


Image 24: Dimensions - Standard half-size PCIe card

3.5.8 Slide-in slot 1

Slide-in slot 1 is internally connected with the chipset 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 41: 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.

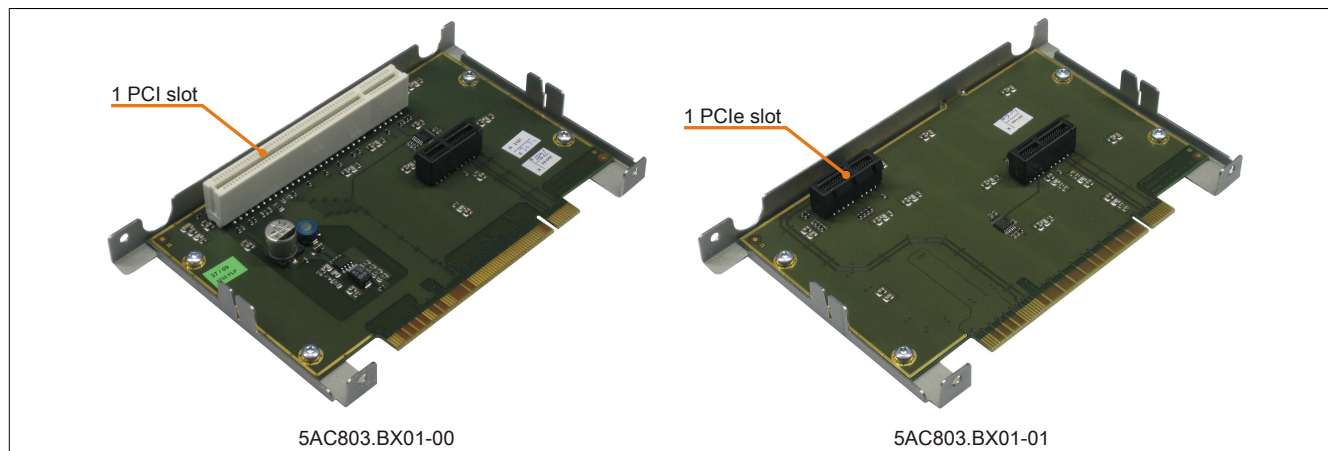


Image 25: 1 slot bus units

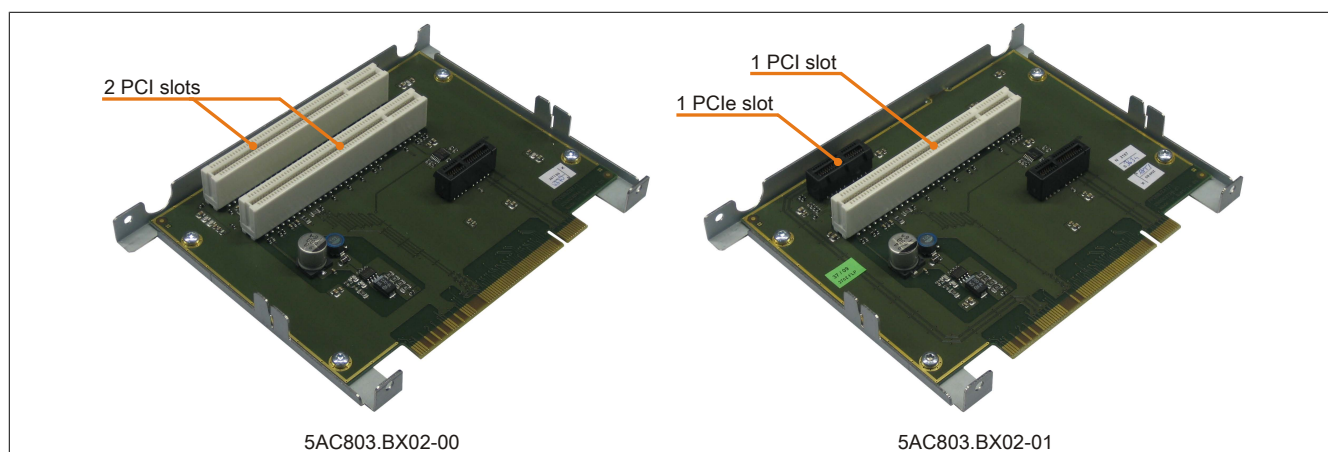


Image 26: 2 slot bus units

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 slots, 1 slide-in slot.	
5AC803.BX02-01	PPC800 bus with 1 PCI, 1 PCI Express, 1 slide-in slot.	

Table 42: 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
Inserts				
PCI slots				
Amount	1	-	2	1
Type	32-bit	-	32-bit	32-bit
Design				
Standard	2.2	-	2.2	2.2
Bus speed	33 MHz	-	33 MHz	33 MHz

Table 43: 5AC803.BX01-00, 5AC803.BX01-01, 5AC803.BX02-00, 5AC803.BX02-01 - Technical data

Product ID	5AC803.BX01-00	5AC803.BX01-01	5AC803.BX02-00	5AC803.BX02-01
PCIe slots	-	1	-	1
Amount	-	1	-	1
Design	-	1.0a	-	x1 (250 MB/s)
Standard	-	x1 (250 MB/s)	-	1.0a
Bus speed	-	x1 (250 MB/s)	-	1.0a

Table 43: 5AC803.BX01-00, 5AC803.BX01-01, 5AC803.BX02-00, 5AC803.BX02-01 - Technical data

3.7 Options

3.7.1 5AC803.BC01-00

General information

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

Order data

Model number	Short description	Figure
	Options	
5AC803.BC01-00	PPC800 option 1 PCI Express compact.	
	Mandatory accessories	
	Interface cards	
5ACPCC.ETH0-00	PClec Ethernet card 1x 10/100/1000	
5ACPCC.MPL0-00	PClec POWERLINK card, 2 POWERLINK interfaces, 512 kB SRAM	

Table 44: 5AC803.BC01-00 - Order data

3.7.2 5AC803.BC02-00

General information

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

Order data

Model number	Short description	Figure
	Options	
5AC803.BC02-00	PPC800 option 1 Slide-in compact.	
	Mandatory accessories	
	Drives	
5AC801.HDDI-00	40 GB SATA hard disk (slide-in compact); 24/7 hard disk with extended temperature range. Remark: Please see manual for proper use of the hard disk.	
5AC801.HDDI-03	250 GB SATA hard disk (slide-in compact); 24/7 hard disk. Remark: Please see manual for proper use of the hard disk.	
5AC801.SSDI-00	32 GB SATA SSD (SLC) (slide-in compact).	

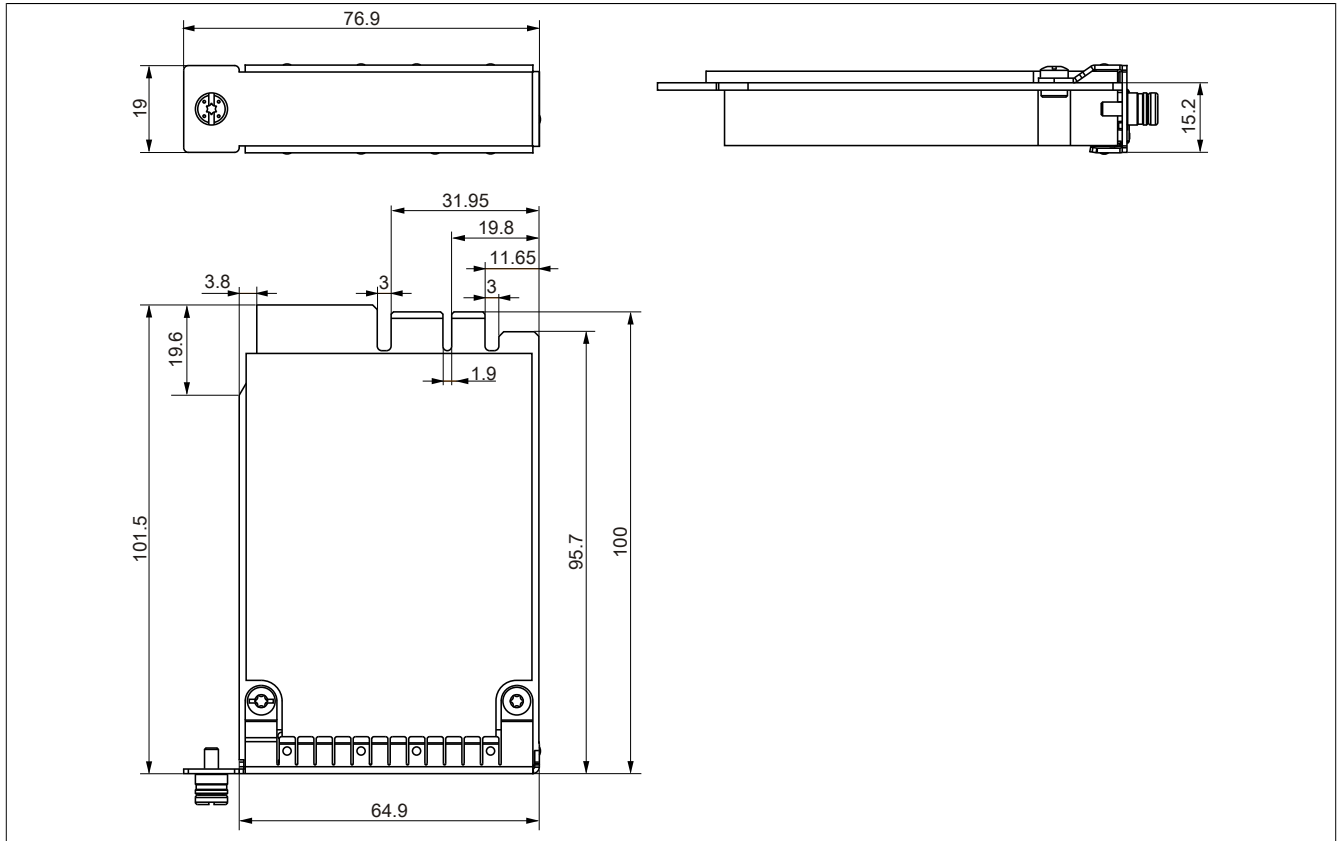
Table 45: 5AC803.BC02-00 - Order data

3.8 PClec Plug-in cardn

3.8.1 General information

The PClec 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



Information:

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

3.8.3 5ACPCC.ETH0-00

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.

- PCIe Ethernet card
- 1 network connection (10/100/1000 MBit/s)

When used in a PPC800

Information:

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

Order data

Model number	Short description	Figure
	Plug-in cards	
5ACPCC.ETH0-00	PCIe Ethernet card 10/100/1000	

Table 46: 5ACPCC.ETH0-00 - Order data

Technical data

Product ID	5ACPCC.ETH0-00
General information	
B&R ID code	\$AB25
Diagnostics	
Data transfer	Yes, with status LED
Certification types	
CE	Yes
Interfaces	
Ethernet	
Amount	1
Controllers	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	PCIe module

Table 47: 5ACPCC.ETH0-00 - Technical data

Ethernet interface

Information:

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

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

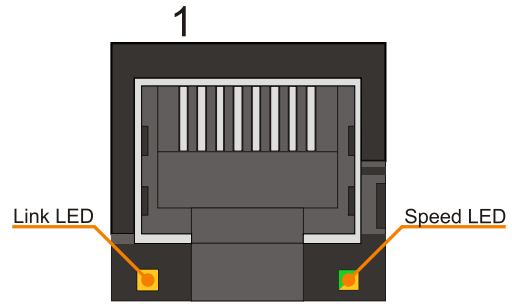


Table 48: 5ACPCC.ETH0-00 - Ethernet interface

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

Driver support

A special driver is required in order to operate the Intel Ethernet controller 82574. The necessary drivers are available in the Downloads area of the B&R website (www.br-automation.com).

Information:

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

3.8.4 5ACPCC.MPL0-00

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.

- PClec Ethernet card
- 2 POWERLINK connections
- 2 station number switches
- Card number switch

When used in a PPC800

Information:

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

Order data

Model number	Short description	Figure
	Plug-in cards	
5ACPCC.MPL0-00	PClec POWERLINK MN 2-port	

Table 49: 5ACPCC.MPL0-00 - Order data

Technical data

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

Table 50: 5ACPCC.MPL0-00 - Technical data

POWERLINK interface**Information:**

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

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

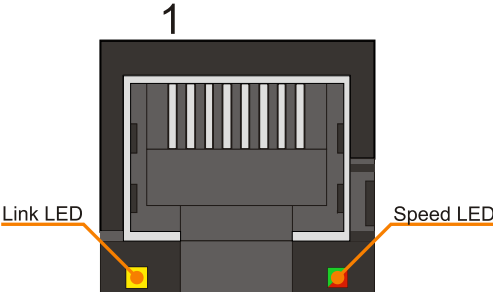


Table 51: 5ACPCC.MPL0-00 - POWERLINK interface

LED STATUS

The status/error LED is a green/red dual LED. 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 52: Status/Error LED - Ethernet TCP/IP operating mode

POWERLINK V1

Status LED		Status of the POWERLINK station
Green	Red	
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 74).

Table 53: Status/error LED - POWERLINK V1 operating mode

POWERLINK V2

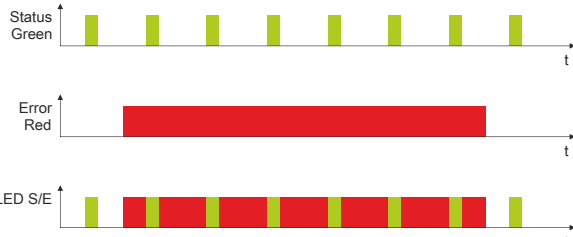
Red - error	Description
On	The POWERLINK interface has encountered an error (failed Ethernet frames, increased number of collisions on the network, etc.). If an error occurs in the following states, then the green LED blinks over the red LED: - BASIC_ETHERNET - PRE_OPERATIONAL_1 - PRE_OPERATIONAL_2 -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

Table 54: Status / Error LED as error LED - POWERLINK 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, however, POWERLINK communication is detected before this time passes, 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, however, POWERLINK communication is detected during this time, the interface goes directly into the PRE_OPERATIONAL_1 status (single flash).
Green flickering (approx. 10 Hz) BASIC_ETHERNET	The interface is in BASIC_ETHERNET status, and is 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. After this, a command changes the status to PRE_OPERATIONAL_3 (triple flash).
Triple flash (approx. 1 Hz) READY_TO_OPERATE	The interface status is READY_TO_OPERATE. Managing Node (MN) Normal cyclic and asynchronous communication. Received PDO data is ignored. Controlled Node (CN) The configuration of the interface is complete. Normal cyclic and asynchronous communication. The PDO data sent corresponds to the PDO mapping used. However, cyclic data is not yet evaluated.
On OPERATIONAL	The interface status is OPERATIONAL.
Blinking (approx. 2.5 Hz) STOPPED	The interface status is STOPPED. Managing Node (MN) This status is not possible for the MN. Controlled Node (CN) No output data is produced and no input data is received. Only the appropriate command from the manager can enter or leave this state.

Table 55: 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 Errors	•	•	•	–	Break	•	•	•	–	Break
Hardware errors	–	•	•	–	Break	–	•	•	–	Break

Table 56: Status/error LED as error LED - system failure error codes

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

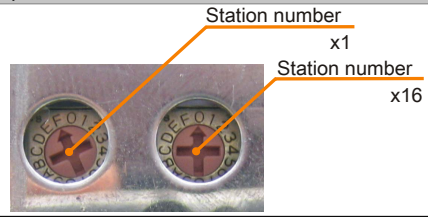


Table 57: POWERLINK station number (x1, x16)

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.

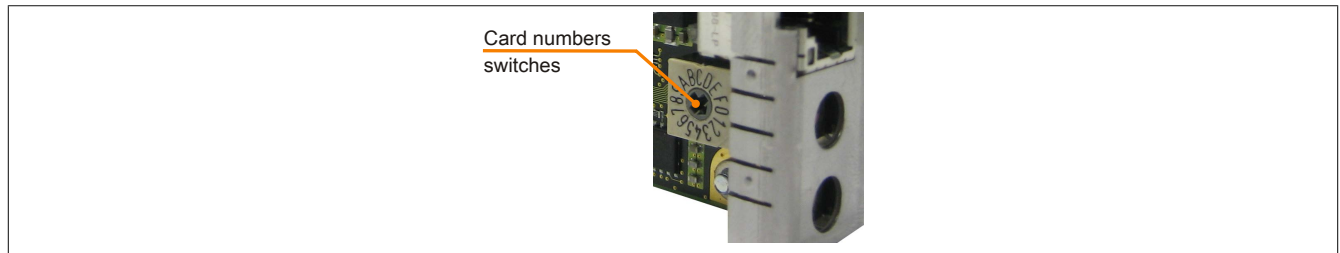


Image 27: POWERLINK card 2-port node number switch

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

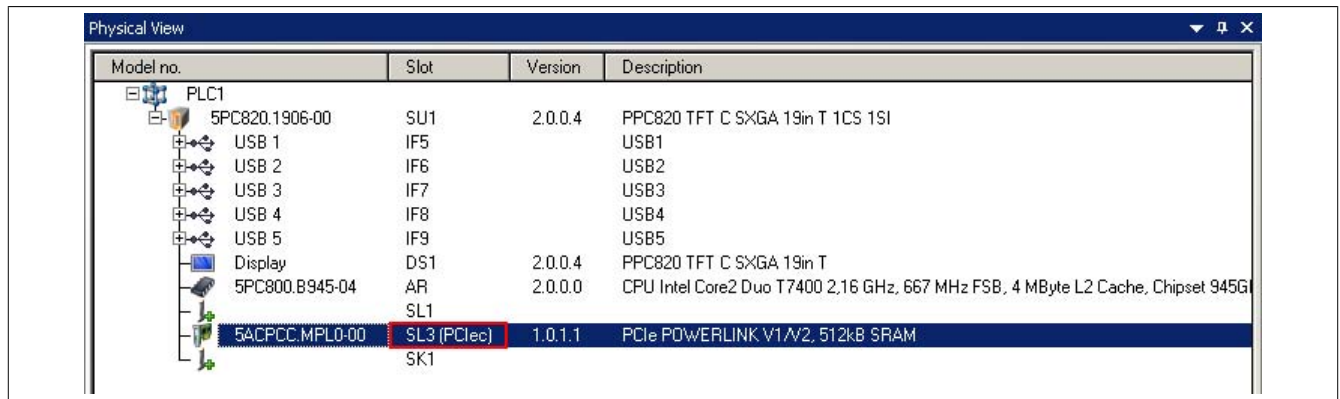


Image 28: Integrating the POWERLINK plug-in card in Automation Studio

SRAM

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

3.9 Drives

3.9.1 5AC801.HDDI-00

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 option 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 I.

Order data

Model number	Short description	Figure
	Drives	
5AC801.HDDI-00	40 GB SATA hard disk (slide-in compact); 24/7 hard disk with extended temperature range. Note: Please consult the manual when using the hard disk.	

Table 58: 5AC801.HDDI-00 - Order data

Technical data

Information:

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

Product ID	5AC801.HDDI-00
Hard Disk	
Capacity	40 GB
Number of heads	1
Number of sectors	78,140,160
Bytes per sector	512
Cache	8 MB
Speed	5400 rpm $\pm 1\%$
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	12.5 ms
Data transfer rate	
Internal	Max. 450 MBit/s
To/from host	Max. 150 MB/s (Ultra DMA mode 5)
Positioning time	
Maximum (read only)	23 ms
Minimum (track to track)	1 ms
Nominal (read only)	12.5 ms
Environmental conditions	
Temperature ¹⁾	
Operation ²⁾	-30 to 85°C
Operation - 24-hour ⁴⁾	-30 to 85°C

Table 59: 5AC801.HDDI-00 - Technical data

Product ID	5AC801.HDDI-00
Bearings	-40 to 95 °C
Transport	-40 to 95 °C
Relative humidity ⁵⁾	
Operation	5 to 90%
Bearings	5 to 95%
Transport	5 to 95%
Vibration	
Operation	5 to 500 Hz: 2 g; no non-recovered errors
Bearings	5 to 500 Hz: 5 g; no non-recovered errors
Transport	5 to 500 Hz: 5 g; no non-recovered errors
Shock	
Operation	300 g and 2 ms duration; no non-recovered errors 150 g and 11 ms duration; no non-recovered errors
Bearings	800 g and 2 ms duration; no non-recovered errors 400 g and 0.5 ms duration; no non-recovered errors
Transport	800 g and 2 ms duration; no non-recovered errors 400 g and 0.5 ms duration; no non-recovered errors
Altitude	
Operation	-300 to 5000 m
Bearings	-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's product ID	ST940817SM

Table 59: 5AC801.HDDI-00 - 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) Temperature values for 305 meter altitude. 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) 24-hour operation means 732 POH (power-on hours) per month.
- 5) Humidity gradient: Maximum 15% per hour.
- 6) Slide-in compact mounting.

Temperature humidity diagram

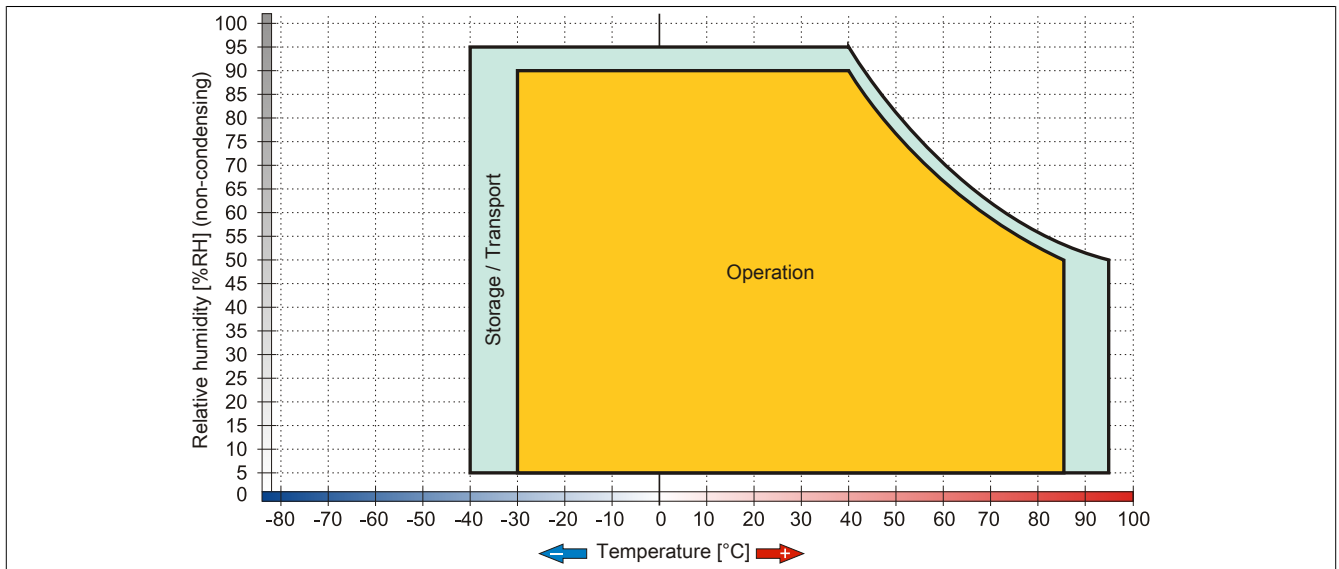


Image 29: 5AC801.HDDI-00 - Temperature humidity diagram

3.9.2 5AC801.HDDI-02

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 option 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 I.

Order data

Model number	Short description	Figure
	Drives	
5AC801.HDDI-02	160 GB SATA hard disk (slide-in compact); 24/7 hard disk with extended temperature range. Note: Please consult the manual when using the hard disk.	

Table 60: 5AC801.HDDI-02 - Order data

Technical data

Information:

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

Product ID	5AC801.HDDI-02
Hard Disk	
Capacity	160 GB
Number of heads	3
Number of sectors	312,581,808
Bytes per sector	512
Cache	8 MB
Speed	5400 rpm $\pm 1\%$
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 MBit/s
To/from host	Max. 150 MB/s (Ultra DMA mode 5)
Positioning time	
Maximum (read only)	22 ms
Minimum (track to track)	1.5 ms
Nominal (read only)	12 ms
Environmental conditions	
Temperature ²⁾	
Operation	-15 to 80°C
Operation - 24-hour ³⁾	-15 to 80°C
Bearings	-40 to 95°C
Transport	-40 to 95°C

Table 61: 5AC801.HDDI-02 - Technical data

Product ID	5AC801.HDDI-02
Relative humidity ⁵⁾	
Operation	5 to 90% ⁴⁾
Bearings	5 to 95% ⁴⁾
Transport	5 to 95% ⁴⁾
Vibration	
Operation	5 to 500 Hz: 1 g; no unrecoverable errors
Bearings	5 to 500 Hz: 5 g, no damage
Transport	5 to 500 Hz: 5 g, no damage
Shock	
Operation	325 g, 2 ms; no unrecoverable errors
Bearings	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
Bearings	-300 to 12192 m
Mechanical characteristics	
Installation	Fixed ⁶⁾
Dimensions	
Width	13 mm
Height	98 mm
Depth	105 mm
Weight	135 g
Manufacturer information	
Manufacturer	Fujitsu
Manufacturer's product ID	MHY2160BH-ESW

Table 61: 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) Maximum humidity at +29 °C.
- 5) Humidity gradient: Maximum 15% per hour.
- 6) Slide-in compact mounting.

Temperature humidity diagram

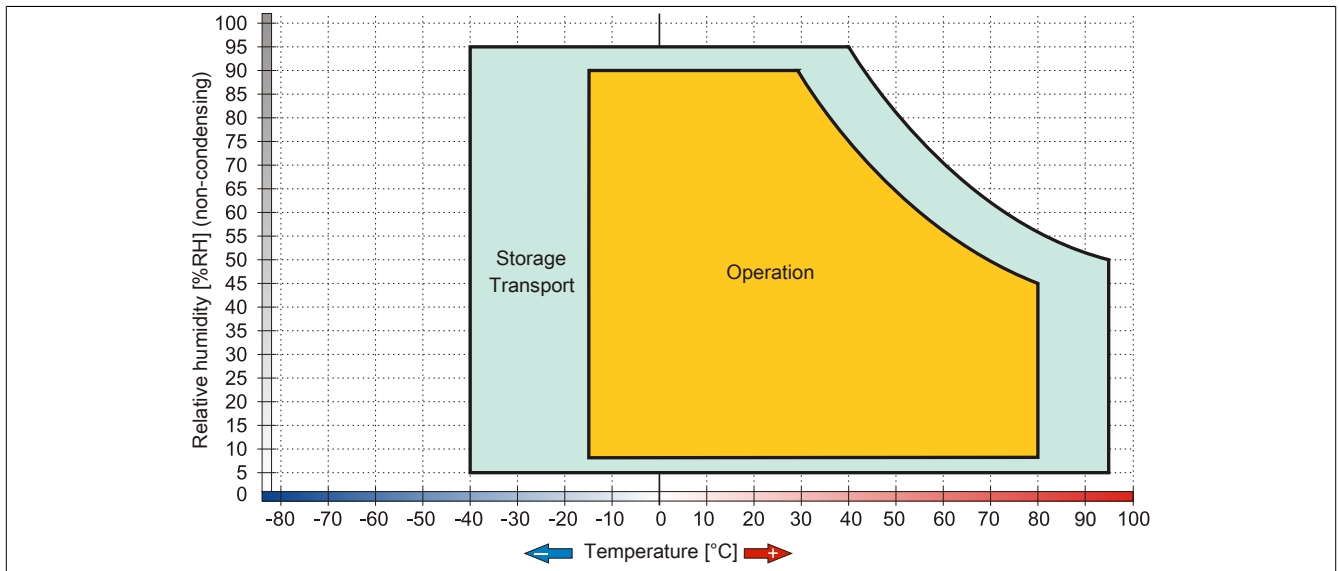


Image 30: 5AC801.HDDI-02 - Temperature humidity diagram

3.9.3 5AC801.HDDI-03

General information

This 250 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.

When used in a PPC800

Information:

The option 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 I.

Order data

Model number	Short description	Figure
	Drives	
5AC801.HDDI-03	250 GB SATA hard disk (slide-in compact); 24/7 hard disk. Remark: Please see manual for proper use of the hard disk.	
	Optional accessories	
	Drives	
5MMHDD.0250-00	250 GB SATA Hard Disk Spare part for 5AC801.HDDI-03 and 5ACPCI.RAIC-05; Remark: Please see manual for proper use of the hard disk.	

Table 62: 5AC801.HDDI-03 - Order data

Technical data

Information:

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

Product ID	5AC801.HDDI-03
General information	
Certification types CE	Yes
Hard Disk	
Capacity	250 GB
Number of heads	1
Number of sectors	488,397,168
Bytes per sector	512
Cache	8 MB
Speed	5400 rpm $\pm 0.2\%$
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 Modus 0-4, Multiword DMA Mode 0-2, UDMA Mode 0-6
Data transfer rate	
Internal	Max. 1175 Mbits/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	

Table 63: 5AC801.HDDI-03 - Technical data

Product ID	5AC801.HDDI-03
Temperature ³⁾	
Operation ²⁾	0 to 60°C
Operation - 24-hour 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
Transport	1000 g and 1 ms duration, no unrecoverable errors
Transport	600 g and 0.5 ms duration, no unrecoverable errors
Transport	800 g and 2 ms duration, no unrecoverable errors
Transport	1000 g and 1 ms duration, no unrecoverable errors
Transport	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's product ID	ST9250315AS

Table 63: 5AC801.HDDI-03 - Technical data

- 1) With 8760 POH (Power On Hours) per year and 25°C surface temperature.
- 2) Standard operation means 333 POH (power-on hours) per month.
- 3) Temperature values for 305 meter altitude. 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) 24-hour operation means 732 POH (power-on hours) per month.
- 5) Humidity gradient: Maximum 30% per hour.
- 6) Slide-in compact mounting

Temperature humidity diagram

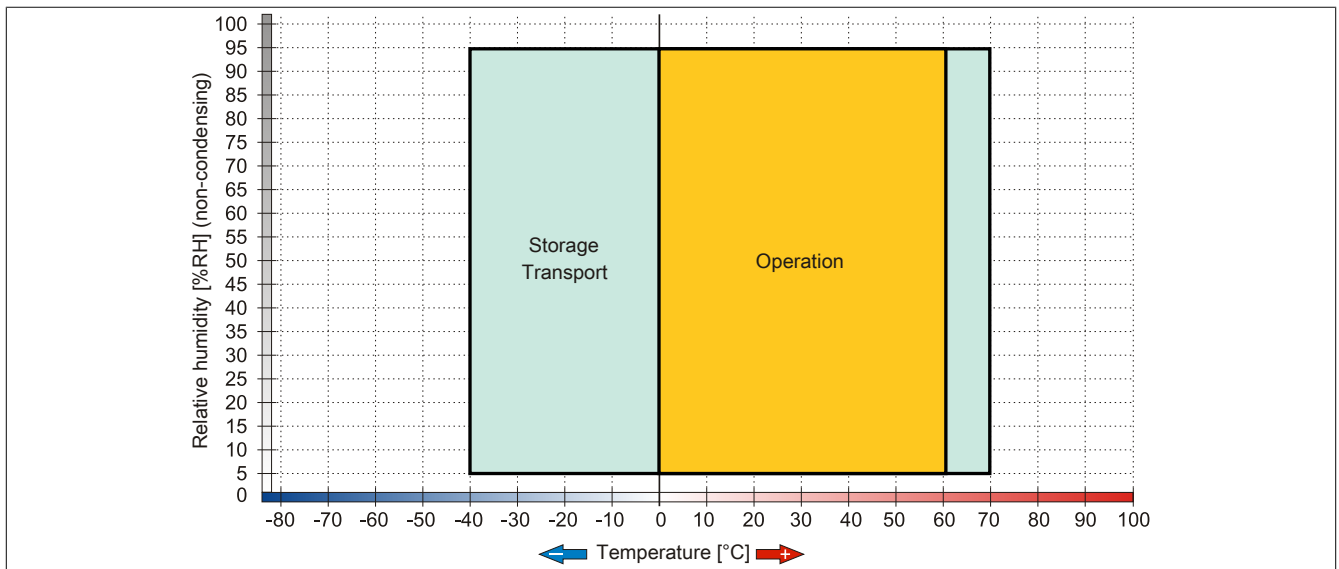


Image 31: 5AC801.HDDI-03 - Temperature humidity diagram

3.9.4 5AC801.SSDI-00

General information

This SSD (Solid State Drive) slide-in compact drive can be used in APC810 and PPC800 system units.

When used in a PPC800

Information:

The option 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 I.

Order data

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

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

Technical data

Caution!

A sudden loss of power can cause data to be lost! In very rare cases, the mass memory may also become damaged.

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

Information:

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

Product ID	5AC801.SSDI-00
Solid state drive	
Capacity	32 GB
Data reliability	< 1 unrecoverable error in 10 ^{>15</sup> 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
Endurance	
Guaranteed amount of data	
Guaranteed	700 TB
Results in 5 years	350 GB/day
SLC-Flash	Yes
Wear leveling	Static

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

Product ID	5AC801.SSDI-00
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) command
Environmental conditions	
Temperature	
Operation	0 to 70°C
Bearings	-55 to 95°C
Transport	-55 to 95°C
Relative humidity	
Operation	5 to 95%
Bearings	5 to 95%
Transport	5 to 95%
Vibration	
Operation	7 to 800 Hz: 2.17 g
Bearings	10 to 500 Hz: 3.13 g
Transport	10 to 500 Hz: 3.13 g
Shock	
Operation	1000 g, 0.5 ms
Bearings	1000 g, 0.5 ms
Transport	1000 g, 0.5 ms
Altitude	
Operation	-300 to 12,192 m
Bearings	-300 to 12,192 m
Transport	-300 to 12,192 m
Mechanical characteristics	
Installation ²⁾	Fixed
Dimensions	
Width	13 mm
Height	98 mm
Depth	105 mm
Weight	118 g
Manufacturer information	
Manufacturer	Intel
Manufacturer's product ID	SSDSA2SH032G1

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

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

Temperature humidity diagram

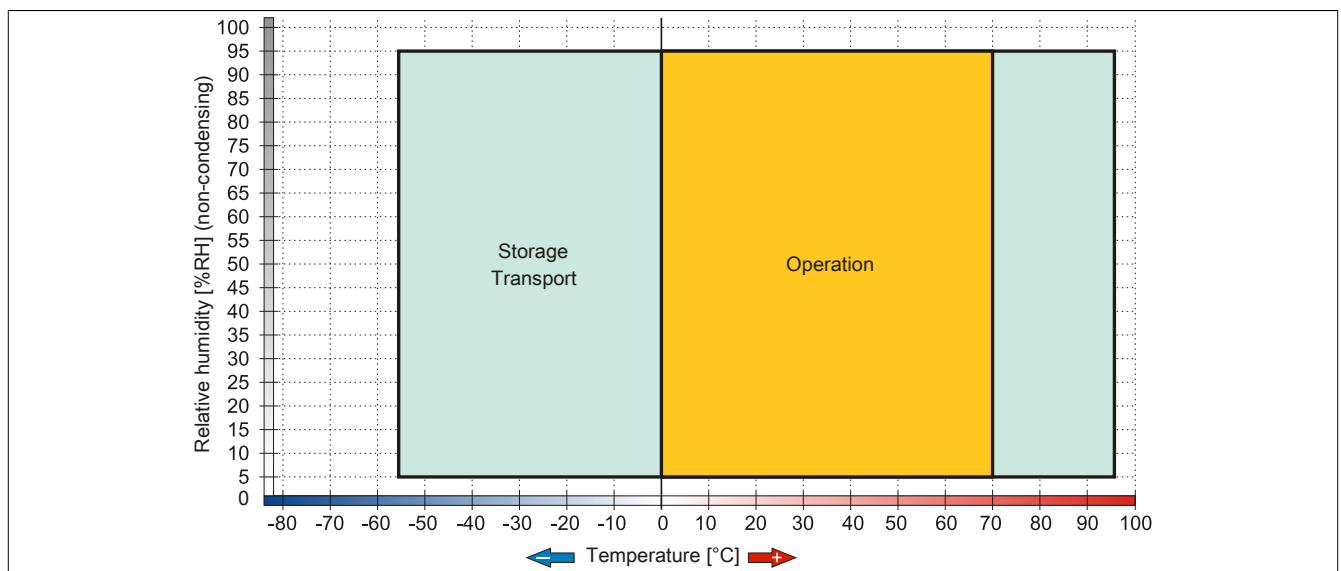


Image 32: 5AC801.SSDI-00 - Temperature humidity diagram

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.

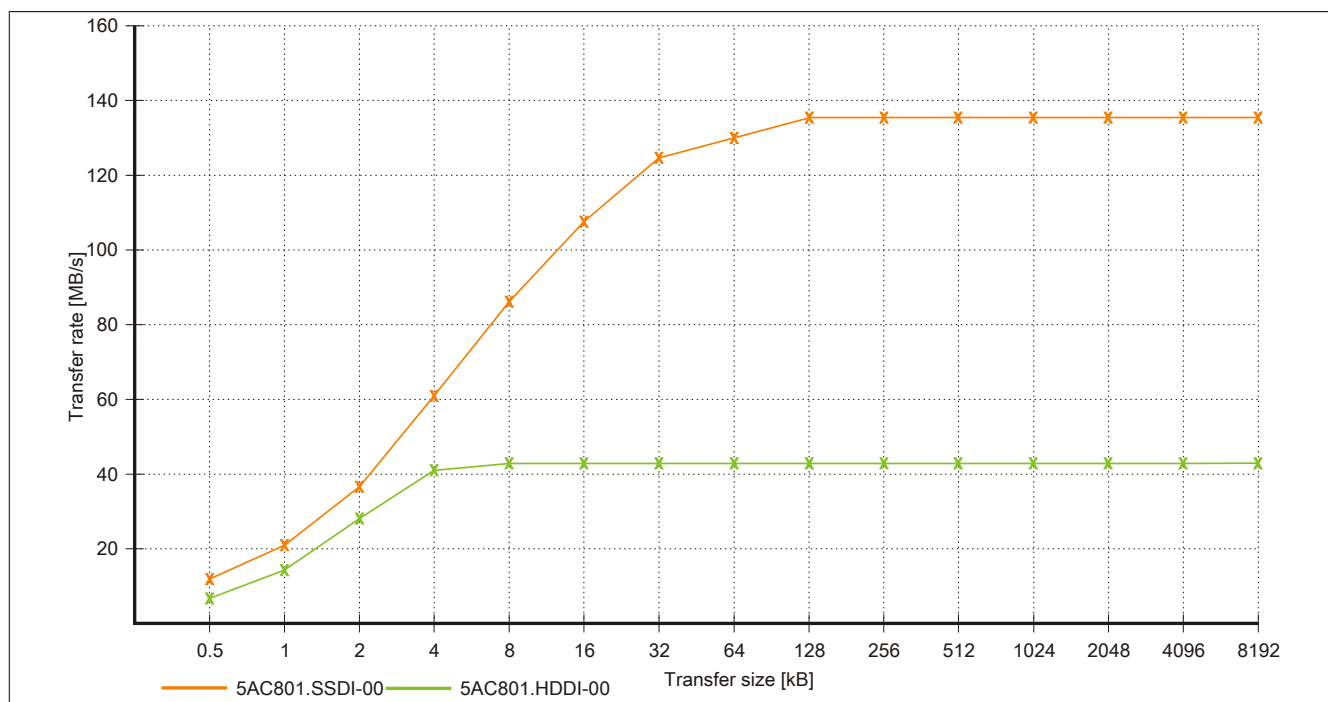


Image 33: 5AC801.SSDI-00 - ATTO disk benchmark v2.34 - Cyclic read

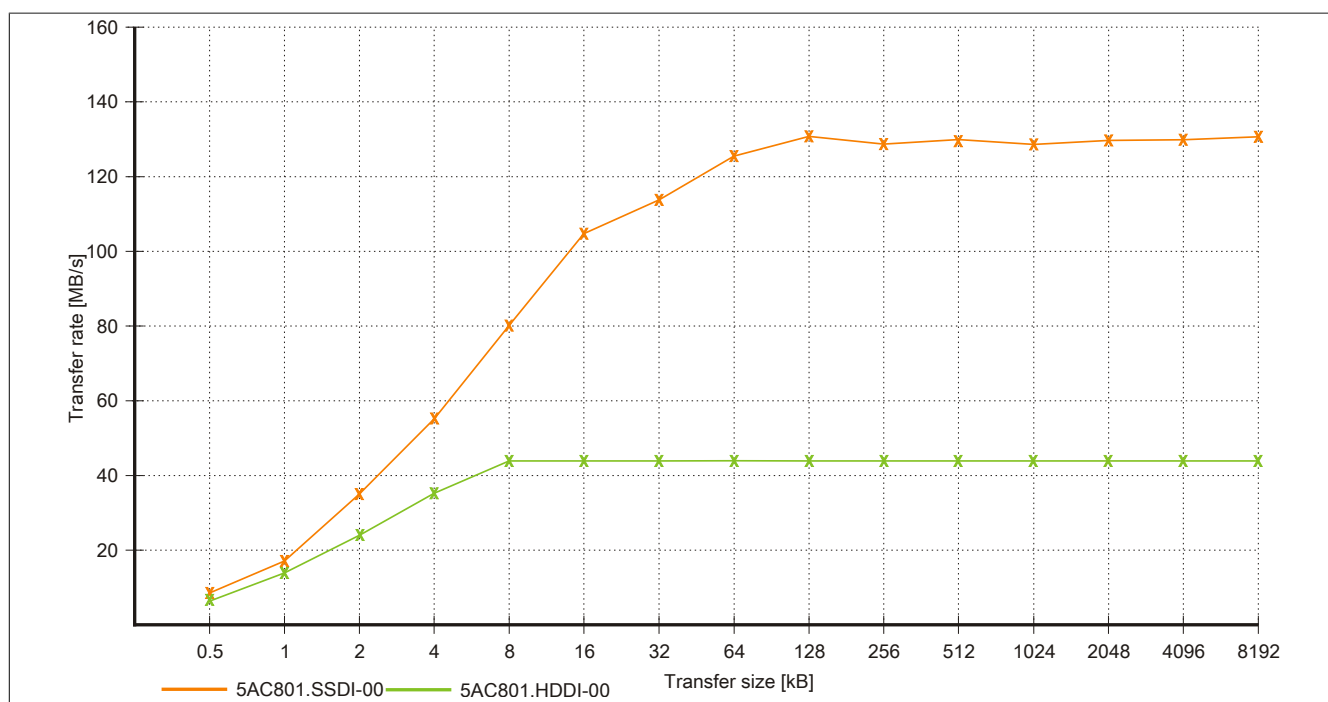


Image 34: 5AC801.SSDI-00 - ATTO disk benchmark v2.34 - Cyclic write

3.9.5 5AC801.ADAS-00

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.

Order data

Model number	Short description	Figure
	Drives	
5AC801.ADAS-00	SATA Hard Disk Adapter (slide-in compact).	

Table 66: 5AC801.ADAS-00 - Order data

Technical data

Product ID	5AC801.ADAS-00
Mechanical characteristics	
Dimensions	
Width	22 mm
Height	172.5 mm
Depth	150 mm
Weight	328 g

Table 67: 5AC801.ADAS-00 - Technical data

3.9.6 5AC801.HDDS-00

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:

It is possible to add or remove a slide-in drive 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 I and USB.

Order data

Model number	Short description	Figure
	Drives	
5AC801.HDDS-00	40 GB SATA hard disk (slide-in) 24/7 hard disk with extended temperature range. Note: Please consult the manual when using the hard disk.	

Table 68: 5AC801.HDDS-00 - Order data

Technical data

Information:

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

Product ID	5AC801.HDDS-00
Hard Disk	
Capacity	40 GB
Number of heads	1
Number of sectors	78,140,160
Bytes per sector	512
Cache	8 MB
Speed	5400 rpm $\pm$ 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	12.5 ms
Data transfer rate	
Internal	Max. 450 MBit/s
To/from host	Max. 150 MB/s (Ultra DMA mode 5)
Positioning time	
Maximum (read only)	23 ms
Minimum (track to track)	1 ms
Nominal (read only)	12.5 ms
Environmental conditions	
Temperature ¹⁾	

Table 69: 5AC801.HDDS-00 - Technical data

Product ID	5AC801.HDDS-00
Operation ²⁾	-30 to 85 °C
Operation - 24-hour ⁴⁾	-30 to 85 °C
Bearings	-40 to 95 °C
Transport	-40 to 95 °C
Relative humidity ⁵⁾	
Operation	5 to 90%
Bearings	5 to 95%
Transport	5 to 95%
Vibration	
Operation	5 to 500 Hz: 2 g; no non-recovered errors
Bearings	5 to 500 Hz: 5 g; no non-recovered errors
Transport	5 to 500 Hz: 5 g; no non-recovered errors
Shock	
Operation	300 g and 2 ms duration; no non-recovered errors
	150 g and 11 ms duration; no non-recovered errors
Bearings	800 g and 2 ms duration; no non-recovered errors
	400 g and 0.5 ms duration; no non-recovered errors
Transport	800 g and 2 ms duration; no non-recovered errors
	400 g and 0.5 ms duration; no non-recovered errors
Altitude	
Operation	-300 to 5000 m
Bearings	-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's product ID	ST940817SM

Table 69: 5AC801.HDDS-00 - 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) Temperature values for 305 meter altitude. 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) 24-hour operation means 732 POH (power-on hours) per month.
- 5) Humidity gradient: Maximum 15% per hour.
- 6) Slide-in compact mounting.

Temperature humidity diagram

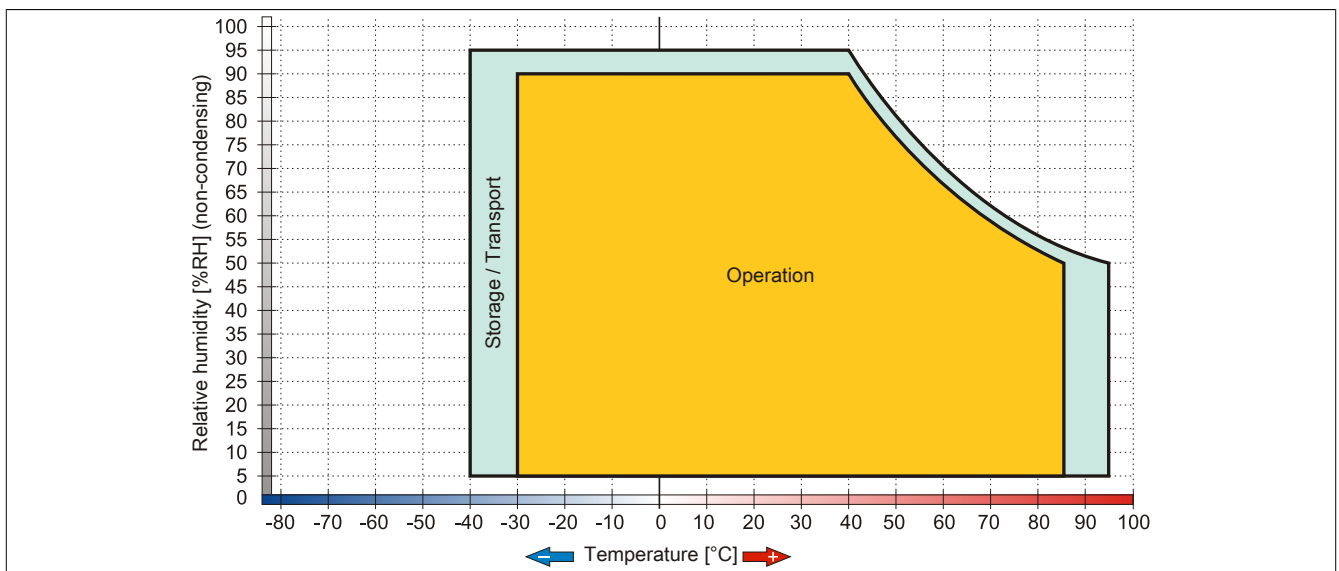


Image 35: 5AC801.HDDS-00 - Temperature humidity diagram

3.9.7 5AC801.DVDS-00

General information

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

Information:

It is possible to add or remove a slide-in drive 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 I and USB.

Order data

Model number	Short description	Figure
	Drives	
5AC801.DVDS-00	DVD-ROM SATA drive (slide-in).	
	Optional accessories	
	Miscellaneous	
5SWUT1.0000-00	OEM Nero CD-RW Software, only available with a CD-RW drive..	

Table 70: 5AC801.DVDS-00 - Order data

Technical data

Information:

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

Product ID	5AC801.DVDS-00
CD / DVD drive	
Data buffer capacity	2 MB
Data transfer rate	Max. 1.5 GB/s
Speed	Max. 5090 rpm $\pm 1\%$
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
Lifespan	60,000 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)
Access time	
CD	Average of 130 ms
DVD	Average of 140 ms
Readable media	

Table 71: 5AC801.DVDS-00 - Technical data

Product ID	5AC801.DVDS-00
CD DVD	CD-ROM (12 cm, 8 cm), CD-A CD-R, CD-RW DVD-ROM, DVD-R, DVD-R DL, DVD-RW, DVD+R DVD+R DL, DVD+RW, DVD-RAM
Reading rate CD DVD	24x 8x
Environmental conditions	
Temperature ²⁾ Operation Bearings Transport	5 to 55°C ¹⁾ -20 to 60°C -20 to 65°C
Relative humidity Operation Bearings Transport	8 to 80% 5 to 95% 5 to 95%
Vibration Operation Bearings Transport	5 to 500 Hz: 0.2g 5 to 500 Hz: 2g 5 to 500 Hz: 2g
Shock Operation Bearings Transport	5 g and 11 ms duration 60 g and 11 ms duration 200 g and 2 ms duration 60 g and 11 ms duration 200 g and 2 ms duration
Mechanical characteristics	
Dimensions Width Height Depth	22 mm 172.5 mm 150 mm
Weight	455 g

Table 71: 5AC801.DVDS-00 - Technical data

- 1) Drive surface temperature
- 2) Temperature data is for operation at 500 meters. Derating the max. ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).

Temperature humidity diagram

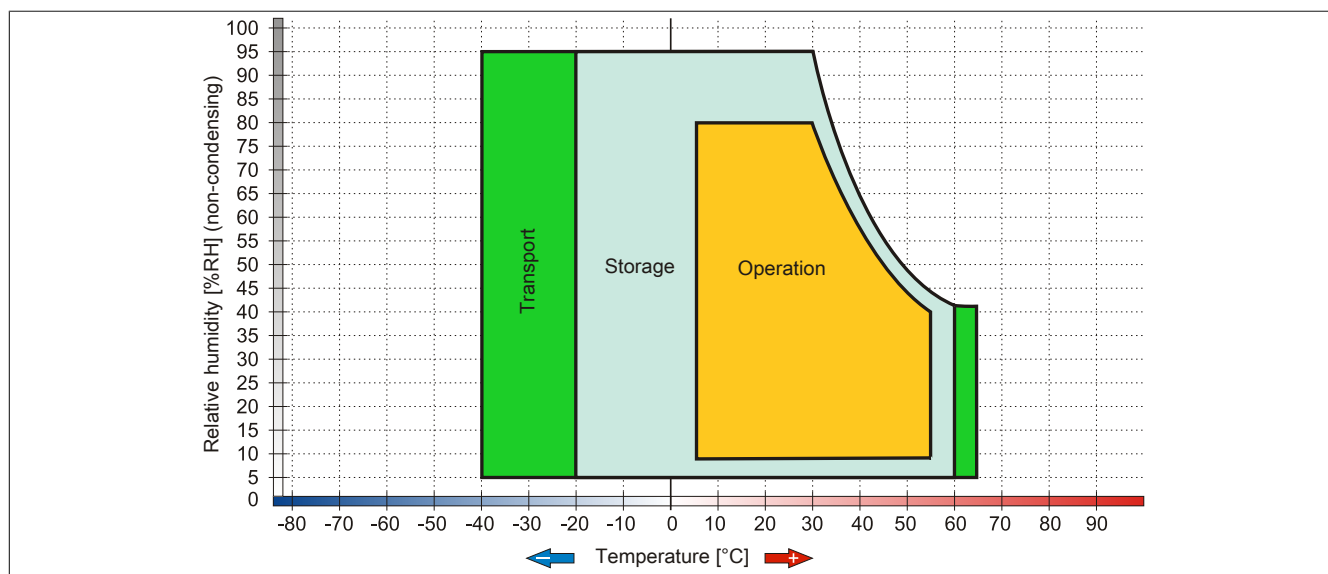


Image 36: 5AC801.DVDS-00 - Temperature humidity diagram

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.

3.9.8 5AC801.DVRS-00

General information

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

Information:

It is possible to add or remove a slide-in drive 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 I and USB.

Order data

Model number	Short description	Figure
	Drives	
5AC801.DVRS-00	DVD-R/RW DVD+R/RW SATA drive (slide-in).	
	Optional accessories	
	Miscellaneous	
5SWUT1.0000-00	OEM Nero CD-RW Software, only available with a CD-RW drive..	

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

Technical data

Information:

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

Product ID	5AC801.DVRS-00
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
Lifespan	60,000 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)
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

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

Product ID	5AC801.DVRS-00
DVD	DVD-ROM, DVD-R, DVD-R (double layer), DVD-RW, DVD-RAM, DVD+R, DVD+R (double layer), DVD+RW, DVD-RAM
Non-write protected 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)
Reading rate	
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 (double layer)	6x, 4x and 2, 4x
DVD+RW	4x and 2x
DVD-R	8x, 4x and 2x
DVD-R (Double 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 ³⁾	
Operation	5 to 55°C ²⁾
Bearings	-20 to 60°C
Transport	-40 to 65°C
Relative humidity	
Operation	8 to 80%
Bearings	5 to 95%
Transport	5 to 95%
Vibration	
Operation	5 to 500 Hz: 0.2g
Bearings	5 to 500 Hz: 2g
Transport	5 to 500 Hz: 2g
Shock	
Operation	At max. 5 g and 11 ms duration
Bearings	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 73: 5AC801.DVRS-00 - Technical data

- 1) RAM drivers are not provided by the manufacturer. Support of RAM function by the burning software "Nero" (model number 5SWUTL.0000-00) or other burning software packages and drivers from third party providers.
- 2) Drive surface temperature
- 3) Temperature data is for operation at 500 meters. Derating the max. ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).

Temperature humidity diagram

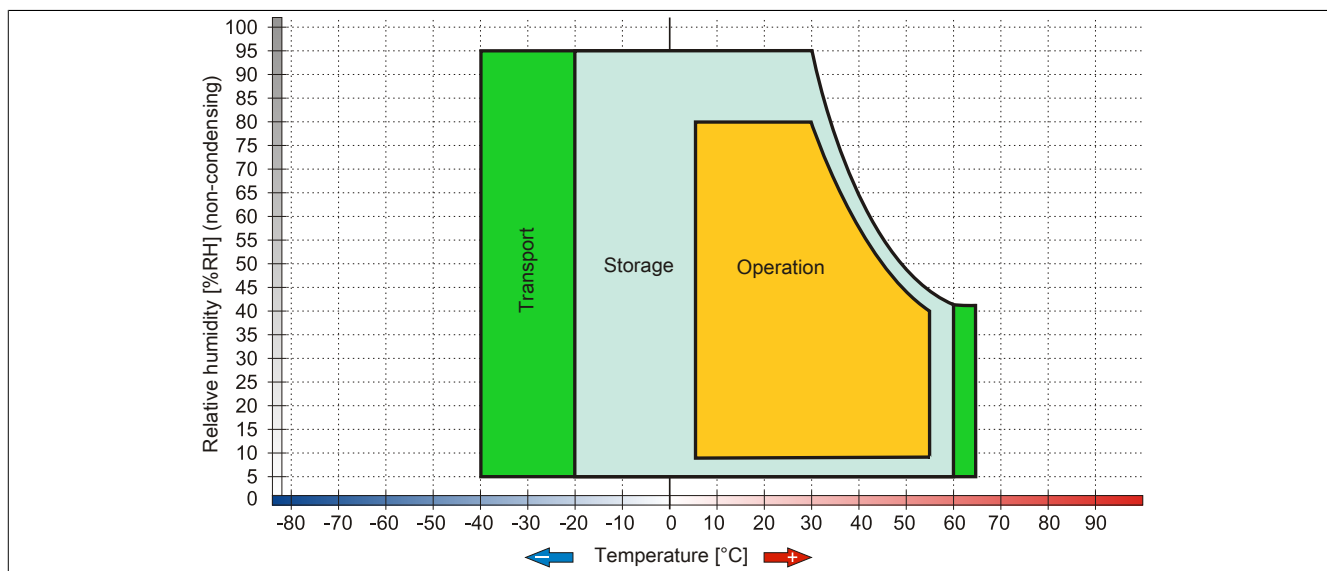


Image 37: 5AC801.DVRS-00 - Temperature humidity diagram

3.9.9 5ACPCI.RAIC-03

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

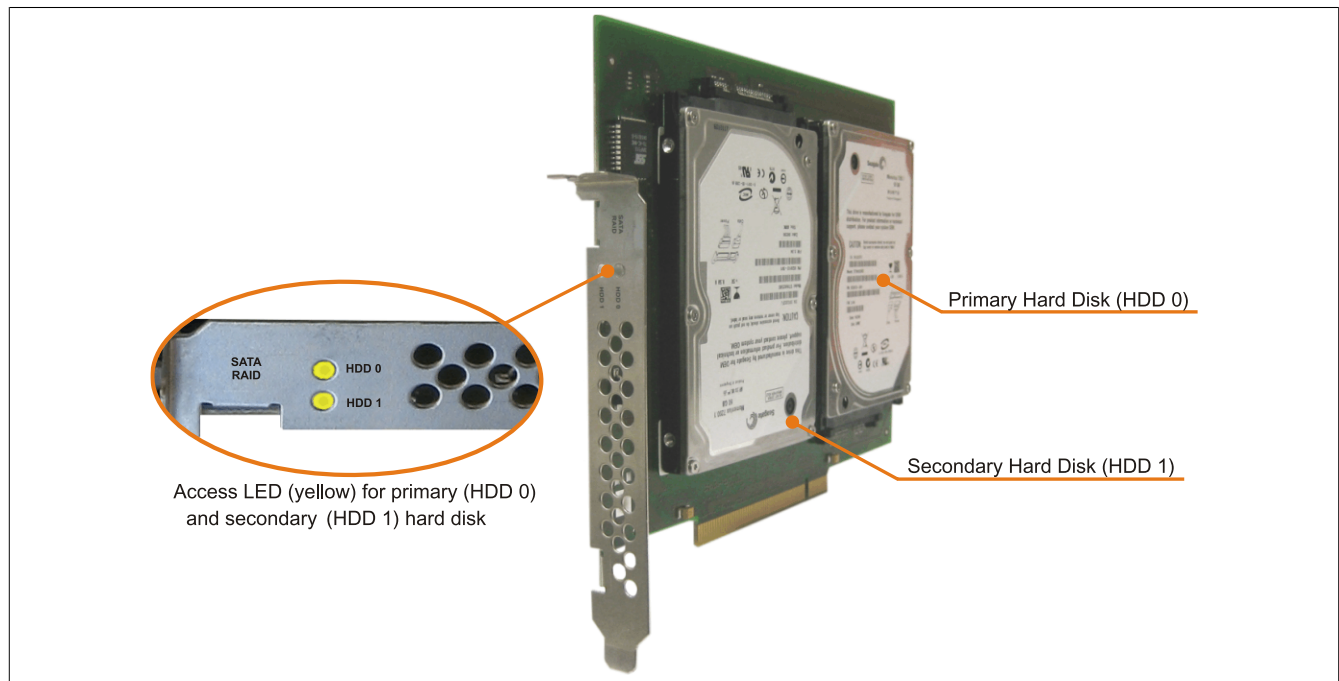


Image 38: PCI SATA RAID controller

Information:

The PCI SATA RAID controller can not 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. This generally takes at least 50 minutes (configurable) to complete.

Order data

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

Table 74: 5ACPCI.RAIC-03 - Order data

Technical data

Information:

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

Product ID	5ACPCI.RAIC-03
Controller	
BIOS Extension ROM - requirements	Approx. 32 KB
Data transfer rate	Max. 1.5 GBit/s (150 MB/s)
RAID level	Supports RAID 0, 1
Specifications	Serial ATA 1.0
Type	Sil 3512 SATA link
Hard Disk	
Capacity	160 GB
Number of heads	3
Number of sectors	312,581,808
Bytes per sector	512
Cache	8 MB
Speed	5400 rpm $\pm$ 1%
Startup time	Typ. 4 s (from 0 rpm to read access)
Lifespan	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 MBit/s
To/from host	Max. 150 MB/s
Positioning time	
Maximum (read only)	22 ms
Minimum (track to track)	1.5 ms
Nominal (read only)	12 ms
Electrical characteristics	
Power consumption	0.3 A at 3.3 V (PCI bus) 1 A at 5 V (PCI bus)
Environmental conditions	
Temperature ¹⁾	
Operation ¹⁾	-15 to 80°C
Operation - 24-hour ³⁾	-15 to 80°C
Bearings	-40 to 95°C
Transport	-40 to 95°C
Relative humidity	
Operation	8 to 90% ⁴⁾
Bearings	5 to 95% ⁵⁾
Transport	5 to 95% ⁵⁾
Vibration ¹⁾	
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
Bearings	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
Shock	
Operation	Max. 125 g, 2 ms; no unrecoverable errors
Bearings	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
Bearings	-300 to 12192 m
Mechanical characteristics	
Installation ⁷⁾	Fixed
Dimensions	
Width	70 mm
Length	100 mm
Height	9.5 mm

Table 75: 5ACPCI.RAIC-03 - Technical data

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

Table 75: 5ACPCI.RAIC-03 - Technical data

- 1) Standard operation means 333 POH (power-on hours) per month.
- 2) Temperature values for 305 meter altitude. 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.
- 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.

Temperature humidity diagram

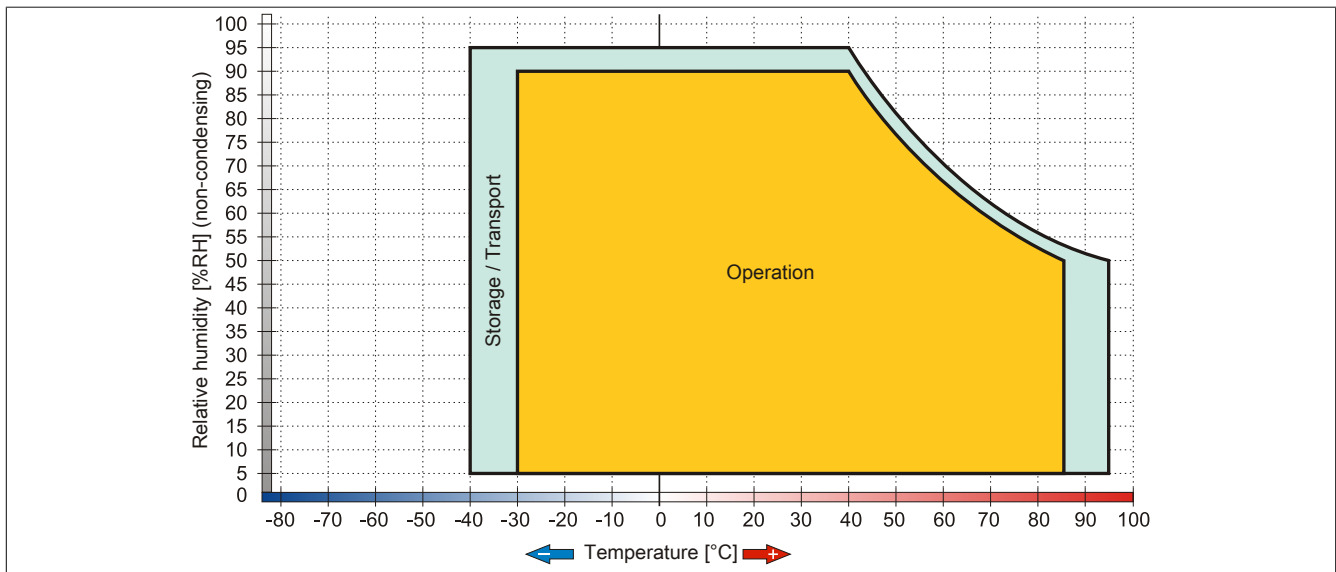


Image 39: 5ACPCI.RAIC-03 - Temperature humidity diagram

Driver support

Special drivers are necessary for operating the PCI SATA RAID controller. The necessary drivers can be downloaded from the download area on the B&R homepage for approved and supported operating systems (www.br-automation.com).

The .NET-based SATARaid™ 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 homepage, not from manufacturers' pages.

Configuration

Configuring a SATA RAID network: see Chapter 3 "Commissioning", section 7 "Configuration of a SATA RAID array" on page 128.

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 / Servicing", section 13 "Exchanging a PCI SATA RAID hard disk in a RAID 1 system" on page 304.

3.9.10 5ACPCI.RAIC-04

General information

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

Order data

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

Table 76: 5ACPCI.RAIC-04 - Order data

Technical data

Information:

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

Product ID	5ACPCI.RAIC-04
Hard Disk	
Manufacturer's product ID	Fujitsu M120-ESW MHY2160BH-ESW
Capacity	160 GB
Number of heads	3
Number of sectors	312,581,808
Bytes per sector	512
Cache	8 MB
Speed	5400 rpm $\pm$ 1%
Startup time	Typ. 4 s (from 0 rpm to read access)
Lifespan	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 MBit/s
To/from host	Max. 150 MB/s
Positioning time	
Maximum (read only)	22 ms
Minimum (track to track)	1.5 ms
Nominal (read only)	12 ms
Electrical characteristics	
Power consumption	0.3 A at 3.3 V (PCI bus) 1 A at 5 V (PCI bus)
Environmental conditions	
Temperature ¹⁾	
Operation ¹⁾	-15 to 80°C
Operation - 24-hour ³⁾	-15 to 80°C
Bearings	-40 to 95°C
Transport	-40 to 95°C
Relative humidity	
Operation	8 to 90% ⁴⁾
Bearings	5 to 95% ⁵⁾
Transport	5 to 95% ⁵⁾
Vibration ¹⁾	
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
Bearings	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
Shock	
Operation	Max. 125 g, 2 ms; no unrecoverable errors
Bearings	Max. 400 g, 2 ms; no damage max. 450 g, 1 ms; no damage max. 200 g, 0.5 ms; no damage

Table 77: 5ACPCI.RAIC-04 - Technical data

Product ID	5ACPCI.RAIC-04
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
Bearings	-300 to 12192 m
Mechanical characteristics	
Dimensions	
Width	70 mm
Length	100 mm
Height	9.5 mm
Weight	350 g

Table 77: 5ACPCI.RAIC-04 - Technical data

- 1) Standard operation means 333 POH (power-on hours) per month.
- 2) Temperature values for 305 meter altitude. 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.
- 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).

Temperature humidity diagram

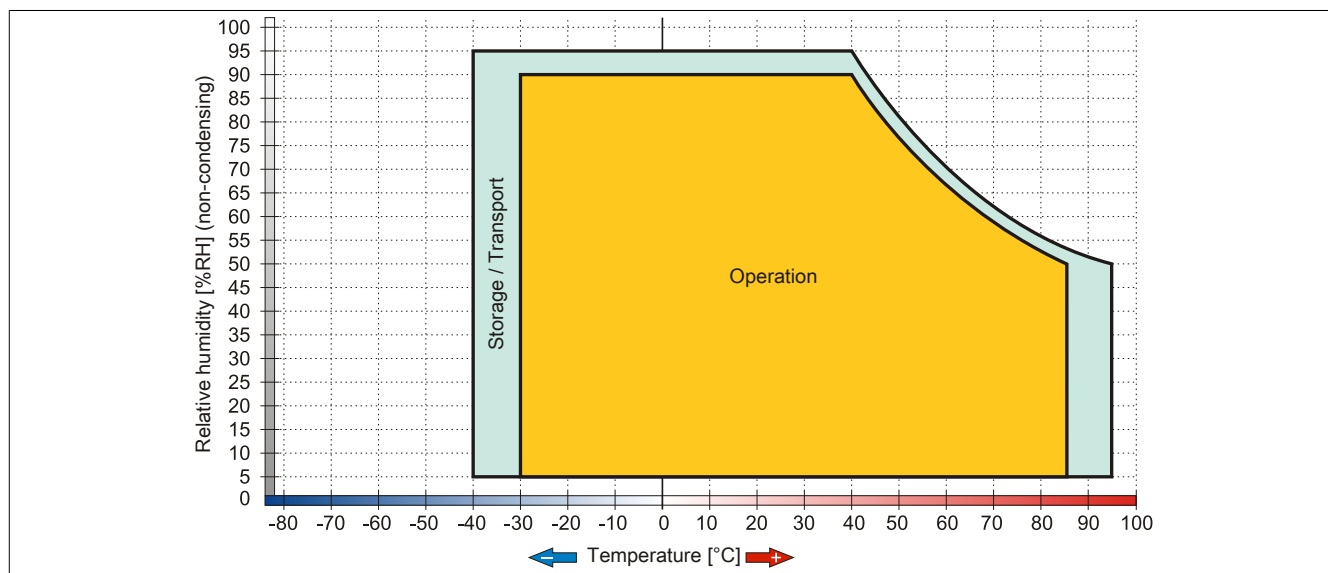


Image 40: 5ACPCI.RAIC-04 - Temperature humidity diagram

3.9.11 5ACPCI.RAIC-05

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 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

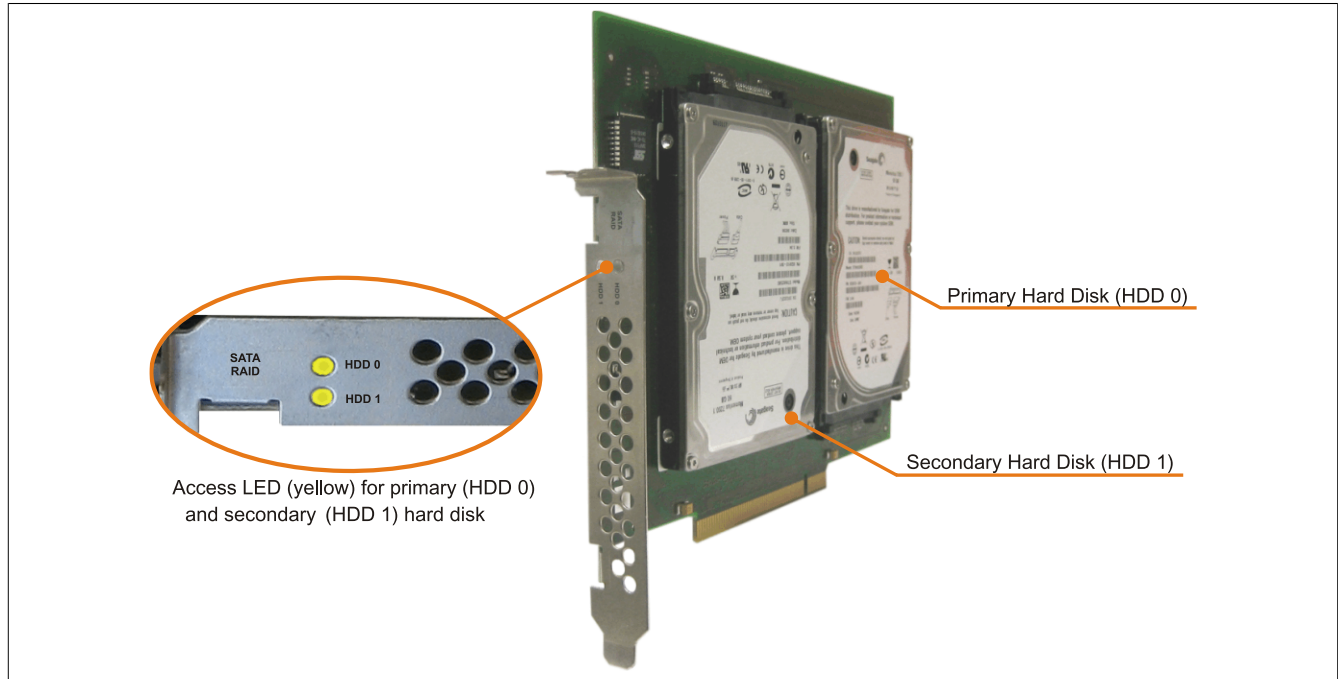


Image 41: PCI SATA RAID controller

Information:

The PCI SATA RAID controller can not 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. This generally takes at least 50 minutes (configurable) to complete.

Order data

Model number	Short description	Figure
5ACPCI.RAIC-05	Drives	
	PCI RAID System SATA 2x 250 GB; Remark: Please see manual for proper use of the hard disk.	
	Optional accessories	
5MMHDD.0250-00	Drives	
	250 GB SATA Hard Disk Spare part for 5AC801.HDDI-03 and 5ACPCI.RAIC-05; Remark: Please see manual for proper use of the hard disk.	

Table 78: 5ACPCI.RAIC-05 - Order data

Technical data

Product ID	5ACPCI.RAIC-05
General information	
Number of hard disks	2
Certification types CE	Yes
Controllers	
Type	Sil 3512 SATA link
Specifications	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	
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 Modus 0-4, Multiword DMA Mode 0-2, UDMA Mode 0-6
Data transfer rate Internal To/from host	Max. 1175 Mbits/s Max. 150 MB/s
Positioning time Minimum (track to track) Nominal (read only) Maximum (read only)	1 ms 14 ms 30 ms
Electrical properties	
Power consumption	0.3 A at 3.3 V (PCI bus) 1 A at 5 V (PCI bus)
Environmental conditions	
Temperature ²⁾ Operation ¹⁾ Operation - 24-hour 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's product ID	ST9250315AS

Table 79: 5ACPCI.RAIC-05 - Technical data

- 1) Standard operation means 333 POH (power-on hours) per month.
- 2) Temperature values for 305 meter altitude. 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) 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.

Temperature humidity diagram

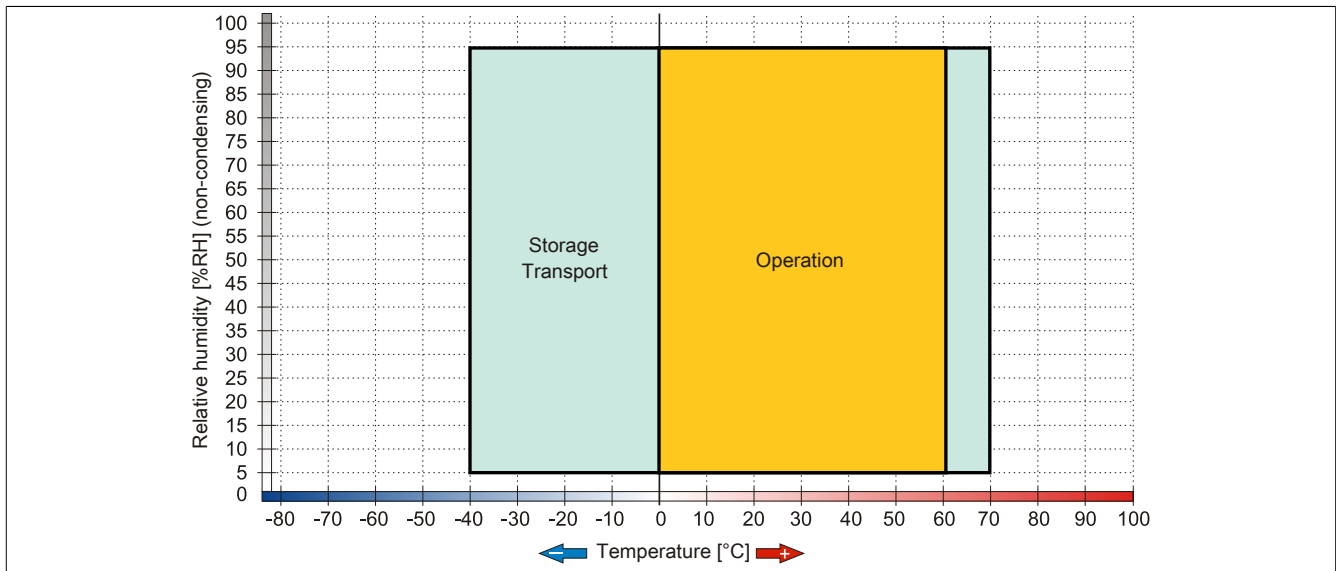


Image 42: 5ACPCI.RAIC-05 - Temperature humidity diagram

Driver support

Special drivers are necessary for operating the PCI SATA RAID controller. The necessary drivers can be downloaded from the download area on the B&R homepage for approved and supported operating systems (www.br-automation.com).

The .NET-based SATARaid™ 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 homepage, not from manufacturers' pages.

Configuration

Configuring a SATA RAID network: see Chapter 3 "Commissioning", section 7 "Configuration of a SATA RAID array" on page 128.

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 exchange see "Maintenance / Servicing" on page 287.

3.9.12 5MMHDD.0250-00

General information

The hard disk can be used as replacement for a HDD in a PCI SATA RAID controller 5ACPCI.RAIC-05.

Order data

Model number	Short description	Figure
5MMHDD.0250-00	Drives 250 GB SATA Hard Disk Spare part for 5AC801.HDDI-03 and 5ACPCI.RAIC-05; Remark: Please see manual for proper use of the hard disk.	

Table 80: 5MMHDD.0250-00 - Order data

Technical data

Information:

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

Product ID	5MMHDD.0250-00
Hard Disk	
Capacity	250 GB
Number of heads	1
Number of sectors	488,397,168
Bytes per sector	512
Cache	8 MB
Speed	5400 rpm $\pm 0.2\%$
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 Modus 0-4, Multiword DMA Mode 0-2, UDMA Mode 0-6
Data transfer rate	
Internal	Max. 1175 Mb/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 ³⁾	
Operation ²⁾	0 to 60°C
Operation - 24-hour 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
Transport	1000 g and 1 ms duration, no unrecoverable errors
Transport	600 g and 0.5 ms duration, no unrecoverable errors
Transport	800 g and 2 ms duration, no unrecoverable errors
Transport	1000 g and 1 ms duration, no unrecoverable errors
Transport	600 g and 0.5 ms duration, no unrecoverable errors

Table 81: 5MMHDD.0250-00 - Technical data

Product ID	5MMHDD.0250-00
Altitude	
Operation	-300 to 3048 m
Storage	-300 to 12192 m
Manufacturer information	
Manufacturer	Seagate
Manufacturer's product ID	ST9250315AS

Table 81: 5MMHDD.0250-00 - Technical data

- 1) With 8760 POH (Power On Hours) per year and 25°C surface temperature.
- 2) Standard operation means 333 POH (power-on hours) per month.
- 3) Temperature values for 305 meter altitude. 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) 24-hour operation means 732 POH (power-on hours) per month.
- 5) Humidity gradient: Maximum 30% per hour.

Temperature humidity diagram

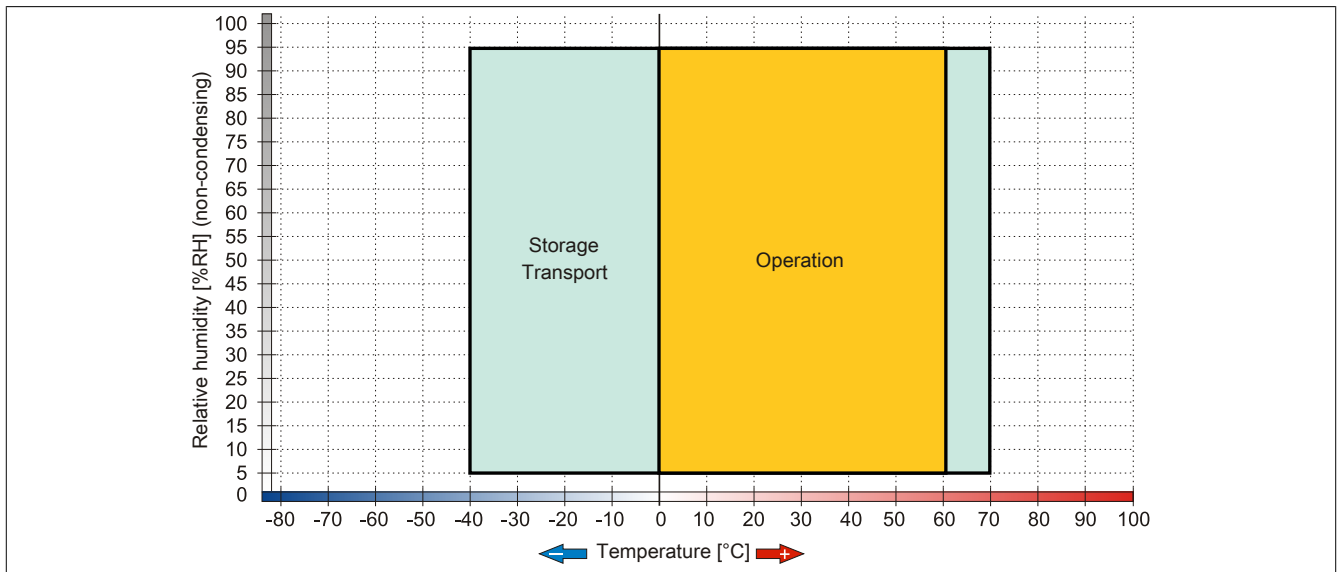


Image 43: 5MMHDD.0250-00 - Temperature humidity diagram

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

General information

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

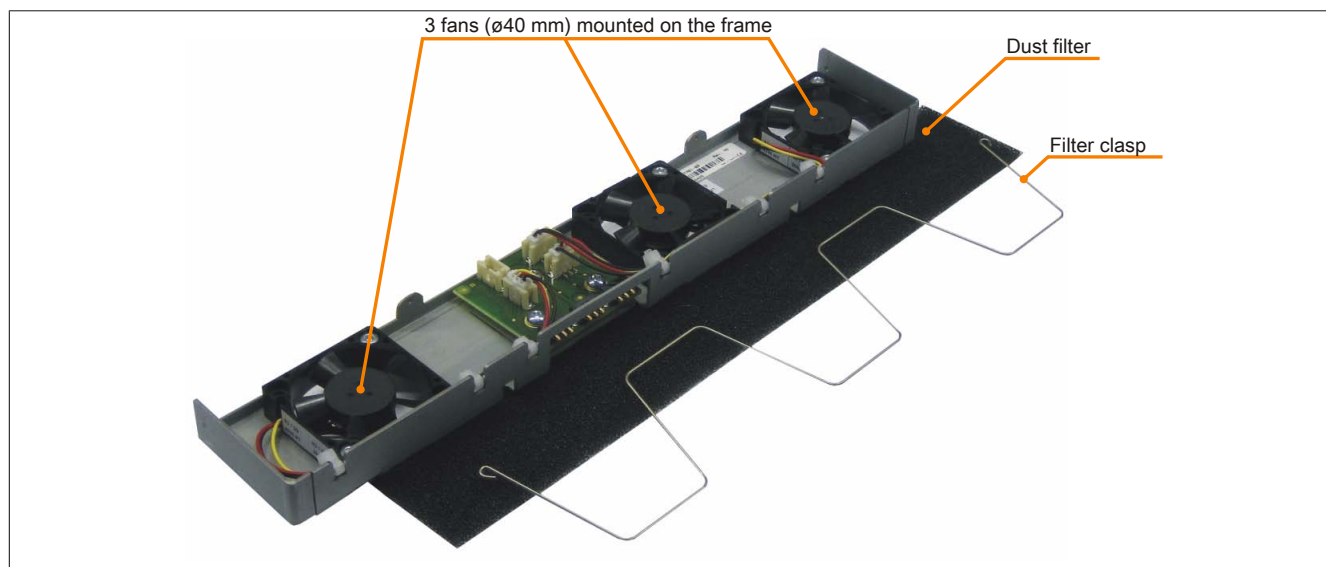


Image 44: 5AC803.FA01-00 - Fan kit

Order data

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

Table 82: 5AC803.FA01-00 - Order data

Technical data

Product ID	5AC803.FA01-00
General information	
Number of fans	3
Speed	Max. 6100 rpm
Noise level	21 dB
Lifespan	29,000 hours at 70°C 95,000 hours at 20°C
Type	Double ball bearings
Mechanical characteristics	
Dimensions	

Table 83: 5AC803.FA01-00 - Technical data

Product ID	5AC803.FA01-00
Fans	
Width	40 mm
Height	40 mm
Depth	10 mm

Table 83: 5AC803.FA01-00 - Technical data

3.10.2 5AC803.FA02-00

General information

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

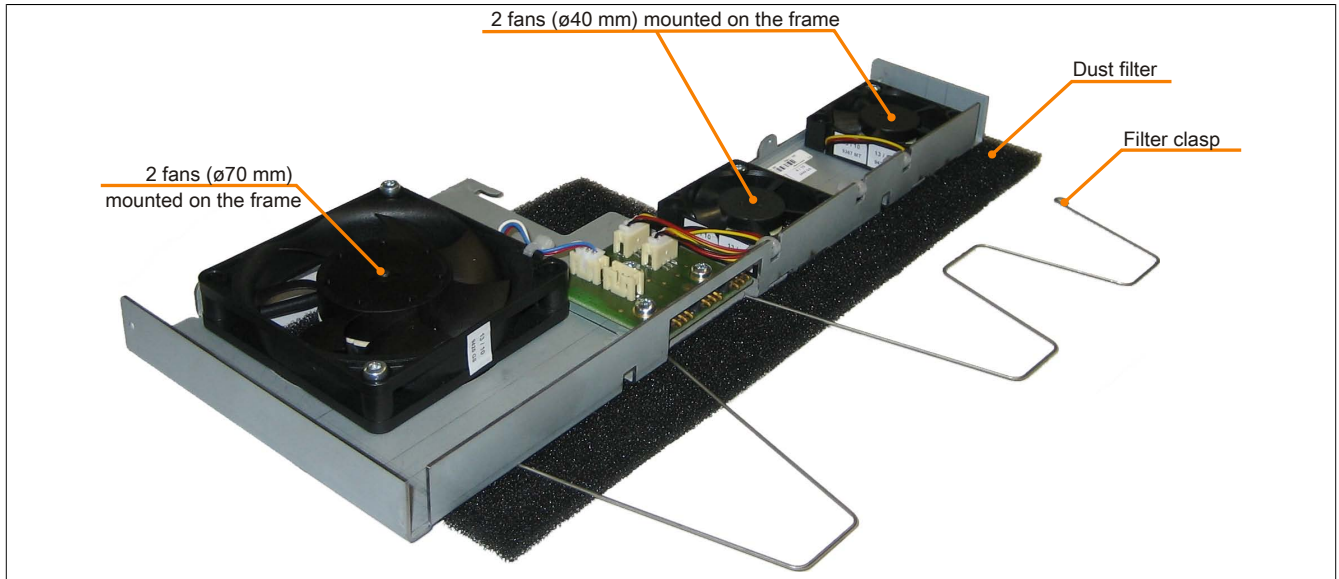


Image 45: 5AC803.FA02-00 - Fan kit

Order data

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

Table 84: 5AC803.FA02-00 - Order data

Technical data

Product ID	5AC803.FA02-00
General information	
Number of fans	4
Speed	Max. 6100 rpm
Noise level	21 dB
Lifespan	29,000 hours at 70°C 95,000 hours at 20°C
Type	Double ball bearings
Mechanical characteristics	
Dimensions	
Fans	
Width	40 mm
Height	40 mm
Depth	10 mm

Table 85: 5AC803.FA02-00 - Technical data

3.10.3 5AC803.FA03-00

General information

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

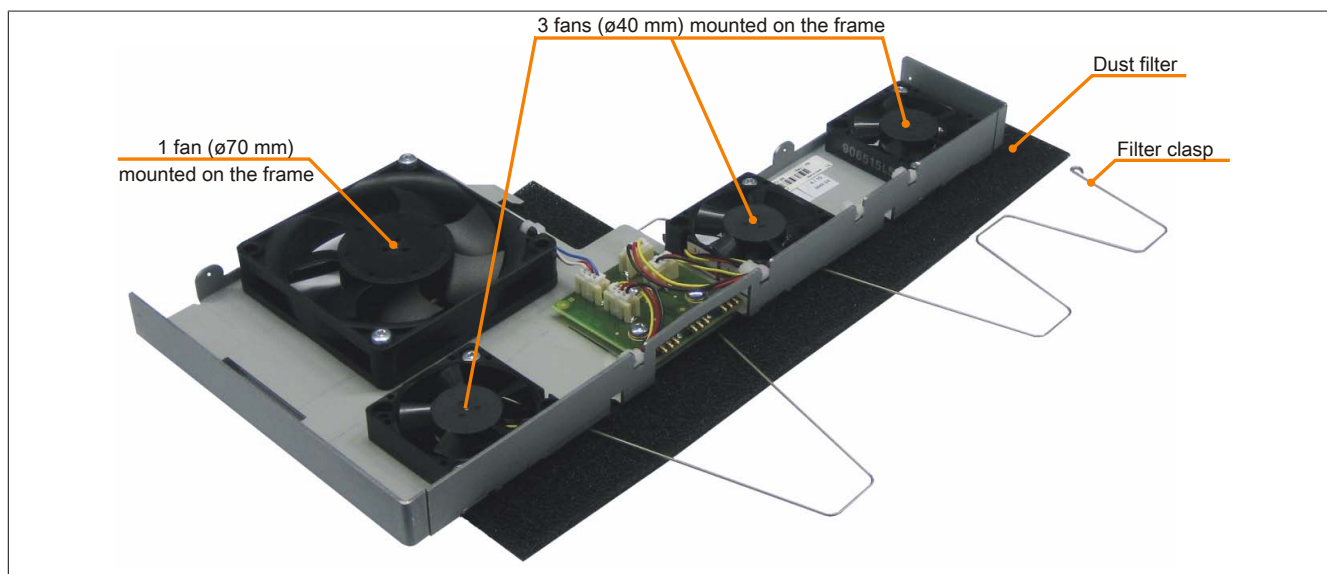


Image 46: 5AC803.FA03-00 - Fan kit

Order data

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

Table 86: 5AC803.FA03-00 - Order data

Technical data

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

Table 87: 5AC803.FA03-00 - Technical data

Chapter 3 • Commissioning

1 Installation

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

1.1 Important mounting information

- The 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.
- The ventilation holes must not be covered.
- This device must be mounted in one of the specified approved orientations.
- Be sure the wall or control cabinet can withstand four times the total weight of the device.
- When connecting cables (DVI, SDL, USB, etc.) do not exceed the flex radius.
- 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 Installation with clamping blocks

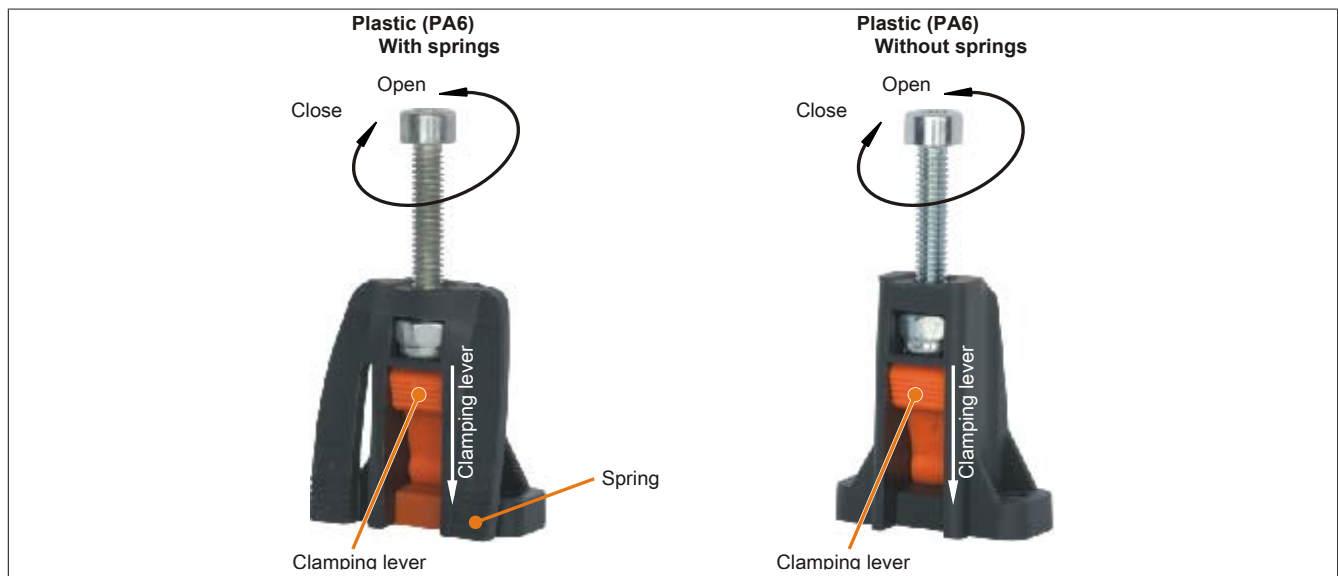


Image 47: Clamping block

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

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

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

1.3 Mounting orientation

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

1.3.1 Mounting orientation 0° and +/- 45°

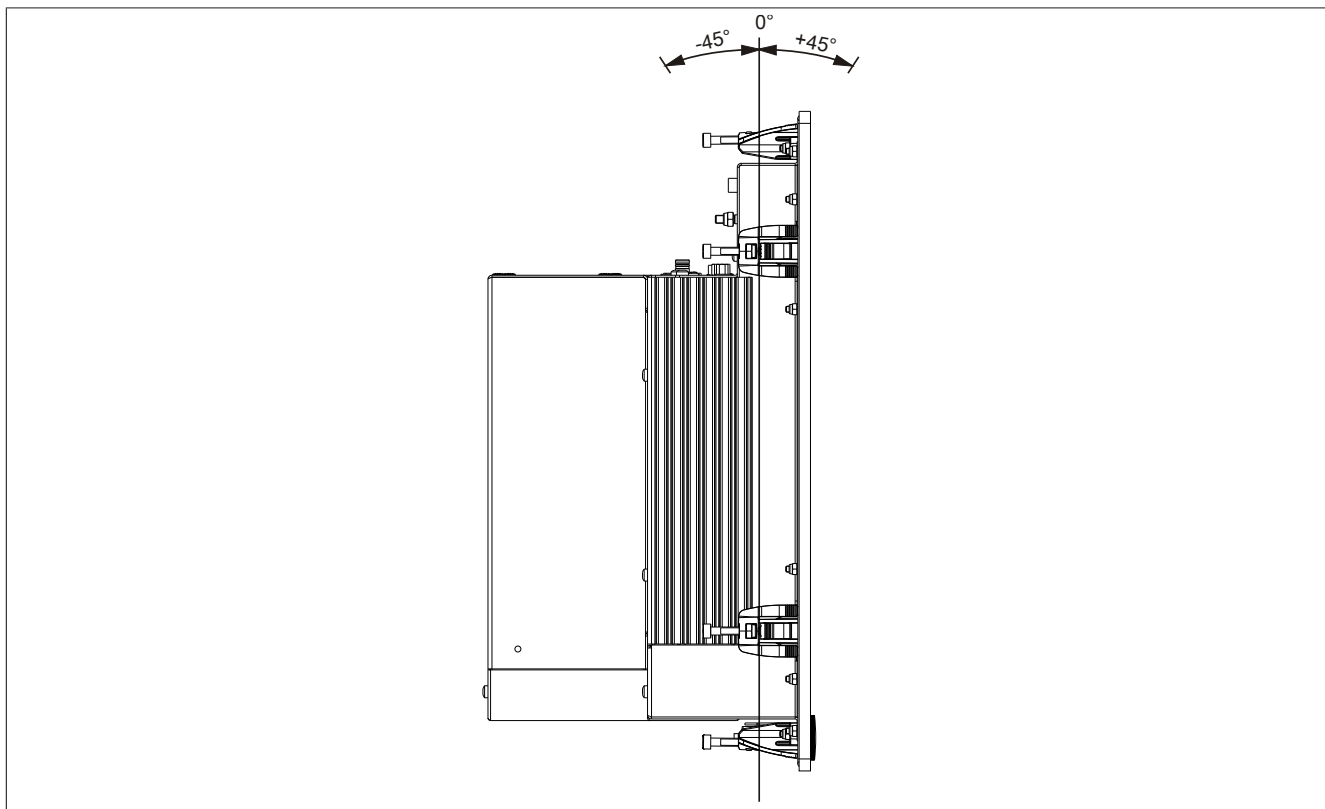


Image 48: Mounting orientation 0° and +/- 45°

Mount the device so that the spacing is as indicated in section " Air circulation spacing" on page 111 in order to facilitate natural air circulation.

1.3.2 Mounting orientation with 5AC801.DVRS-00

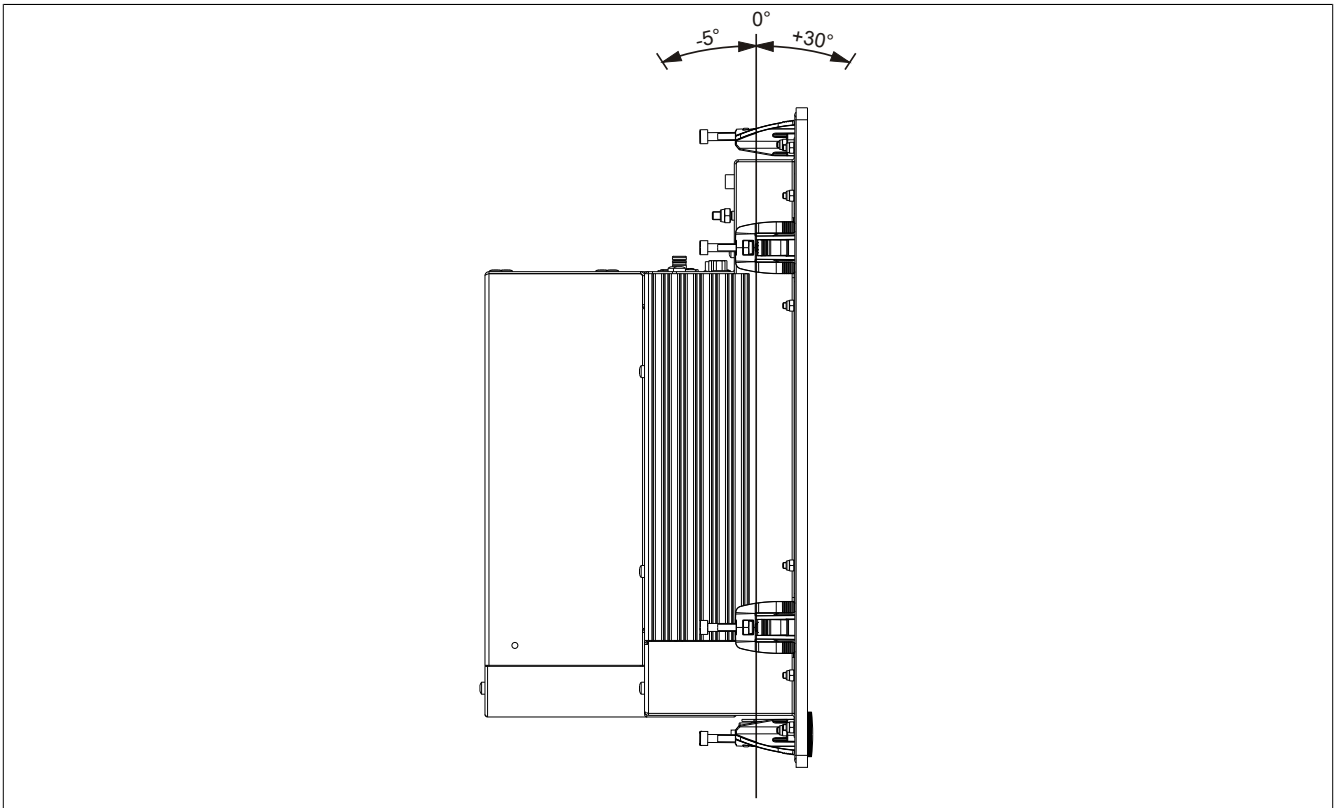


Image 49: Mounting orientation with 5AC801.DVRS-00

Mount the device so that the spacing is as indicated in section " Air circulation spacing" on page 111 in order to facilitate natural air circulation.

1.3.3 Mounting orientation with 5AC801.DVDS-00

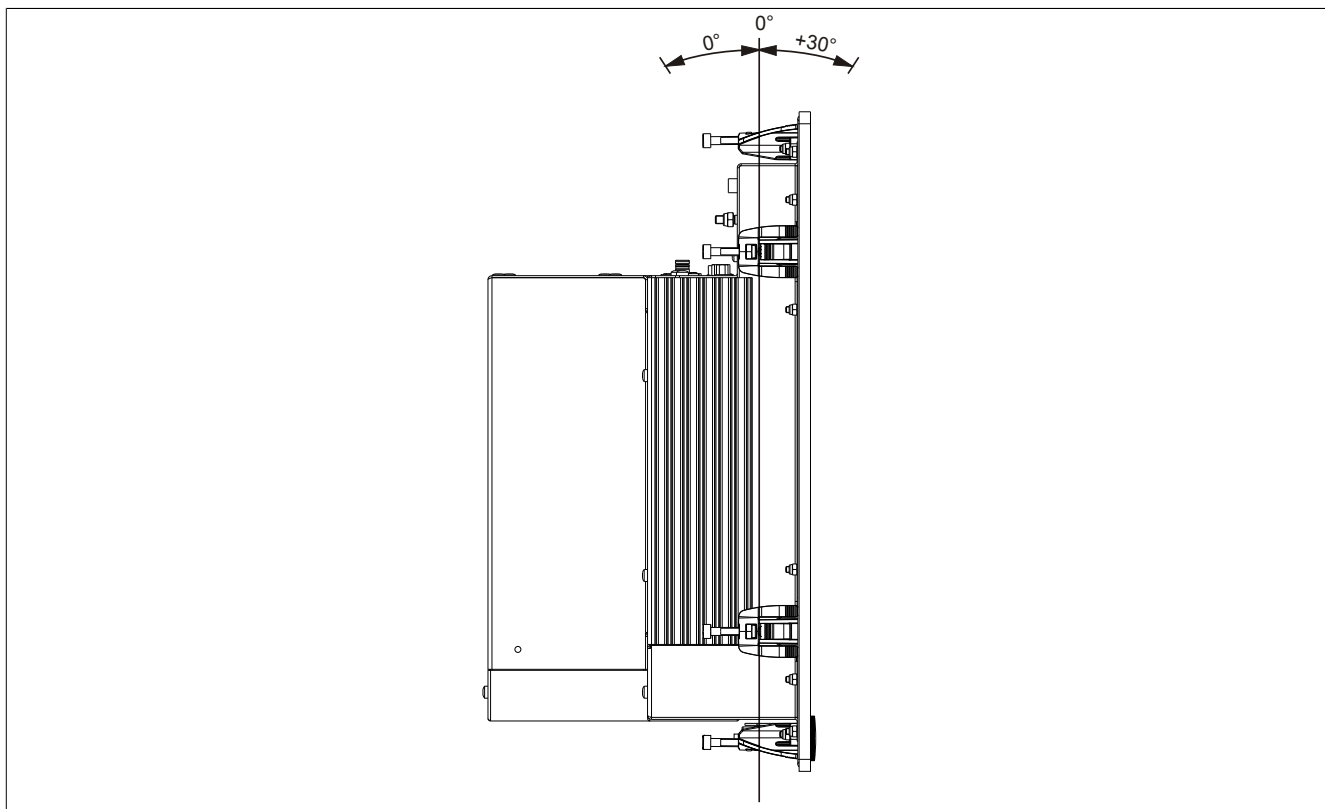


Image 50: Mounting orientation with 5AC801.DVDS-00

Mount the device so that the spacing is as indicated in section " Air circulation spacing" on page 111 in order to facilitate natural air circulation.

1.4 Air circulation spacing

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

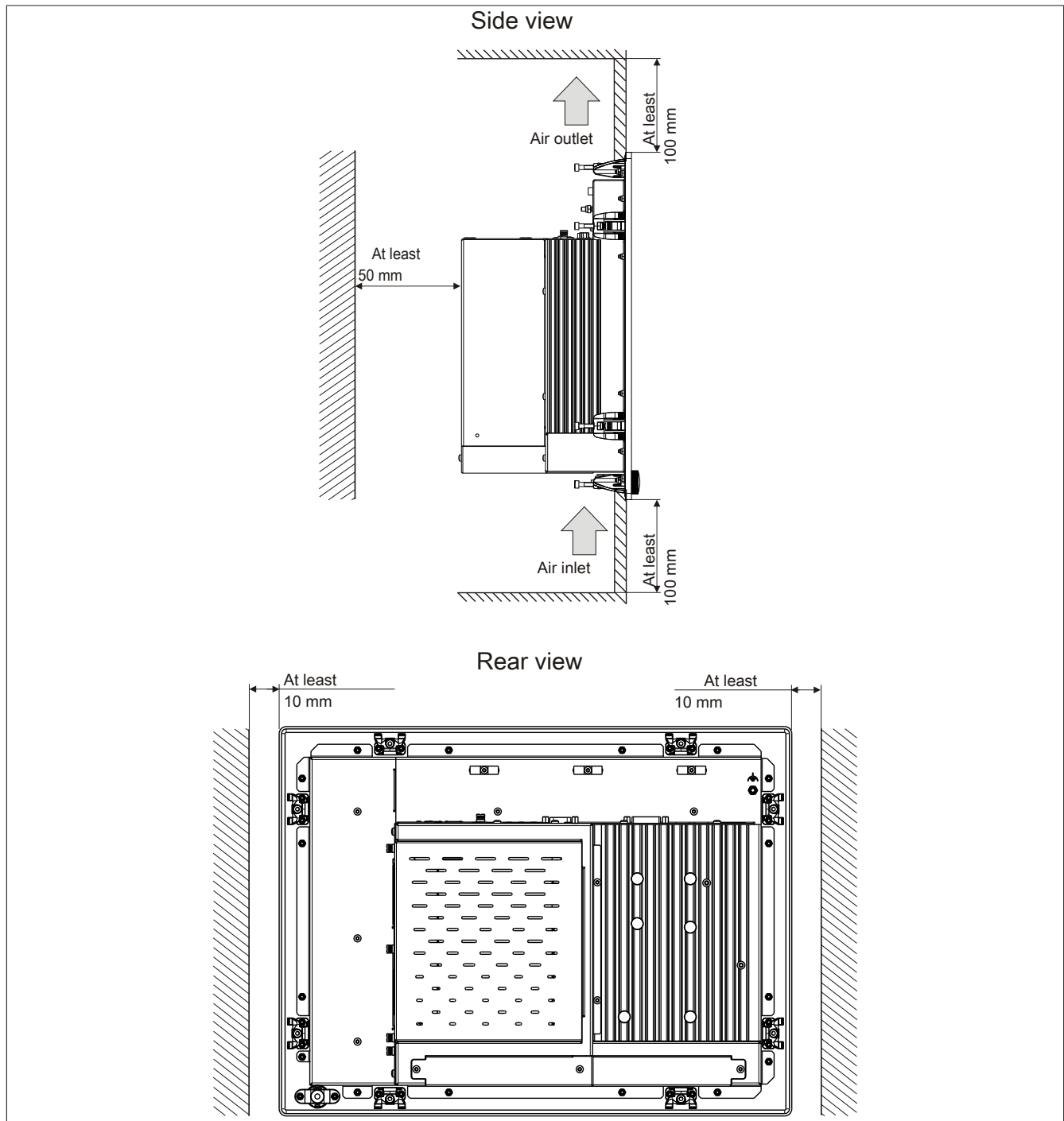


Image 51: Distances for air circulation

2 Cable connections

When making cable connections and installing cables, it is not permitted to have a Flex radius smaller than the minimum value specified.

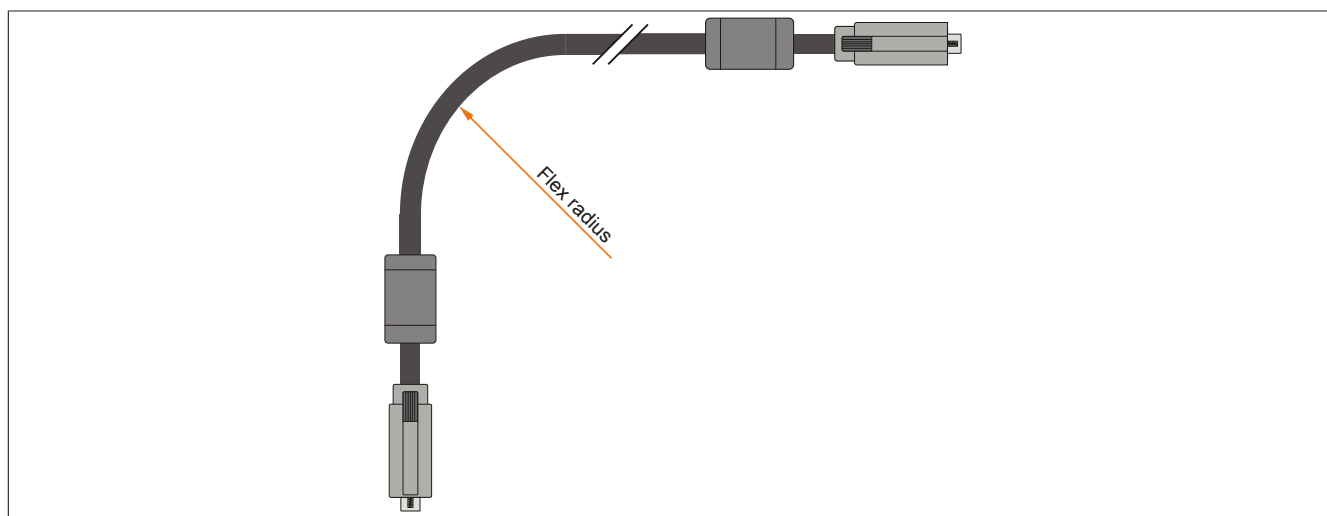


Image 52: Flex radius - Cable connection

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 homepage www.br-automation.com.

3 Grounding concept

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

The functional ground on the device has 2 connections:

- Supply voltage
- Ground connection

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

- The device should be connected to the ground using the shortest route possible.
- Use cable with a minimum cross section of 2.5 mm^2 per connection.
- Note the line shielding concept, all connected data cables are used as shielded lines.

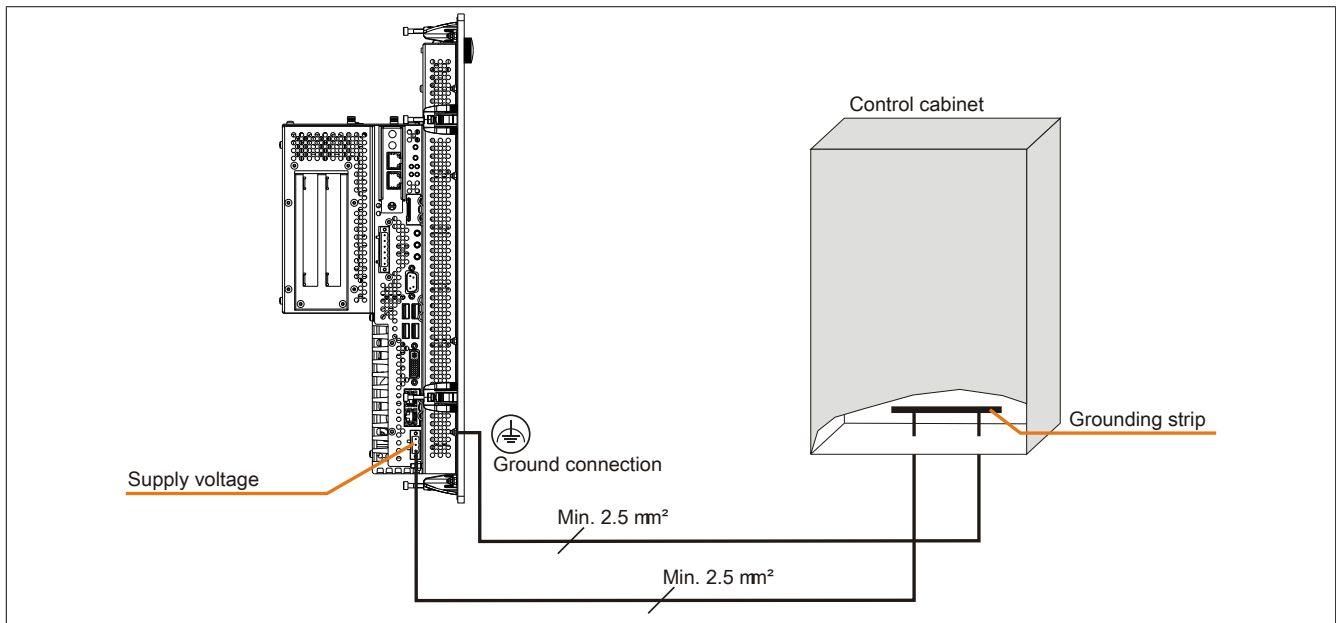


Image 53: Grounding concept

4 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?

4.1 Selecting the display units

If an Automation Panel 800 and an Automation Panel 900 should be connected 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 88: Selecting the display units

4.2 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 DVI interface or an analog monitor (using adapter with model no. 5AC900.1000-00) can also be operated. A separate cable is used for touch screen and USB. 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 (without a hub).

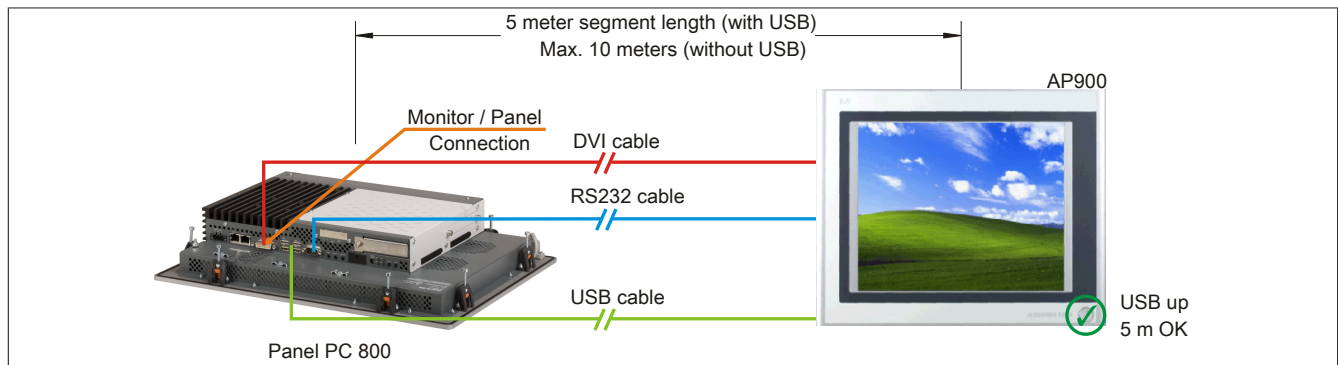


Image 54: One Automation Panel 900 via DVI

4.2.1 Basic 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.BM45-00	✓	✓	Max. SXGA
5PC800.BM45-01	✓	✓	Max. SXGA

Table 89: Possible combinations of system unit and CPU board

4.2.2 Link modules

Information:

A corresponding link module must be selected for every device used.

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

Table 90: Link modules

4.2.3 Cables

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

Order 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 operating of a display unit with touch screen, 1.8 m.	1.8 m ±50 mm
9A0014.05	RS232 extension cable for remote operating of a display unit with touch screen, 5 m.	5 m ±80 mm
9A0014.10	RS232 extension cable for remote operating of a display unit with touch screen, 10 m.	10 m ±100 mm
5CAUSB.0018-00	USB 2.0 connecting cable type A - type B, 1.8 m.	1.8 m ±30 mm
5CAUSB.0050-00	USB 2.0 connecting cable type A - type B, 5 m.	5 m ±50 mm

Table 91: 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 homepage www.br-automation.com.

4.2.4 Possible Automation Panel units, resolutions and segment lengths

The following Automation Panel 900 units can be used. In rare cases, the segment length is limited according to 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 92: Possible Automation Panel units, resolutions and segment lengths

- 1) USB support is not possible on the Automation Panel 900 because USB is limited to 5 m.

Information:

The DVI transfer mode does not allow reading statistical values on Automation Panel 900 units.

4.3 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 (without a hub).

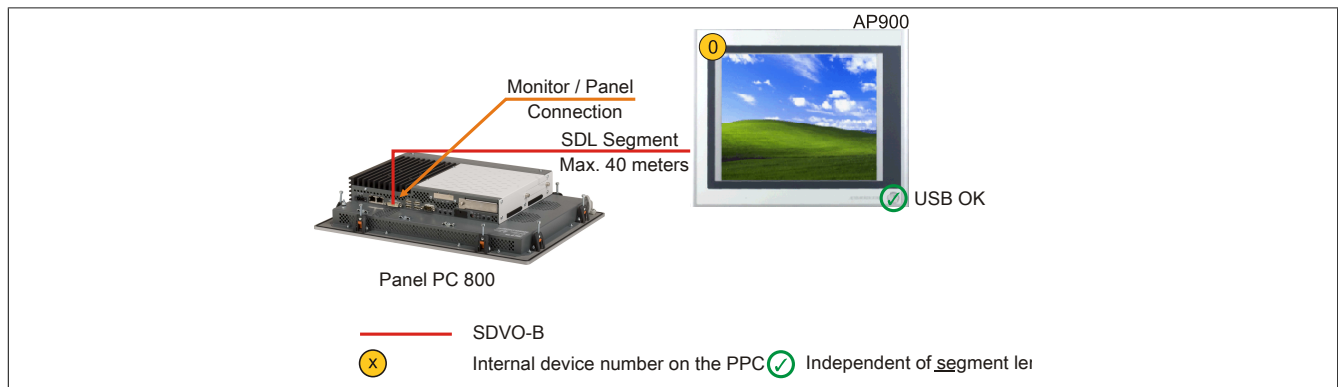


Image 55: One Automation Panel 900 via onboard SDL

4.3.1 Basic 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.BM45-00	✓	✓	Max. UXGA
5PC800.BM45-01	✓	✓	Max. UXGA

Table 93: Possible combinations of system unit and CPU board

4.3.2 Link modules

Information:

A corresponding link module must be selected for every device used.

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

Table 94: Link modules

4.3.3 Cables

Select an Automation Panel 900 cable from the following table.

Order 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 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; 45° connector, 1.8 m.	1.8 m ±30 mm
5CASDL.0050-01	SDL cable; 45° connector, 5 m.	5 m ±50 mm
5CASDL.0100-01	SDL cable; 45° connector, 10 m.	10 m ±100 mm
5CASDL.0150-01	SDL cable; 45° connector, 15 m.	15 m ±100 mm

Table 95: 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 homepage www.br-automation.com.

Cable lengths and resolutions for SDL transfer

The following table shows the relationship between segment lengths and the maximum resolution according to the SDL cable 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.0018-00	5CASDL.0018-00	5CASDL.0018-00	5CASDL.0018-00
	5CASDL.0018-01	5CASDL.0018-01	5CASDL.0018-01	5CASDL.0018-01	5CASDL.0018-01
	5CASDL.0018-03	5CASDL.0018-03	5CASDL.0018-03	5CASDL.0018-03	5CASDL.0018-03
5	5CASDL.0050-00	5CASDL.0050-00	5CASDL.0050-00	5CASDL.0050-00	5CASDL.0050-00
	5CASDL.0050-01	5CASDL.0050-01	5CASDL.0050-01	5CASDL.0050-01	5CASDL.0050-01
	5CASDL.0050-03	5CASDL.0050-03	5CASDL.0050-03	5CASDL.0050-03	5CASDL.0050-03
10	5CASDL.0100-00	5CASDL.0100-00	5CASDL.0100-00	5CASDL.0100-00	5CASDL.0100-00
	5CASDL.0100-01	5CASDL.0100-01	5CASDL.0100-01	5CASDL.0100-01	5CASDL.0100-01
	5CASDL.0100-03	5CASDL.0100-03	5CASDL.0100-03	5CASDL.0100-03	5CASDL.0100-03
15	5CASDL.0150-00	5CASDL.0150-00	5CASDL.0150-00	5CASDL.0150-00	-
	5CASDL.0150-01	5CASDL.0150-01	5CASDL.0150-01	5CASDL.0150-01	-
	5CASDL.0150-03	5CASDL.0150-03	5CASDL.0150-03	5CASDL.0150-03	-
20	5CASDL.0200-00	5CASDL.0200-00	5CASDL.0200-00	5CASDL.0200-00	-
	5CASDL.0200-03	5CASDL.0200-03	5CASDL.0200-03	5CASDL.0200-03	-
25	5CASDL.0250-00	5CASDL.0250-00	5CASDL.0250-00	-	-
	5CASDL.0250-03	5CASDL.0250-03	5CASDL.0250-03	-	-
30	5CASDL.0300-00	5CASDL.0300-00	-	-	-
	5CASDL.0300-03	5CASDL.0300-03	5CASDL.0300-13	5CASDL.0300-13	-
40	5CASDL.0400-13	5CASDL.0400-13	5CASDL.0400-13	5CASDL.0400-13	-

Table 96: Cable lengths and resolutions for SDL transfer

4.3.4 BIOS settings

No special BIOS settings are necessary for operation.

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

Touch screen functionality

The COM C must be enabled in BIOS in order to operate the connected panel touch screen on the monitor / panel connection (found in the BIOS menu under "Advanced - Main board / Panel Features - Legacy Devices").

4.4 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).

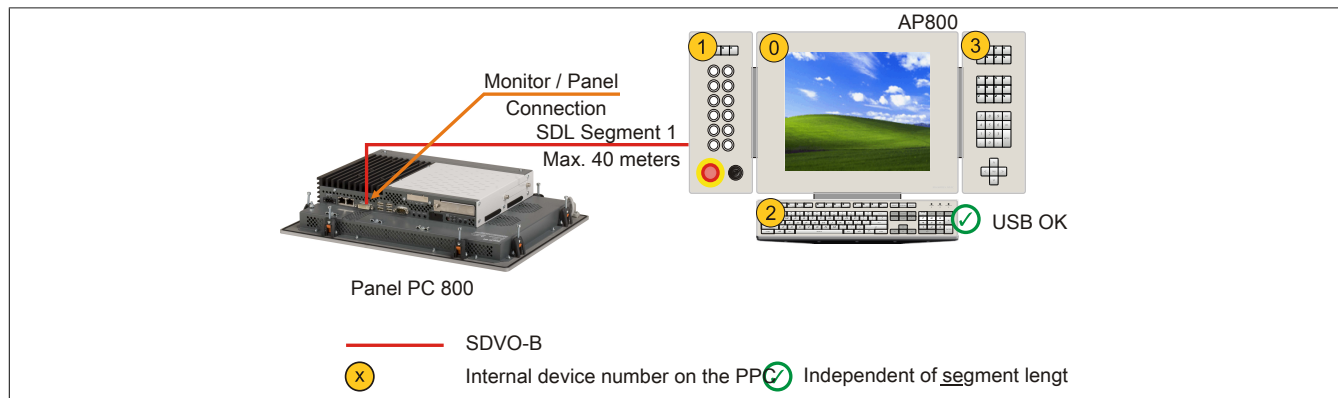


Image 56: One Automation Panel 800 via onboard SDL

4.4.1 Basic 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.BM45-00	✓	✓	Max. UXGA
5PC800.BM45-01	✓	✓	Max. UXGA

Table 97: Possible combinations of system unit and CPU board

4.4.2 Cables

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

Order number	Description	Length
5CASDL.0018-20	SDL flex cable for Automation Panel 800, 1.8 m.	1,8 m ±20 mm
5CASDL.0050-20	SDL flex cable for Automation Panel 800, 5 m.	5 m ±45 mm
5CASDL.0100-20	SDL flex cable for Automation Panel 800, 10 m.	10 m ±90 mm
5CASDL.0150-20	SDL flex cable for Automation Panel 800, 15 m.	15 m ±135 mm
5CASDL.0200-20	SDL flex cable for Automation Panel 800, 20 m.	20 m ±180 mm
5CASDL.0250-20	SDL flex cable for Automation Panel 800, 25 m.	25 m ±230 mm
5CASDL.0300-30	SDL flex cable for Automation Panel 800 with extender, 30 m.	30 m ±280 mm
5CASDL.0400-30	SDL flex cable for Automation Panel 800 with extender, 40 m.	40 m ±380 mm

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 homepage www.br-automation.com.

Cable lengths and resolutions for SDL transfer

The following table shows the relationship between segment lengths and the maximum resolution according to the SDL cable 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 98: Cable lengths and resolutions for SDL transfer

4.4.3 BIOS settings

No special BIOS settings are necessary for operation.

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

Touch screen functionality

The COM C must be enabled in BIOS in order to operate the connected panel touch screen on the monitor / panel connection (found in the BIOS menu under "Advanced - Main board / Panel Features - Legacy Devices").

4.5 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).

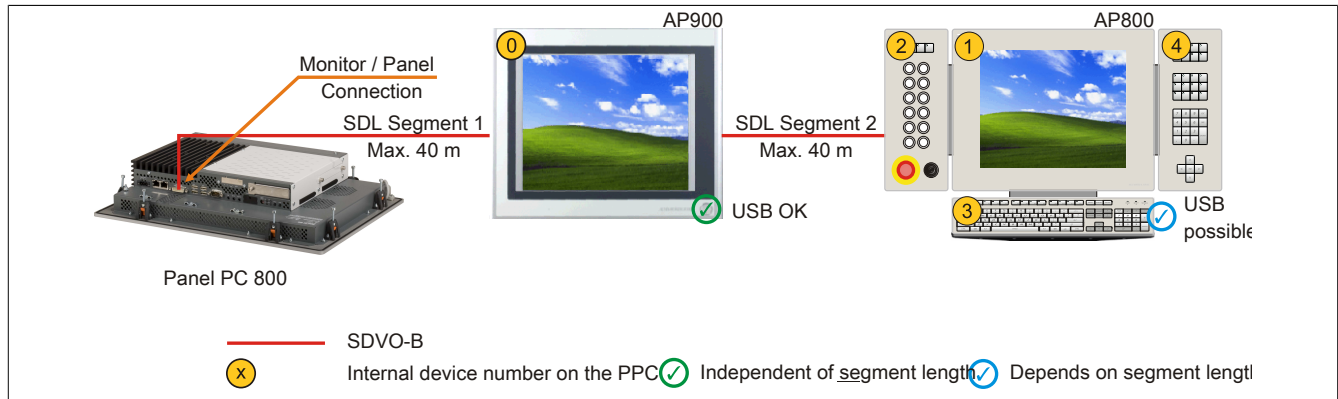


Image 57: One AP900 and one AP800 via onboard SDL

4.5.1 Basic 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.BM45-00	✓	✓	Max. UXGA
5PC800.BM45-01	✓	✓	Max. UXGA

Table 99: Possible combinations of system unit and CPU board

4.5.2 Link modules

Information:

A corresponding link module must be selected for every device used.

Model number	Description	Note
5DLVI.1000-01	Automation Panel Link SDL transceiver Connections for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900

Table 100: Link modules

4.5.3 Cables

Selection of SDL cables for connecting the AP900 display to the AP900 display see "Cables" on page 118

Selection of SDL cables for connecting the AP800 display to the AP900 display see "Cables" on page 119.

Information:

Detailed technical data about the cables can be found in chapter "Accessories".

4.5.4 BIOS settings

No special BIOS settings are necessary for operation.

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

Touch screen functionality

The COM C must be enabled in BIOS in order to operate the connected panel touch screen on the monitor / panel connection (found in the BIOS menu under "Advanced - Main board / Panel Features - Legacy Devices").

4.6 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 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 side). From a distance of 30 m and longer, USB is only available for the first panel (front and back side). USB devices can only be connected directly to the Automation Panel (without a hub).

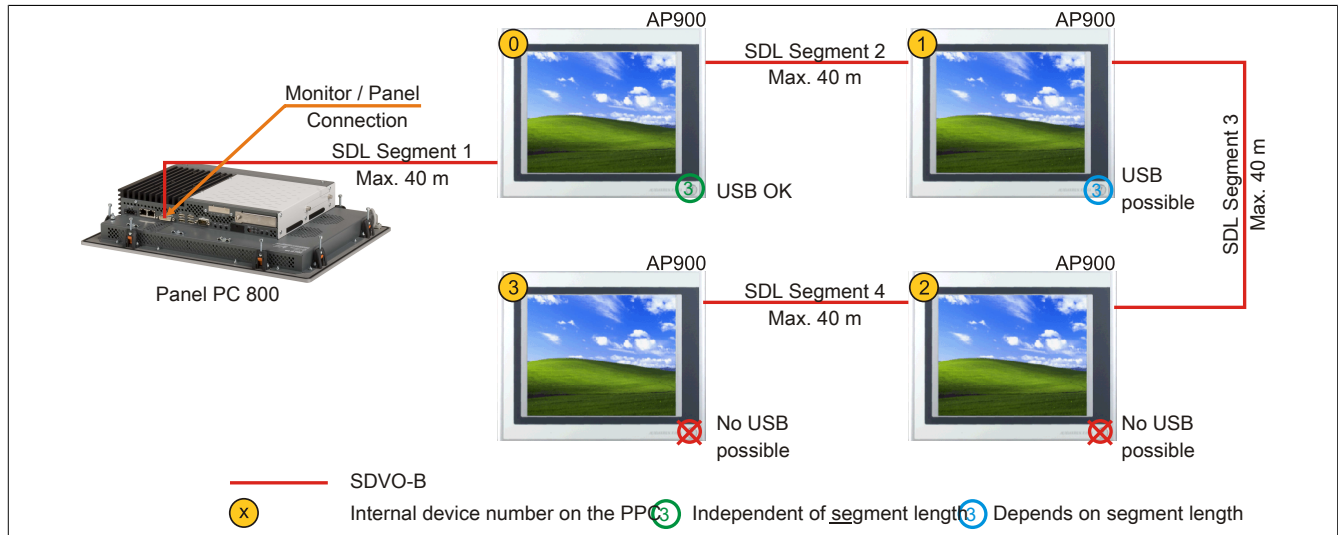


Image 58: Four Automation Panel 900 units via onboard SDL

4.6.1 Basic 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.BM45-00	✓	✓	Max. UXGA
5PC800.BM45-01	✓	✓	Max. UXGA

Table 101: Possible combinations of system unit and CPU board

4.6.2 Link modules

Information:

A corresponding link module must be selected for every device used.

Model number	Description	Note
5DL DVI.1000-00	Automation Panel Link SDL receiver Connection for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900
5DLS DL.1000-01	Automation Panel Link SDL transceiver Connections for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900

Table 102: Link modules

4.6.3 Cables

Select an Automation Panel 900 cable from the following table.

Order 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

Table 103: Cables for SDL configurations

Order number	Description	Length
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 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; 45° connector, 1.8 m.	1,8 m ±30 mm
5CASDL.0050-01	SDL cable; 45° connector, 5 m.	5 m ±50 mm
5CASDL.0100-01	SDL cable; 45° connector, 10 m.	10 m ±100 mm
5CASDL.0150-01	SDL cable; 45° connector, 15 m.	15 m ±100 mm

Table 103: 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 homepage www.br-automation.com.

Cable lengths and resolutions for SDL transfer

The following table shows the relationship between segment lengths and the maximum resolution according to the SDL cable 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 104: Cable lengths and resolutions for SDL transfer

4.6.4 BIOS settings

No special BIOS settings are necessary for operation.

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

Touch screen functionality

The COM C must be enabled in BIOS in order to operate the connected panel touch screen on the monitor / panel connection (found in the BIOS menu under "Advanced - Main board / Panel Features - Legacy Devices").

5 Touch screen calibration

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

Regardless of this, the touch screen driver requires calibration following installation.

5.1 Windows XP Professional

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

5.2 Windows XP Embedded

After first starting Windows XP Embedded (First Boot Agent), the touch screen driver must be installed in the device in order to operate the touch screen. The necessary driver is available in the Download area of the B&R website www.br-automation.com.

5.3 Windows Embedded Standard 2009

After first starting Windows Embedded Standard 2009 (First Boot Agent), the touch screen driver must be installed in the device in order to operate the touch screen. The necessary driver is available in the Download area of the B&R website (www.br-automation.com).

5.4 Windows 7

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

5.5 Windows Embedded Standard 7

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

The touch screen driver must be installed manually if a touch controller was not detected during the Windows Embedded Standard 7 setup or if an Automation Panel 800/900 has been connected after setup. The necessary driver is available in the Download area of the B&R website (www.br-automation.com).

5.6 Windows CE

Windows CE starts the touch screen calibration sequence during its first boot in the default configuration / delivered state.

5.7 Automation Runtime / Visual Components

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

6 Connecting USB peripheral devices

Warning!

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

6.1 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 maximum load of 1A. The maximum transfer rate is USB 2.0.

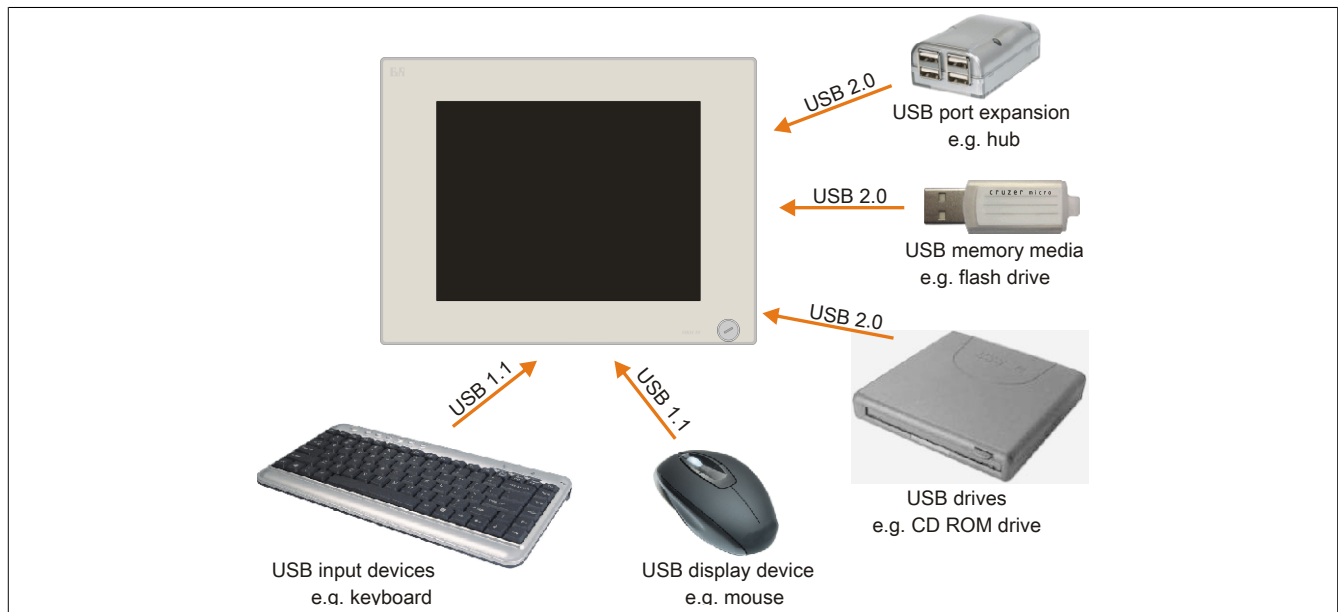


Image 59: Local connection of USB peripheral devices on the PPC800

6.2 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 (no hubs) can be connected to the Automation Panel 900.

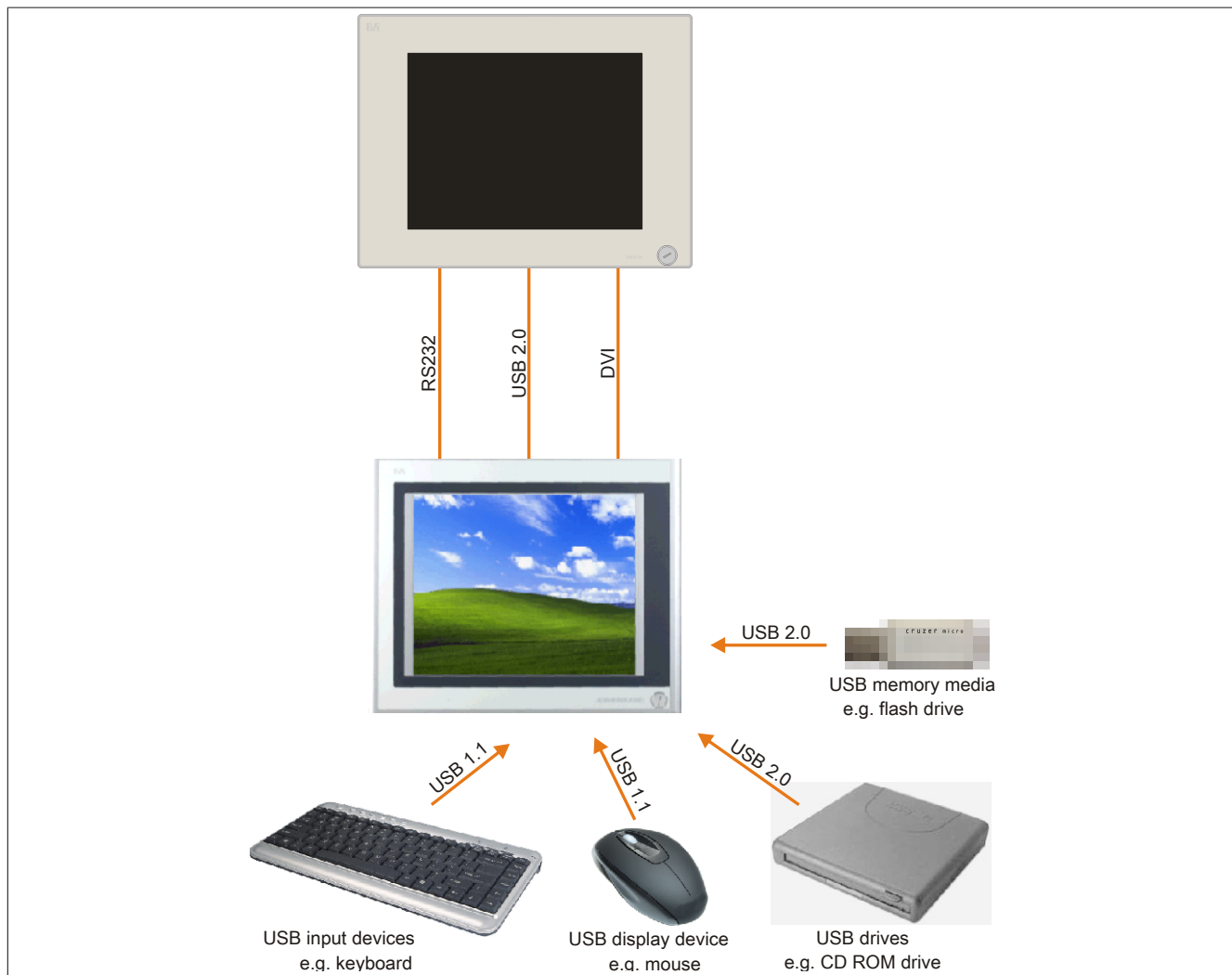


Image 60: Remote connection of USB peripheral devices to the APC900 via DVI

6.3 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 and/or USB connections on the 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.

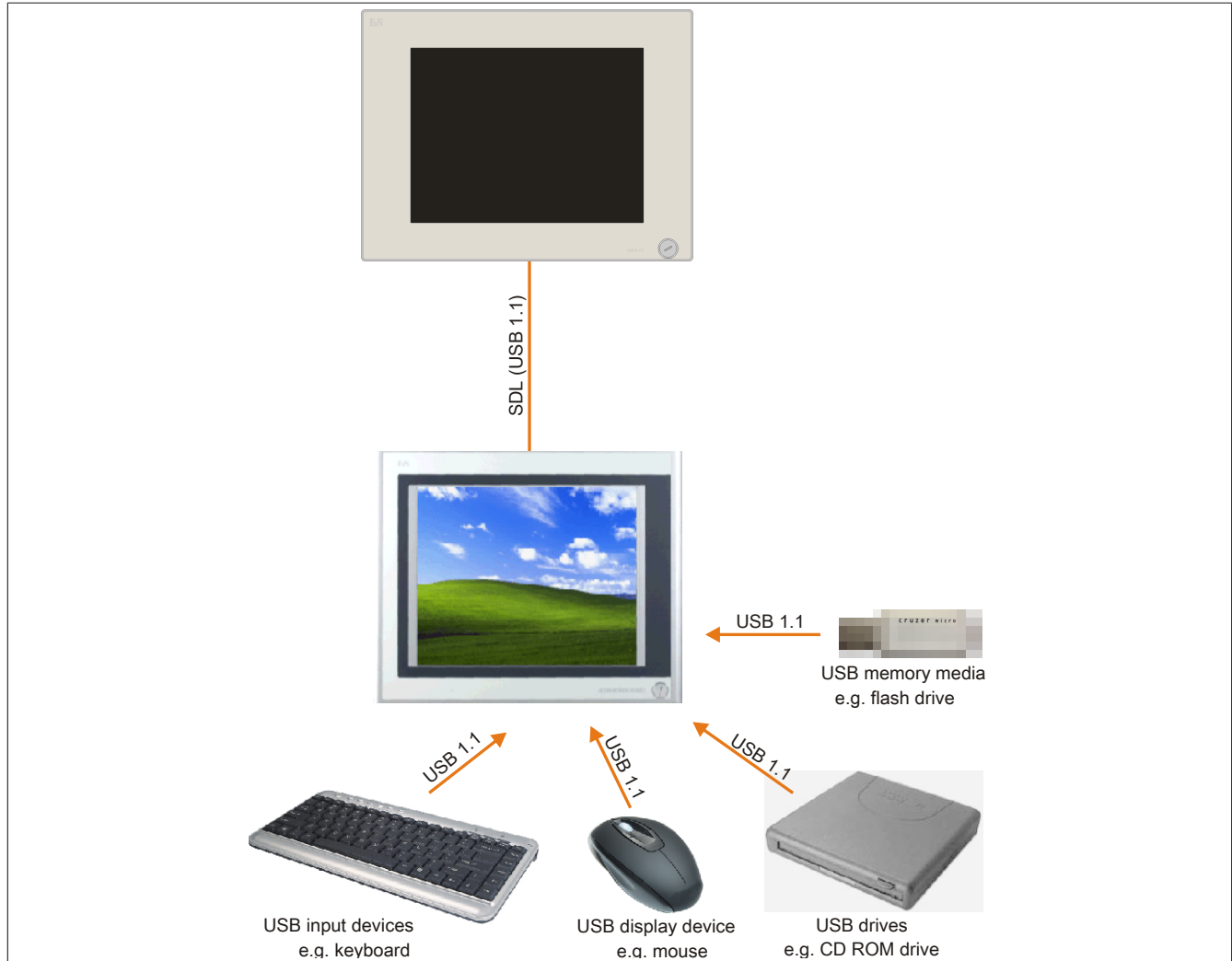


Image 61: Remote connection of USB peripheral devices to the APC800/900 via SDL

7 Configuration of a SATA RAID array

Information:

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

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.

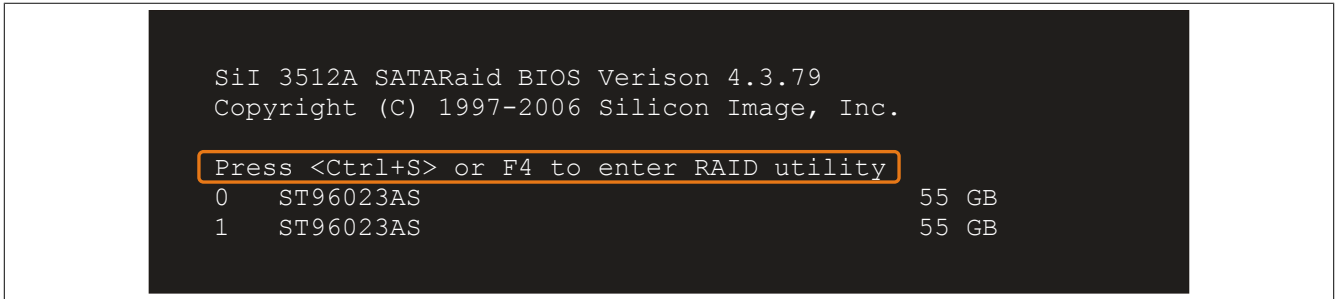


Image 62: Open the RAID Configuration Utility

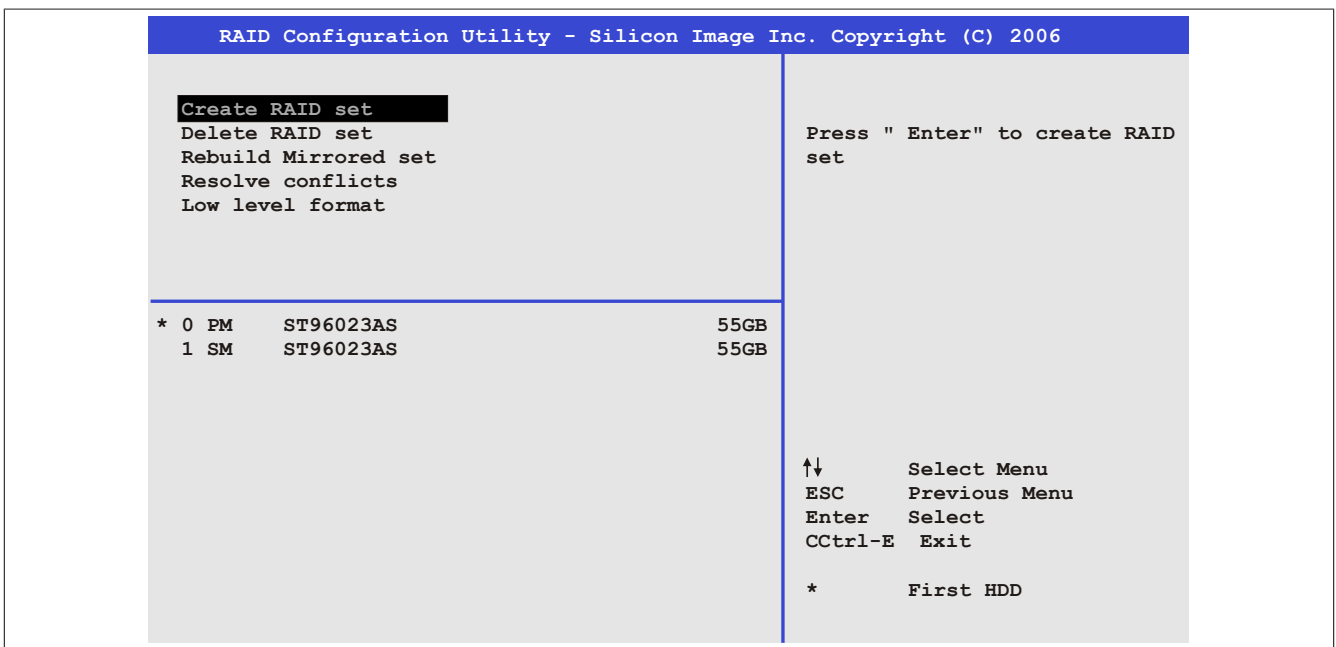


Image 63: RAID Configuration Utility - Menu

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

Key	Function
Cursor ↑	Go to previous item.
Cursor ↓	Go to the next item.
Enter	Select an item or open a submenu.
ESC	Go back to previous menu.
Ctrl+E	Exit setup and save the changed settings.

Table 105: BIOS-relevant keys in the RAID Configuration Utility

7.1 Create RAID set

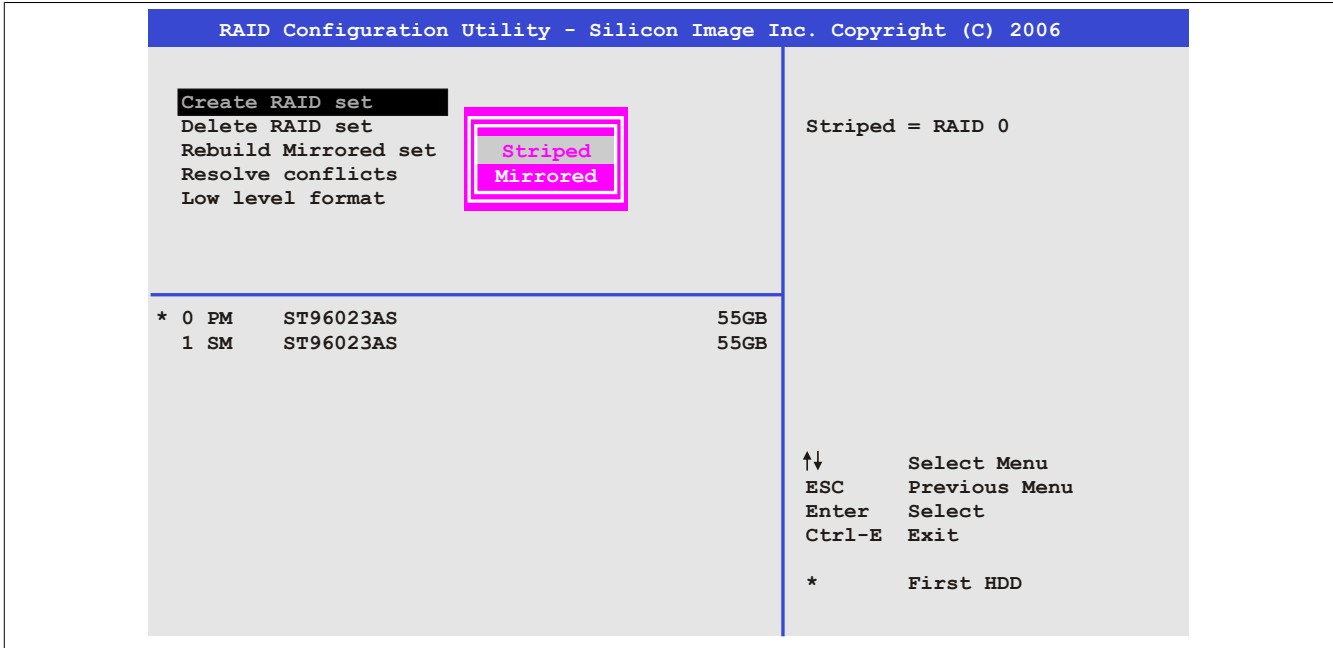


Image 64: RAID Configuration Utility - Menu

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

7.2 Create RAID set - Striped

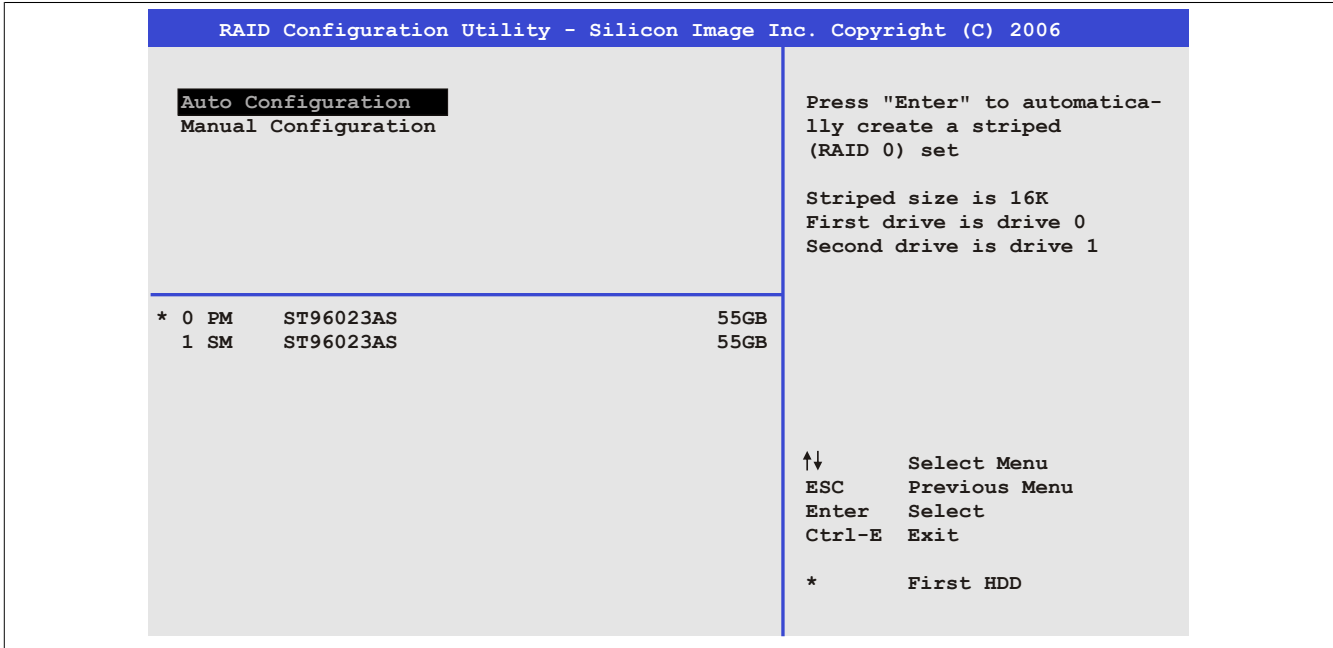


Image 65: RAID Configuration Utility - Create RAID set - Striped

"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).

7.3 Create RAID set - Mirrored

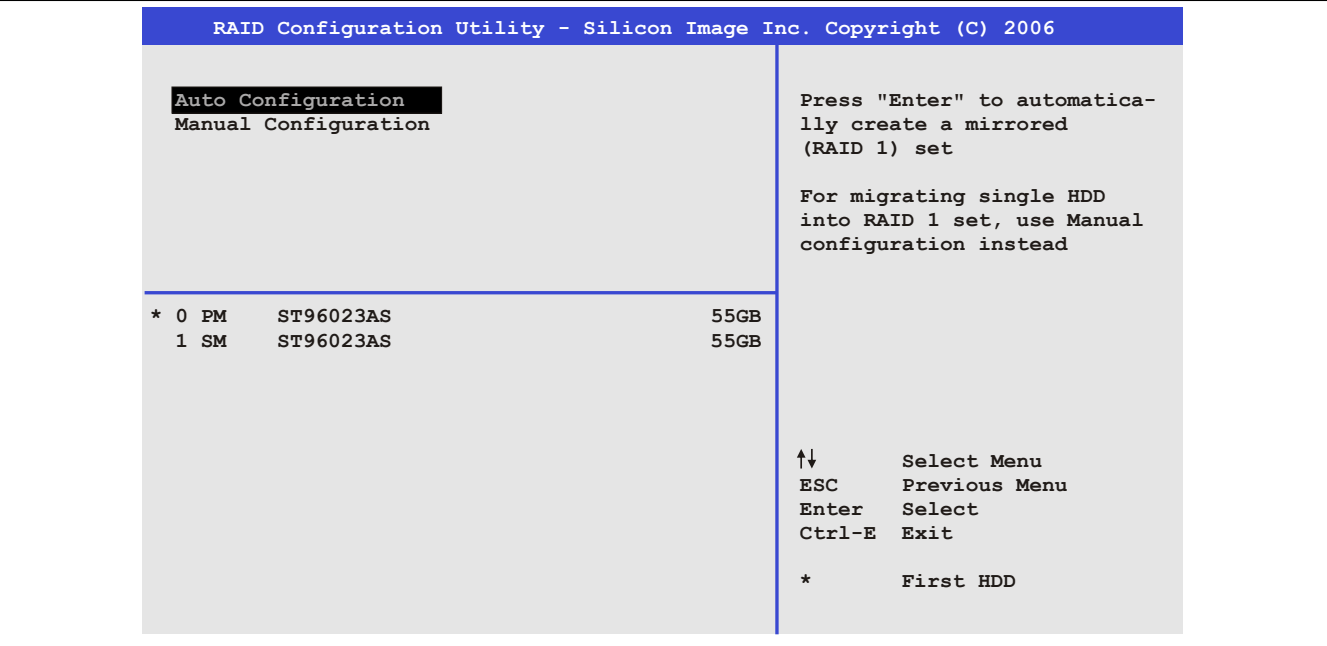


Image 66: RAID Configuration Utility - Create RAID set - Mirrored

"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).

7.4 Delete RAID set

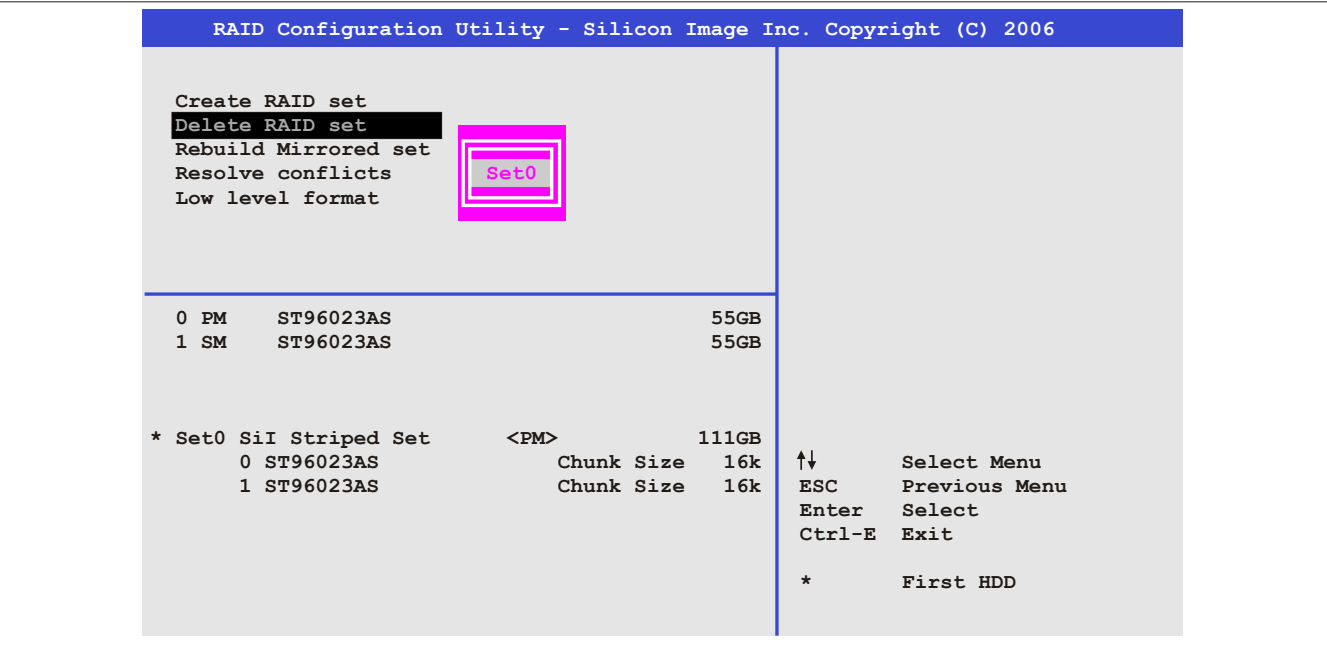


Image 67: RAID Configuration Utility - Delete RAID set

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

7.5 Rebuild mirrored set

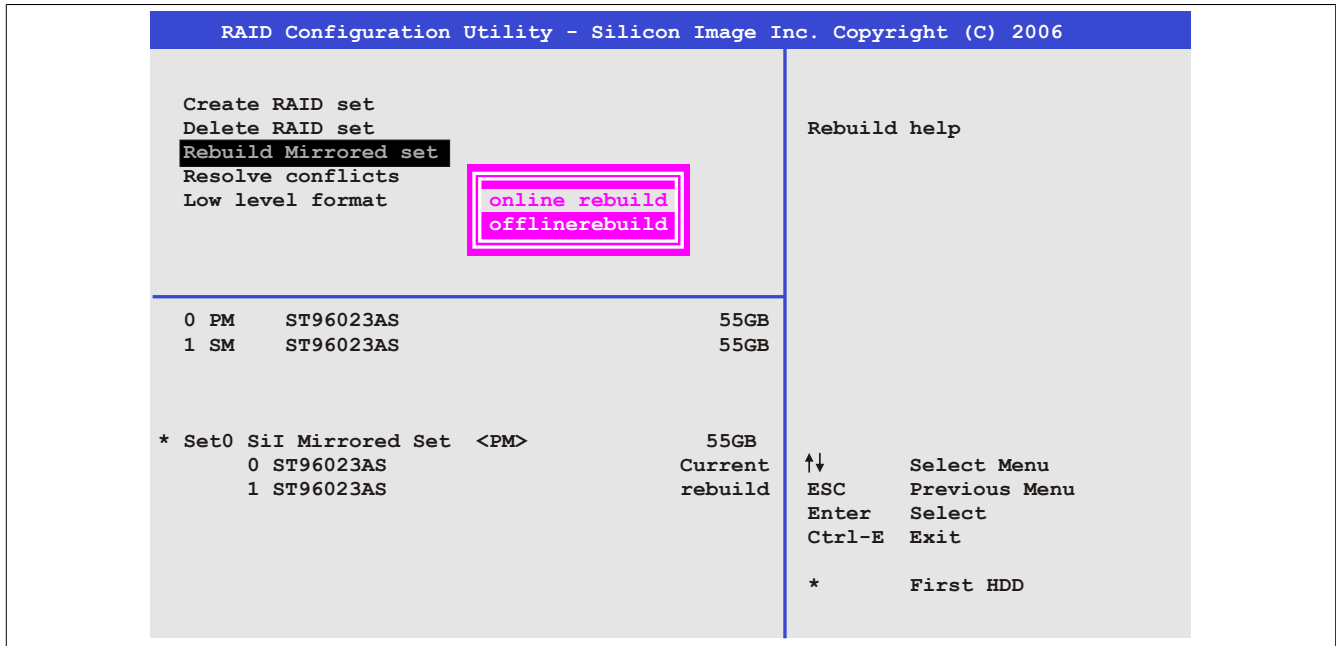


Image 68: RAID Configuration Utility - Rebuild mirrored set

The "Rebuild mirrored set" menu can be used to restart a rebuild procedure in a RAID 1 network 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 (lasts approximately 30 minutes).

7.6 Resolve conflicts

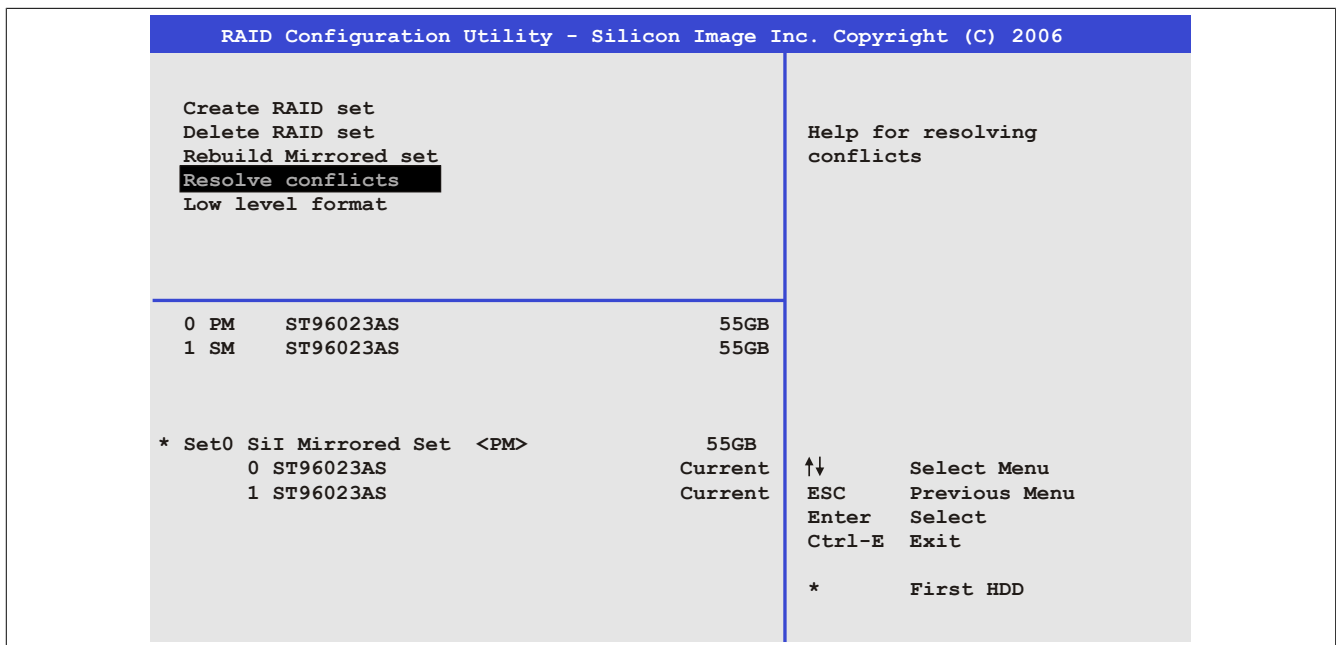


Image 69: RAID Configuration Utility - Resolve conflicts

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".

7.7 Low level format

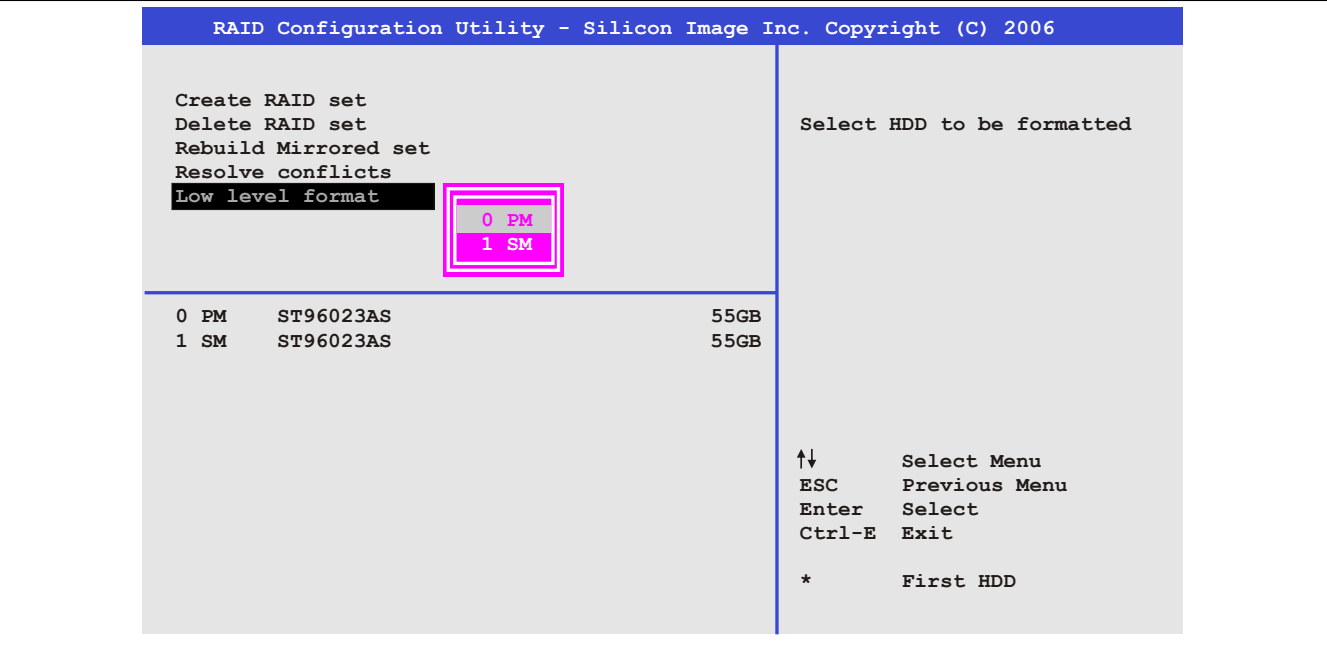


Image 70: RAID Configuration Utility - Low level format

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.

8 User tips for increasing the display lifespan

8.1 Backlight

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

8.1.1 How can the lifespan of backlights be extended?

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

8.2 Image sticking

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

There are 2 types of this:

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

8.2.1 What causes image sticking?

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

8.2.2 How can image sticking be avoided?

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

9 Pixel error

Information:

Displays can contain faulty pixels (dead pixels) that result from the manufacturing process. These flaws are not grounds claiming reclamation or warranty.

10 Known problems / issues

- Using two different types of CompactFlash cards can cause problems in Automation PCs and Panel PCs. This can result in one of the two cards not being detected during system startup. This is caused by varying startup speeds. CompactFlash cards with older technology require significantly more time during system startup than CompactFlash cards with newer technology. This behavior occurs near the limits of the time frame provided for startup. The problem described above can occur because the startup time for the CompactFlash cards fluctuates due to the variance of the components being used. Depending on the CompactFlash cards being used, this error might never, sometimes or always occur.
- 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.
- The MIC, Line IN and Line OUT inputs/outputs are not supported due to the Intel GM45 chipset.
- The CompactFlash Slot 2 is not supported due to the Intel GM45 chipset.

Chapter 4 • Software

1 BIOS options

Information:

The following diagrams and BIOS menu items including descriptions refer to BIOS version 1.15. It is therefore possible that these diagrams and BIOS descriptions do not correspond with the installed BIOS version.

1.1 General information

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

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

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

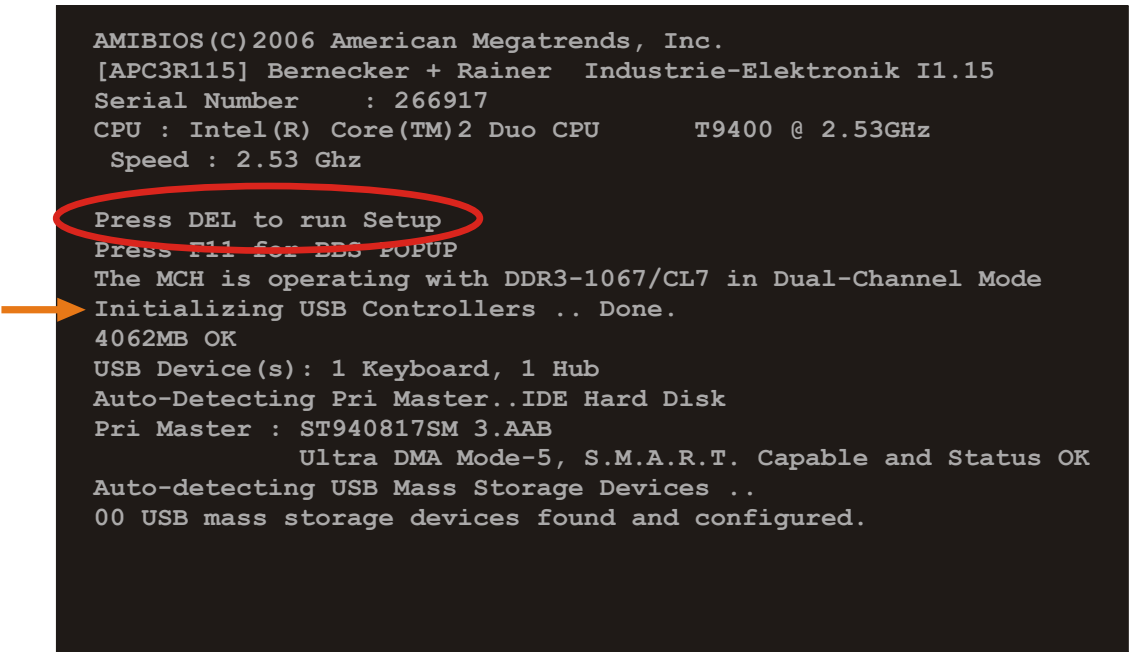
1.2 BIOS setup and boot procedure

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

BIOS reads the system configuration information in CMOS RAM, checks the system, and configures it using the Power On Self Test (POST).

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

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

The image shows a BIOS boot screen with white text on a black background. A red oval highlights the line "Press DEL to run Setup". An orange arrow points to the line "Initializing USB Controllers .. Done.". The text on the screen includes system information and hardware detection status.

```
AMIBIOS(C)2006 American Megatrends, Inc.  
[APC3R115] Bernecker + Rainer Industrie-Elektronik I1.15  
Serial Number      : 266917  
CPU : Intel(R) Core(TM)2 Duo CPU          T9400 @ 2.53GHz  
Speed : 2.53 Ghz  
  
Press DEL to run Setup  
Press F11 for DDS POPUP  
The MCH is operating with DDR3-1067/CL7 in Dual-Channel Mode  
→ Initializing USB Controllers .. Done.  
4062MB OK  
USB Device(s): 1 Keyboard, 1 Hub  
Auto-Detecting Pri Master..IDE Hard Disk  
Pri Master : ST940817SM 3.AAB  
                Ultra DMA Mode-5, S.M.A.R.T. Capable and Status OK  
Auto-detecting USB Mass Storage Devices ..  
00 USB mass storage devices found and configured.
```

Image 71: Boot screen

1.2.1 BIOS setup keys

The following keys are enabled during the POST:

Information:

The key signals from the USB keyboard are only registered after the USB controller has been initialized.

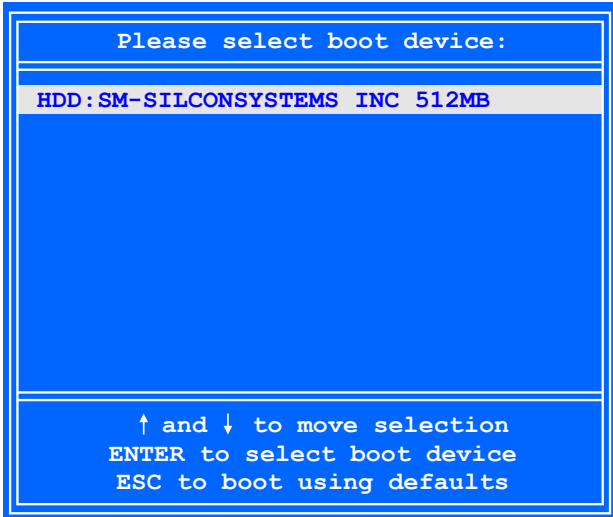
Keys	Function
Del	Enters the BIOS setup menu.
F12	Using the F12 key, you can boot from the network.
F11	Cues the boot menu. Lists all bootable devices that are connected to the system. Select the device to boot from with cursor ↑, cursor ↓ and <ENTER>.
	
<Pause>	Pressing the <Pause> key stops the POST. Press any other key to resume the POST.

Table 106: BIOS-relevant keys for POST

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

Key	Function
F1	General help.
Cursor ↑	Moves to the previous item.
Cursor ↓	Go to the next item.
Cursor ←	Moves to the previous item.
Cursor →	Go to the next item.
+/-	Changes the setting of the selected function.
Enter	Changes to the selected menu.
Page ↑	Change to the previous page.
Page ↓	Change to the previous page.
Pos 1	Jumps to the first BIOS menu item or object.
End	Jumps to the last BIOS menu item or object.
F2 / F3	The colors of the BIOS Setup are switched.
F7	Changes are reset.
F9	These settings are loaded for all BIOS configurations.
F10	Save and close.
Esc	Exits the submenu.

Table 107: BIOS-relevant keys in the BIOS menu

1.3 Main

Immediately after the DEL button is pressed during startup, the main BIOS setup menu appears.

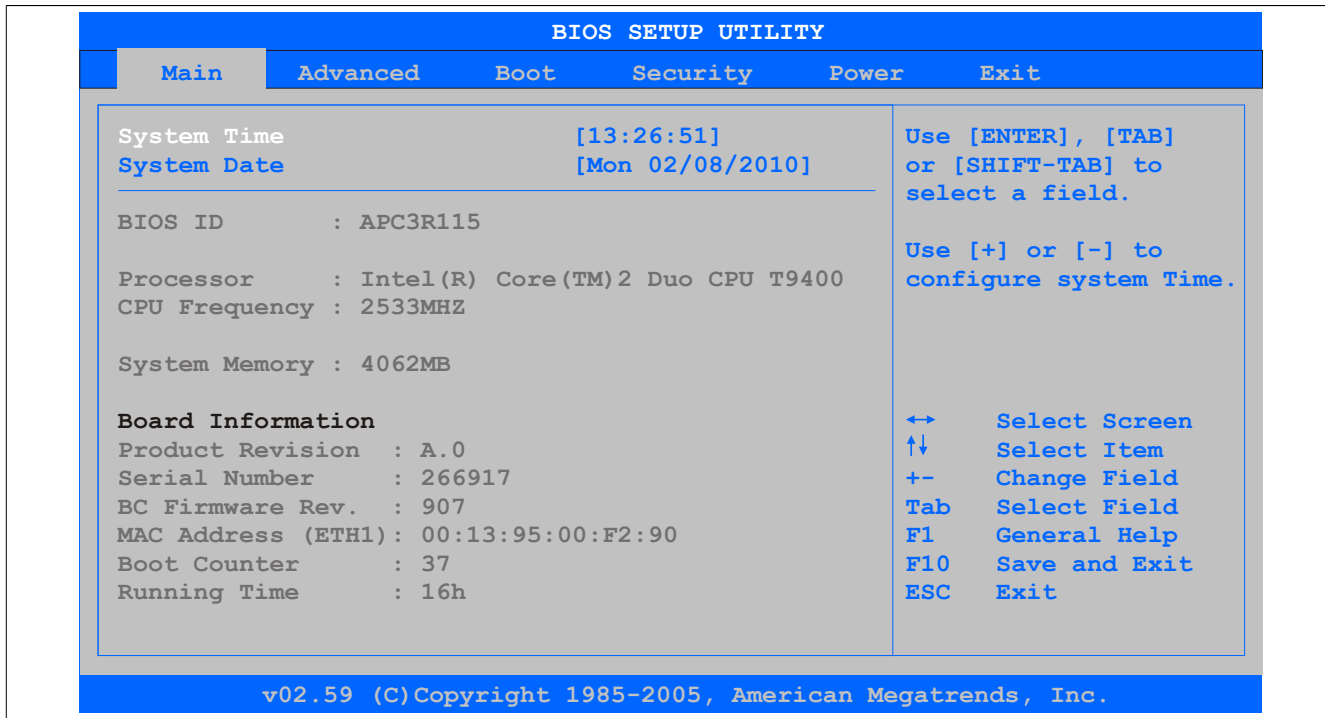


Image 72: GM45 Main menu

BIOS setting	Meaning	Setting options	Effect
System Time	This is the current system time setting. The time is buffered by a battery (CMOS battery) after the system has been switched off.	Adjustment of the system time	Set the system time in the format Hour:Minute:Second (hh:mm:ss).
System Date	This is the current system date setting. The time is buffered by a battery (CMOS battery) after the system has been switched off.	Changes to the system date	Sets the system date in the format Month:Day:Year (mm:dd:yyyy).
BIOS ID	Displays the BIOS recognition.	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 MAC addresses assigned for the ETH1 interface.	None	-
Boot Counter	Displays the boot counter - each restart increments the counter by one (max. 16777215).	None	-
Running Time	Displays the runtime in whole hours. (max. 65535).	None	-

Table 108: GM45 Main menu - Setting options

1.4 Advanced

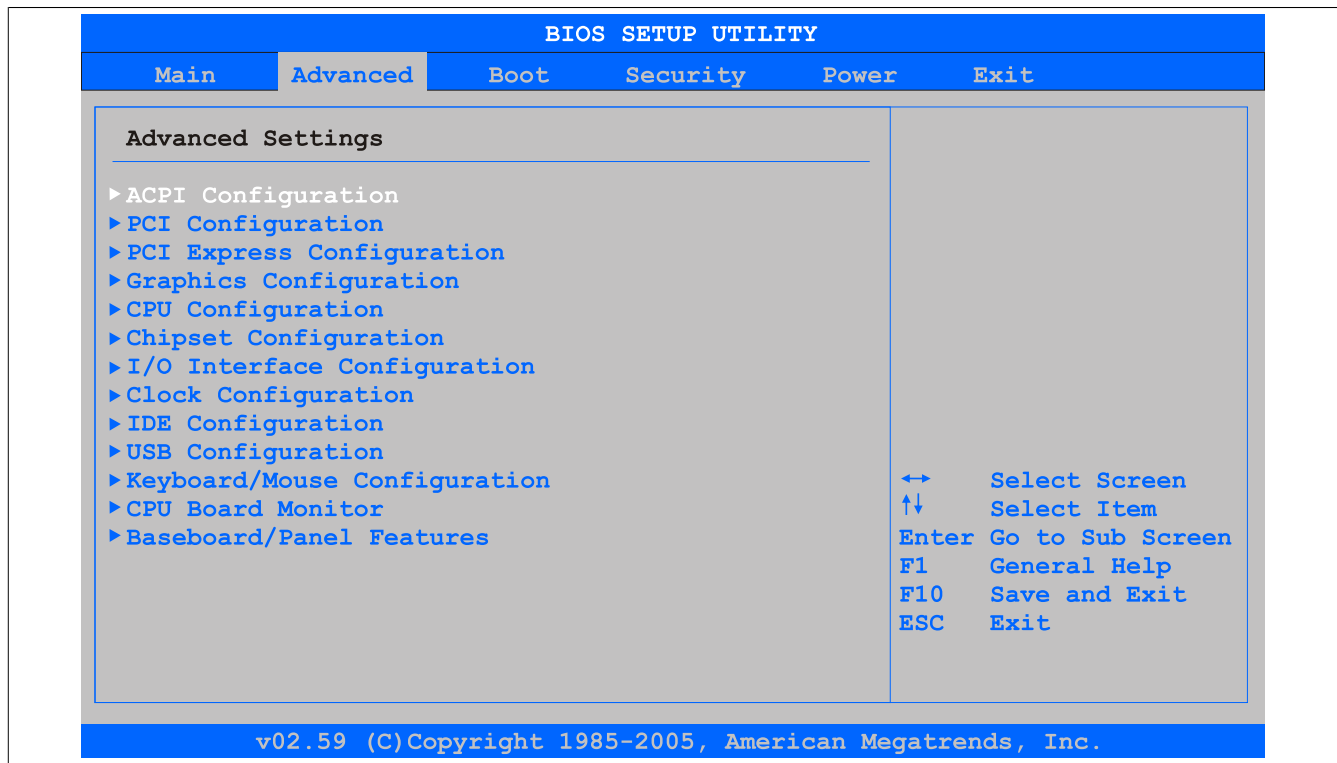


Image 73: GM45 Advanced menu

BIOS setting	Meaning	Setting options	Effect
ACPI configuration	Configures the ACPI devices.	Enter	Opens the submenu see "ACPI Configuration" on page 140
PCI configuration	Configures PCI devices.	Enter	Opens the submenu see "PCI Configuration" on page 141
PCI express configuration	Configures the PCI Express.	Enter	Opens the submenu see "PCI Express Configuration" on page 144
Graphics configuration	Configures the graphics settings.	Enter	Opens the submenu see "Graphics Configuration" on page 146
CPU configuration	Configures the CPU settings.	Enter	Opens the submenu see "CPU Configuration" on page 148
Chipset configuration	Configures the chipset functions.	Enter	Opens the submenu see "Chipset Configuration" on page 149
I/O interface configuration	Configures the I/O devices.	Enter	Opens the submenu see "I/O Interface Configuration" on page 150
Clock configuration	Configures the clock settings.	Enter	Opens the submenu see "Clock Configuration" on page 151
IDE configuration	Configures the IDE functions.	Enter	Opens the submenu see "IDE Configuration" on page 151
USB configuration	Configures the USB settings.	Enter	Opens the submenu see "USB Configuration" on page 157
Keyboard/mouse configuration	Configures the keyboard/mouse options.	Enter	Opens the submenu see "Keyboard/Mouse Configuration" on page 158
CPU Board Monitor	Displays the current voltages and temperature of the processor in use.	Enter	Opens the submenu see "CPU Board Monitor" on page 158
Main Board/Panel Features	Displays device specific information and setup of device specific values.	Enter	Opens the submenu see "Baseboard/Panel Features" on page 160

Table 109: GM45 Advanced menu

1.4.1 ACPI Configuration

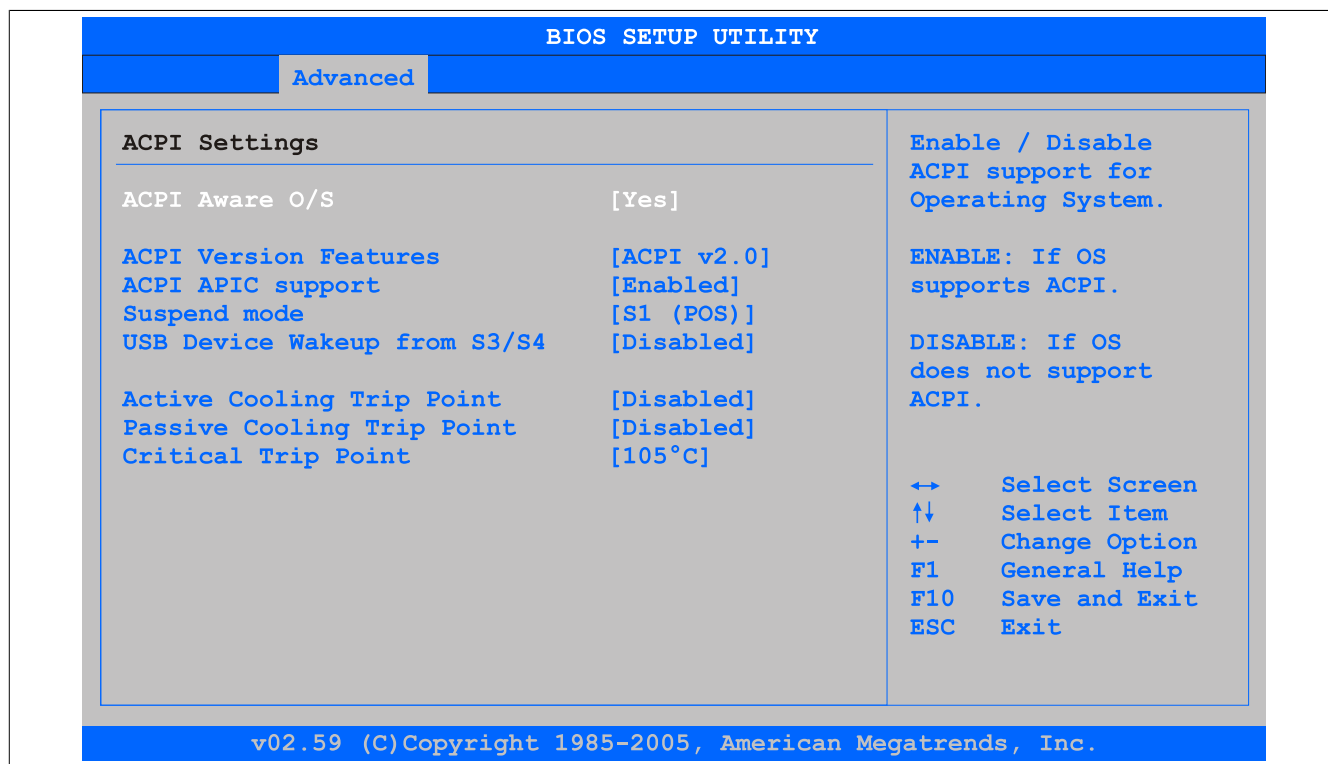


Image 74: GM45 Advanced ACPI configuration

BIOS setting	Meaning	Setting 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 the RAM, which is then supplied solely with 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	With this function, a temperature can be set at which the operating system automatically shuts itself 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 110: GM45 Advanced ACPI Configuration - Setting options

1.4.2 PCI Configuration

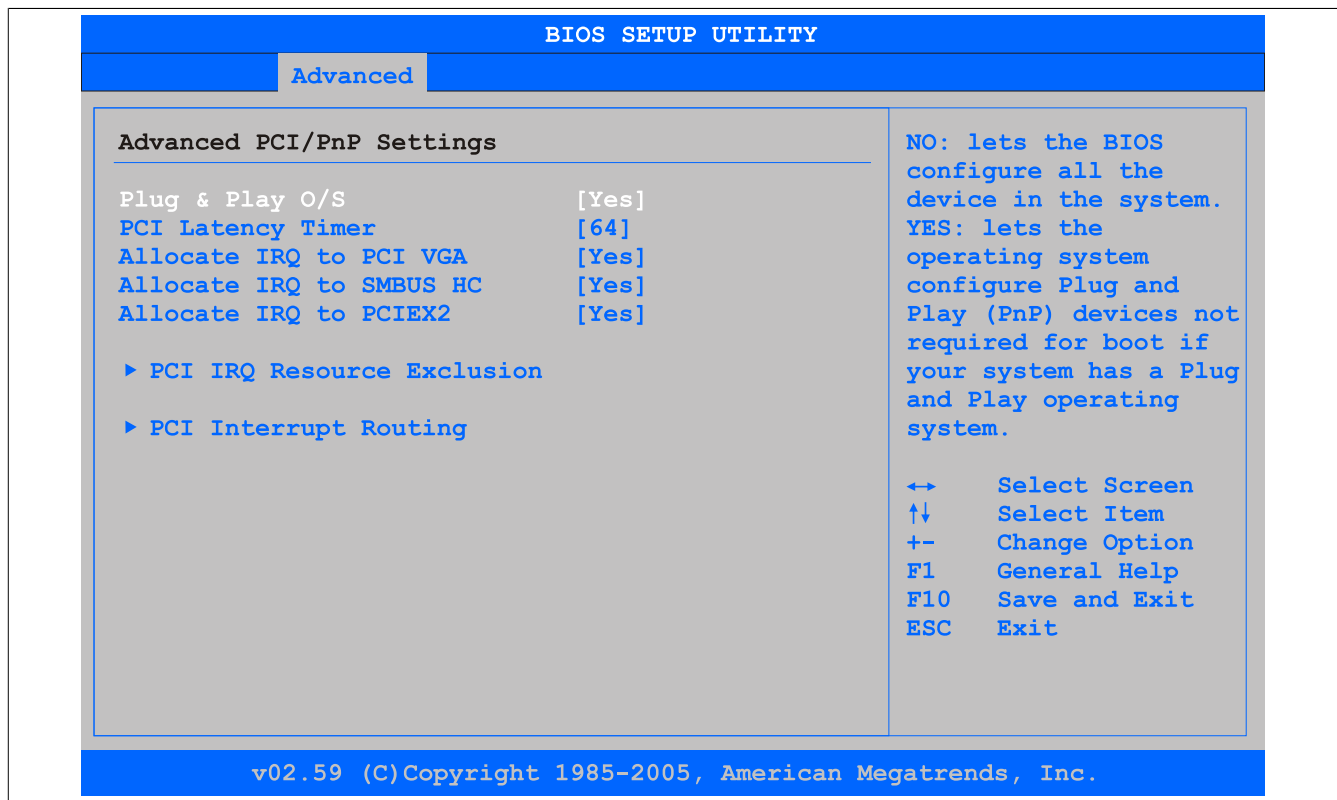


Image 75: GM45 Advanced PCI configuration

BIOS setting	Meaning	Setting 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	This option controls 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 142
PCI Interrupt Routing	Configures PCI interrupt routing	Enter	Opens the submenu see "PCI Interrupt Routing" on page 143

Table 111: GM45 Advanced PCI Configuration - Setting options

PCI IRQ Resource Exclusion

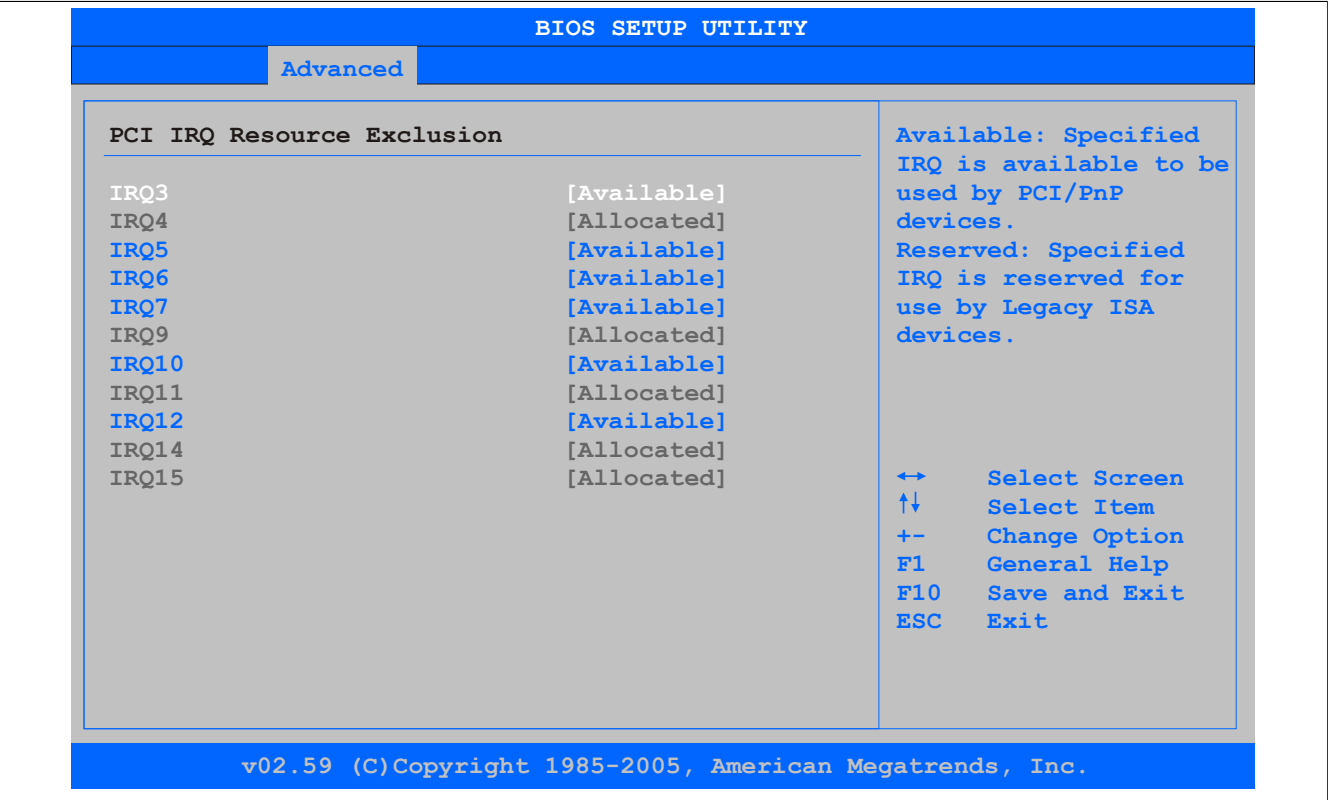


Image 76: GM45 Advanced PCI IRQ resource exclusion

BIOS setting	Meaning	Setting 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 112: GM45 Advanced PCI IRQ Resource Exclusion - Setting options

PCI Interrupt Routing

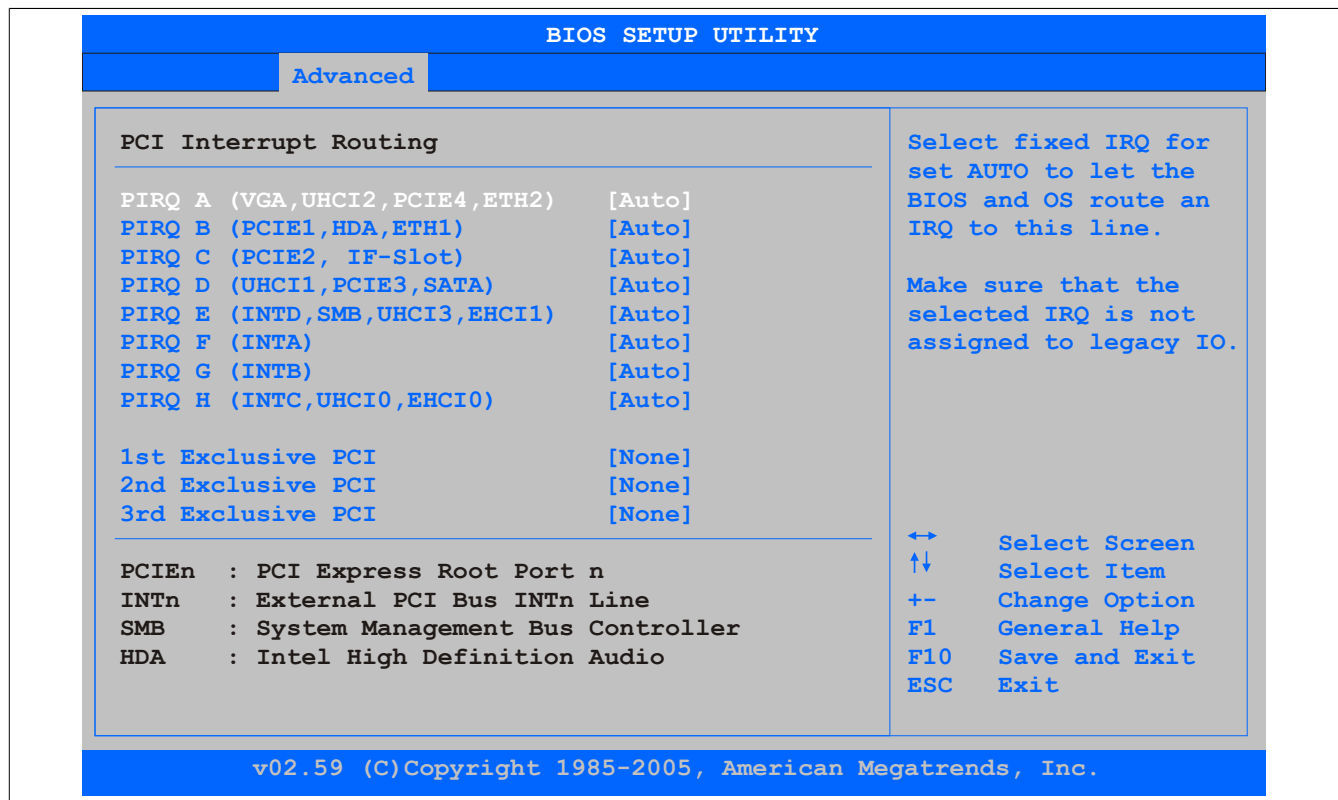


Image 77: GM45 Advanced PCI interrupt routing

BIOS setting	Meaning	Setting options	Effect
PIRQ A (VGA,UHCI2,PCIE4,ETH2)	Option for setting the PIRQ A.	Auto	Automatic assignment by the BIOS and operating system.
		5,6,7,9,10,11,12	Manual assignment.
PIRQ B (PCIE1,HDA,ETH1)	Option for setting the PIRQ B.	Auto	Automatic assignment by the BIOS and operating system.
		5,6,7,9,10,11,12	Manual assignment.
PIRQ C (PCIE2, IF-slot)	Option for setting the PIRQ C.	Auto	Automatic assignment by the BIOS and operating system.
		5,6,7,9,10,11,12	Manual assignment.
PIRQ D (UHCI1,PCIE3, SATA)	Option for setting the PIRQ D.	Auto	Automatic assignment by the BIOS and operating system.
		5,6,7,9,10,11,12	Manual assignment.
PIRQ E (INTD, SMB,UHCI3,EHCI1)	Option for setting the PIRQ E.	Auto	Automatic assignment by the BIOS and operating system.
		5,6,7,9,10,11,12	Manual assignment.
PIRQ F (INTA)	Option for setting the PIRQ F.	Auto	Automatic assignment by the BIOS and operating system.
		5,6,7,9,10,11,12	Manual assignment.
PIRQ G (INTB)	Option for setting the PIRQ G.	Auto	Automatic assignment by the BIOS and operating system.
		5,6,7,9,10,11,12	Manual assignment.
PIRQ H (INTC,UHCI0, EHCI0)	Option for setting the PIRQ H.	Auto	Automatic assignment by the BIOS and 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).	None	No interrupt is assigned.
		x	Assigns the PIRQ as 1st exclusive PCI IRQ.

Information:

Is only displayed if a PIRQ is manually set (e.g. 5).

Table 113: GM45 Advanced PCI Interrupt Routing - Setting options

BIOS setting	Meaning	Setting 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 is 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 on PPC800 units and when three PIRQ are manually set.	None	No interrupt is assigned.
		x	Assigns the PIRQ as 3rd exclusive PCI IRQ.

Table 113: GM45 Advanced PCI Interrupt Routing - Setting options

1.4.3 PCI Express Configuration

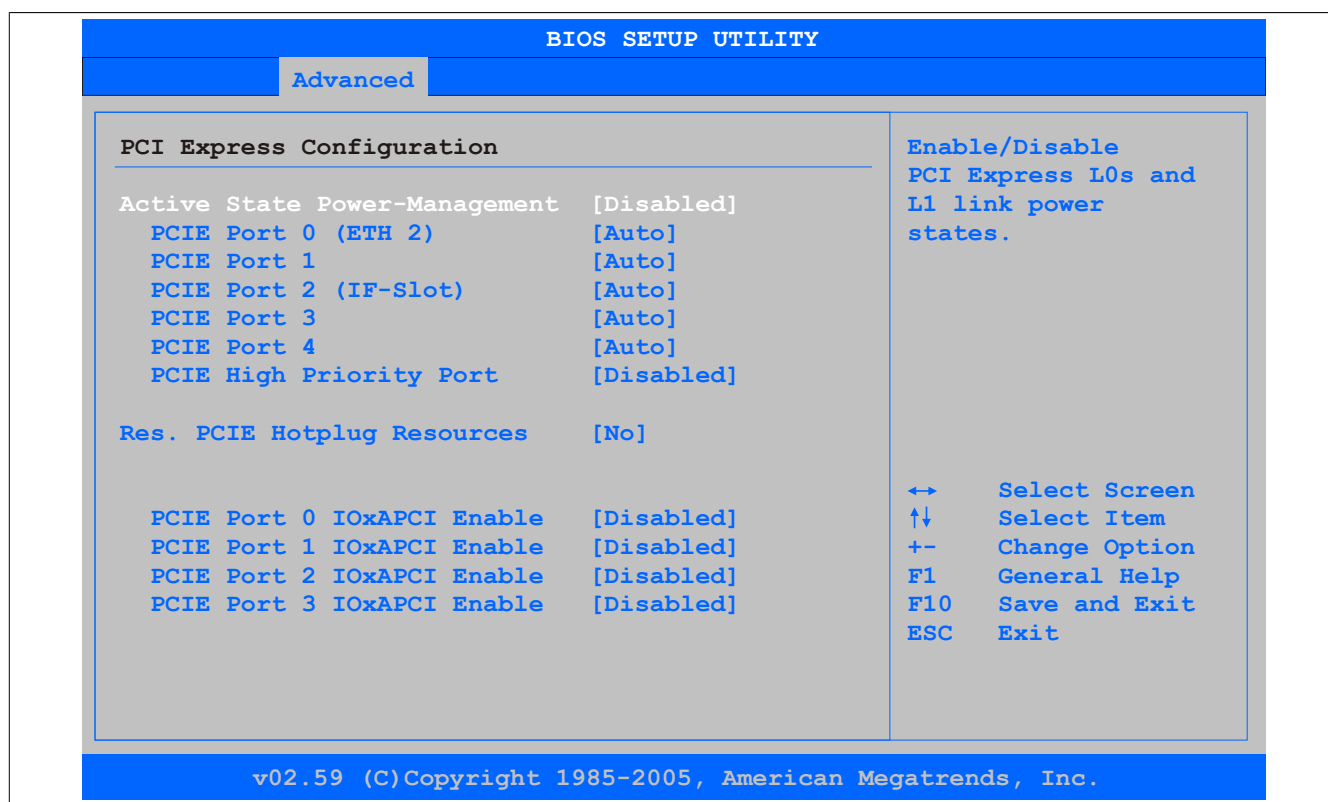


Image 78: GM45 Advanced PCI express configuration

BIOS setting	Meaning	Setting 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. Information: This option should be deactivated if a PCI Express device is not being used.	Enabled	Enables this function.
		Disabled	Disables this function.
PCIE Port 0 (ETH2)	This option activates or deactivates the PCI Express connection function. Information: This option should be deactivated if a PCI Express device is not being used.	Auto	Automatic assignment by the BIOS and operating system.
		Enabled	Enables this function.
PCIE Port 1	This option activates or deactivates the PCI Express connection function. Information: This option should be deactivated if a PCI Express device is not being used.	Disabled	Disables this function.
		Auto	Automatic assignment by the BIOS and operating system.
PCIE Port 2 (IF slot)	This option activates or deactivates the PCI Express connection function.	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 the BIOS and operating system.

Table 114: GM45 Advanced PCI Express Configuration - Setting options

BIOS setting	Meaning	Setting options	Effect
	Information: This option should be deactivated if a PCI Express device is not being used.	Enabled	Enables this function.
		Disabled	Disables this function.
PCIE Port 3	This option activates or deactivates the PCI Express connection function. Information: This option should be deactivated if a PCI Express device is not being used.	Auto	Automatic assignment by the BIOS and operating system.
		Enabled	Enables this function.
		Disabled	Disables this function.
PCIE Port 4	This option activates or deactivates the PCI Express connection function. Information: This option should be deactivated if a PCI Express device is not being used.	Auto	Automatic assignment by the BIOS and 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.
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 is used to enable or disable the APIC (Advanced Programmable Interrupt Controller) on the 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 is used to enable or disable the APIC (Advanced Programmable Interrupt Controller) on the 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 is used to enable or disable the APIC (Advanced Programmable Interrupt Controller) on the 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 is used to enable or disable the APIC (Advanced Programmable Interrupt Controller) on the 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 114: GM45 Advanced PCI Express Configuration - Setting options

1.4.4 Graphics Configuration

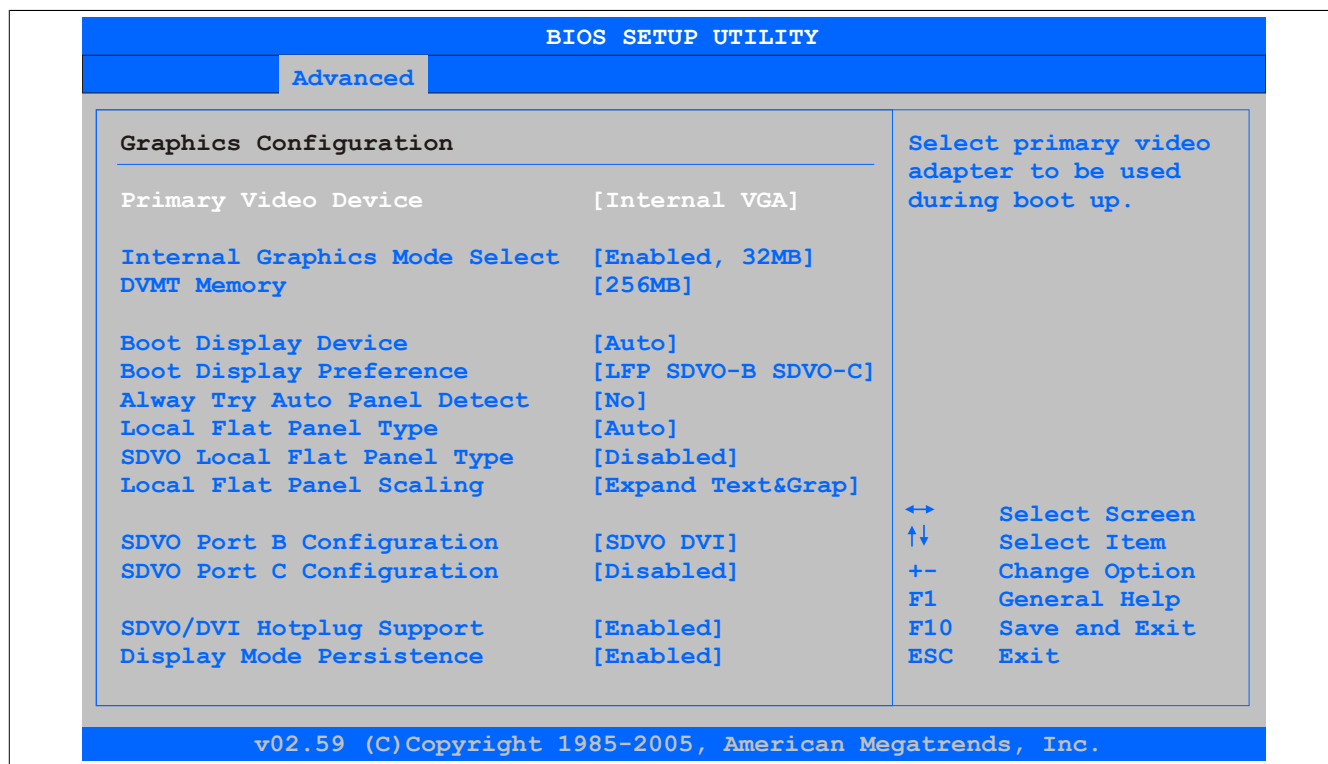


Image 79: GM45 Advanced graphics configuration

BIOS setting	Meaning	Setting options	Effect
Primary Video Device	Option for selecting the primary video device.	Internal VGA	The internal graphics chip on the CPU board is used as video device (monitor / panel connection).
		PCI / Int. VGA	The graphics chip of a connected graphics card is used as video 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, 32MB	32MB main memory provided.
		Enabled, 64MB	64MB main memory provided.
		Enabled, 128MB	128MB main memory provided.
DVMT Memory	Option for setting the amount of memory used for the DVMT mode.	128 MB	128MB of main memory can be used.
		256 MB	256MB 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.
Boot Display Preference	This option determines the order in which the devices on the connected channels LFP and SDVO should be checked and booted.	CRT + LFP	Use CRT + LFP channel.
		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.
Always Try Auto Panel Detect	This option first searches for EDID data in an external EEPROM to configure the LFP. If no EDID data is found, then the data selected under "Local Flat Panel Type" is used.	SDVO-C SDVO-B LFP	Serial Digital Video C output - Serial Digital Video B output - Local Flat Panel.
		No	Disables this function.
Local Flat Panel Type	This option can be used to set a pre-defined profile for the LVDS channel.	Yes	Enables this function.
		Auto	Automatic detection and setting using the EDID data.
		VGA 1x18 (002h)	640 x 480
		VGA 1x18 (013h)	640 x 480
		SVGA 1x18 (01Ah)	800 x 600
		XGA 1x18 (006h)	1024 x 768

Table 115: GM45 Advanced Graphics Configuration - Setting options

BIOS setting	Meaning	Setting options	Effect
SDVO local flat panel type	This option can be used to set a pre-defined profile for the SDVO LVDS channel. Information: An SDVO LVDS transmitter must be connected to one of the SDVO ports, and the corresponding SDVO port device must be set to LVDS.	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
		Disabled	Deactivates this function.
		Auto	Automatic detection and setting using the EDID data.
		VGA 1x18 (002h)	640 x 480
		VGA 1x18 (013h)	640 x 480
		SVGA 1x18 (01Ah)	800 x 600
		XGA 1x18 (006h)	1024 x 768
		XGA 2x18 (007h)	1024 x 768
		XGA 1x24 (008h)	1024 x 768
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, or to define the port as an HDMI or display port.	Disabled	No video device connected.
		HDMI Port	Port is configured as an HDMI port.
		Display Port	Port is configured as a display port.
		SDVO DVI	Video signal output is optimized for an SDVO DVI-compatible video device.
		SDVO TV	Video signal output is optimized for an SDVO TV-compatible video device.
		SDVO CRT	Video signal output is optimized for a SDVO CRT-compatible video device.
		SDVO LVDS	Video signal output is optimized for an SDVO LVDS-compatible video device.
		SDVO DVI-Analog	Video signal output is optimized for an analog SDVO DVI-compatible video device.
SDVO Port C Device	Option for selecting the video device that is connected to the SDVO Port C, or to define the port as an HDMI or display port.	Disabled	No video device connected.
		HDMI Port	Port is configured as an HDMI port.
		Display Port	Port is configured as a display port.
		SDVO DVI	Video signal output is optimized for an SDVO DVI-compatible video device.
		SDVO TV	Video signal output is optimized for an SDVO TV-compatible video device.
		SDVO CRT	Video signal output is optimized for a SDVO CRT-compatible video device.
		SDVO LVDS	Video signal output is optimized for an SDVO LVDS-compatible video device.
		SDVO DVI-Analog	Video signal output is optimized for an analog SDVO 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.

Table 115: GM45 Advanced Graphics Configuration - Setting options

BIOS setting	Meaning	Setting options	Effect
Display Mode Persistence	"Display mode persistence" means that the operating system can remember and restore the previous display configuration. 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	Enables this function.
		Disabled	Disables this function.

Table 115: GM45 Advanced Graphics Configuration - Setting options

1.4.5 CPU Configuration

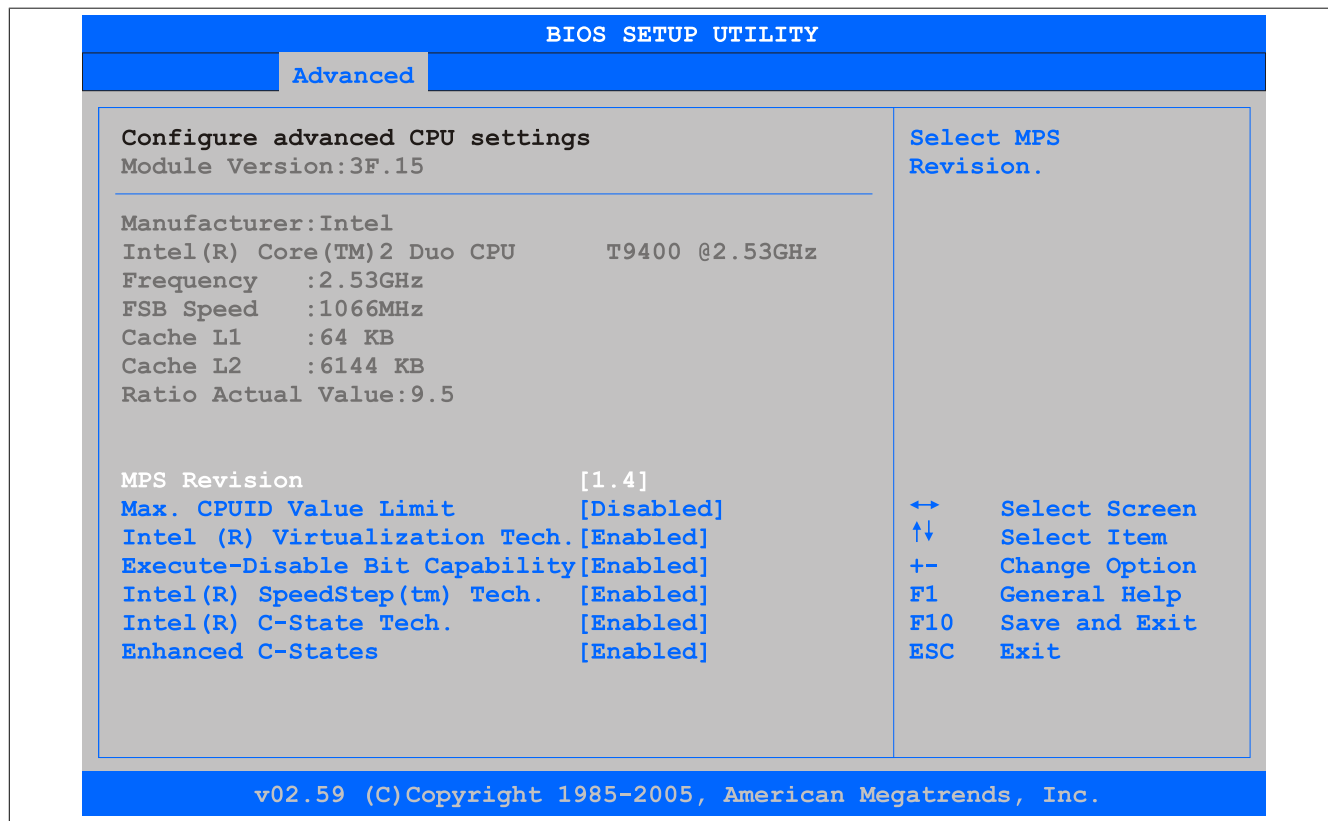


Image 80: GM45 Advanced CPU Configuration

BIOS setting	Meaning	Setting 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 could 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.
Intel(R) Virtualization Tech.	Option for activating or deactivating a virtual machine. Information: You must restart in order to apply changes made to this setting.	Disabled	Disables this function.
		Enabled	If the function is enabled, a virtual machine can use the additional hardware capacity.
Execute Disable Bit	Option for enabling or disabling hardware support for prevention of data execution.	Enabled	Enables this function.
		Disabled	Disables this function.
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.	Enabled	The processor speed is regulated by the operating system.
		Disabled	Disables SpeedStep technology.

Table 116: GM45 Advanced CPU Configuration - Setting options

BIOS setting	Meaning	Setting options	Effect
Intel(R) C-State Tech.	This setting allows the operating system to set processor clock rates on its own, thereby saving energy.	Disabled	Disables this function. Both processors are run at the same frequency.
		Enabled	Enables this function. The processors are run at different frequencies, thereby saving energy.
Enhanced CStates ¹⁾	This setting allows the operating system to set processor clock rates on its own, thereby saving energy.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 116: GM45 Advanced CPU Configuration - Setting options

1) This setting is only shown if *Intel(R) C-State Tech.* is set to *Enabled*.

1.4.6 Chipset Configuration

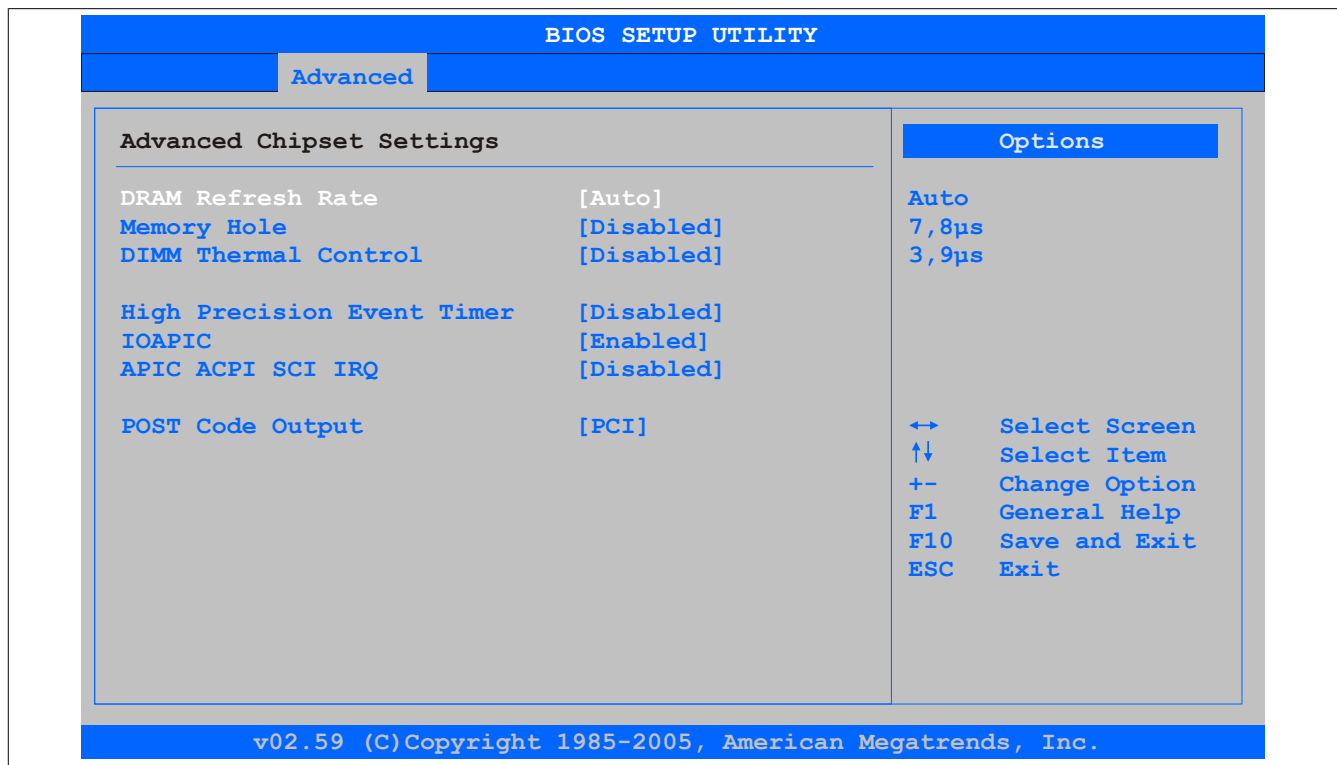


Image 81: GM45 Advanced Chipset Configuration

BIOS setting	Meaning	Setting options	Effect
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 μ s	Manual setting for the DRAM refresh rate.
		3.9 μ s	Manual setting for the DRAM refresh rate.
Memory Hole	Option for ISA cards with frame buffer. Not relevant for a 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.
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).	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	IRQ9 is used for SCI.
POST Code Output	This option is used when the port 80h/84h BIOS POST code output should be routed to the PCI bus or the LPC bus.	PCI	Port 80h/84h is routed to the PCI bus.
		LPC	Port 80h/84h is routed to the LPC bus.

Table 117: GM45 Advanced Chipset - Setting options

1.4.7 I/O Interface Configuration

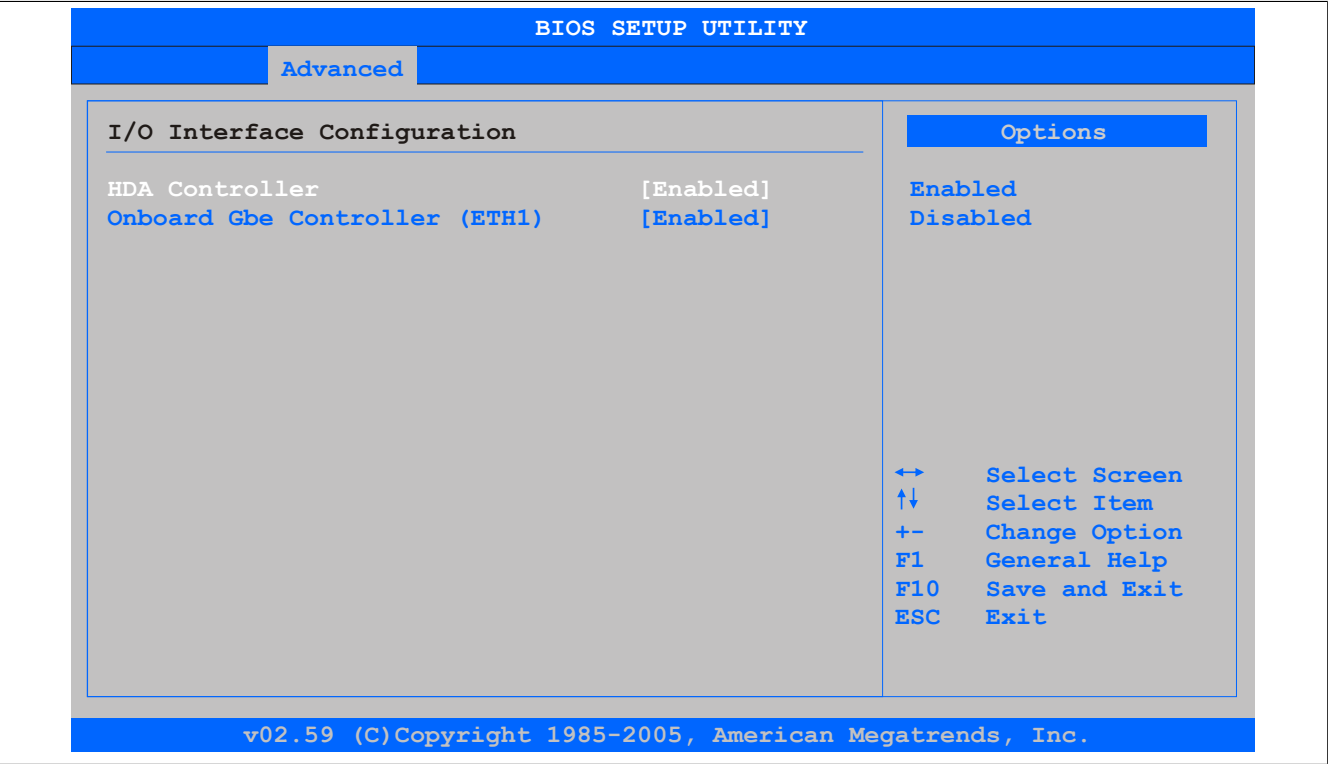


Image 82: GM45 Advanced I/O interface configuration

BIOS setting	Meaning	Setting options	Effect
HDA Controller	This option is used to turn the HDA controller on or off. Information: The GM45 CPU board does not have a sound controller.	Enabled	Enables the HDA controller.
		Disabled	Disables the HDA controller.
Onboard Gbe Controller (ETH1)	This option is used to turn the onboard Ethernet controller on or off.	Disabled	Onboard Ethernet controller is disabled.
		Enabled	Onboard Ethernet controller is enabled.

Table 118: GM45 Advanced I/O Interface Configuration - Setting options

1.4.8 Clock Configuration

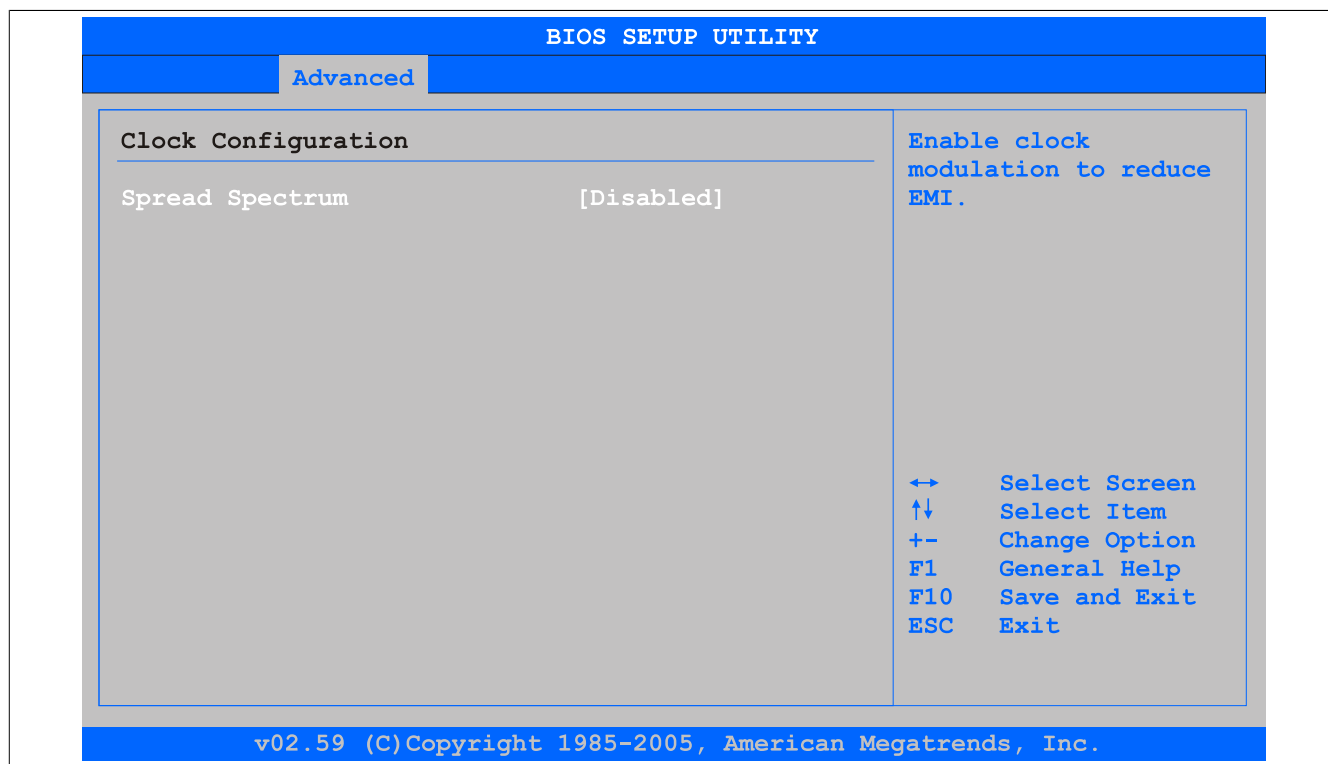


Image 83: GM45 Advanced clock configuration

BIOS settings	Meaning	Setting 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 119: GM45 Advanced Clock Configuration - Setting options

1.4.9 IDE Configuration

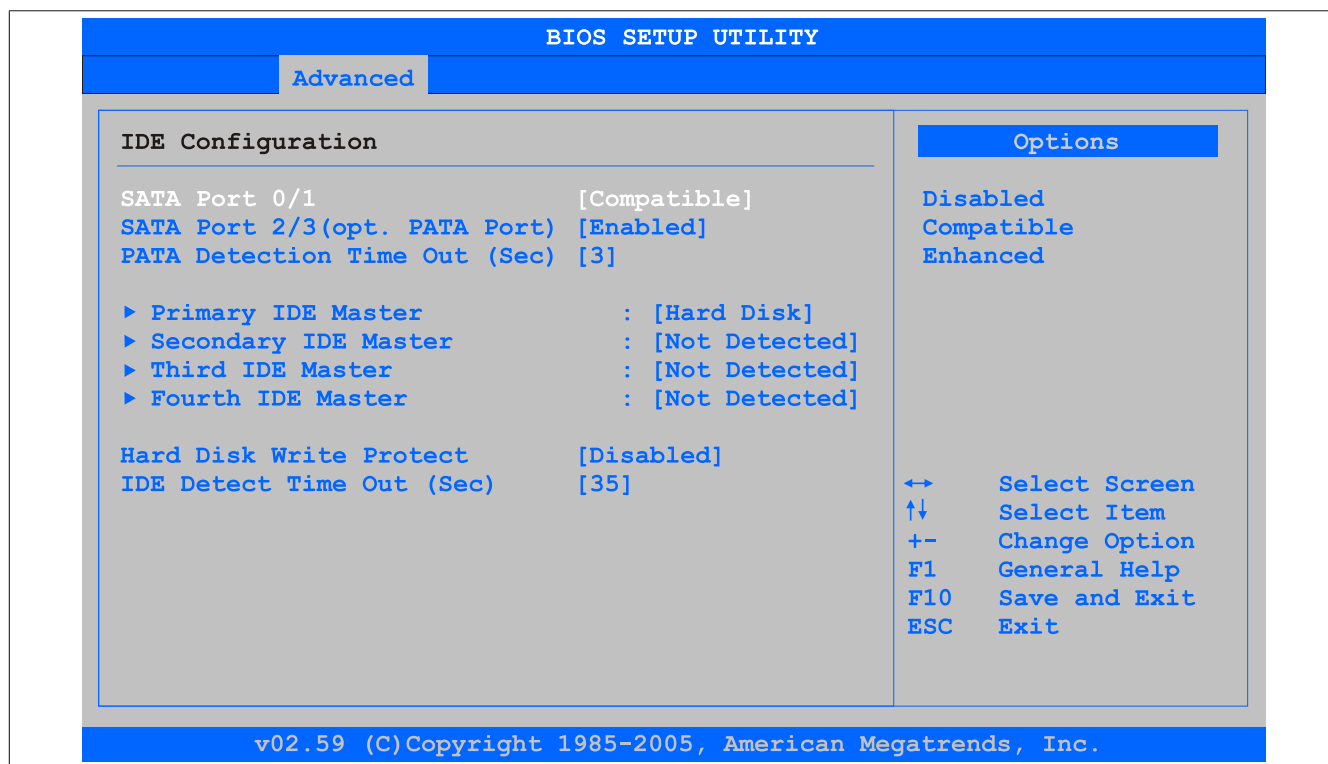


Image 84: GM45 Advanced IDE configuration

BIOS settings	Meaning	Setting options	Effect
SATA Port 0/1	Option for configuring the integrated SATA controller.	Compatible	The controller runs in Legacy or Compatible mode.
		Disabled	Disables the controller and both ports.
		Enhanced	The controller runs in Enhanced or Native mode.
Configure SATA Port 0/1 as ¹⁾	The Serial ATA connections 0/1 supported by the Southbridge can be defined here.	IDE	The serial ATA hard drive is used as a parallel ATA physical memory drive.
		RAID	RAID 0, 1, 5, 10 or the Intel® Matrix storage technology can be configured here with the serial ATA hard drive.
		AHCI	The AHCI setting enables the internal memory driver for the SATA functions, which increase the storage performance for random read-write access by allowing the drive to determine the sequence of commands.
Hot Plug ²⁾	Option for turning SATA hot plugging support on or off.	Disabled	Disables this function.
		Enabled	Enables this function.
SATA Port 2/3 (opt. PATA Port)	Option for turning integrated SATA controllers 2 and 3 on or off.	Disabled	Disables this function.
		Enabled	Enables this function.
PATA Detection Time Out (Sec) ³⁾	Configuring the time overrun limit value for the ATA/ATAPI device identification. This option only applies for PATA channels.	0,1,2,3,5,10,15,30	Time setting in seconds.
Primary IDE Master	The drive in the system that is connected to the primary IDE master port is configured here.	Enter	Opens the submenu see "Primary IDE Master" on page 153
Secondary IDE Master	The drive in the system that is connected to the secondary IDE master port is configured here.	Enter	Opens the submenu see "Secondary IDE master" on page 154
Third IDE Master	The drive in the system that is connected to the third IDE master port is configured here. Information: The Third IDE Master is not used on the PPC800. Therefore these settings are not relevant.	Enter	Opens the submenu see "Third IDE Master" on page 155
Fourth IDE Master	The drive in the system that is connected to the fourth IDE master port is configured here.	Enter	Opens the submenu see "Fourth IDE Master" on page 156
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. This option applies for SATA and PATA channels.	0, 5, 10, 15, 20, 25, 30, 35	Time setting in seconds.

Table 120: GM45 Advanced IDE Configuration - Setting options

- 1) These settings are only possible if *SATA Port 0/1* is set to *Enhanced*.
2) These settings are only possible if *Configure SATA Port 0/1* as is set to *RAID* or *AHCI*.
3) These settings are only possible if *SATA Port 2/3 (opt. PATA port)* is set to *Enabled*.

Primary IDE Master

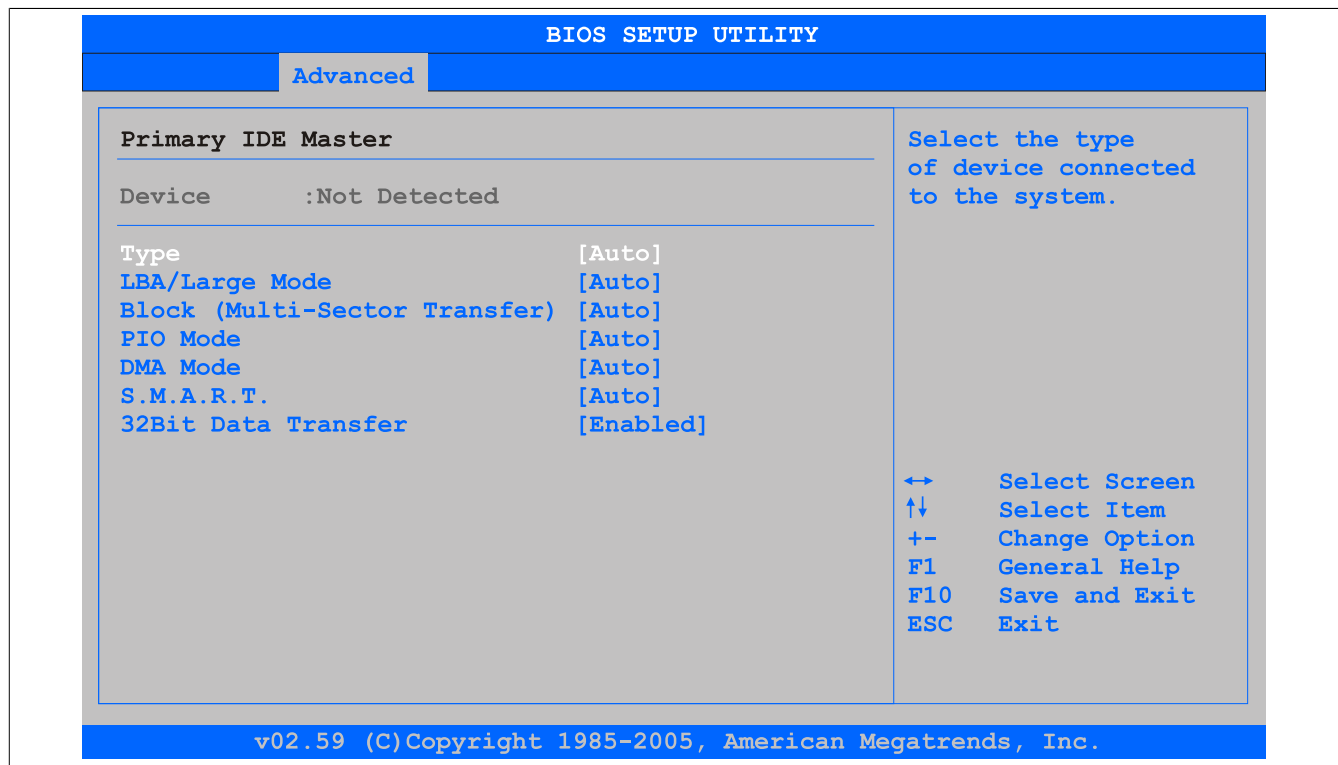


Image 85: GM45 Primary IDE master

BIOS settings	Meaning	Setting 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. Information: This option is not available on the PPC800. Therefore this setting is not relevant.	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 121: GM45 - Primary IDE master - Setting options

Secondary IDE master

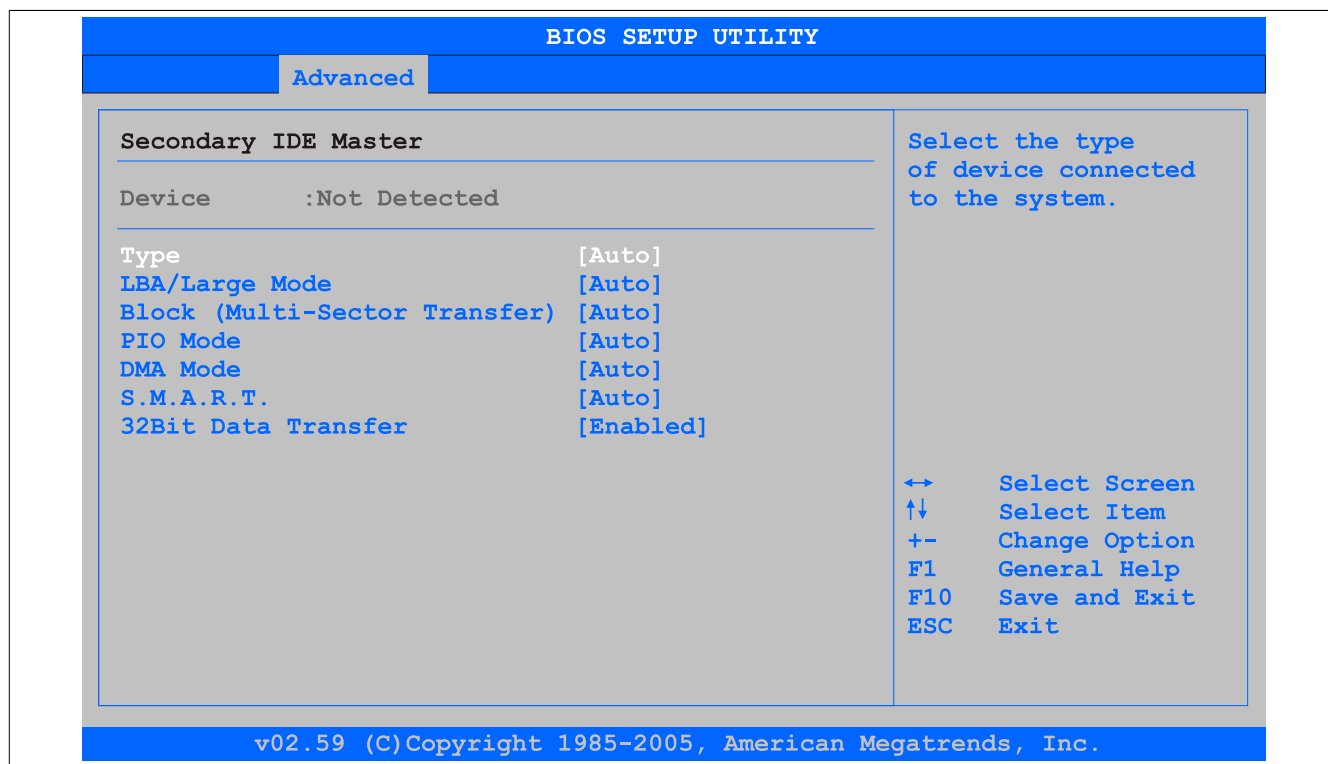


Image 86: GM45 Secondary IDE master

BIOS settings	Meaning	Setting options	Effect
Type	The type of drive connected to the secondary 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. Information: This option is not available on the PPC800. Therefore this setting is not relevant.	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 secondary 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 122: GM45 - Secondary IDE master - Setting options

Third IDE Master

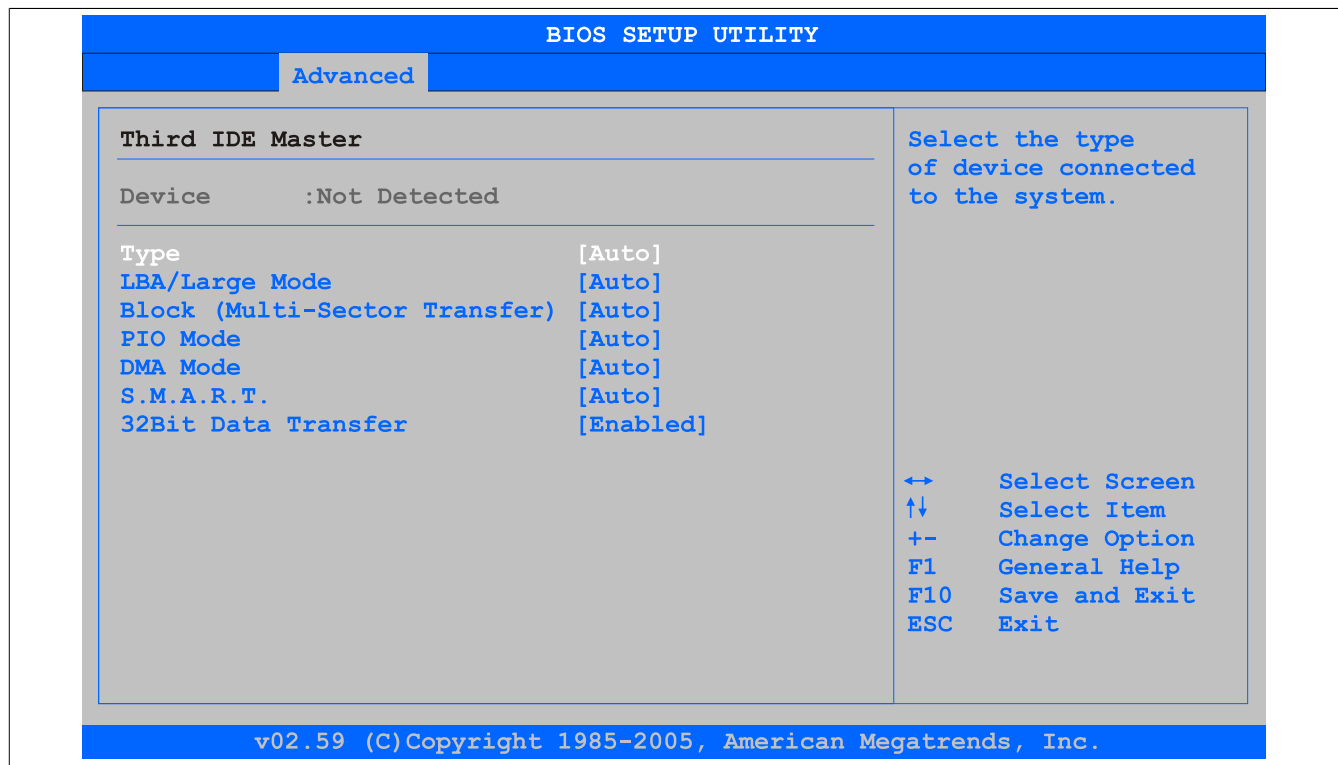


Image 87: GM45 Third IDE master

BIOS settings	Meaning	Setting options	Effect
Type	The type of drive connected to the third 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. Information: This option is not available on the PPC800. Therefore this setting is not relevant.	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 third 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 123: GM45 - Third IDE master - Setting options

Fourth IDE Master

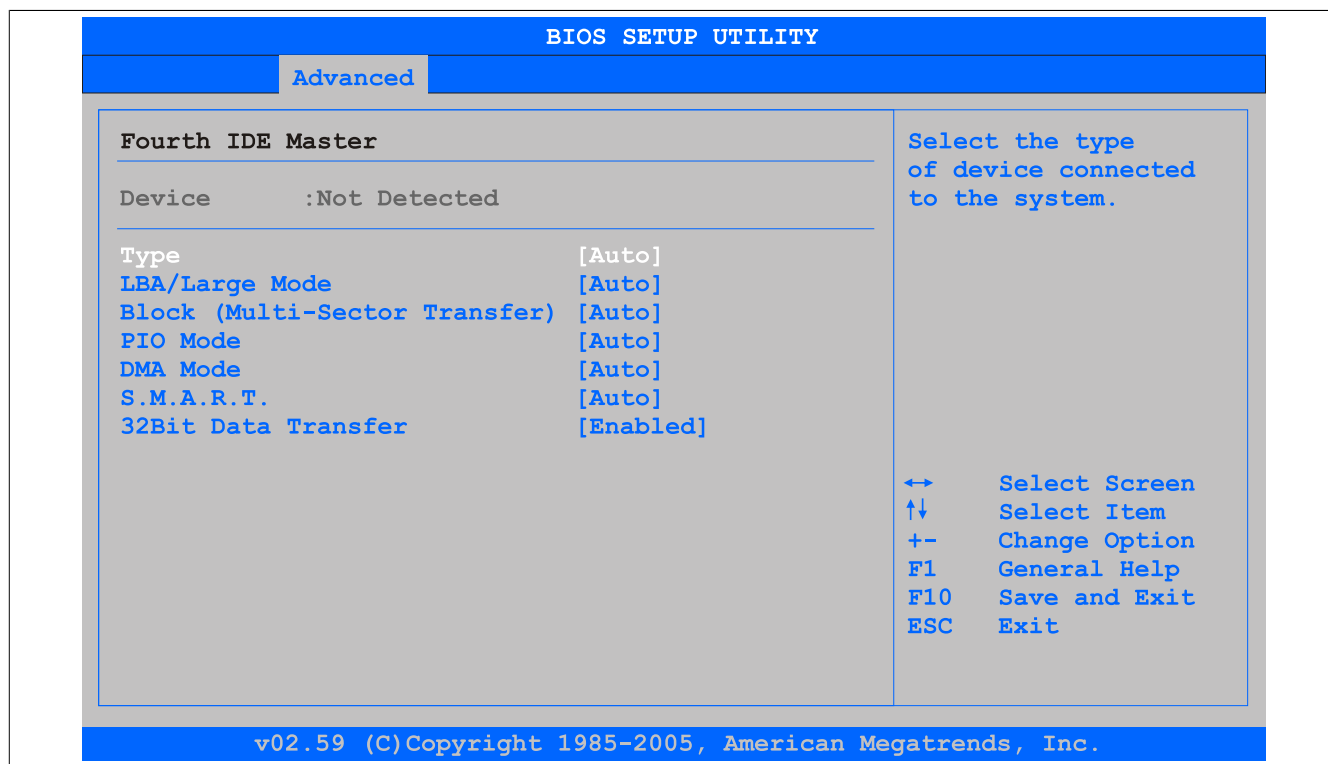


Image 88: GM45 Fourth IDE master

BIOS settings	Meaning	Setting options	Effect
Type	The type of drive connected to the fourth 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. Information: This option is not available on the PPC800. Therefore this setting is not relevant.	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 fourth 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 124: GM45 - Fourth IDE master - Setting options

1.4.10 USB Configuration

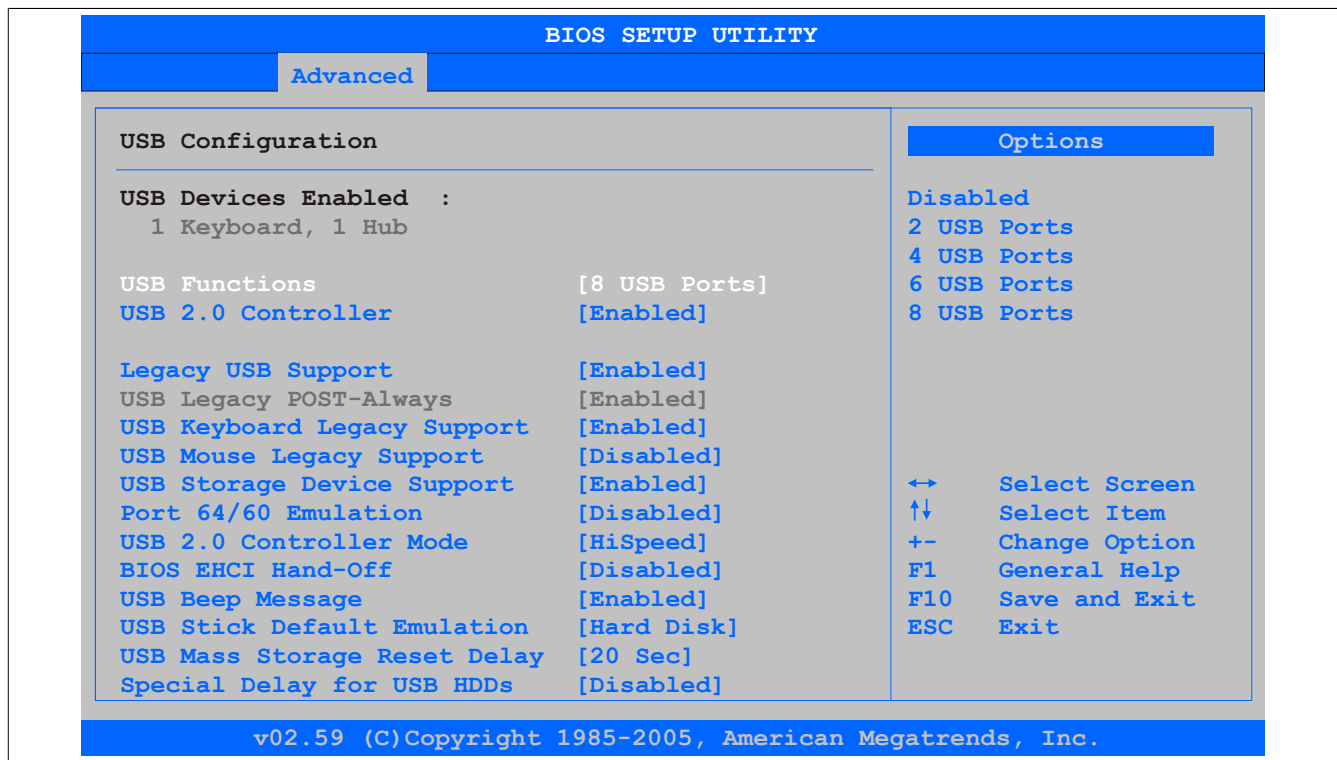


Image 89: GM45 Advanced USB configuration

BIOS setting	Meaning	Setting options	Effect
USB Functions	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 is supported again after the operating system has started. A USB keyboard is still recognized during the POST.	Enabled	Enables this function.
		Disabled	Disables this function.
		Auto	Automatic enabling.
USB Legacy POST-Always	Legacy USB support is enabled during the POST (Power On Self Test) regardless of the Legacy USB support setting.	None (automatically enabled)	The BIOS Setup can be called up during the POST using a USB keyboard.
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 in all systems excluding 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 outputting a tone each time a USB device is detected by the BIOS during the 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	An HDD-formatted drive can be used as an FDD (e.g. zip drive) for starting the system.

Table 125: GM45 Advanced USB Configuration - Setting options

BIOS setting	Meaning	Setting 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 1 Sec, 2 Sec, 3 Sec, 4 Sec, 5 Sec, 7 Sec, 10 Sec	Disables this function. No boot delay is added. A boot delay of 1, 2, 3, 4, 5, 7 or 10 seconds is added.

Table 125: GM45 Advanced USB Configuration - Setting options

1.4.11 Keyboard/Mouse Configuration

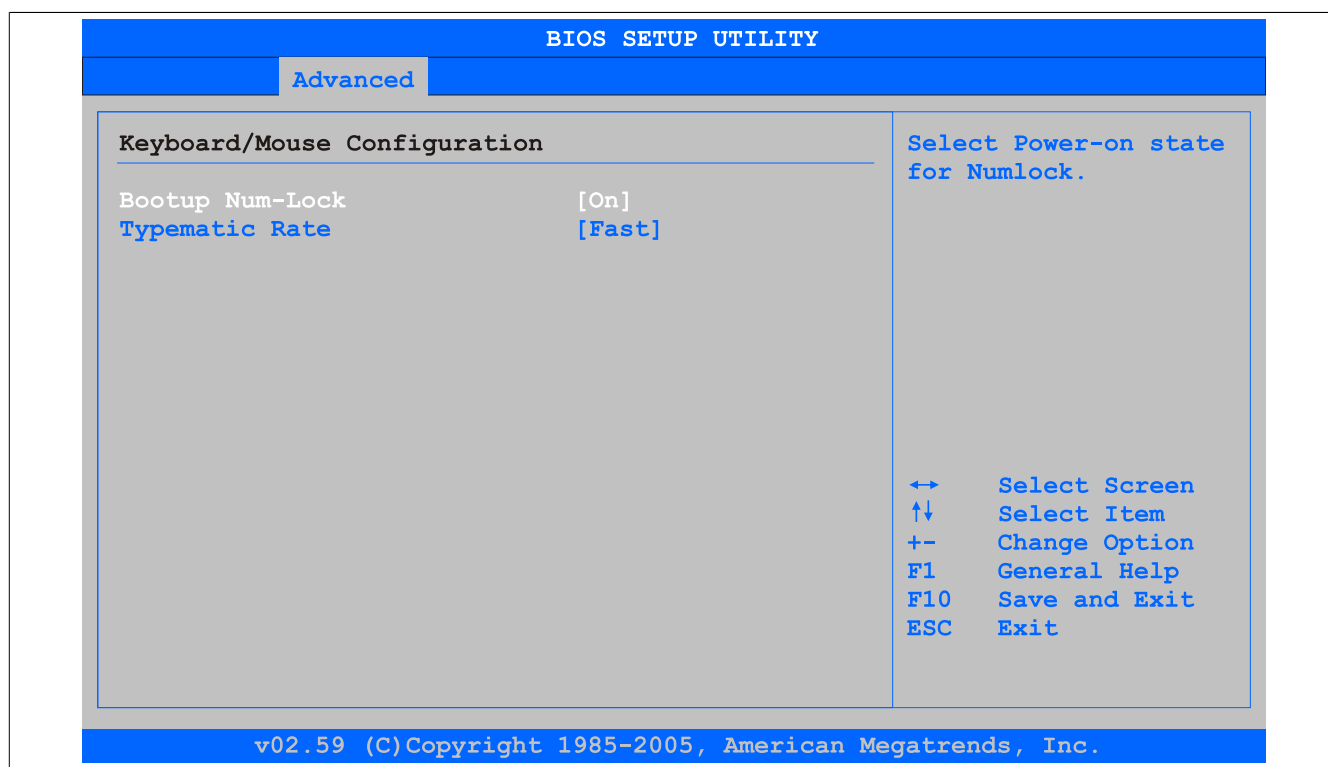


Image 90: GM45 Advanced keyboard/mouse configuration

BIOS setting	Meaning	Setting options	Effect
Boot-up Num-lock	With this field you can define the state of the Num-Lock key when booting.	Off	Only the cursor functions of the numerical keypad are activated.
		On	Numeric keypad is enabled.
Typematic rate	The key repeat function is set here.	Slow	Slow key repeat.
		Fast	Fast key repeat.

Table 126: GM45 Advanced Keyboard/Mouse 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 diagnostics functions that can be applied in the event of error.

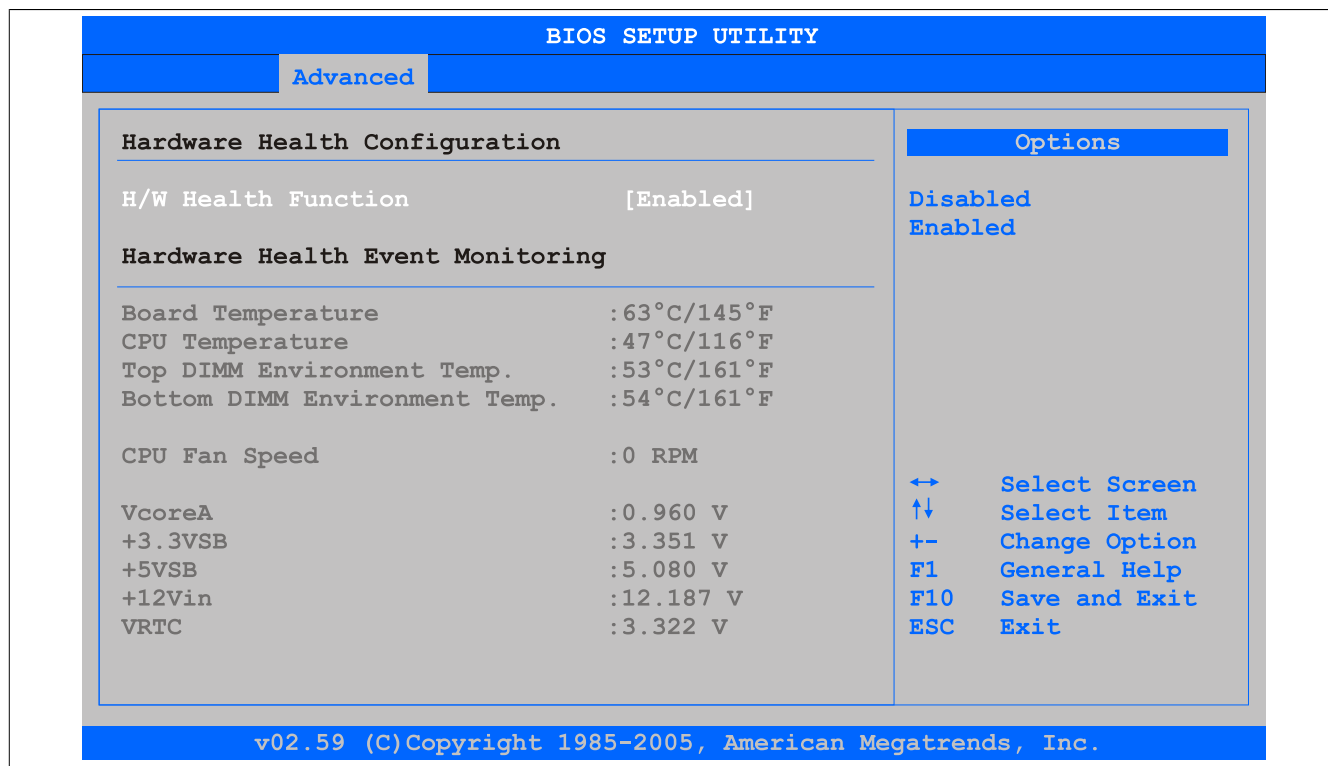


Image 91: GM45 Advanced CPU board monitor

BIOS setting	Meaning	Setting 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 127: GM45 Advanced CPU board monitor - Setting options

1.4.13 Baseboard/Panel Features

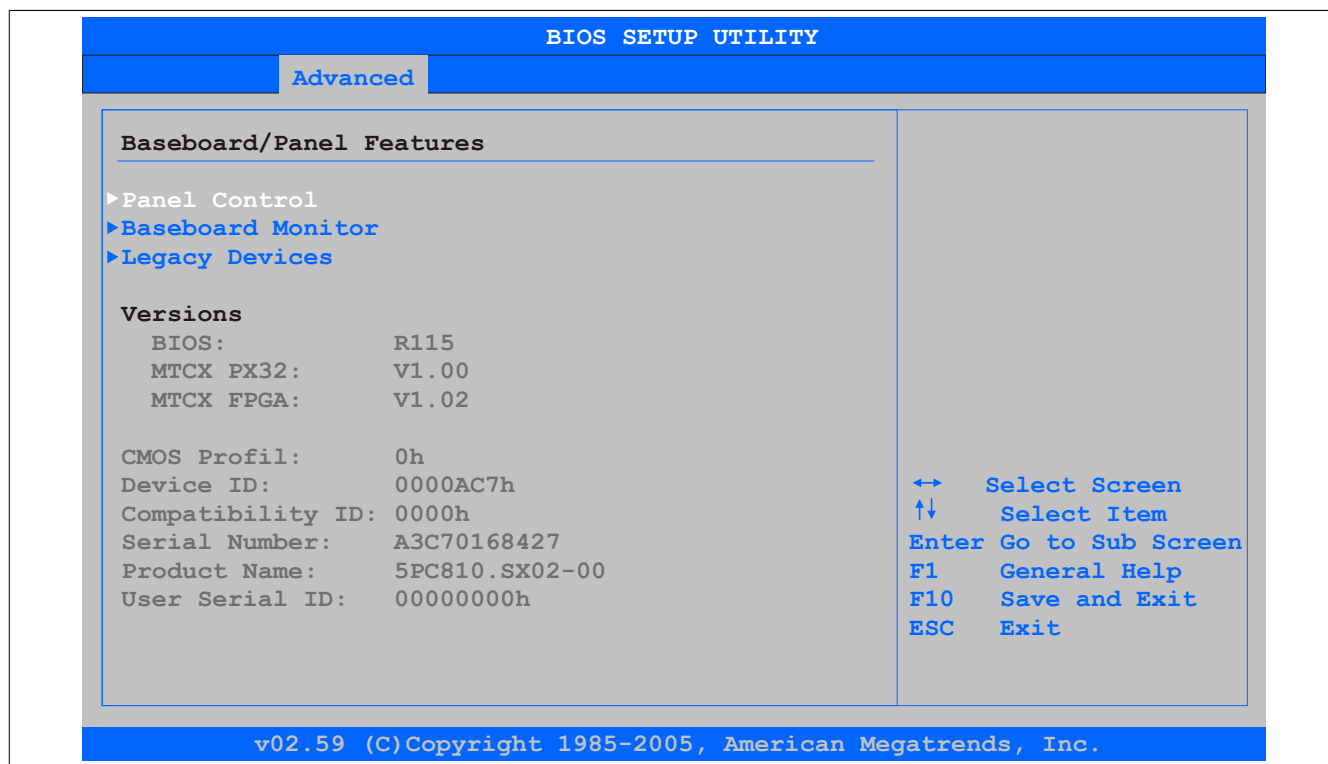


Image 92: GM45 Advanced Baseboard/Panel Features

BIOS setting	Meaning	Setting options	Effect
Panel control	For special setup of connected panels (display units).	Enter	Opens the submenu see " Panel Control" on page 161
Baseboard Monitor	Display of various temperatures and fan speeds.	Enter	Opens the submenu see " Baseboard Monitor" on page 162
Legacy Devices	Special settings for the interface can be changed here.	Enter	Opens the submenu see " Legacy Devices" on page 163
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 hex value can be freely assigned by the user (e.g. to give the device a unique ID) and can only be changed with using the "B&R Control Center" via the ADI driver.	None	-

Table 128: GM45 Advanced Baseboard/Panel Features - Setting options

Panel Control

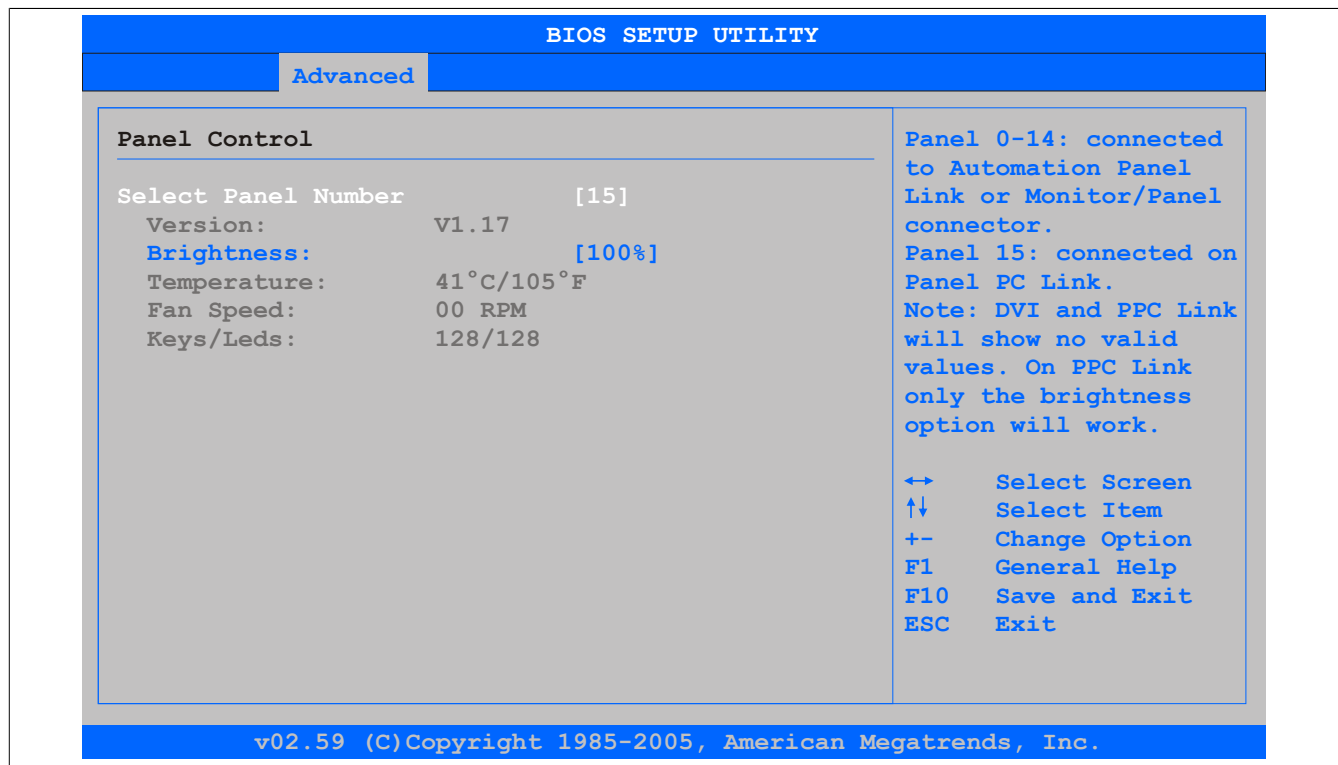


Image 93: GM45 Panel control

BIOS setting	Meaning	Setting 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. Panel 15 is specifically intended for panel PC 800 systems.
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%	For setting the brightness (in %) of the selected panel. Changes take effect after saving and restarting the system (e.g. by pressing <F10>).
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 129: GM45 Panel Control - Setting options

Baseboard Monitor

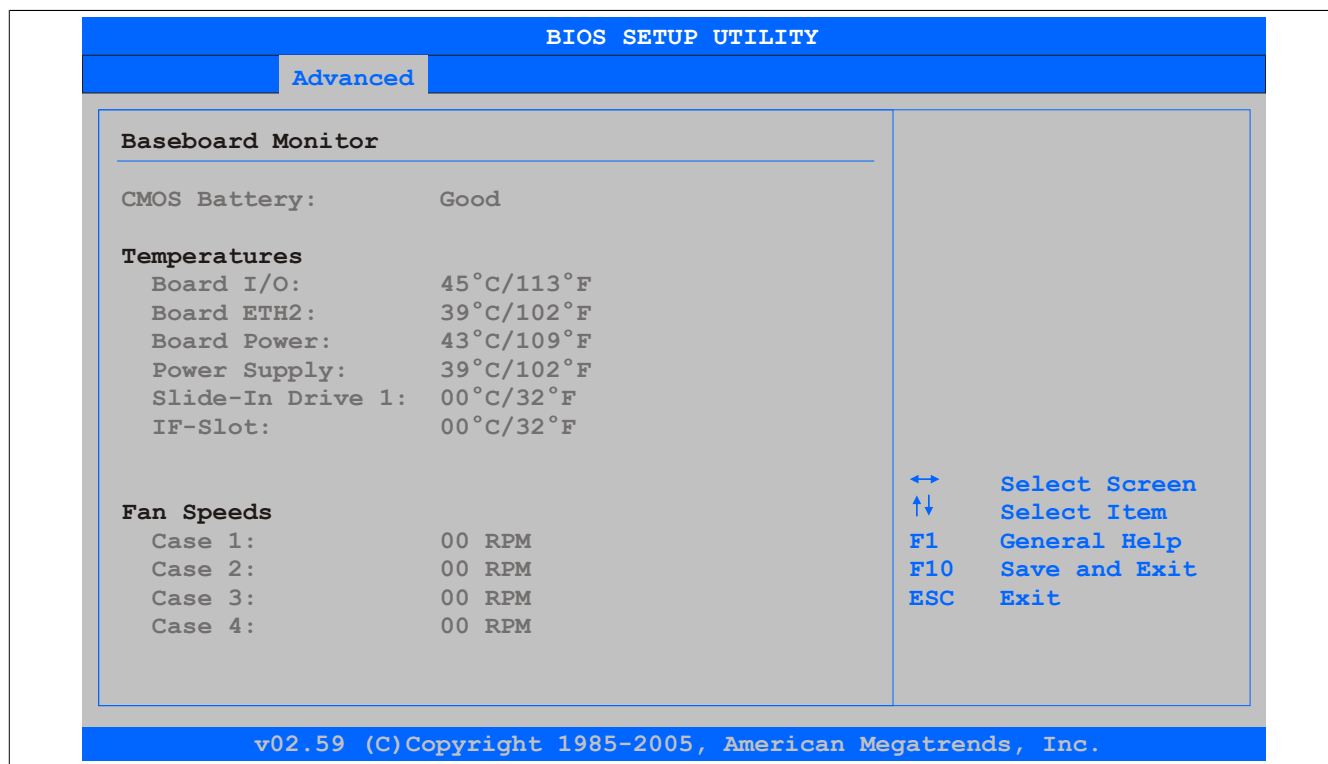


Image 94: GM45 Baseboard monitor

BIOS setting	Meaning	Setting 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 130: GM45 Baseboard Monitor - Setting options

Legacy Devices

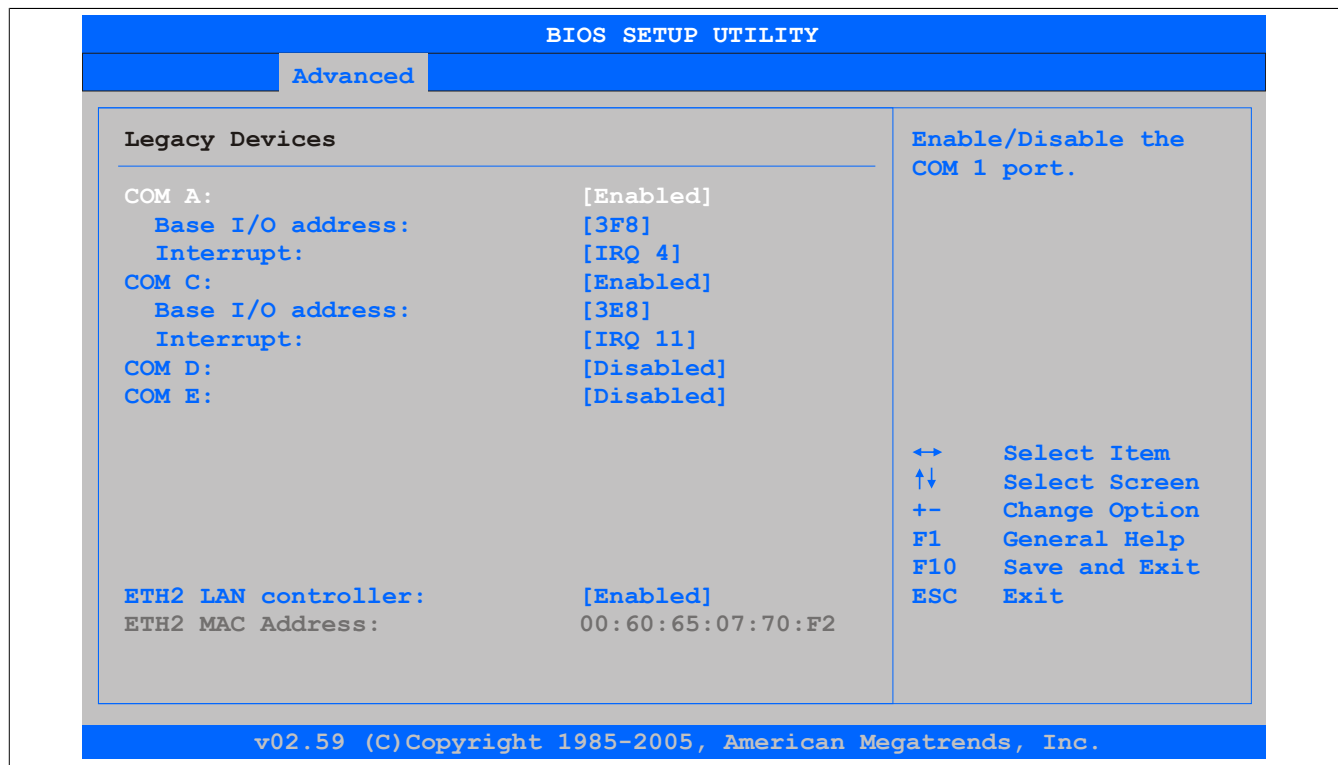


Image 95: GM45 Legacy devices

BIOS setting	Meaning	Setting options	Effect
COM A	Settings 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	Setting 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.
ETH2 LAN controller	For turning the onboard LAN controller (ETH2) on and off.	Enabled	Enables the controller.
ETH2 MAC Address	Displays the Ethernet 2 controller MAC address.	Disabled	Disables the controller.
		None	-

Table 131: GM45 Legacy Devices - Setting options

1.5 Boot

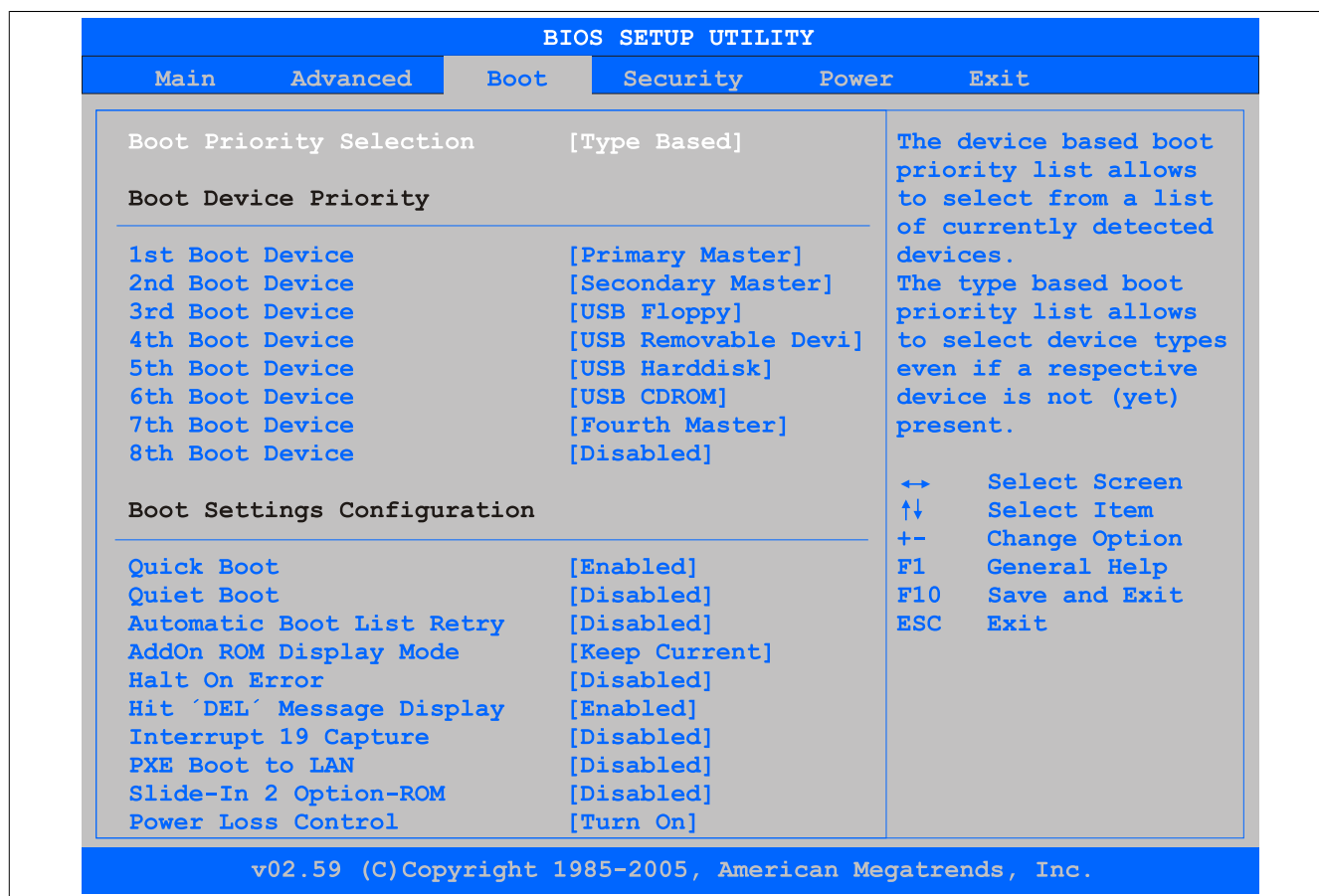


Image 96: GM45 Boot menu

BIOS setting	Meaning	Setting options	Effect
Boot Priority Selection	The method for when the drives should be booted can be set here.	Device Based	Only the devices that are recognized by the system are listed. The sequence of this list can be changed. Information: Either "device based" or "type based" must be used. Mixed operation is not permitted.
		Type Based	The boot sequence of a device type list can be changed. Device types that are not connected can also be entered to this list. Information: Either "device based" or "type based" must be used. Mixed operation is not permitted.
1st Boot Device	The boot drives can be set using this option.	Disabled, Primary Master, Primary Slave, Secondary Master, Secondary Slave, Legacy Floppy, USB Floppy, USB Harddisk, USB CDROM, USB Removable Device, Onboard LAN, External LAN, PCI Mass Storage, PCI SCSI Card, Any PCI BEV Device, Third Master, Third Slave, PCI RAID, Local BEV ROM, Fourth Master, Fourth Slave	Select the desired sequence.
2nd boot device			
3rd boot device			
4th boot device			
5th boot device			
6th boot device			
7th boot device			
8th boot device			
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 132: GM45 Boot menu - Setting options

BIOS setting	Meaning	Setting 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	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	Determines if the system is on/off following power loss.	Remain Off	Remains off.
		Turn On	Powers on.
		Last State	Enables the previous state.

Table 132: GM45 Boot menu - Setting options

1.6 Security

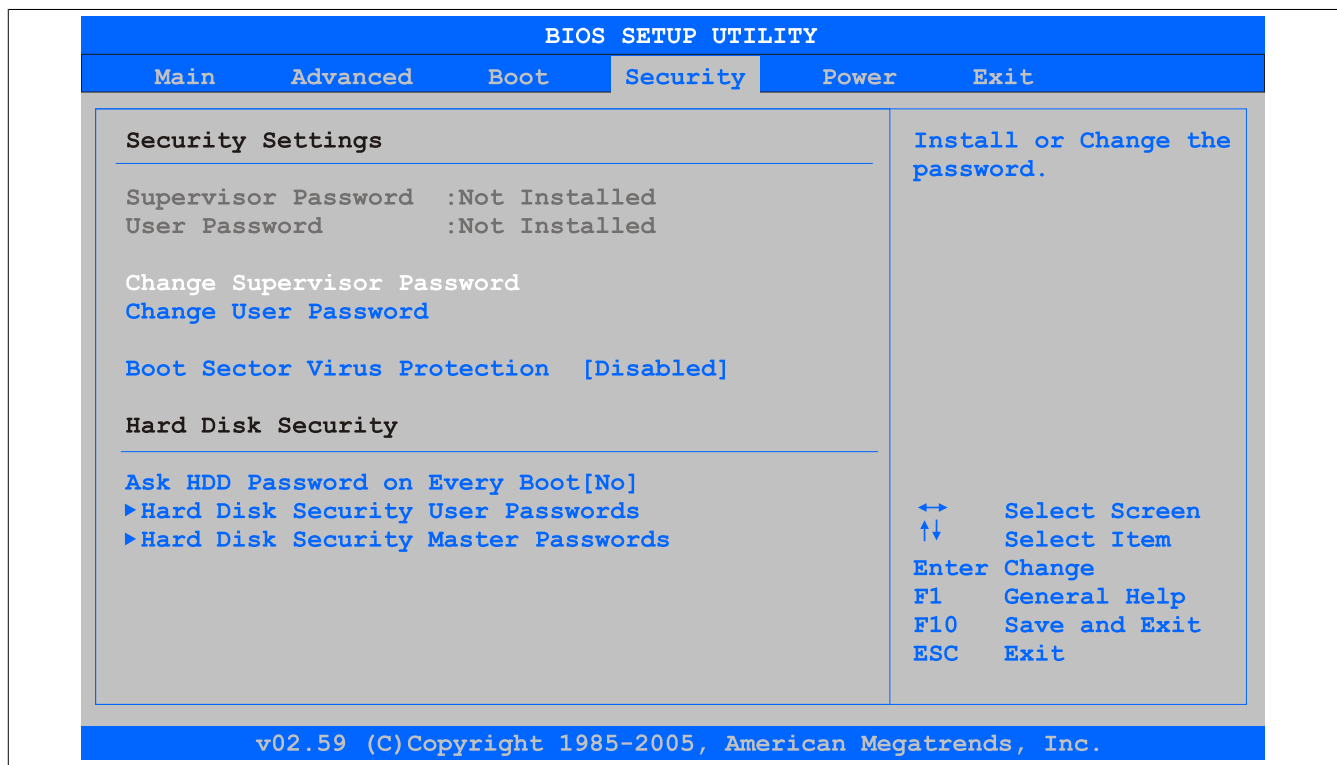


Image 97: GM45 Security menu

BIOS setting	Meaning	Setting options	Effect
Supervisor Password	Displays whether or not a supervisor password has been set.	None	-
User Password	Displays whether or not a user password has been set.	None	-
Change Supervisor Password	To enter/change a supervisor password. A supervisor password is necessary to edit all BIOS settings.	Enter	Enter password.
Change User Password	To enter/change a user password. A user password allows the user to edit only certain BIOS settings.	Enter	Enter password.

Table 133: GM45 Security menu - Setting options

BIOS setting	Meaning	Setting 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.
Ask HDD Password on Every Boot	This option can be used to select whether the hard disk password must be entered each time the system boots. Information: This option only makes sense if a hard disk user security password is set.	Yes	The hard disk password must be entered when booting.
		No	The hard disk password doesn't have to be entered when booting.
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 166
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 167

Table 133: GM45 Security menu - Setting options

1.6.1 Hard Disk Security User Password

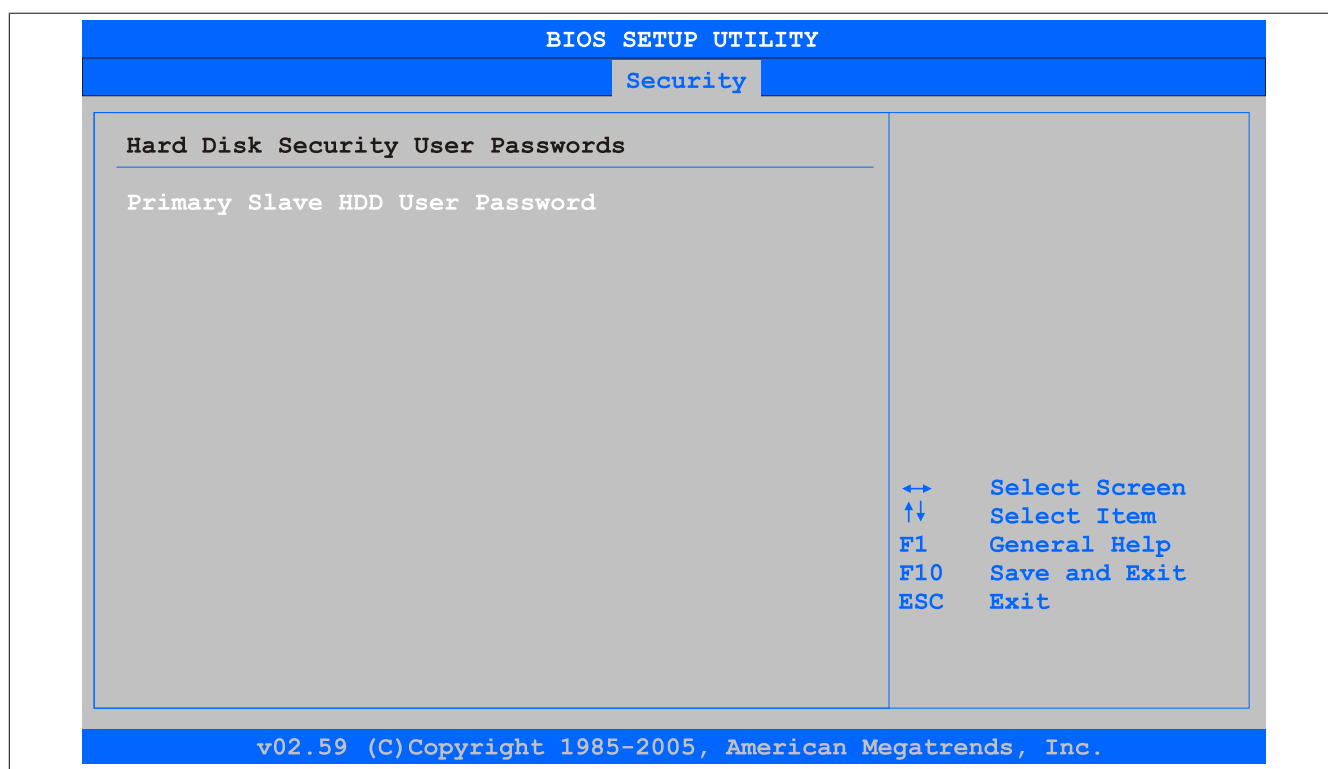


Image 98: GM45 Hard Disk Security User Password

BIOS setting	Meaning	Setting 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	Enter password.

Table 134: GM45 Hard Disk Security User Password

1.6.2 Hard Disk Security Master Password

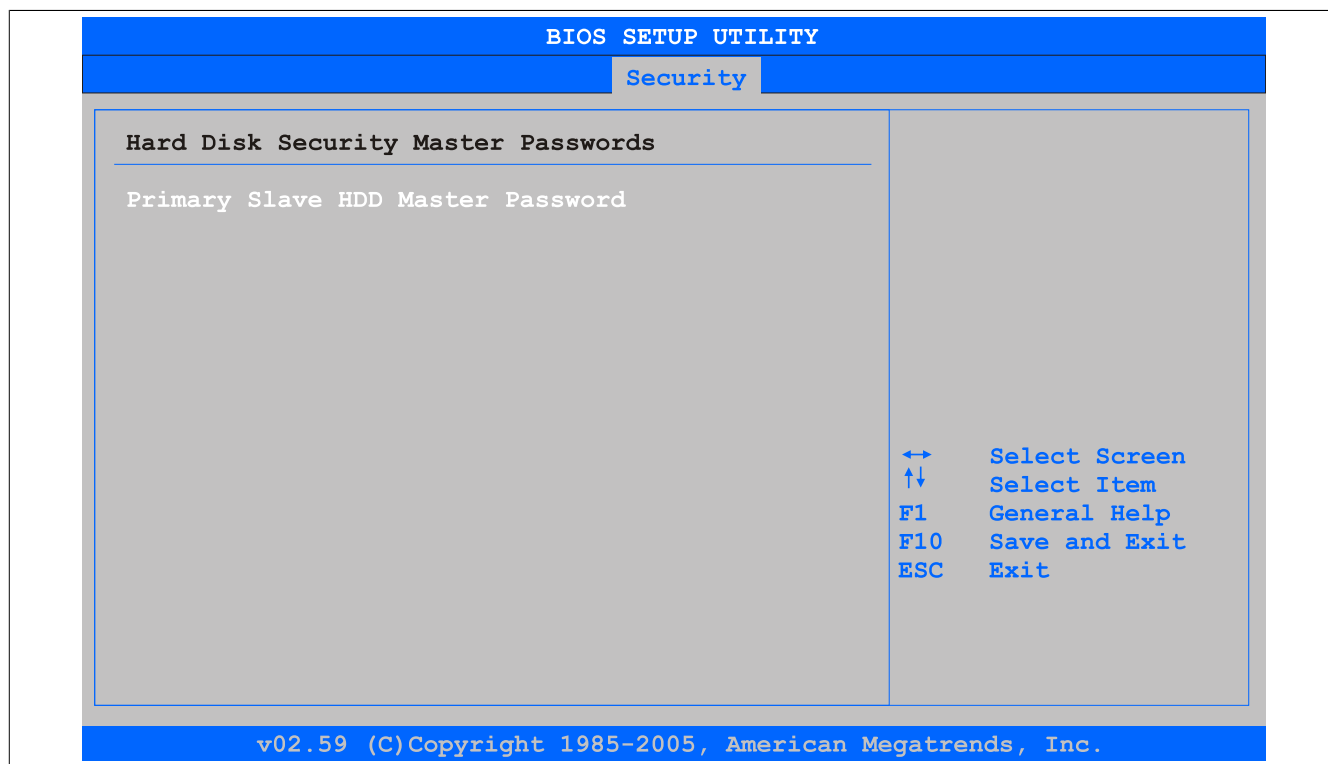


Image 99: GM45 Hard Disk Security Master Password

BIOS setting	Meaning	Setting 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	Enter password.

Table 135: GM45 Hard Disk Security Master Password

1.7 Power

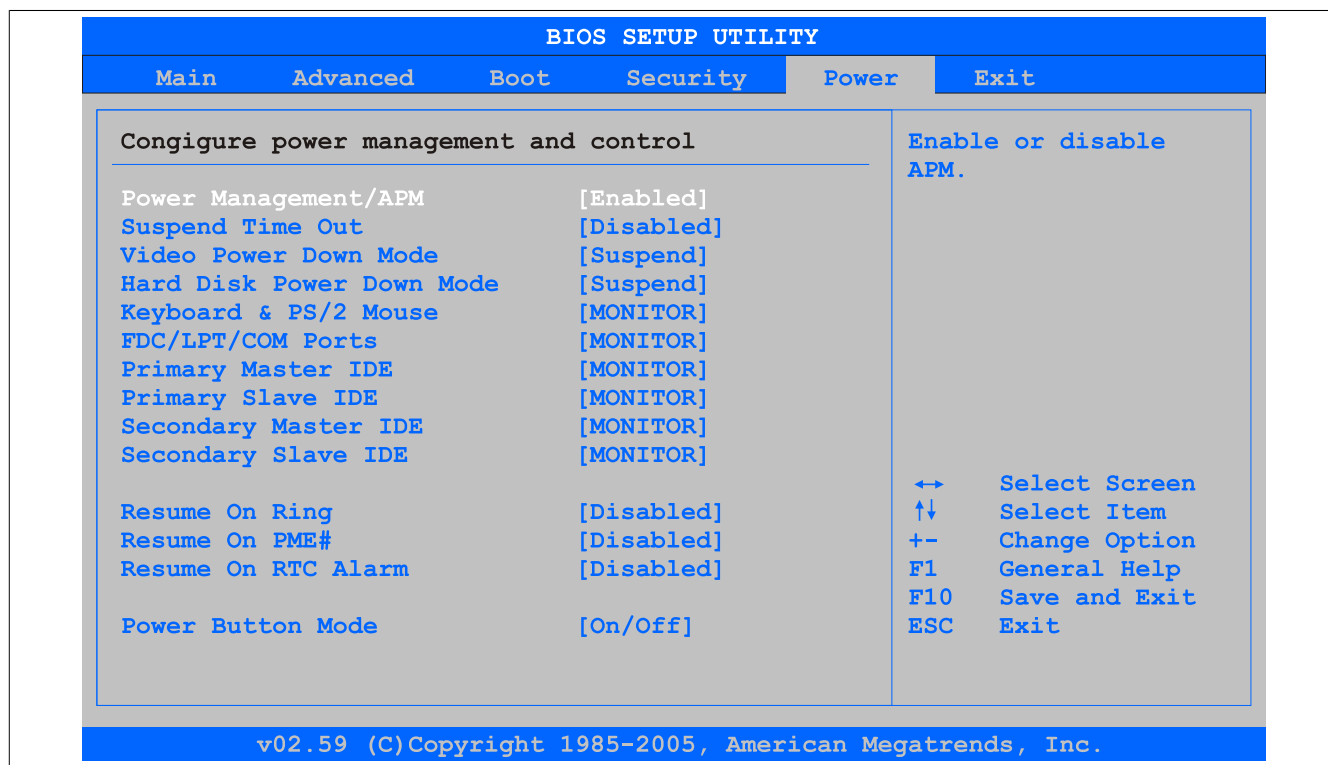


Image 100: GM45 Power menu

BIOS setting	Meaning	Setting 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 136: GM45 Power menu - Setting options

1.8 Exit

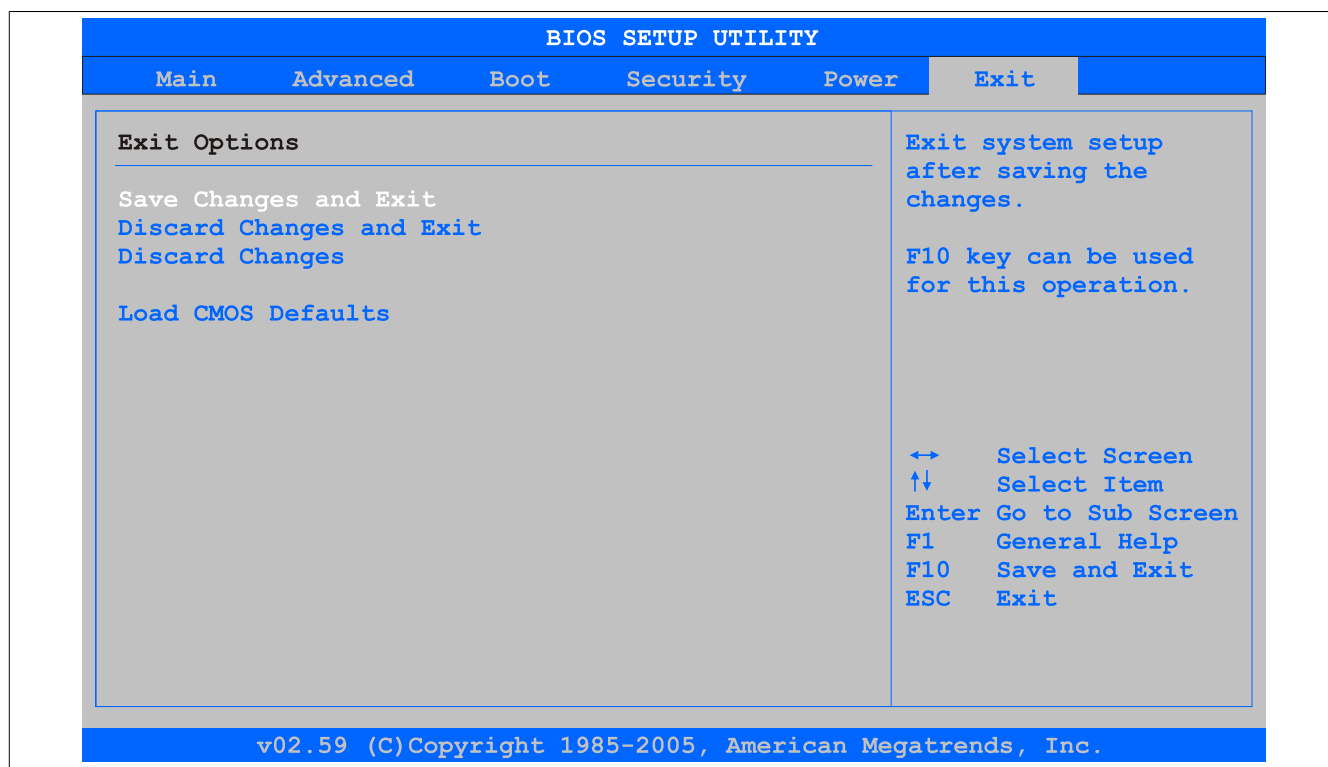


Image 101: GM45 Exit menu

BIOS setting	Meaning	Setting options	Effect
Save Changes and Exit	BIOS setup is closed with this item. Changes made are saved in CMOS after confirmation, and the system is rebooted.	OK / Cancel	
Discard Changes and Exit	With this item you can close BIOS setup without saving the changes made. The system is then rebooted.	OK / Cancel	
Discard Changes	In the event that settings were made that the user can no longer remember, they can be reset (as long as they haven't 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 137: GM45 Exit menu - Setting options

1.9 BIOS Defaulteinstellungen

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.



Image 102: CMOS profile hex switch

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	System unit 5PC810.SX05-00	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 APC800 user's manual. This can be downloaded for free from the B&R homepage.

Table 138: Profile overview

1.9.1 Main

Setting / View	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 139: GM45 Main profile setting overview

1.9.2 Advanced

ACPI configuration

Setting / View	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 140: GM45 Advanced - ACPI Configuration profile setting overview

PCI Configuration

Setting / View	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	
PCI IRQ Resource Exclusion			
IRQ3	Allocated	Available	
IRQ4	Allocated	Allocated	
IRQ5	Available	Available	
IRQ6	Available	Available	
IRQ7	Available	Available	
IRQ9	Allocated	Allocated	
IRQ10	Available	Allocated	
IRQ11	Allocated	Allocated	
IRQ12	Available	Available	
IRQ14	Allocated	Allocated	
IRQ15	Allocated	Allocated	
PCI Interrupt Routing			
PIRQ A (VGA,UHCI2,PCIE4, ETH2)	Auto	Auto	
PIRQ B (PCIE1,HDA,ETH1)	Auto	Auto	
PIRQ C (PCIE2, IF-slot)	Auto	Auto	
PIRQ D (UHCI1,PCIE3, SATA)	Auto	Auto	
PIRQ E (INTD,UHCI3,PATA)	Auto	Auto	
PIRQ F (INTA)	Auto	Auto	
PIRQ G (INTB)	Auto	Auto	
PIRQ H (INTC,UHCI0, EHCI0)	Auto	Auto	
1st Exclusive PCI	-	-	
2nd Exclusive PCI	-	-	
3rd Exclusive PCI	-	-	

Table 141: GM45 Advanced - PCI Configuration profile setting overview

PCI express configuration

Setting / View	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 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 142: GM45 Advanced - PCI Express Configuration profile setting overview

Graphics configuration

Setting / View	Profile 0	Profile 5	My setting
Primary Video Device	Internal VGA	Internal VGA	
Internal Graphics Mode Select	Enabled, 32MB	Enabled, 32MB	
DVMT Memory	256 MB	256 MB	
Boot Display Device	Auto	Auto	
Boot Display Preference	SDVO-B SDVO-C LFP	LFP SDVO-B SDVO-C	
Always Try Auto Panel Detect	No	No	
Local Flat Panel Type	Auto	Auto	
SDVO local flat panel type	Disabled	Disabled	
Local flat panel scaling	Centering	Expand Text & Graphics	

Table 143: GM45 Advanced - Graphics Configuration profile setting overview

Setting / View	Profile 0	Profile 5	My setting
SDVO Port B Configuration	SDVO DVI	SDVO DVI	
SDVO Port C Configuration	SDVO DVI	Disabled	
SDVO/DVI Hot Plugging Support	Enabled	Enabled	
Display Mode Persistence	Enabled	Enabled	

Table 143: GM45 Advanced - Graphics Configuration profile setting overview

CPU configuration

Setting / View	Profile 0	Profile 5	My setting
MPS revision	1.4	1.4	
Max CPUID value limit	Disabled	Disabled	
Intel(R) Virtualization Tech	Enabled	Enabled	
Execute-Disable Bit Capability	Enabled	Enabled	
Intel(R) SpeedStep(tm) tech.	Enabled	Enabled	
Intel(R) C-State Tech.	Disabled	Disabled	
Enhanced C-States	Disabled	Disabled	

Table 144: GM45 Advanced - CPU Configuration profile setting overview

Chipset configuration

Setting / View	Profile 0	Profile 5	My setting
DRAM Refresh Rate	Auto	Auto	
Memory Hole	Disabled	Disabled	
DIMM Thermal Control	Disabled	Disabled	
TMRC Mode	Disabled	Disabled	
TS on DIMM	Disabled	Disabled	
High Precision Event Timer	Disabled	Disabled	
IOAPIC	Enabled	Enabled	
APIC ACPI SCI IRQ	Disabled	Disabled	
POST Code Output	PCI	PCI	

Table 145: GM45 Advanced - Chipset Configuration profile setting overview

I/O interface configuration

Setting / View	Profile 0	Profile 5	My setting
HDA Controller	Disabled	Enabled	
Onboard Gbe Controller (ETH1)	Enabled	Enabled	

Table 146: GM45 Advanced - I/O Interface Configuration profile setting overview

Clock Configuration

Setting / View	Profile 0	Profile 5	My setting
Spread spectrum	Disabled	Disabled	

Table 147: GM45 Advanced - Clock Configuration profile setting overview

IDE configuration

Setting / View	Profile 0	Profile 5	My setting
SATA Port 0/1	Compatible	Compatible	
SATA Port 2/3 (opt. PATA Port)	Enabled	Enabled	
PATA Detection Time Out (Sec)	3	3	
Hard disk write protect	Disabled	Disabled	
IDE Detect Time Out (Sec)	35	35	
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	
Secondary IDE Master			
Type	Auto	Auto	
LBA/Large Mode	Auto	Auto	
Block (Multi-Sector Transfer)	Auto	Auto	

Table 148: GM45 Advanced - IDE Configuration profile setting overview

Setting / View	Profile 0	Profile 5	My setting
PIO Mode	Auto	Auto	
DMA Mode	Auto	Auto	
S.M.A.R.T.	Auto	Auto	
32Bit data transfer	Enabled	Enabled	
Third 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	
Fourth 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	

Table 148: GM45 Advanced - IDE Configuration profile setting overview

USB configuration

Setting / View	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	-	-	
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	hard disk	
USB Mass Storage Reset Delay	20 Sec	20 Sec	

Table 149: GM45 Advanced - USB Configuration profile setting overview

Keyboard/mouse configuration

Setting / View	Profile 0	Profile 5	My setting
Boot-up Num-lock	On	On	
Typematic rate	Fast	Fast	

Table 150: GM45 Advanced - Keyboard/Mouse Configuration profile setting overview

Main Board/Panel Features

Setting / View	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	-	-	
IF slot	-	-	
Case 1	-	-	
Case 2	-	-	
Case 3	-	-	

Table 151: GM45 Advanced - Baseboard/Panel Features profile setting overview

Setting / View	Profile 0	Profile 5	My setting
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	-	-	
ETH2 LAN Controller	Enabled	Enabled	
ETH2 MAC Address	-	-	

Table 151: GM45 Advanced - Baseboard/Panel Features profile setting overview

1.9.3 Boot

Setting / View	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	Secondary Master	
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	Fourth Master	Fourth Master	
8th Boot Device	Disabled	Disabled	
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	Enabled	Disabled	
Slide-in 2 optional ROM	Enabled	Disabled	
Power Loss Control	Turn On	Turn On	

Table 152: GM45 Main profile setting overview

1.9.4 Security

Setting / View	Profile 0	Profile 5	My setting
Supervisor Password	-	-	
User Password	-	-	
Boot Sector Virus Protection	Disabled	Disabled	
Ask HDD Password on Every Boot	No	No	
Hard disk security user password	-	-	
Hard disk security master password	-	-	

Table 153: GM45 Security profile setting overview

1.9.5 Power

Setting / View	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	
Secondary Slave IDE	MONITOR	MONITOR	

Table 154: GM45 Power profile setting overview

Setting / View	Profile 0	Profile 5	My setting
Resume On Ring	Disabled	Disabled	
Resume on PME#	Disabled	Disabled	
Resume On RTC Alarm	Disabled	Disabled	
Power Button Mode	On/Off	On/Off	

Table 154: GM45 Power profile setting overview

1.10 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	Meaning	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 155: BIOS post code messages BIOS BM45

1.11 Distribution of resources

1.11.1 RAM address assignment

RAM address	Address in Hex	Resource
(TOM - 384 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 - 0FFFFFFh	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 156: 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 32 MB in the setup.

1.11.2 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
04D0h - 04D1h	Motherboard resources
0500h - 053Fh	Motherboard resources
0800h - 087Fh	Motherboard resources
0A00h - 0A7Fh	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 157: I/O address assignment

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

1.11.3 Interrupt 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 ²⁾															•			
Secondary IDE channel ²⁾																•		
B&R	COM3 (COM C)			○	○	○	○	○			○	○	○					•
	COM5 (COM E)			○	○	○	○	○			○	○	○					•

Table 158: IRQ interrupt assignments PIC Mode

- 1) Advanced Configuration and Power Interface.
- 2) If the SATA configuration in BIOS is set to Enhanced mode for all SATA ports, IRQs 14 and 15 are enabled for the system and the SATA ports use other IRQs.

- ... Default setting
- ... Optional setting

1.11.4 Interrupt assignments in APIC mode

A total of 23 IRQs are available in APIC (**A**dvanced **P**rogrammable Interrupt **C**ontroller) mode. Enabling this option is only effective if done before the 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 ²⁾															•											
Secondary IDE channel ²⁾																•										
B&R	COM3 (COM C)			○	○	○	○	○			○	○	○													•
				○	○	○	○	○			○	○	○													•
				○	○	○	○	○			○	○	○													•
PIRQ A ³⁾																	•									
PIRQ B ⁴⁾																		•								
PIRQ C ⁵⁾																			•							
PIRQ D ⁶⁾																				•						
PIRQ E ⁷⁾																					•					
PIRQ F ⁸⁾																						•				
PIRQ G ⁹⁾																							•			
PIRQ H ¹⁰⁾																								•		

Table 159: IRQ interrupt assignments in APIC mode

- 1) **A**dvanced **C**onfiguration and **P**ower **I**nterface.
- 2) If the SATA configuration in BIOS is set to Enhanced mode for all SATA ports, IRQs 14 and 15 are enabled for the system and the SATA ports use other IRQs.
- 3) PIRQ A: for PCIe; UHCI Host Controller 2, VGA controller, PCI Express root port 4
- 4) PIRQ B: for PCIe; HD audio, PCI express root port 1, onboard gigabit LAN controller
- 5) PIRQ C: for PCIe; PCI express root port 2
- 6) PIRQ D: for PCIe; UHCI host controller 1, serial ATA controller 0 + 1 in enhanced/native mode, PCI express root port 3
- 7) PIRQ E: PCI bus INTD, UHCI host controller 3, EHCI host controller 1, SM bus controller
- 8) PIRQ F: PCI bus INTA
- 9) PIRQ G: PCI bus INTB
- 10) PIRQ H: PCI bus INTC, UHCI host controller 0, EHCI host controller 0

- ... Default setting
- ... Optional setting

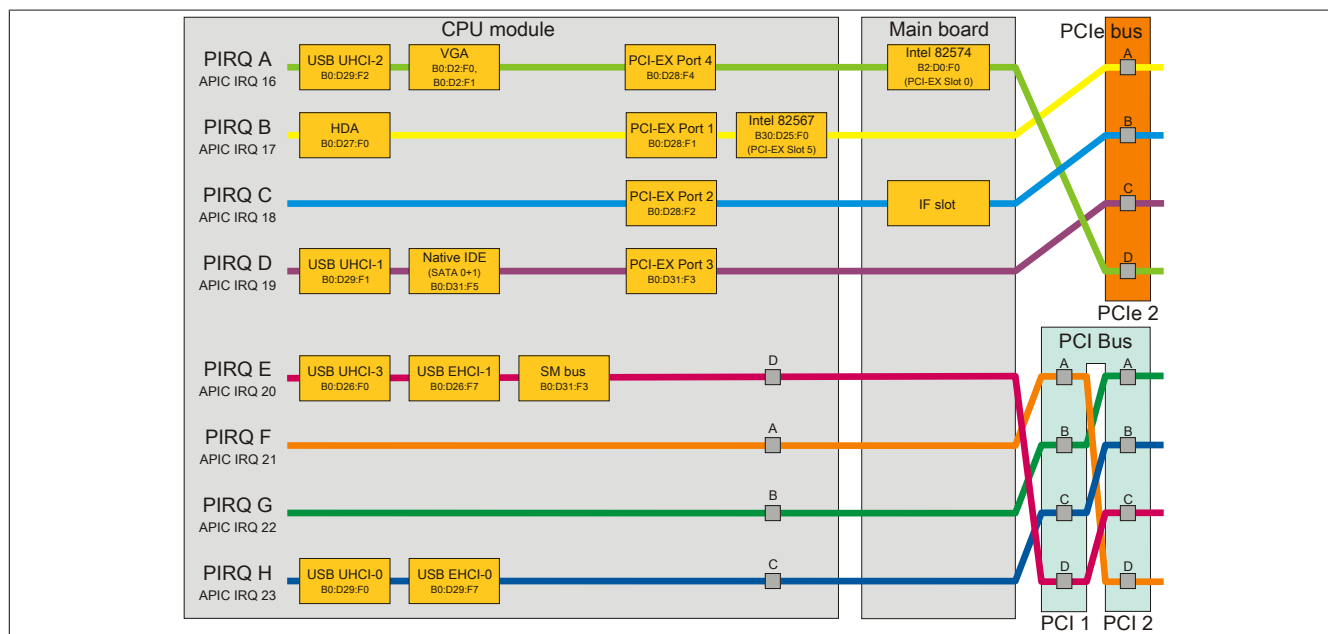


Image 103: PCI and PCIe routing with activated APIC CPU boards GM45

2 Upgrade information

Warning!

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

2.1 BIOS upgrade

An upgrade might be necessary for the following reason:

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

2.1.1 What information do I need?

Information:

Individually saved BIOS settings are deleted when upgrading the BIOS.

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

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, you can get to the BIOS Setup by pressing "Del".
- From the BIOS main menu "Advanced", select "Main board/panel features".

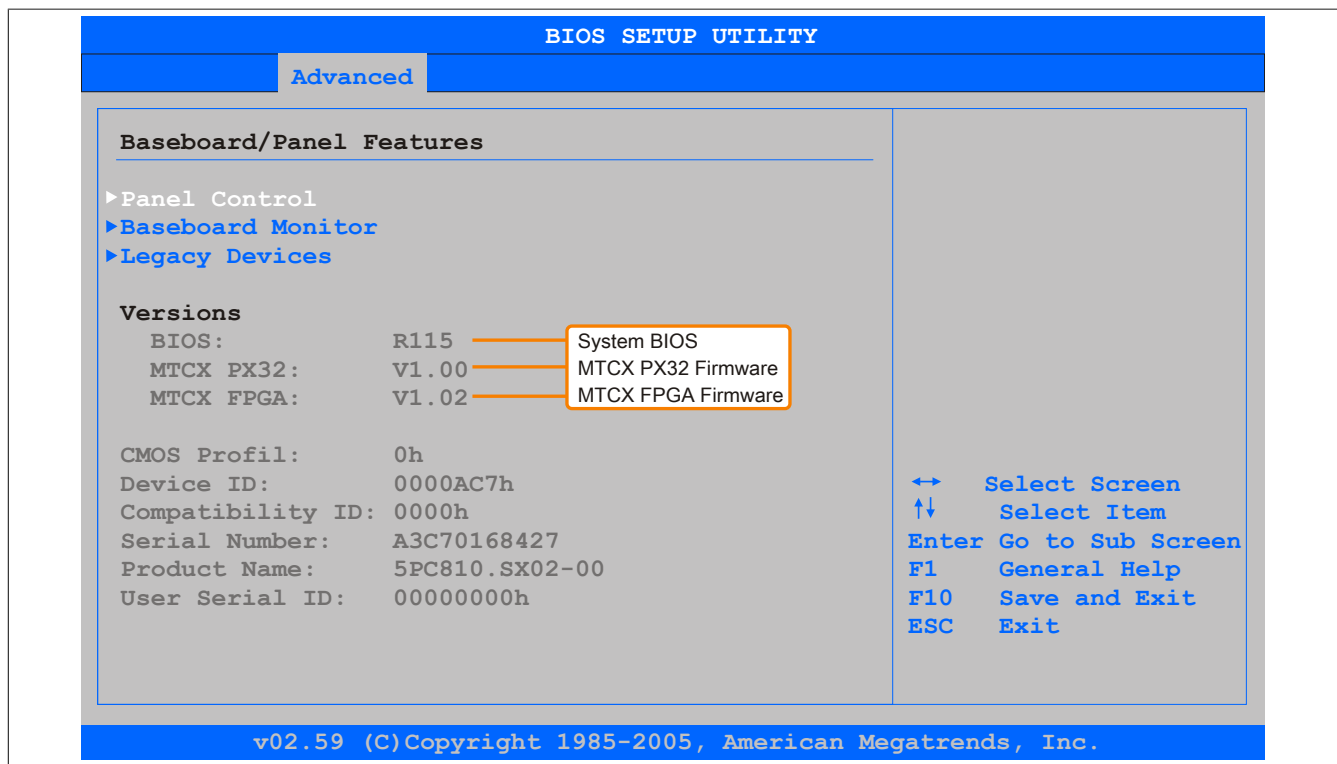


Image 104: Software version

2.1.2 Procedure with MS-DOS

- Download the zip file from the B&R website (www.br-automation.com).
- Create bootable media.

Information:

In MS-DOS, Win95 and Win98, a blank HD disk can be made bootable using the command line command "sys a:" or "format a: /s".

Information on creating a bootable diskette in Windows XP can be found on page 183.

Information on creating a USB flash drive for a B&R upgrade can be found on page 185.

Information on creating a CompactFlash card for a B&R upgrade can be found on page 186.

3. Copy the contents of the *.zip file to the bootable media. If the B&R upgrade was already added when the bootable media was created using 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 BM45 (5PC800.BM45-00, -01)
2. Exit
```

Concerning item 1:

BIOS is automatically upgraded (default after 5 seconds).

Concerning item 2:

Return to the shell (MS-DOS).

Information:

If you do not press a button within 5 seconds, then step 1 "Upgrade AMI BIOS for BM45" is automatically carried out and the APC810 is automatically updated.

6. The system must be rebooted after a successful upgrade.
7. Reboot and press "Del" to enter the BIOS setup menu and load the setup defaults, then select "Save Changes and Exit".

2.1.3 Using the Control Center

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

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

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

Information:

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

Information:

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

2.2 Firmware upgrade

The "PPC800 Firmware Upgrade (MTCX, SDLR, SDLT)" software makes it possible to update the firmware for multiple controllers (MTCX, SDLT, SDLR, UPSI), depending on the structure of the PPC800 system.

Current "PPC800 Firmware Upgrade (MTCX, SDLR, SDLT)" software can be downloaded directly from the service portal on 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 using the command line command "sys a:" or "format a: /s".

Information on creating a bootable diskette in Windows XP can be found on page 183.

Information on creating a USB flash drive for a B&R upgrade can be found on page 185.

Information on creating a CompactFlash card for a B&R upgrade can be found on page 186.

3. Copy the contents of the *.zip file to the bootable media. If the B&R upgrade was already added when the bootable media was created using 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
21. Upgrade SDLR on AP 0 (AP800/AP900)
22. Upgrade SDLR on AP 1 (AP800/AP900)
23. Upgrade SDLR on AP 2 (AP800/AP900)
24. Upgrade SDLR on AP 3 (AP800/AP900)
25. Upgrade all SDLR (AP800/AP900)
26. Return to main menu
3. Upgrade add-on UPS (firmware and battery settings)
31. Upgrade Add-On UPS Firmware (5AC600.UPSI-00)
32. Upgrade Battery Settings (5AC600.UPSB-00)
33. 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. Place an empty 1.44 MB HD diskette in the disk drive
2. Open Windows Explorer
3. Right-click on the 3½" Floppy icon and select "Format...".

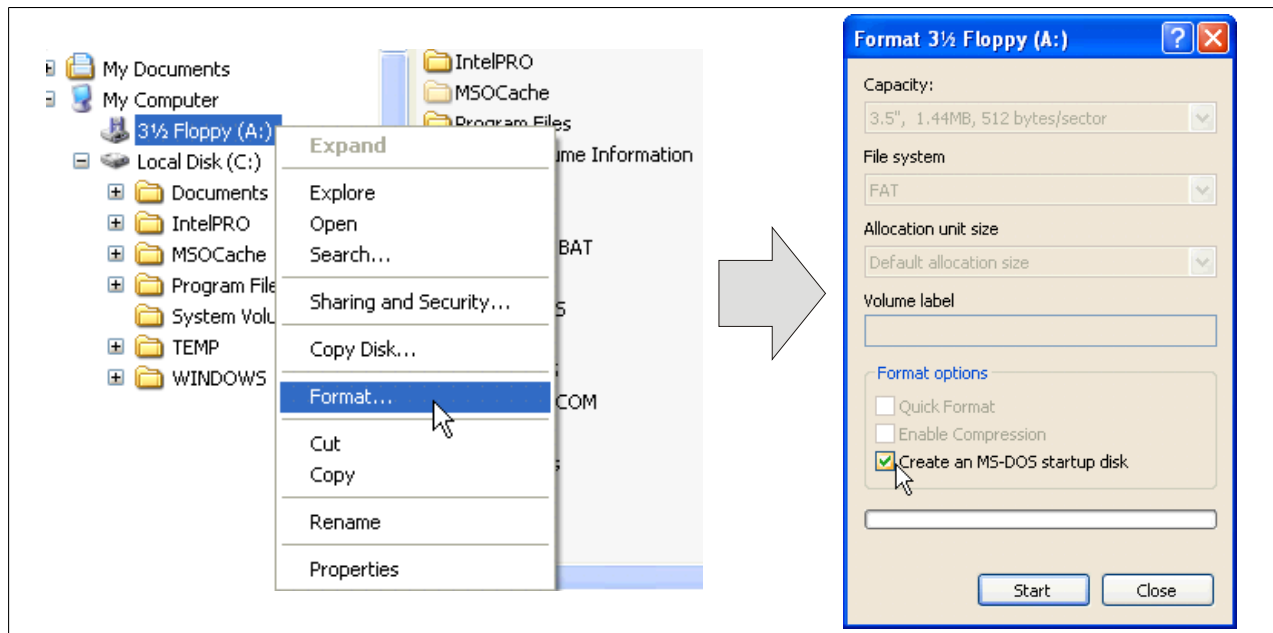


Image 105: Creating a bootable diskette in Windows XP - step 1

4. Then select the checkbox "Create an MS-DOS startup disk", press "Start" and acknowledge the warning message with "OK".



Image 106: Creating a bootable diskette in Windows XP - step 2

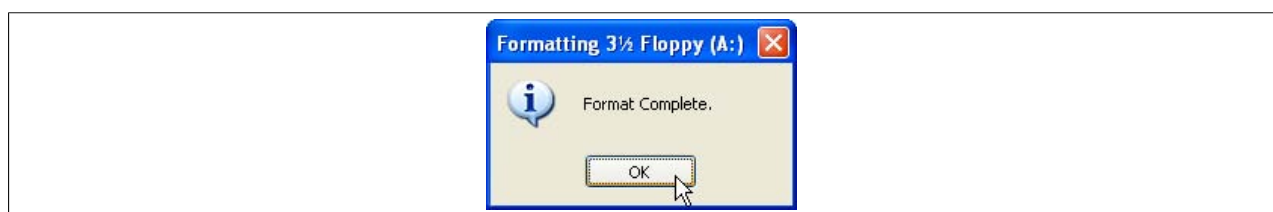


Image 107: Creating a bootable diskette in Windows XP - step 3

After creating the startup disk, some of the files must be deleted because of the size of the update.

When doing this, all files (hidden, system files, etc.) must be shown on the diskette.

In the Explorer, go to the "Tools" menu, select "Folder Options..." and open the "View" tab - now deactivate the option "Hide protected operating system files (Recommended)" (activated as default) and activate the option "Show hidden files and folders".

before				after			
Name	Size	Type	Date Modified	Name	Size	Type	Date Modified
DISPLAY.SYS	17 KB	System file	6/8/2000 5:00 PM	AUTOEXEC.BAT	0 KB	MS-DOS Batch File	3/22/2006 10:08 AM
EGA2.CPI	58 KB	CPI File	6/8/2000 5:00 PM	COMMAND.COM	91 KB	MS-DOS Application	6/8/2000 5:00 PM
EGA3.CPI	58 KB	CPI File	6/8/2000 5:00 PM	CONFIG.SYS	0 KB	System file	3/22/2006 10:08 AM
EGA.CPI	58 KB	CPI File	6/8/2000 5:00 PM	DISPLAY.SYS	17 KB	System file	6/8/2000 5:00 PM
KEYB.COM	22 KB	MS-DOS Application	6/8/2000 5:00 PM	EGA2.CPI	58 KB	CPI File	6/8/2000 5:00 PM
KEYBOARD.SYS	34 KB	System file	6/8/2000 5:00 PM	EGA3.CPI	58 KB	CPI File	6/8/2000 5:00 PM
KEYBRD2.SYS	32 KB	System file	6/8/2000 5:00 PM	EGA.CPI	58 KB	CPI File	6/8/2000 5:00 PM
KEYBRD3.SYS	31 KB	System file	6/8/2000 5:00 PM	IO.SYS	114 KB	System file	5/15/2001 6:57 PM
KEYBRD4.SYS	13 KB	System file	6/8/2000 5:00 PM	KEYB.COM	22 KB	MS-DOS Application	6/8/2000 5:00 PM
MODE.COM	29 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

Image 108: Creating a bootable diskette in Windows XP - step 4

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

Image 109: Creating a bootable diskette in Windows XP - step 5

Now all files (marked) 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 for free from the B&R homepage (www.br-automation.com).

2.4.1 Requirements

The following peripherals are required for creating 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

- Connect the USB flash drive to the PC.
- If the drive list is not refreshed automatically, the list must be updated using the command **Drives > Refresh**.
- Mark the desired USB flash drive in the drive list.
- Change to the **Action** tab and select **Install a B&R Update to a USB flash drive** as type of action.
- Enter the path to the MS-DOS operating system files. If the files are part of a ZIP archive, then click on the button **By ZIP file....** If the files are stored in a directory on the hard drive, then click on the button **By folder....**
- In the **B&R Upgrade** text box, it's also possible to enter the path to the ZIP file for the B&R Upgrade Disk and select the file.
- Click on the **Start action** button in the toolbar.

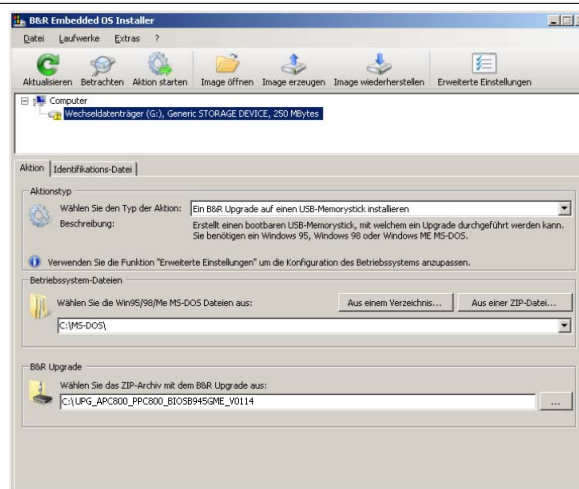


Image 110: Creating a USB flash drive for B&R upgrade files

2.4.3 Where do I get 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 183. Then the files from the diskette are to be copied to your 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 for free from the B&R homepage (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
- B&R Embedded OS Installer (V3.10 at least)

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 must 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 **By ZIP file...**. If the files are stored in a directory on the hard drive, then click on the button **By folder...**
6. In the **B&R Upgrade** text box, it's 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.

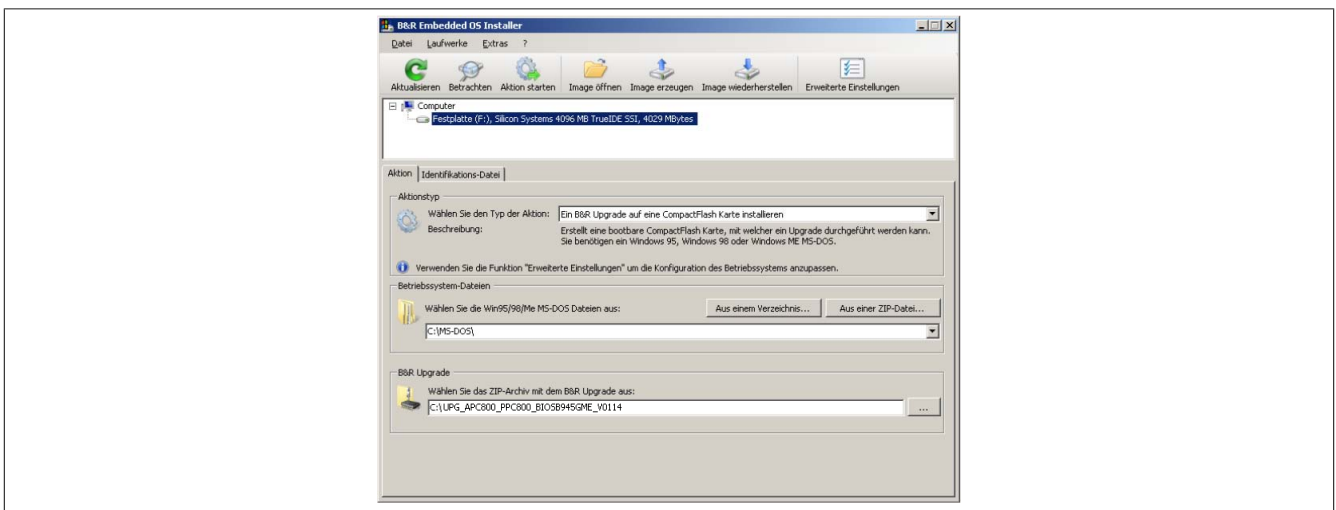


Image 111: Creating a CompactFlash card for B&R upgrade files

2.5.3 Where do I get 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 183. Then the files from the diskette are to be copied to your hard drive.

3 Microsoft DOS

3.1 Order data

Image not found for 9S0000.01-010-9S0000.01-020!	
Model number	Short description
MS-DOS	
9S0000.01-010	OEM Microsoft MS-DOS 6.22, German Floppy disks, only available with a new PC.
9S0000.01-020	OEM Microsoft MS-DOS 6.22, English Floppy disks, only available with a new PC.

Table 160: 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 161: 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 162: Tested resolutions and color depths for RGB signals

4 Windows XP Professional

4.1 Order data

Model number	Short description	Figure
	Windows XP Professional	
5SWWWXP.0600-ENG	Microsoft OEM Windows XP Professional Service Pack 3, CD, English. Only available with a B&R device.	
5SWWWXP.0600-GER	Microsoft OEM Windows XP Professional Service Pack 3, CD, German. Only available with a B&R device.	
5SWWWXP.0600-MUL	Microsoft OEM Windows XP Professional Service Pack 3, CD, multilanguage. Only available with a B&R device.	
5SWWWXP.0500-ENG	Microsoft OEM Windows XP Professional Service Pack 2c, CD, English. Only available with a B&R device.	
5SWWWXP.0500-GER	Microsoft OEM Windows XP Professional Service Pack 2c, CD, German. Only available with a B&R device.	
5SWWWXP.0500-MUL	Microsoft OEM Windows XP Professional Service Pack 2c, CD, Multilanguage Only available with a B&R device.	
	Erforderliches Zubehör	
	CompactFlash	
5CFCRD.016G-04	CompactFlash 16 GB B&R	
5CFCRD.4096-03	CompactFlash 4 GB Western Digital	
5CFCRD.4096-04	CompactFlash 4 GB B&R	
5CFCRD.8192-03	CompactFlash 8 GB Western Digital	
5CFCRD.8192-04	CompactFlash 8 GB B&R	

Table 163: 5SWWWXP.0600-ENG, 5SWWWXP.0600-GER, 5SWWWXP.0600-MUL, 5SWWWXP.0500-ENG, 5SWWWXP.0500-GER, 5SWWWXP.0500-MUL - Order data

4.2 Overview

Model number	Edition	Target system	Chipset	Service Pack	Language	Preinstalled	Memory required on CF/HDD	Minimum amount of RAM
5SWWWXP.0600-ENG	Professional	APC510 APC511 APC620 APC810 APC820 PPC700 PPC725 PPC800 PP500	945GME GM45 US15W	SP3	English	Optional	≤ 2.1 GB	128 MB
5SWWWXP.0600-GER	Professional	APC510 APC511 APC620 APC810 APC820 PPC700 PPC725 PPC800 PP500	945GME GM45 US15W	SP3	German	Optional	≤ 2.1 GB	128 MB
5SWWWXP.0600-MUL	Professional	APC510 APC511 APC620 APC810 APC820 PPC700 PPC725 PPC800 PP500	945GME GM45 US15W	SP3	Multilanguage	Optional	≤ 2.1 GB	128 MB
5SWWWXP.0500-ENG	Professional	APC620 APC810 APC820 PPC700 PPC725 PPC800	945GME GM45	SP2c	English	Optional	≤ 2.1 GB	128 MB
5SWWWXP.0500-GER	Professional	APC620 APC810 APC820 PPC700 PPC725 PPC800	945GME GM45	SP2c	German	Optional	≤ 2.1 GB	128 MB
5SWWWXP.0500-MUL	Professional	APC620 APC810 APC820 PPC700 PPC725 PPC800	945GME GM45	SP2c	Multilanguage	Optional	≤ 2.1 GB	128 MB

4.3 Installation

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

4.3.1 Installation on PCI SATA RAID controller - 5ACPCI.RAIC-03, 5ACPCI.RAIC-05

The following steps are necessary for installing Windows XP Professional on the 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 the Media Drive and boot from the CD.
4. Press the F6 key during setup to install a third-party SCSI or a driver.
5. Press the "s" key when asked about installing an additional drive. Insert the disk in the floppy drive. Press "Enter" and select the driver.
6. Follow the setup instructions.
7. The setup copies the files to the Windows XP Professional folder and restarts the Panel PC 800.

Information:

- **Not all USB FDD drives are supported by the Windows XP Setup (see Microsoft Kb 916196).**
- **Depending on the system, the boot order may have to be adjusted in BIOS.**

4.4 Drivers

The latest drivers for all released operating systems can be found in the Download area of the B&R website (www.br-automation.com).

Information:

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

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 German and English are available in Windows® 7 Professional, while Windows® 7 Ultimate supports up to 35 different languages. Product activation is not necessary on B&R PCs, which is a huge advantage for simple logistical procedures relating to machine automation.

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

5.2 Order data

Model number	Short description	Figure
	Windows 7	
5SWWI7.0100-ENG	Microsoft OEM Windows 7 Professional 32-bit, DVD, English. Only available with a new device.	
5SWWI7.0100-GER	Microsoft OEM Windows 7 Professional 32-bit, DVD, German. Only available with a new device.	
5SWWI7.0300-MUL	Microsoft OEM Windows 7 Ultimate 32-bit, DVD, multilanguage. Only available with a new device.	
5SWWI7.0200-ENG	Microsoft OEM Windows 7 Professional 64-bit, DVD, English. Only available with a new device.	
5SWWI7.0200-GER	Microsoft OEM Windows 7 Professional 64-bit, DVD, German. Only available with a new device.	
5SWWI7.0400-MUL	Microsoft OEM Windows 7 Ultimate 64-bit, DVD, multilanguage. Only available with a new device.	

Table 164: 5SWWI7.0100-ENG, 5SWWI7.0100-GER, 5SWWI7.0300-MUL, 5SWWI7.0200-ENG, 5SWWI7.0200-GER, 5SWWI7.0400-MUL - Order data

5.3 Overview

Model number	Edition	Target system	Chipset	Architectures	Language	Preinstalled	Minimum size of CF/HDD	Minimum amount of RAM
5SWWI7.0100-ENG	Professional	APC510 APC511 APC810 PPC800 PP500	945GME GM45 US15W	32-bit	English	Optional	16 GB	1 GB
5SWWI7.0100-GER	Professional	APC510 APC511 APC810 PPC800 PP500	945GME GM45 US15W	32-bit	German	Optional	16 GB	1 GB
5SWWI7.0300-MUL	Ultimate	APC510 APC511 APC810 PPC800 PP500	945GME GM45 US15W	32-bit	Multilanguage	Optional	16 GB	1 GB
5SWWI7.0200-ENG	Professional	PPC800 APC810	945GME Intel® Core™2 Duo GM45	64-bit	English	Optional	20 GB	2 GB
5SWWI7.0200-GER	Professional	PPC800 APC810	945GME Intel® Core™2 Duo GM45	64-bit	German	Optional	20 GB	2 GB
5SWWI7.0400-MUL	Ultimate	PPC800 APC810	945GME Intel® Core™2 Duo GM45	64-bit	Multilanguage	Optional	20 GB	2 GB

5.4 Installation

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

5.4.1 Installation on PCI SATA RAID controller - 5ACPCI.RAIC-03, 5ACPCI.RAIC-05

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 www.br-automation.com and copy the data to a folder on a flash drive.
2. Boot using the Windows7 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 adjusted in BIOS.

5.5 Special considerations, limitations

- Windows 7 does not contain a Beep.sys file, which means that audible signal is no longer played (i.e. when touching a key or button).
- Windows 7 system classification is not currently supported (does not apply to PP500, APC510 and APC511 devices).

5.6 Drivers

The latest drivers for all released operating systems can be found in the Download area of the B&R website (www.br-automation.com).

Information:

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

6 Windows Embedded Standard 2009

6.1 General information

Windows® Embedded Standard 2009 is the modular version of Windows® XP Professional. It's used if XP applications require a smaller operating system size to run. Together with 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 multilingual.

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

6.2 Order data

Model number	Short description	Figure
	Windows Embedded Standard 2009	
5SWWXP.0734-ENG	Microsoft OEM Windows Embedded Standard 2009, English; for PPC800 with GM45 chipset; please order CompactFlash separately (minimum 1 GB).	
	Mandatory accessories	
	CompactFlash	
5CFCRD.016G-06	B&R CompactFlash 16 GB	
5CFCRD.1024-03	CompactFlash 1 GB Western Digital	
5CFCRD.1024-06	B&R CompactFlash 1 GB	
5CFCRD.2048-03	CompactFlash 2 GB Western Digital	
5CFCRD.2048-06	B&R CompactFlash 2 GB	
5CFCRD.4096-03	CompactFlash 4 GB Western Digital	
5CFCRD.4096-06	B&R CompactFlash 4 GB	
5CFCRD.8192-03	CompactFlash 8 GB Western Digital	
5CFCRD.8192-06	B&R CompactFlash 8 GB	

Table 165: 5SWWXP.0734-ENG - Order data

6.3 Overview

Model number	Type	Target system	Chipset	Language	Preinstalled	Minimum size of CF/HDD	Minimum amount of RAM
5SWWXP.0734-ENG	WES2009 PPC800 GM45	PPC800	GM45	English	Yes	1 GB	256 MB

6.4 Features with WES2009 (Windows Embedded Standard 2009)

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

Function	Present
Enhanced write filter (EWF)	✓
File Based Write Filter (FBWF)	✓
Page file	Configurable
Administrator account	✓
User account	Configurable
Explorer shell	✓
Registry filter	✓
Internet Explorer 7.0	✓
Internet information service (IIS)	-
Terminal service	✓
Windows Firewall	✓
MSN-Explorer	-
Outlook Express	-
Administrative Tools	✓
Remote Desktop	✓
Remote Assistance	-

Table 166: Device functions in Windows Embedded Standard 2009

Function	Present
.NET Framework	-
ASP.NET	-
Local Network Bridge	✓
Codepages/User Locale/Keyboard	✓
Disk Management Service	✓
Windows Installer Service	✓
Class Installer	✓
CoDevice Installer	✓
Media Player 6.4	✓
DirectX 9.0c	✓
Accessories	✓
Number of fonts	89

Table 166: Device functions in Windows Embedded Standard 2009

6.5 Installation

Upon request, Windows Embedded Standard 2009 can be preinstalled at B&R Austria on a suitable CompactFlash card (min. 1GB). The system is then automatically configured when it is switched on for the first time. This procedure takes approximately 10 minutes, and the device will be rebooted a number of times.

6.6 Drivers

All drivers required for operation are preinstalled on the operating system. If an older version of the driver is installed, the latest version can be downloaded from the B&R website (www.br-automation.com) and installed. Be sure to check whether the "Enhanced Write Filter (EWF)" is enabled.

6.6.1 Touch screen drivers

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 is available in 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 homepage, not from manufacturers' pages.

7 Windows Embedded Standard 7

7.1 General information

The successor to Windows® XP Embedded has been given the name Windows® Embedded Standard 7. As with previous versions, this embedded operating system offers full system support of Automation PC 810, Panel PC 800 and Power Panel 500 devices. In addition to brand new features that are also included in Windows® 7 Professional, Windows® Embedded Standard 7 includes components such as Enhanced Write Filter, File-Based Write Filter, Registry Filter and USB Boot. Windows® Embedded Standard 7 is available in two different versions. The main difference between them has to do with 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 also made substantial improvements in the area of security. The AppLocker program, available in the premium version, can prevent the execution of unknown or potentially unwanted applications that should be installed over a network or from drives that are directly connected. A tiered approach allows the differentiation between scripts (.ps1, .bat, .cmd, .vbs and .js), installer files (.msi, .msp) and libraries (.dll, .ocx). AppLocker can also be configured to record undesired activity and display it in the Event Viewer. Windows® Embedded Standard 7 is available in both 32-bit and 64-bit versions. This also provides support for challenging 64-bit applications.

7.2 Order data

Model number	Short description	Figure
	Windows Embedded Standard 7	
5SWWI7.0534-ENG	Microsoft OEM Windows Embedded Standard 7 32-bit, English; for PPC800 with GM45 chipset; please order CompactFlash separately (minimum 8 GB).	
5SWWI7.0634-ENG	Microsoft OEM Windows Embedded Standard 7 64-bit, English; for PPC800 with GM45 chipset; please order CompactFlash separately (minimum 16 GB).	
5SWWI7.0734-MUL	Microsoft OEM Windows Embedded Standard 7 Premium 32-bit, multilanguage; for PPC800 with GM45 chipset; please order CompactFlash separately (minimum 8 GB).	
5SWWI7.0834-MUL	Microsoft OEM Windows Embedded Standard 7 Premium 64-bit, multilanguage; for PPC800 with GM45 chipset; please order CompactFlash separately (minimum 16 GB).	
	Mandatory accessories	
	CompactFlash	
5CFCRD.016G-06	B&R CompactFlash 16 GB	
5CFCRD.8192-06	B&R CompactFlash 8 GB	
	Optional accessories	
	Windows Embedded Standard 7	
5SWWI7.0900-MUL	WES7P 32bit Language Pack DVD	
5SWWI7.1000-MUL	WES7P 64bit Language Pack DVD	

Table 167: 5SWWI7.0534-ENG, 5SWWI7.0634-ENG, 5SWWI7.0734-MUL, 5SWWI7.0834-MUL - Order data

7.3 Overview

Model number	Edition	Target system	Chipset	Architectures	Language	Preinstalled	Minimum size of CF/HDD	Minimum amount of RAM
5SWWI7.0534-ENG	Embedded	PPC800	GM45	32-bit	English	Optional	8 GB	1 GB
5SWWI7.0634-ENG	Embedded	PPC800	GM45	64-bit	English	Optional	16 GB	1 GB
5SWWI7.0734-MUL	Premium	PPC800	GM45	32-bit	Multilanguage	Optional	8 GB	1 GB
5SWWI7.0834-MUL	Premium	PPC800	GM45	64-bit	Multilanguage	Optional	16 GB	1 GB

7.4 Features with WES7 (Windows Embedded Standard 7)

The feature list shows the most important device functions 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 account	✓	✓
User account	Configurable	Configurable
Windows Explorer Shell	✓	✓
Registry filter	✓	✓
Internet Explorer 8.0	✓	✓
Internet Information Service (IIS) 7.0	✓	✓
AntiMalware (Windows Defender)	-	✓
Add-ons (Snipping tool, Sticky Notes)	-	✓
Windows Firewall	✓	✓
.NET Framework 3.5	✓	✓
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 Stick	✓	✓
Accessories	✓	✓
Page file	Configurable	Configurable
Number of fonts	134	134

Table 168: Device functions in Windows Embedded Standard 7

7.5 Installation

Upon request, Windows Embedded Standard 7 can be preinstalled at B&R Austria on a suitable CompactFlash card (32-bit: at least 8 GB, 64-bit: at least 16 GB). The system is then automatically configured when it is switched on for the first time. This procedure takes approximately 30 minutes, and the device will be rebooted a number of times.

7.6 Drivers

All drivers required for operation are preinstalled on the operating system. If an older version of the driver is installed, the latest version can be downloaded from the B&R website (www.br-automation.com) and installed. Be sure to check whether the Enhanced Write Filter (EWF) is enabled.

7.6.1 Touch screen drivers

A touch screen driver will be automatically installed if a touch controller is detected during the Windows Embedded Standard 7 setup. If a touch controller is not detected during Windows Embedded Standard 7 setup, or if an Automation Panel 800/900 is connected later on, the touch screen driver needs to be installed or the additional touch screen interface needs to be selected in the touch screen settings in the Windows Control Panel. The driver is available in the Download area of the B&R website (www.br-automation.com). When doing so, be sure that the Enhanced Write Filter (EWF) or File Based Write Filter (FBWF) are not enabled.

Information:

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

8 Automation Runtime

8.1 General information

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

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

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

8.2 Order data

Model number	Short description	Figure
9A0003.02U	USB Port Button Holder DS9490B	
1A4600.10	B&R Automation Runtime ARwin, incl. License Label and Security Key	
1A4600.10-2	B&R Automation Runtime ARwin, ARNC0	
1A4600.10-3	B&R Automation Runtime ARwin+PVIControls incl. License Label and Security Key	
1A4600.10-4	B&R Automation Runtime ARwin+ARNC0+PVIControls	

Table 169: 9A0003.02U, 1A4600.10, 1A4600.10-2, 1A4600.10-3, 1A4600.10-4 - Order data

8.3 Automation Runtime Windows (ARwin)

The system is supported by ARwin with an AS 3.0 / AR 2.96 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 196.

Information:

An Automation Runtime dongle is no longer required in AS 3.0.90 / AR4.00.

8.4 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.

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

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

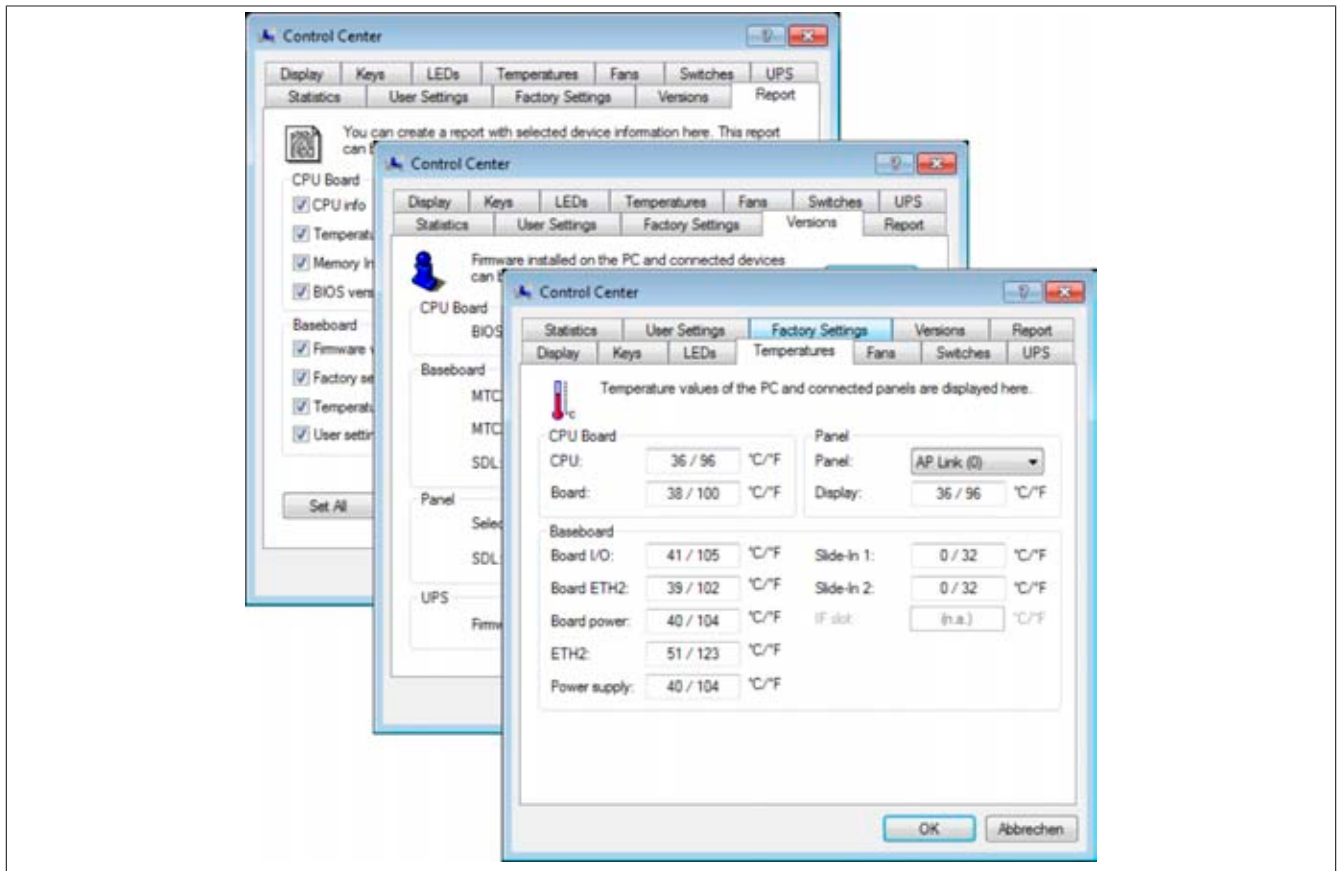


Image 112: ADI Control Center screenshots - Examples (symbol photo)

Information:

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

9.1 Functions

Information:

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

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

Supports following systems:

- Automation PC 510
- Automation PC 511
- Automation PC 620
- Automation PC 810
- Automation PC 820
- Panel PC 700
- Panel PC 725
- Panel PC 800
- Power Panel 100/200
- Power Panel 300/400
- Power Panel 500
- Mobile Panel 40/50
- Mobile Panel 100/200
- Connected Automation Panel 800
- Connected Automation Panel 900

9.2 Installation

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

1. Download and unzip the ZIP archive
2. Close all applications
3. Run the Setup.exe file (e.g. double-click on it in Explorer).

Information:

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

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

9.3 SDL equalizer setting

1. Open the **Control Center** in the **Control Panel**.
2. Select **Display** tab.
3. Click on **Settings**. This opens the following dialog box:

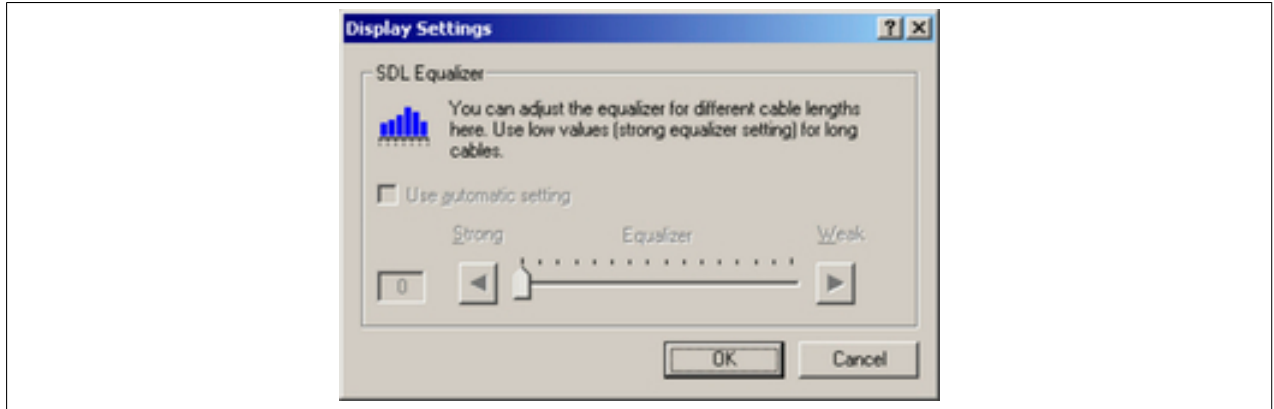


Image 113: ADI Control Center - SDL equalizer settings

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).

9.4 UPS configuration

Here you can view the status values for an optionally installed B&R APC 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.

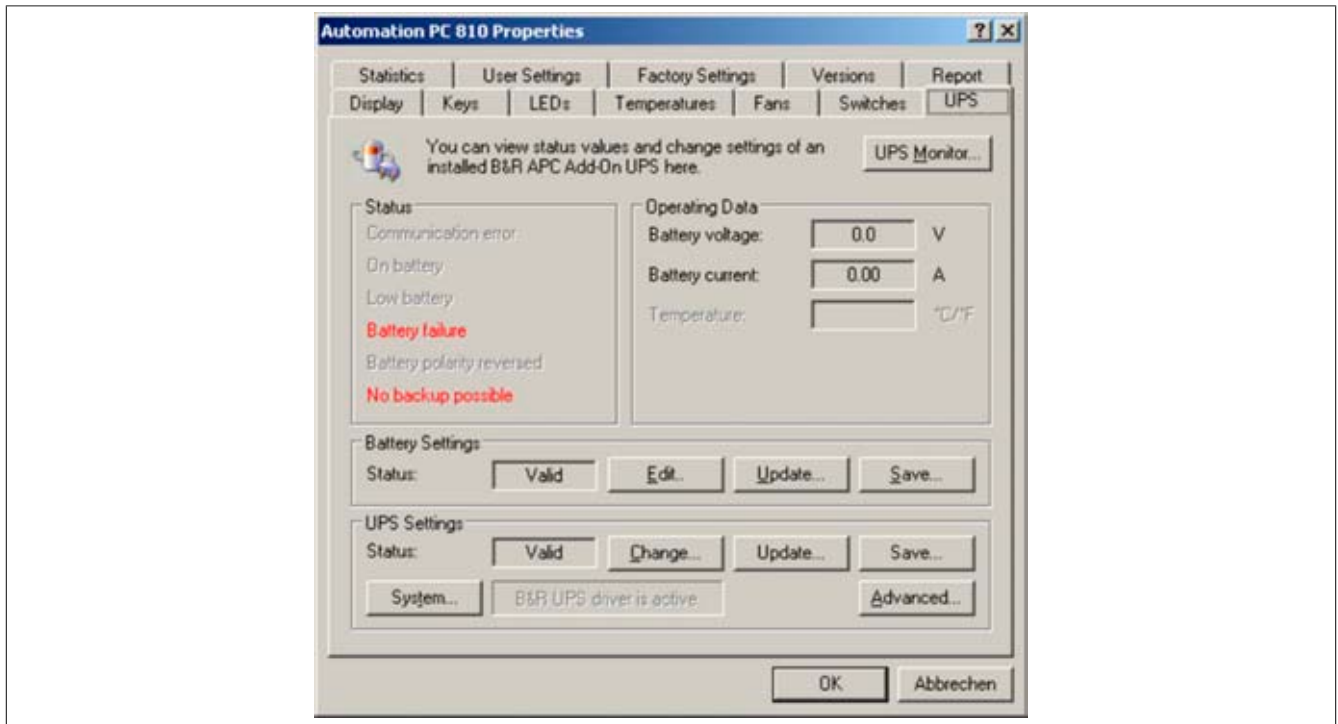


Image 114: ADI Control Center - UPS settings

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.

9.4.1 Installing the UPS service for the B&R APC 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.

9.4.2 Displaying UPS status values

1. Open the **Control Center** in the **Control Panel**.
2. Select the **UPS** tab.

The displayed values are updated automatically.

Information:

The "reversed battery polarity " status 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.

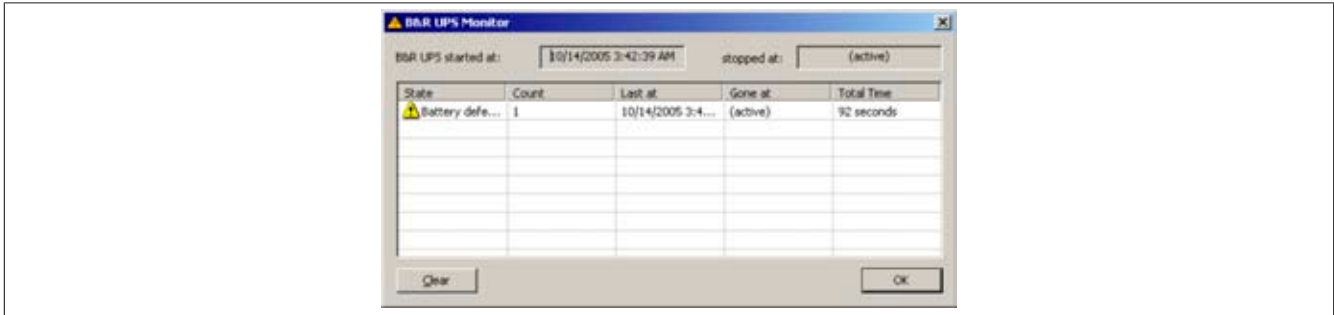


Image 115: ADI Control Center - UPS monitor

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.

9.4.3 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.



Image 116: ADI Control Center - UPS battery settings

In this dialog box you can change the settings for the UPS battery.

The changed settings are written to the file by clicking on the **OK** button. The battery settings for the UPS can then be updated with this file.

none

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.

9.4.4 Updating 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 aborted by clicking on **Cancel** in the Download dialog box. 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.

9.4.5 Saving 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.

9.4.6 UPS system settings configure

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:

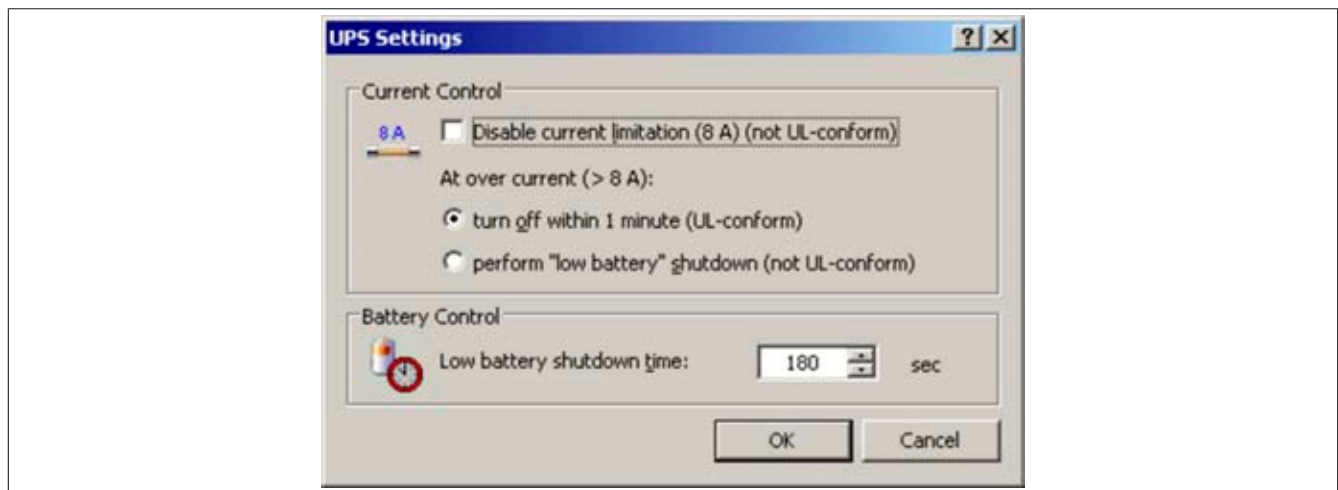


Image 117: ADI Control Center - UPS settings

Further information regarding the UPS 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.

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 over-current > 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.

Changing the shutdown time of the UPS when 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 309). 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.

9.4.7 Changing additional UPS settings

UPS turn-off time - change

Under **Windows UPS Service**, you can enter the **turn-off 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.

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)¹⁾ active and the PC is connected to a network. Additionally, some conditions of the B&R APC add-on UPS are not detected by the Windows UPS Service, and are 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").

9.4.8 Procedure following power failure

Over current shutdown

If an over-current > 8 A is present during battery operation for a duration of 16 seconds, the over-current 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 over-current shutdown has the highest priority.

Low battery shutdown

If the LowBatteryFlag is set during power failure, then the "Low Battery" shutdown is executed. This prevents the rechargeable battery from dying. Once the turn-off time expires (3 minutes by default), the UPS shuts down.

If an "over-current" shutdown or "standard" shutdown is detected during the shutdown process, the "low battery" shutdown is replaced by the respective process.

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.

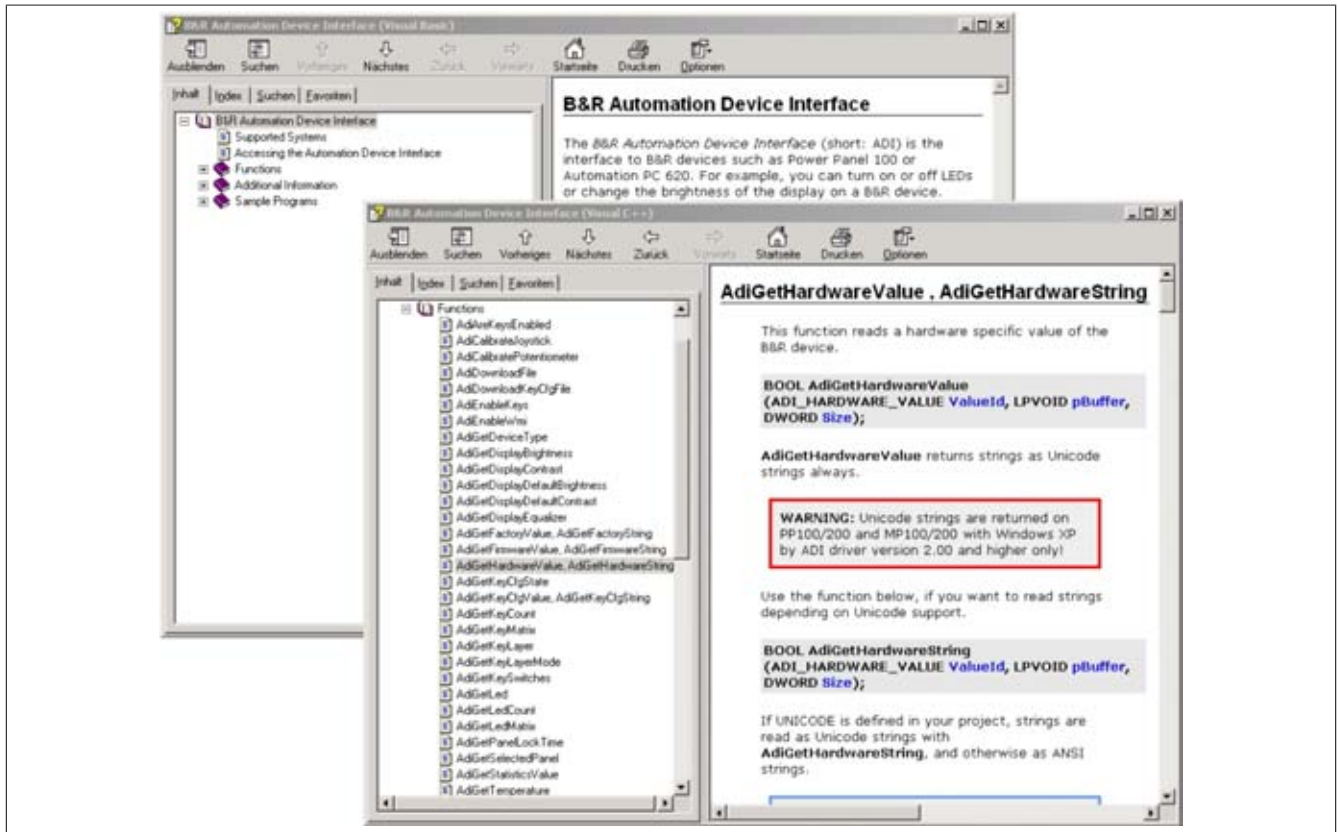
If the supply voltage returns during the shutdown process, then the shutdown timer will run until the APC810 enters standby mode and will then reboot the system.

¹⁾ The Windows Alerter is supported starting with B&R Windows Embedded Version 2.10 or higher.

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

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

- Microsoft Visual C++ 6.0
- Microsoft Visual Basic 6.0
- Microsoft eMbedded Visual C++ 4.0
- Microsoft Visual Studio 2005 (or newer)



Features:

- One Microsoft Visual Basic module with declarations for the ADI functions
- Header files and import libraries for Microsoft Visual C++
- Help files for Visual Basic and Visual C++
- Sample projects for Visual Basic and Visual C++
- ADI DLL (for testing the applications, if no ADI drive is installed)

Supports following systems (Version 3.10 and higher):

- Automation PC 510
- Automation PC 511
- Automation PC 620
- Automation PC 810
- Automation PC 820
- Mobile Panel 40/50
- Mobile Panel 100/200
- Panel PC 300
- Panel PC 700
- Panel PC 800
- Power Panel 100/200
- Power Panel 300/400
- Power Panel 500

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

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

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

11 B&R Automation Device Interface (ADI) .NET SDK

This software can be used to activate functions in the B&R Automation Device Interface (ADI) from .NET applications, which were created using Microsoft Visual Studio 2005 (or newer).

Supported programming languages:

- Visual Basic
- Visual C++
- Visual C#
- Visual J#

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)

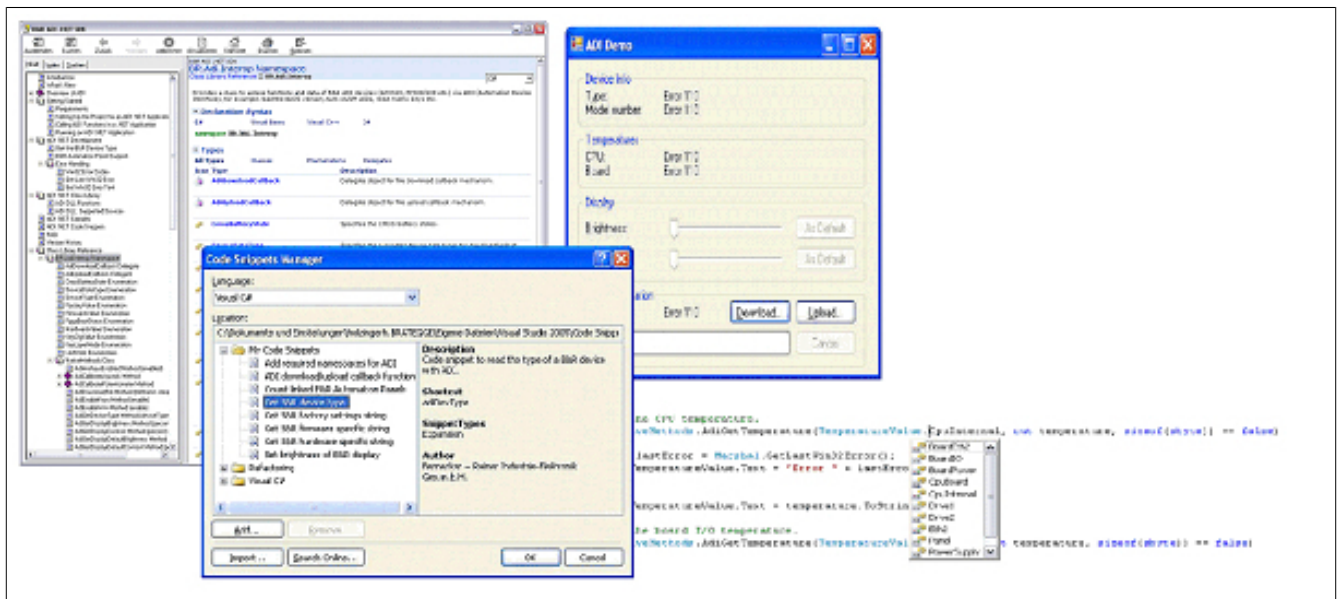


Image 118: ADI .NET SDK screenshots (Version 1.50)

Features:

- 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++, Visual C# and Visual J#.
- ADI DLL (for testing the applications, if no ADI drive is installed).

Supports following systems (Version 1.50 and higher):

- Automation PC 620
- Automation PC 810
- Automation PC 820
- 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

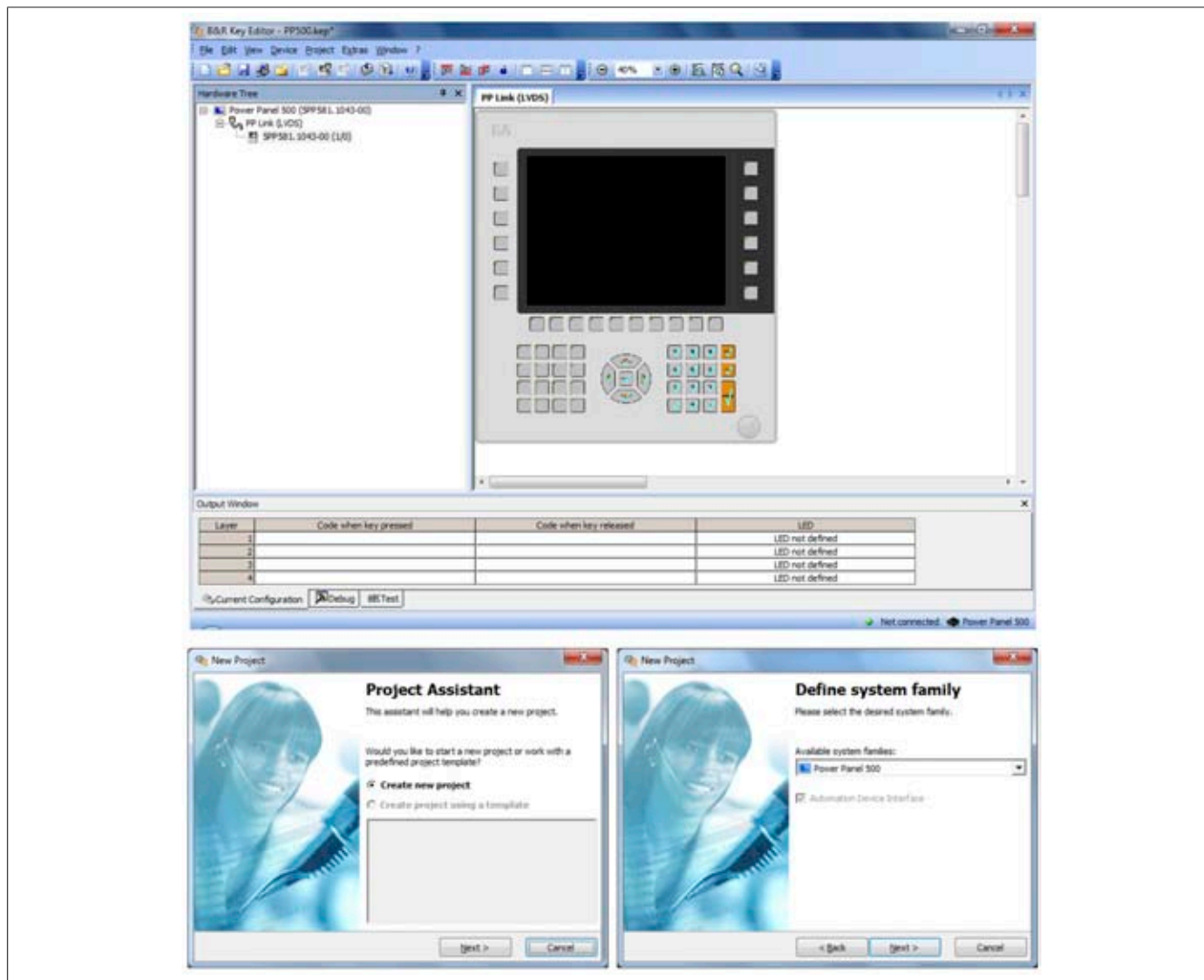
The ADI driver suitable for the device must be installed on the stated product series. The ADI driver is already included in the B&R images of embedded operating systems.

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

ADI .NET SDK is available in the Downloads area of the B&R website (www.br-automation.com).

12 B&R Key Editor

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



Features:

- Configuration of normal keys like on a keyboard (A, B, C, etc.)
- Keyboard shortcuts (CTRL+C, SHIFT+DEL, etc.) on one key
- Special key functions (change brightness, etc.)
- Assign functions to LEDs (HDD access, power, etc.)
- 4 assignments per key possible (using layer function)
- Configuration of panel locking time when multiple Automation Panel 900 devices are connected to Automation PC and Panel PC devices

Supports following systems (Version 3.20):

- Automation PC 510
- Automation PC 511
- Automation PC 620
- Automation PC 810
- Automation PC 820
- Automation Panel 800
- Automation Panel 900
- IPC2000, IPC2001, IPC2002
- IPC5000, IPC5600
- IPC5000C, IPC5600C

- Mobile Panel 40/50
- Mobile Panel 100/200
- Panel PC 300
- Panel PC 700
- Panel PC 800
- Power Panel 100/200
- Power Panel 300/400
- Power Panel 500

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

Chapter 5 • Standards and certifications

1 Applicable European Directives

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

2 Overview of standards

Standard	Description
EN 55011 Class A	Electromagnetic compatibility (EMC), radio disturbance product standard, industrial, scientific, and medical high-frequency devices (ISM devices), limit values and measurement procedure; group 1 (devices that do not create HF during material processing) and group 2 (devices that create HF during material processing)
EN 55022 Class A	Electromagnetic compatibility (EMC), radio disturbance characteristics, information technology equipment (ITE devices), limits and methods of measurement
EN 60060-2	High-voltage test techniques - part 2: Measuring systems
EN 60068-2-1	Environmental testing - part 2: Tests; test A: Dry cold
EN 60068-2-2	Environmental testing - part 2: Tests; test B: Dry heat
EN 60068-2-3	Environmental testing - part 2: Tests; test and guidance: Damp heat, constant
EN 60068-2-6	Environmental testing - part 2: Tests; test: Vibration (sinusoidal)
EN 60068-2-14	Environmental testing - part 2: Tests; test N: Change of temperature
EN 60068-2-27	Environmental testing - part 2: Tests; test and guidance: Shock
EN 60068-2-30	Environmental testing - part 2: Tests; test and guidance: Damp heat, cyclic
EN 60068-2-31	Environmental testing - part 2: Tests; test: Drop and topple, primarily for equipment-type specimens
EN 60068-2-32	Environmental testing - part 2: Tests; test: Free fall
EN 60204-1	Safety of machinery, electrical equipment on machines - part 1: General requirements
EN 60529	Degree of protection provided by enclosures (IP code)
EN 60664-1	Insulation coordination for equipment within low-voltage systems - part 1: Principles, requirements and tests
EN 60721-3-2	Classification of environmental conditions - part 3: Classification of groups of environmental parameters and their severities, section 2: Transport
EN 60721-3-3	Classification of environmental conditions - part 3: Classification of groups of environmental parameters and their severities, section 3: Stationary use at weather-protected locations
EN 61000-3-2	Electromagnetic compatibility (EMC) - part 3-2: Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)
EN 61000-3-3	Electromagnetic compatibility (EMC) - part 3-3: Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, equipment with rated current ≤ 16 A per phase, and not subject to conditional connection.
EN 61000-4-2	Electromagnetic compatibility (EMC) - part 4-2: Testing and measuring techniques; electrostatic discharge immunity test
EN 61000-4-3	Electromagnetic compatibility (EMC) - part 4-3: Testing and measuring techniques; radiated radio-frequency electromagnetic field immunity test
EN 61000-4-4	Electromagnetic compatibility (EMC) - part 4-4: Testing and measuring techniques; electrical fast transient/burst immunity test
EN 61000-4-5	Electromagnetic compatibility (EMC) - part 4-5: Testing and measuring techniques; surge immunity test
EN 61000-4-6	Electromagnetic compatibility (EMC) - part 4-6: Testing and measuring techniques; immunity to conducted disturbances, induced by radio-frequency fields
EN 61000-4-8	Electromagnetic compatibility (EMC) - part 4-8: Testing and measuring techniques; power frequency magnetic field immunity test
EN 61000-4-18	Electromagnetic compatibility (EMC) - part 4-18: Testing and measuring techniques; damped oscillatory waves immunity test
EN 61000-4-29	Electromagnetic compatibility (EMC) - part 4-29: Testing and measuring techniques; voltage dips, short interruptions and voltage variations on DC input power port immunity tests
EN 61000-6-2	Electromagnetic compatibility (EMC), generic immunity standard - part 2: Industrial environment
EN 61000-6-4	Electromagnetic compatibility (EMC), generic emission standard - part 2: Industrial environment
EN 61131-2	Product standard, programmable logic controllers - part 2: Equipment requirements and tests
Germanischer Lloyd 2003	Germanischer Lloyd 2003: Supplementary provisions and guidelines - Part 7: Guidelines for type testing
UL 508	Industrial control equipment (UL = Underwriters Laboratories)
47 CFR	Federal Communications Commission (FCC), 47 CFR Part 15 Subpart B Class A
VCCI V-3	Agreement of Voluntary Control Council for Interference by Information Technology Equipment; Class A
ICES 003	Devices that cause interference - Digital devices; Class A

Table 170: Overview of standards

3 Emission requirements

Emissions	Test carried out in accordance with	Limits in accordance with
Network-related emissions	EN 55011 / EN 55022	EN 61000-6-4: Generic standard (industrial areas) EN 55011: Industrial, scientific, and medical (ISM) radio-frequency equipment, class A (industrial areas) EN 55022: Information technology equipment (ITE devices), class A (industrial areas) EN 61131-2: Programmable logic controllers EN 50091-2: Uninterruptible power systems (UPS), class A 47 CFR Part 15 Subpart B Class A (FCC) Germanischer Lloyd 2003
Emissions, electromagnetic emissions	EN 55011 / EN 55022	EN 61000-6-4: Generic standard (industrial areas) EN 55011: Industrial, scientific, and medical (ISM) radio-frequency equipment, class A (industrial areas) EN 55022: Information technology equipment (ITE devices), class A (industrial areas) EN 61131-2: Programmable logic controllers EN 50091-2: Uninterruptible power systems (UPS), class A 47 CFR Part 15 Subpart B Class A (FCC) Germanischer Lloyd 2003
Harmonic current emissions for equipment with input current ≤ 16 A per line	EN 61000-3-2	EN 61000-3-2: Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)
Voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, equipment with rated current ≤ 16 A per phase, and not subject to conditional connection.	EN 61000-3-3	EN 61000-3-3: Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, equipment with rated current ≤ 16 A per phase, and not subject to conditional connection Class A/D

Table 171: Overview of limits and testing guidelines for emissions

3.1 Network-related emissions

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

Table 172: Test requirements - Network-related emissions for industrial areas

1) AC network connections only with EN 61131-2

3.2 Emissions, electromagnetic emissions

Tests in accordance with EN 55011 / EN 55022	Limit values in accordance with EN 61000-6-4	Limit values in accordance with EN 55011 Class A	Limit values in accordance with EN 55022 Class A
30 MHz - 230 MHz measured at a distance of 10 m	< 40 dB (µV/m) Quasi-peak value	< 40 dB (µV/m) Quasi-peak value	< 40 dB (µV/m) Quasi-peak value
230 MHz - 1 GHz measured at a distance of 10 m	< 47 dB (µV/m) Quasi-peak value	< 47 dB (µV/m) Quasi-peak value	< 47 dB (µV/m) Quasi-peak value
Tests in accordance with EN 55011 / EN 55022	Limit values in accordance with EN 61131-2	Limit values in accordance with EN 50091-2 class A	
30 MHz - 230 MHz measured at a distance of 10 m	< 40 dB (µV/m) Quasi-peak value	< 40 dB (µV/m) Quasi-peak value	
230 MHz - 1 GHz measured at a distance of 10 m	< 47 dB (µV/m) Quasi-peak value	< 47 dB (µV/m) Quasi-peak value	
Test carried out	Limits according to 47 CFR Part 15 Subpart B class A		
30 MHz - 88 MHz measured at a distance of 10 m	< 90 dB (µV/m) Quasi-peak value		
88 MHz - 216 MHz measured at a distance of 10 m	< 150 dB (µV/m) Quasi-peak value		
216 MHz - 960 MHz measured at a distance of 10 m	< 210 dB (µV/m) Quasi-peak value		
> 960 MHz measured at a distance of 10 m	< 300 dB (µV/m) Quasi-peak value		
Test carried out in accordance with CISPR 16-1, CISPR 16-2	Limit value in accordance with Germanischer Lloyd 2003		
150 kHz - 300 kHz measured at a distance of 3 m	< 80 dBµV/m - 52 dBµV/m quasi-peak value		
300 kHz - 30 MHz measured at a distance of 3 m	< 52 dBµV/m - 34 dBµV/m quasi-peak value		
30 MHz - 2 GHz measured at a distance of 3 m	< 54 dBµV/m quasi-peak value		
except for 156 MHz - 165 MHz measured at a distance of 3 m	< 24 dBµV/m quasi-peak value		

Table 173: Test requirements - Electromagnetic emissions for industrial areas

4 Requirements for immunity to disturbances

Immunity	Test carried out in accordance with	Limits in accordance with
Electrostatic discharge (ESD)	EN 61000-4-2	EN 61000-6-2: Generic standard (industrial areas) EN 61131-2: Programmable logic controllers Germanischer Lloyd 2003
Immunity to high-frequency electro-magnetic fields (HF field)	EN 61000-4-3	EN 61000-6-2: Generic standard (industrial areas) EN 61131-2: Programmable logic controllers Germanischer Lloyd 2003
Immunity to high-speed transient electrical disturbances (burst)	EN 61000-4-4	EN 61000-6-2: Generic standard (industrial areas) EN 61131-2: Programmable logic controllers Germanischer Lloyd 2003
Immunity to surge voltages	EN 61000-4-5	EN 61000-6-2: Generic standard (industrial areas) EN 61131-2: Programmable logic controllers Germanischer Lloyd 2003
Immunity to conducted disturbances	EN 61000-4-6	EN 61000-6-2: Generic standard (industrial areas) EN 61131-2: Programmable logic controllers Germanischer Lloyd 2003
Immunity against magnetic fields with electrical frequencies	EN 61000-4-8	EN 61000-6-2: Generic standard (industrial areas) EN 61131-2: Programmable logic controllers Germanischer Lloyd 2003
Immunity to damped oscillatory waves	EN 61000-4-18	EN 61131-2: Programmable logic controllers
Immunity to voltage fluctuations	EN 61000-4-29	EN 61131-2: Programmable logic controllers Germanischer Lloyd 2003
Immunity to voltage dips	EN 61000-4-29	EN 61131-2: Programmable logic controllers Germanischer Lloyd 2003
Immunity to supply voltage changes	EN 61131-2	EN 61131-2: Programmable logic controllers
Immunity to gradual shutdown/startup	EN 61131-2	EN 61131-2: Programmable logic controllers

Table 174: Overview of limits and testing guidelines for immunity

Evaluation criteria in accordance with EN 61000-6-2

Criteria A:

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

Criteria B:

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

Criteria C:

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

Criteria D:

Degradation or failure of functionality which can no longer be restored (operating equipment destroyed).

4.1 Electrostatic discharge (ESD)

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

Table 175: Test requirements - Electrostatic discharge (ESD)

4.2 High-frequency electromagnetic fields (HF field)

Tests in accordance with IEC 61000-4-3	Limit values in accordance with EN 61000-6-2	Limit values in accordance with IEC 61131-2	Limit value in accordance with Germanischer Lloyd 2003
Housing, completely wired	80 MHz - 1 GHz, 10 V/m, 80% amplitude modulation with 1 kHz, 3 seconds duration, criteria A	2 GHz - 2.7 GHz, 1 V/m, 14 GHz - 2 GHz, 3 V/m, 80 MHz - 1 GHz, 10 V/m, 80% amplitude modulation with 1 kHz, 3 second duration, criteria A	80 MHz - 2 GHz, 10V/m, 80% amplitude modulation with 1kHz, 1%/3sec, criteria A

Table 176: Test requirements - High-frequency electromagnetic fields (HF field)

4.3 High-speed transient elect. disturbance value (burst)

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

Table 177: Test requirements - High-speed transient electrical disturbances (burst)

1) For EN 55024 without length limitation.

4.4 Surge voltages (surge)

Tests in accordance with IEC 61000-4-5	Limit values in accordance with EN 61000-6-2	Limit values in accordance with IEC 61131-2	Limit values in accordance with Germanischer Lloyd 2003
AC power I/O, L to L	±1 kV, criteria B	±1 kV, criteria B	-
AC power I/O, L to PE	±2 kV, criteria B	±2 kV, criteria B	-
DC mains inputs/outputs, L+ to L-, >30 m	±1 kV, criteria B	±1 kV, criteria B	-
DC mains inputs/outputs, L to PE, >30 m	±2 kV, criteria B	±2 kV, criteria B	-
DC power inputs, L+ to L-	-	-	±0.5 kV, Kriterium A
DC power inputs, L to PE	-	-	±1 kV, Kriterium A
Signal connections >30 m	±1 kV, criteria B	±1 kV, criteria B	-
All shielded cables	±1 kV, criteria B	±1 kV, criteria B	-

Table 178: Test requirements - Surge voltages

4.5 Conducted disturbances

Tests in accordance with IEC 61000-4-6	Limit values in accordance with EN 61000-6-2	Limit values in accordance with IEC 61131-2	Limit value in accordance with Germanischer Lloyd 2003
AC mains inputs/outputs	150 kHz - 80 MHz, 10 V, 80% amplitude modulation with 1 kHz, 3 seconds duration, criteria A	150 kHz - 80 MHz, 3 V, 80% amplitude modulation with 1 kHz, 3 seconds duration, criteria A	150 kHz - 80 MHz, 10 V ¹⁾ 80% amplitude modulation with 1 kHz, 3 second duration, criteria A
DC mains inputs/outputs	150 kHz - 80 MHz, 10 V, 80% amplitude modulation with 1 kHz, 3 seconds duration, criteria A	150 kHz - 80 MHz, 3 V, 80% amplitude modulation with 1 kHz, 3 seconds duration, criteria A	150 kHz - 80 MHz, 10 V ¹⁾ 80% amplitude modulation with 1 kHz, 3 second duration, criteria A
Functional ground connection	150 kHz - 80 MHz, 10 V, 80% amplitude modulation with 1 kHz, 3 seconds duration, criteria A	150 kHz - 80 MHz, 3 V, 80% amplitude modulation with 1 kHz, 3 seconds duration, criteria A	150 kHz - 80 MHz, 10 V ¹⁾ 80% amplitude modulation with 1 kHz, 3 second duration, criteria A
Signal connections >3 m	150 kHz - 80 MHz, 10 V, 80% amplitude modulation with 1 kHz, 3 seconds duration, criteria A	150 kHz - 80 MHz, 3 V, 80% amplitude modulation with 1 kHz, 3 seconds duration, criteria A	150 kHz - 80 MHz, 10 V ¹⁾ 80% amplitude modulation with 1 kHz, 3 second duration, criteria A

Table 179: Test requirements - Conducted disturbances

1) Increase carrier signal voltage to 10Veff in accordance with IEC 60945 at following frequencies: 2MHz; 3MHz; 4MHz; 6,2 MHz; 8,2MHz; 12,6MHz; 16,5MHz; 18.8 MHz; 22MHz; 25MHz

4.6 Magnetic fields with electrical frequencies

Tests according to IEC 61000-4-8	Limit values according to EN 61000-6-2	Limit value according to IEC 61131-2	
Test direction x, test in the field of an induction coil 1m x 1m	30 A/m, criteria A	30 A/m, criteria A	
Test direction y, test in the field of an induction coil 1m x 1m	30 A/m, criteria A	30 A/m, criteria A	
Test direction z, test in the field of an induction coil 1m x 1m	30 A/m, criteria A	30 A/m, criteria A	

Table 180: Test requirements - Magnetic fields with electrical frequencies

4.7 Voltage fluctuations

Tests in accordance with IEC 61000-4-29	Limit values in accordance with IEC 61131-2	Limit value in accordance with Germanischer Lloyd 2003	
Power supply connections	30 min at 0.85 x U _e or 1.2 x U _e Constant ripple 0.05 x U _e	30 min at 0.75 x U _e or 1.3 x U _e	

Table 181: Test requirements - Voltage fluctuations

4.8 Voltage dips

Tests in accordance with IEC 61000-4-29	Limit values in accordance with IEC 61131-2	Limit value in accordance with Germanischer Lloyd 2003	
DC power inputs	20 interruptions for 10 ms (PS2)	3 interruptions for 30 s in 5 min	

Table 182: Test requirements - Voltage dips

4.9 Changed supply voltage

Tests in accordance with EN 61131-2	Limit values in accordance with IEC 61131-2		
Power supply connections	100% to 90% /60s - 90% to 100% /60s 100% to 0% /5s - 0% to 100% /5s		

Table 183: Test requirements - Changed supply voltage

4.10 Turning off and back on

Tests in accordance with EN 61131-2	Limit values in accordance with IEC 61131-2		
Supply voltage	100% to 0% /60s - 0% to 100% /60s		

Table 184: Test requirements - Turning off and back on

4.11 Damped oscillatory waves

Tests in accordance with IEC 61000-4-18	Limit values in accordance with IEC 61131-2		
Mains inputs/outputs, L to L	±1 kV, 1 MHz, repeat rate 400/sec, length 2 sec, connection lengths 2 m, criteria B		
Power I/O, L to PE	±2.5 kV, 1 MHz, repeat rate 400/sec, length 2 sec, connection lengths 2 m, criteria B		

Table 185: Test requirements - Damped oscillatory waves

5 Mechanical conditions

Vibration	Test carried out in accordance with	Limits in accordance with
Vibration operation	EN 60068-2-6	EN 61131-2: Programmable logic controllers EN 60721-3-3 class 3M4
Vibration during transport (packaged)	EN 60068-2-6	EN 60721-3-2 class 2M1 EN 60721-3-2 class 2M2 EN 60721-3-2 class 2M3
Shock during operation	EN 60068-2-27	EN 61131-2: Programmable logic controllers EN 60721-3-3 class 3M4
Shock during transport (packaged)	EN 60068-2-27	EN 60721-3-2 class 2M1 EN 60721-3-2 class 2M2 EN 60721-3-2 class 2M3
Toppling (packaged)	EN 60068-2-31	EN 60721-3-2 class 2M1 EN 60721-3-2 class 2M2 EN 60721-3-2 class 2M3
Free fall (packaged)	EN 60068-2-32	EN 61131-2: Programmable logic controllers

Table 186: Overview of limits and testing guidelines for vibration

5.1 Vibration operation

Tests in accordance with IEC 60068-2-6	Limit values in accordance with IEC 61131-2		Limit values in accordance with EN 60721-3-3 Class 3M4		
Vibration during operation: Uninterrupted duty with moveable frequency in all 3 axes (x, y, z), 1 octave per minute	10 sweeps for each axis		10 sweeps for each axis		
	Frequency	Limit value	Frequency	Limit value	
	5 - 9 Hz	Amplitude 3.5 mm	2 - 9 Hz	Amplitude 3 mm	
	9 - 150 Hz	Acceleration 1 g	9 - 200 Hz	Acceleration 1 g	

Table 187: Test requirements - Vibration during operation

5.2 Vibration during transport (packaged)

Tests in accordance with IEC 60068-2-6	Limit values in accordance with EN 60721-3-2 Class 2M1		Limit values in accordance with EN 60721-3-2 Class 2M2		Limit values in accordance with EN 60721-3-2 Class 2M3	
Vibration during transport: Uninterrupted duty with moveable frequency in all 3 axes (x, y, z)	10 sweeps for each axis, packaged		10 sweeps for each axis, packaged		10 sweeps for each axis, packaged	
	Frequency	Limit value	Frequency	Limit value	Frequency	Limit value
	2 - 9 Hz	Amplitude 3.5 mm	2 - 9 Hz	Amplitude 3.5 mm	2 - 8 Hz	Amplitude 7.5 mm
	9 - 200 Hz	Acceleration 1 g	9 - 200 Hz	Acceleration 1 g	8 - 200 Hz	Acceleration 2 g
	200 - 500 Hz	Acceleration 15 g	200 - 500 Hz	Acceleration 15 g	200 - 500 Hz	Acceleration 4 g

Table 188: Test requirements - Vibration during transport (packaged)

5.3 Shock during operation

Tests in accordance with IEC 60068-2-27	Limit values in accordance with IEC 61131-2	Limit values in accordance with EN 60721-3-3 Class 3M4	
Shock during operation: Pulse (half-sine) stress in all 3 axes (x, y, z)	Acceleration 15 g, Duration 11 ms, 18 shocks	Acceleration 10 g, Duration 11 ms	

Table 189: Test requirements - Shock during operation

5.4 Shock during transport (packaged)

Tests in accordance with IEC 60068-2-27	Limit values in accordance with EN 60721-3-2 Class 2M1	Limit values in accordance with EN 60721-3-2 Class 2M2
Pulse (half-sine) stress in all 3 axes (x, y, z)	Acceleration 10 g, Duration 11 ms, each 3 shocks, packaged	Acceleration 30 g, Duration 6 ms, each 3 shocks, packaged

Table 190: Test requirements - Shock during transport

5.5 Toppling

Tests according to IEC 60068-2-31	Limit values according to EN 60721-3-2 Class 2M1		Limit values according to EN 60721-3-2 Class 2M2		Limit values according to EN 60721-3-2 Class 2M3	
Drop and topple	Devices: Drop/topple on each edge. packaged		Devices: Drop/topple on each edge. packaged		Devices: Drop/topple on each edge. packaged	
	Weight	Required	Weight	Required	Weight	Required
	< 20 kg	Yes	< 20 kg	Yes	< 20 kg	Yes
	20 - 100 kg	-	20 - 100 kg	Yes	20 - 100 kg	Yes
	> 100 kg	-	> 100 kg	-	> 100 kg	Yes

Table 191: Test requirements - Toppling

5.6 Free fall (packaged)

Tests in accordance with IEC 60068-2-32	Limit values in accordance with IEC 61131-2		Limit values in accordance with EN 60721-3-2 Class 2M1		Limit values in accordance with EN 60721-3-2 Class 2M2	
Free fall	Devices with delivery packaging each with 5 fall tests		Devices packaged		Devices packaged	
	Weight	Height	Weight	Height	Weight	Height
	< 10 kg	1.0 m	< 20 kg	0.25 m	< 20 kg	1.2 m
	10 - 40 kg	0.5 m	20 - 100 kg	0.25 m	20 - 100 kg	1.0 m
	> 40 kg	0.25 m	> 100 kg	0.1 m	> 100 kg	0.25 m
	Devices with product packaging each with 5 fall tests					
	Weight	Height				
	< 10 kg	0.3 m				
	10 - 40 kg	0.3 m				
	> 40 kg	0.25 m				

Table 192: Test requirements - Free fall

6 Climate conditions

Temperature and humidity	Test carried out in accordance with	Limits in accordance with
Worst case operation	UL 508	UL 508: Industrial control equipment
Dry heat	EN 60068-2-2	EN 61131-2: Programmable logic controllers
Dry cold	EN 60068-2-1	EN 61131-2: Programmable logic controllers
Large temperature fluctuations	EN 60068-2-14	EN 61131-2: Programmable logic controllers
Temperature fluctuations in operation	EN 60068-2-14	EN 61131-2: Programmable logic controllers
Humid heat, cyclic	EN 60068-2-30	EN 61131-2: Programmable logic controllers
Constant humid heat (storage)	EN 60068-2-3	EN 61131-2: Programmable logic controllers

Table 193: Overview of limits and testing guidelines for temperature and humidity

6.1 Worst case operation

Tests according to UL 508	Limit values according to UL 508	Limit values in accordance with IEC 61131-2	
Worst case during operation. Operation of the device with the max. ambient temperature specified in the data sheet at the max. specified load	3 hours at max. ambient temperature (min. +40°C) duration approx. 5 hours	3 hours at max. ambient temperature (min. +40°C) duration approx. 5 hours	

Table 194: Test requirements - Worst case during operation

6.2 Dry heat

Tests in accordance with IEC 60068-2-2	Limit values in accordance with IEC 61131-2		
Dry heat	16 hours at +70°C for 1 cycle, then 1 hour acclimatization and function testing, duration approximately 17 hours		

Table 195: Test requirements - Dry heat

6.3 Dry cold

Tests in accordance with IEC 60068-2-1	Limit values in accordance with IEC 61131-2		
Dry cold	16 hours at -40°C for 1 cycle, then 1 hour acclimatization and function testing, duration approximately 17 hours		

Table 196: Test requirements - Dry cold

6.4 Large temperature fluctuations

Tests in accordance with IEC 60068-2-14	Limit values in accordance with IEC 61131-2		
Large temperature fluctuations	3 hours at -40°C and 3 hours at +70°C, 5 cycles, then 2 hours acclimatization and function testing, duration approximately 14 hours		

Table 197: Test requirements - Large temperature fluctuations

6.5 Temperature fluctuations in operation

Tests in accordance with IEC 60068-2-14	Limit values in accordance with IEC 61131-2		
Open devices: These can also have a housing and are installed in control cabinets	3 hours at +5°C and 3 hours at 55°C, 5 cycles, temperature gradient 3°C / min, the unit is occasionally supplied with voltage during testing, duration approximately 30 hours		
Closed devices: These are devices whose data sheet specifies a surrounding housing (enclosure) with appropriate safety precautions	3 hours at +5°C and 3 hours at +55°C, 5 cycles, temperature gradient 3°C / min, the unit is occasionally supplied with voltage during testing, duration approximately 30 hours		

Table 198: Test requirements - Temperature fluctuations during operation

6.6 Humid heat, cyclic

Tests in accordance with IEC 60068-2-30	Limit values in accordance with IEC 61131-2		
Alternating climate	24 hours at +25°C / +55°C and 97% / 83% RH, 2 cycles, then 2 hours acclimatization, function testing and insulation, duration approximately 50 hours		

Table 199: Test requirements - Humid heat, cyclic

6.7 Humid heat, constant (Storage)

Tests in accordance with IEC 60068-2-3	Limit values in accordance with IEC 61131-2		
Constant humid heat (storage)	48 hours at +40°C and 92.5% RH, then insulation test within 3 hours, duration approximately 49 hours		

Table 200: Test requirements - Humid heat, constant (storage)

7 Safety

Safety	Test carried out according to	Limits according to
Ground resistance	EN 61131-2	EN 60204-1: Electrical equipment of machines EN 61131-2: Programmable logic controllers
Insulation resistance		EN 60204-1: Electrical equipment of machines
High voltage	EN 60060-1	EN 61131-2: Programmable logic controllers UL 508: Industrial control equipment
Residual voltage	EN 61131-2	EN 60204-1: Electrical equipment of machines EN 61131-2: Programmable logic controllers
Leakage current		VDE 0701-1: Service, changes and testing of electrical devices
Overload	UL 508	EN 61131-2: Programmable logic controllers UL 508: Industrial control equipment
Simulation component defect	UL 508	EN 61131-2: Programmable logic controllers UL 508: Industrial control equipment

Table 201: Overview of limits and testing guidelines for safety

7.1 Ground resistance

Tests according to EN 61131-2	Limit values in accordance with IEC 60204-1		Limit value according to IEC 61131-2
Ground resistance: housing (from any metal part to the ground terminal)	Smallest effective cross section of the protective ground conductor for the branch being tested	Maximum measured voltage drop at a test current of 10 A	Test current 30 A for 2 min, < 0.1 Ω
	1.0 mm ²	3.3 V	
	1.5 mm ²	2.6 V	
	2.5 mm ²	1.9 V	
	4.0 mm ²	1.4 V	
	> 6.0 mm ²	1.0 V	

Table 202: Test requirements - Ground resistance

7.2 Insulation resistance

Test carried out	Limit values in accordance with IEC 60204-1		
Insulation resistance: main circuits to protective ground conductor	> 1 MΩ at 500 VDC		

Table 203: Test requirements - Insulation resistance

7.3 High voltage

Tests according to EN 60060-1	Limit values in accordance with IEC 61131-2				Limit values according to UL 508		
High voltage: Primary circuit to secondary circuit and to protective ground circuit (transformers, coils, varistors, capacitors and components used to protect against over-voltage can be removed before the test)	Input voltage	Test voltage			Input voltage	Test voltage	
		1.2/50 μs peak voltage surge	AC, 1 min	DC, 1 min		AC, 1 min	AC, 1 min
	0 - 50 VAC 0 - 60 VDC	850 V	510 V	720 V	≤ 50 V	500 V	707 V
	50 - 100 VAC 60 - 100 VDC	1360 V	740 V	1050 V	>50 V	1000 V + 2 x U _N	(1000 V + 2 x U _N) x 1.414
	100 - 150 VAC 100 - 150 VDC	2550 V	1400 V	1950 V			
	150 - 300 VAC 150 - 300 VDC	4250 V	2300 V	3250 V			
	300 - 600 VAC 300 - 600 VDC	6800 V	3700 V	5250 V			
	600 - 1000 VAC 600 - 1000 VDC	10200 V	5550 V	7850 V			

Table 204: Test requirements - High voltage

7.4 Residual voltage

Tests according to EN 61131-2	Limit value according to IEC 60204-1	Limit value according to IEC 61131-2	
Residual voltage after switching off	< 60 V after 5 sec (active parts) < 60 V after 1 sec (plug pins)	< 60 V after 5 sec (active parts) < 60 V after 1 sec (plug pins)	

Table 205: Test requirements - Residual voltage

7.5 Leakage current

Test carried out	Limit value according to VDE 0701-1		
Leakage current: Phase to ground	< 3.5 mA		

Table 206: Test requirements - Leakage current

7.6 Overload

Tests according to UL 508	Limit value according to IEC 61131-2	Limit values according to UL 508	
Overload of transistor outputs	50 switches, 1.5 I _N , 1 sec ON / 9 sec OFF	50 switches, 1.5 I _N , 1 sec ON / 9 sec OFF	

Table 207: Test requirements - Overload

7.7 Defective component

Tests according to UL 508	Limit value according to IEC 61131-2	Limit values according to UL 508	
Simulation of how components in power supply became defective	Non-flammable surrounding cloth No contact with conductive parts	Non-flammable surrounding cloth No contact with conductive parts	

Table 208: Test requirements - Defective component

8 Other tests

Other tests	Test carried out in accordance with	Limits in accordance with
Protection	-	EN 60529: Degree of protection provided by enclosures (IP code)
Degree of pollution	-	EN 60664-1: Insulation coordination for equipment within low-voltage systems - part 1: Principles, requirements and tests

Table 209: Overview of limits and testing guidelines for other tests

8.1 Protection

Test carried out in accordance with	Limit values in accordance with EN 60529	Limit values in accordance with EN 60529	
Protection of the operating equipment	IP2. Protection against large solid foreign bodies ≥ 12.5 mm diameter	IP6. No penetration of dust -> Dust-proof	
Protection of personnel	IP2. Protection against touching dangerous parts with fingers	IP6. Protection against touching dangerous parts with conductor	
Protection against water permeation with damaging consequences	IP0. Not protected	IP5. Protection against water jets	

Table 210: Test requirements - Protection

9 International certifications

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

Certifications	
USA and Canada 	All important B&R products are tested and listed by Underwriters Laboratories and checked quarterly by a UL inspector. This mark is valid for the USA and Canada and simplifies certification of your machines and systems in these areas.
Europe 	All harmonized EN standards for the applicable directives are met.

Table 211: International certifications

Chapter 6 • Accessories

The following accessories have passed B&R's functional testing and are approved for use with this device. However, it is important to observe any limitations that apply to the overall device when operated with different components. When operating the overall device, all of 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

The lithium battery is needed for buffering the BIOS CMOS data and real-time clock (RTC).

The battery is subject to wear and must be replaced when the battery power ("Bad" status) is insufficient.

1.1.2 Order data

Model number	Short description	Figure
	Batteries	
0AC201.91	Lithium batteries 4 pcs., 3 V / 950 mAh button cell We hereby state 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 212: 0AC201.91, 4A0006.00-000 - Order data

1.1.3 Technical data

Warning!

Replace battery with Renata, type CR2477N only. Use of another battery may present a risk of fire or explosion.

Battery may explode if mistreated. Do not recharge, disassemble or dispose of in fire.

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate those specified for the entire device. For the entire device where this accessory is installed, refer to the data provided specifically for the entire device.

Product ID	0AC201.91	4A0006.00-000
General information		
Storage time	Max. 3 years at 30°C	
Electrical properties		
Capacity	950 mAh	
Self discharging	<1% per year (at 23°C)	
Voltage range	3V	
Environmental conditions		
Temperature	-20 to 60°C	
Storage		
Relative humidity	0 to 95%	
Operation		
Storage		
Transport		

Table 213: 0AC201.91, 4A0006.00-000 - Technical data

2 Supply voltage connectors

2.1 0TB103.9x

2.1.1 General information

The single row 3-pin terminal block TB103 is used to connect the supply voltage.

2.1.2 Order data

Model number	Short description	Figure
Terminal blocks		
0TB103.9	Connector, 24 VDC, 3-pin female, screw clamps 3.31 mm ² , protected against vibration by the screw flange	
0TB103.91	Connector, 24 VDC, 3-pin female, cage clamps 3.31 mm ² , protected against vibration by the screw flange	

Table 214: 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 those specified for the entire device. For the entire device where this accessory is installed, refer to the data provided specifically for the entire device.

Product ID	0TB103.9	0TB103.91
Terminal block		
Note	Protected against vibration by the screw flange Rated values according to UL	
Number of pins	3 (female)	
Type of terminal	Screw clamps	Cage clamps ²⁾
Cable type	Copper wires only (no aluminum wires!)	
Distance between contacts	5.08 mm	
Connection cross section		
AWG wire	26 to 12 AWG	
Wire tip sleeves with plastic covering	0.20 to 1.50 mm ²	
Solid wire line	0.20 to 2.50 mm ²	
Fine wire line	0.20 to 1.50 mm ²	0.20 to 2.50 mm ²
With wire tip sleeves	0.20 to 1.50 mm ²	
Mounting torque	0.4 Nm	-
Electrical properties		
Rated voltage	300 V	
Rated current ¹⁾	10 A / contact	
Contact resistance	≤ 5 mΩ	

Table 215: 0TB103.9, 0TB103.91 - Technical data

- 1) Please take the respective limit data for the I/O modules into consideration!
- 2) The terminal block in the cage clamp design cannot be strung 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 216: 5AC900.1000-00 - Order data

4 USB port cap

4.1 5AC900.1201-00

4.1.1 General information

Front side, flat USB port cap for Automation Panel 900, Power Panel 500 and Panel PC 700 and Panel PC 800 devices.

4.1.2 Order data

Model number	Short description	Figure
	Accessories	
5AC900.1201-00	USB Cover M20 IP65 flat	

Table 217: 5AC900.1201-00 - Order data

4.2 5AC900.1201-01

4.2.1 General information

Front side, rounded, knurled USB port cap (attached) for Automation Panel 900, Power Panel 500 and Panel PC 700 and Panel PC 800 devices.

4.2.2 Order data

Model number	Short description	Figure
	Accessories	
5AC900.1201-01	USB Cover M20 IP65 raised	

Table 218: 5AC900.1201-01 - Order data

5 Clamping blocks

5.1 5AC900.BLOC-00

5.1.1 General information

These replacement clips are used to fasten B&R panel devices.

5.1.2 Order data

Model number	Short description	Figure
Accessories		
5AC900.BLOC-00	Mounting block with wings 10pcs Spare part.	

Table 219: 5AC900.BLOC-00 - Order data

6 Uninterruptible power supply (UPS)

With an optionally integrated UPS, the B&R Industrial PC makes sure that the PC system completes write operations even after 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 ended 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 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 homepage.**

By integrating the charging circuit in the housing of the B&R Industrial PC, the 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. The batteries are easily accessible from the front and can be switched in just a few moments when servicing.

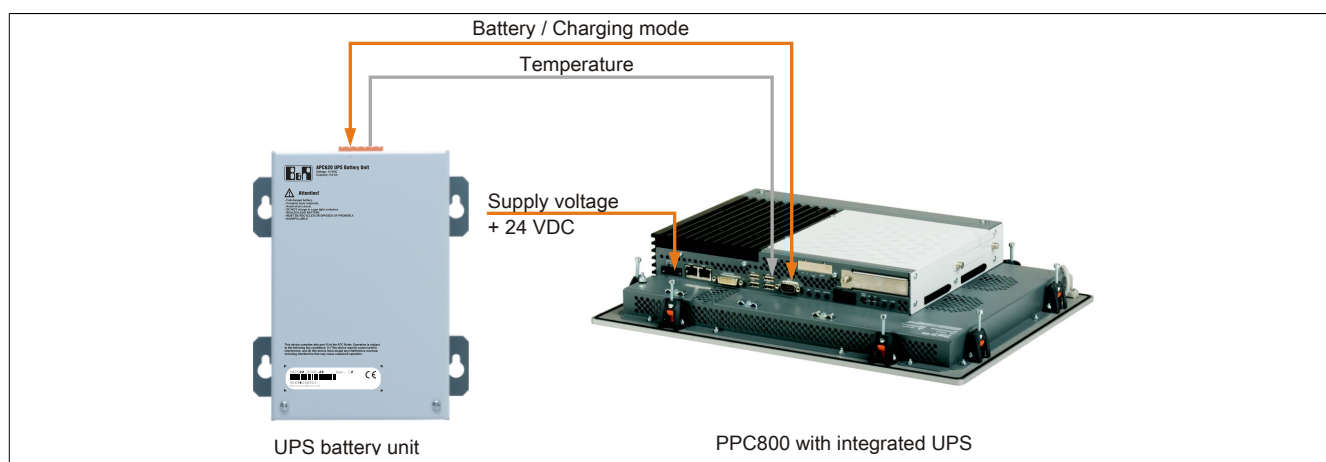


Image 119: UPS principle

6.1 Uninterruptible power supply

With an optionally integrated UPS, the B&R Industrial PC makes sure that the PC system completes write operations even after 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 ended 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 monitor is not buffered by the UPS and will shut off when the power fails.**
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By integrating the charging circuit in the housing of the B&R Industrial PC, the 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. The batteries are easily accessible from the front and can be switched in just a few moments when servicing.

6.1.1 Features

- Long-lasting, maintenance-free rechargeable batteries
- Communication via integrated interfaces
- Temperature sensor
- Driver software
- Deep discharge protection

6.1.2 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.

6.1.3 5AC600.UPSI-00

General information

The add-on UPS module can easily be installed in an appropriate system unit (List of required revisions: see section 6.1.2 "Requirements" on page 232).

Order data

Model number	Short description	Figure
5AC600.UPSI-00	Uninterruptible power supply 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 220: 5AC600.UPSI-00 - Order data

Technical data

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate those specified for the entire device. For the entire device where this accessory is installed, refer to the data provided specifically for the entire device.

Product ID	5AC600.UPSI-00
General information	
Certification types	
CE	Yes
c-UL-us	Yes
Electrical properties	
Power consumption	Max. 7.5 watts
Power failure bypass	Max. 20 min with 150 W load
Deep discharge protection	Yes, at 10 V on the battery unit
Short circuit protection	No
Battery charging rating	
Charging current	Max. 0.5 A
Switching threshold	
Battery operation	13 V
Mains operation	15 V

Table 221: 5AC600.UPSI-00 - Technical data

Installation

The module is installed using the materials included in the delivery.

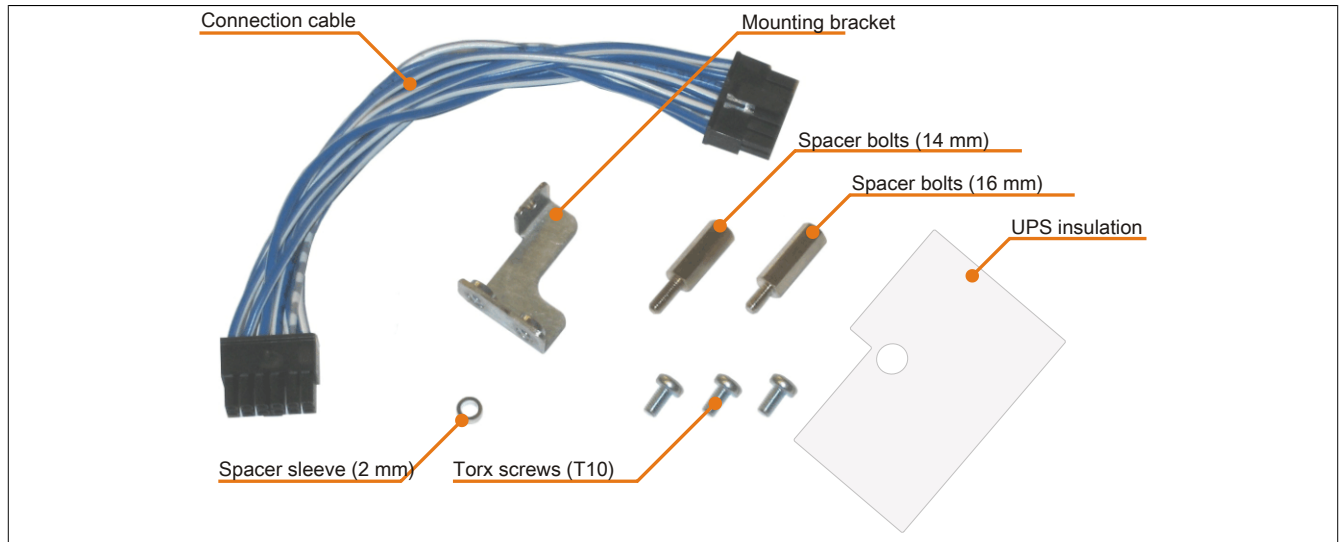


Image 120: 5AC600.UPS1-00 Add-on UPS module - Installation materials

6.1.4 5AC600.UPSB-00

General information

The battery unit is subject to wear and should be replaced regularly (at least following the specified lifespan).

Order data

Model number	Short description	Figure
5AC600.UPSB-00	Uninterruptible power supply Battery unit 5Ah; for APC620, APC810 or PPC800 UPS.	

Table 222: 5AC600.UPSB-00 - Order data

Technical data

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate those specified for the entire device. For the entire device where this accessory is installed, refer to the data provided specifically for the entire device.

Product ID	5AC600.UPSB-00
General information	
Battery	
Type	Energys Cyclon 12 V 5 Ah (6 connected in series)
Lifespan	10 years ¹⁾
Design	Single cell
Temperature sensor	NTC resistance
Maintenance interval during storage	Charge once every 6 months
Certification types	
CE	Yes
c-UL-us	Yes
Charge duration when battery low	Typ. 15 hours
Electrical properties	
Rated voltage	12 V
Battery current	Max. 8 A
Capacity	5 Ah
Deep discharge voltage	10 V
Environmental conditions	
Temperature	
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
Mechanical characteristics	
Dimensions	
Width	104 mm ²⁾
Length	170.5 mm
Height	87.5 mm
Weight	Approx. 3200 g

Table 223: 5AC600.UPSB-00 - Technical data

1) At 25°C (up to 80% battery capacity)

2) Dimensions without mounting clips

Temperature life span diagram up to 20% battery capacity.

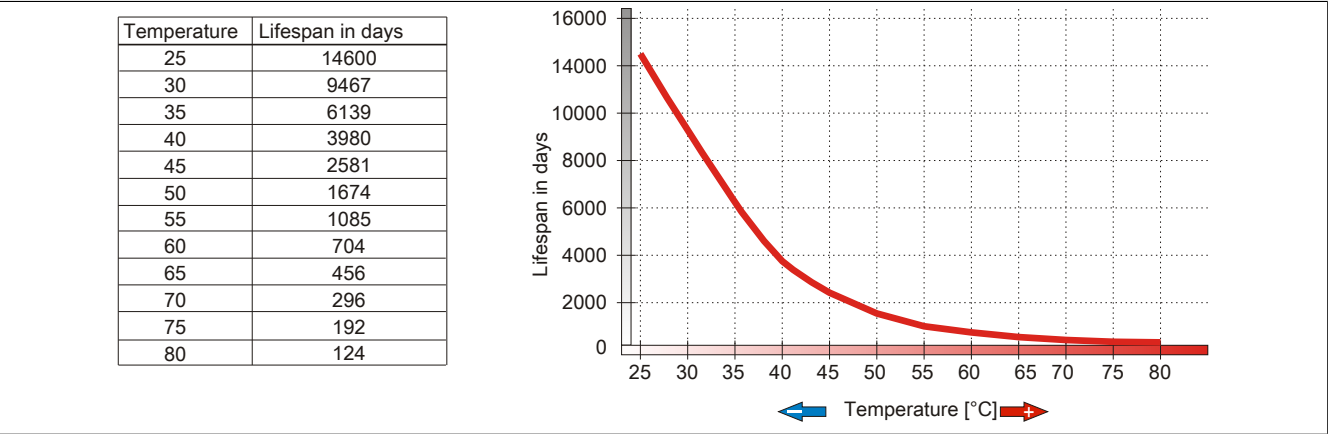


Image 121: Temperature life span diagram

Deep discharge cycles

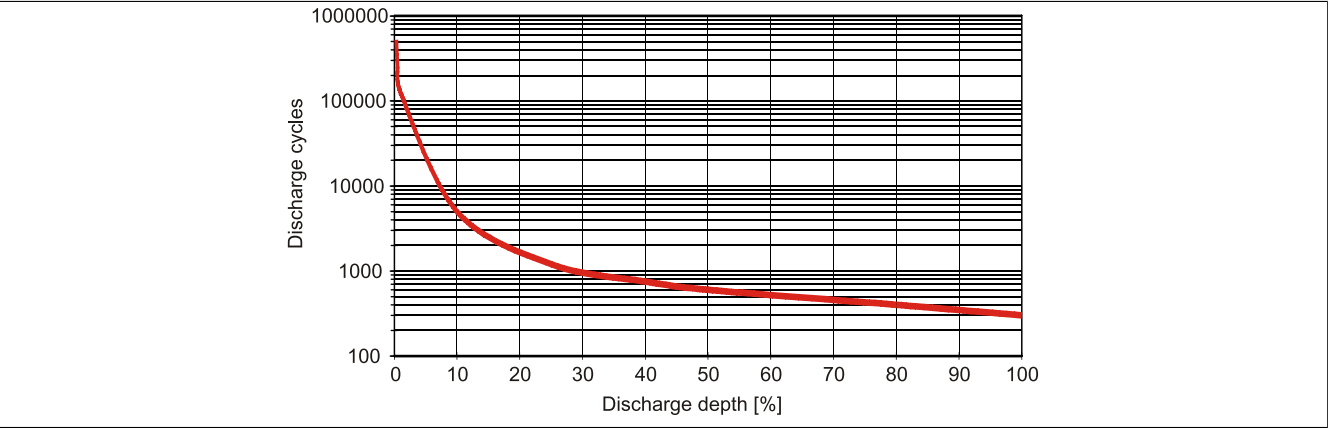


Image 122: Deep discharge cycles

Dimensions

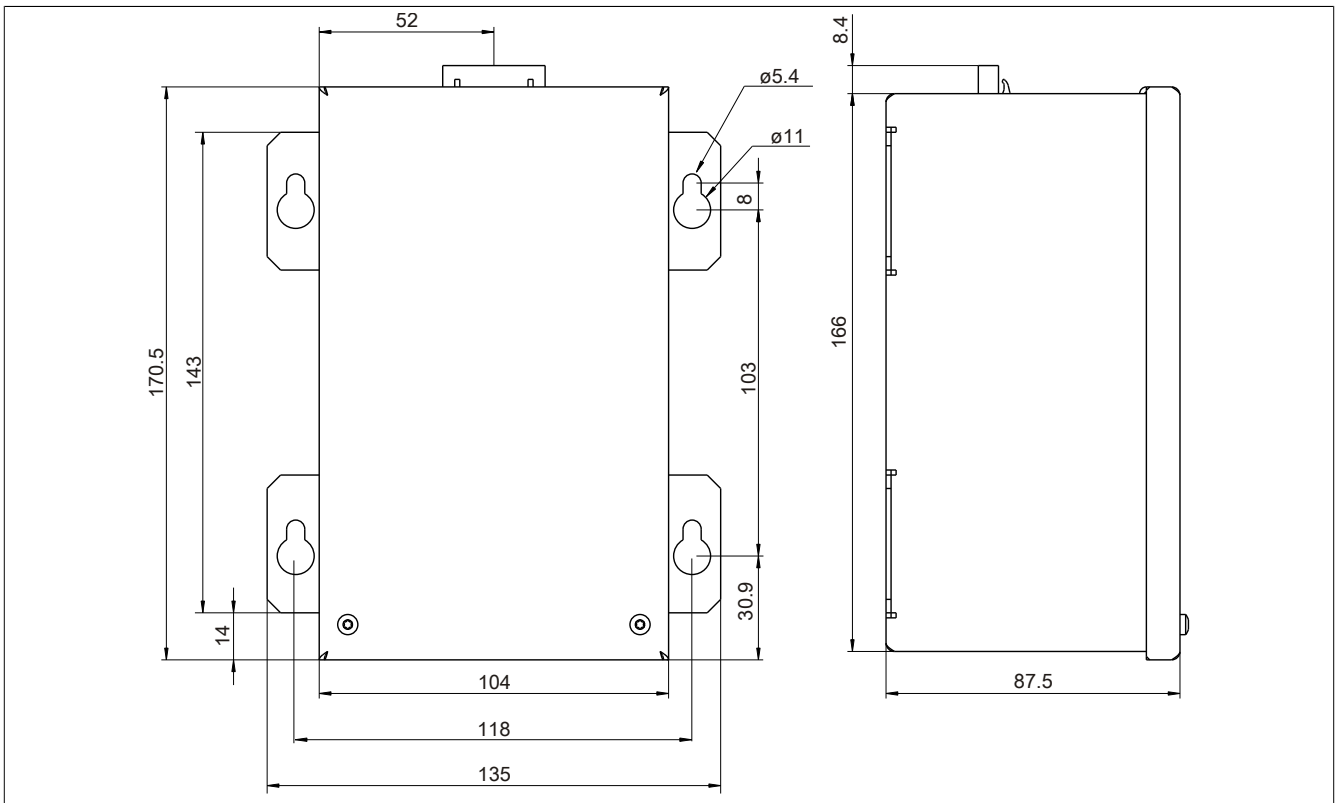


Image 123: 5PC600.UPSB-00 - Dimensions

Drilling template

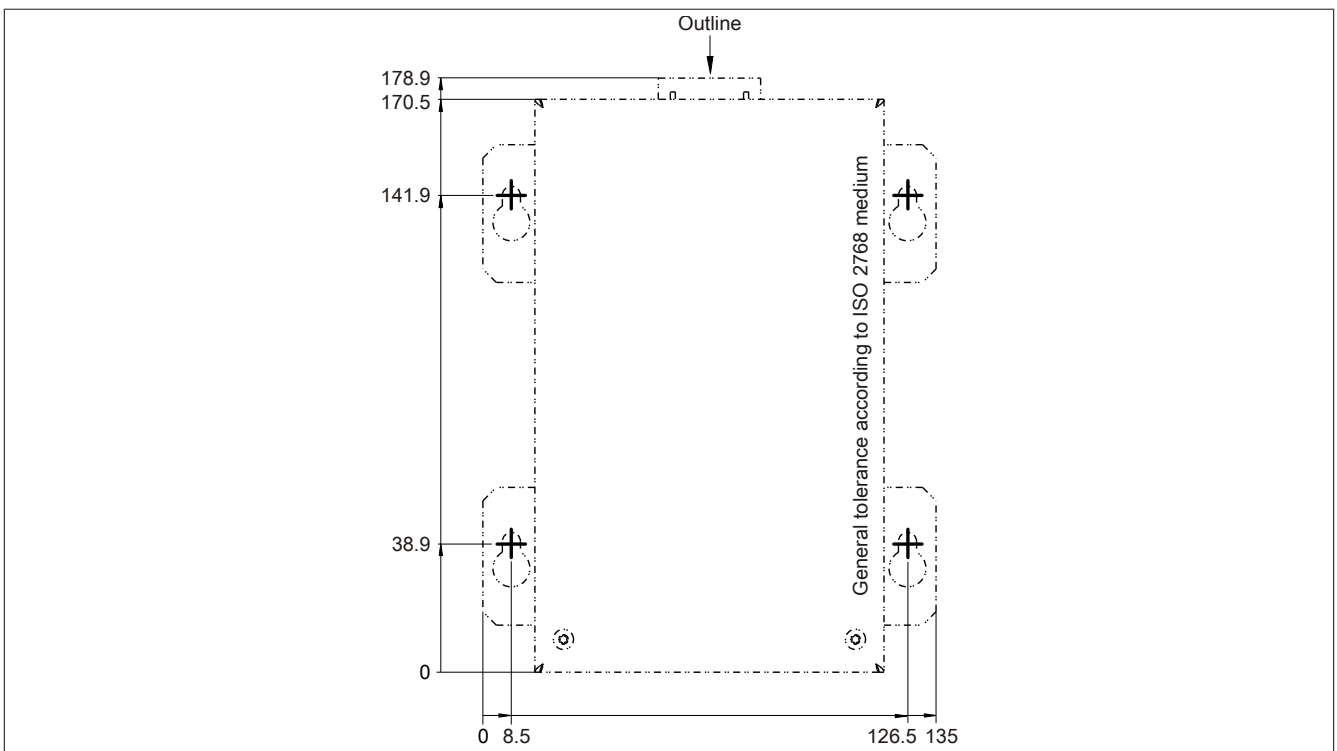


Image 124: 5PC600.UPSB-00 - Drilling template

Mounting instructions

Due to the unique construction of these batteries, they can be stored and operated in any position.

6.1.5 5CAUPS.00xx-00

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.

Order data

Model number	Short description	Figure
	Uninterruptible power supplies	
5CAUPS.0005-00	UPS cable 0.5 m; for USV 5AC600.UPSI-00.	
5CAUPS.0030-00	UPS cable 3 m; for USV 5AC600.UPSI-00.	

Table 224: 5CAUPS.0005-00, 5CAUPS.0030-00 - Order data

Technical data

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate those specified for the entire device. For the entire device where this accessory is installed, refer to the data provided specifically for the entire device.

Product ID	5CAUPS.0005-00	5CAUPS.0030-00
General information		
Certification types CE c-UL-us	Yes Yes	
Cable structure		
Wire cross section	-	2x 0.5 mm² (AWG 20) 4x 2.5 mm² (AWG 13)
Conductor resistance	-	At 0.5 mm² 0.5 max. 39 Ω/km At 2.5 mm² max. 7.98 Ω/km
Outer sheathing Material Color	- -	Thermoplastic PVC-based material Window gray (similar to RAL 7040)
Supply lines Conductor resistance	At 0.5 mm² 0.5 max. 39 Ω/km At 2.5 mm² max. 7.98 Ω/km	-
Connector		
Type	6-pin plug connectors, tension clamp connection / 6-pin socket connectors, tension clamp connection	
Electrical properties		
Operating voltage	Max. 300 V	
Peak operating voltage	12 VDC	
Test voltage Wire/wire	-	1500 V
Current load	10 A at 20°C	
Environmental conditions		
Temperature Moving Static	-5 to 80°C -30 to 80°C	
Mechanical characteristics		
Dimensions Length Diameter	0.5 m 8.5 mm ± 0.2 mm	3 m
Flex radius Moving Fixed installation	10x wire cross-section 5x wire cross-section	
Weight	Approx. 100 g	Approx. 470 g

Table 225: 5CAUPS.0005-00, 5CAUPS.0030-00 - Technical data

7 External UPS

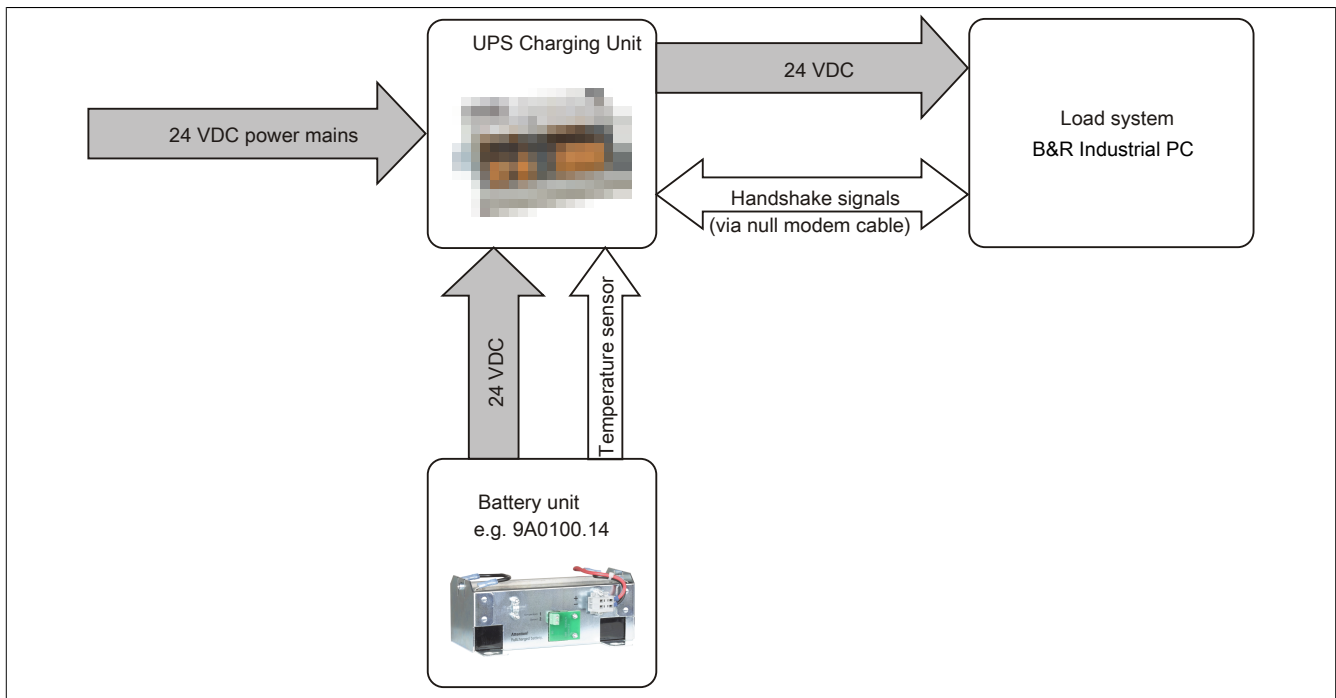


Image 125: Block diagram of the entire system

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 concerning an 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 (spare 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 (spare 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 (spare part), 2x 12 V, 4.5 Ah, for battery unit 9A0100.16	
Mandatory 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		
Miscellaneous		
5SWHMI.0000-00	HMI Drivers & Utilities DVD	
Replacement batteries		

Table 226: 9A0100.11, 9A0100.12, 9A0100.13, 9A0100.14, 9A0100.15, 9A0100.16, 9A0100.17 - Order data

Model number	Short description	Figure
9A0100.13	UPS batteries type A (spare part), 2x 12 V, 7 Ah, for battery unit 9A0100.12	
9A0100.15	UPS batteries type B (spare part), 2x 12 V, 2.2 Ah, for battery unit 9A0100.14	
9A0100.17	UPS batteries type C (spare part), 2x 12 V, 4.5 Ah, for battery unit 9A0100.16	

Table 226: 9A0100.11, 9A0100.12, 9A0100.13, 9A0100.14, 9A0100.15, 9A0100.16, 9A0100.17 - Order data

8 PCI Plug-in cardn

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)

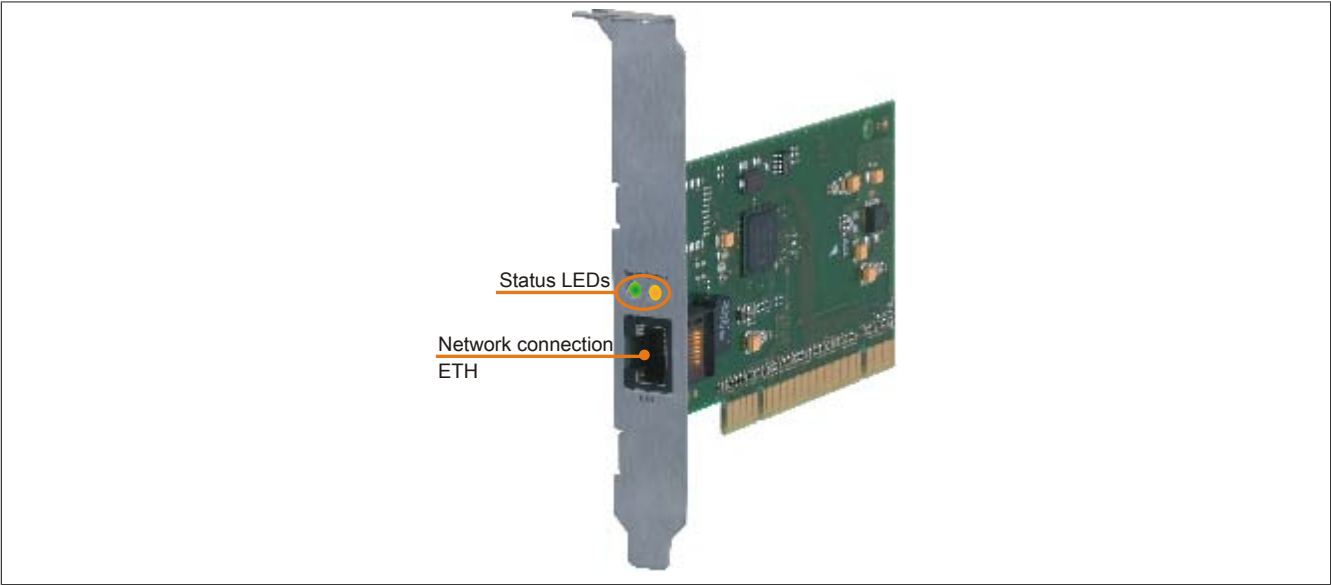


Image 126: Order data - PCI Ethernet Card 10/100

8.1.2 Order data

Model number	Short description	Figure
Accessories		
5ACPCI.ETH1-01	PCI Ethernet Card 1 x 10/100	

Table 227: 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, with status LED
Certification types	
CE	Yes
Interfaces	
Ethernet	
Amount	1

Table 228: 5ACPCI.ETH1-01 - Technical data

Product ID	5ACPCI.ETH1-01
Controllers	Intel 82551ER
Design	Shielded RJ45 port
Transfer rate	10/100 Mbit/s
Cable length	Max. 100 m between two stations (segment length)

Table 228: 5ACPCI.ETH1-01 - Technical data

Ethernet interface

Information:

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

Ethernet connection		
Controller	Intel 82551ER	
Power supply	Universal card (2 notches) for 3.3 V or 5 V	
Cabling	S/STP (Cat5e)	
Transfer rate	10/100 MBit/s	
Cable length	max. 100 m (min. Cat5e)	
LED	On	Off
Green	100 Mbit/s	10 Mbit/s
Orange	Link (Ethernet network connection available)	Activity (blinking - data transfer in progress)

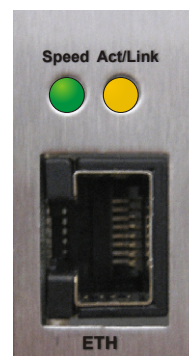


Table 229: 5ACPCI.ETH1-01 - Technical data

8.1.4 Driver support

A special driver is required in order to operate the Intel Ethernet controller 82551ER. Drivers for Windows XP Professional, Windows XP Embedded, and 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 homepage, not from manufacturers' pages.

8.1.5 Dimensions

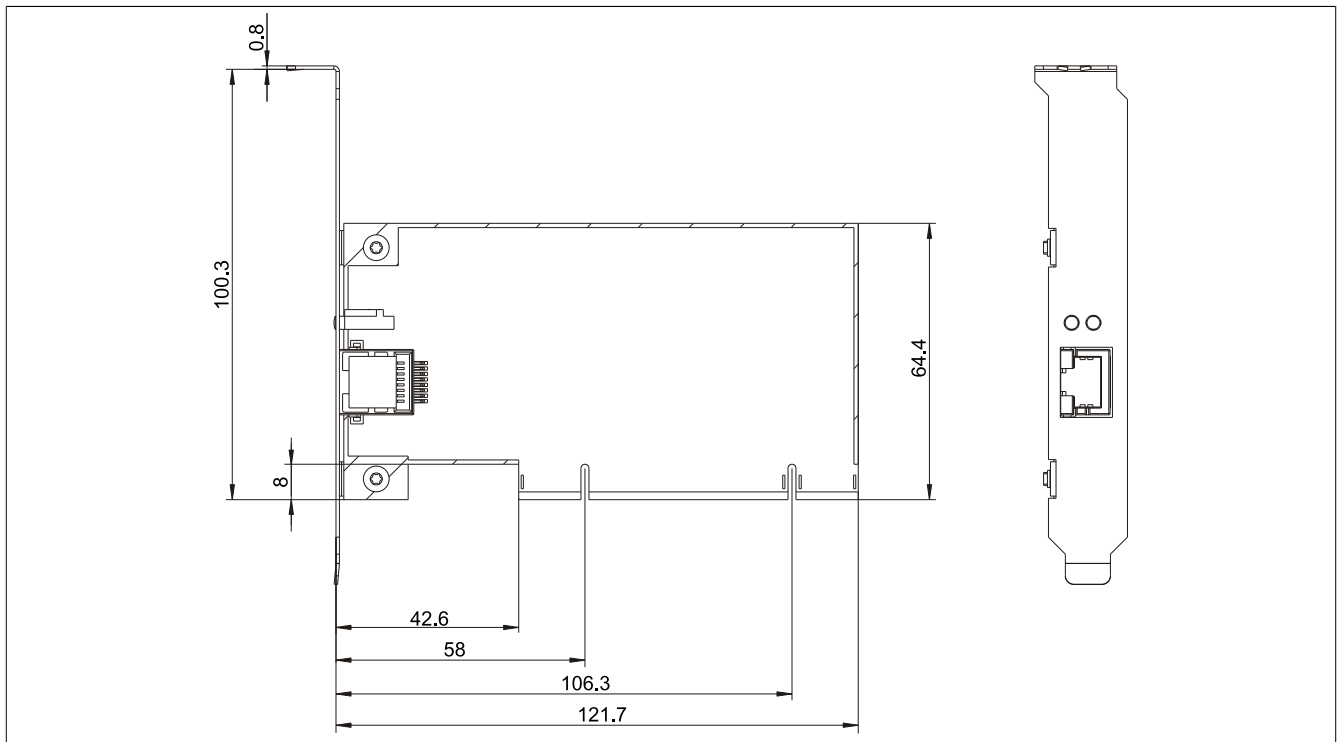


Image 127: 5ACPCI.ETH1-01 - Dimensions

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)



Image 128: 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 3 x 10/100	

Table 230: 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, with status LED
Certification types CE	Yes
Interfaces	
Ethernet	
Amount	3
Controllers	Intel 82551ER
Design	Shielded RJ45 port
Transfer rate	10/100 Mbit/s
Cable length	Max. 100 m between two stations (segment length)

Table 231: 5ACPCI.ETH3-01 - Technical data

Ethernet interface

Information:

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

Ethernet connections		
Controller	each with Intel 82551ER	
Power supply	Universal card (2 notches) for 3.3 V or 5 V	
Cabling	S/STP (Cat5e)	
Transfer rate	10/100 MBit/s	
Cable length	max. 100 m (min. Cat5e)	
LED	On	Off
Green	100 Mbit/s	10 Mbit/s
Orange	Link (Ethernet network connection available)	Activity (blinking - data transfer in progress)

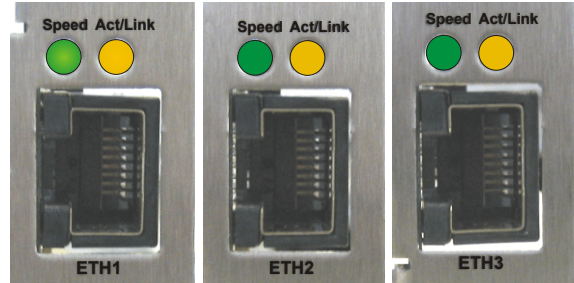


Table 232: 5ACPCI.ETH3-01 - Technical data

8.2.4 Driver support

A special driver is required in order to operate the Intel Ethernet controller 82551ER. Drivers for Windows XP Professional, Windows XP Embedded, and 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 homepage, not from manufacturers' pages.

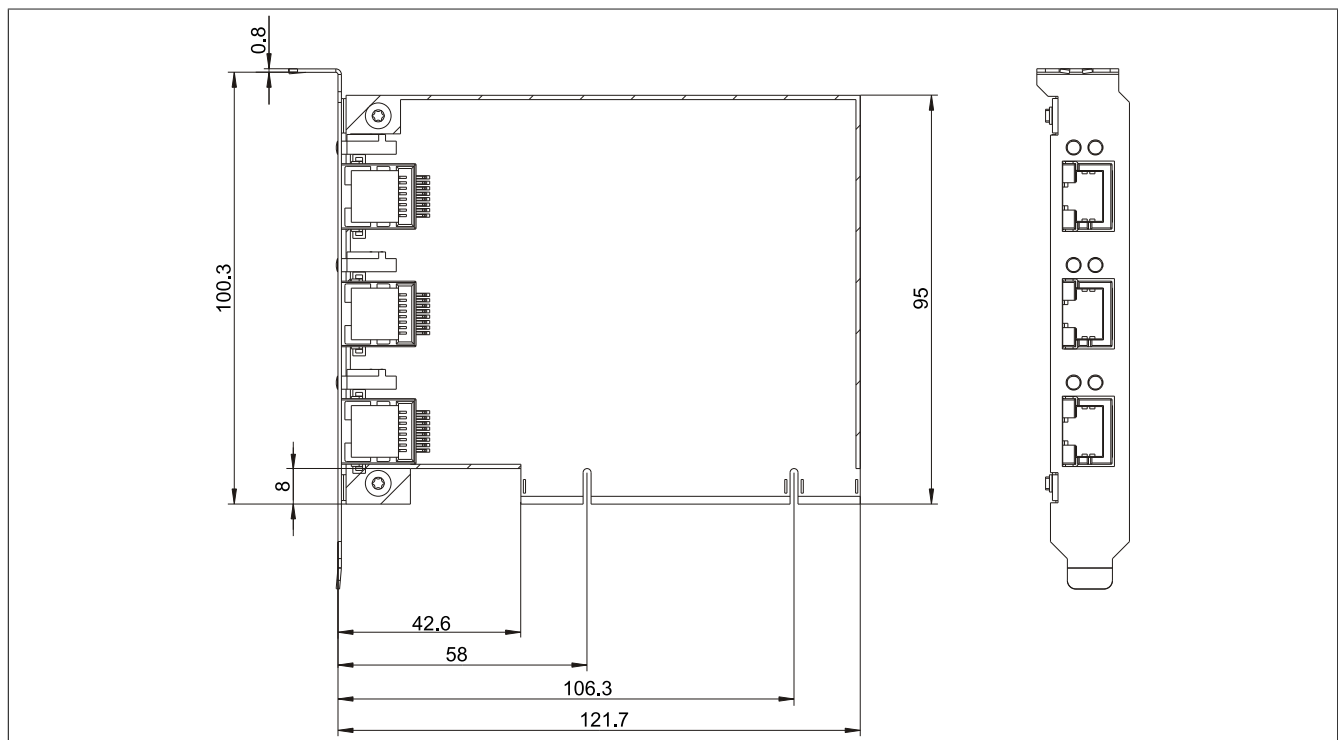
8.2.5 Dimensions

Image 129: 5ACPCI.ETH3-01 - Dimensions

9 CompactFlash cards

9.1 General information

CompactFlash cards are easy-to-exchange storage media. Due to their robustness against environmental influences (e.g. temperature, shock, vibration, etc.), CompactFlash cards are ideal for use as storage media in industrial environments.

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.

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.

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.

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 memory 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 259

Information:

The 5CFCRD.xxxx-06 CompactFlash cards are supported on B&R devices with WinCE version ≥ 6.0 or higher.

9.3.2 Order data

Model number	Short description	Figure
	CompactFlash	
5CFCRD.0512-06	B&R CompactFlash 512 MB	
5CFCRD.1024-06	B&R CompactFlash 1 GB	
5CFCRD.2048-06	B&R CompactFlash 2 GB	
5CFCRD.4096-06	B&R CompactFlash 4 GB	
5CFCRD.8192-06	B&R CompactFlash 8 GB	
5CFCRD.016G-06	B&R CompactFlash 16 GB	

Table 233: 5CFCRD.0512-06, 5CFCRD.1024-06, 5CFCRD.2048-06, 5CFCRD.4096-06, 5CFCRD.8192-06, 5CFCRD.016G-06 - Order data

9.3.3 Technical data

Caution!

A sudden loss of power can cause data to be lost! In very rare cases, the mass memory may also become damaged.

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

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate those specified for the entire device. For the entire device where this accessory is installed, refer to the data provided specifically for the entire device.

Product ID	5CFCRD.0512-06	5CFCRD.1024-06	5CFCRD.2048-06	5CFCRD.4096-06	5CFCRD.8192-06	5CFCRD.016G-06
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 10¹⁴ 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				36 MB/s	
Maximum	35 MB/s			34 MB/s		37 MB/s
Continuous writing						
Typical	15 MB/s			14 MB/s		28 MB/s
Maximum	18 MB/s			17 MB/s		30 MB/s

Table 234: 5CFCRD.0512-06, 5CFCRD.1024-06, 5CFCRD.2048-06, 5CFCRD.4096-06, 5CFCRD.8192-06, 5CFCRD.016G-06 - Technical data

Product ID	5CFCRD.0512-06	5CFCRD.1024-06	5CFCRD.2048-06	5CFCRD.4096-06	5CFCRD.8192-06	5CFCRD.016G-06
Certification types CE	Yes					
Endurance						
Guaranteed amount of data Guaranteed ¹⁾ Results in 5 years ¹⁾	50 TB 27.40 GB/day	100 TB 54.79 GB/day	200 TB 109.9 GB/day	400 TB 219.8 GB/day	800 TB 438.6 GB/day	1600 TB 876.72 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 Windows 7 64-bit Windows Embedded Standard 7, 32-bit Windows Embedded Standard 7, 64-bit Windows XP Professional Windows XP Embedded Windows Embedded Standard 2009 Windows CE 6.0 Windows CE 5.0	No No No No No Yes No Yes Yes Yes ²⁾					
Software PVI Transfer Tool B&R Embedded OS Installer	≥ V3.2.3.8 (part of PVI Development Setup ≥ V2.06.00.3011) ≥ V3.10 No ≥ V3.20					
Environmental conditions						
Temperature Operation Storage Transport	0 to 70°C -65 to 150°C -65 to 150°C					
Relative humidity Operation Storage Transport	Max. 85% at 85°C Max. 85% at 85°C Max. 85% at 85°C					
Vibration Operation Storage 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) 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) 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 Storage Transport	1.5 kg peak, 0-5 ms 5x (JEDEC JESD22, B110 method) 30 g, 11 ms 1x (IEC 68-2-27) 1.5 kg peak, 0-5 ms 5x (JEDEC JESD22, B110 method) 30 g, 11 ms 1x (IEC 68-2-27) 1.5 kg peak, 0-5 ms 5x (JEDEC JESD22, B110 method) 30 g, 11 ms 1x (IEC 68-2-27)					
Altitude Operation	Max. 4.572 m					
Mechanical characteristics						
Dimensions Width Length Height	42.8 ± 0.10 mm 36.4 ± 0.15 mm 3.3 ± 0.10 mm					
Weight	10 g					

Table 234: 5CFCRD.0512-06, 5CFCRD.1024-06, 5CFCRD.2048-06,
5CFCRD.4096-06, 5CFCRD.8192-06, 5CFCRD.016G-06 - Technical data

- 1) Endurance of B&R CFs (with linear written block size ≥ 128 kB)
2) Not supported by B&R Embedded OS installer.

9.3.4 Temperature humidity diagram

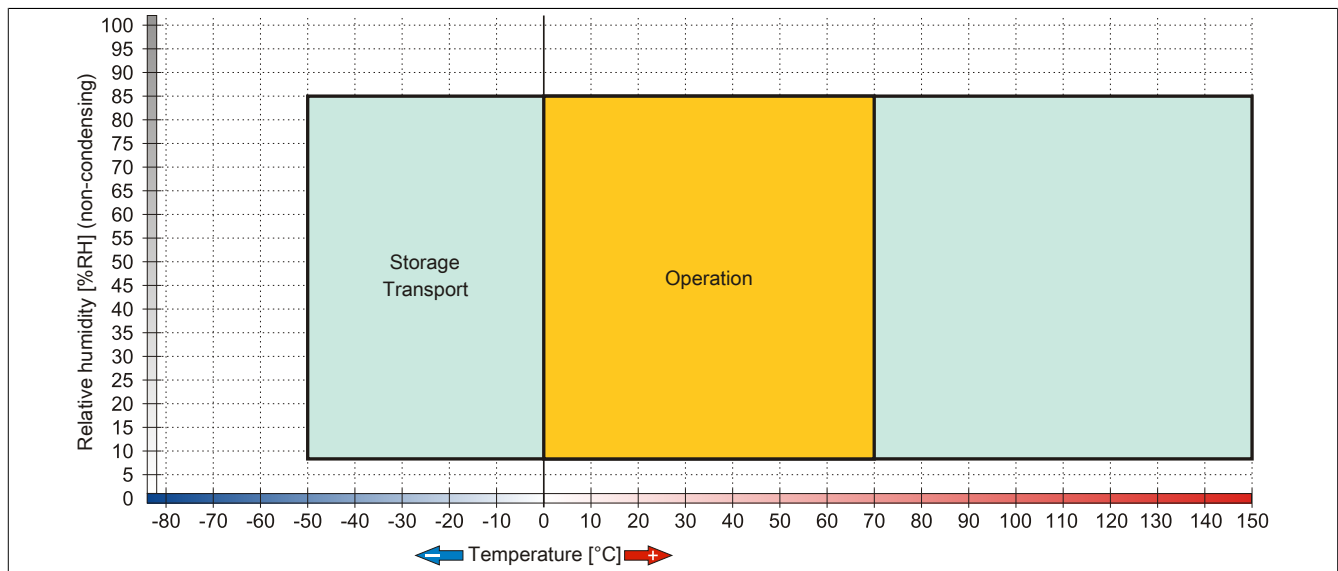


Image 130: 5CFCRD.xxxx-06 - Temperature humidity diagram for CompactFlash cards

9.3.5 Dimensions

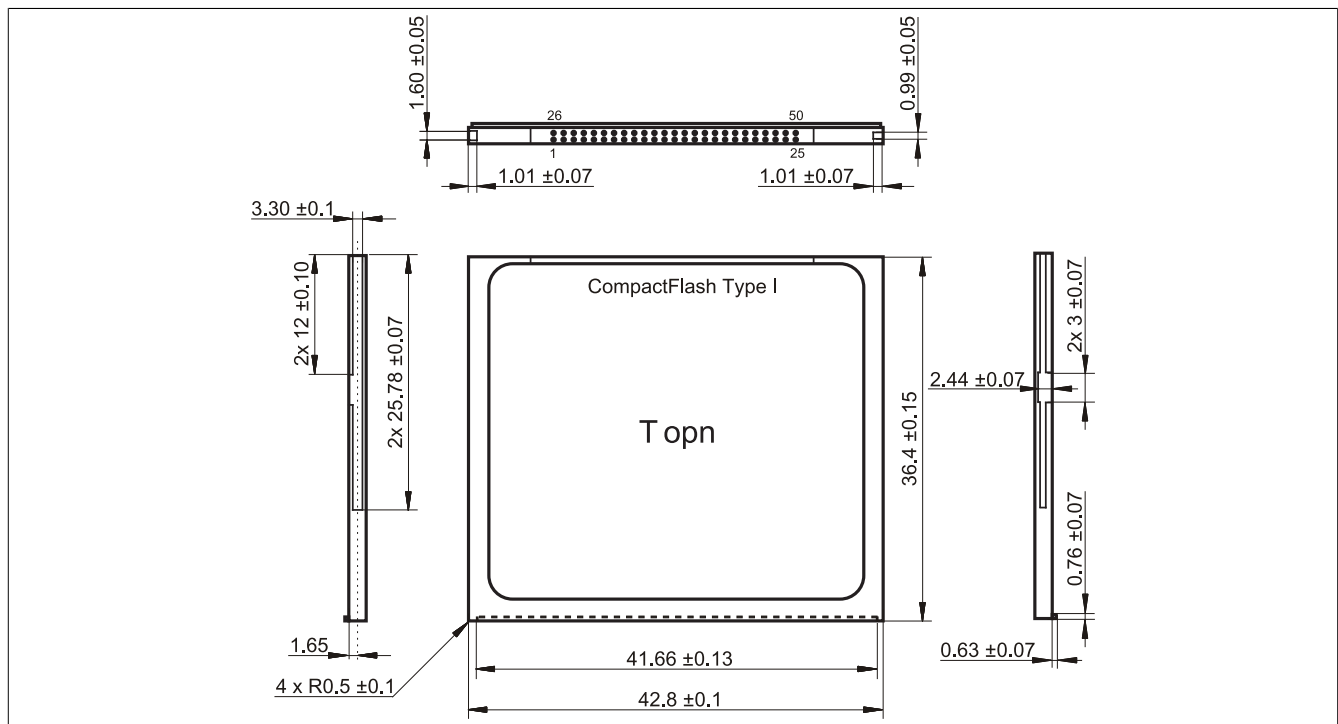


Image 131: Dimensions - CompactFlash card Type I

9.3.6 Benchmark

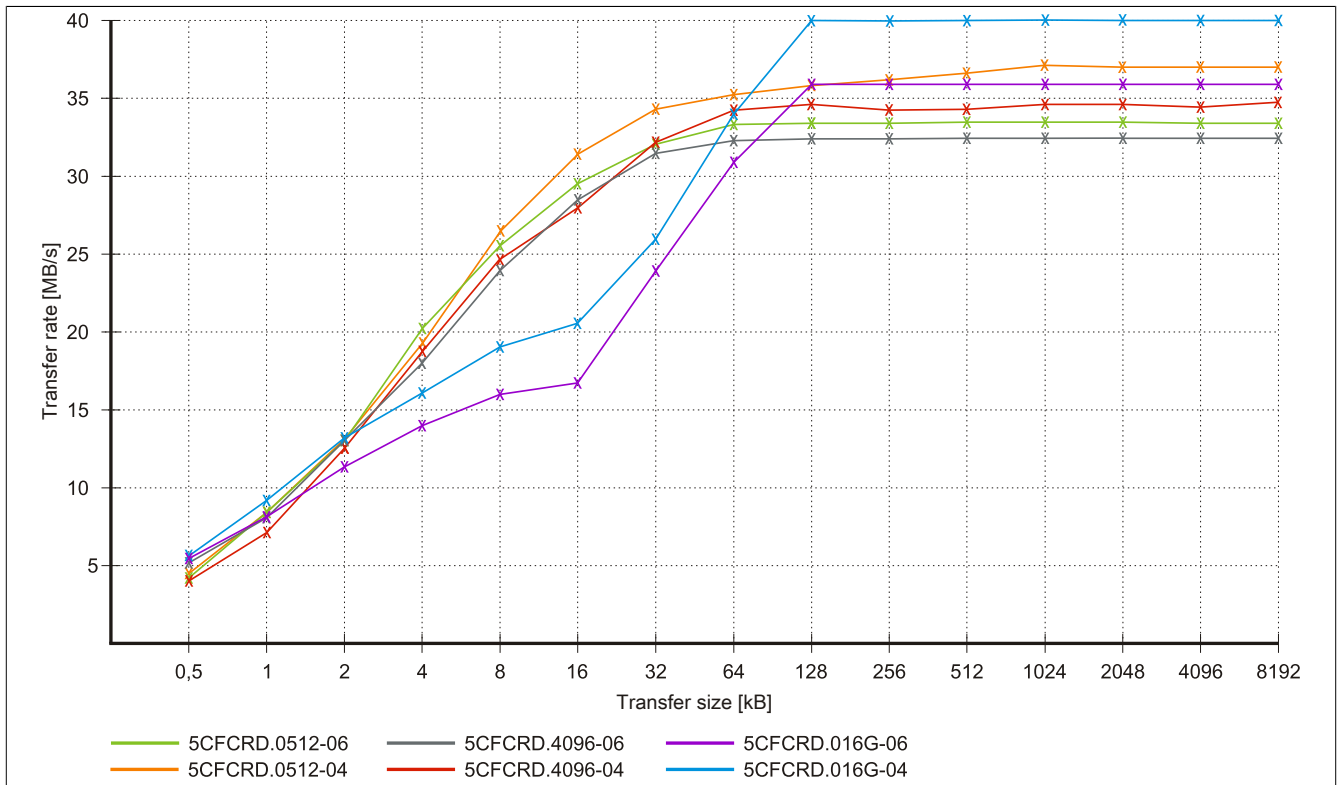


Image 132: ATTO Disk Benchmark v2.34 comparison when reading - 5CFCRD.xxxx-04 with 5CFCRD.xxxx-06

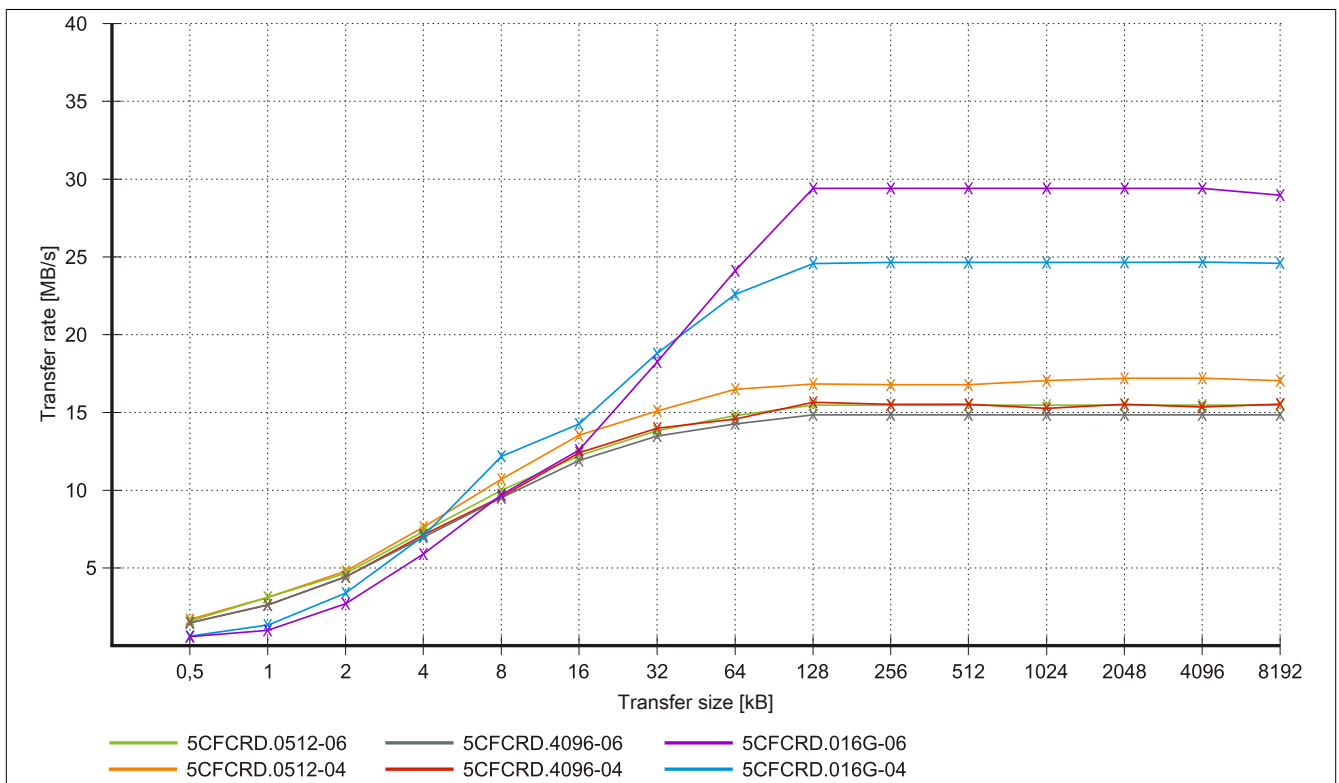


Image 133: ATTO Disk Benchmark v2.34 comparison when writing - 5CFCRD.xxxx-04 with 5CFCRD.xxxx-06

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 259

Information:

The 5CFCRD.xxxx-04 CompactFlash cards are supported on B&R devices with WinCE version ≥ 6.0 or higher.

9.4.2 Order data

Model number	Short description	Figure
5CFCRD.0512-04	B&R CompactFlash 512 MB	
5CFCRD.1024-04	B&R CompactFlash 1 GB	
5CFCRD.2048-04	B&R CompactFlash 2 GB	
5CFCRD.4096-04	B&R CompactFlash 4 GB	
5CFCRD.8192-04	B&R CompactFlash 8 GB	
5CFCRD.016G-04	B&R CompactFlash 16 GB	

Table 235: 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 can cause data to be lost! In very rare cases, the mass memory may also become damaged.

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

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate those specified for the entire device. For the entire device where this accessory is installed, refer to the data provided specifically for the entire device.

Product ID	5CFCRD.0512-04	5CFCRD.1024-04	5CFCRD.2048-04	5CFCRD.4096-04	5CFCRD.8192-04	5CFCRD.016G-04
General information						
Capacity	512 MB	1 GB	2 GB	4 GB	8 GB	16 GB
Data retention	10 years					
Data reliability	< 1 unrecoverable error in 10¹⁴ bit read accesses					
Lifetime monitoring	Yes					
MTBF	> 3,000,000 hours (at 25°C)					
Maintenance	None					
Supported operating modes	PIO mode 0-6, Multiword DMA mode 0-4, Ultra DMA mode 0-4					
Continuous reading	Typical	35 MB/s (240X) ¹⁾	33 MB/s (220X) ¹⁾	27 MB/s (180X) ¹⁾	36 MB/s (240X) ¹⁾	37 MB/s (247X) ¹⁾
	Maximum	37 MB/s (260X) ¹⁾	34 MB/s (226X) ¹⁾	28 MB/s (186X) ¹⁾	37 MB/s (247X) ¹⁾	37 MB/s (247X) ¹⁾
Continuous writing						

Table 236: 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
Typical	17 MB/s (110X)			16 MB/s (106X)	15 MB/s (100X)	18 MB/s (120X)
Maximum	20 MB/s (133X)			18 MB/s (120X)	17 MB/s (110X)	19 MB/s (126X)
Certification types CE	Yes					
Endurance						
Guaranteed amount of data						
Guaranteed ²⁾	50 TB	100 TB	200 TB	400 TB	800 TB	1600 TB
Results in 5 years ²⁾	27.40 GB/day	54.79 GB/day	109.9 GB/day	219.8 GB/day	438.6 GB/day	876.72 GB/day
Clear/write cycles						
Typical ³⁾	2,000,000					
Guaranteed	100,000					
SLC-Flash	Yes					
Wear leveling	Static					
Error Correction Coding (ECC)	Yes					
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					Yes
Windows 7 64-bit	No					
Windows Embedded Standard 7, 32-bit	No					Yes
Windows Embedded Standard 7, 64-bit	No					Yes
Windows XP Professional	No					Yes
Windows XP Embedded	Yes					
Windows Embedded Standard 2009	No	Yes				
Windows CE 6.0	Yes					Yes ⁴⁾
Windows CE 5.0	No					
Software						
PVI Transfer Tool	≥ V3.2.3.8 (part of PVI Development Setup ≥ V2.06.00.3011)					No
B&R Embedded OS Installer	≥ V3.10					≥ 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 5x (JEDEC JESD22, B110 method) 30 g, 11 ms 1x (IEC 68-2-27)					
Storage	1.5 kg peak, 0-5 ms 5x (JEDEC JESD22, B110 method) 30 g, 11 ms 1x (IEC 68-2-27)					
Transport	1.5 kg peak, 0-5 ms 5x (JEDEC JESD22, B110 method) 30 g, 11 ms 1x (IEC 68-2-27)					
Altitude						
Operation	Max. 4.572 m					
Mechanical characteristics						
Dimensions						
Width	42.8 ± 0.10 mm					
Length	36.4 ± 0.15 mm					
Height	3.3 ± 0.10 mm					
Weight	10 g					

Table 236: 5CFCRD.0512-04, 5CFCRD.1024-04, 5CFCRD.2048-04, 5CFCRD.4096-04, 5CFCRD.8192-04, 5CFCRD.016G-04 - Technical data

- 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.
- Endurance of B&R CFs (with linear written block size ≥ 128 kB)
- Depending on the average file size.
- Not supported by B&R Embedded OS installer.

9.4.4 Temperature humidity diagram

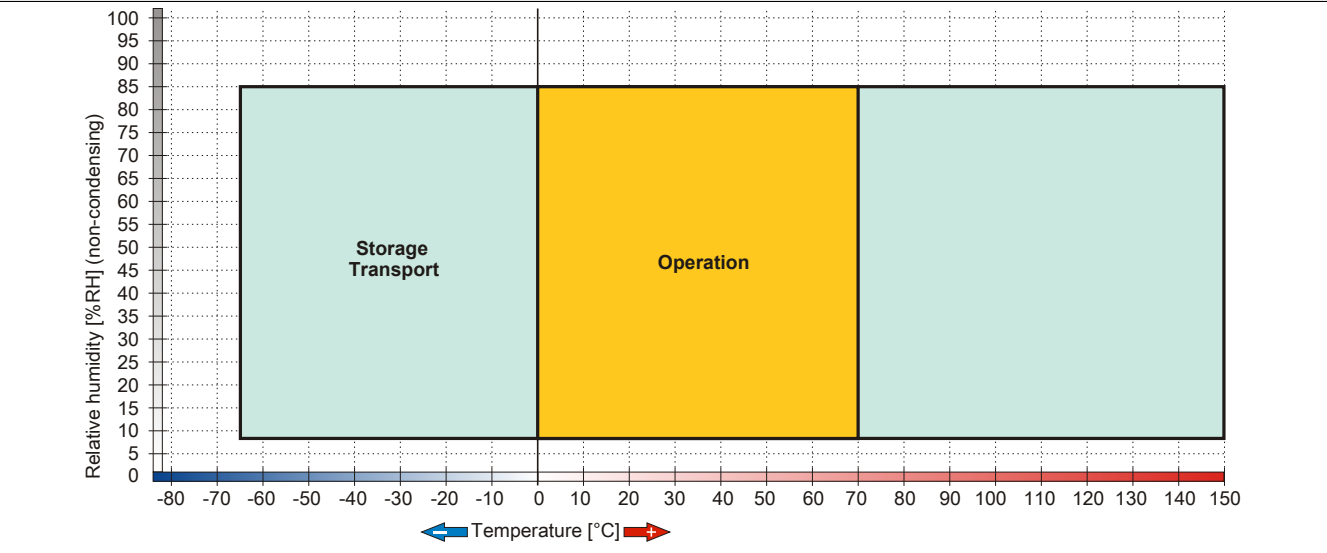


Image 134: 5CFCRD.xxxx-04 - Temperature humidity diagram for CompactFlash cards

9.4.5 Dimensions

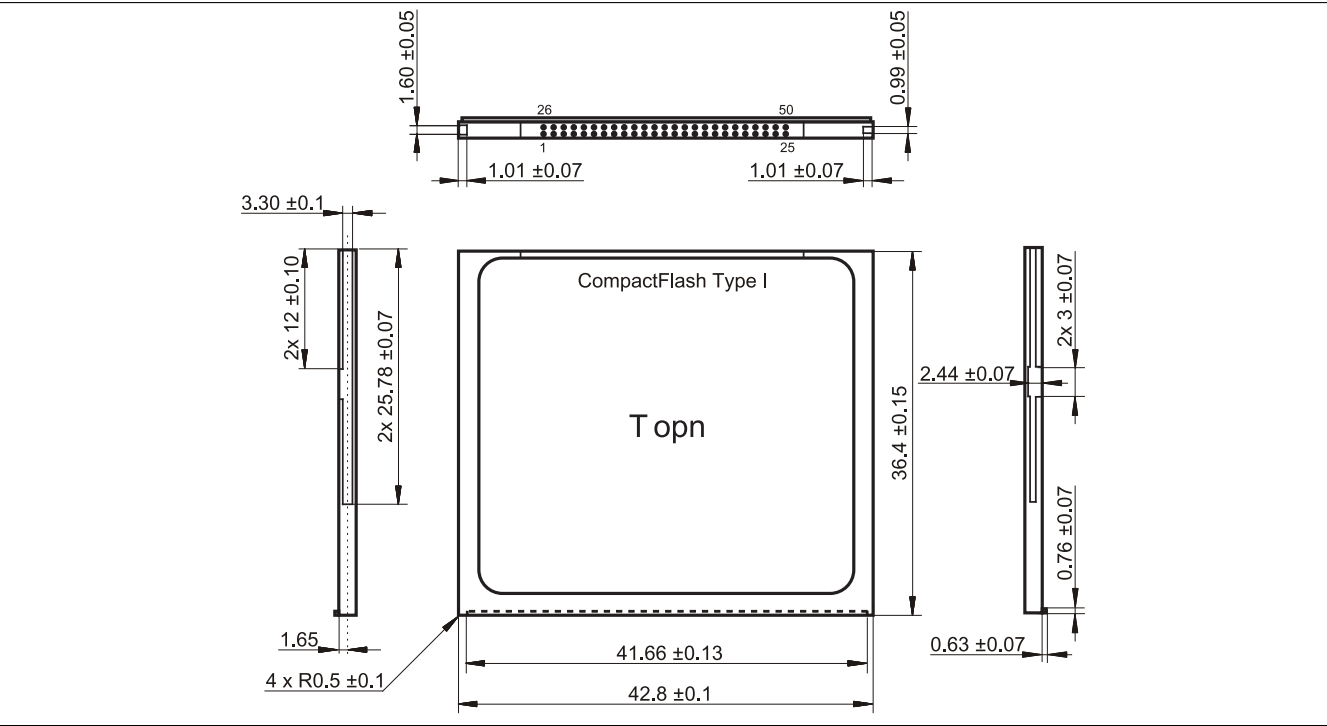


Image 135: Dimensions - CompactFlash card Type I

9.4.6 Benchmark

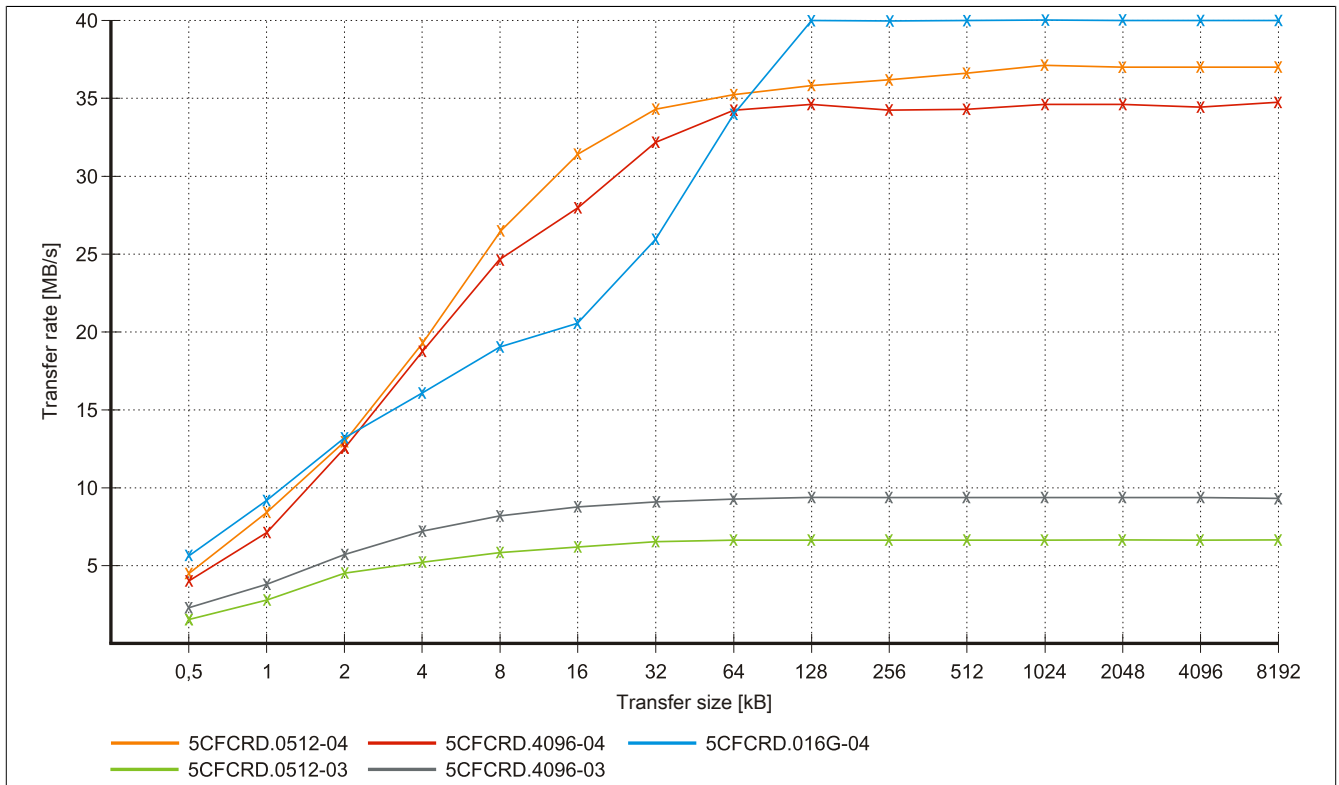


Image 136: ATTO Disk Benchmark v2.34 comparison when reading - 5CFCRD.xxxx-03 with 5CFCRD.xxxx-04

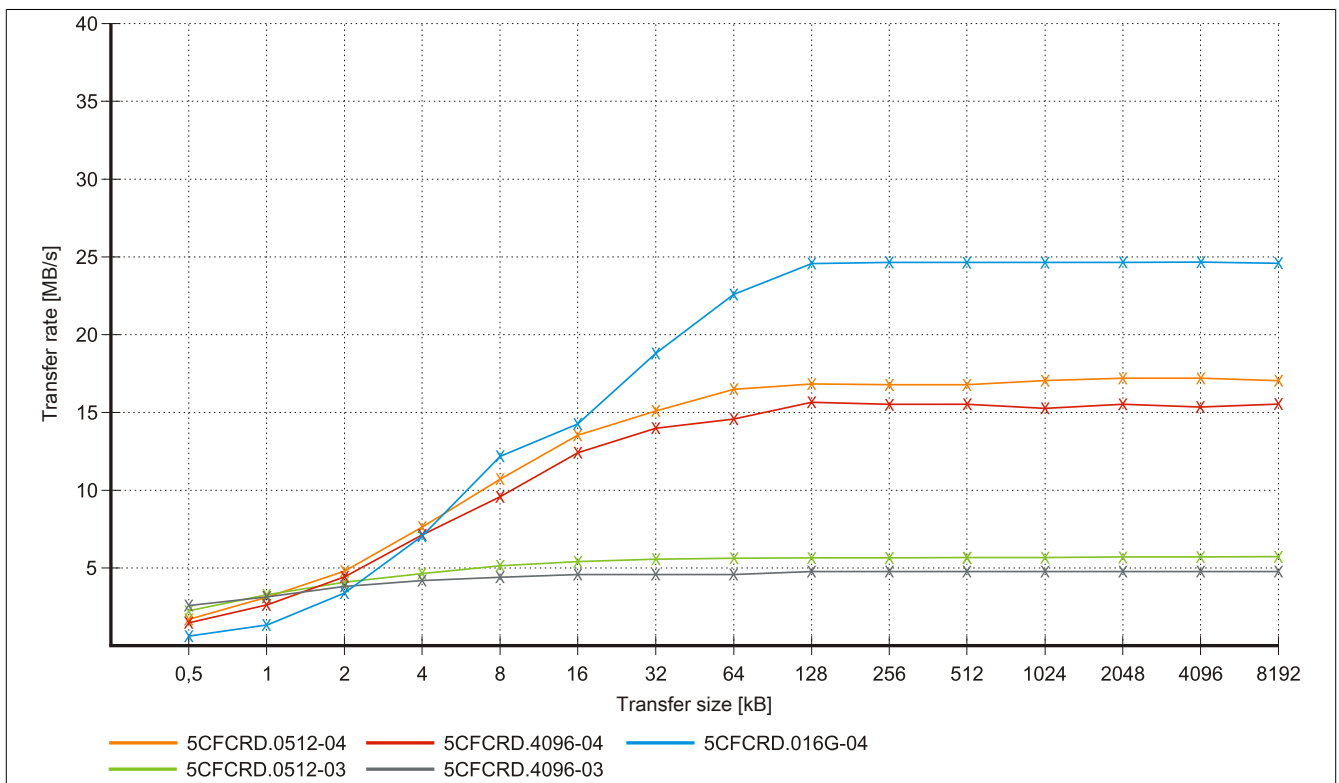


Image 137: ATTO Disk Benchmark v2.34 comparison when writing - 5CFCRD.xxxx-03 with 5CFCRD.xxxx-04

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 259

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 been changed.

9.5.2 Order data

Model number	Short description	Figure
	CompactFlash	
5CFCRD.0064-03	CompactFlash 64 MB Western Digital	
5CFCRD.0128-03	CompactFlash 128 MB Western Digital	
5CFCRD.0256-03	CompactFlash 256 MB Western Digital	
5CFCRD.0512-03	CompactFlash 512 MB Western Digital	
5CFCRD.1024-03	CompactFlash 1 GB Western Digital	
5CFCRD.2048-03	CompactFlash 2 GB Western Digital	
5CFCRD.4096-03	CompactFlash 4 GB Western Digital	
5CFCRD.8192-03	CompactFlash 8 GB Western Digital	

Table 237: 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 can cause data to be lost! In very rare cases, the mass memory may also become damaged.

To prevent damage and loss of data, B&R recommends that you use a UPS device.

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate those specified for the entire device. For the entire device where this accessory is installed, refer to the data provided specifically for the entire device.

Product ID	5CFCRD.0064-03	5CFCRD.0128-03	5CFCRD.0256-03	5CFCRD.0512-03	5CFCRD.1024-03	5CFCRD.2048-03	5CFCRD.4096-03	5CFCRD.8192-03
General information								
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 10¹⁴ bit read accesses							
Lifetime monitoring	Yes							
MTBF	> 4,000,000 hours (at 25°C)							

Table 238: 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 types CE	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 Windows 7 64-bit Windows Embedded Standard 7, 32-bit Windows Embedded Standard 7, 64-bit Windows XP Professional Windows XP Embedded Windows Embedded Standard 2009 Windows CE 6.0 Windows CE 5.0	No No No No No No No Yes Yes ¹⁾							
Software PVI Transfer Tool B&R Embedded OS Installer	≥ V2.57 (part of PVI Development Setup ≥ V2.5.3.3005) ≥ V2.21							
Environmental conditions								
Temperature Operation Storage Transport	0 to 70°C -50 to 100°C -50 to 100°C							
Relative humidity Operation Storage Transport	8 to 95%, non-condensing 8 to 95%, non-condensing 8 to 95%, non-condensing							
Vibration Operation Storage Transport	Max. 16.3 g (159 m/s² 0-peak) Max. 30 g (294 m/s² 0-peak) Max. 30 g (294 m/s² 0-peak)							
Shock Operation Storage Transport	Max. 1000 g (9810 m/s² 0-peak) Max. 3000 g (29430 m/s² 0-peak) Max. 3000 g (29430 m/s² 0-peak)							
Altitude Operation	Max. 24.383 m							
Mechanical characteristics								
Dimensions Width Length Height	42.8 ± 0.10 mm 36.4 ± 0.15 mm 3.3 ± 0.10 mm							
Weight	11.4 g							

Table 238: 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 B&R Embedded OS installer.

9.5.4 Temperature humidity diagram

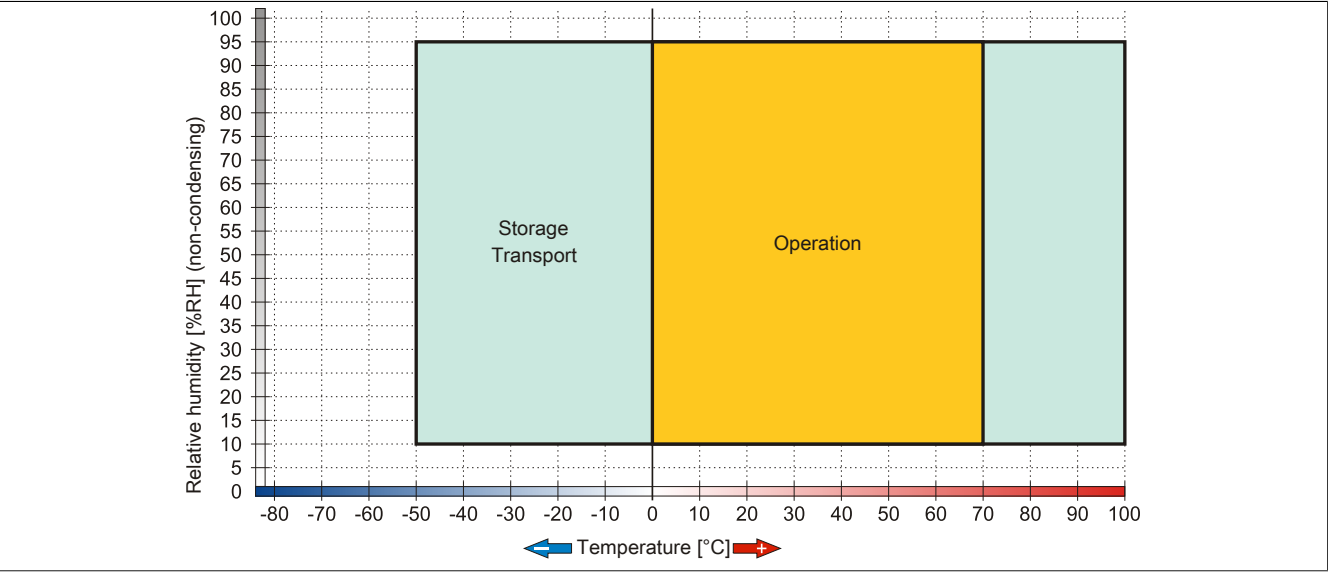


Image 138: 5CFCRD.xxxx-03 - Temperature humidity diagram for CompactFlash cards

9.5.5 Dimensions

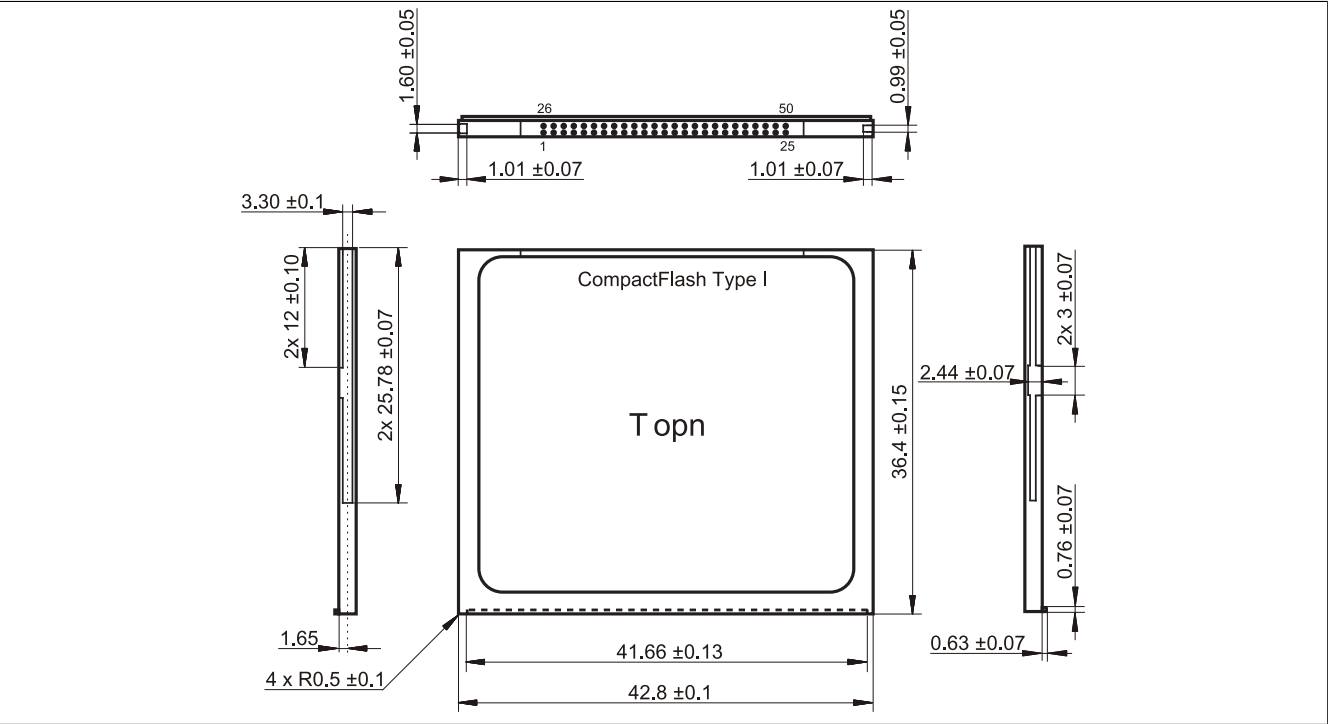


Image 139: Dimensions - CompactFlash card Type I

9.6 Known problems / issues

The following issue for devices with two CompactFlash slots is known:

- Using two different types of CompactFlash cards can cause problems in Automation PCs and Panel PCs. This can result in one of the two cards not being detected during system startup. This is caused by varying startup speeds. CompactFlash cards with older technology require significantly more time during system startup than CompactFlash cards with newer technology. This behavior occurs near the limits of the time frame provided for startup. The problem described above can occur because the startup time for the CompactFlash cards fluctuates due to the variance of the components being used. Depending on the CompactFlash cards being used, this error might never, sometimes or always occur.

10 USB flash drives

10.1 5MMUSB.2048-00

10.1.1 General information

USB flash drives are easy-to-exchange storage media. Because of the fast data transfer (USB 2.0), the USB flash drives are ideal for use as a portable memory medium. Without requiring additional drivers ("Hot Plug & Play" - except with Windows 98SE), the USB flash drive can immediately act as an additional drive where data can be read or written. Only USB flash drives from the memory specialists SanDisk are used.

Information:

We reserve the right to supply alternative products due to the vast quantity of flash drives available on the market and their corresponding short product lifecycle. Therefore, the following measures might be necessary in order to boot from these flash drives:

- The flash drive must be reformatted or in some cases even re-partitioned (set active partition).
- The flash drive must be at the top of the BIOS boot order, or alternatively the IDE controllers can also be deactivated in the BIOS. This can be avoided in most cases if a "fdisk /mbr" command is also executed on the USB flash drive.

10.1.2 Order data

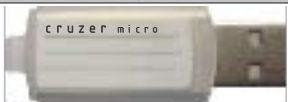
Model number	Short description	Figure
5MMUSB.2048-00	USB 2.0 flash drive, 2048 MB	

Table 239: 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 those specified for the entire device. For the entire device where this accessory is installed, refer to the data provided specifically for the entire device.

Product ID	5MMUSB.2048-00
General information	
Data retention	10 years
LEDs	1 LED (green), signals data transfer (send and receive) ¹⁾
MTBF	100,000 hours (at 25°C)
Type	USB 1.1 and 2.0 compatible
Maintenance	None
Interfaces	
USB	
Type	USB 1.1, USB 2.0
Connection	To each USB type A interface
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), to high speed (480 Mbit/s)
Sequential reading	Max. 8.7 MB/s
Sequential writing	Max. 1.7 MB/s
Support	
Operating systems	
Windows 2000	Yes
Windows ME	Yes
Windows XP Professional	Yes
Windows XP Embedded	Yes
Windows CE 4.2	Yes
Windows CE 5.0	Yes
Electrical characteristics	
Current requirements	650 µA sleep mode, 150 mA read/write
Environmental conditions	
Temperature	
Operation	0 to 45°C
Bearings	-20 to 60°C
Transport	-20 to 60°C

Table 240: 5MMUSB.2048-00 - Technical data

Product ID	5MMUSB.2048-00
Relative humidity	
Operation	10 to 90%, non-condensing
Bearings	5 to 90%, non-condensing
Transport	5 to 90%, non-condensing
Vibration	
Operation	10 to 500 Hz: 2 g (19.6 m/s ² 0-peak), oscillation rate 1/minute
Bearings	10 to 500 Hz: 2 g (19.6 m/s ² 0-peak), oscillation rate 1/minute
Transport	10 to 500 Hz: 2 g (19.6 m/s ² 0-peak), oscillation rate 1/minute
Shock	
Operation	Max. 40 g (392 m/s ² 0-peak) and 11 ms length
Bearings	Max. 80 g (784 m/s ² 0-peak) and 11 ms length
Transport	Max. 80 g (784 m/s ² 0-peak) and 11 ms length
Altitude	
Operation	Max. 3048 m
Bearings	Max. 12192 m
Transport	Max. 12192 m
Mechanical characteristics	
Dimensions	
Width	19 mm
Length	52.2 mm
Height	7.9 mm

Table 240: 5MMUSB.2048-00 - Technical data

- 1) Signals data transfer (send and receive).

10.1.4 Temperature humidity diagram

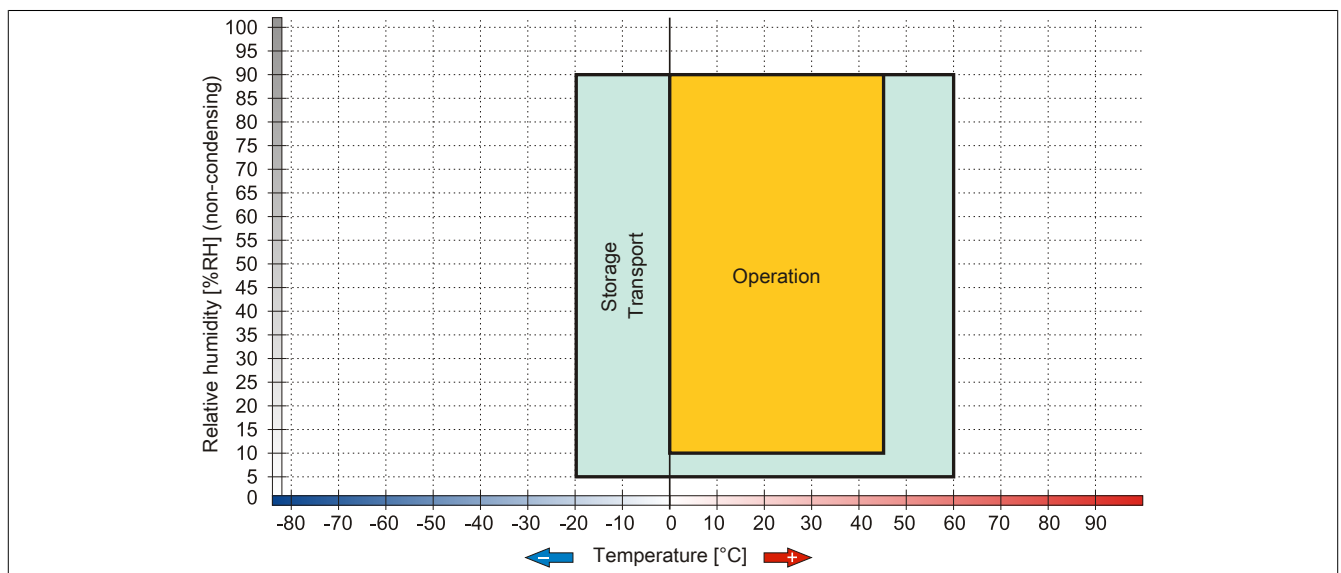


Image 140: 5MMUSB.2048-00 - Temperature humidity diagram

10.2 5MMUSB.2048-01

10.2.1 General information

USB flash drives are easy-to-exchange storage media. Because of the fast data transfer (USB 2.0), the USB flash drives are ideal for use as a portable memory medium. Without requiring additional drivers ("Hot Plug & Play" - except with Windows 98SE), the USB flash drive can immediately act as an additional drive where data can be read or written.

Information:

We reserve the right to supply alternative products due to the vast quantity of flash drives available on the market and their corresponding short product lifecycle. Therefore, the following measures might be necessary in order to boot from these flash drives:

- The flash drive must be reformatted or in some cases even re-partitioned (set active partition).
 - The flash drive must be at the top of the BIOS boot order, or alternatively the IDE controllers can also be deactivated in the BIOS. This can be avoided in most cases if a "fdisk /mbr" command is also executed on the USB flash drive.
- USB 1.1, USB 2.0
 - High transfer rate
 - High data storage
 - Ambient temperature during operation: 0 to 70°C

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 241: 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), signals data transfer (send and receive) ¹⁾
MTBF	> 3,000,000 hours
Type	USB 1.1, USB 2.0
Maintenance	None
Certification types	
CE	Yes
Interfaces	
USB	
Type	USB 1.1, USB 2.0
Connection	To each USB type A interface
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), to high speed (480 Mbit/s)
Sequential reading	Max. 31 MB/s
Sequential writing	Max. 30 MB/s
Support	
Operating systems	
Windows 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 properties	
Current requirements	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 242: 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. 3048 m
Storage	Max. 12192 m
Transport	Max. 12192 m
Mechanical characteristics	
Dimensions	
Width	17.97 mm
Length	67.85 mm
Height	8.35 mm

Table 242: 5MMUSB.2048-01 - Technical data

1) Signals data transfer (send and receive).

10.2.4 Temperature humidity diagram

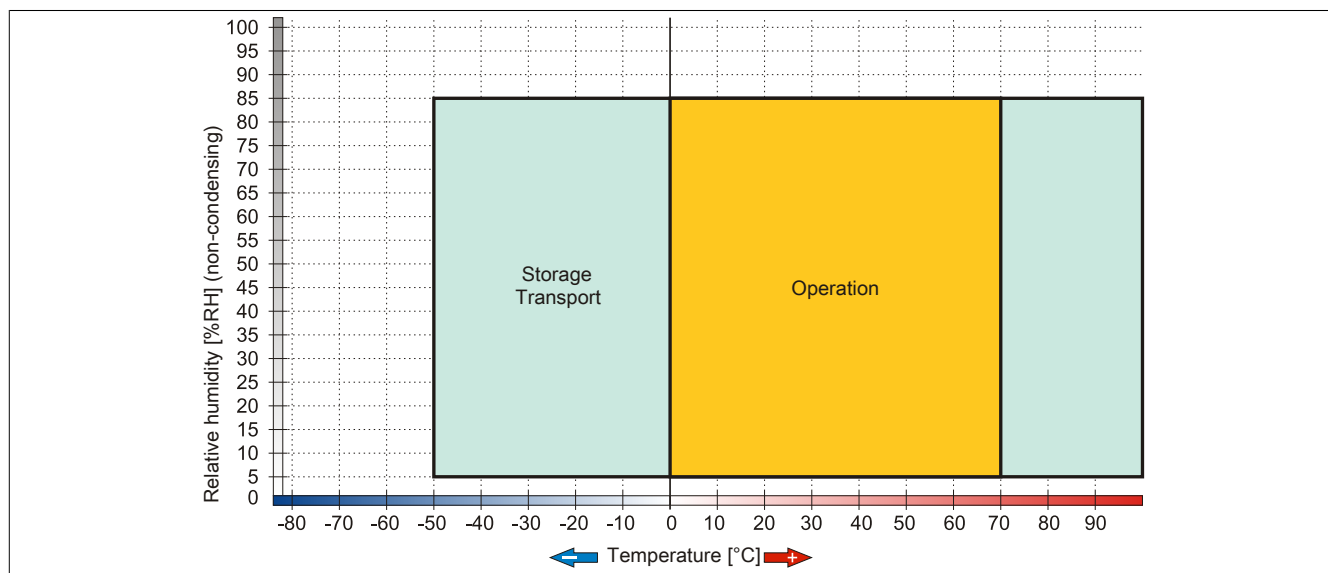


Image 141: 5MMUSB.2048-01 - Temperature humidity diagram

11 HMI Drivers & Utilities DVD

11.1 5SWHMI.0000-00

11.1.1 General information

This DVD contains drivers, utilities, software upgrades and user's manuals for B&R Panel system products (see B&R website www.br-automation.com – Industrial PCs, Visualization and Operation).

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”).

11.1.2 Order data

Model number	Short description	Figure
5SWHMI.0000-00	Miscellaneous HMI Drivers & Utilities DVD	

Table 243: 5SWHMI.0000-00 - Order data

11.1.3 Contents (V2.10)

BIOS upgrades for the products

- 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

Drivers for the devices

- 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 lifespan calculator (Silicon Systems)
- Miscellaneous
- MTC utilities
- Key editor
- MTC & Mkey utilities
- Mkey utilities
- UPS configuration software
- ICU ISA configuration
- Intel PCI NIC boot ROM
- Diagnostics 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)

12 Cable

12.1 DVI cable

12.1.1 5CADVI.0xxx-00

General information

The DVI cables 5CADVI.0xxx-00 are designed for fixed layout.

Caution!

Cable can only be plugged in and unplugged when the device is turned off.

Order data

Model number	Short description	Figure
	DVI cables	
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 244: 5CADVI.0018-00, 5CADVI.0050-00, 5CADVI.0100-00 - Order data

Technical data

Product ID	5CADVI.0018-00		5CADVI.0050-00	5CADVI.0100-00
General information				
Certification types	Yes			
CE				
c-UL-us	Yes			
Cable structure				
Wire cross section	AWG 28			
Shield	Individual cable pairs and entire cable			
Cable shielding	Tinned CU mesh, optical coverage >86%			Tinned Cu mesh, optical coverage >86%
Outer sheathing	PVC Beige AWM STYLE 20276 80°C 30V VW1 DVI DIGITAL SINGLE LINK DER AN			
Material				
Color				
Labeling				
Connector				
Type	2x DVI-D (18+1), male			
Connection cycles	100			
Electrical properties				
Conductor resistance	Max. 237 Ω/km			
Insulation resistance	Min. 100 MΩ/km			
Mechanical characteristics				
Dimensions	1.8 m ±50 mm 5 m ± 80 mm 10 m ±100 mm			
Length				
Diameter	Max. 8.5 mm			
Flex radius	≥ 5x cable diameter (plug - ferrite magnet and ferrite magnet - ferrite magnet)			
Weight	Approx. 260 g	Approx. 460 g		Approx. 790 g

Table 245: 5CADVI.0018-00, 5CADVI.0050-00, 5CADVI.0100-00 - Technical data

Flex radius specification

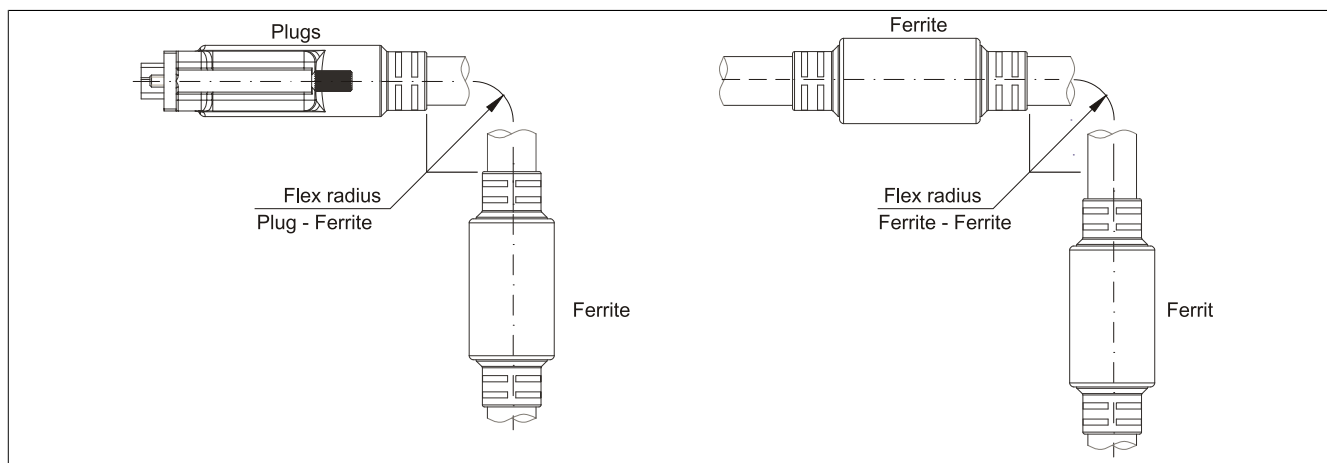


Image 142: Flex radius specification

Dimensions

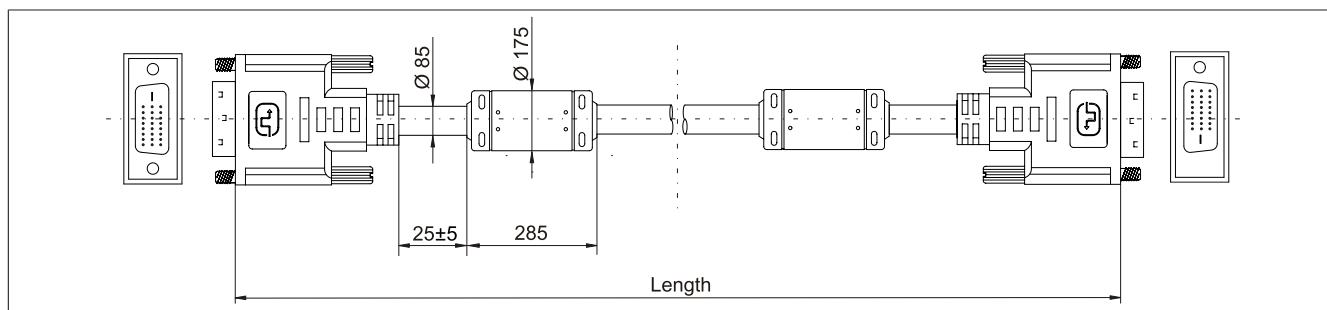


Image 143: 5CADVI.0xxx-00 - Dimensions

Cable specifications

Warning!

If you want to build a suitable cable yourself, it should be wired according to these specifications.

If a self-built cable is used, B&R cannot guarantee that it will function properly. B&R guarantees the performance of all cables that they provide.

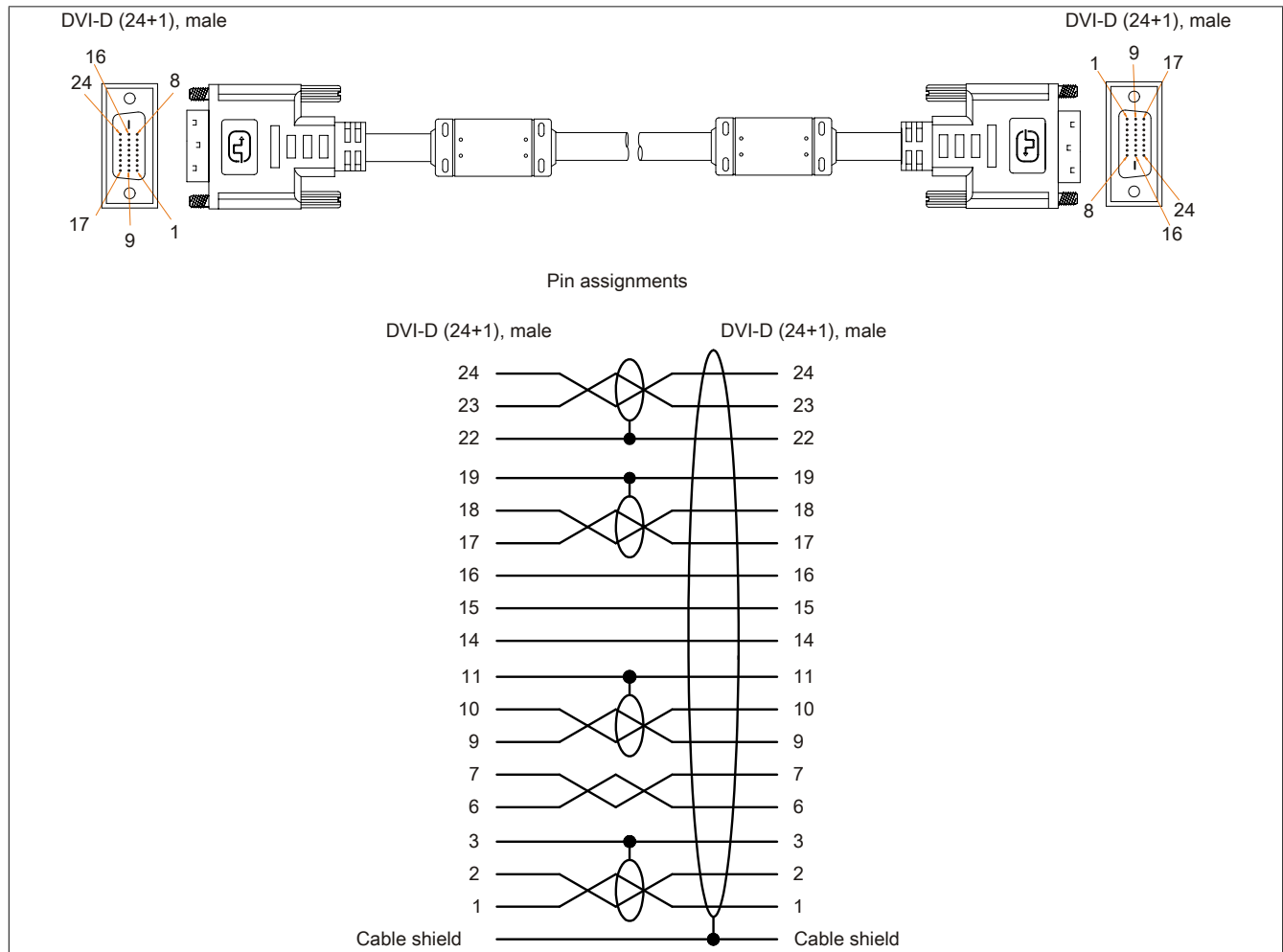


Image 144: 5CADVI.0xxx-00 - Pin assignments

12.2 SDL cables

12.2.1 5CASDL.0xxx-00

General information

The SDL cables 5CASDL.0xxx-00 are designed for fixed layout. Use of the SDL flex cable 5CASDL.0xxx-03 is required for a flexible installation (e.g. in swing arm systems).

Caution!

Cable can only be plugged in and unplugged when the device is turned off.

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 246: 5CASDL.0018-00, 5CASDL.0050-00, 5CASDL.0100-00, 5CASDL.0150-00, 5CASDL.0200-00, 5CASDL.0250-00, 5CASDL.0300-00 - Order data

Technical data

Product ID	5CASDL. 0018-00	5CASDL. 0050-00	5CASDL. 0100-00	5CASDL. 0300-00	5CASDL. 0250-00	5CASDL. 0200-00	5CASDL. 0150-00
General information							
Certification types	Yes Yes						
CE							
c-UL-us							
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	PVC Black E74020-C (UL) AWM STYLE 20176 80°C 30V VW-1 DVI DIGITAL LINK						
Material							
Color							
Labeling							
Connector							
Type	2x DVI-D (24+1), male						
Connection cycles	100						
Contacts	Gold plated						
Mechanical protection	Metal cover with crimped stress relief						
Electrical properties							
Conductor resistance	- ≤93 Ω/km						
AWG 24							
AWG 28	≤237 Ω/km		-				
Insulation resistance	Min. 10 MΩ/km						
Mechanical characteristics							
Dimensions	1.8 m ±30 mm 5 m ±30 mm 10 m ±50 mm 30 m ±100 mm 25 m ±100 mm 20 m ±100 mm 15 m ±100 mm Typ. 8.6 ± 0.2 mm Max. 9 mm Typ. 11 ± 0.2 mm Max. 11.5 mm						
Length							
Diameter							
Flex radius	≥ 5x cable diameter (plug - ferrite magnet and ferrite magnet - ferrite magnet)						
Flexibility	Limited flexibility; valid for ferrite magnet - ferrite magnet (tested 100 cycles with 5x cable diameter, 20 cycles / minute)						
Weight	Approx. 300 g	Approx. 580 g	Approx. 1500 g	Approx. 5520 g	Approx. 4800 g	Approx. 2880 g	Approx. 2250 g

Table 247: 5CASDL.0018-00, 5CASDL.0050-00, 5CASDL.0100-00, 5CASDL.0300-00, 5CASDL.0250-00, 5CASDL.0200-00, 5CASDL.0150-00 - Technical data

Flex radius specification

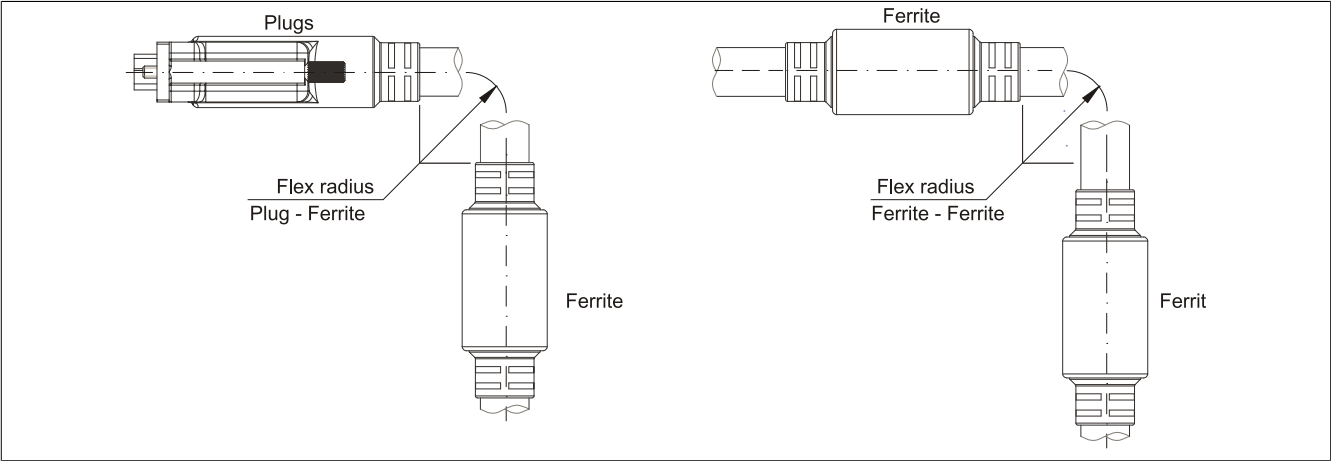


Image 145: Flex radius specification

Dimensions

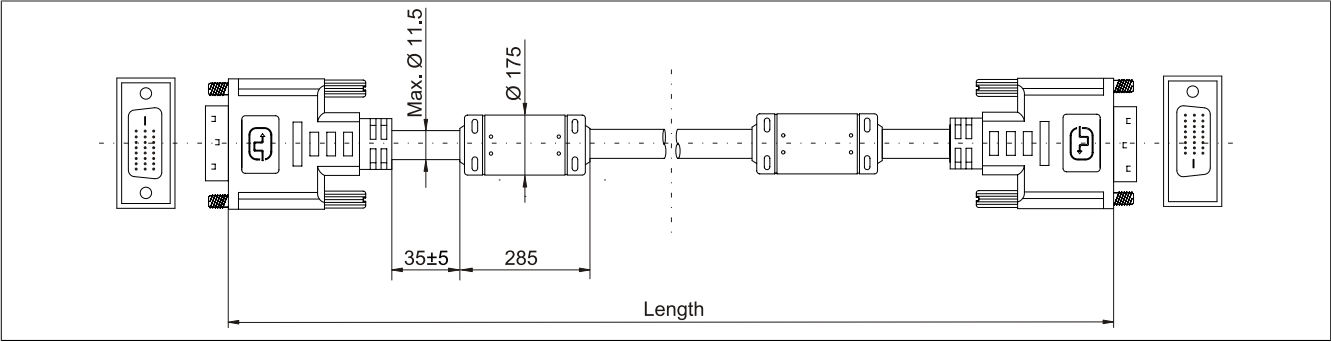


Image 146: 5CASDL.0xxx-00- Dimensions

Cable specifications

Warning!

If you want to build a suitable cable yourself, it should be wired according to these specifications.

If a self-built cable is used, B&R cannot guarantee that it will function properly. B&R guarantees the performance of all cables that they provide.

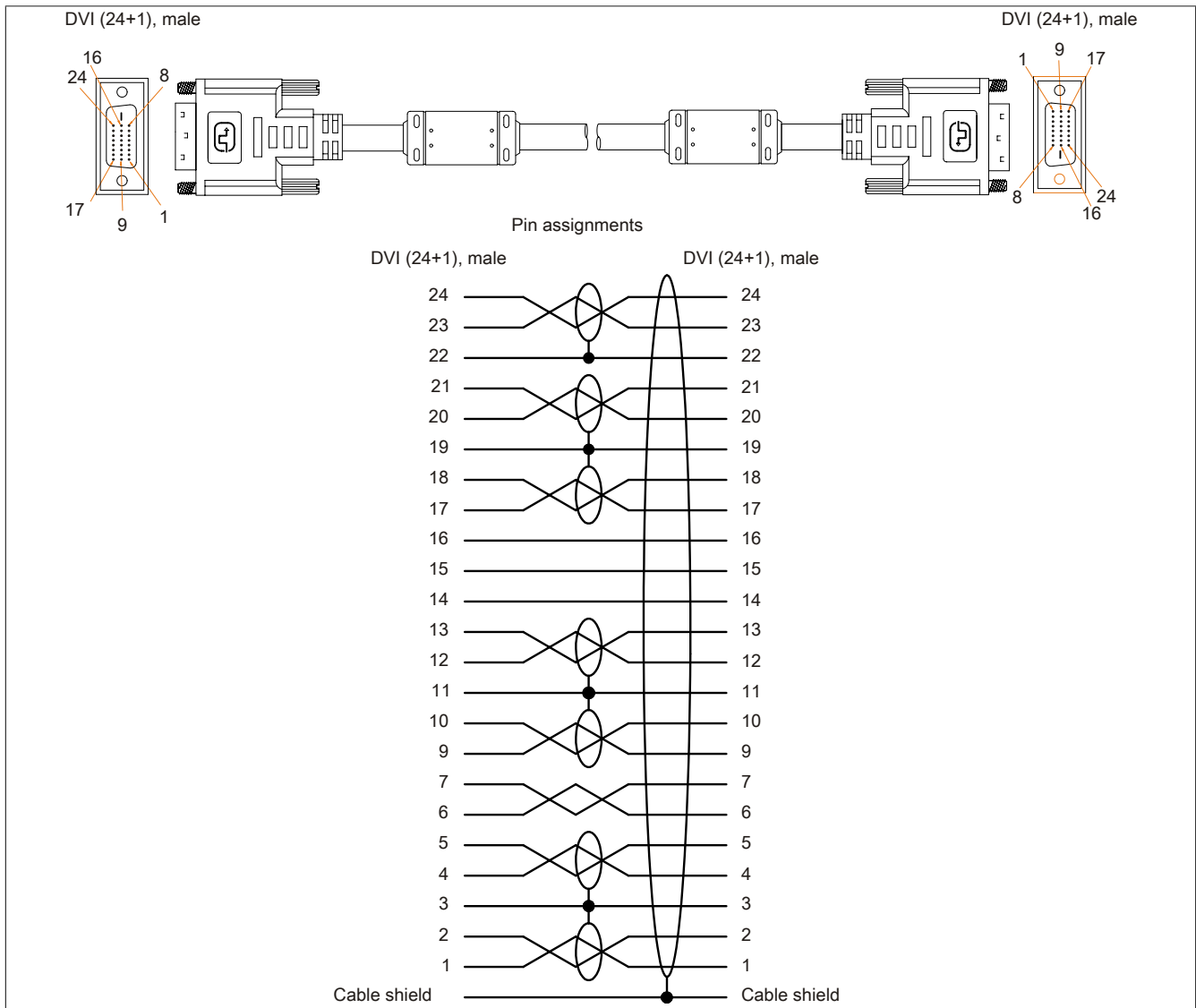


Image 147: 5CASDL.0xxx-00- Pin assignments

12.3 SDL cable with 45° plug

12.3.1 5CASDL.0xxx-01

General information

The 5CASDL.xxxx-01 SDL cables with 45° plug are designed for fixed layout.

Caution!

Cable can only be plugged in and unplugged when the device is turned off.

Order data

Model number	Short description	Figure
	SDL cables: 45° connectors	
5CASDL.0018-01	SDL cable; 45° connector, 1.8 m.	
5CASDL.0050-01	SDL cable; 45° connector, 5 m.	
5CASDL.0100-01	SDL cable; 45° connector, 10 m.	
5CASDL.0150-01	SDL cable; 45° connector, 15 m.	

Table 248: 5CASDL.0018-01, 5CASDL.0050-01, 5CASDL.0100-01, 5CASDL.0150-01 - Order data

Technical data

Product ID	5CASDL.0018-01	5CASDL.0050-01	5CASDL.0100-01	5CASDL.0150-01
General information				
Certification types	Yes Yes			
CE				
c-UL-us				
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	PVC Black			
Material				
Color				
Connector				
Type	2x DVI-D (24+1), male			
Connection cycles	100			
Contacts	Gold plated			
Mechanical protection	Metal cover with crimped stress relief			
Electrical properties				
Conductor resistance	≤93 Ω/km -			
AWG 24				
AWG 28				
Insulation resistance	Min. 10 MΩ/km			
Mechanical characteristics				
Dimensions	1.8 m ±30 mm 5 m ± 50 mm 10 m ±100 mm 15 m ±100 mm Max. 9 mm Max. 11.5 mm			
Length				
Diameter				
Flex radius	≥ 5x cable diameter (plug - ferrite magnet and ferrite magnet - ferrite magnet)			
Fixed installation				
Flexibility	Limited flexibility; valid for ferrite magnet - ferrite magnet (tested 100 cycles with 5x cable diameter, 20 cycles / minute)			
Weight	Approx. 300 g	Approx. 590 g	Approx. 2800 g	Approx. 2860 g

Table 249: 5CASDL.0018-01, 5CASDL.0050-01, 5CASDL.0100-01, 5CASDL.0150-01 - Technical data

Flex radius specification

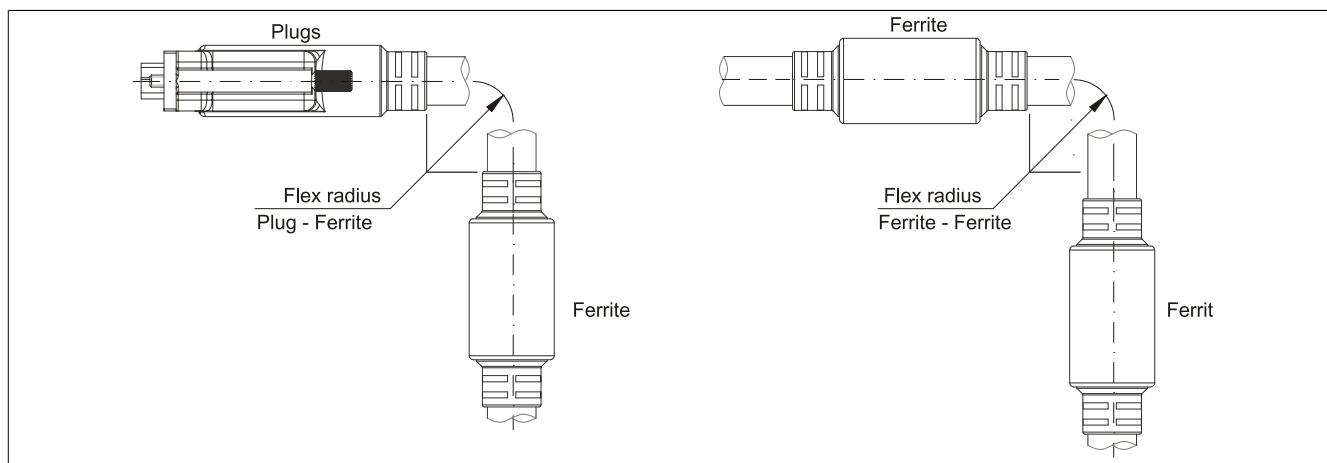


Image 148: Flex radius specification

Dimensions

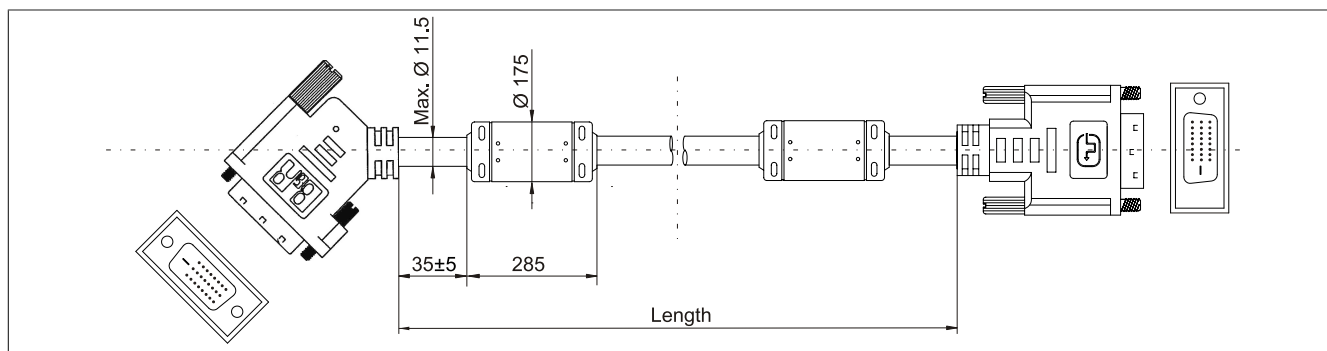


Image 149: 5CASDL.0xxx-01 - Dimensions

Cable specifications

Warning!

If you want to build a suitable cable yourself, it should be wired according to these specifications.

If a self-built cable is used, B&R cannot guarantee that it will function properly. B&R guarantees the performance of all cables that they provide.

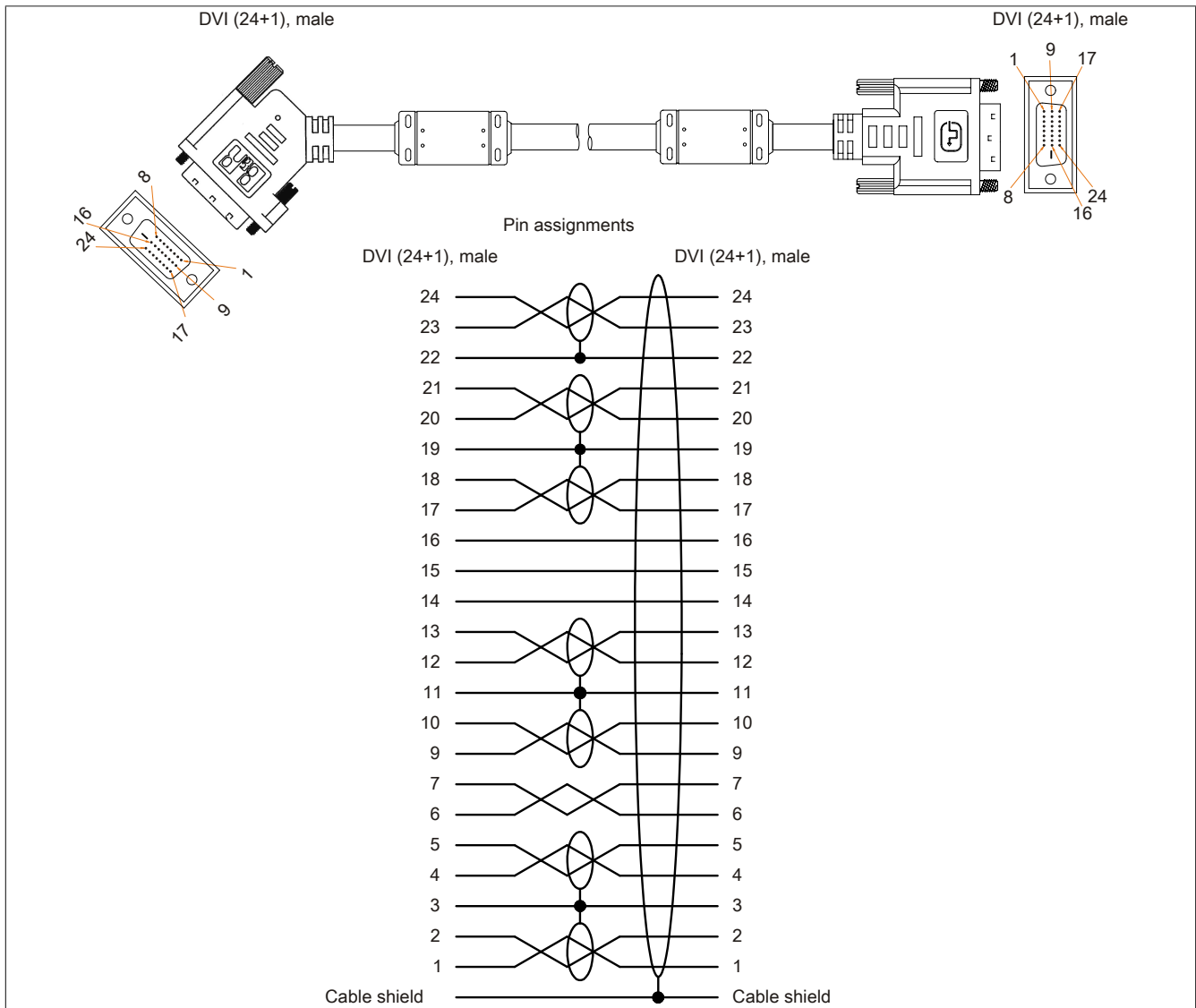


Image 150: 5CASDL.0xxx-01 - Pin assignments

12.4 SDL flex cable

12.4.1 5CASDL.0xxx-03

General information

The 5CASDL.0xxx-03 SDL flex cables are designed for use in both fixed and flexible installations (e.g. in swing arm systems).

Caution!

Cable can only be plugged in and unplugged when the device is turned off.

Order data

Model number	Short description	Figure
	SDL flex cables	
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 250: 5CASDL.0018-03, 5CASDL.0050-03, 5CASDL.0100-03, 5CASDL.0150-03, 5CASDL.0200-03, 5CASDL.0250-03, 5CASDL.0300-03 - Order data

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 types	Yes						
CE							
c-UL-us	Yes						
Cable structure							
Wire cross section	26 AWG (control wires) 26 AWG (DVI, USB, data)						
Characteristics	Free of halogen and silicon						
Shield	Individual cable pairs and entire cable						
Cable shielding	Aluminum foil clad + tinned copper mesh						
Outer sheathing	Special TMPU - semi gloss Black (B&R) SDL cable (UL) AWM 20236 80°C 30V E 63216						
Material							
Color							
Labeling							
Connector							
Type	2x DVI-D (24+1), male						
Connection cycles	Min. 200						
Contacts	Gold plated						
Mechanical protection	Metal cover with crimped stress relief						
Electrical properties							
Operating voltage	≤30 V						
Test voltage	1 kV						
Wire/wire							
Wire/shield	0.5 kV						
Wave impedance	100 ±10 Ω						
Conductor resistance	≤95 Ω/km ≤145 Ω/km						
AWG 24							
AWG 26							
Insulation resistance	> 200 MΩ/km						
Operating conditions							
Approbation	UL AWM 20236 80°C 30V						
Flame resistant	In accordance with UL758 (cable vertical flame test)						
Oil and hydrolysis resistance	According to VDE 0282-10						
Environmental conditions							
Temperature	-20 to 80°C -5 to 60°C -20 to 80°C						
Storage							
Moving							
Fixed installation							

Table 251: 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
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 (from plug - ferrite magnet)						
Flexible installation	≥ 10x cable diameter (from ferrite magnet - ferrite magnet)						
	≥ 15x cable diameter (from ferrite magnet - ferrite magnet)						
Flexibility	Flexible; valid for ferrite magnet - ferrite magnet (tested 300,000 cycles with 15x cable diameter, 4800 cycles / hour)						
Drag chain data							
Flex cycles	300.000						
Speed	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							
In operation	≤50 N						
During installation	≤400 N						

Table 251: 5CASDL.0018-03, 5CASDL.0050-03, 5CASDL.0100-03, 5CASDL.0150-03, 5CASDL.0200-03, 5CASDL.0250-03, 5CASDL.0300-03 - Technical data

Flex radius specification

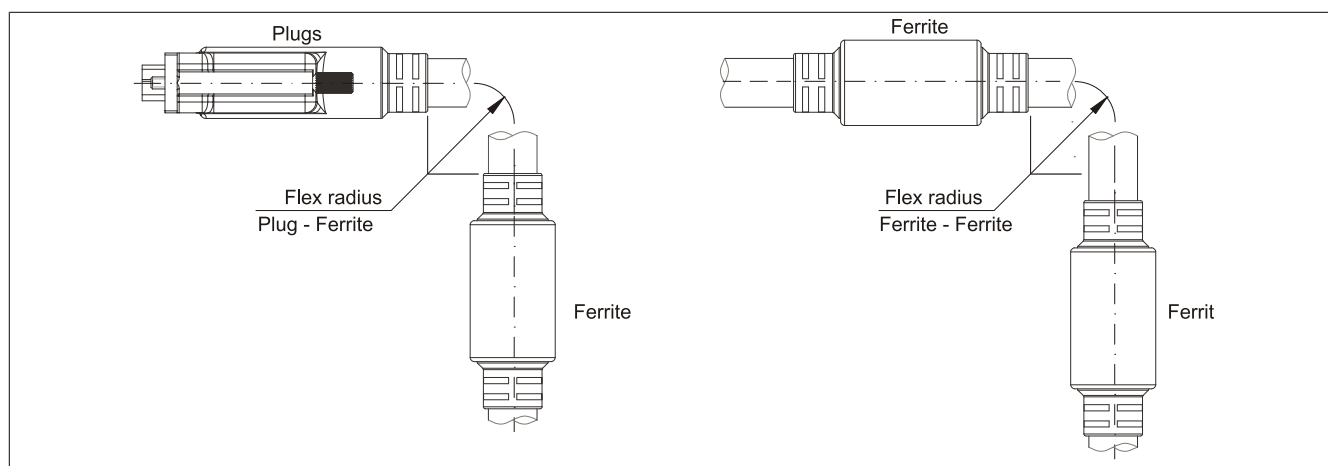


Image 151: Flex radius specification

Dimensions

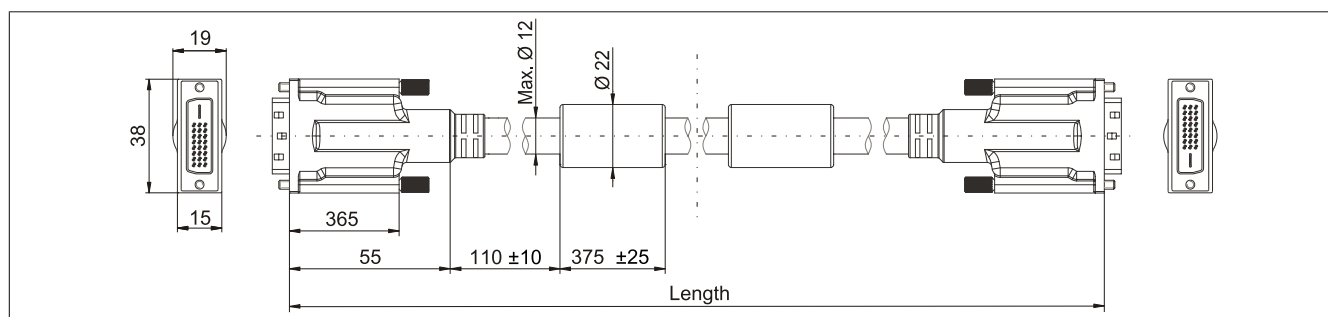


Image 152: 5CASDL.0xxx-03 - Dimensions

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	
	DDC cycle	24 AWG	
	DDC data	24 AWG	
	+5 V	24 AWG	
	mass	24 AWG	
Control wires	Hot Plug detect	24 AWG	

Table 252: Structure - SDL flex cable 5CASDL.0xxx-03

Cable specifications

Warning!

If you want to build a suitable cable yourself, it should be wired according to these specifications.

If a self-built cable is used, B&R cannot guarantee that it will function properly. B&R guarantees the performance of all cables that they provide.

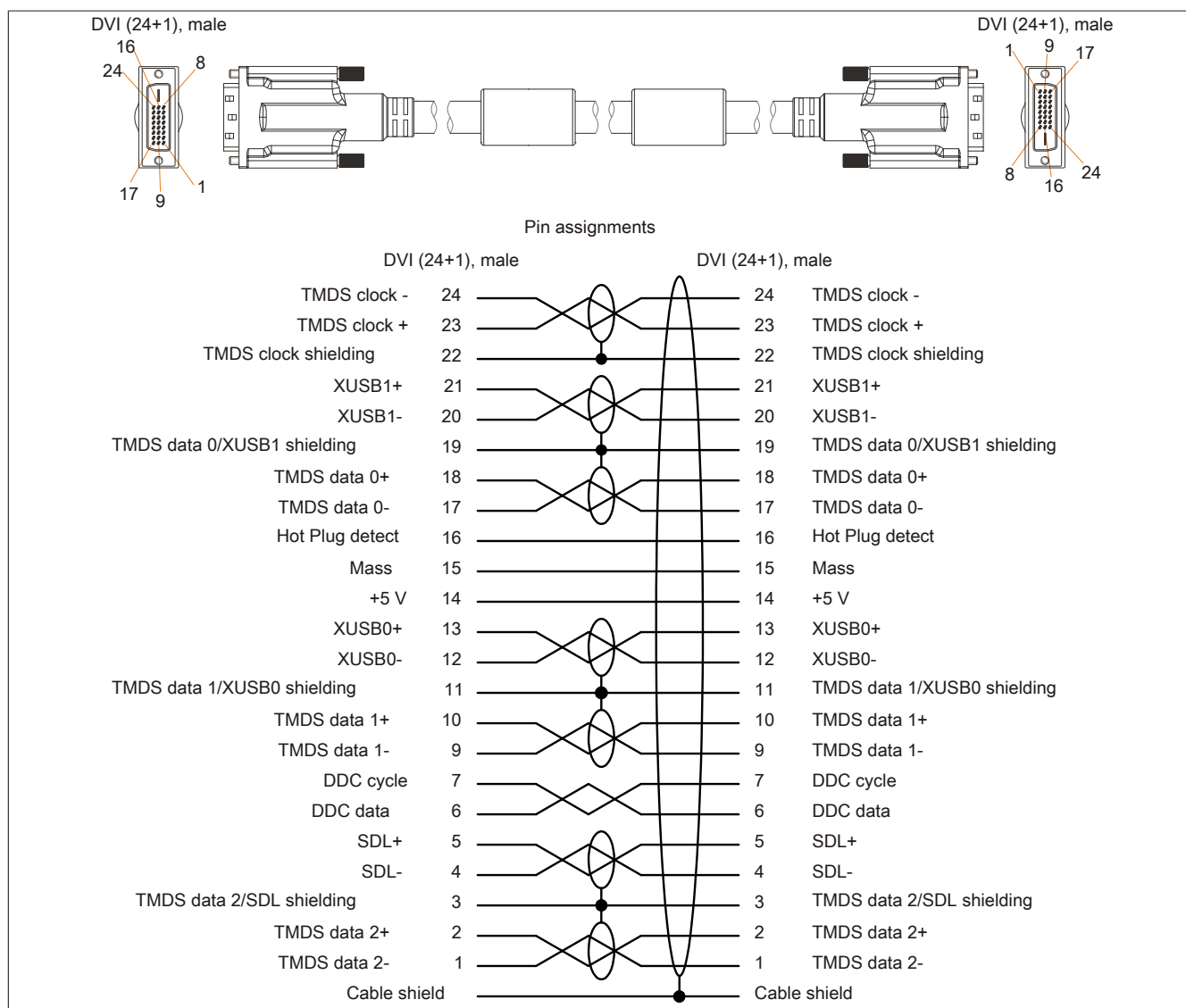


Image 153: 5CASDL.0xxx-03- Pin assignments

12.5 SDL flex cable with extender

12.5.1 5CASDL.0xx0-13

General information

The 5CASDL.xxxx-13 SDL flex cables with extender are designed for use in both fixed and flexible installations (e.g. in swing arm systems).

Caution!

Cable can only be plugged in and unplugged when the device is turned off.

Order data

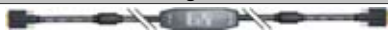
Model number	Short description	Figure
	SDL flex cables	
5CASDL.0300-13	SDL cable with extender, 30 m.	
5CASDL.0400-13	SDL flex cable with extender, 40 m.	
5CASDL.0430-13	SDL flex cable with extender, 43 m.	

Table 253: 5CASDL.0300-13, 5CASDL.0400-13, 5CASDL.0430-13 - Order data

Technical data

Product ID	5CASDL.0300-13	5CASDL.0400-13	5CASDL.0430-13
General information			
Certification types			
CE	Yes		
c-UL-us	Yes		
Cable structure			
Wire cross section	26 AWG (control wires) 26 AWG (DVI, USB, data)		
Characteristics	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 properties			
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 30V		
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		
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	

Table 254: 5CASDL.0300-13, 5CASDL.0400-13, 5CASDL.0430-13 - Technical data

Product ID	5CASDL.0300-13	5CASDL.0400-13	5CASDL.0430-13
Height	18.5 mm		
Flex radius			
Fixed installation	≥ 6x cable diameter (from plug - ferrite magnet) ≥ 10x cable diameter (from ferrite magnet - ferrite magnet) ≥ 15x cable diameter (from ferrite magnet - ferrite magnet)		
Flexible installation	Flexible; valid for ferrite magnet - ferrite magnet (tested 300,000 cycles with 15x cable diameter, 4800 cycles / hour)		
Flexibility			
Drag chain data			
Flex cycles	300.000		
Speed	4800 cycles / hour		
Flex radius	180 mm; 15x cable diameter		
Hub	460 mm		
Weight	Approx. 5430 g	Approx. 7200 g	Approx. 7790 g
Tension			
In operation	≤50 N		
During installation	≤400 N		

Table 254: 5CASDL.0300-13, 5CASDL.0400-13, 5CASDL.0430-13 - Technical data

Flex radius specification

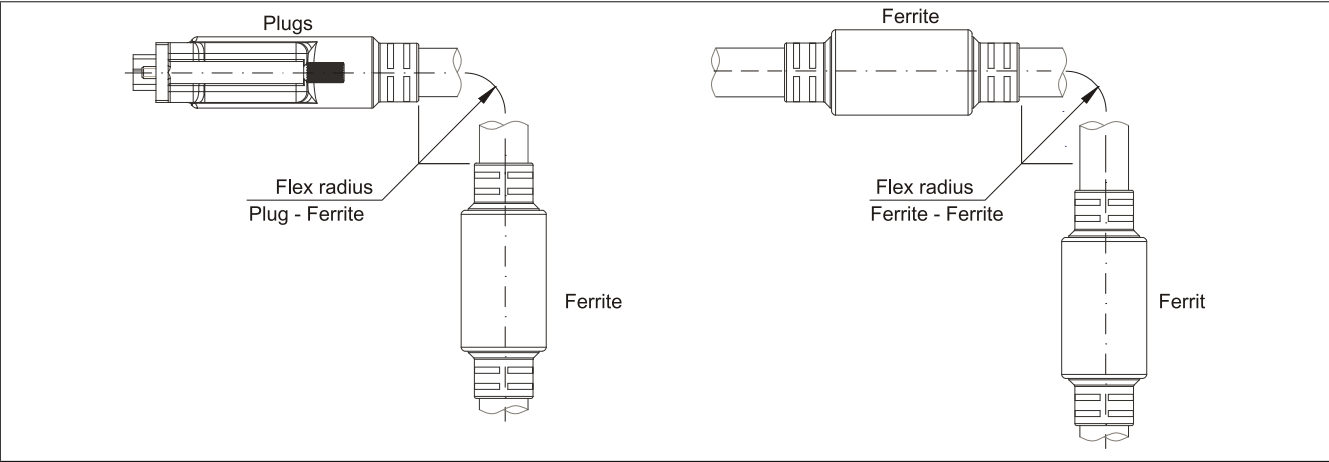


Image 154: Flex radius specification

Dimensions

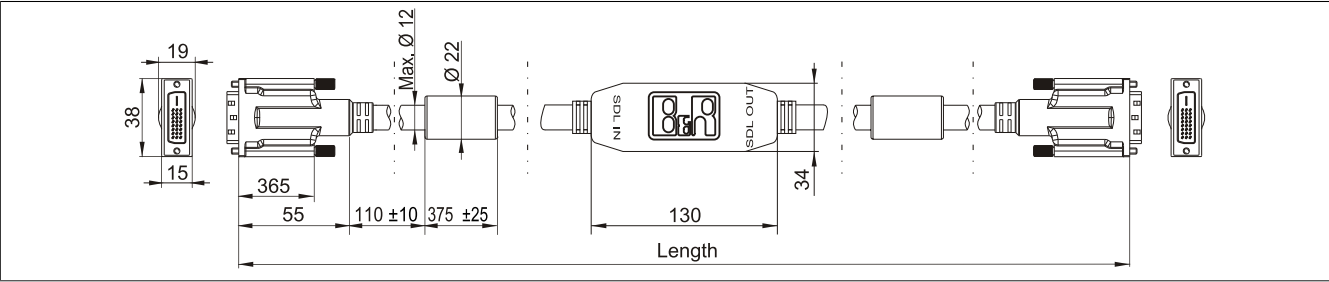


Image 155: 5CASDL.0xx0-13- Dimensions

Cable specifications

Warning!

If you want to build a suitable cable yourself, it should be wired according to these specifications.

If a self-built cable is used, B&R cannot guarantee that it will function properly. B&R guarantees the performance of all cables that they provide.

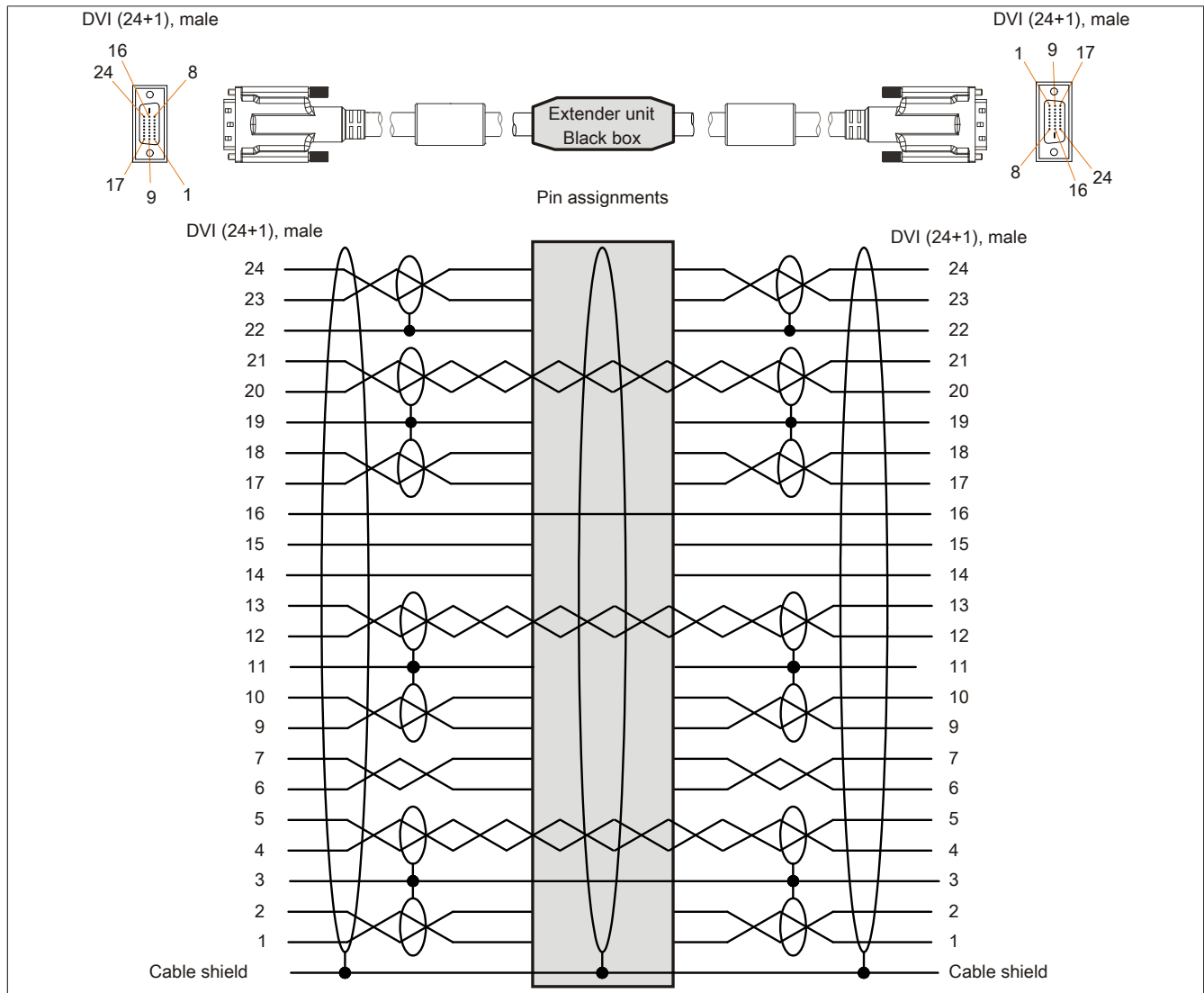


Image 156: 5CASDL.0xx0-13 - Pin assignments

Cable connection

The SDL flex cable with extender must be connected between the Industrial PC and Automation Panel 900 display unit in the correct direction. The signal direction is indicated on the extender unit for this purpose:

- Connect the end labeled "SDL IN" with the video output of e.g. the APC820 (monitor/panel output) or Panel OUT of an AP900 AP Link card.
- The "SDL OUT" end should be connected to the display unit (e.g. Automation Panel 900) via the Automation Panel Link insert card (Panel IN).

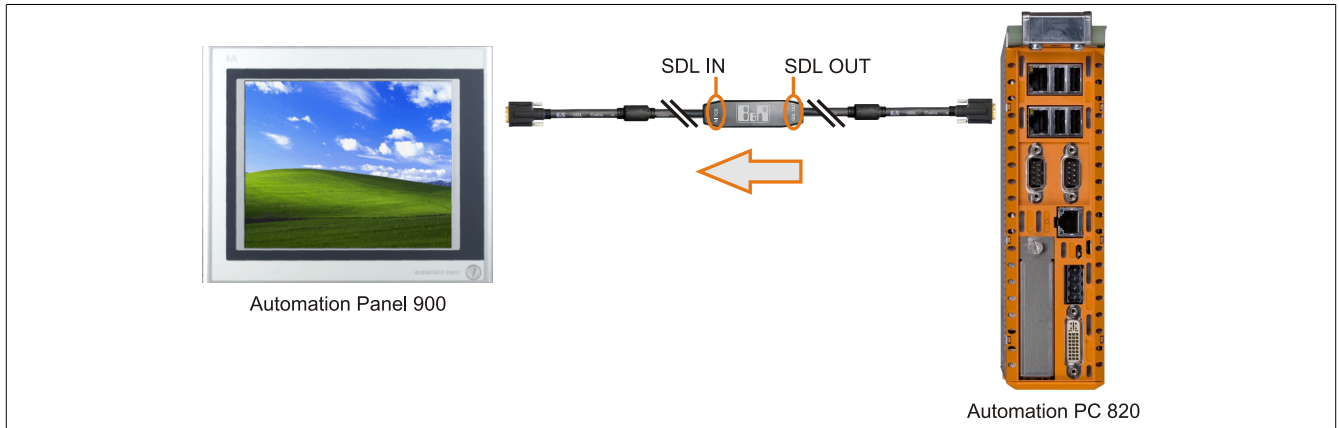


Image 157: Example of signal direction for the SDL flex cable with extender - APC820

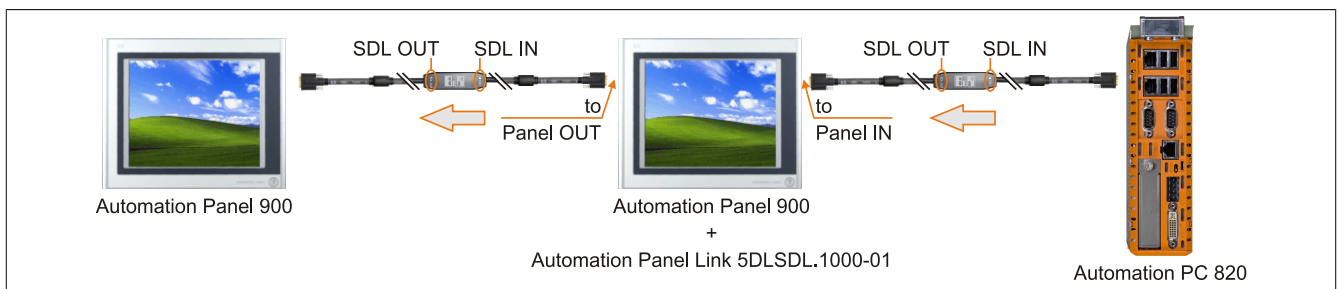


Image 158: Example of signal direction display - SDL flex cable with extender

12.6 USB cable

12.6.1 5CAUSB.00xx-00

General information

USB cables are designed for USB 2.0 transfer speed.

Order data

Model number	Short description	Figure
	USB cables	
5CAUSB.0018-00	USB 2.0 connecting cable type A - type B, 1.8 m.	
5CAUSB.0050-00	USB 2.0 connecting cable type A - type B, 5 m.	

Table 255: 5CAUSB.0018-00, 5CAUSB.0050-00 - Order data

Technical data

Product ID	5CAUSB.0018-00	5CAUSB.0050-00
General information		
Certification types		
CE	Yes	
c-UL-us	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 256: 5CAUSB.0018-00, 5CAUSB.0050-00 - Technical data

Cable specifications

Warning!

If you want to build a suitable cable yourself, it should be wired according to these specifications.

If a self-built cable is used, B&R cannot guarantee that it will function properly. B&R guarantees the performance of all cables that they provide.

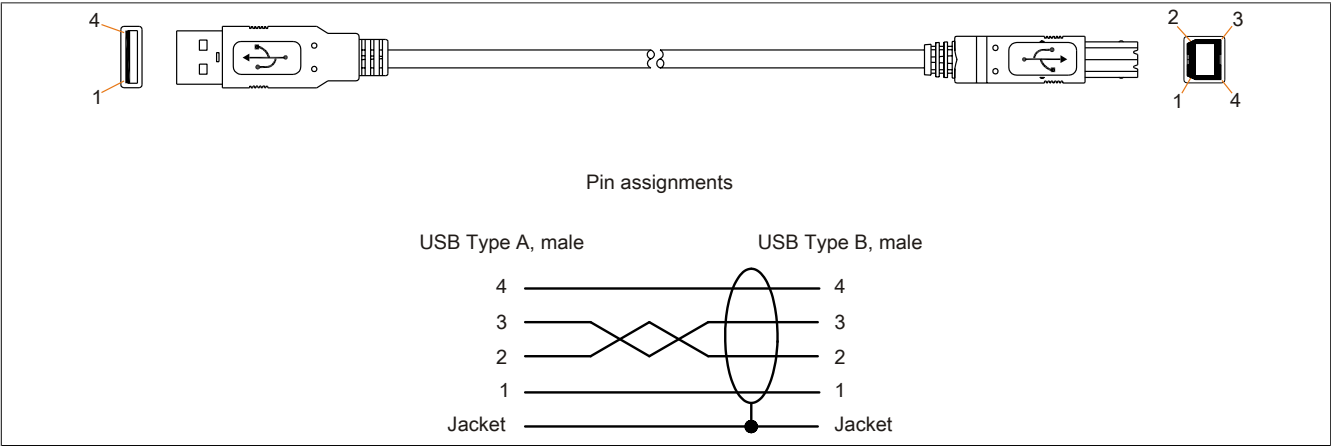


Image 159: 5CAUSB.00xx-00 - USB cable pin assignments

12.7 RS232 cable

12.7.1 9A0014.xx

Order data

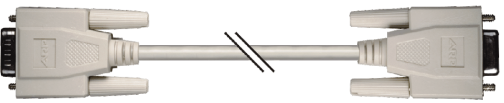
Model number	Short description	Figure
	RS232 cables	
9A0014.02	RS232 extension cable for remote operating of a display unit with touch screen, 1.8 m.	
9A0014.05	RS232 extension cable for remote operating of a display unit with touch screen, 5 m.	
9A0014.10	RS232 extension cable for remote operating of a display unit with touch screen, 10 m.	

Table 257: 9A0014.02, 9A0014.05, 9A0014.10 - Order data

Technical data

Product ID	9A0014.02	9A0014.05	9A0014.10
General information			
Certification types 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 258: 9A0014.02, 9A0014.05, 9A0014.10 - Technical data

Cable specifications

Warning!

If you want to build a suitable cable yourself, it should be wired according to these specifications.
If a self-built cable is used, B&R cannot guarantee that it will function properly. B&R guarantees the performance of all cables that they provide.

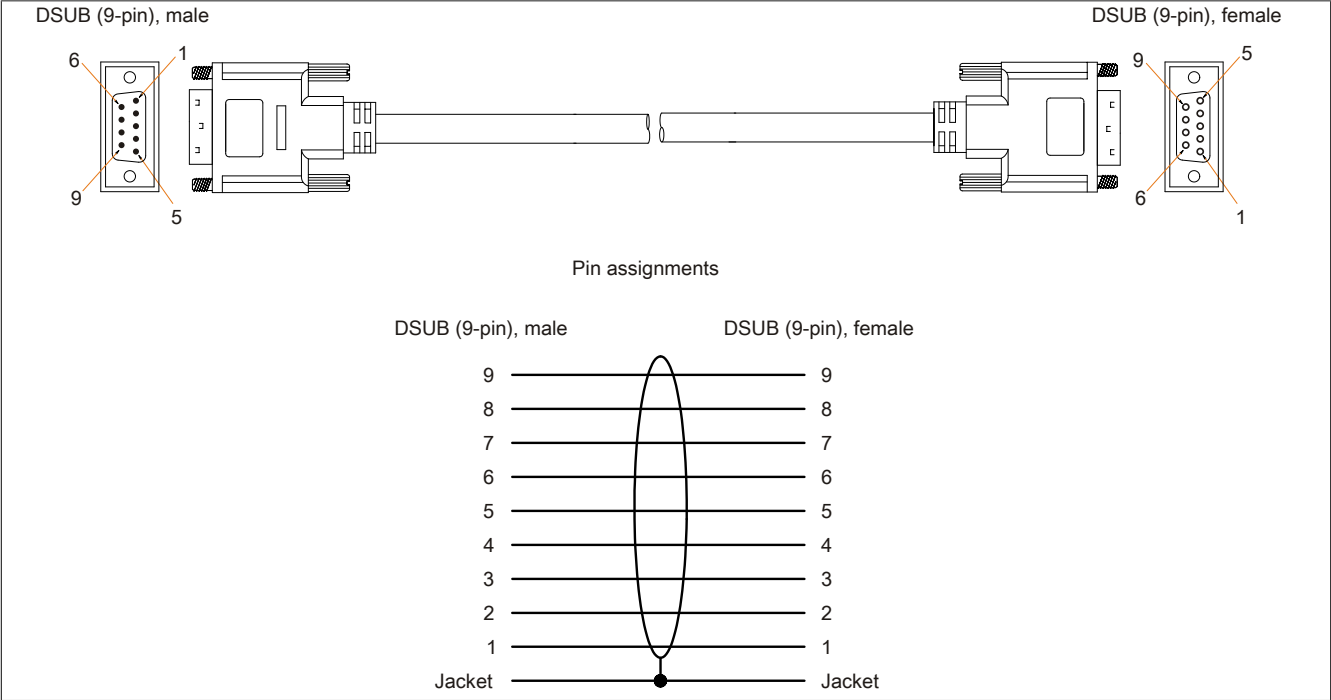


Image 160: 9A0014.xx - RS232 cable pin assignments

12.8 Internal supply cable 5CAMSC.0001-00

12.8.1 General information

This supply cable is used internally e.g. to supply special PCI cards. It is connected to the main board.
For requirements and procedures, see "Connection of an external device to the main board" on page 308.

Caution!

Cable can only be plugged in and unplugged when the device is turned off.

12.8.2 Order data

Model number	Short description	Figure
5CAMSC.0001-00	APC620 internal power supply cable - Customized -	Image not found for 5CAMSC.0001-00!

Table 259: 5CAMSC.0001-00 - Order data

12.8.3 Technical data

Product ID	5CAMSC.0001-00
General information	
Certification types 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 260: 5CAMSC.0001-00 - Technical data

Chapter 7 • Maintenance / Servicing

The following chapter describes service/maintenance work which can be carried out by a trained, qualified user.

1 Changing the battery

The lithium battery buffers the internal real-time clock (RTC) and the 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!

Replace battery with Renata, type CR2477N only. Use of another battery may present a risk of fire or explosion.

Battery may explode if mistreated. Do not recharge, disassemble or dispose of in fire.

The following replacement lithium batteries are available: 4A0006.00-000 (1 pc.) and 0AC201.91 (4 pcs.).

1.1 Battery status evaluation

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

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

Table 261: Meaning of battery status

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

1.2 Procedure

- Disconnect the B&R industrial PC.
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Remove the cover from the battery compartment and carefully pull out the battery using the removal strips.



Image 161: Remove battery

- The battery should not be held by its edges. Insulated tweezers may also be used for inserting the battery.

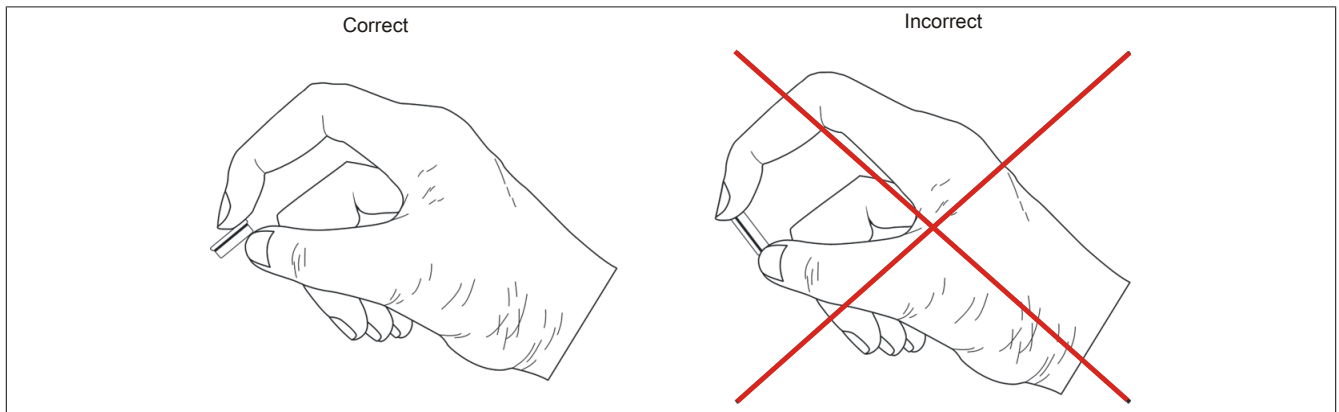


Image 162: Battery handling

- Insert the new battery with correct polarity.



Image 163: Battery polarity

- To make the next battery change easier, be sure the removal strip is in place when inserting battery.
- Reconnect power supply to the B&R industrial PC (plug in power cable and press power button).
- Date and time might need to be reset in BIOS.

Warning!

Lithium batteries are considered hazardous waste. Used batteries should be disposed of according to local requirements.

2 Cleaning

Danger!

The unit can only be cleaned when turned off in order to prevent unintentionally executing functions by actuating the touch screen or pressing keys.

A moist towel should be used to clean the device. When moistening the cloth, use only water with detergent, screen cleaning agent, or alcohol (ethanol). The cleaning agent should be applied to the cloth beforehand, not sprayed directly on the device! Never use aggressive solvents, chemicals, scouring agents, pressurized air or steam jet.

Information:

Displays with a touch screen should be cleaned regularly.

3 Exchanging the CompactFlash

The CompactFlash card can be exchanged quickly and easily by pressing the ejector (see image) with a pointed object such as a pen.

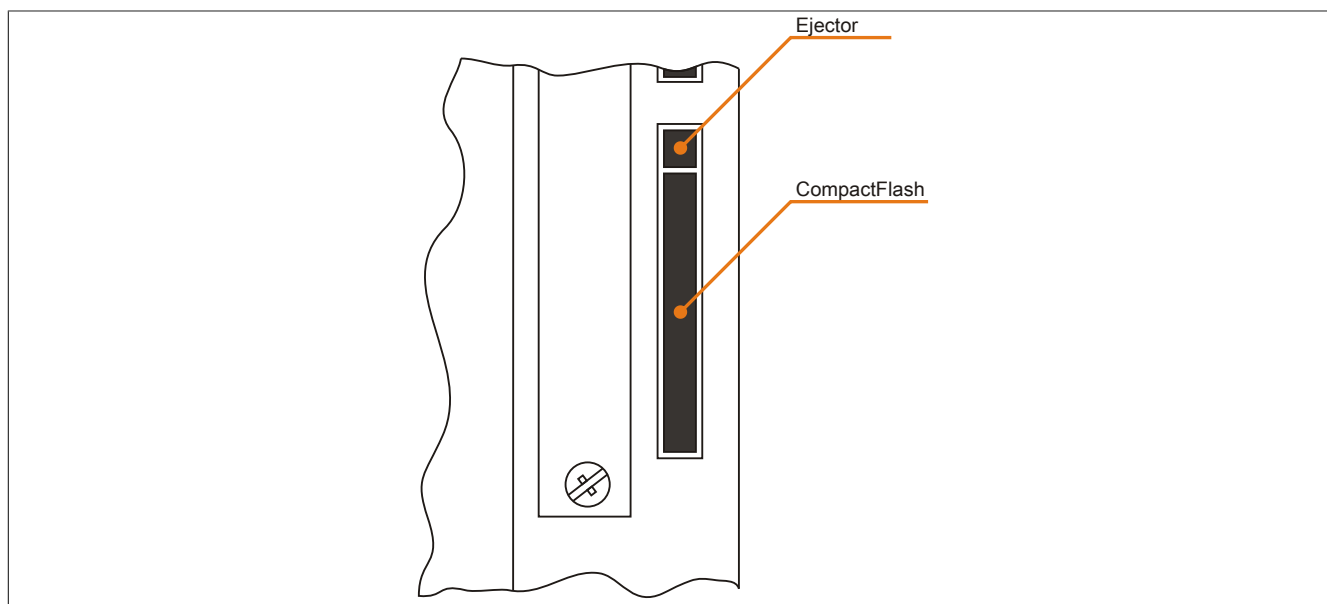


Image 164: CompactFlash + ejector (sample photo)

Caution!

Turn off the power before exchanging the CompactFlash card!

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.



Image 165: Loosening the ¼ turn screws

2. Insert the compact SATA drive and tighten the ¼ turn screws.



Image 166: 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 (not the power supply!) 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.



Image 167: Loosening the ¼ turn screws

4. Insert the slide-in drive and tighten with the two ¼ turn screws.

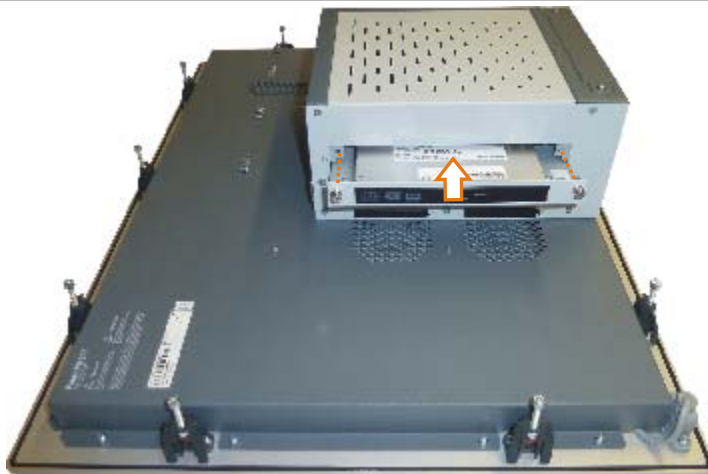


Image 168: Installing the slide-in drive

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 (not the power supply!) 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.



Image 169: Loosening the ¼ turn screws

4. Insert the slide-in compact adapter and tighten the two ¼ turn screws.

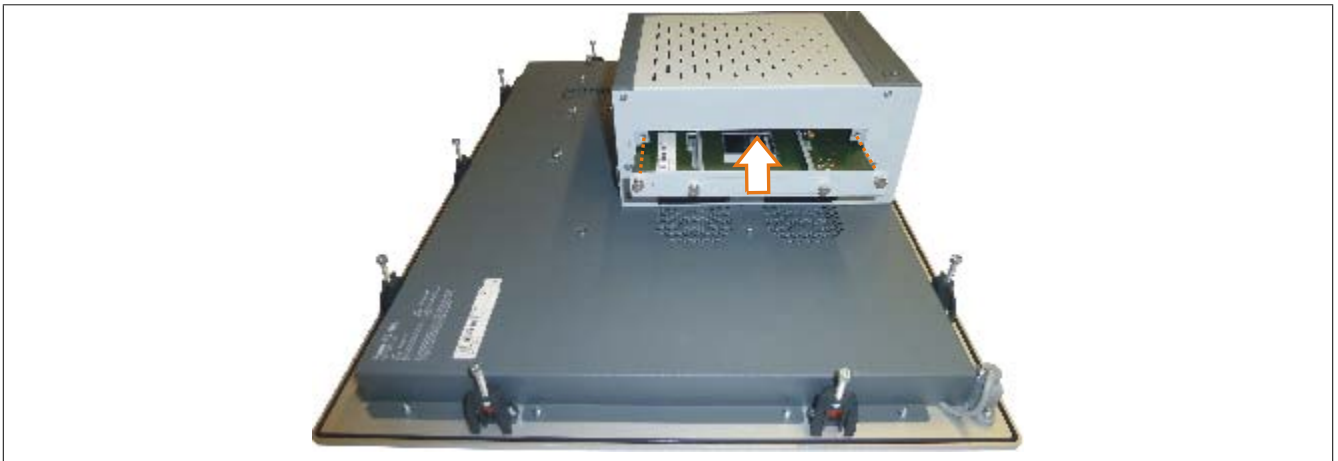


Image 170: Installing the slide-in compact adapter

5. Once the adapter has been installed, the slide-in compact drive can be inserted.



Image 171: 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.

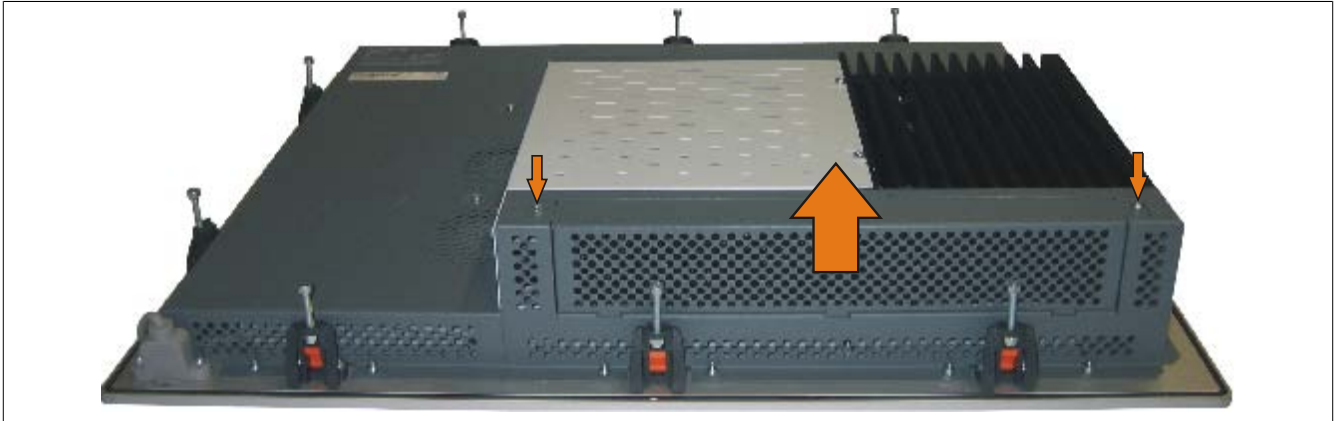


Image 172: Removing the fan kit cover

2. Insert fan kit frame and press down until it is fully fastened into the terminal.

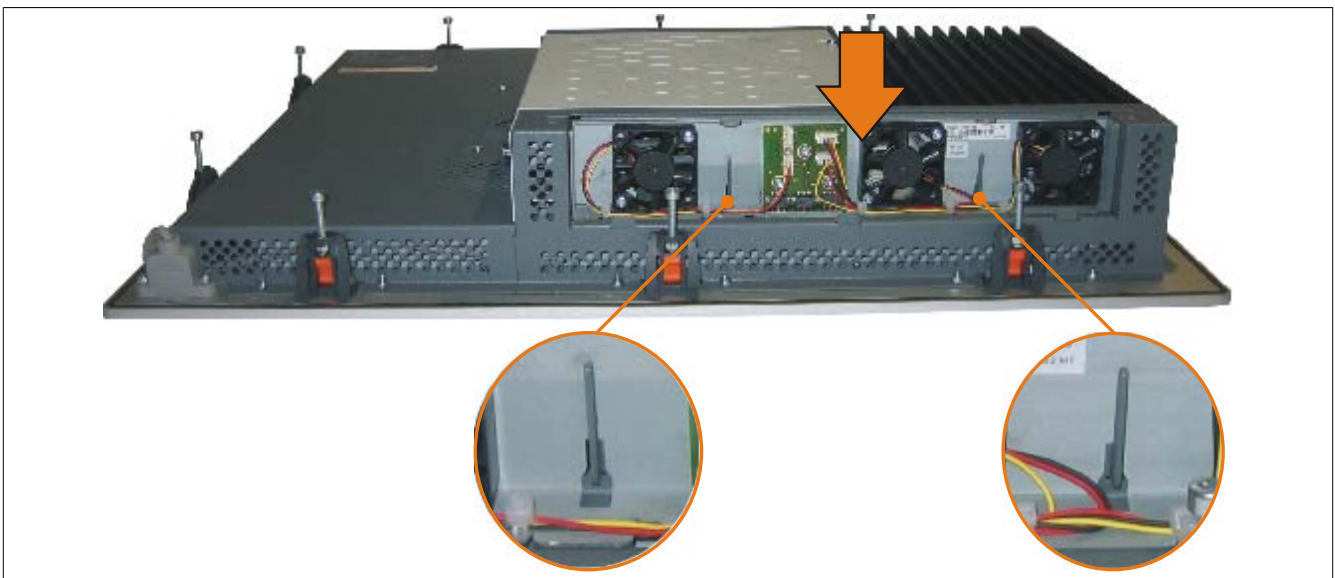


Image 173: Inserting the fan kit

3. Place the dust filter in the fan kit cover and secure with the filter clasp.

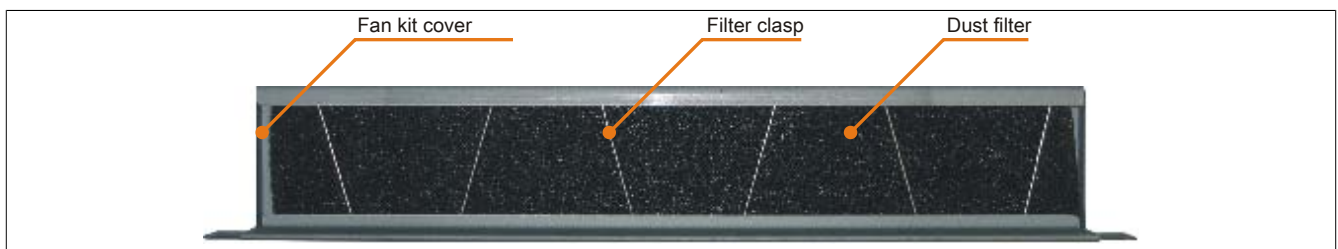


Image 174: Securing the dust filter and filter clasp

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.

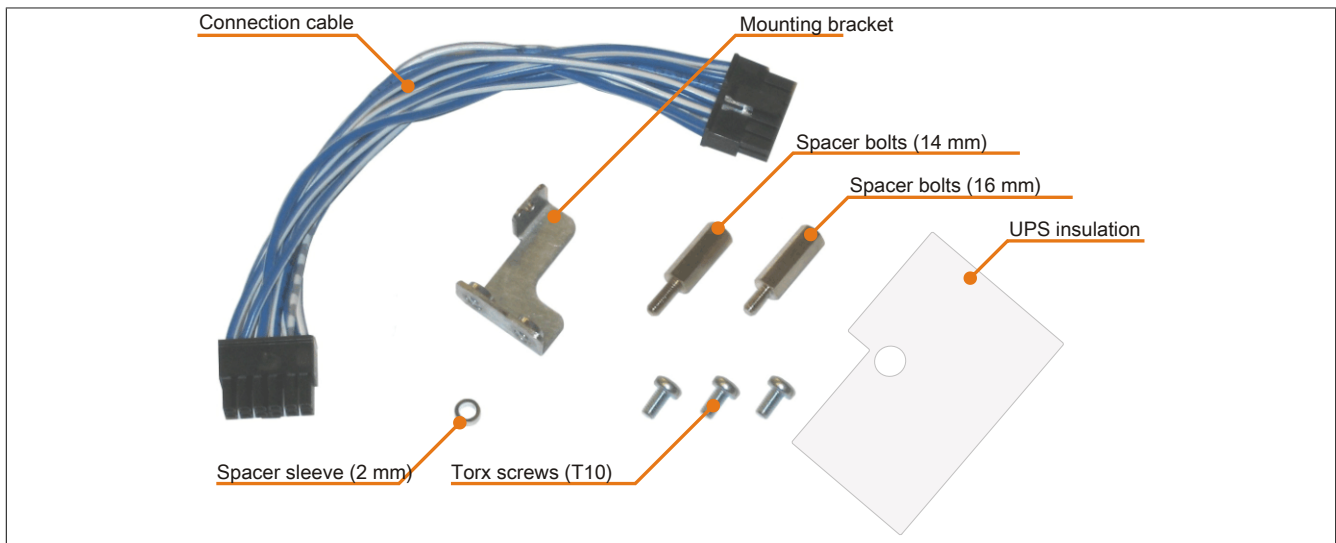


Image 175: 5AC600.UPS1-00 Add-on UPS module - Installation materials

1. Remove the side cover (see "Mounting the side cover" on page 303).
2. Remove UPS module cover by removing the 2 marked Torx screws (T10).

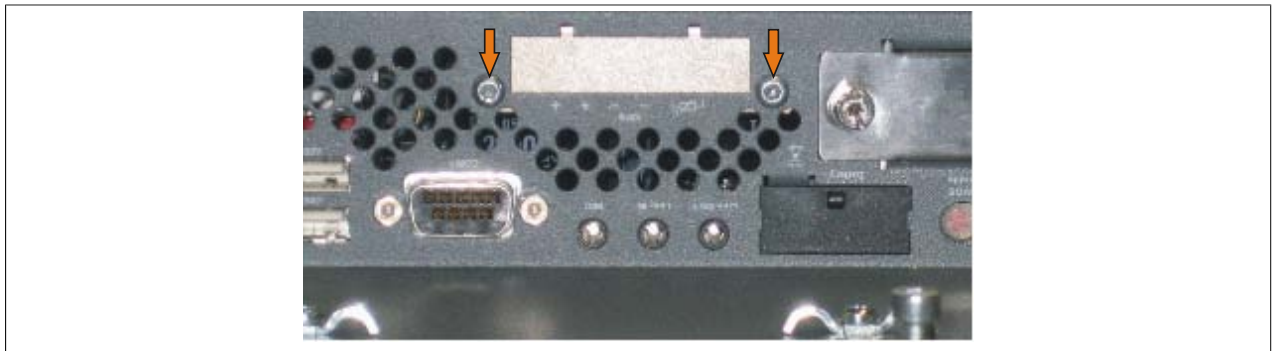


Image 176: Removing the UPS module cover

3. Install UPS module with 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.

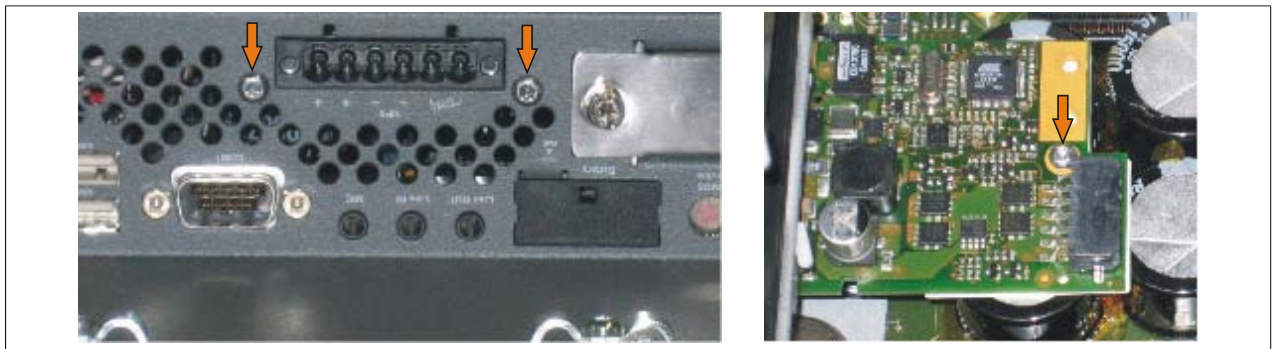


Image 177: Installing the UPS module

4. Plug in connection cable (see marked socket).

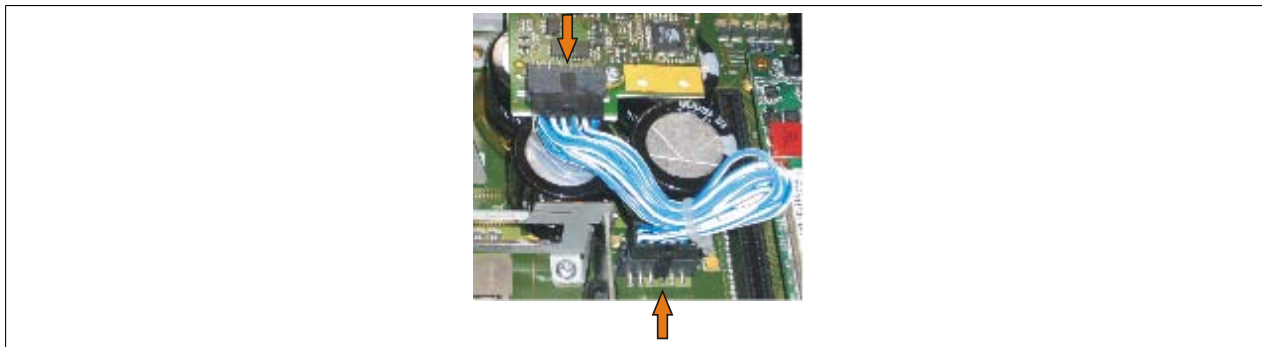


Image 178: Plugging in the connection cable

Information:

When connecting the cable, make sure that the connector locking mechanism is engaged.

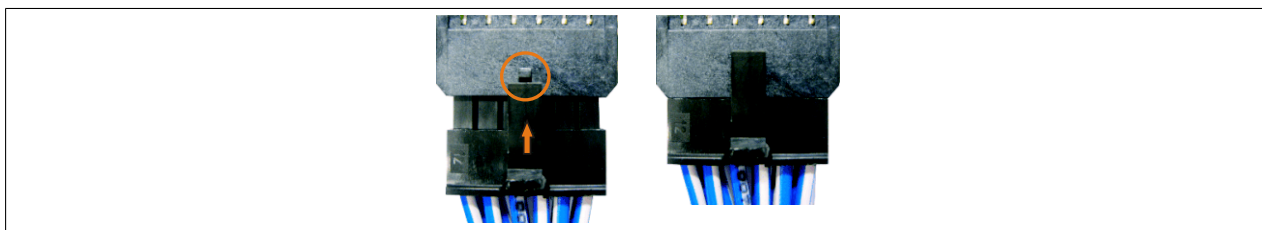


Image 179: Connector locking mechanism

5. Attach the side cover.

9 Installing / exchanging the bus unit

Bus units can be installed and exchanged in system units with 1 or 2 card slot expansion.

9.1 Procedure

1. Disconnect the power supply to the Panel PC 800.
2. Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
3. Remove the side cover (see "Mounting the side cover" on page 303).
4. Loosen the Torx screws (T10) mounted to the main board.



Image 180: Removing the screws

5. Plug the bus unit into the bus unit slot and fasten using three Torx screws (T10).

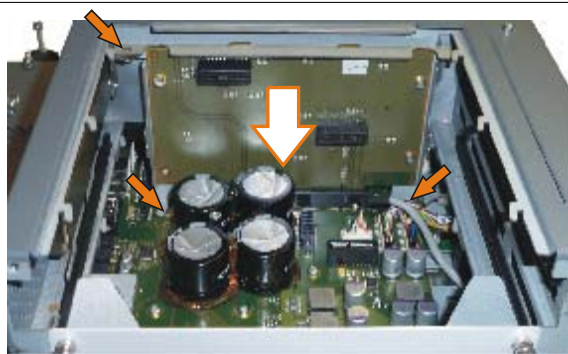


Image 181: Installing the bus unit

6. Attach the side cover.

10 Installing / exchanging the option board

1. Remove the side cover (see "Mounting the side cover" on page 303).
2. Remove 1 card slot or 2 card slot expansion if present.

10.1 Procedure for the option board 5AC803.BC01-00

1. Loosen the Torx screws (T10) mounted to the main board.



Image 182: Removing the screws

2. Place option board and guide rails in the intended positions and fasten using the Torx screws (T10) removed earlier.

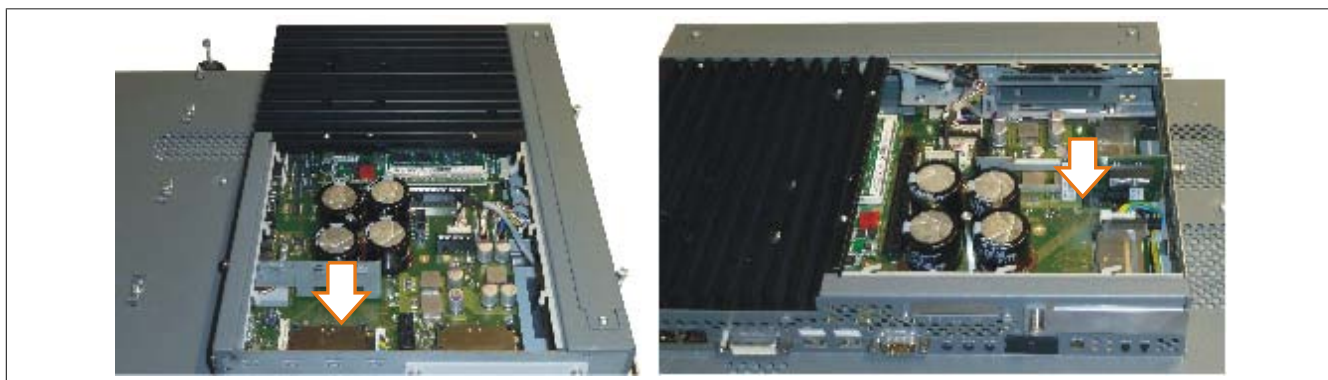


Image 183: Installing the 5AC803.BC01-00 option board

3. Attach the side cover.

10.2 Procedure for the option board 5AC803.BC02-00

1. Plug option board into the intended slot.



Image 184: Installing the 5AC803.BC02-00 option board

2. Attach the side cover.

11 Installing / exchanging the PCIe plug-in card

11.1 Procedure

1. Loosen the 1/4 turn screws and remove PCIe module cover.



Image 185: Removing the PCIe module cover

2. Slide PCIe plug-in card into place.

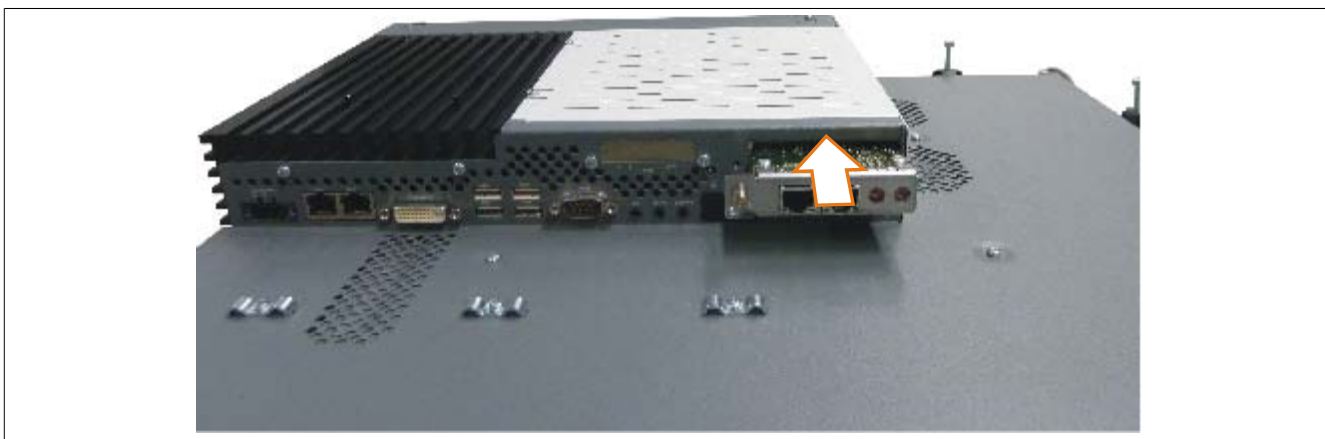


Image 186: Inserting the PCIe plug-in card

3. Fasten PCIe plug-in card using the 1/4 turn screws.

12 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.

12.1 PPC800 without expansion

1. Disconnect the power supply to the Panel PC 800.
2. Touch the housing or ground connection (not the power supply!) 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).

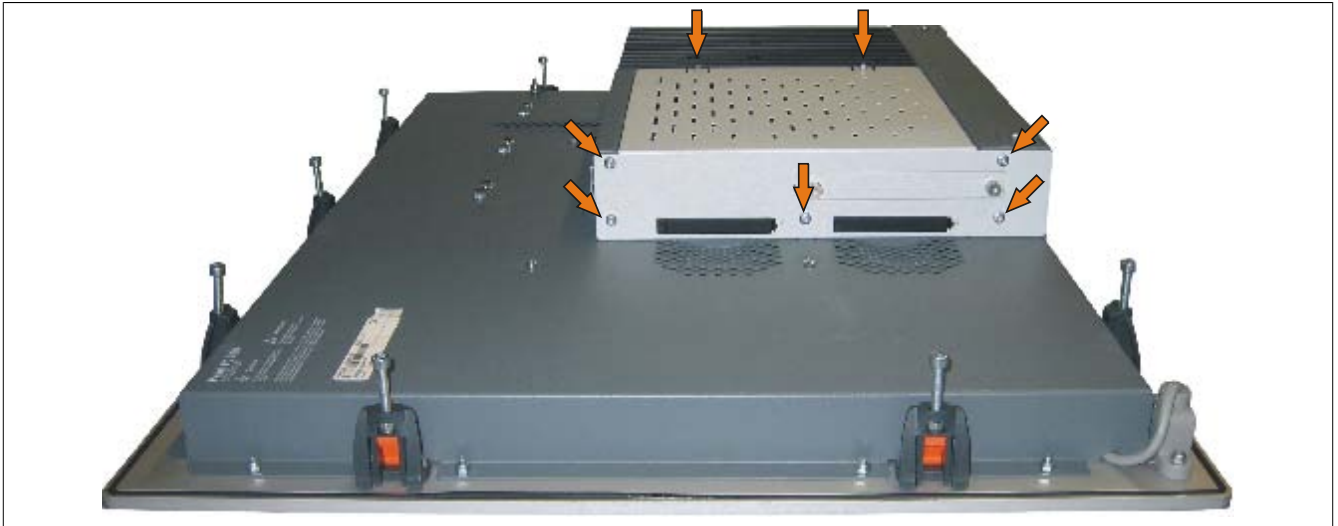


Image 187: Mounting the side cover on a PPC800 without expansion

12.2 PPC800 with expansion

1. Disconnect the power supply to the Panel PC 800.
2. Touch the housing or ground connection (not the power supply!) 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).

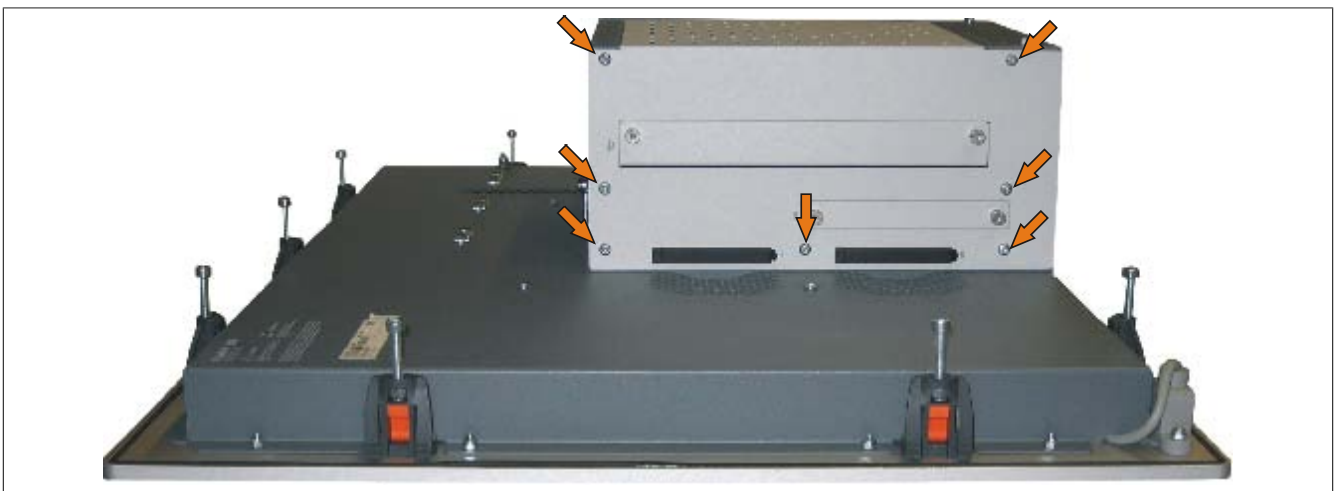


Image 188: Mounting the side cover on a PPC800 with expansion (1 slot expansion shown in image)

13 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-03	5ACPCI.RAIC-04	160 GB hard disk
5ACPCI.RAIC-05	5MMHDD.0250-00	250 GB hard disk

Table 262: Overview of required replacement SATA HDD for PCI SATA HDD RAID controller

A size 10 Torx screwdriver is needed for exchanging the hard disk.

13.1 Procedure

1. Disconnect the power supply.
2. Touch the housing or ground connection (not the power supply!) 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).

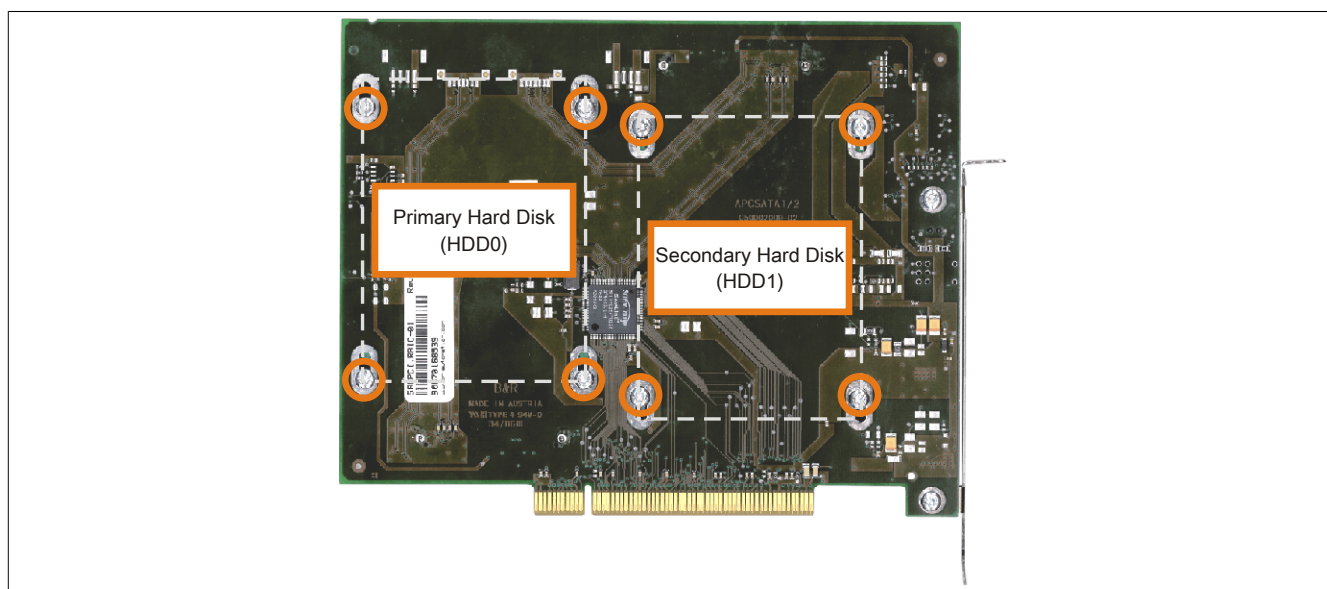


Image 189: Screw layout on the back side of the SATA RAID controller 5ACPCI.RAIC-03

6. On the front side, slide the hard disk down and away (image 1).
7. Insert the new hard disk carefully into the connector (image 2), being careful to only touch it on the front, and not on the top.

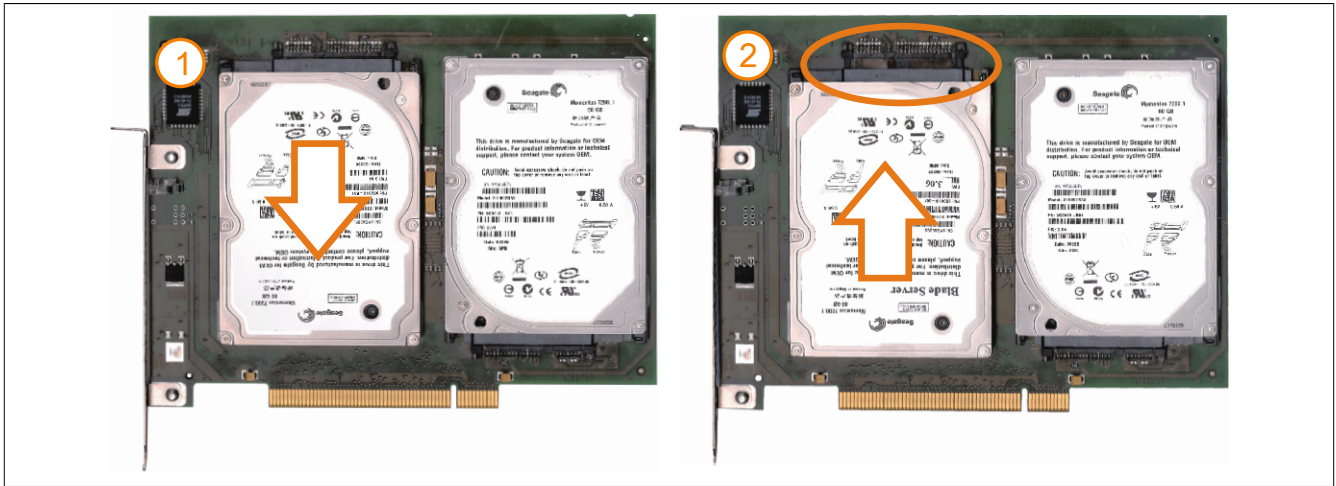


Image 190: Hard disk exchange

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 Critical status - press any key to enter Configuration Utility".
11. A rebuild must be executed in the SATA RAID BIOS - see "Rebuild mirrored set" on page 131.

Appendix A

1 Maintenance Controller Extended (MTCX)

The MTCX controller (FPGA processor) is located on the main board (part of every system unit).

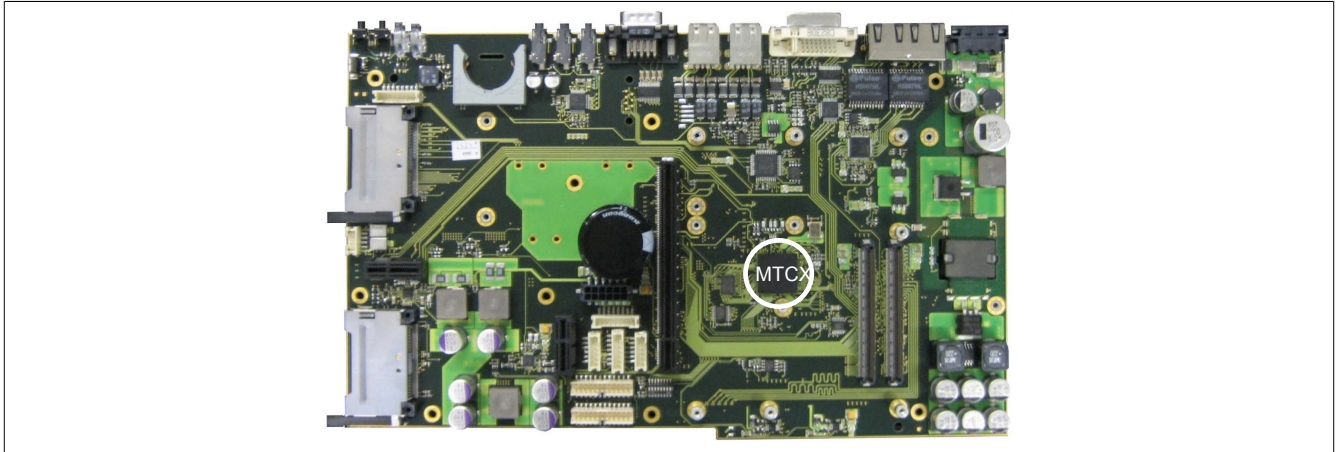


Image 191: MTCX controller location

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)

The MTCX functions can be added with a firmware upgrade¹⁾⁾. 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 for download from 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 263: 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: $44^{\circ}\text{C} + 16^{\circ}\text{C} = 60^{\circ}\text{C}$ --> 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 Connection of an external device to the main board

A plug on the main board enables branching of +5 VDC and +12 VDC for the internal supply of e.g. special PCI cards.

The voltage can be accessed using the "Internal supply cable 5CAMSC.0001-00" on page 286. The connector is located near the reset or power button (see image). The PPC800 side cover (see "Mounting the side cover" on page 303) and possibly also the slide-in drives, PCIec and PCI cards must be removed to reach the connector.



Image 192: 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	Max. 5 watts	
3	GND		
4	+5 VDC		

Table 264: Pin assignments - 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 entire device. For the entire device in which this individual component is used, refer to the data given specifically for the entire device.

Product ID	Touch Screen AMT 5-wire
General information	
Certification	
CE	Yes
c-UL-us	Yes
Manufacturer	AMT
Release pressure	< 1 N
Light permeability	81 ±3%
Environmental conditions	
Temperature	
Operation	- 20 to 70°C
Storage	- 40 to 80°C
Transport	- 40 to 80°C
Relative humidity	
Operation	90% at max. 50°C
Storage	90% RH at max. 60°C for 504 hours
Transport	90% RH at max. 60°C for 504 hours
Operating conditions	
Service life	36 million touch operations on the same point (release pressure: 250 g, interval: 2x per second)
Chemical resistance ¹⁾	Acetone, methylene chloride, methyl ethyl ketone, isopropyl alcohol, hexane, turpentine, mineral spirits, unleaded gasoline, diesel, motor oil, gear lubricating oil, antifreeze, ammonia-based glass cleaner, chemical cleaning agents, household cleaning agents, vinegar, coffee, tea, lubricant, cooking oil, salt
Activation	Finger, pointer, credit card, glove
Drivers	Touch screen drivers are available from the Downloads area on the B&R website (www.br-automation.com).

Table 265: Technical data - Touch Screen AMT 5-wire

1) The active area of the touch screen is resistant to these chemicals for a timeframe of one hour at 25°C.

3.2 Temperature humidity diagram

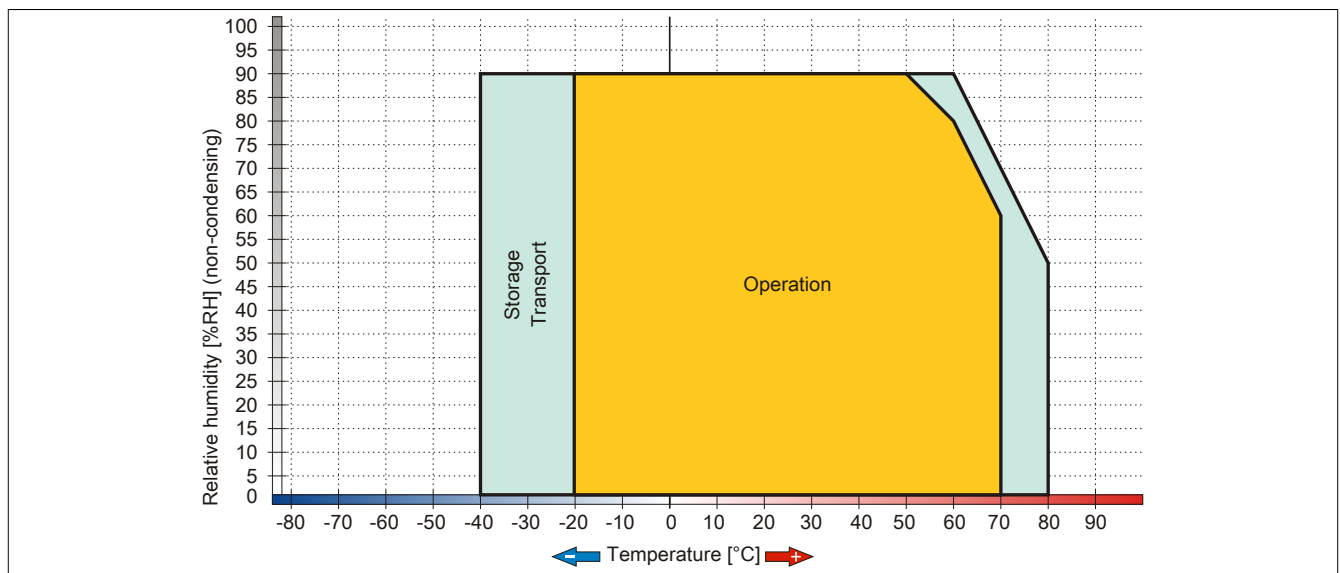


Image 193: Temperature humidity diagram - AMT touch screen 5-wire

3.3 Cleaning

Danger!

The unit can only be cleaned when turned off in order to prevent unintentionally executing functions by actuating the touch screen or pressing keys.

A moist towel should be used to clean the device. When moistening the cloth, use only water with detergent, screen cleaning agent, or alcohol (ethanol). The cleaning agent should be applied to the cloth beforehand, not sprayed directly on the device! Never use aggressive solvents, chemicals, scouring agents, pressurized air or steam jet.

Information:

Displays with a touch screen should be cleaned regularly.

4 Panel membrane

The panel membrane conforms to DIN 42115 (section 2). This means it is resistant to exposure to the following chemicals for a 24-hour period with no visible signs of damage:

Information:

The following characteristics, features, and limit values only apply to this individual component and can deviate from those specified for the entire device.

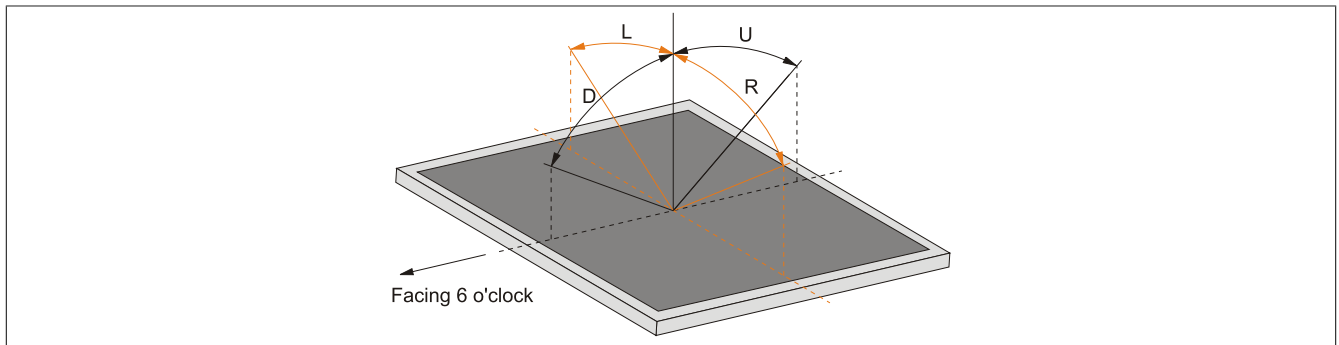
Ethanol Cyclohexanol Diacetone alcohol Glycol Isopropanol Glycerine Methanol Triacetin Dowandol DRM/PM	Formaldehyde 37 to 42% Acetaldehyde Aliphatic hydrocarbons Toluene Xylene White spirits	Trichloroethane Ethyl acetate Diethyl ether N-Butyl acetate Amyl acetate Butylcellosolve Ether
Acetone Methyl ethyl ketone Dioxan Cyclohexanone MIBK Isophorone	Formic acid < 50% Acetic acid < 50% Phosphoric acid < 30% Hydrochloric acid < 36% Nitric acid < 10% Trichloroacetic 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)
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 Universal brake fluid Aviation fuel Gasoline Water Sea water Decon	Dibutyl phthalate Dioctyl phthalate Sodium carbonate

Table 266: 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

The viewing angle information of the display types (R, L, U, D) can be seen in the technical data for the individual components.



6 Mounting compatibilities

This section describes the compatibility of the installation dimensions for the Power Panel 100/200, Power Panel 300/400, Power Panel 500, Automation Panel 900, Automation Panel 700 and Panel PC 800 units according to the respective device diagonals.

The outer dimensions of the device types are identical for the respective diagonals.

The different device types are abbreviated as follows:

Device type	Abbreviation
Power Panel 100/200	PP100/200
Power Panel 300/400	PP300/400
Power Panel 500	PP500
Automation Panel 900	AP900
Panel PC 700	PPC700
Panel PC 800	PPC800

Table 267: Product abbreviations

6.1 Compatibility overview

The following table offers a brief overview of the devices PP100/200, PP300/400, PP500, AP900, PPC700 and PPC800. Detailed information can be found in the section 6.2 "Compatibility details" on page 314.

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 268: Device compatibility overview

6.2 Compatibility details

6.2.1 Example

The measurement values (all in mm) in the following figures have the following meaning.

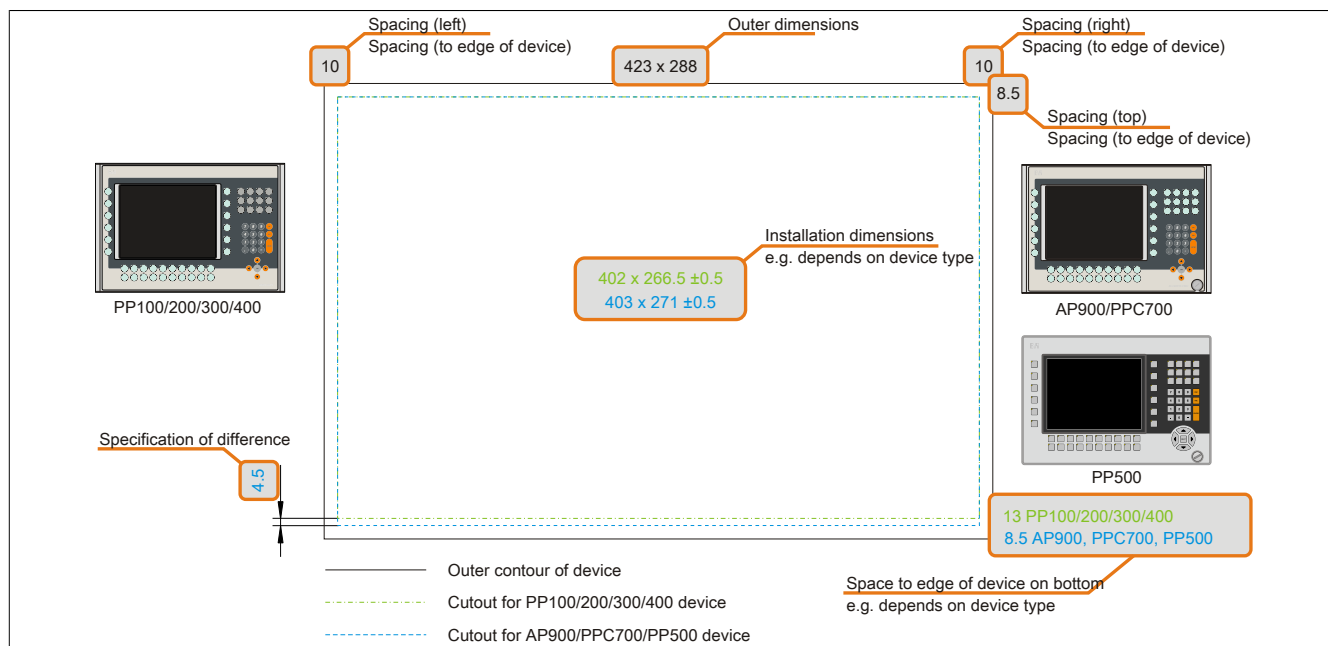


Image 194: Overview of compatibility figures

6.2.2 5.7" devices

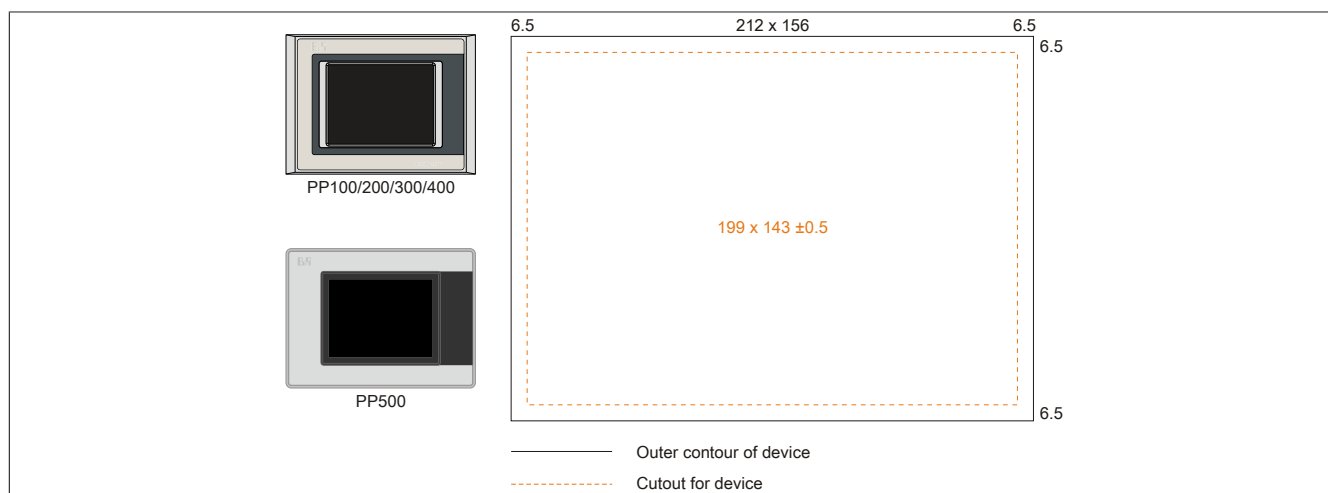


Image 195: Mounting compatibility - 5.7" device - Horizontal1

5.7" Power Panel 500, Power Panel 300/400 and Power Panel 100/200 devices in Horizontal1 format are 100% mounting compatible.

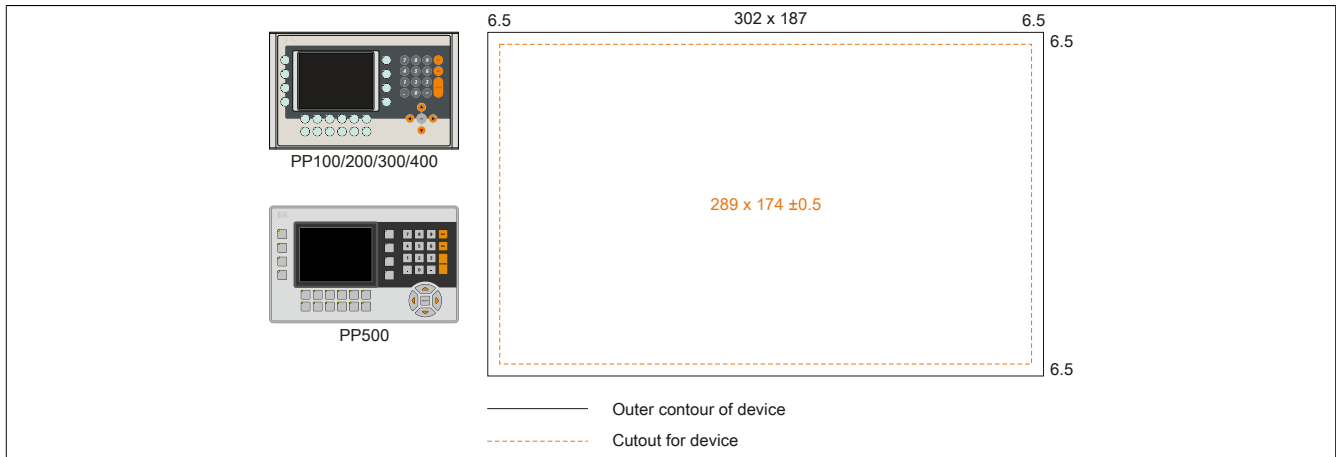


Image 196: Mounting compatibility - 5.7" device - Horizontal2

5.7" Power Panel 500, Power Panel 300/400 and Power Panel 100/200 devices in Horizontal2 format are 100% mounting compatible.

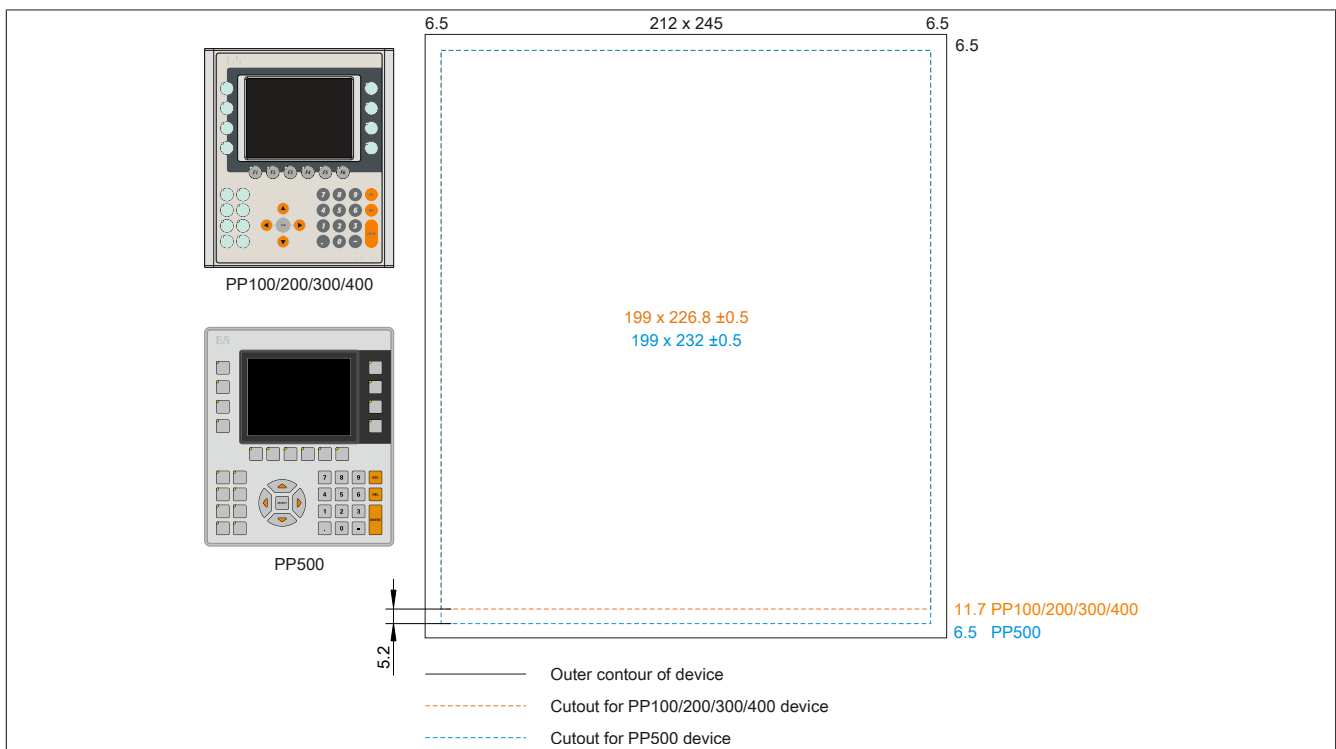


Image 197: Mounting compatibility - 5.7" device - Vertical1

5.7" Power Panel 500 devices are not 100% mounting compatible with Power Panel 300/400 and Power Panel 100/200 devices in Vertical1 format. The Power Panel 500 devices require a cutout that is 5.2 mm higher (bottom edge).

The larger cutout can 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

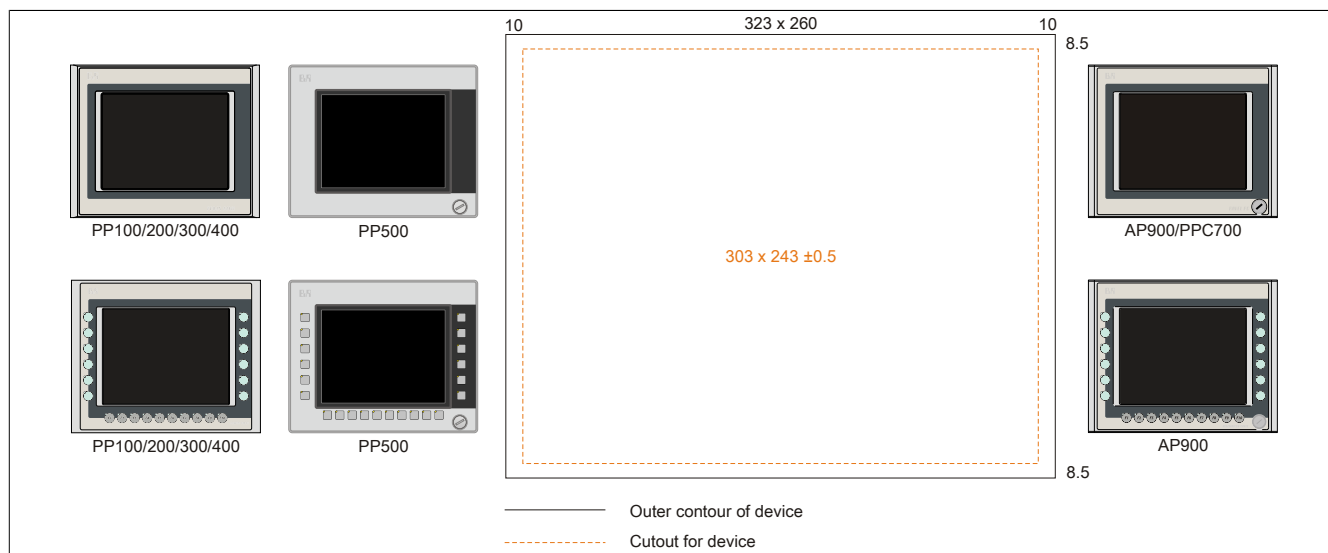


Image 198: Mounting compatibility - 10.4" device - Horizontal1

10.4" Power Panel 500, Power Panel 300/400 and Power Panel 100/200 devices in Horizontal1 format are 100% mounting compatible.

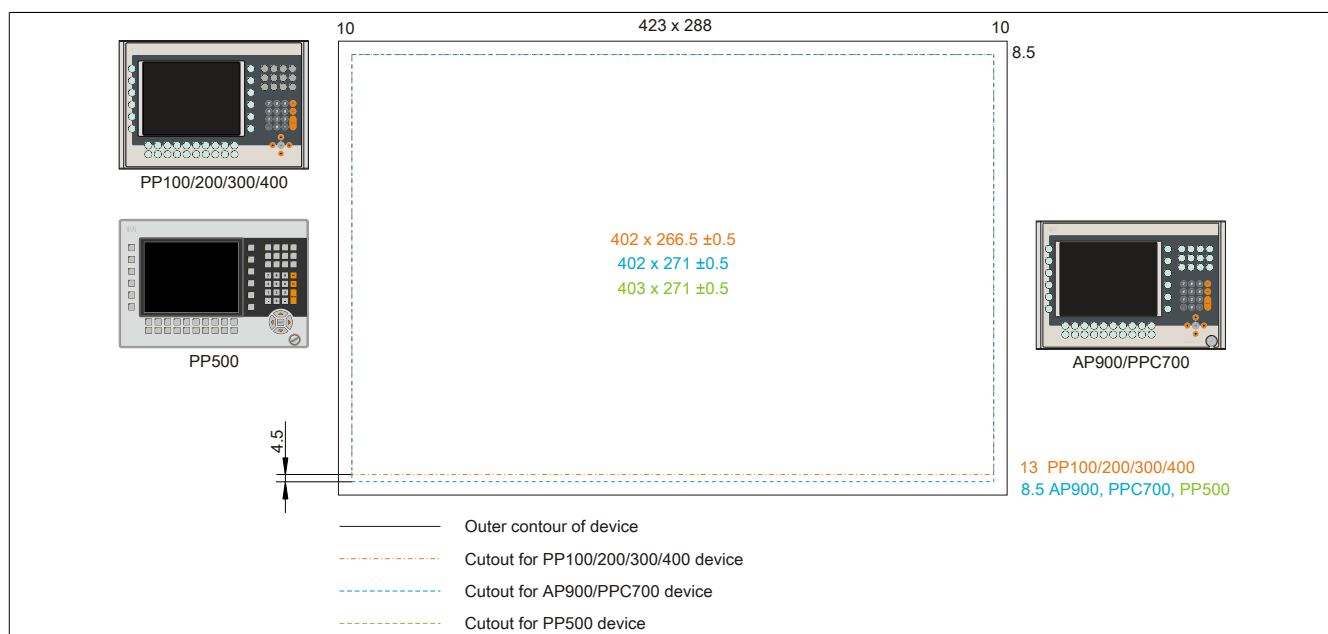


Image 199: Mounting compatibility - 10.4" device - Horizontal2

The 10.4" Power Panel 500, Automation Panel 900 and Panel PC 700 devices are not 100% mounting compatible with the Power Panel 300/400 or Power Panel 100/200 device format Horizontal2. The Power Panel 500, Automation Panel 900 and Panel PC 700 devices require a cutout that is 4.5 mm higher (bottom edge).

The larger cutout can 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).

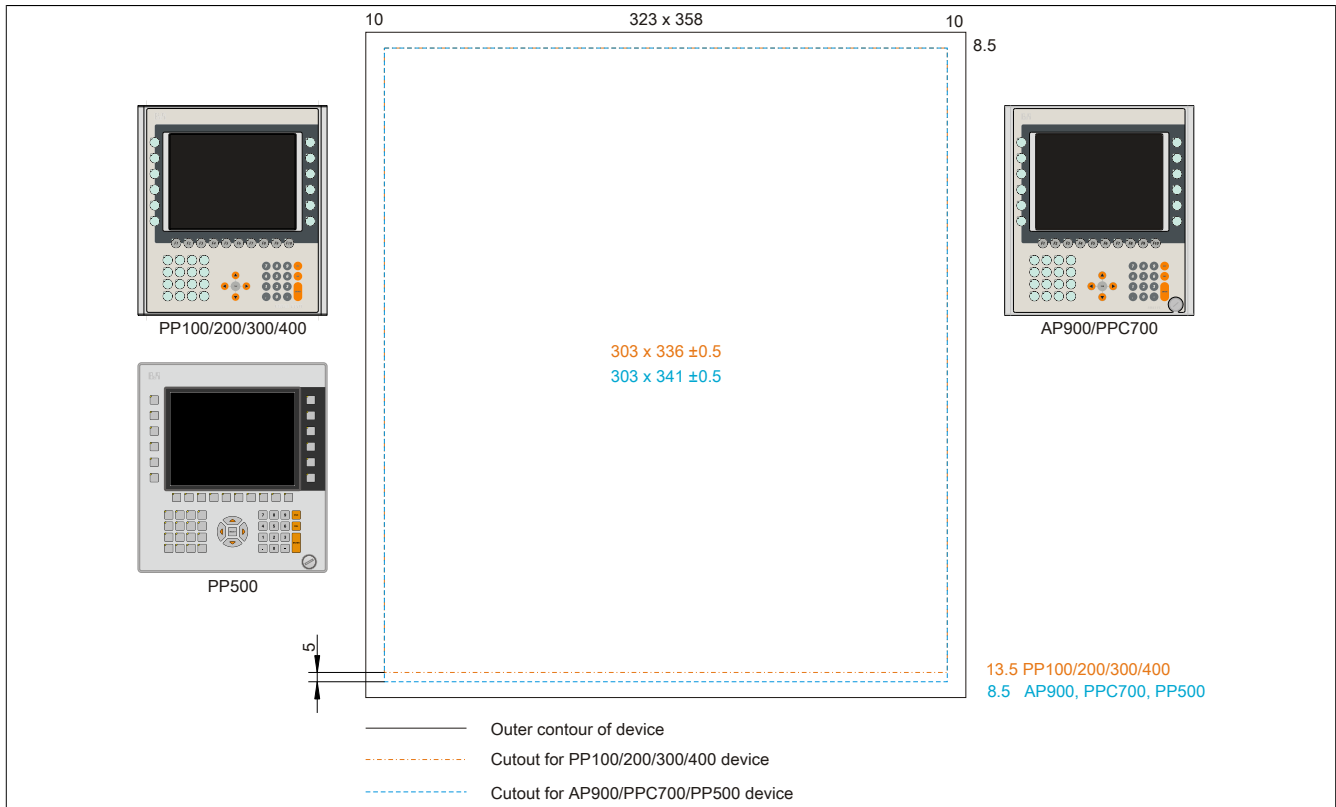


Image 200: Mounting compatibility - 10.4" device - Vertical1

The 10.4" Power Panel 500, Automation Panel 900 and Panel PC 700 devices are not 100% mounting compatible with the Power Panel 300/400 or Power Panel 100/200 device format Vertical1. The Power Panel 500, Automation Panel 900 and Panel PC 700 devices require a cutout that is 5 mm higher (bottom edge).

The larger cutout can 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

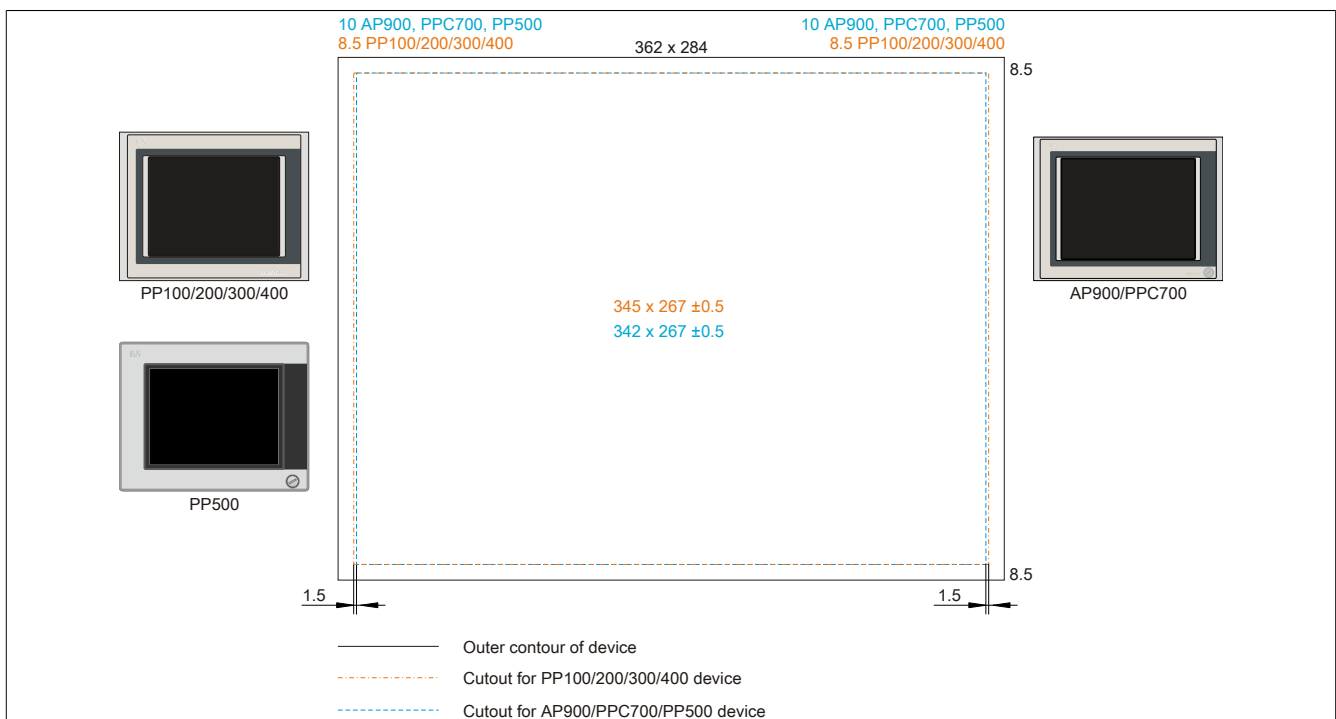


Image 201: Mounting compatibility - 12.1" device - Horizontal1

The 12.1" Power Panel 500, Automation Panel 900 and Panel PC 700 devices are not 100% mounting compatible with the Power Panel 300/400 or Power Panel 100/200 device format Horizontal1. The Power Panel 300/400 and Power Panel 100/200 devices require a cut that is 1.5 mm wider (left and right).

The larger cutout can 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

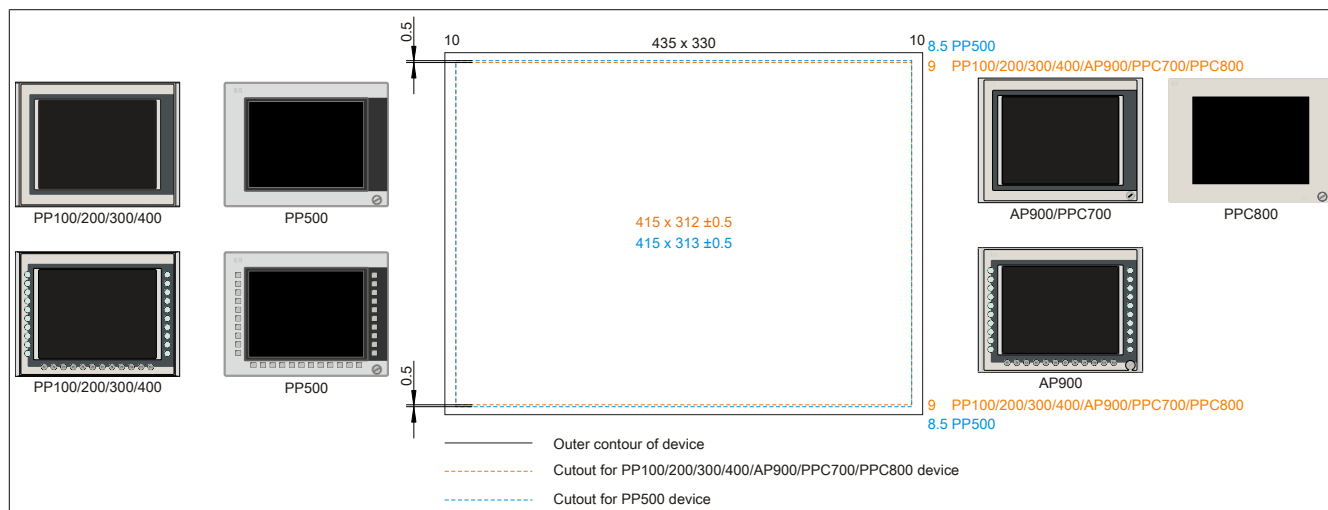


Image 202: Mounting compatibility - 15" device - Horizontal1

15" Power Panel 500 devices are not 100% mounting compatible with the Power Panel 300/400, Power Panel 100/200, Automation Panel 900, Panel PC 700 and Panel PC 800 device format Vertical1. The Power Panel 500 devices require a cutout that is 0.5 mm higher (top and bottom edge).

The larger cutout can be used for all devices under certain conditions:

- When mounting, make sure that the PP100/200/300/400, AP900, PPC700 and PPC800 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).

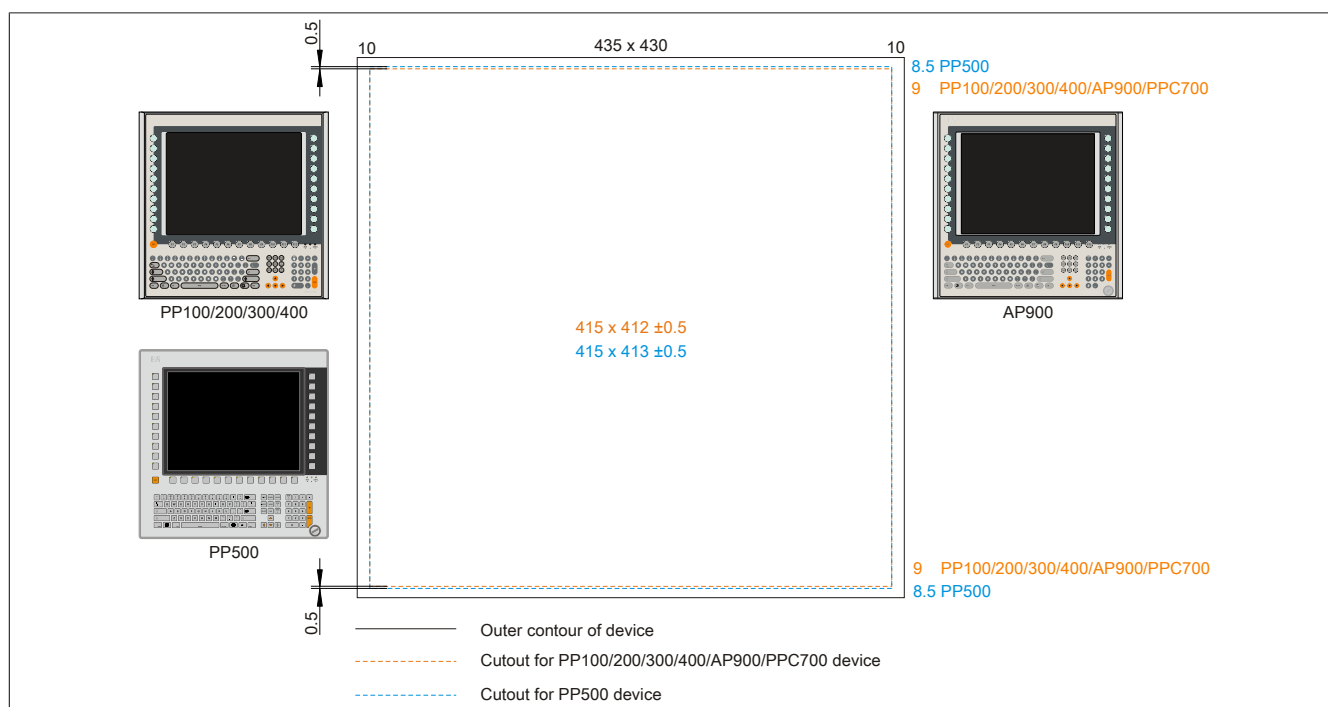


Image 203: Mounting compatibility - 15" device - Vertical1

15" Power Panel 500 devices are not 100% mounting compatible with the Power Panel 300/400, Power Panel 100/200, Automation Panel 900 and Panel PC 700 device format Vertical1. The Power Panel 500 devices require a cutout that is 0.5 mm higher (top and bottom edge).

The larger cutout can be used for all devices under certain conditions:

- When mounting, make sure that the PP100/200/300/400, 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

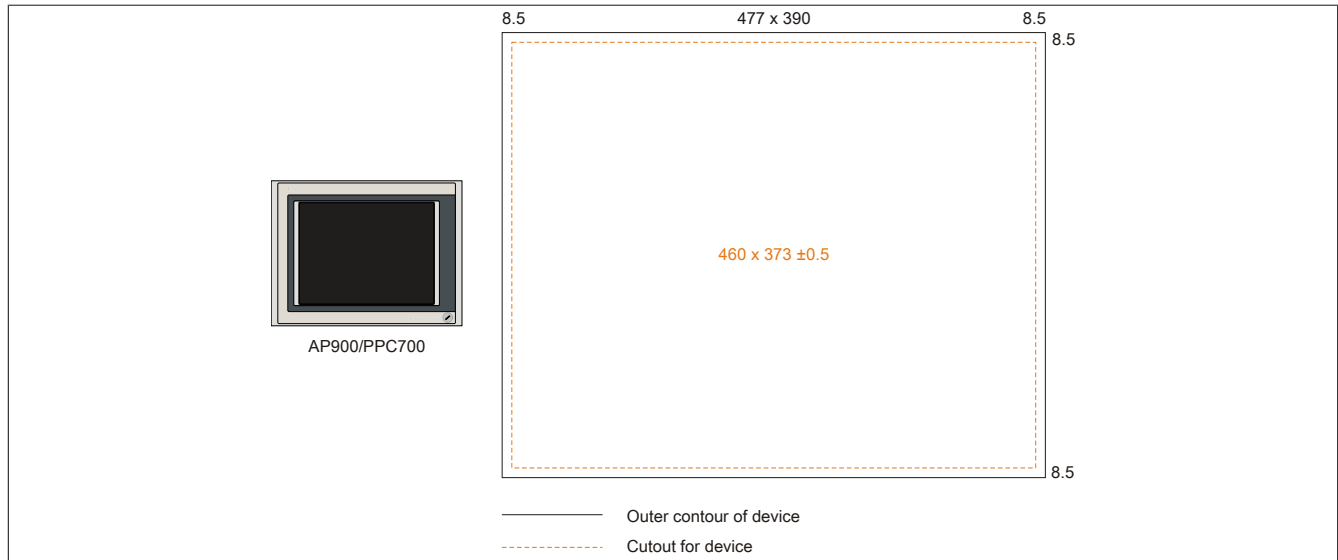


Image 204: Mounting compatibility - 17" device - Horizontal1

17" Automation Panel 900 and Panel PC 700 in Horizontal1 format are 100% mounting compatible.

6.2.7 19" devices

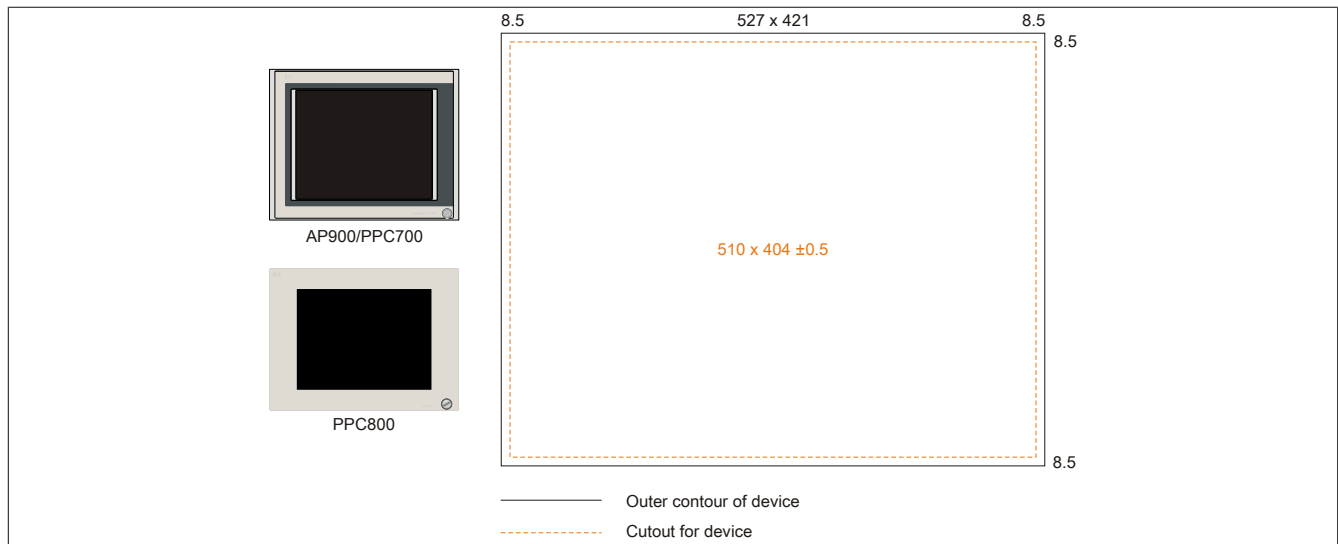


Image 205: Mounting compatibility - 19" device - Horizontal1

19" Automation Panel 900, Panel PC 700 and Panel PC 800 in Horizontal1 format are 100% mounting compatible.

6.2.8 21.3" devices

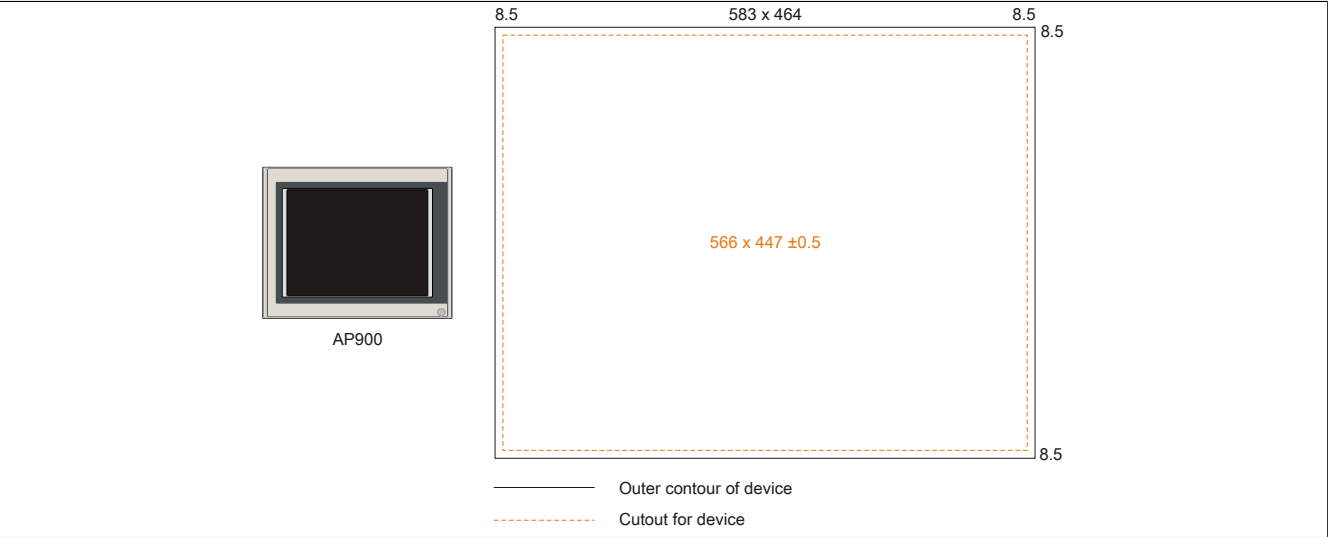


Image 206: Mounting compatibility - 21.1" device - Horizontal1

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. <i>Discreteness</i>: An algorithm is made up of a finite series of steps. <i>Determinacy</i>: Under the same start conditions, it always creates the same end result. <i>Clearness</i>: The series of steps is clearly defined. <i>Finiteness</i>: 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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