

Automation PC 810

User's Manual

Version: **1.50 (August 2013)**
Model no.: **MAAPC800-ENG**

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Chapter 1 • General information

1 Manual history

| Version | Date | Change |
|------------------|-----------|---|
| 0.10 Preliminary | 20-Nov-07 | <ul style="list-style-type: none"> First version |
| 0.20 Preliminary | 11-Jan-08 | <ul style="list-style-type: none"> Modified brief description text for system units. Modified text to read 945GME (instead of 945GM). Removed 256 MB main memory. Updated 5AC801.ADAS-00 and 5AC801.HDDS-00. Updated accessories. Updated 5AC801.RDYR-00 ready relay, SATA RAID controller, fan kit, IF options and replacement fan filter. Updated BIOS description. |
| 0.30 Preliminary | 31-Jan-08 | <ul style="list-style-type: none"> Correct mistake regarding configuration. Updated BIOS default profiles. Modified model number and name from APC810 to APC800. Updated technical data for the complete system. Updated connection examples. Updated problems and properties of the first production batch. |
| 0.40 Preliminary | 11-Apr-08 | <ul style="list-style-type: none"> Revised problems and properties of the first production batch. Updated section "Temperature sensor locations" in chapter "Appendix A". Updated section "Temperature specifications" on page 31. Updated 1-slot system unit. Updated content (especially in the chapter "Maintenance and service" chapter). Revised BIOS description for Version 1.10. |
| 0.41 Preliminary | 09-May-08 | <ul style="list-style-type: none"> Corrected images for "Ambient temperatures with and without a fan kit". Updated measurement specifications of 1- and 2-slot complete systems to include the 5AC801.HS00-01 heat sink. Updated "Power management" section. Updated serial number sticker information. Updated "Automation PC 810 with Windows XP Professional and Windows XP embedded" section. Updated "Automation Device Interface (ADI)" section. Updated 5-slot variant. Updated drilling templates 5-card variant. Updated section "Connecting peripheral USB devices" on page 220. Updated index. |
| 0.42 Preliminary | 29-May-08 | <ul style="list-style-type: none"> Added information about mounting orientation (vertical, horizontal) in 3 "Installation". Updated ambient temperature specifications with and without a fan kit for each mounting orientation (vertical, horizontal). Corrected error (fan kit model numbers) in Figure 2 "Configuration - Optional components" on page 30. Corrected error (pinout) in Table 18 "Supply voltage connection 24 VDC" on page 57. Revised slide-in slot 2 description. Updated 5AC801.DVDS-00 slide-in DVD burner. Updated fan kit for the 5-slot variant (5PC810.FA05-00). Updated real-time clock (RTC) specifications. |
| 1.00 | 10-Jul-08 | <ul style="list-style-type: none"> Corrected spelling and sentence structure errors. Updated block diagrams for all system units with relation to the bus unit ("Block diagrams" on page 49). Updated description of the 5AC600.485I-00 add-on interface module. |

Table 1: Manual history

| Version | Date | Change |
|---------|-----------|---|
| 1.10 | 12-Sep-08 | <ul style="list-style-type: none"> • Corrected spelling and sentence structure errors. • Updated starting current values (due to new power supply). • Updated 5ACPCI.ETH1-01 and 5ACPCI.ETH3-01 PCI Ethernet cards. • Updated power consumption from 1..5 A to 1..6 A. • Updated manual to the maximum value of 130 W. • Added new "Standards and certifications" chapter. • Updated humidity specifications in "Humidity specifications" on page 39. • Explained user ID in further detail. • Updated model number for Windows XP with SP3 (5SWWXP.0600-ENG, 5SWWXP.0600-GER, 5SWWXP.0600-MUL). • Added minimum ambient temperature specifications. • Added 5CAMSC.0001-00 internal supply cable (for external consumers on the PCI slot). • Moved SATA RAID controller configuration from "Software" to "Commissioning". • Corrected errors for 5PC810.FA05-00 (see "5PC810.FA05-00" on page 173). • Modified BIOS settings (new BIOS version). • Updated information about creating a bootable MS-DOS diskette. • Updated information about creating a bootable USB flash drive. • Updated B&R Key Editor description. • Updated HMI Drivers & Utilities DVD. • Revised description for operating the RS232/422/485 add-on interface module as an RS485 interface. • Updated ADI Control Center. • Updated glossary. • Updated information about removing the 5PC810.SX01-00 and 5PC810.SX05-00 side cover. • Updated information about installing the UPS module (with and without add-on interface module). • Corrected model number errors for 3-phase 40 A power supply (0PS340.1). • Updated 5-slot bus unit. • Corrected temperature humidity diagrams. • Updated add-on interface slot. • Updated description "Connecting an external device to the mainboard" on page 432. • Updated description "AP Link installation" on page 424. • Corrected power supply fuse from 10 A to 15 A in "+24 VDC supply voltage" on page 57. • Updated CMOS profile switch position 2 in "CMOS profile switch" on page 68. • Corrected service life and revolution speed of the 5PC810.FA01-00 fan kit. • Updated temperature monitoring and fan control, see "Temperature monitoring - Fan control" on page 430. |

Table 1: Manual history

| Version | Date | Change |
|---------|-----------|---|
| 1.20 | 14-Oct-09 | <ul style="list-style-type: none"> Updated topology images. Corrected maximum ambient temperature for the 5AC800.B945-02 system unit in the figure Maximale Umgebungstemperatur ohne Lüfter Kit. Modified the description of the CMOS battery status in Table 211 "945GME Advanced - Baseboard monitor - Configuration options" on page 256. Added HDD replacement tray to accessories in "5AC801.FRAM-00" on page 397 and corresponding installation in 7 "Maintenance and service". Corrected error in figure and table index. Corrected error in temperature humidity diagram for the 5ACPCI.RAIC-03 and 5ACPCI.RAIC-04 SATA RAID hard disks. Modified ADI Development Kit. Added table for the maximum ambient temperature of heat sinks 5AC801.HS00-00 > Rev. D0 and 5AC801.HS00-01 > Rev. D0. Updated PCIE port (ETH2) and PCIE port (ETH1) BIOS description. Discontinued 9S0000.08-010, 9S0000.08-020 and 9S0000.09-090. Updated information regarding firmware upgrades. Added CMOS profile 3 (5PC820.SX01-00). Additional information about this CMOS profile can be found in the APC820 user's manual. Updated section "Environmentally friendly disposal" in chapter 1 "General information". Added new 5PC810.FA02-01 for 2-slot APC810 variants. Added PCI bus type for bus units. Updated BIOS default settings for FDC/LPT/COM ports. Removed content of delivery for USB flash drives. Updated image for Silicon Systems CompactFlash. Corrected L2 cache of 5PC800.B945-00 CPU board to 2 MB. Updated B&R CompactFlash cards. Revised technical data for Silicon Systems CF cards. Updated section 1.11 "Allocation of resources" on page 271. Updated section 4.3.1 "Installation on a PCI SATA RAID controller - 5ACPCI.RAIC-03, 5ACPCI.RAIC-05, 5ACPCI.RAIC-06" on page 288. Updated new "5AC801.SSDI-00" on page 122. Updated BIOS settings to V1.14. Removed "CPU board software versions" and "Automation Panel Link software versions" tables from section "BIOS upgrade". Modified dimensions for slide-in and slide-in compact devices. The new dimensions are based on all of the mechanical features of the devices. Updated mechanical properties for products 5AC801.DVDS-00 and 5AC801.DVRS-00. Updated operating systems 5SWWXP.0500-GER, 5SWWXP.0500-ENG and 5SWWXP.0500-MUL. Removed section 9.4 "Creating a bootable USB flash drive". In chapter 4 "Software", updated and moved sections "BIOS upgrade", "Firmware upgrade" and "Creating an MS-DOS boot diskette in Windows XP" to section 2 "Upgrade information". In chapter 4 "Software", updated section "Creating a bootable USB flash drive for B&R upgrade files" on page 284. In chapter 4 "Software", updated section 2.5 "Creating a bootable CompactFlash card for B&R upgrade files" on page 285. Added specifications for possible resolutions to the technical data of the CPU boards. Updated section 1.10 "BIOS error signals (beep codes)" on page 270 in 4 "Software". Modified Windows XP Professional installation text. Changed section "Temperature sensor locations". Updated information about B&R Key Editor. Updated section 3 "Microsoft DOS" on page 286. Corrected chipset for technical data of the CPU board in section "945GME CPU boards" on page 106. Corrected Table 92 "5AC801.ADAS-00 - Technical data" on page 142. Updated information in "RS422 - Bus length and cable type" on page 184. Corrected Table 183 "Link modules" on page 218. Updated hex range in Table 239 "RAM address assignment" on page 271. Replaced 0AC201.9 replacement CMOS batteries with 0AC201.91. Updated 5PC800.B945-05 CPU board. Revised section 2.2 "Humidity specifications" on page 39. |

Table 1: Manual history

| Version | Date | Change |
|---------|-----------|---|
| 1.30 | 12-Jul-10 | <ul style="list-style-type: none"> Updated system unit 5PC810.SX03-00, bus unit 5PC810.BX03-00, fan kit 5PC810.FA03-00 and replacement fan 5AC801.FA03-00. Updated section 7 "Windows Embedded Standard 2009" on page 294. Updated section 11 "B&R Automation Device Interface (ADI) - Control Center" on page 302. 5 "Standards and certifications" on page 318 revised. Added B&R 16 GB CompactFlash card 5CFCRD.016G-04. Updated section "Known problems / issues" on page 227 to include additional information. Updated section "Cables" on page 377 in chapter 6 "Accessories". Added B&R ID codes for system units. Updated section 9 "Windows CE" on page 299. Updated B&R USB flash drive in 6 "Accessories" on page 324. Added CPU boards 5PC800.B945-10, 5PC800.B945-11, 5PC800.B945-12, 5PC800.B945-13, and 5PC800.B945-14. Updated technical data "Remanent variables for AR (Automation Runtime) in power fail mode" for APC810 system units. |
| 1.31 | 14-Nov-10 | <ul style="list-style-type: none"> Updated 5AC801.RDYR-01 ready relay in chapter 6 "Accessories". Updated section 13 "Installing the ready relay /2 in the add-on UPS slot" on page 428 in chapter 7 "Maintenance and service". |
| 1.32 | 02-Nov-10 | <ul style="list-style-type: none"> "5AC801.HDDI-03" on page 118 updated. "5ACPCI.RAIC-05" on page 160 updated. "5MMHDD.0250-00" on page 166 updated. Revised "Configuration - Optional components" on page 30. Updated 5AC801.HDDI-03, 5ACPCI.RAIC-05 and 5MMHDD.0250-00 in sections 2.1 "Temperature specifications" and 2.2 "Humidity specifications" on page 39. |
| 1.33 | 20-May-11 | <ul style="list-style-type: none"> Updated sections "Windows Embedded Standard 7" on page 296, "B&R Automation Device Interface (ADI) .NET SDK" on page 314, "Automation Runtime" on page 301 and "B&R Automation Runtime dongle". Updated BIOS version (1.14 -> 1.17). Revised sections "B&R Automation Device Interface (ADI) - Control Center" on page 302, "B&R Key Editor" on page 316, "HMI Drivers & Utilities DVD" on page 358 and "B&R Automation Device Interface (ADI) Development Kit" on page 312. Updated bus unit 5PC810.BX05-02. Corrected chipset information "945GME CPU boards" on page 106. Revised "Configuration - Optional components" on page 30. |
| 1.34 | 11-Jul-11 | <ul style="list-style-type: none"> Updated USB5 in heading ("USB interfaces (USB1, 2, 3, 4, 5)" on page 63). Updated 5AC801.HDDI-03 in Table 44 "Slide-in compact slot" on page 74. Updated "Charge duration when battery low" entry in Table 287 "5AC600.UPSB-00, 5AC600.UPSB-00 - Technical data" on page 364. Revised sections "B&R Automation Device Interface (ADI) - Control Center" on page 302, "B&R Automation Device Interface (ADI) Development Kit" on page 312 and "B&R Automation Device Interface (ADI) .NET SDK" on page 314. Updated information regarding "Special considerations for the 5PCI slot variant" in "Windows XP Professional" on page 287 and "Windows 7" on page 289. Corrected information on "Windows XP mode" in section "Features with WES7 (Windows Embedded Standard 7)" on page 297. Revised reference to external UPS 24 VDC in section "Uninterruptible power supply" on page 361. |
| 1.40 | 23-Jan-12 | <ul style="list-style-type: none"> Revised section "CompactFlash cards". Moved section "B&R Automation Device Interface (ADI) Development Kit" to 4 "Software". Moved section "Temperature sensor locations" to 2 "Technical data". Removed drilling templates section from the "Installation" chapter and updated drilling templates for the system units in chapter 2 "Technical data", section 2 "Complete system" on page 31. Revised section "Connection examples" on page 195. Removed "Cable lengths and resolutions for SDL transmission" in section "AP Link cards" on page 175. Added new CompactFlash cards 5CFCRD.xxxx-06 in 6 "Accessories". Discontinued CompactFlash cards 5CFCRD.xxxx-04. Removed section "B&R Automation Runtime dongle" and updated the order data in section "Automation Runtime" on page 301. Updated BIOS version (1.17 -> 1.18). Revised entire manual according to current formatting standards. |
| 1.41 | 25-Jun-12 | <ul style="list-style-type: none"> Updated information about the Automation Device Interface and B&R Key Editor. Updated section "Card slots (PCI / PCIe)" on page 66 to include information regarding using 64-bit PCI cards. Updated section "Cable lengths and resolutions for SDL transmission" on page 59. Updated information regarding "PCI to PCI bridge" in 3.2.3 "Technical data" for the bus units. Updated information regarding "PCIe to SATA bridge" in section "Slide-in slot 2" on page 73. Moved ready relay 5AC801.RDYR-01 to section "Ready relay". |

Table 1: Manual history

| Version | Date | Change |
|---------|-----------|--|
| 1.45 | 01-Oct-12 | <ul style="list-style-type: none"> Modified "Organization of safety notices" on page 22, updated descriptions for cautions and warnings. Added SSD drives "5AC801.SSDI-01" on page 126 and "5AC801.SSDI-02" on page 128. Updated section "General instructions for performing temperature testing" on page 191. Updated Windows 7 Service Pack 1 (see "Windows 7" on page 289). Updated Windows Embedded Standard 7 Service Pack 1 (see "Windows Embedded Standard 7" on page 296). Updated "B&R Automation Device Interface (ADI) - Control Center" on page 302. Updated "B&R Automation Device Interface (ADI) Development Kit" on page 312 to version 3.40. Updated "B&R Automation Device Interface (ADI) .NET SDK" on page 314 to version 1.80. Updated "B&R Key Editor" on page 316 to version 3.30. Updated technical data for CPU boards, see "945GME CPU boards" on page 106. |
| 1.46 | 21-Nov-12 | <ul style="list-style-type: none"> Updated B&R CompactFlash card 5CFCRD.032G-06, see "5CFCRD.xxxx-06" on page 331. Revised technical data for UPS cables, see "5CAUPS.00xx-00" on page 367. |
| 1.47 | 14-Mar-13 | <ul style="list-style-type: none"> Updated the following drives: "5AC801.HDDI-04" on page 120, "5ACPCI.RAIC-06" on page 163, "5MMHDD.0500-00" on page 168. Revised order data for system units "5PC810.SX01-00" on page 75, "5PC810.SX02-00" on page 82, "5PC810.SX03-00" on page 89 and "5PC810.SX05-00" on page 96. Revised general information regarding drives "5ACPCI.RAIC-01" on page 150, "5ACPCI.RAIC-05" on page 160 and "5MMHDD.0250-00" on page 166. Corrected spelling and sentence structure errors. |
| 1.48 | 15-May-13 | <ul style="list-style-type: none"> 5 "Standards and certifications" on page 318 revised. Revised information regarding certifications in technical data of individual components. Updated line filter "5AC804.MFLT-00" on page 369. Updated add-on fuse kit "5AC600.UPSF-00" on page 368 and replacement fuses "5AC600.UPSF-01" on page 368 for the UPS battery unit. Updated slide-in compact drive "5AC801.SSDI-03" on page 130. Updated replacement SSDs "5MMSSD.0060-00" on page 134, "5MMSSD.0060-01" on page 136 and "5MMSSD.0180-00" on page 140. |
| 1.50 | 19-Aug-13 | <ul style="list-style-type: none"> Updated B&R USB flash drive 5MMUSB.4096-01, see "USB flash drives" on page 354. Updated slide-in compact drive "5AC801.SSDI-04" on page 132. Updated replacement SSD "5MMSSD.0128-01" on page 138. Updated tightening torque of locating screws in section "Cables" on page 377. Updated sections "B&R Automation Device Interface (ADI) Development Kit" on page 312 and "B&R Automation Device Interface (ADI) .NET SDK" on page 314. Revised description of ready relay "5AC801.RDYR-00" on page 177 and "5AC801.RDYR-01" on page 178. |

Table 1: Manual history

2 Safety notices

2.1 Intended use

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

2.2 Protection against electrostatic discharge

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

2.2.1 Packaging

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

2.2.2 Guidelines for proper ESD handling

Electrical components with a housing

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

Electrical components without a housing

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

- Any persons handling electrical components or devices with installed electrical components must be grounded.
- Components may only be touched on their narrow sides or front plate.
- Components should always be stored in a suitable medium (ESD packaging, conductive foam, etc.). Metallic surfaces are not suitable storage surfaces!
- Components should not be subjected to electrostatic discharge (e.g. through the use of charged plastics).
- Ensure a minimum distance of 10 cm from monitors and TV sets.
- Measurement devices and equipment must be grounded.
- Measurement probes on potential-free measurement devices must be discharged on sufficiently grounded surfaces before taking measurements.

Individual components

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

2.3 Policies and procedures

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

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

All tasks such as the installation, commissioning and servicing of devices are only permitted to be carried out by qualified personnel. Qualified personnel are those familiar with the transport, mounting, installation, commissioning and operation of devices who also have the appropriate qualifications (e.g. IEC 60364). National accident prevention regulations must be observed.

The safety notices, connection descriptions (type plate and documentation) and limit values listed in the technical data are to be read carefully before installation and commissioning and must be observed.

2.4 Transport and storage

During transport and storage, devices must be protected against undue stress (mechanical loads, temperature, humidity, aggressive atmospheres, etc.).

2.5 Installation

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

2.6 Operation

2.6.1 Protection against touching electrical parts

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

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

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

2.6.2 Environmental conditions - Dust, humidity, aggressive gases

The use of operating/monitoring devices (e.g. industrial PCs, Power Panels, Mobile Panels, etc.) and uninterruptible power supplies in very dusty environments should be avoided. Dust collection on the devices can affect functionality and may prevent sufficient cooling, especially in systems with active cooling systems (fans).

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

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

2.6.3 Viruses and dangerous programs

This system is subject to potential risk each time data is exchanged or software is installed from a data medium (e.g. diskette, CD-ROM, USB flash drive, etc.), a network connection or the Internet. The user is responsible for assessing these dangers, implementing preventive measures such as virus protection programs, firewalls, etc. and making sure that software is only obtained from trusted sources.

2.7 Environmentally friendly disposal

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

2.7.1 Separation of materials

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

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

Table 2: Environmentally friendly separation of materials

Disposal must comply with applicable legal regulations.

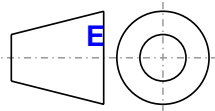
3 Organization of safety notices

Safety notices in this manual are organized as follows:

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

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

4 Guidelines



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

All dimensions are specified in mm.

| Range of nominal sizes | General tolerance according to DIN ISO 2768 (medium) |
|------------------------|--|
| Up to 6 mm | ± 0.1 mm |
| For 6 to 30 mm | ± 0.2 mm |
| For 30 to 120 mm | ± 0.3 mm |
| For 120 to 400 mm | ± 0.5 mm |
| For 400 to 1000 mm | ± 0.8 mm |

Table 4: Range of nominal sizes

5 Overview

| Product ID | Short description | on page |
|---|--|---------|
| Accessories | | |
| 5AC801.FA01-00 | APC810 replacement fan filter for 5PC810.SX01-00; 5 pcs. | 327 |
| 5AC801.FA02-00 | APC810 replacement fan filter for 5PC810.SX02-00; 5 pcs. | 327 |
| 5AC801.FA03-00 | APC810 replacement fan filter for 5PC810.SX03-00; 5 pcs. | 327 |
| 5AC801.FA05-00 | APC810 replacement fan filter for 5PC810.SX05-00; 5 pcs. | 327 |
| 5AC801.FRAME-00 | APC810 SATA hard disk replacement tray | 397 |
| 5AC801.RDYR-01 | Ready relay for APC810 for installation on an add-on UPS slot | 178 |
| 5AC804.MFLT-00 | Line filter | 369 |
| 5ACPCI.ETH1-01 | PCI Ethernet card 1x 10/100 | 371 |
| 5ACPCI.ETH3-01 | PCI Ethernet card 3x 10/100 | 374 |
| 5CAMSC.0001-00 | Internal supply cable | 396 |
| Automation Panel Link interfaces | | |
| 5AC801.RDYR-00 | APC810 ready relay | 177 |
| 5AC801.SDL0-00 | Smart Display Link/DVI-D transmitter | 175 |
| Automation Runtime | | |
| 1A4600.10 | B&R Automation Runtime ARwin, incl. license sticker and copy protection | 301 |
| 1A4600.10-2 | B&R Automation Runtime ARwin, ARNC0 | 301 |
| 1A4600.10-3 | B&R Automation Runtime ARwin+PVIControls incl. license sticker and copy protection | 301 |
| 1A4600.10-4 | B&R Automation Runtime ARwin+ARNC0+PVIControls | 301 |
| 1A4601.06 | B&R Automation Runtime AREmb, incl. license sticker and copy protection | 301 |
| 1A4601.06-2 | B&R Automation Runtime AREmb, ARNC0 | 301 |
| 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 the cells, repack intact cells and protect the cells against short circuit. For emergency information, call RENATA SA at +41 61 319 28 27. | 324 |
| 4A0006.00-000 | Lithium battery, 3 V / 950 mAh, button cell | 324 |
| Bus units | | |
| 5PC810.BX01-00 | APC810 bus, 1 PCI | 104 |
| 5PC810.BX01-01 | APC810 bus, 1 PCI Express (x4) | 104 |
| 5PC810.BX02-00 | APC810 bus, 2 PCI | 104 |
| 5PC810.BX02-01 | APC810 bus, 1 PCI, 1 PCI Express (x4) | 104 |
| 5PC810.BX03-00 | APC810 bus, 2 PCI, 1 PCI Express (x4) | 104 |
| 5PC810.BX05-00 | APC810 bus, 4 PCI, 1 PCI Express (x1) | 104 |
| 5PC810.BX05-01 | APC810 bus, 2 PCI, 3 PCI Express (x1) | 104 |
| 5PC810.BX05-02 | APC810 bus, 5 PCI | 104 |
| CPU boards | | |
| 5PC800.B945-00 | Intel Core Duo L2400 CPU board, 1.66 GHz, dual core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111B Ethernet controller | 106 |
| 5PC800.B945-01 | Intel Core2 Duo L7400 CPU board, 1.5 GHz, dual core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 4 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111B Ethernet controller | 106 |
| 5PC800.B945-02 | Intel Core2 Duo U7500 CPU board, 1.06 GHz, dual core, 533 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111B Ethernet controller | 106 |
| 5PC800.B945-03 | Intel Celeron M 423 CPU board, 1.06 GHz, single core, 533 MHz FSB, 1 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111B Ethernet controller | 106 |
| 5PC800.B945-04 | Intel Core2 Duo T7400 CPU board, 2.16 GHz, dual core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 4 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111B Ethernet controller | 106 |
| 5PC800.B945-05 | Intel Atom N270 CPU board, 1.6 GHz, single core, 533 MHz FSB, 512 kB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | 106 |
| 5PC800.B945-10 | Intel Core Duo L2400 CPU board, 1.66 GHz, dual core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | 106 |
| 5PC800.B945-11 | Intel Core2 Duo L7400 CPU board, 1.5 GHz, dual core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | 106 |
| 5PC800.B945-12 | Intel Core2 Duo U7500 CPU board, 1.06 GHz, dual core, 533 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | 106 |
| 5PC800.B945-13 | Intel Celeron M 423 CPU board, 1.06 GHz, single core, 533 MHz FSB, 1 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | 106 |
| 5PC800.B945-14 | Intel Core2 Duo T7400 CPU board, 2.16 GHz, dual core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | 106 |
| CompactFlash | | |
| 5CFCRD.0064-03 | CompactFlash 64 MB Western Digital (SLC) | 339 |
| 5CFCRD.0128-03 | CompactFlash 128 MB Western Digital (SLC) | 339 |
| 5CFCRD.016G-04 | CompactFlash 16 GB B&R (SLC) | 335 |
| 5CFCRD.016G-06 | CompactFlash 16 GB B&R (SLC) | 331 |
| 5CFCRD.0256-03 | CompactFlash 256 MB Western Digital (SLC) | 339 |
| 5CFCRD.032G-06 | CompactFlash 32 GB B&R (SLC) | 331 |
| 5CFCRD.0512-03 | CompactFlash 512 MB Western Digital (SLC) | 339 |
| 5CFCRD.0512-04 | CompactFlash 512 MB B&R (SLC) | 335 |
| 5CFCRD.0512-06 | CompactFlash 512 MB B&R (SLC) | 331 |
| 5CFCRD.1024-03 | CompactFlash 1 GB Western Digital (SLC) | 339 |
| 5CFCRD.1024-04 | CompactFlash 1 GB B&R (SLC) | 335 |
| 5CFCRD.1024-06 | CompactFlash 1 GB B&R (SLC) | 331 |
| 5CFCRD.2048-03 | CompactFlash 2 GB Western Digital (SLC) | 339 |
| 5CFCRD.2048-04 | CompactFlash 2 GB B&R (SLC) | 335 |
| 5CFCRD.2048-06 | CompactFlash 2 GB B&R (SLC) | 331 |

| Product ID | Short description | on page |
|----------------------|---|---------|
| 5CFCRD.4096-03 | CompactFlash 4 GB Western Digital (SLC) | 339 |
| 5CFCRD.4096-04 | CompactFlash 4 GB B&R (SLC) | 335 |
| 5CFCRD.4096-06 | CompactFlash 4 GB B&R (SLC) | 331 |
| 5CFCRD.8192-03 | CompactFlash 8 GB Western Digital (SLC) | 339 |
| 5CFCRD.8192-04 | CompactFlash 8 GB B&R (SLC) | 335 |
| 5CFCRD.8192-06 | CompactFlash 8 GB B&R (SLC) | 331 |
| DVI cable | | |
| 5CADVI.0018-00 | DVI-D cable, 1.8 m | 377 |
| 5CADVI.0050-00 | DVI-D cable, 5 m | 377 |
| 5CADVI.0100-00 | DVI-D cable, 10 m | 377 |
| Drives | | |
| 5AC801.ADAS-00 | SATA hard disk adapter for operating a slide-in compact hard disk in a slide-in slot | 142 |
| 5AC801.DVDS-00 | DVD-ROM SATA slide-in drive | 145 |
| 5AC801.DVRS-00 | DVD-R/RW DVD+R/RW SATA slide-in drive | 147 |
| 5AC801.HDDI-00 | 40 GB SATA slide-in compact hard disk; 24/7 operation with extended temperature range. Note: please see the manual for information about using this hard disk | 112 |
| 5AC801.HDDI-01 | 80 GB slide-in compact SATA hard disk; 24/7 operation with extended temperature range. Note: Please see the manual for information about using this hard disk. | 114 |
| 5AC801.HDDI-02 | 160 GB SATA hard disk, slide-in compact, 24/7 operation with extended temperature range. Note: please see the manual for information about using this hard disk | 116 |
| 5AC801.HDDI-03 | 250 GB slide-in compact SATA hard disk, 24/7 operation. Note: please see the manual for information about using this hard disk | 118 |
| 5AC801.HDDI-04 | 500 GB SATA hard disk, slide-in compact, 24/7 operation Note: please see the manual for information about using this hard disk | 120 |
| 5AC801.HDDS-00 | 40 GB SATA slide-in hard disk; 24/7 operation with extended temperature range. Note: please see the manual for information about using this hard disk | 143 |
| 5AC801.SSDI-00 | 32 GB SATA SSD (SLC), slide-in compact | 122 |
| 5AC801.SSDI-01 | 60 GB SATA slide-in compact SSD (MLC) | 126 |
| 5AC801.SSDI-02 | 180 GB SATA slide-in compact SSD (MLC) | 128 |
| 5AC801.SSDI-03 | 60 GB SATA slide-in compact SSD (MLC) | 130 |
| 5AC801.SSDI-04 | 128 GB SATA SSD (MLC), slide-in compact | 132 |
| 5ACPCI.RAIC-01 | PCI RAID system SATA 2x 60 GB; Note: Please see the manual for information about using this hard disk. | 150 |
| 5ACPCI.RAIC-02 | 60 GB SATA hard disk replacement part for 5ACPCI.RAIC-01; Note: Please see the manual for information about using this hard disk. | 153 |
| 5ACPCI.RAIC-03 | PCI RAID system SATA 2x 160 GB; note: Please see the manual for information about using this hard disk. | 155 |
| 5ACPCI.RAIC-04 | 160 GB SATA hard disk, replacement part for 5ACPCI.RAIC-03; note: Please see the manual for information about using this hard disk. | 158 |
| 5ACPCI.RAIC-05 | PCI RAID system SATA 2x 250 GB; note: please see the manual for information about using this hard disk | 160 |
| 5ACPCI.RAIC-06 | PCI RAID system SATA 2x 500 GB; note: please see the manual for information about using this hard disk | 163 |
| 5MMHDD.0250-00 | 250 GB SATA hard disk; replacement for 5AC801.HDDI-03 and 5ACPCI.RAIC-05; note: please see the manual for information about using this hard disk | 166 |
| 5MMHDD.0500-00 | 500 GB SATA hard disk; replacement for 5AC801.HDDI-04, 5AC901.CHDD-01 and 5ACPCI.RAIC-06; note: please see the manual for information about using this hard disk | 168 |
| 5MMSSD.0060-00 | 60 GB SATA SSD (MLC); replacement for 5AC801.SSDI-01 and 5AC901.CSSD-01; SSD for 5PP5IO.GMAC-00; note: please see the manual for information about using this SSD | 134 |
| 5MMSSD.0060-01 | 60 GB SATA SSD (MLC); replacement for 5AC801.SSDI-03 and 5AC901.CSSD-03; SSD for 5PP5IO.GMAC-00; note: please see the manual for information about using this SSD | 136 |
| 5MMSSD.0128-01 | 128 GB SATA SSD (MLC); replacement for 5AC801.SSDI-04 and 5AC901.CSSD-04; SSD for 5PP5IO.GMAC-00; note: please see the manual for information about using this SSD | 138 |
| 5MMSSD.0180-00 | 180 GB SATA SSD (MLC); replacement part for 5AC801.SSDI-02 and 5AC901.CSSD-02; SSD for 5PP5IO.GMAC-00; note: please see the manual for information about using this SSD | 140 |
| Fan kits | | |
| 5PC810.FA01-00 | APC810 fan kit for 5PC810.SX01-00 system unit | 170 |
| 5PC810.FA02-00 | APC810 fan kit for 5PC810.SX02-00 system unit | 171 |
| 5PC810.FA02-01 | APC810 fan kit for 5PC810.SX02-00 (revisions > D0) | 171 |
| 5PC810.FA03-00 | APC810 fan kit for 5PC810.SX03-00 system unit | 172 |
| 5PC810.FA05-00 | APC810 fan kit for 5PC810.SX05-00 system unit | 173 |
| Kühlkörper | | |
| 5AC801.HS00-00 | APC810 heat sink for CPU boards with L2400, L7400, U7500 or Celeron M 423 dual-core processor | 109 |
| 5AC801.HS00-01 | APC810 heat sink for CPU boards with T7400, T9400 or P8400 dual-core processor | 109 |
| 5AC801.HS00-02 | APC810 heat sink for CPU board with Atom processor N270 | 109 |
| MS-DOS | | |
| 9S0000.01-010 | OEM Microsoft MS-DOS 6.22, German floppy disks, only supplied together with a new PC | 286 |
| 9S0000.01-020 | OEM Microsoft MS-DOS 6.22, English floppy disks, only supplied together with a new PC | 286 |
| Main memory | | |
| 5MMDDR.0512-01 | SO-DIMM DDR2 RAM 512 MB PC2-5300 | 111 |
| 5MMDDR.1024-01 | SO-DIMM DDR2 RAM 1024 MB PC2-5300 | 111 |
| 5MMDDR.2048-01 | SO-DIMM DDR2 RAM 2048 MB PC2-5300 | 111 |
| Miscellaneous | | |
| 5AC900.1000-00 | DVI (male connector) to CRT (female connector) adapter. For connecting a standard monitor to a DVI-I interface. | 328 |
| Other | | |
| 5SWHMI.0000-00 | HMI Drivers & Utilities DVD | 358 |
| RS232 cable | | |
| 9A0014.02 | RS232 extension cable for remote operation of a display unit with touch screen, 1.8 m | 394 |
| 9A0014.05 | RS232 extension cable for remote operation of a display unit with touch screen, 5 m | 394 |
| 9A0014.10 | RS232 extension cable for remote operation of a display unit with touch screen, 10 m | 394 |

| Product ID | Short description | on page |
|--|--|---------|
| SDL cable - 45° connector | | |
| 5CASDL.0018-01 | SDL cable with 45° male connector, 1.8 m | 383 |
| 5CASDL.0050-01 | SDL cable with 45° male connector, 5 m | 383 |
| 5CASDL.0100-01 | SDL cable with 45° male connector, 10 m | 383 |
| 5CASDL.0150-01 | SDL cable with 45° male connector, 15 m | 383 |
| SDL cables | | |
| 5CASDL.0018-00 | SDL cable, 1.8 m | 380 |
| 5CASDL.0050-00 | SDL cable, 5 m | 380 |
| 5CASDL.0100-00 | SDL cable, 10 m | 380 |
| 5CASDL.0150-00 | SDL cable, 15 m | 380 |
| 5CASDL.0200-00 | SDL cable, 20 m | 380 |
| 5CASDL.0250-00 | SDL cable, 25 m | 380 |
| 5CASDL.0300-00 | SDL cable, 30 m | 380 |
| SDL flex cable | | |
| 5CASDL.0018-03 | SDL flex cable, 1.8 m | 386 |
| 5CASDL.0050-03 | SDL flex cable, 5 m | 386 |
| 5CASDL.0100-03 | SDL flex cable, 10 m | 386 |
| 5CASDL.0150-03 | SDL flex cable, 15 m | 386 |
| 5CASDL.0200-03 | SDL flex cable, 20 m | 386 |
| 5CASDL.0250-03 | SDL flex cable, 25 m | 386 |
| 5CASDL.0300-03 | SDL flex cable, 30 m | 386 |
| 5CASDL.0300-13 | SDL flex cable with extender, 30 m | 389 |
| 5CASDL.0400-13 | SDL flex cable with extender, 40 m | 389 |
| 5CASDL.0430-13 | SDL flex cable with extender, 43 m | 389 |
| Serial adapters | | |
| 5AC600.485I-00 | RS232/422/485 interface, for installation in an APC620, APC810 or PPC700 | 183 |
| 5AC600.CANI-00 | CAN interface; for installation in an APC620, APC810 or PPC700 | 180 |
| Systemeinheiten | | |
| 5PC810.SX01-00 | APC810 system unit, 1 slot (PCI Express, PCI, depending on bus); 1 compact slide-in slot; Smart Display Link/DVI/Monitor, 2x RS232, 5x USB 2.0, 2x ETH 10/100/1000, 24 VDC (order 0TB103.9 screw clamp or 0TB103.91 cage clamp terminals separately) | 75 |
| 5PC810.SX02-00 | APC810 system unit, 2 slots (PCI Express, PCI, depending on bus); 1 slot for Automation Panel Link transmitter; 1 slide-in compact and 1 slide-in slot; Smart Display Link/DVI/Monitor, 2x RS232, 5x USB 2.0, 2x ETH 10/100/1000, 24 VDC (order 0TB103.9 screw clamp or 0TB103.91 cage clamp terminals separately) | 82 |
| 5PC810.SX03-00 | APC810 system unit, 3 slots (PCI Express, PCI, depending on bus); 1 slot for Automation Panel Link transmitter; 1 slide-in compact and 1 slide-in slot; Smart Display Link/DVI/Monitor, 2x RS232, 5x USB 2.0, 2x ETH 10/100/1000, AC97 sound, 24 VDC (order 0TB103.9 screw clamp or 0TB103.91 cage clamp terminals separately) | 89 |
| 5PC810.SX05-00 | APC810 system unit, 5 slots (PCI Express, PCI, depending on bus); 1 slot for Automation Panel Link transmitter; 1 slide-in compact and 2 slide-in slots; Smart Display Link/DVI/Monitor, 2x RS232, 5x USB 2.0, 2x ETH 10/100/1000, 24 VDC (order 0TB103.9 screw clamp or 0TB103.91 cage clamp terminals separately) | 96 |
| Terminal blocks | | |
| 0TB103.9 | Connector, 24 VDC, 3-pin female, 3.31 mm ² screw clamp, protected against vibration by the screw flange | 326 |
| 0TB103.91 | Connector, 24 VDC, 3-pin female, 3.31 mm ² cage clamp, protected against vibration by the screw flange | 326 |
| USB accessories | | |
| 5A5003.03 | Front cover, for remote CD-ROM drive 5A5003.02 and USB 2.0 drive combination 5MD900.USB2-00, 5MD900.USB2-01 and 5MD900.USB2-02 | 352 |
| 5MD900.USB2-01 | USB 2.0 drive combination, consists of DVD-R/RW DVD+R/RW, FDD, CompactFlash slot (Type II), USB connection (Type A on front, Type B on back); 24 VDC, (order screw clamp 0TB103.9 or cage clamp 0TB103.91 separately) | 343 |
| 5MD900.USB2-02 | USB 2.0 drive combination, consists of DVD-R/RW DVD+R/RW, CompactFlash slot (Type II), USB connection (Type A on the front, Type B on the back); 24V DC (order screw clamp terminal 0TB103.9 or cage clamp terminal 0TB103.91 separately) | 348 |
| 5MMUSB.2048-00 | USB 2.0 flash drive, 2048 MB | 354 |
| 5MMUSB.2048-01 | USB 2.0 flash drive, 2048 MB, B&R | 356 |
| 5MMUSB.4096-01 | USB 2.0 flash drive, 4096 MB, B&R | 356 |
| USB cable | | |
| 5CAUSB.0018-00 | USB 2.0 connection cable type A - type B, 1.8 m | 393 |
| 5CAUSB.0050-00 | USB 2.0 connection cable type A - type B, 5 m | 393 |
| Uninterruptible power supplies | | |
| 5AC600.UPSB-00 | Battery unit 5 Ah; for APC620, APC810 or PPC800 UPS | 364 |
| 5AC600.UPSF-00 | UPS fuse kit for battery unit 5AC600.UPSB-00 up to revision D0. | 368 |
| 5AC600.UPSF-01 | UPS fuse, 5 pcs. | 368 |
| 5AC600.UPSI-00 | UPS module for APC620, APC810, PPC800; for system units 5PC600.SX01-00 (beginning with rev. H0), 5PC600.SX02-00 (beginning with rev. G0), 5PC600.SX02-01 (beginning with rev. H0), 5PC600.SX05-00 (beginning with rev. F0), 5PC600.SX05-01 (beginning with rev. F0), 5PC600.SF03-00 (beginning with rev. A0), 5PC810.SX*, 5PC820.1505-00, 5PC820.1906-00. Order cable (5CAUPS.0005-00 or 5CAUPS.0030-00) and battery unit (5AC600.UPSB-00) separately. | 362 |
| 5CAUPS.0005-00 | UPS cable 0.5 m; for UPS 5AC600.UPSI-00 | 367 |
| 5CAUPS.0030-00 | UPS cable 3 m; for UPS 5AC600.UPSI-00 | 367 |
| Windows 7 Professional/Ultimate | | |
| 5SWWI7.0100-ENG | Microsoft OEM Windows 7 Professional 32-bit, DVD, English. Only available with a new device. | 289 |
| 5SWWI7.0100-GER | Microsoft OEM Windows 7 Professional 32-bit, DVD, German. Only available with a new device. | 289 |
| 5SWWI7.0200-ENG | Microsoft OEM Windows 7 Professional 64-bit, DVD, English. Only available with a new device. | 289 |
| 5SWWI7.0200-GER | Microsoft OEM Windows 7 Professional 64-bit, DVD, German. Only available with a new device. | 289 |
| 5SWWI7.0300-MUL | Microsoft OEM Windows 7 Ultimate 32-bit, DVD, multilingual. Only available with a new device. | 289 |
| 5SWWI7.0400-MUL | Microsoft OEM Windows 7 Ultimate 64-bit, DVD, multilingual. Only available with a new device. | 289 |

| Product ID | Short description | on page |
|---------------------------------------|--|---------|
| 5SWWI7.1100-ENG | Microsoft OEM Windows 7 Professional 32-bit, Service Pack 1, DVD, English. Only available with a new device. | 289 |
| 5SWWI7.1100-GER | Microsoft OEM Windows 7 Professional 32-bit, Service Pack 1, DVD, German. Only available with a new device. | 289 |
| 5SWWI7.1200-ENG | Microsoft OEM Windows 7 Professional 64-bit, Service Pack 1, DVD, English. Only available with a new device. | 289 |
| 5SWWI7.1200-GER | Microsoft OEM Windows 7 Professional 64-bit, Service Pack 1, DVD, German. Only available with a new device. | 289 |
| 5SWWI7.1300-MUL | Microsoft OEM Windows 7 Ultimate 32-bit, Service Pack 1, DVD, multilingual. Only available with a new device. | 289 |
| 5SWWI7.1400-MUL | Microsoft OEM Windows 7 Ultimate 64-bit, Service Pack 1, DVD, multilingual. Only available with a new device. | 289 |
| Windows CE 6.0 | | |
| 5SWWCE.0826-ENG | Microsoft OEM Windows CE 6.0 Professional, English; for APC810 with 945GME chipset; order CompactFlash separately (at least 128 MB). | 299 |
| Windows Embedded Standard 2009 | | |
| 5SWWXP.0726-ENG | Microsoft OEM Windows Embedded Standard 2009, English; for APC810 with 945GME chipset; order CompactFlash separately (at least 1 GB). | 294 |
| Windows Embedded Standard 7 | | |
| 5SWWI7.1526-ENG | Microsoft OEM Windows Embedded Standard 7 32-bit, Service Pack 1, English; for APC810 with 945GME chipset; order CompactFlash separately (at least 16 GB) | 296 |
| 5SWWI7.1626-ENG | Microsoft OEM Windows Embedded Standard 7 64-bit, Service Pack 1, English; for APC810 with 945GME chipset; order CompactFlash separately (at least 16 GB) | 296 |
| 5SWWI7.1726-MUL | Microsoft OEM Windows Embedded Standard 7 Premium 32-bit, Service Pack 1, multilingual; for APC810 with 945GME chipset; order CompactFlash separately (at least 16 GB) | 296 |
| 5SWWI7.1826-MUL | Microsoft OEM Windows Embedded Standard 7 Premium 64-bit, Service Pack 1, multilingual; for APC810 with 945GME chipset; order CompactFlash separately (at least 16 GB) | 296 |
| Windows XP Embedded | | |
| 5SWWXP.0426-ENG | Microsoft OEM Windows XP Embedded Feature Pack 2007, English; for APC810 with 945GME chipset; order CompactFlash separately (at least 512 MB) | 292 |
| Windows XP Professional | | |
| 5SWWXP.0500-ENG | Microsoft OEM Windows XP Professional Service Pack 2c, CD, English. Only available with a new device. | 287 |
| 5SWWXP.0500-GER | Microsoft OEM Windows XP Professional Service Pack 2c, CD, German. Only available with a new device. | 287 |
| 5SWWXP.0500-MUL | Microsoft OEM Windows XP Professional Service Pack 2c, CD, multilingual. Only available with a new device. | 287 |
| 5SWWXP.0600-ENG | Microsoft OEM Windows XP Professional Service Pack 3, CD, English. Only available with a new device. | 287 |
| 5SWWXP.0600-GER | Microsoft OEM Windows XP Professional Service Pack 3, CD, German. Only available with a new device. | 287 |
| 5SWWXP.0600-MUL | Microsoft OEM Windows XP Professional Service Pack 3, CD, multilingual. Only available with a new device. | 287 |

Chapter 2 • Technical data

1 Introduction

The APC810 is a logical step forward from the successful APC620 product series. Based on the latest Intel® Core™2 Duo technology, the APC810 offers the highest level of performance for any application that requires maximum computing power.

The APC810 saves space in the control cabinet, with drive bays (DVD, HDD) and two CompactFlash slots protected behind a cover on the front of the device. Modular plug-in technology makes it easy for the user to replace drives. All connections and interfaces are located on the top of the housing so that installation depth is not increased by protruding connectors. Different APC810 sizes with one, two, three or five slots for PCI and/or PCI Express cards ensure the optimum design for any type of installation – a perfect fit that doesn't waste valuable space in the control cabinet.



1.1 Features

- Latest processor technology – Core Duo, Core 2 Duo, Celeron M and Atom N270
- Up to 3 GB main memory (dual-channel memory support)
- 2 CompactFlash slots (type I)
- 1, 2, 3 or 5 card slots (for PCI / PCI Express (PCIe) cards)
- SATA drives (slide-in and slide-in compact slots)
- 5x USB 2.0
- 2x Ethernet 10/100/1000 Mbit interfaces
- 2x RS232 interface, modem-compatible
- 24 VDC supply voltage
- Fan-free operation¹⁾
- BIOS (AMI)
- Real-time clock (RTC, battery-backed)
- 512 kB SRAM (battery-backed)
- Possibility to connect various display devices to the "Monitor/Panel" video output (supports RGB, DVI and SDL - Smart Display Link - signals)
- 2nd graphics line by installing the optional AP Link card
- Easy slide-in drive replacement (SATA hot plugging)
- Optional installation of the add-on UPS module
- Optional CAN interface
- Optional RS232/422/485 interface
- Optional RAID controller (requires an open PCI slot)

1.2 System components / configuration

The APC810 system can be assembled to meet individual requirements and operating conditions.

The following components are absolutely essential for operation:

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

¹⁾ Depends on the device configuration and ambient temperature.

1.3 Configuration - Base system





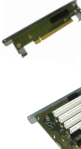




| Base system configuration | | | | |
|--|--|---|---|---|
| System unit Select one A system unit consists of a housing and mainboard. <u>Variants:</u> Card slots (1, 2, 3 or 5) Slide-in slots (0, 1 or 2) AP Link slot (0 or 1) <u>Example:</u> (2 / 1 / 1) = 2 card slots, 1 slide-in slot, 1 AP Link slot | Select one | | | |
| |  |  |  |  |
| | 5PC810.SX01-00 (1 / 0 / 0) | 5PC810.SX02-00 (2 / 1 / 1) | 5PC810.SX03-00 (3 / 1 / 1) | 5PC810.SX05-00 (5 / 2 / 1) |
| | ↓ | ↓ | ↓ | ↓ |
| Bus unit Select one   | Select one | | | |
| | 5PC810.BX01-00 (1 PCI) | 5PC810.BX02-00 (2 PCI) | 5PC810.BX03-00 (2 PCI / 1 PCIe) | 5PC810.BX05-00 (4 PCI / 1 PCIe) |
| | 5PC810.BX01-01 (1 PCIe) | 5PC810.BX02-01 (1 PCI / 1 PCIe) | | 5PC810.BX05-01 (2 PCI / 3 PCIe) |
| | | | | 5PC810.BX05-02 (5 PCI) |
| CPU board - Heat sink - Main memory | | | | |
| CPU board Select one  | Select one | | | |
| | 5PC800.B945-00 = -10 5PC800.B945-01 = -11 5PC800.B945-02 = -12 5PC800.B945-03 = -13 | 5PC800.B945-04 = -14 | 5PC800.B945-05 | |
| | ↓ | ↓ | ↓ | |
| | | | | |
| Heat sinks Select one  | Select one | | | |
| | 5AC801.HS00-00 | 5AC801.HS00-01 | 5AC801.HS00-02 | |
| | | | | |
| | | | | |
| Main memory Select one or two (max. 3 GB can be used)  | Select one or two (max. 3 GB can be used) | | | |
| | | 5MMDDR.0512-01 - 512 MB 5MMDDR.1024-01 - 1 GB 5MMDDR.2048-01 - 2 GB | | |
| | | | | |
| | | | | |

Figure 1: Base system configuration

1.4 Configuration - Optional components





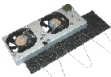


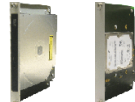











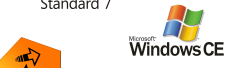
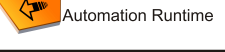
| Configuration - Drives, software, accessories | | | | |
|--|--|--|---|---|
| System unit | Select one | | | |
| A system unit consists of a housing and mainboard. <u>Variants:</u> Card slots (1, 2, 3 or 5) Slide-in slots (0, 1 or 2) AP Link slot (0 or 1) <u>Example:</u> (2 / 1 / 1) = 2 card slots, 1 slide-in slot, 1 AP Link slot |  |  |  |  |
| | 5PC810.SX01-00 (1 / 0 / 0) | 5PC810.SX02-00 (2 / 1 / 1) | 5PC810.SX03-00 (3 / 1 / 1) | 5PC810.SX05-00 (5 / 2 / 1) |
| Fan kit | Select one | | | |
|  | 5PC810.FA01-00 | 5PC810.FA02-01 | 5PC810.FA03-00 | 5PC810.FA05-00 |
| Slide-in compact drive | Select one | | | |
|  | 5AC801.HDDI-00 (40 GB) 5AC801.HDDI-04 (500 GB) 5AC801.SSDI-00 (32 GB) | | 5AC801.SSDI-01 (60 GB) 5AC801.SSDI-02 (180 GB) 5AC801.SSDI-03 (60 GB) | |
| CompactFlash | Select one or two | | | |
|  | 5CFCRD.0512-06, 5CFCRD.1024-06, 5CFCRD.2048-06, 5CFCRD.4096-06, 5CFCRD.8192-06, 5CFCRD.016G-06, 5CFCRD.032G-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 | |
| Slide-in drive | Not possible | 1 possible | 2 possible | |
|  |  | | 5AC801.HDDS-00 (40 GB) 5AC801.DVDS-00 (DVD drive) 5AC801.ADAS-00 (adapter) 5AC801.DVRS-00 (DVD writer) | |
| AP Link card | | | Select one | |
|  |  | | 5AC801.SDL0-00 (for 2nd graphics line) 5AC801.RDYR-00 (ready relay) | |
| RAID system | Select one | | | |
|  | 5ACPCI.RAIC-06 (2x 500 GB, uses 1 PCI slot) 5MMHDD.0500-00 (Replacement SATA-HDD 500 GB) | | | |
| Interface option | Select one | | | |
|  | 5AC600.CANI-00 (CAN) 5AC600.485I-00 (combined RS232/RS422/RS485) | | | |
| UPS module + battery | Select one | | | |
|  | 5AC600.UPSI-00 (add-on UPS module) + 5AC600.UPSB-00 (UPS battery unit) Connection cable: 5CAUPS.0005-00 (0.5 meters) or 5CAUPS.0030-00 (3 meters) | | | |
| Terminal blocks | Select one | | | |
|  | 0TB103.9 (screw clamps) 0TB103.91 (cage clamps) | | | |
| Software | Select one | | | |
|  Windows xp  Windows 7  Windows xp Embedded  Windows Embedded Standard 2009  Windows Embedded Standard 7  Windows CE Automation Runtime | 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.0726-ENG Windows Embedded Standard 7 5SWWI7.1526-ENG 5SWWI7.1626-ENG 5SWWI7.1726-MUL 5SWWI7.1826-MUL | Automation Runtime 1A4601.06 1A4601.06-2 1A4600.10 1A4600.10-2 1A4600.10-3 1A4600.10-4 | |
| | Windows CE 5SWWCE.0826-ENG | Windows XP Embedded 5SWWXP.0426-ENG | | |
| | Windows 7 5SWWI7.1200-ENG 5SWWI7.1200-GER 5SWWI7.1400-MUL | 5SWWI7.1100-ENG 5SWWI7.1100-GER 5SWWI7.1300-MUL | | |
| | | | Microsoft DOS 9S0000.01-010 9S0000.01-020 | |
| | | | | |

Figure 2: Configuration - Optional components

2 Complete system

2.1 Temperature specifications

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

Information:

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

Information regarding worst-case conditions

- Thermal Analysis Tool (TAT V2.02) from Intel for simulating a 100% processor load
- BurnInTest tool (BurnInTest V4.0 Pro from Passmark Software) for simulating a 100% load on the interface via loop back adapters (serial interfaces, add-on and slide-in drives, USB ports, audio outputs)
- Maximum system expansion and power consumption

What must be considered when determining the maximum ambient temperature?

- Operating the Ethernet interfaces (ETH1/ETH2) in 10/100 Mbit or 1 Gbit mode
- Operating the complete system with or without fan kit
- The revision of the heat sink being used

2.1.1 Maximum ambient temperature

2.1.1.1 Maximum ambient temperature without a fan kit

Information:

- There is a difference when operating ETH2 in "up to 100 Mbit" or "up to 1 Gbit" mode.
- Operation without a fan kit is permitted **ONLY** when installed vertically (see "Mounting orientation" on page 187).
- The specifications in the following table are only valid for system units with heat sinks 5AC801.HS00-00 < Rev. D0 and 5AC801.HS00-01 < Rev. D0.

| | | ETH1: Up to 100 Mbit operation ETH2: Up to 100 Mbit operation | | | | | ETH1: Up to 100 Mbit operation ETH2: Up to 1 Gbit operation | | | | | Temperature limits | Location of sensor(s) |
|---|--------------------------------------|--|-------------------------|-------------------------|-------------------------|-------------------------|--|-------------------------|-------------------------|-------------------------|-------------------------|--------------------|-----------------------|
| | | L2400 5PC800.B945-00 | L7400 5PC800.B945-01 | U7500 5PC800.B945-02 | M 423 5PC800.B945-03 | T7400 5PC800.B945-04 | L2400 5PC800.B945-00 | L7400 5PC800.B945-01 | U7500 5PC800.B945-02 | M 423 5PC800.B945-03 | T7400 5PC800.B945-04 | | |
| All temperature values in degrees Celsius (°C) at 500 m above sea level. | | | | | | | | | | | | | |
| The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level). | | | | | | | | | | | | | |
| Maximum ambient temperature | | 35 | 35 | 35 | 45 | - | 30 | 30 | 30 | 40 | - | | |
| What else can also be operated at the max. ambient temperature, or are there any limits? | | | | | | | | | | | | | |
| Slide-in compact drives | Onboard CompactFlash ¹⁾ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 80 | I/O |
| | 5AC801.HDDI-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 80 | |
| | 5AC801.HDDI-01 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 80 | |
| | 5AC801.HDDI-02 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 80 | |
| | 5AC801.HDDI-03 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 60 | |
| | 5AC801.HDDI-04 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 60 | |
| | 5AC801.SSDI-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 70 | |
| | 5AC801.SSDI-01 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 70 | |
| | 5AC801.SSDI-02 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 70 | |
| | 5AC801.SSDI-03 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 70 | |
| | 5AC801.SSDI-04 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 70 | |
| Slide-in drives | 5AC801.HDDS-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 80 | Slide-in drive |
| | 5AC801.DVDS-00 | ✓ | ✓ | ✓ | 40 | | ✓ | ✓ | ✓ | ✓ | | 50 | |
| | 5AC801.DVRS-00 | ✓ | ✓ | ✓ | 40 | | ✓ | ✓ | ✓ | ✓ | | 50 | |
| Main memory | 5MMDDR.0512-01 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | - | - |
| | 5MMDDR.1024-01 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | - | |
| | 5MMDDR.2048-01 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | - | |
| System units | 5PC810.SX01-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 80 | Power supply |
| | 5PC810.SX02-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 80 | |
| | 5PC810.SX03-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 80 | |
| | 5PC810.SX05-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 80 | |
| Additional insert cards Interfaces / AP Link | 5AC600.CANI-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | - | - |
| | 5AC600.485I-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | - | |
| | 5AC801.SDL0-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | - | |
| | 5AC801.RDYR-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | - | |
| | 5ACPCI.RAIC-01 (24 hours / standard) | 30/ ✓ | 30/ ✓ | 30/ ✓ | 30/ 40 | | ✓ | ✓ | ✓ | ✓ | 30/ ✓ | - | |
| | 5ACPCI.RAIC-03 (24 hours / standard) | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | - | |
| | 5ACPCI.RAIC-05 (24 hours / standard) | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | - | |
| | 5ACPCI.RAIC-06 (24 hours / standard) | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | - | |

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

Table 5: Ambient temperature without a fan kit

Information:

- There is a difference when operating ETH1 and ETH2 in "up to 100 Mbit" or "up to 1 Gbit" mode.
- Operation without a fan kit is permitted **ONLY** when installed vertically (see "Mounting orientation" on page 187).
- The specifications in the following table are only valid for system units with heat sinks 5AC801.HS00-00 ≥ Rev. D0 and 5AC801.HS00-01 ≥ Rev. D0.

| | | ETH1: Up to 100 Mbit operation ETH2: Up to 100 Mbit operation | | | | | ETH1: Up to 100 Mbit operation ETH2: Up to 1 Gbit operation | | | | | Temperature limits Location of sensor(s) | |
|---|--------------------------------------|--|----------------|----------------|----------------|----------------|--|----------------|----------------|----------------|----------------|---|----------------|
| | | L2400 | L7400 | U7500 | M 423 | T7400 | L2400 | L7400 | U7500 | M 423 | T7400 | | |
| All temperature values in degrees Celsius (°C) at 500 m above sea level. | | 5PC800.B945-00 | 5PC800.B945-01 | 5PC800.B945-02 | 5PC800.B945-03 | 5PC800.B945-04 | 5PC800.B945-00 | 5PC800.B945-01 | 5PC800.B945-02 | 5PC800.B945-03 | 5PC800.B945-04 | | |
| The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level). | | | | | | | | | | | | | |
| Maximum ambient temperature | | 35 | 35 | 45 | 45 | - | 30 | 30 | 40 | 40 | - | | |
| What else can also be operated at the max. ambient temperature, or are there any limits? | | | | | | | | | | | | | |
| Slide-in compact drives | Onboard CompactFlash ¹⁾ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 80 | I/O |
| | 5AC801.HDDI-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 80 | |
| | 5AC801.HDDI-01 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 80 | |
| | 5AC801.HDDI-02 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 80 | |
| | 5AC801.HDDI-03 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 60 | |
| | 5AC801.HDDI-04 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 60 | |
| | 5AC801.SSDI-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 70 | |
| | 5AC801.SSDI-01 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 70 | |
| | 5AC801.SSDI-02 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 70 | |
| | 5AC801.SSDI-03 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 70 | |
| | 5AC801.SSDI-04 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 70 | |
| Slide-in drives | 5AC801.HDDS-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 80 | Slide-in drive |
| | 5AC801.DVDS-00 | ✓ | ✓ | 40 | 40 | | ✓ | ✓ | ✓ | ✓ | | 50 | |
| | 5AC801.DVRS-00 | ✓ | ✓ | 40 | 40 | | ✓ | ✓ | ✓ | ✓ | | 50 | |
| Main memory | 5MMDDR.0512-01 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | - | - |
| | 5MMDDR.1024-01 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | - | |
| | 5MMDDR.2048-01 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | - | |
| System units | 5PC810.SX01-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 80 | Power supply |
| | 5PC810.SX02-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 80 | |
| | 5PC810.SX03-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 80 | |
| | 5PC810.SX05-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | 80 | |
| Additional insert cards Interfaces / AP Link | 5AC600.CANI-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | - | - |
| | 5AC600.485I-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | - | |
| | 5AC801.SDL0-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | - | |
| | 5AC801.RDYR-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | - | |
| | 5ACPCI.RAIC-01 (24 hours / standard) | 30/ ✓ | 30/ ✓ | 30/ ✓ | 30/ 40 | | ✓ | ✓ | ✓ | 30/ ✓ | | - | |
| | 5ACPCI.RAIC-03 (24 hours / standard) | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | - | |
| | 5ACPCI.RAIC-05 (24 hours / standard) | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | - | |
| | 5ACPCI.RAIC-06 (24 hours / standard) | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | - | |

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

Table 6: Ambient temperature without a fan kit

Information:

- There is no difference when operating ETH1 and ETH2 in "up to 100 Mbit" or "up to 1 Gbit" mode.
- Operation without a fan kit is permitted **ONLY** when installed vertically (1.3 "Mounting orientation" on page 187).
- The specifications in the following table are only valid for system units with heat sinks 5AC801.HS00-00 ≥ Rev. D0 and 5AC801.HS00-01 ≥ Rev. D0 and the CPU board 5PC800.B945-05 with heat sink 5AC801.HS00-02.

| All temperature values in degrees Celsius (°C) at 500 m above sea level. | | L2400 | L7400 | U7500 | M 423 | T7400 | N270 | Temperature limits | Location of sensor(s) |
|---|--------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|--------------------|-----------------------|
| The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level). | | 5PC800.B945-10 | 5PC800.B945-11 | 5PC800.B945-12 | 5PC800.B945-13 | 5PC800.B945-14 | 5PC800.B945-05 | | |
| Maximum ambient temperature | | 35 | 35 | 45 | 45 | - | 50 | Temperature limits | Location of sensor(s) |
| What else can also be operated at the max. ambient temperature, or are there any limits? | | | | | | | | | |
| Slide-in compact drives | Onboard CompactFlash ¹⁾ | ✓ | ✓ | ✓ | ✓ | | ✓ | 80 | I/O |
| | 5AC801.HDDI-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | 80 | |
| | 5AC801.HDDI-01 | ✓ | ✓ | ✓ | ✓ | | ✓ | 80 | |
| | 5AC801.HDDI-02 | ✓ | ✓ | ✓ | ✓ | | ✓ | 80 | |
| | 5AC801.HDDI-03 | ✓ | ✓ | ✓ | ✓ | | 45 | 60 | |
| | 5AC801.HDDI-04 | ✓ | ✓ | ✓ | ✓ | | 45 | 60 | |
| | 5AC801.SSDI-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | 70 | |
| | 5AC801.SSDI-01 | ✓ | ✓ | ✓ | ✓ | | ✓ | 70 | |
| | 5AC801.SSDI-02 | ✓ | ✓ | ✓ | ✓ | | ✓ | 70 | |
| | 5AC801.SSDI-03 | ✓ | ✓ | ✓ | ✓ | | ✓ | 70 | |
| | 5AC801.SSDI-04 | ✓ | ✓ | ✓ | ✓ | | ✓ | 70 | |
| Slide-in drives | 5AC801.HDDS-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | 80 | Slide-in drive |
| | 5AC801.DVDS-00 | ✓ | ✓ | 40 | 40 | | 40 | 50 | |
| | 5AC801.DVRS-00 | ✓ | ✓ | 40 | 40 | | 40 | 50 | |
| Main memory | 5MMDDR.0512-01 | ✓ | ✓ | ✓ | ✓ | | ✓ | - | - |
| | 5MMDDR.1024-01 | ✓ | ✓ | ✓ | ✓ | | ✓ | - | |
| | 5MMDDR.2048-01 | ✓ | ✓ | ✓ | ✓ | | ✓ | - | |
| System units | 5PC810.SX01-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | 80 | Power supply |
| | 5PC810.SX02-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | 80 | |
| | 5PC810.SX03-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | 80 | |
| | 5PC810.SX05-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | 80 | |
| Additional insert cards Interfaces / AP Link | 5AC600.CANI-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | - | - |
| | 5AC600.4851-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | - | |
| | 5AC801.SDL0-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | - | |
| | 5AC801.RDYR-00 | ✓ | ✓ | ✓ | ✓ | | ✓ | - | |
| | 5ACPCI.RAIC-01 (24 hours / standard) | 30/✓ | 30/✓ | 30/✓ | 30/40 | | 30/40 | - | |
| | 5ACPCI.RAIC-03 (24 hours / standard) | ✓ | ✓ | ✓ | ✓ | | ✓ | - | |
| | 5ACPCI.RAIC-05 (24 hours / standard) | ✓ | ✓ | ✓ | ✓ | | 45 | - | |
| | 5ACPCI.RAIC-06 (24 hours / standard) | ✓ | ✓ | ✓ | ✓ | | 45 | - | |

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

Table 7: Ambient temperature without a fan kit

2.1.1.2 Maximum ambient temperature with a fan kit

Information:

- There is a difference when operating ETH1 and ETH2 in "up to 100 Mbit" or "up to 1 Gbit" mode.
- Vertical and horizontal (minus 5°C) mounting orientations are permitted (see "Mounting orientation" on page 187).

All temperature values in degrees Celsius (°C) at 500 m above sea level.

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

| | | ETH1: Up to 100 Mbit operation ETH2: Up to 100 Mbit operation | | | | | ETH1: Up to 100 Mbit operation ETH2: Up to 1 Gbit operation | | | | | Temperature limits | Location of sensor(s) |
|--|--------------------------------------|--|-------------------------|-------------------------|-------------------------|-------------------------|--|-------------------------|-------------------------|-------------------------|-------------------------|--------------------|-----------------------|
| | | L2400 5PC800.B945-00 | L7400 5PC800.B945-01 | U7500 5PC800.B945-02 | M 423 5PC800.B945-03 | T7400 5PC800.B945-04 | L2400 5PC800.B945-00 | L7400 5PC800.B945-01 | U7500 5PC800.B945-02 | M 423 5PC800.B945-03 | T7400 5PC800.B945-04 | | |
| Maximum ambient temperature | | 55 | 55 | 55 | 55 | 55 | 50 | 50 | 50 | 50 | 45 | | |
| What else can also be operated at the max. ambient temperature, or are there any limits? | | | | | | | | | | | | | |
| Slide-in compact drives | Onboard CompactFlash ¹⁾ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 80 | I/O |
| | 5AC801.HDDI-00 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 80 | |
| | 5AC801.HDDI-01 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 80 | |
| | 5AC801.HDDI-02 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 80 | |
| | 5AC801.HDDI-03 | 50 | 50 | 50 | 50 | 50 | ✓ | ✓ | ✓ | ✓ | ✓ | 60 | |
| | 5AC801.HDDI-04 | 50 | 50 | 50 | 50 | 50 | ✓ | ✓ | ✓ | ✓ | ✓ | 60 | |
| | 5AC801.SSDI-00 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 70 | |
| | 5AC801.SSDI-01 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 70 | |
| | 5AC801.SSDI-02 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 70 | |
| | 5AC801.SSDI-03 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 70 | |
| | 5AC801.SSDI-04 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 70 | |
| Slide-in drives | 5AC801.HDDS-00 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 80 | Slide-in drive |
| | 5AC801.DVDS-00 | 50 | 50 | 50 | 50 | 50 | ✓ | ✓ | ✓ | ✓ | ✓ | 50 | |
| | 5AC801.DVRS-00 | 50 | 50 | 50 | 50 | 50 | ✓ | ✓ | ✓ | ✓ | ✓ | 50 | |
| Main memory | 5MMDDR.0512-01 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - | - |
| | 5MMDDR.1024-01 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - | |
| | 5MMDDR.2048-01 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - | |
| System units | 5PC810.SX01-00 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 80 | Power supply |
| | 5PC810.SX02-00 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 80 | |
| | 5PC810.SX03-00 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 80 | |
| | 5PC810.SX05-00 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 80 | |
| Additional in-sert cards Interfaces / AP Link | 5AC600.CANI-00 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - | - |
| | 5AC600.485I-00 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - | |
| | 5AC801.SDL0-00 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - | |
| | 5AC801.RDYR-00 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - | |
| | 5ACPCI.RAIC-01 (24 hours / standard) | 30/ 40 | 30/ 40 | 30/ 40 | 30/ 40 | 30/ 40 | 30/ 40 | 30/ 40 | 30/ 40 | 30/ 40 | 30/ 40 | - | |
| | 5ACPCI.RAIC-03 (24 hours / standard) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - | |
| | 5ACPCI.RAIC-05 (24 hours / standard) | 50 | 50 | 50 | 50 | 50 | ✓ | ✓ | ✓ | ✓ | ✓ | - | |
| | 5ACPCI.RAIC-06 (24 hours / standard) | 50 | 50 | 50 | 50 | 50 | ✓ | ✓ | ✓ | ✓ | ✓ | - | |

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

Table 8: Ambient temperature with a fan kit

Information:

- There is no difference when operating ETH1 and ETH2 in "up to 100 Mbit" or "up to 1 Gbit" mode.
- Vertical and horizontal (minus 5°C) mounting orientations are permitted (see "Mounting orientation" on page 187).
- The specifications in the following table are only valid for system units with heat sinks 5AC801.HS00-00 ≥ Rev. D0 and 5AC801.HS00-01 ≥ Rev. D0 and the CPU board 5PC800.B945-05 with heat sink 5AC801.HS00-02.

| All temperature values in degrees Celsius (°C) at 500 m above sea level. The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level). | | L2400 5PC800.B945-10 | L7400 5PC800.B945-11 | U7500 5PC800.B945-12 | M 423 5PC800.B945-13 | T7400 5PC800.B945-14 | N270 5PC800.B945-05 | Temperature limits | Location of sensor(s) |
|---|--------------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|------------------------|--------------------|-----------------------|
| Maximum ambient temperature | | 55 | 55 | 55 | 55 | 55 | 60 | | |
| What else can also be operated at the max. ambient temperature, or are there any limits? | | | | | | | | | |
| Slide-in compact drives | Onboard CompactFlash ¹⁾ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 80 | I/O |
| | 5AC801.HDDI-00 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 80 | |
| | 5AC801.HDDI-01 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 80 | |
| | 5AC801.HDDI-02 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 80 | |
| | 5AC801.HDDI-03 | 50 | 50 | 50 | 50 | 50 | 50 | 60 | |
| | 5AC801.HDDI-04 | 50 | 50 | 50 | 50 | 50 | 50 | 60 | |
| | 5AC801.SSDI-00 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 70 | |
| | 5AC801.SSDI-01 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 70 | |
| | 5AC801.SSDI-02 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 70 | |
| | 5AC801.SSDI-03 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 70 | |
| | 5AC801.SSDI-04 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 70 | |
| Slide-in drives | 5AC801.HDDS-00 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 80 | Slide-in drive |
| | 5AC801.DVDS-00 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | |
| | 5AC801.DVRS-00 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | |
| Main memory | 5MMDDR.0512-01 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - | - |
| | 5MMDDR.1024-01 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - | |
| | 5MMDDR.2048-01 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - | |
| System units | 5PC810.SX01-00 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 80 | Power supply |
| | 5PC810.SX02-00 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 80 | |
| | 5PC810.SX03-00 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 80 | |
| | 5PC810.SX05-00 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 80 | |
| Additional insert cards Interfaces / AP Link | 5AC600.CANI-00 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - | - |
| | 5AC600.4851-00 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - | |
| | 5AC801.SDL0-00 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - | |
| | 5AC801.RDYR-00 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - | |
| | 5ACPCI.RAIC-01 (24 hours / standard) | 30/ 40 | 30/ 40 | 30/ 40 | 30/ 40 | 30/ 40 | 30/ 40 | - | |
| | 5ACPCI.RAIC-03 (24 hours / standard) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - | |
| | 5ACPCI.RAIC-05 (24 hours / standard) | 50 | 50 | 50 | 50 | 50 | 50 | - | |
| | 5ACPCI.RAIC-06 (24 hours / standard) | 50 | 50 | 50 | 50 | 50 | 50 | - | |

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

Table 9: Ambient temperature with a fan kit

2.1.1.3 How is the maximum ambient temperature determined?

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

Information:

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

3. Incorporating additional drives (add-on, slide-in), main memory, additional insert cards, etc. can change the temperature limits of an APC810 system.

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

If there is a specific temperature, for example "35", next to the component, then the ambient temperature of the complete APC810 system cannot exceed this temperature.

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, 5ACPCI.RAIC-01 and 5ACPCI.RAIC-02. If none of these components are used, then the minimum ambient temperature is 0°C.

2.1.3 Temperature monitoring

Sensors monitor temperature values at various places in the APC810 (CPU, board, board I/O, board ETH2, board power supply, ETH2 controller, power supply and slide-in drives 1/2). The location of the temperature sensors can be seen in Figure 3 "Temperature sensor locations" on page 38. The values listed in the table represent the defined maximum temperature²⁾ for the respective measurement point. An alarm is not triggered if this temperature is exceeded. These temperatures can be read in BIOS ("Advanced" - Baseboard/Panel features - Baseboard monitor) or in approved Microsoft operating systems via the B&R Control Center.

In addition, the hard disks for APC810 systems available from B&R are equipped with S.M.A.R.T, or Self-Monitoring, Analysis, and Reporting Technology. This makes it possible to read various parameters, e.g. temperature, using software (such as HDD Thermometer, a freeware program) on approved Microsoft operating systems (except Windows CE).

²⁾ The temperature measured approximates the immediate ambient temperature but may also be influenced by neighboring components.

2.1.4 Temperature sensor locations

Sensors indicate temperature values at different locations in the APC810 (CPU, board I/O, slide-in drive, etc). The temperatures³⁾ can be read in BIOS (Advanced - CPU monitor) or in Microsoft Windows operating systems via the B&R Control Center⁴⁾.

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

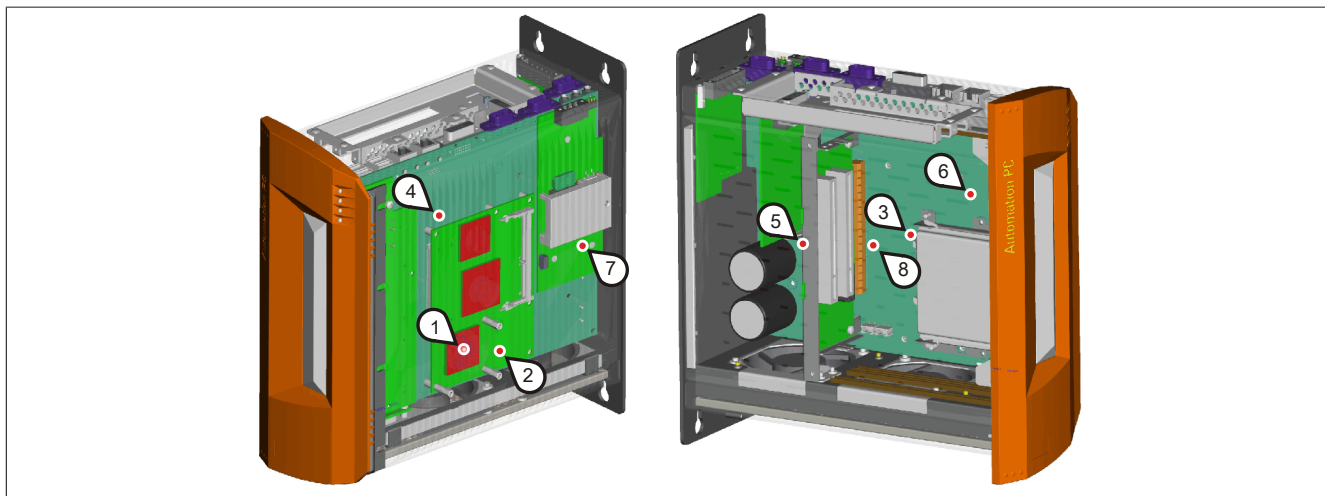


Figure 3: Temperature sensor locations

| Position | Measurement point for | Measurement | Max. specified |
|----------|-----------------------|---|----------------------|
| 1 | CPU | Ambient temperature of the processor (sensor integrated in the processor) | 100°C |
| 2 | Board | CPU board temperature (sensor integrated on the CPU board) | 85°C |
| 3 | Board I/O | Board temperature in the I/O area (sensor on the baseboard) | 85°C |
| 4 | Board ETH2 | Baseboard temperature near the ETH2 controller (sensor on the baseboard) | 80°C |
| 5 | Board power supply | Board power supply temperature (sensor on the mainboard) | 80°C |
| 6 | ETH2 controller | ETH2 controller temperature (sensor in the ETH2 controller) | 125°C |
| 7 | Power supply | Power supply temperature (sensor on the power supply) | 80°C |
| 8 | Slide-in drive 1 | Slide-in drive 1 temperature (sensor integrated in the slide-in slot) | Depends on the drive |
| 8 | Slide-in drive 2 | Slide-in drive 2 temperature (sensor integrated in the slide-in slot) | Depends on the drive |

Table 10: Temperature sensor locations

³⁾ The temperature measured approximates the immediate ambient temperature but can be influenced by neighboring components.

⁴⁾ The ADI driver that includes the B&R Control Center is available in the Downloads section of the B&R website (www.br-automation.com).

2.2 Humidity specifications

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

| Component | | Operation | Storage / Transport |
|-------------------------------|--------------------------------------|-----------|---------------------|
| 945GME COM Express CPU boards | | 10 to 90% | 5 to 95% |
| System units (all models) | | 5 to 90% | 5 to 95% |
| Main memory for CPU boards | | 10 to 90% | 5 to 95% |
| Slide-in compact drives | 5AC801.HDDI-00 | 5 to 90% | 5 to 95% |
| | 5AC801.HDDI-01 | 5 to 90% | 5 to 95% |
| | 5AC801.HDDI-02 | 8 to 80% | 5 to 95% |
| | 5AC801.HDDI-03 | 5 to 95% | 5 to 95% |
| | 5AC801.HDDI-04 | 5 to 95% | 5 to 95% |
| | 5AC801.SSDI-00 | 5 to 95% | 5 to 95% |
| | 5AC801.SSDI-01 | 5 to 95% | 5 to 95% |
| | 5AC801.SSDI-02 | 5 to 95% | 5 to 95% |
| | 5AC801.SSDI-03 | 8 to 95% | 8 to 95% |
| | 5AC801.SSDI-04 | 8 to 95% | 8 to 95% |
| Slide-in drives | 5AC801.HDDS-00 | 5 to 90% | 5 to 90% |
| | 5AC801.DVDS-00 | 8 to 90% | 5 to 95% |
| | 5AC801.DVRS-00 | 8 to 90% | 5 to 95% |
| Additional insert cards | 5AC600.CANI-00 | 5 to 90% | 5 to 95% |
| | 5AC600.485I-00 | 5 to 90% | 5 to 95% |
| | 5AC801.SDL0-00 | 5 to 90% | 5 to 95% |
| | 5AC801.RDYR-00 | 5 to 90% | 5 to 95% |
| | 5ACPCI.RAIC-01 (24 hours / standard) | 5 to 90% | 5 to 95% |
| | 5ACPCI.RAIC-02 (24 hours / standard) | 5 to 90% | 5 to 95% |
| | 5ACPCI.RAIC-03 (24 hours / standard) | 8 to 90% | 5 to 95% |
| | 5ACPCI.RAIC-04 (24 hours / standard) | 8 to 90% | 5 to 95% |
| | 5ACPCI.RAIC-05 (24 hours / standard) | 5 to 95% | 5 to 95% |
| | 5ACPCI.RAIC-06 (24 hours / standard) | 5 to 95% | 5 to 95% |
| | 5MMHDD.0250-00 (24 hours / standard) | 5 to 95% | 5 to 95% |
| | 5MMHDD.0500-00 (24 hours / standard) | 5 to 95% | 5 to 95% |
| Accessories | 5CFCRD.xxxx-06 CompactFlash cards | 85% | 85% |
| | 5CFCRD.xxxx-04 CompactFlash cards | 85% | 85% |
| | 5CFCRD.xxxx-03 CompactFlash cards | 8 to 95% | 8 to 95% |
| | 5MMUSB.2048-00 flash drive | 10 to 90% | 5 to 90% |
| | 5MMUSB.xxxx-01 flash drive | 85% | 85% |
| | 5MD900.USB2-01 USB media drive | 20 to 80% | 5 to 90% |

Table 11: Overview of humidity specifications for individual components

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

2.3 Power management

2.3.1 Supply voltage block diagram

The following block diagram illustrates the simplified structure of the APC810 supply voltage for system units.

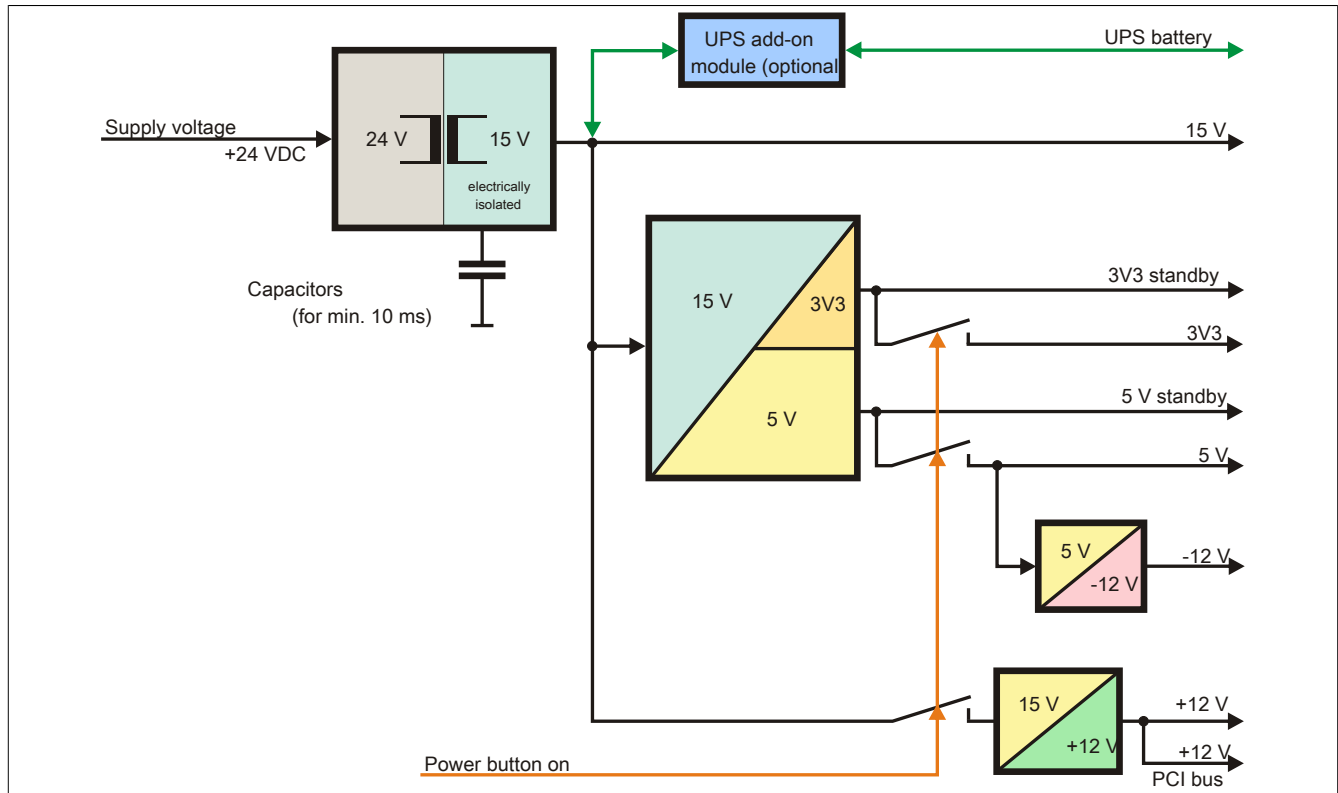


Figure 4: Supply voltage for system units

Description

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

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

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

2.3.2 Power calculation with 5PC810.SX01-00 revision < D0

| Information: | | CPU board | | | | | | Current system |
|--|-------|--|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------|-----------------------------|
| | | 5PC800.B945-00 5PC800.B945-10 | 5PC800.B945-01 5PC800.B945-11 | 5PC800.B945-02 5PC800.B945-12 | 5PC800.B945-03 5PC800.B945-13 | 5PC800.B945-04 5PC800.B945-14 | 5PC800.B945-05 | |
| 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. | | | | | | | | Enter values in this column |
| Total power supply | +12 V | Total power supply power (maximum) | | | | | | 130 |
| | | Add-on UPS module, optional | | | | | | |
| | | Maximum possible at +12V | | | | | | 75 |
| | | CPU board, permanent consumers | | | | | | |
| | | 512 MB RAM, max. 2 with 1.5 W each | | | | | | |
| | | 1024 MB RAM, max. 2 with 2.5 W each | | | | | | |
| | | 2048 MB RAM, max. 2 with 3 W each | | | | | | |
| | | Fan kit, optional | | | | | | |
| | | External consumers, optional (via mainboard) | | | | | | |
| | | 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 ∑ | | | | | | |
| | +5 V | Maximum possible at +5V | | | | | | 65 |
| | | System unit, permanent consumers | | | | | | |
| | | Hard disk (slide-in compact) | | | | | | |
| | | USB peripherals USB2 and USB4 with 2.5 W each | | | | | | |
| | | USB peripherals USB1, USB3 and USB5 with 5 W each | | | | | | |
| | | Interface option (add-on interface), optional | | | | | | |
| | | External consumers, optional (via mainboard) | | | | | | |
| | | 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 ∑ | | | | | | |
| | -12 V | Consumers +5 V ∑ | | | | | | |
| | | Maximum possible at 3V3 | | | | | | 40 |
| | | System unit, permanent consumers | | | | | | |
| | | CompactFlash, 1 W each | | | | | | |
| | | Interface option (add-on interface), optional | | | | | | |
| | | 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 the power consumption for each voltage range) may not exceed the limits stated for operation with or without a fan kit.

Table 12: 1-slot APC variant - Power calculation table

2.3.3 Power calculation with 5PC810.SX01-00 revision < D0

| Information: | | CPU board | | | | | | Current system |
|--|-------|--|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------|----------------|
| | | 5PC800.B945-00 5PC800.B945-10 | 5PC800.B945-01 5PC800.B945-11 | 5PC800.B945-02 5PC800.B945-12 | 5PC800.B945-03 5PC800.B945-13 | 5PC800.B945-04 5PC800.B945-14 | 5PC800.B945-05 | |
| 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. | | Enter values in this column | | | | | | |
| Total power supply | +12 V | Total power supply power (maximum) | | | | | | 85 |
| | | Add-on UPS module, optional | | | | | | |
| | | Maximum possible at +12V | | | | | | 75 |
| | | CPU board, permanent consumers | | | | | | |
| | | 512 MB RAM, max. 2 with 1.5 W each | | | | | | |
| | | 1024 MB RAM, max. 2 with 2.5 W each | | | | | | |
| | | 2048 MB RAM, max. 2 with 3 W each | | | | | | |
| | | Fan kit, optional | | | | | | |
| | | External consumers, optional (via mainboard) | | | | | | |
| | | 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 ∑ | | | | | | |
| | +5 V | Maximum possible at +5V | | | | | | 65 |
| | | System unit, permanent consumers | | | | | | |
| | | Hard disk (slide-in compact) | | | | | | |
| | | USB peripherals USB2 and USB4 with 2.5 W each | | | | | | |
| | | USB peripherals USB1, USB3 and USB5 with 5 W each | | | | | | |
| | | Interface option (add-on interface), optional | | | | | | |
| | | External consumers, optional (via mainboard) | | | | | | |
| | | 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 ∑ | | | | | | |
| | -12 V | Consumers +5 V ∑ | | | | | | |
| | | Maximum possible at 3V3 | | | | | | 40 |
| | | System unit, permanent consumers | | | | | | |
| | | CompactFlash, 1 W each | | | | | | |
| | | Interface option (add-on interface), optional | | | | | | |
| | | 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 the power consumption for each voltage range) may not exceed the limits stated for operation with or without a fan kit.

Table 13: 1-slot APC variant - Power calculation table

2.3.4 Power calculation with 5PC810.SX02-00 revision < D0

| Information: | | CPU board | | | | | | Current system | | |
|--|------------------------------------|--|--|----------------------------------|----------------------------------|----------------------------------|----------------|-----------------------------|------|-----|
| | | 5PC800.B945-00 5PC800.B945-10 | 5PC800.B945-01 5PC800.B945-11 | 5PC800.B945-02 5PC800.B945-12 | 5PC800.B945-03 5PC800.B945-13 | 5PC800.B945-04 5PC800.B945-14 | 5PC800.B945-05 | Enter values in this column | | |
| All values in watts The values for the suppliers are maximum values. The values for the con- sumers are average maximum values, but not peak values. | | | | | | | | | | |
| Total power supply | Total power supply power (maximum) | | | | | | | 130 | | |
| | Add-on UPS module, optional | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | | | |
| | Maximum possible at +12V | | | | | | | 75 | | |
| | +12 V | CPU board, permanent consumers | 26 | 30 | 18 | 14 | 43 | 11 | | |
| | | 512 MB RAM, max. 2 with 1.5 W each | | | | | | | | |
| | | 1024 MB RAM, max. 2 with 2.5 W each | | | | | | | | |
| | | 2048 MB RAM, max. 2 with 3 W each | | | | | | | | |
| | | Fan kit, optional | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | | |
| | | External consumers, optional (via mainboard) | 10 | 10 | 10 | 10 | 10 | 10 | | |
| | | 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 ∑ | | | | | | | | |
| | +5 V | Maximum possible at +5V | | | | | | | 65 | |
| | | | System unit, permanent consumers | 4 | 4 | 4 | 4 | 4 | 4 | |
| | | | Hard disk (slide-in compact) | 4 | 4 | 4 | 4 | 4 | 4 | |
| | | | Slide-in drive (hard disk, DVD-ROM, etc.) | 4 | 4 | 4 | 4 | 4 | 4 | |
| | | | USB peripherals USB2 and USB4 with 2.5 W each | | | | | | | |
| | | | USB peripherals USB1, USB3 and USB5 with 5 W each | | | | | | | |
| | | | Interface option (add-on interface), optional | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | |
| | | | Graphics adapter (AP Link), optional | 5 | 5 | 5 | 5 | 5 | 5 | |
| | | | External consumers, optional (via mainboard) | 5 | 5 | 5 | 5 | 5 | 5 | |
| | | | 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 ∑ | | | | | | | |
| | | 3V3 | Maximum possible at 3V3 | | | | | | | 40 |
| | | | System unit, permanent consumers | 4 | 4 | 4 | 4 | 4 | 4 | |
| | | | CompactFlash, 1 W each | | | | | | | |
| | | | Interface option (add-on interface), optional | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | |
| | | | Graphics adapter (AP Link), optional | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | |
| | | | 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 the power consumption for each voltage range) may not exceed the limits stated for operation with or without a fan kit.

Table 14: 2-slot APC variant - Power calculation table

2.3.5 Power calculation with 5PC810.SX02-00 revision < D0

| Information: | | CPU board | | | | | | Current system |
|--|--|--|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------|-----------------------------|
| | | 5PC800.B945-00 5PC800.B945-10 | 5PC800.B945-01 5PC800.B945-11 | 5PC800.B945-02 5PC800.B945-12 | 5PC800.B945-03 5PC800.B945-13 | 5PC800.B945-04 5PC800.B945-14 | 5PC800.B945-05 | Enter values in this column |
| All values in watts The values for the suppliers are maximum values. The values for the con- sumers are average maximum values, but not peak values. | | Total power supply power (maximum) | | | | | | 85 |
| Add-on UPS module, optional | | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | |
| +12 V | Maximum possible at +12V | | | | | | 75 | |
| | CPU board, permanent consumers | 26 | 30 | 18 | 14 | 43 | 11 | |
| | 512 MB RAM, max. 2 with 1.5 W each | | | | | | | |
| | 1024 MB RAM, max. 2 with 2.5 W each | | | | | | | |
| | 2048 MB RAM, max. 2 with 3 W each | | | | | | | |
| | Fan kit, optional | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | |
| | External consumers, optional (via mainboard) | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 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 ∑ | | | | | | | |
| +5 V | Maximum possible at +5V | | | | | | 65 | |
| | System unit, permanent consumers | 4 | 4 | 4 | 4 | 4 | 4 | |
| | Hard disk (slide-in compact) | 4 | 4 | 4 | 4 | 4 | 4 | |
| | Slide-in drive (hard disk, DVD-ROM, etc.) | 4 | 4 | 4 | 4 | 4 | 4 | |
| | USB peripherals USB2 and USB4 with 2.5 W each | | | | | | | |
| | USB peripherals USB1, USB3 and USB5 with 5 W each | | | | | | | |
| | Interface option (add-on interface), optional | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | |
| | Graphics adapter (AP Link), optional | 5 | 5 | 5 | 5 | 5 | 5 | |
| | External consumers, optional (via mainboard) | 5 | 5 | 5 | 5 | 5 | 5 | |
| | 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 ∑ | | | | | | | | |
| 3V3 | Maximum possible at 3V3 | | | | | | 40 | |
| | System unit, permanent consumers | 4 | 4 | 4 | 4 | 4 | 4 | |
| | CompactFlash, 1 W each | | | | | | | |
| | Interface option (add-on interface), optional | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | |
| | Graphics adapter (AP Link), optional | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | |
| | 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 the power consumption for each voltage range) may not exceed the limits stated for operation with or without a fan kit.

Table 15: 2-slot APC variant - Power calculation table

2.3.6 Power calculation with 5PC810.SX03-00

| Information: | | CPU board | | | | | | Current system | | |
|--|-----------------------------|--|--|----------------------------------|----------------------------------|----------------------------------|----------------|-----------------------------|-----|--|
| | | 5PC800.B945-00 5PC800.B945-10 | 5PC800.B945-01 5PC800.B945-11 | 5PC800.B945-02 5PC800.B945-12 | 5PC800.B945-03 5PC800.B945-13 | 5PC800.B945-04 5PC800.B945-14 | 5PC800.B945-05 | Enter values in this column | | |
| All values in watts The values for the suppliers are maximum values. The values for the con- sumers 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 | 7.5 | 7.5 | 7.5 | | | |
| | Maximum possible at +12V | | | | | | | 75 | | |
| | +12 V | CPU board, permanent consumers | 26 | 30 | 18 | 14 | 43 | 11 | | |
| | | 512 MB RAM, max. 2 with 1.5 W each | | | | | | | | |
| | | 1024 MB RAM, max. 2 with 2.5 W each | | | | | | | | |
| | | 2048 MB RAM, max. 2 with 3 W each | | | | | | | | |
| | | Fan kit, optional | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | | |
| | | External consumers, optional (via mainboard) | 10 | 10 | 10 | 10 | 10 | 10 | | |
| | | 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 ∑ | | | | | | | | | |
| | +5 V | Maximum possible at +5V | | | | | | | 65 | |
| | | System unit, permanent consumers | 4 | 4 | 4 | 4 | 4 | 4 | | |
| | | Hard disk (slide-in compact) | 4 | 4 | 4 | 4 | 4 | 4 | | |
| | | Slide-in drive (hard disk, DVD-ROM, etc.) | 4 | 4 | 4 | 4 | 4 | 4 | | |
| | | USB peripherals USB2 and USB4 with 2.5 W each | | | | | | | | |
| | | USB peripherals USB1, USB3 and USB5 with 5 W each | | | | | | | | |
| | | Interface option (add-on interface), optional | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | | |
| | | Graphics adapter (AP Link), optional | 5 | 5 | 5 | 5 | 5 | 5 | | |
| | | External consumers, optional (via mainboard) | 5 | 5 | 5 | 5 | 5 | 5 | | |
| | | 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 ∑ | | | | | | | | |
| | 3V3 | Maximum possible at 3V3 | | | | | | | 40 | |
| | | System unit, permanent consumers | 4 | 4 | 4 | 4 | 4 | 4 | | |
| CompactFlash, 1 W each | | | | | | | | | | |
| Interface option (add-on interface), optional | | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | | | |
| Graphics adapter (AP Link), optional | | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | | | |
| 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 the power consumption for each voltage range) may not exceed the limits stated for operation with or without a fan kit.

Table 16: 3-slot APC variant - Power calculation table

2.3.7 Power calculation with 5PC810.SX05-00

| Information: | | CPU board | | | | | | Current system |
|--|-------|--|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------|-----------------------------|
| | | 5PC800.B945-00 5PC800.B945-10 | 5PC800.B945-01 5PC800.B945-11 | 5PC800.B945-02 5PC800.B945-12 | 5PC800.B945-03 5PC800.B945-13 | 5PC800.B945-04 5PC800.B945-14 | 5PC800.B945-05 | |
| 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. | | | | | | | | Enter values in this column |
| Total power supply | +12 V | Total power supply power (maximum) | | | | | | 130 |
| | | Add-on UPS module, optional | | | | | | |
| | | Maximum possible at +12V | | | | | | 75 |
| | | CPU board, permanent consumers | | | | | | |
| | | 512 MB RAM, max. 2 with 1.5 W each | | | | | | |
| | | 1024 MB RAM, max. 2 with 2.5 W each | | | | | | |
| | | 2048 MB RAM, max. 2 with 3 W each | | | | | | |
| | | Fan kit, optional | | | | | | |
| | | External consumers, optional (via mainboard) | | | | | | |
| | | 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 ∑ | | | | | | |
| | +5 V | Maximum possible at +5V | | | | | | 65 |
| | | System unit, permanent consumers | | | | | | |
| | | Hard disk (slide-in compact) | | | | | | |
| | | Slide-in drive (hard disk, DVD-ROM, etc.) | | | | | | |
| | | USB peripherals USB2 and USB4 with 2.5 W each | | | | | | |
| | | USB peripherals USB1, USB3 and USB5 with 5 W each | | | | | | |
| | | Interface option (add-on interface), optional | | | | | | |
| | | Graphics adapter (AP Link), optional | | | | | | |
| | | External consumers, optional (via mainboard) | | | | | | |
| | | PCI card limit, optional (max. 3 W without fan kit, max. 20 W with fan kit) ¹⁾ | | | | | | |
| | -12 V | Maximum possible at -12V | | | | | | 1.2 |
| | | PCI card limit, optional (max. 1.2 W with or without fan kit) ¹⁾ | | | | | | |
| | | Consumers -12 V ∑ | | | | | | |
| | | Consumers +5 V ∑ | | | | | | |
| | 3V3 | Maximum possible at 3V3 | | | | | | 40 |
| | | System unit, permanent consumers | | | | | | |
| | | CompactFlash, 1 W each | | | | | | |
| | | Interface option (add-on interface), optional | | | | | | |
| | | Graphics adapter (AP Link), optional | | | | | | |
| | | 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 the power consumption for each voltage range) may not exceed the limits stated for operation with or without a fan kit.

Table 17: 5-slot APC variant - Power calculation table

2.4 Serial number sticker

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



Figure 5: Serial number sticker (front)

A sticker with detailed information about the installed components can also be found on the back of the mounting plate.

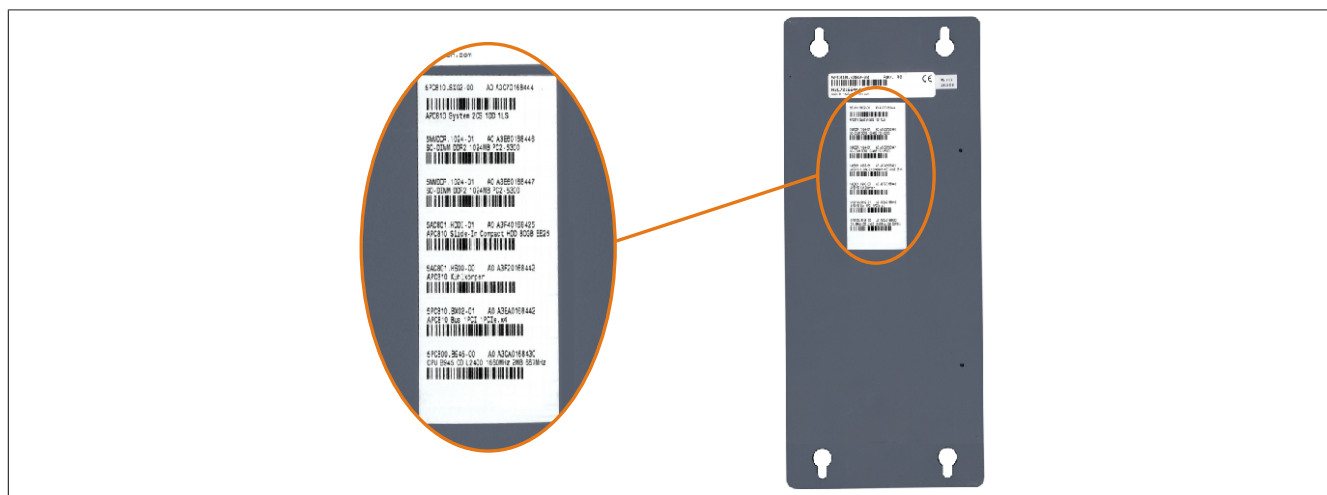


Figure 6: Serial number sticker (back)

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

The screenshot shows the B&R website interface. At the top, there is a search bar with the serial number "A3C70168444" entered. Below the search bar, there are tabs for "Website", "Materialnummer", and "Serialnummer". The "Serialnummer" tab is selected. On the left side, there is a navigation menu with various product categories. The main content area displays the search results for the serial number "A3C70168444". It includes fields for "Serialnummer:", "Materialnummer:", "Revision:", "Auslieferungsdatum:", and "Gewährleistungsende:". Below these fields, there is a table listing the installed components.

Serial number entered here
e.g. A3C70168444

Switching to the option
"Serial number"

List of installed
components shown after
searching for a serial number

| SERIAL | MATERIAL | REVISION | LIEFERUNG | GEWÄHRLEISTUNGSENDE |
|-------------|----------------|----------|-----------|---------------------|
| A3C70168444 | 5PC810.SX02-00 | A0 | *N/V | *N/A |
| A3E60168446 | 5MMDDR.1024-01 | A0 | *N/V | *N/A |
| A3E60168447 | 5MMDDR.1024-01 | A0 | *N/V | *N/A |
| A3F40168425 | 5AC801.HDDI-01 | A0 | *N/V | *N/A |
| A3F20168442 | 5AC801.HS00-00 | A0 | *N/V | *N/A |
| A3EA0168442 | 5PC810.BX02-01 | A0 | *N/V | *N/A |
| A3CA0168430 | 5PC800.B945-00 | A0 | *N/V | *N/A |

Figure 7: A3C70168444 - Example of serial number search

2.5.1 System unit 5PC810.SX01-00 and bus unit 5PC810.BX01-00



2.5.2 System unit 5PC810.SX01-00 and bus unit 5PC810.BX01-01

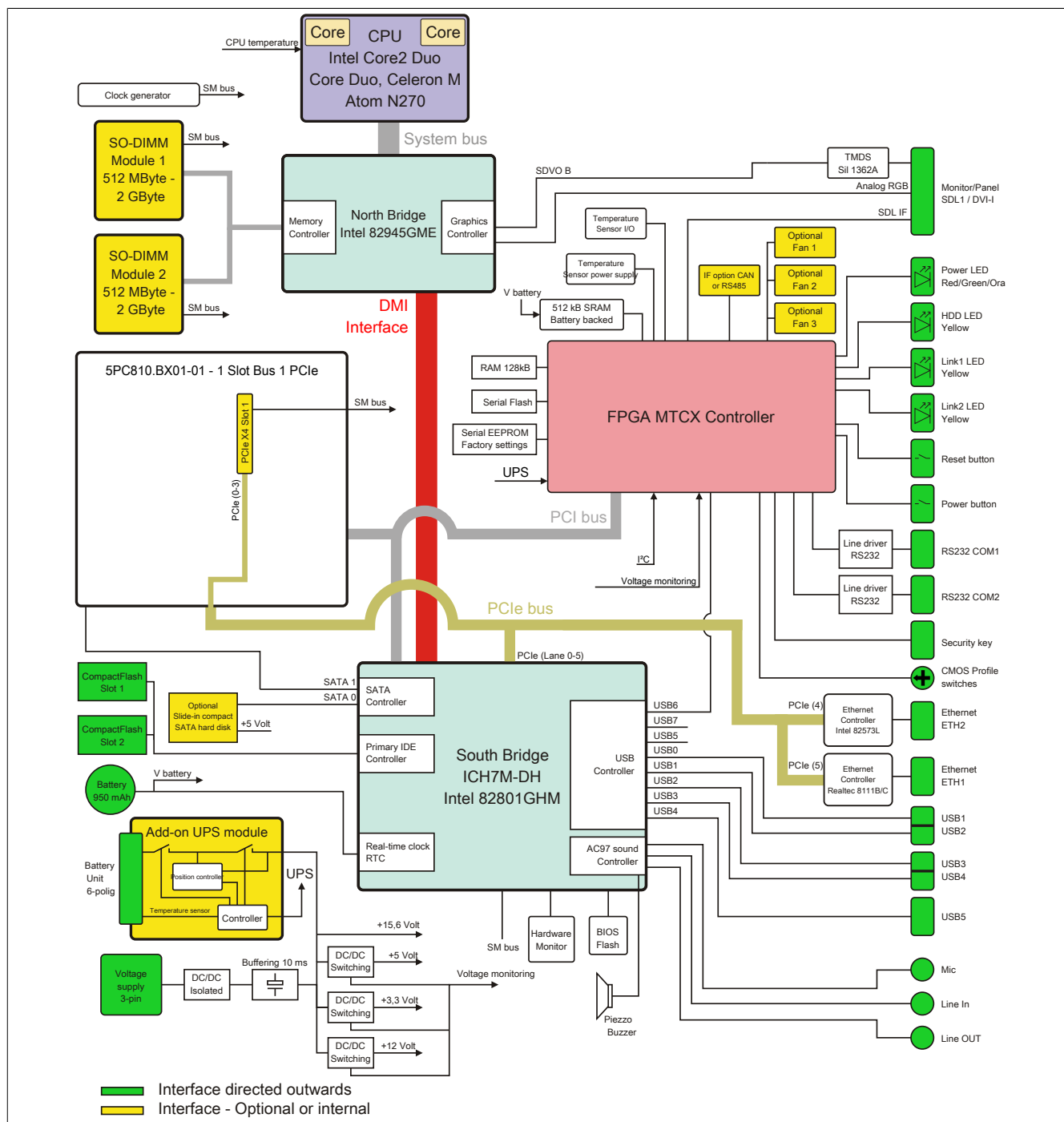


Figure 9: 5PC810.SX01-00 + 5PC810.BX01-01 - Block diagram

2.5.3 System unit 5PC810.SX02-00 and bus unit 5PC810.BX02-00

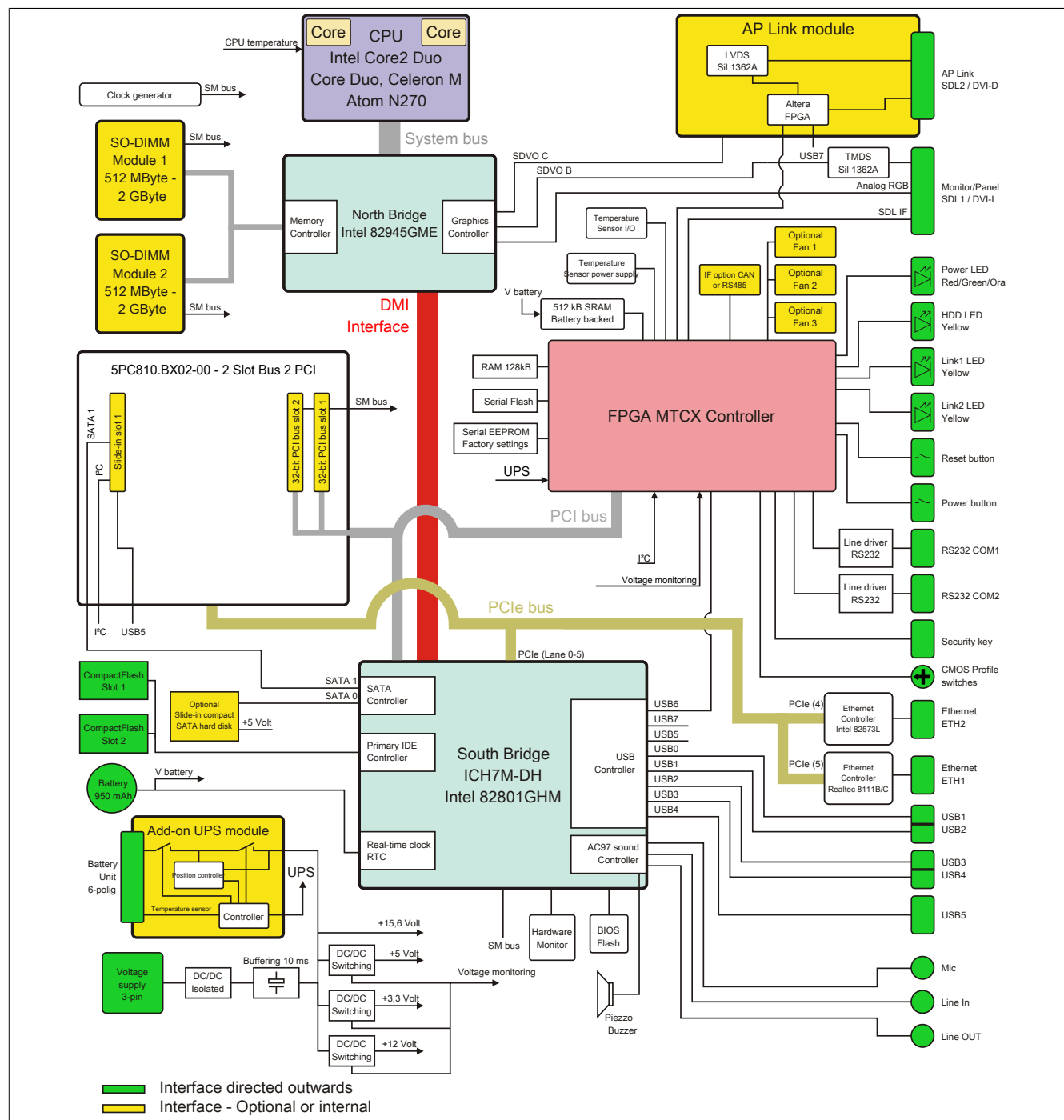


Figure 10: 5PC810.SX02-00 + 5PC810.BX02-00 - Block diagram

2.5.4 System unit 5PC810.SX02-00 and bus unit 5PC810.BX02-01

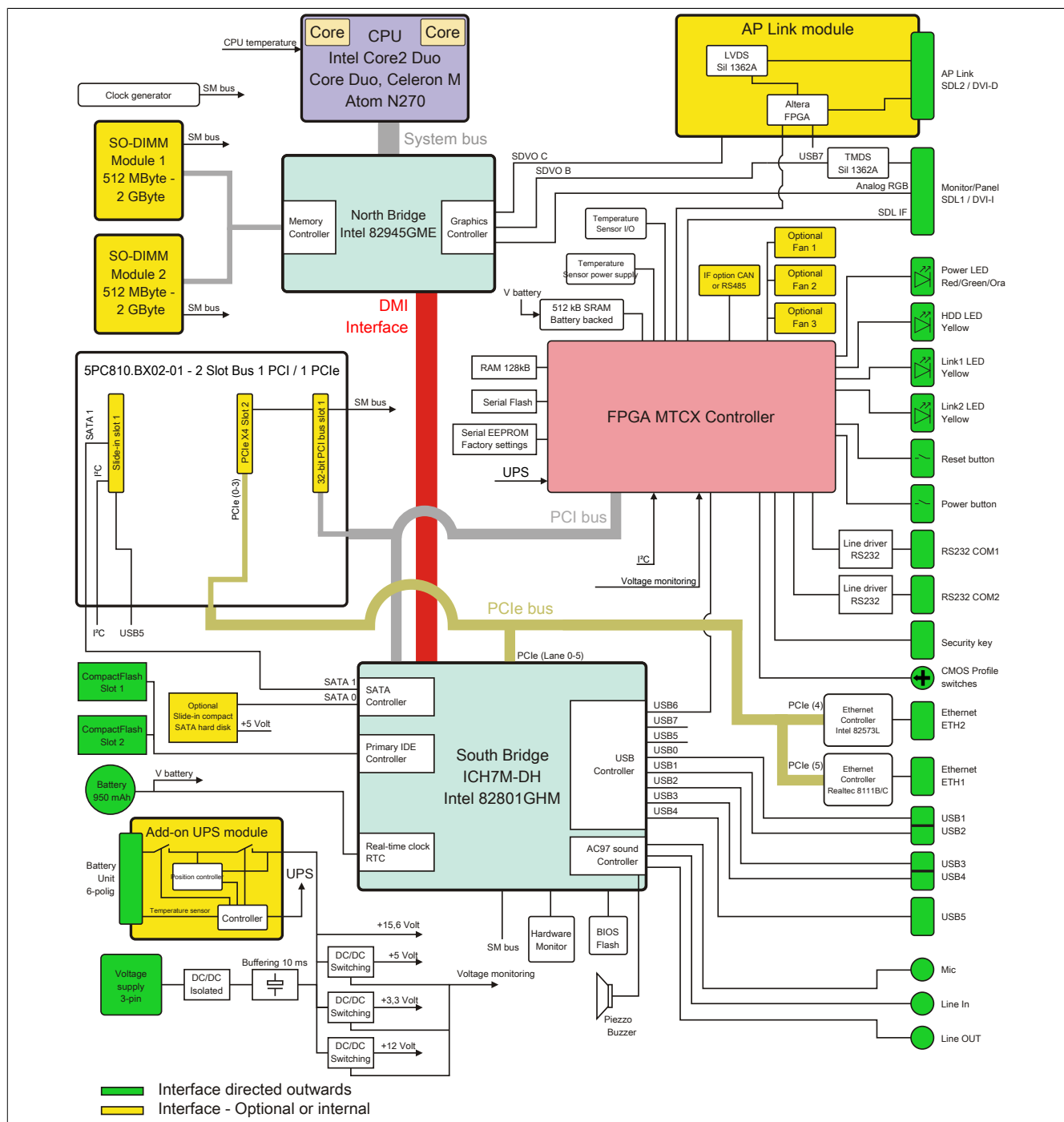


Figure 11: 5PC810.SX02-00 + 5PC810.BX02-01 - Block diagram

2.5.5 System unit 5PC810.SX03-00 and bus unit 5PC810.BX03-00

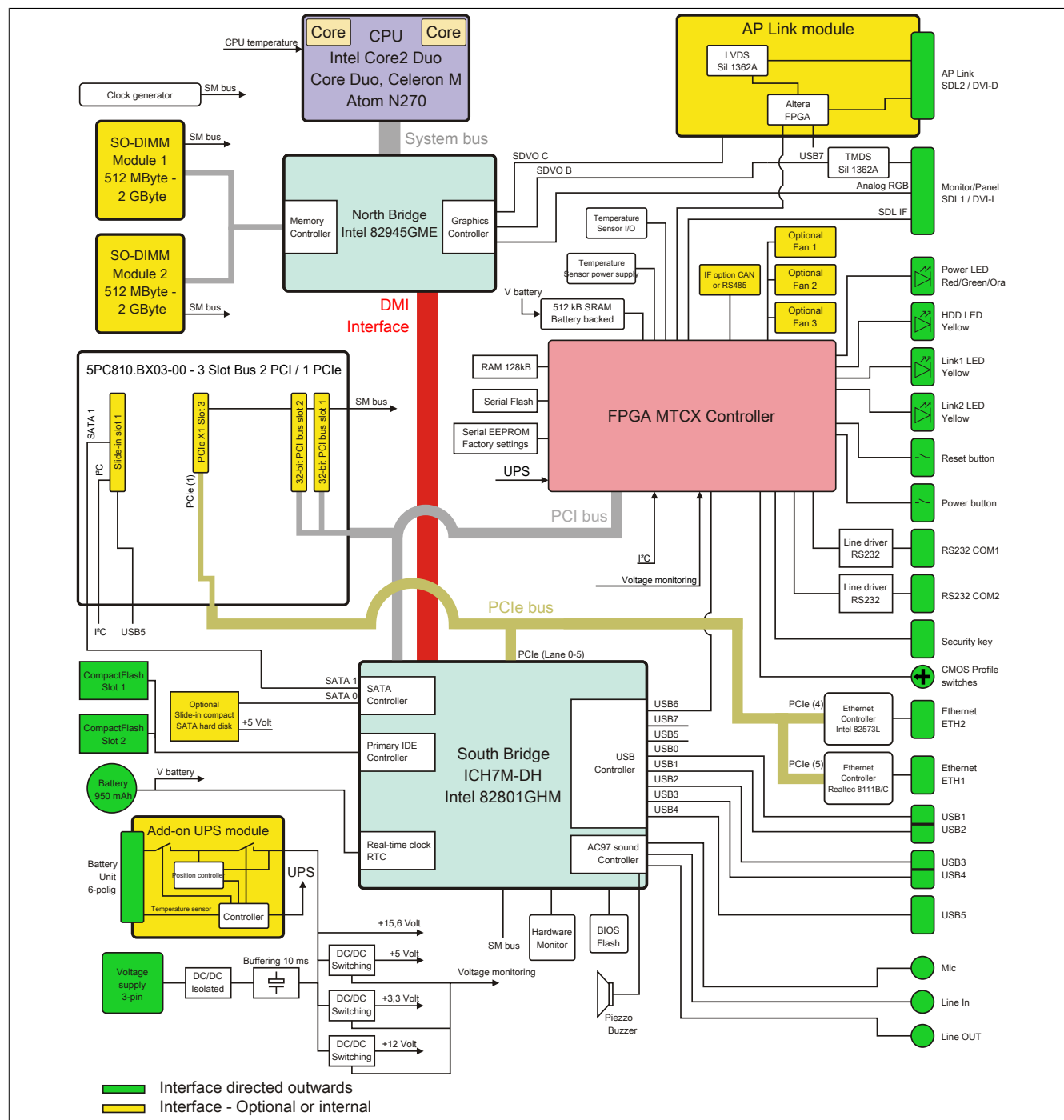


Figure 12: 5PC810.SX03-00 + 5PC810.BX03-00 - Block diagram

2.5.6 System unit 5PC810.SX05-00 and bus unit 5PC810.BX05-00

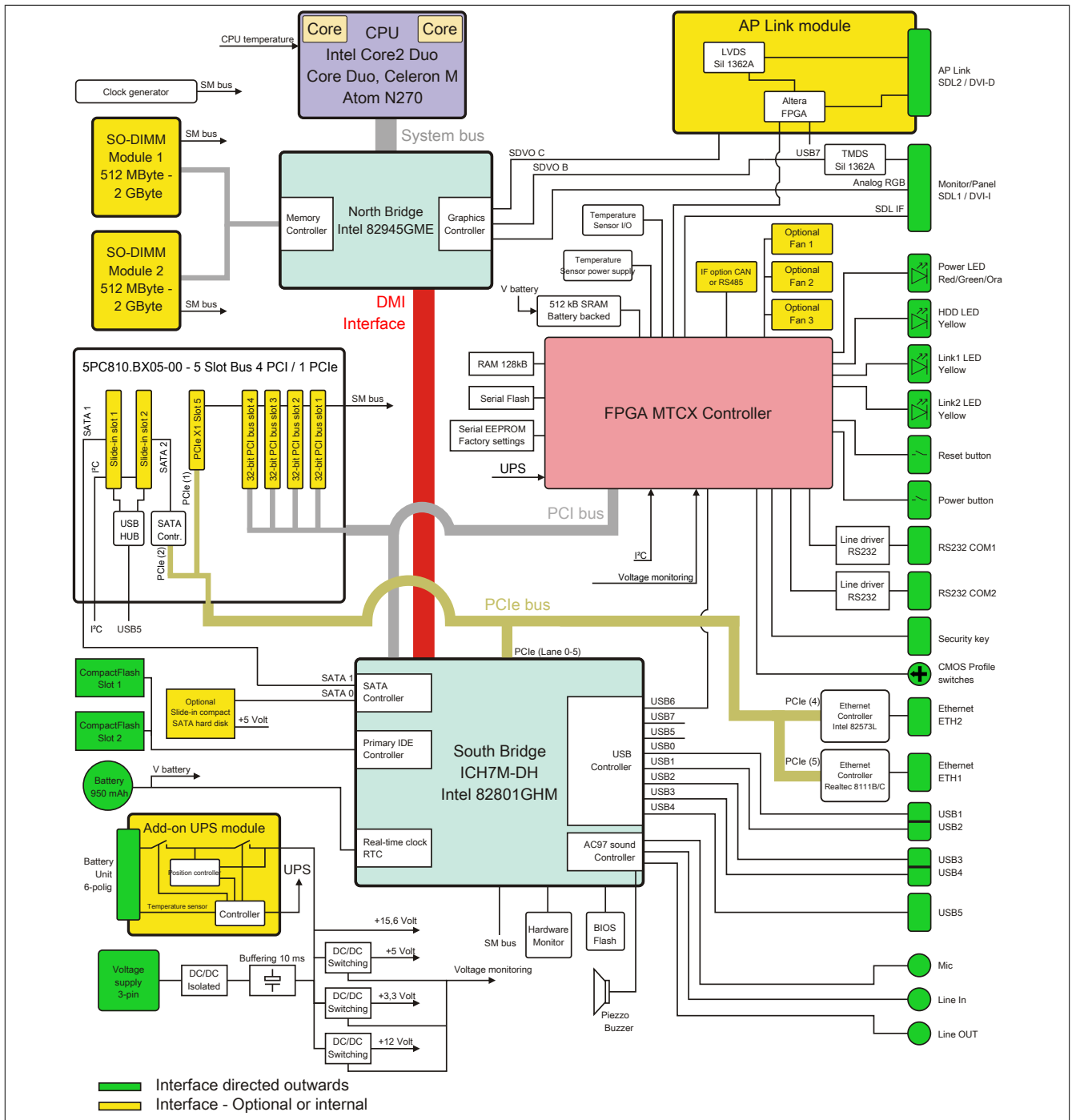


Figure 13: 5PC810.SX05-00 + 5PC810.BX05-00 - Block diagram

2.5.7 System unit 5PC810.SX05-00 and bus unit 5PC810.BX05-01

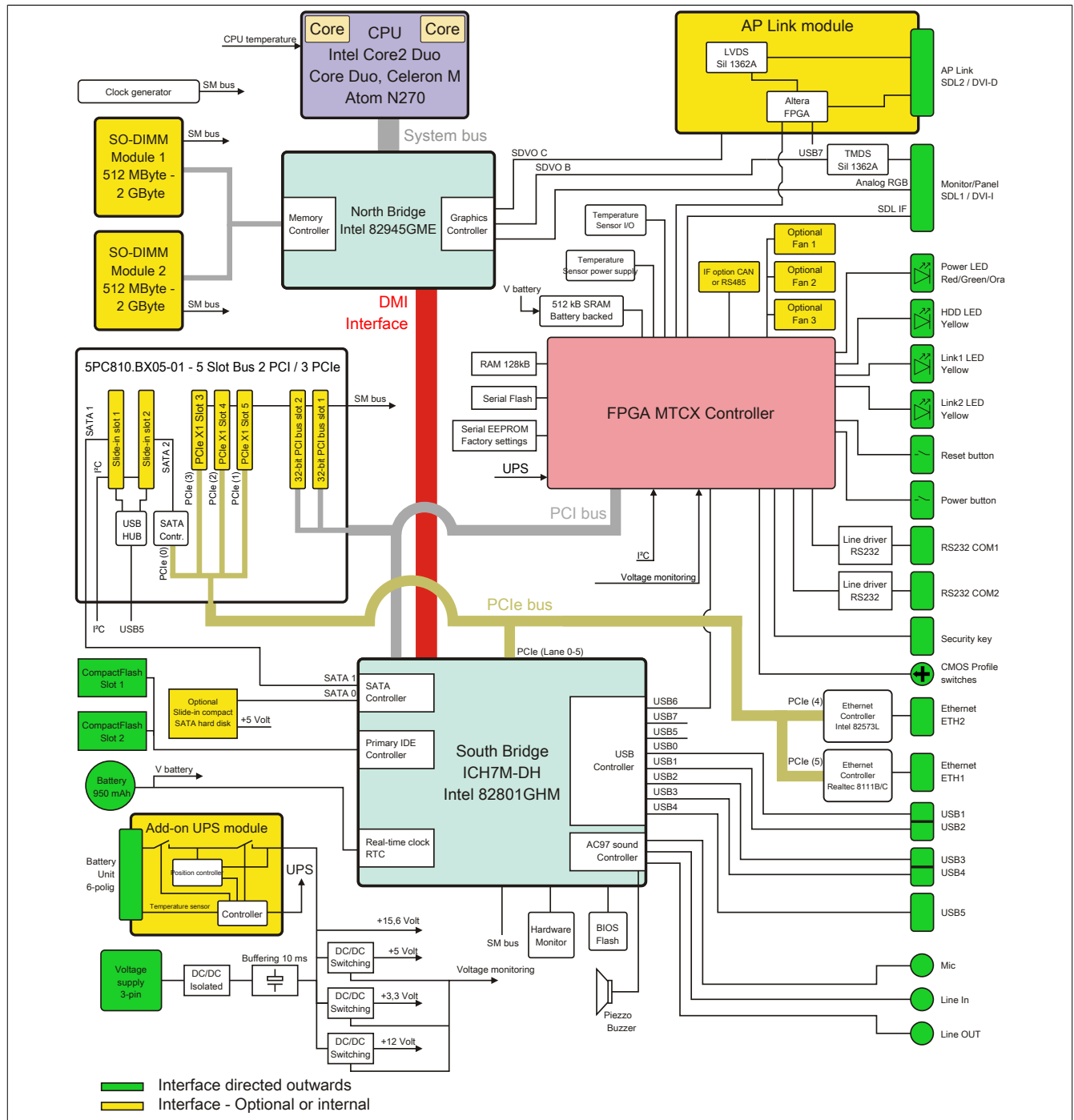


Figure 14: 5PC810.SX05-00 + 5PC810.BX05-01 - Block diagram

2.5.8 System unit 5PC810.SX05-00 and bus unit 5PC810.BX05-02

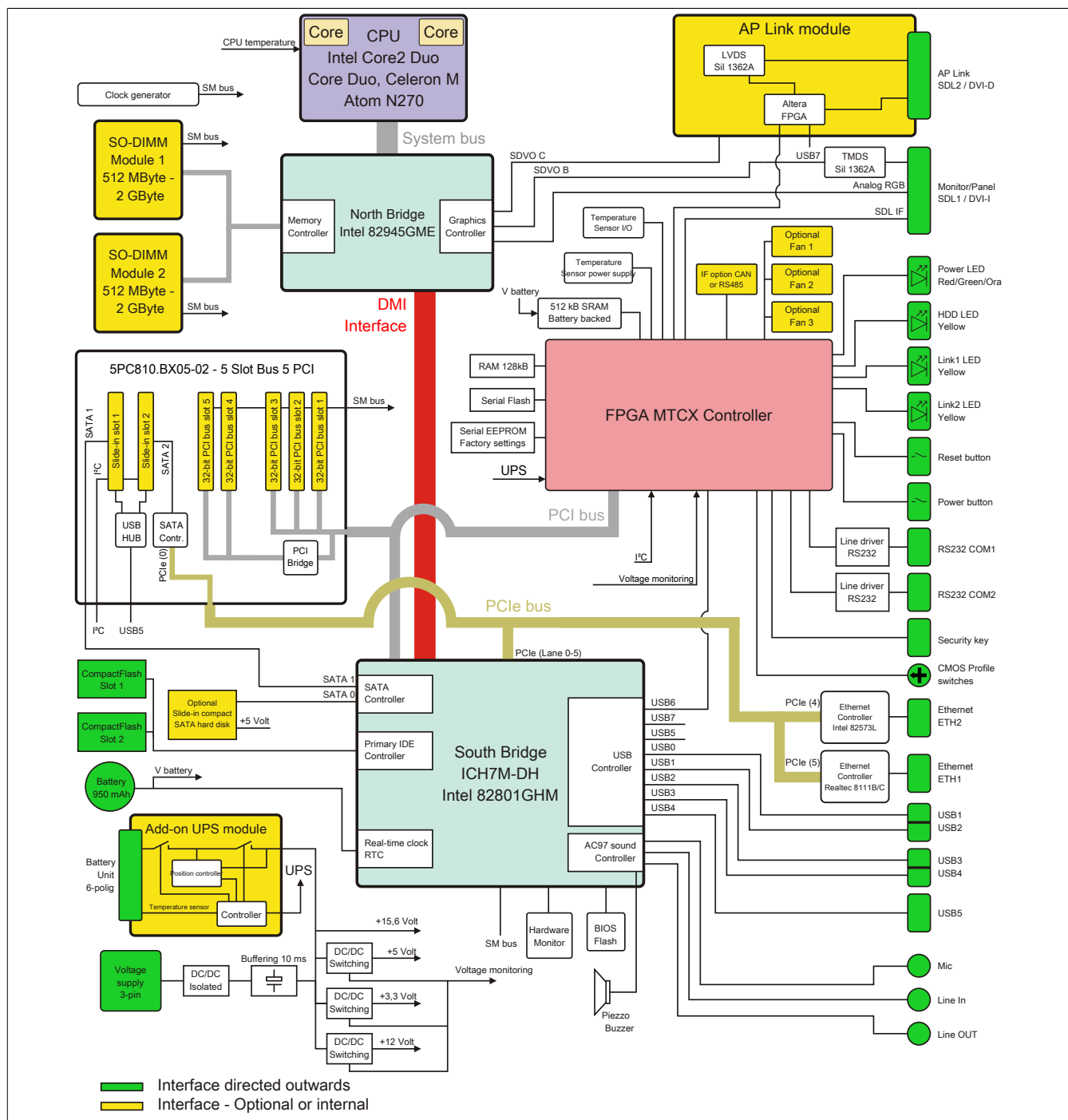


Figure 15: 5PC810.SX05-00 + 5PC810.BX05-02 - Block diagram

2.6 Device interfaces

2.6.1 +24 VDC supply voltage

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

The pinout is listed in the following table and printed on the APC810 housing. The supply voltage is protected internally by a soldered fuse (15 A, fast-acting) to prevent damage to the device in the event of 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 in the event of an error.

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

3-pin, male

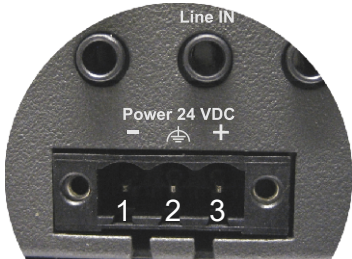


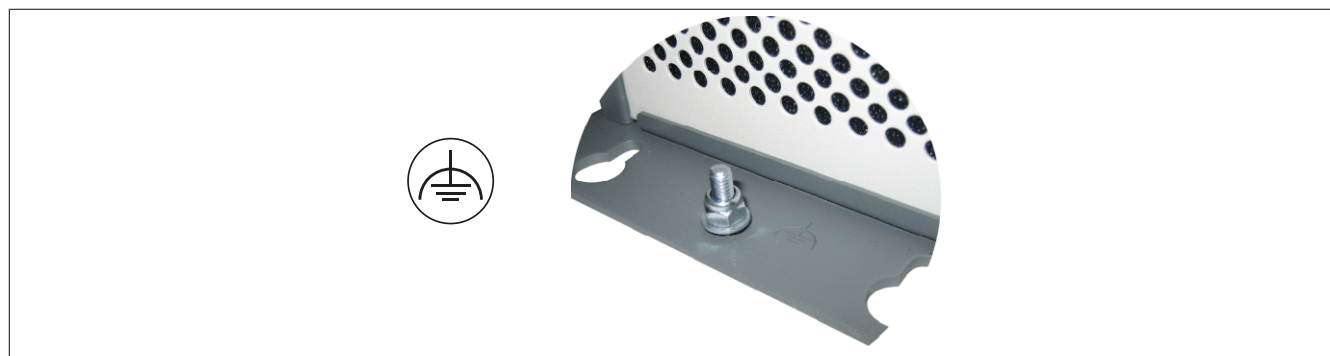
Table 18: Supply voltage connection 24 VDC

2.6.1.1 Grounding

Caution!

The functional ground (pin 2) must be connected to ground (e.g. control cabinet) using the shortest possible path. Using the largest possible conductor cross section on the supply connector is recommended.

The ground connection is located on the bottom of the APC810 system.



The M4 self-locking nut can be used, for example, to fasten a copper strip to a central grounding point in the control cabinet or system where the APC810 is installed. The largest possible conductor cross section should be used (at least 2.5 mm²).

2.6.2 COM1 serial interface

| COM1 serial interface ¹⁾ | |
|-------------------------------------|---|
| | RS232 |
| Type | RS232, modem-capable, not electrically isolated |
| UART | 16550-compatible, 16-byte FIFO |
| Transfer rate | Max. 115 kbit/s |
| Bus length | Max. 15 m |
| Pin | Assignment |
| 1 | DCD |
| 2 | RXD |
| 3 | TXD |
| 4 | DTR |
| 5 | GND |
| 6 | DSR |
| 7 | RTS |
| 8 | CTS |
| 9 | RI |

9-pin male DSUB connector

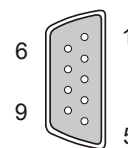


Table 19: COM1 - Pinout

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

2.6.3 COM2 serial interface

| COM2 serial interface ¹⁾ | |
|-------------------------------------|---|
| | RS232 |
| Type | RS232, modem-capable, not electrically isolated |
| UART | 16550-compatible, 16-byte FIFO |
| Transfer rate | Max. 115 kbit/s |
| Bus length | Max. 15 m |
| Pin | Assignment |
| 1 | DCD |
| 2 | RXD |
| 3 | TXD |
| 4 | DTR |
| 5 | GND |
| 6 | DSR |
| 7 | RTS |
| 8 | CTS |
| 9 | RI |

9-pin male DSUB connector

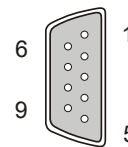


Table 20: COM2 - Pinout

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

2.6.4 Monitor/Panel interface - SDL (Smart Display Link / DVI)

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



Table 21: Monitor/Panel interface - RGB, DVI, SDL

2.6.4.1 Pinout

| Pin | Assignment | Description | Pin | Assignment | Description |
|-----|---|---|-----|---------------------------|---|
| 1 | TMDS data 2- | DVI lane 2 (negative) | 16 | HPD | Hot plug detect |
| 2 | TMDS data 2+ | DVI lane 2 (positive) | 17 | TMDS data 0- | DVI lane 0 (negative) |
| 3 | TMDS data 2/4 SHIELD | Shield for data pair 2 and 4 | 18 | TMDS data 0+ | DVI lane 0 (positive) |
| 4 | SDL- | SDL lane (negative) | 19 | TMDS Data 0/ XUSB1 SHIELD | Shield for data pair 0 and USB1 |
| 5 | SDL+ | SDL lane (positive) | 20 | XUSB1- | USB lane 1 (negative) |
| 6 | DDC clock | DDC-based control signal (clock) | 21 | XUSB1+ | USB lane 1 (positive) |
| 7 | DDC data | DDC-based control signal (data) | 22 | TMDS clock shield | Shield for clock pair |
| 8 | NC | Not connected | 23 | TMDS clock+ | DVI clock (positive) |
| 9 | TMDS data 1- | DVI lane 1 (negative) | 24 | TMDS clock - | DVI clock (negative) |
| 10 | TMDS DATA 1+ | DVI lane 1 (negative) HDMI clock (positive) | C1 | ANALOG RED | Analog red |
| 11 | TMDS DATA 1/ XUSB0 SHIELD | Shield for data pair 1 and XUSB0 | C2 | ANALOG GREEN | Analog green |
| 12 | XUSB0- | USB lane 0 (negative) | C3 | ANALOG BLUE | Analog blue |
| 13 | XUSB0+ | USB lane 0 (positive) | C4 | ANALOG HORZ SYNC | Analog horizontal synchronization |
| 14 | +5 V power ¹⁾ | +5 V power supply | C5 | ANALOG GND | Analog ground (return for R, G and B signals) |
| 15 | Ground (return for +5 V, HSync and VSync) | Ground | | | |

DVI 24-pin, female

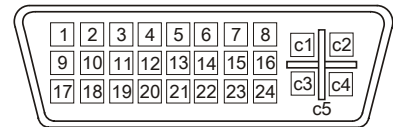


Table 22: DVI interface - Pinout

1) Protected internally by a multifuse.

2.6.4.2 Cable lengths and resolutions for SDL transmission

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

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

Table 23: Cable lengths and resolutions for SDL transmission

2.6.4.3 Cable lengths and resolutions for DVI transmission

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

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

Table 24: Cable lengths and resolutions for DVI transmission

2.6.5 Ethernet 1 (ETH1)

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

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

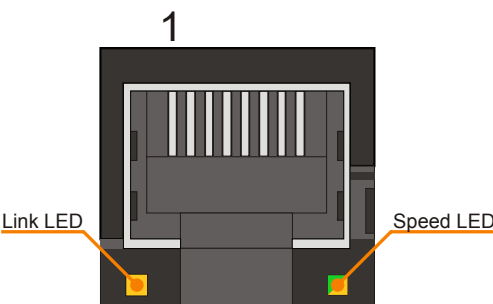


Table 25: Ethernet interface (ETH1)

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

Important information regarding transfer speed

Due to thermal factors, operation of the ETH1 in 1000 Mbit/s mode with the CPU boards 5PC800.B945-00, -01, -02, -03 and -04 is only permitted with use of a fan kit or heat sinks (5AC801.HS00-00, 5AC801.HS00-01) for Rev. D0 and higher (see "Temperature specifications" on page 31). This limitation does not apply to CPU boards 5PC800.B945-10, -11, -12, -13 and -14 with heat sinks 5AC801.HS00-00 and 5AC801.HS00-01 or CPU board 5PC800.B945-05 with heat sink 5AC801.HS00-02.

Driver support

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

Information:

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

2.6.6 Ethernet 2 (ETH2)

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

| Ethernet 2 connection (ETH2 ¹⁾) | | |
|---|--|---|
| Controller | Intel 82573L | |
| Cabling | S/STP (Cat 5e) | |
| Transfer rate | 10/100/1000 Mbit/s ²⁾ | |
| Cable length | Max. 100 m (min. Cat 5e) | |
| Speed LED | On | Off |
| Green | 100 Mbit/s | 10 Mbit/s ³⁾ |
| Orange | 1000 Mbit/s | - |
| Link LED | On | Off |
| Orange | Link (Ethernet network connection available) | Activity (blinking - data transfer in progress) |

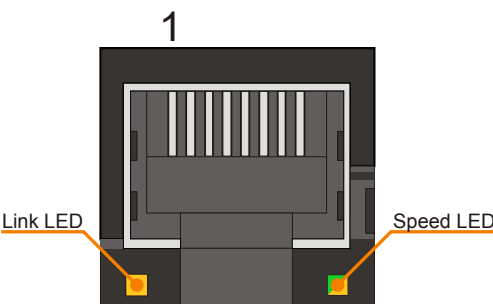


Table 26: Ethernet interface (ETH2)

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

Driver support

A special driver is required in order to operate the Intel 82573L Ethernet controller. Drivers for approved operating systems are available in the Downloads section of the B&R website (www.br-automation.com).

Information:

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

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

The APC810 features a USB 2.0 (Universal Serial Bus) host controller with multiple USB ports, 5 of which are accessible externally for easy user access.

Warning!

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

Information:

For additional information, please see 3 "Installation", section "Connecting peripheral USB devices" on page 220.

Caution!

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

USB1,2,3,4

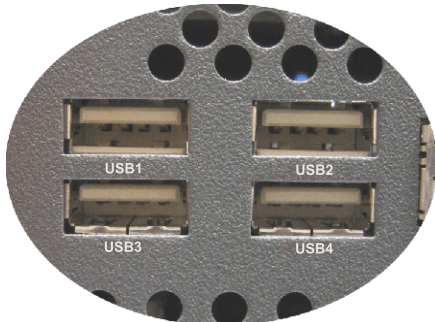
| Universal Serial Bus (USB1, USB2, USB3, USB4 ¹⁾) | |
|---|---|
| Type | USB 2.0 |
| Design | Type A |
| Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) |
| Current load ²⁾ USB1, USB3 USB2, USB4 | Max. 1 A Max. 500 mA |
| Cable length | Max. 5 m (without hub)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

Table 27: USB1, USB2, USB3 and USB4 interfaces

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

USB5


| Universal Serial Bus (USB5 ¹⁾) | |
|--|---|
| Type | USB 2.0 |
| Design | Type A |
| Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) |
| Power supply ²⁾ USB5 | Max. 1 A |
| Cable length | Max. 5 m (without hub) |
|  | |

Table 28: USB5 interface

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

2.6.8 MIC, Line IN, Line OUT

All APC810 systems include an AC97-compatible sound chip (Rev 2.2) with access to MIC, Line IN and Line OUT channels from the outside.

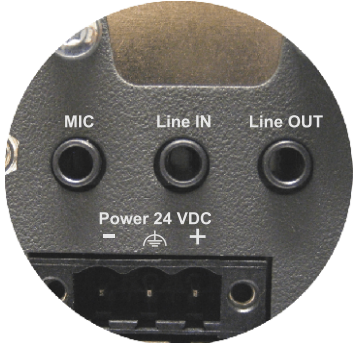
| MIC, Line IN, Line OUT | | |
|------------------------|---|--|
| Controller | Realtek AC97, Rev. 2.2 | 3.5 mm jack, female |
| MIC | Connection of a mono microphone with a 3.5 mm jack | |
| Line IN | Stereo Line IN signals supplied via a 3.5 mm jack | |
| Line OUT | Connection of a stereo playback device (e.g. amplifier) via a 3.5 mm jack | |
| | |  |

Table 29: MIC, Line IN, Line OUT

Driver support

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

Information:

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

2.6.9 Add-on interface slot

An optional add-on interface (e.g. CAN, RS485) can be installed here. See also "Add-on interfaces (IF option)" on page 180.

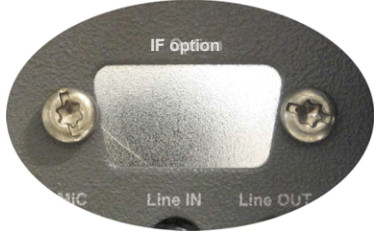
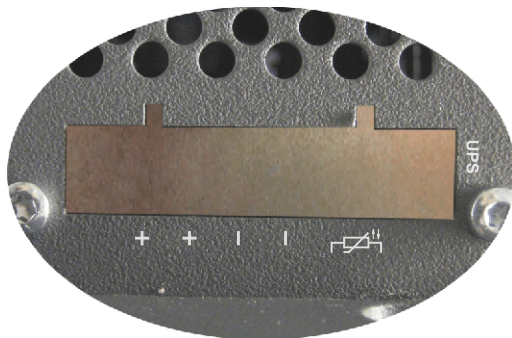
| Add-on interface slot | | |
|-----------------------|--------------------------------|--|
| Model number | Short description |  |
| | Serial port adapter | |
| 5AC600.CANI-00 | Add-on CAN interface | |
| 5AC600.458I-00 | Add-on RS232/422/458 interface | |
| | | |

Table 30: Add-on interface slot

2.6.10 Add-on UPS slot

An optional Automation PC add-on UPS module or the APC810 ready relay /2 can be installed in this slot.

| Add-on UPS slot | |
|---|---|
| Pinout with installed add-on UPS module | |
| 1 | + |
| 2 | + |
| 3 | - |
| 4 | - |
| 5 | NTC (for battery temperature measurement) |
| 6 | NTC (for battery temperature measurement) |
| Model number | Short description |
| Uninterruptible power supply | |
| 5AC600.UPSI-00 | Add-on UPS module |
| 5AC600.UPSB-00 | Battery unit 5 Ah |
| 5CAUPS.0005-00 | UPS cable 0.5 m |
| 5CAUPS.0030-00 | UPS cable 3 m |
| APC810 ready relay | |
| 5AC801.RDYR-01 | APC810 ready relay /2 |
| | |






Table 31: Add-on UPS slot (with and without installed UPS)

For additional information about the UPS module, see chapter 6 "Accessories", section 361.

2.6.11 AP Link slot

When connected with the 5AC801.SDL0-00 AP Link card, it is possible to implement a second graphics line with DVI and SDL, but without RGB signals. In addition, the 5AC801.RDYR-00 ready relay can also be installed in the APC810.

Information:

AP Link cards can only be installed with system units 5PC810.SX02-00, 5PC810.SX03-00 and 5PC810.SX05-00.

2.6.12 Card slots (PCI / PCIe)

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

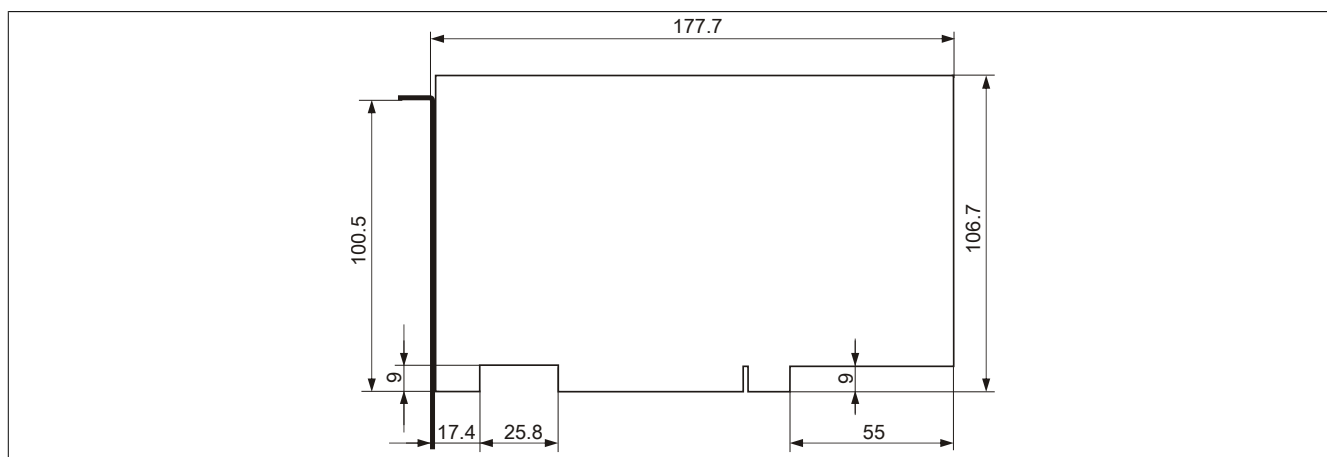


Figure 16: Standard half-size 32-bit PCI card - Dimensions

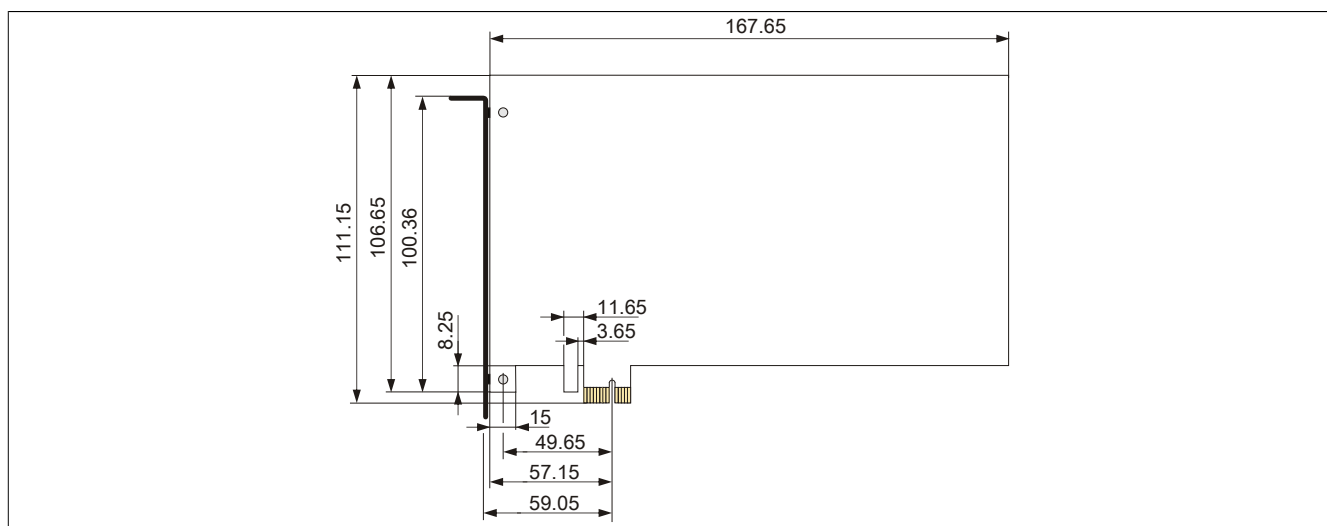
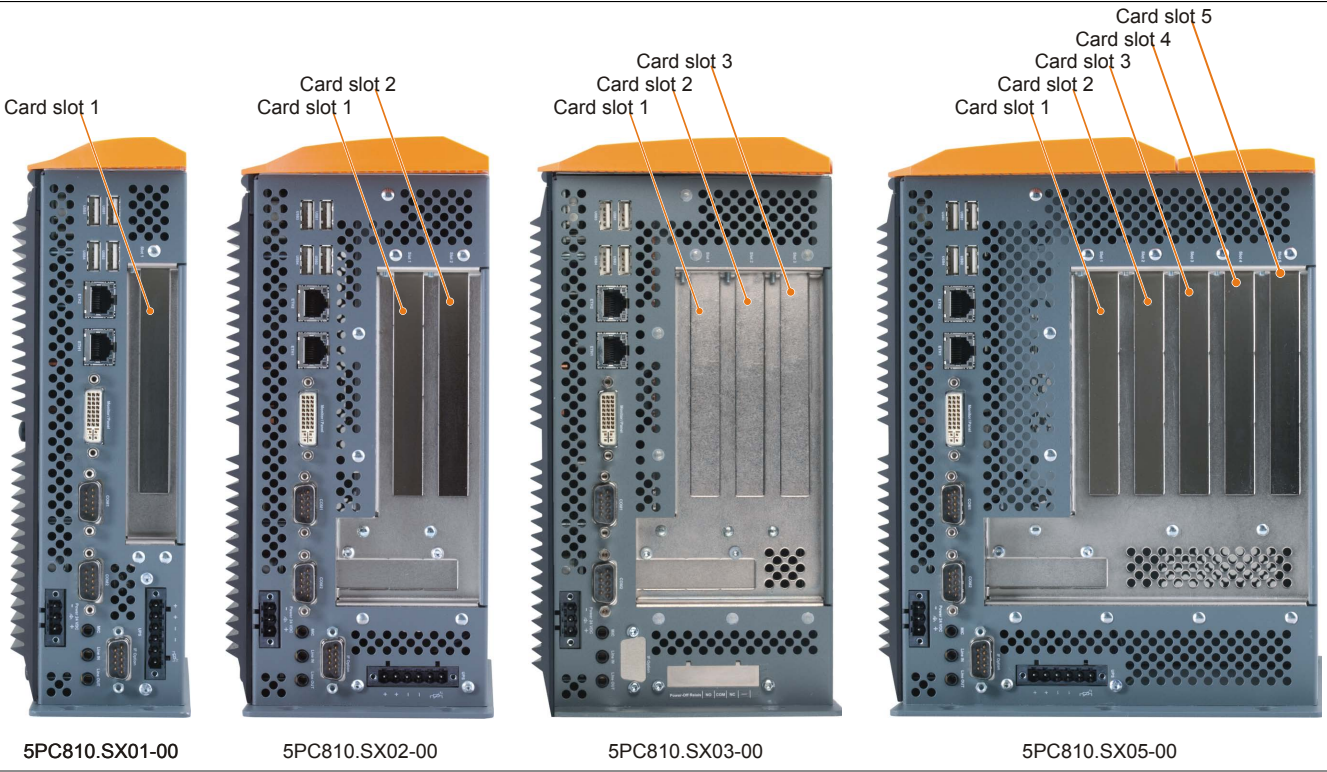


Figure 17: Standard half-size PCIe card - Dimensions

Due to mechanical limitations, a 64-bit PCI card cannot be inserted in every system unit or card slot. The following table provides an overview of the slots where 64-bit cards can be inserted.

| System unit | Bus unit | Card slot 1 | Card slot 2 | Card slot 3 | Card slot 4 | Card slot 5 |
|----------------|----------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 5PC810.SX01-00 | 5PC810.BX01-00 | 32-bit PCI | | | | |
| | 5PC810.BX01-01 | PCIe | | | | |
| 5PC810.SX02-00 | 5PC810.BX02-00 | 32-bit and 64-bit PCI | 32-bit PCI | | | |
| | 5PC810.BX02-01 | 32-bit and 64-bit PCI | PCIe | | | |
| 5PC810.SX03-00 | 5PC810.BX03-00 | 32-bit and 64-bit PCI | 32-bit PCI | PCIe | | |
| 5PC810.SX05-00 | 5PC810.BX05-00 | 32-bit and 64-bit PCI | 32-bit and 64-bit PCI | 32-bit and 64-bit PCI | 32-bit PCI | PCIe |
| | 5PC810.BX05-01 | 32-bit and 64-bit PCI | 32-bit and 64-bit PCI | PCIe | PCIe | PCIe |
| | 5PC810.BX05-02 | 32-bit and 64-bit PCI | 32-bit and 64-bit PCI | 32-bit and 64-bit PCI | 32-bit and 64-bit PCI | 32-bit and 64-bit PCI |

Table 32: Overview of 64-bit cards



2.6.13 LED status indicators

LED status indicators are integrated in the system unit behind the orange front cover.

| LED status indicators | | | |
|-----------------------|----------------------|----------|--|
| LED | Color | Status | Description |
| Power | Green | On | Supply voltage OK |
| | Red | On | System in standby mode (S5: Soft-off mode, S4: Hibernation mode -suspend-to-disk or S3: Suspend-to-RAM) |
| | Orange ¹⁾ | On | Supply voltage not OK, system operating on battery power |
| HDD | Yellow | On | Indicates IDE drive access (CF, HDD, CD, etc.) |
| Link1 | Yellow | On | Indicates an active SDL connection on the male monitor/panel connector |
| | | Blinking | Indicates that an active SDL connection has been interrupted by a loss of power to the display unit |
| Link2 | Yellow | On | Indicates an active SDL connection on the AP Link. |
| | | Blinking | Indicates that an active SDL connection on the AP Link has been interrupted by a loss of power to the display unit |



Table 33: LED status indicators - Data

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

The light for the LED status indicators is fed to the front cover via fiber optic lines.



Figure 18: LED status indicators - Front

2.6.14 CMOS profile switch

| CMOS profile switch | |
|---|--|
| Different BIOS default value profiles can be specified using the 16-position CMOS profile switch. | |
| Switch position | Description |
| 0 | Profile 0: Reserved for default profile |
| 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 34: CMOS profile switch

Information:

The factory default switch position represents the optimal BIOS default values for this system and should therefore not be changed.

The position of the CMOS profile switch is displayed in BIOS Setup and in the B&R ADI Control Center (among other places).

2.6.15 Power button

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


| Power button | |
|---|--|
| <p>The power button can be pressed with a pointed object (e.g. paper clip or tip of a pen).</p> <p>The power button acts like the on/off switch on a normal desktop PC with an ATX power supply:</p> <p>Press and release ... Switches on the APC810 or shuts down the operating system and switches off the APC810</p> <p>Press and hold ... Switches off the ATX power supply without shutting down the APC810 (data could be lost!)</p> <p>Pressing the power button does not reset the MTCX processor.</p> |  |

Table 35: Power button

2.6.16 Reset button

Information:

With MTCX PX32 firmware \geq V00.11 and higher, the reset button is only triggered by edges. This means that the device boots even when the reset button is pressed. With MTCX PX32 firmware $<$ V00.11, the system does not start after pressing (ca. 10 seconds) and releasing the reset button.


| Reset button | |
|--|---|
| <p>The reset button can be pressed with a pointed object (e.g. paper clip or tip of a pen).</p> <p>Pushing the reset button triggers a hardware and PCI reset. The APC810 is restarted (cold restart).</p> <p>Pressing the reset button does not reset the MTCX processor.</p> |  |

Table 36: Reset button

Warning!

A system reset can result in lost data!

2.6.17 Battery

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


| Battery | |  |
|---------------|--|--|
| Battery | | |
| Type | 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 pc., 3 V / 950 mAh, button cell | |
| | | |

Table 37: Battery

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

Battery status evaluation

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

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

Table 38: Battery status

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

2.6.18 Hardware security key (dongle)

B&R recommends a hardware security key (dongle) based on the DS1425 from MAXIM (formerly Dallas Semiconductors) for software copy protection.


| Hardware security key | |
|--|--|
| A hardware security key (dongle) can be inserted behind the black cover. |  |

Table 39: Hardware security key

Warning!

Turn off power before removing or adding the hardware security key.

2.6.19 CompactFlash slot 1

This CompactFlash slot is a fixed part of an APC810 system and internally connected with the chipset via IDE PATA. Type I CompactFlash cards are supported.

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



Table 40: CompactFlash slot (CF1)

Warning!

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

2.6.20 CompactFlash slot 2

This CompactFlash slot is a fixed part of an APC810 system and internally connected with the chipset via IDE PATA. Type I CompactFlash cards are supported.

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



Table 41: CompactFlash slot (CF2)

Warning!

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

2.6.21 Slide-in slot 1

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

| Slide-in slot 1 | |
|-----------------|--|
| Connection | SATA I and USB |
| Model number | Short description |
| Drives | |
| 5AC801.ADAS-00 | SATA hard disk adapter for operating a slide-in compact hard disk in a slide-in slot |
| 5AC801.HDDS-00 | 40 GB SATA slide-in hard disk; 24/7 operation with extended temperature range. Note: Please see the manual for information about using this hard disk. |
| 5AC801.DVRS-00 | DVD-R/RW DVD+R/RW SATA slide-in drive |
| 5AC801.DVDS-00 | DVD-ROM SATA slide-in drive |
| | |

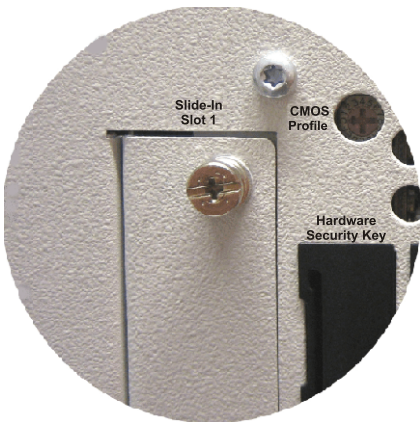


Table 42: Slide-in slot 1

Information:

The SATA I interface allows disks to be replaced during operation (hot plugging). In order to take advantage of this capability, this feature must be supported by the operating system.

2.6.22 Slide-in slot 2

The internal connection between slide-in slot 2 and the chipset is made via a PCIe to SATA bridge (SiL 3531) and USB.

| Slide-in slot 2 | |
|-----------------|--|
| Connection | PCIe to SATA Bridge (SiL 3531) and USB |
| Model number | Short description |
| | Drives |
| 5AC801.HDDS-00 | 40 GB SATA slide-in hard disk; 24/7 operation with extended temperature range. Note: Please see the manual for information about using this hard disk. |
| 5AC801.DVRS-00 | DVD-R/RW DVD+R/RW SATA slide-in drive |
| 5AC801.DVDS-00 | DVD-ROM SATA slide-in drive |
| | |

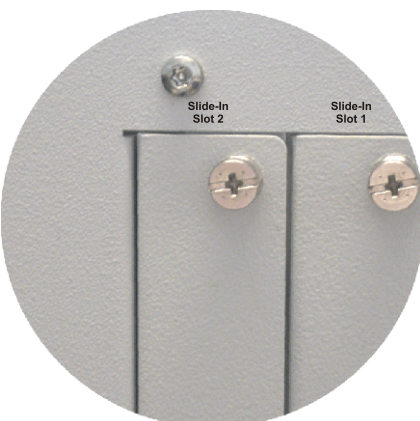


Table 43: Slide-in slot 2

Information:

The APC810 slide-in compact adapter 5AC801.ADAS-00 can only be inserted into slide-in slot 1 for mechanical reasons (so that the front door can be closed).

Information:

The SATA I interface allows disks to be replaced during operation (hot plugging). In order to take advantage of this capability, this feature must be supported by the operating system.

Information:

The required drivers are available for the operating system being used and can be downloaded from the B&R website.

2.6.23 Slide-in compact slot

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

| Slide-in compact slot | |
|-----------------------|---|
| Connection | SATA I |
| Model number | Short description |
| Drives | |
| 5AC801.HDDI-00 | 40 GB SATA hard disk, slide-in compact, 24/7 operation with extended temperature range. Note: Please see the manual for information about using this hard disk. |
| 5AC801.HDDI-03 | 250 GB SATA hard disk, slide-in compact, 24/7 operation Note: Please see the manual for information about using this hard disk. |
| 5AC801.HDDI-04 | 500 GB SATA hard disk, slide-in compact, 24/7 operation. Note: Please see the manual for information about using this hard disk. |
| 5AC801.SSDI-00 | 32 GB SATA SSD (SLC), slide-in compact |
| 5AC801.SSDI-01 | 60 GB SATA SSD (MLC), slide-in compact |
| 5AC801.SSDI-02 | 180 GB SATA SSD (MLC), slide-in compact |
| 5AC801.SSDI-03 | 60 GB SATA SSD (MLC), slide-in compact |
| 5AC801.SSDI-04 | 128 GB SATA SSD (MLC), slide-in compact |
| | |




Table 44: Slide-in compact slot

Information:

The SATA I interface allows disks to be replaced during operation (hot plugging). In order to take advantage of this capability, this feature must be supported by the operating system.

For information about installing/replacing a slide-in compact drive, see "Procedure" on page 402.

3 Individual components

3.1 System units

The system unit unites all of the individual components into one compact device. It consists of a housing and an integrated mainboard. Interfaces are easily accessible either on top of the device or behind the orange cover on the front. System units either have 1, 2, 3 or 5 card slots.

3.1.1 5PC810.SX01-00

3.1.1.1 General information

- Slot for a bus unit with 1 PCI or 1 PCIe slot
- 512 kB SRAM onboard
- Insert for 1 slide-in compact drive

3.1.1.2 Order data


| Model number | Short description | Figure |
|----------------|--|--|
| | System units |  |
| 5PC810.SX01-00 | APC810 system unit, 1 slot (PCI Express, PCI, depending on bus); 1 compact slide-in slot; Smart Display Link/DVI/Monitor, 2x RS232, 5x USB 2.0, 2x ETH 10/100/1000, 24 VDC (order 0TB103.9 screw clamp or 0TB103.91 cage clamp terminals separately) | |
| | Required accessories | |
| | Bus units | |
| 5PC810.BX01-00 | APC810 bus, 1 PCI | |
| 5PC810.BX01-01 | APC810 bus, 1 PCI Express (x4) | |
| | CPU boards | |
| 5PC800.B945-05 | Intel Atom N270 CPU board, 1.6 GHz, single core, 533 MHz FSB, 512 kB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| 5PC800.B945-10 | Intel Core Duo L2400 CPU board, 1.66 GHz, dual core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| 5PC800.B945-11 | Intel Core2 Duo L7400 CPU board, 1.5 GHz, dual core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 4 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| 5PC800.B945-12 | Intel Core2 Duo U7500 CPU board, 1.06 GHz, dual core, 533 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| 5PC800.B945-13 | Intel Celeron M 423 CPU board, 1.06 GHz, single core, 533 MHz FSB, 1 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| 5PC800.B945-14 | Intel Core2 Duo T7400 CPU board, 2.16 GHz, dual core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 4 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| | Terminal blocks | |
| 0TB103.9 | Connector, 24 VDC, 3-pin female, 3.31 mm ² screw clamp, protected against vibration by the screw flange | |
| 0TB103.91 | Connector, 24 VDC, 3-pin female, 3.31 mm ² cage clamp, protected against vibration by the screw flange | |
| | Main memory | |
| 5MMDDR.0512-01 | SO-DIMM DDR2 RAM 512 MB PC2-5300 | |
| 5MMDDR.1024-01 | SO-DIMM DDR2 RAM 1024 MB PC2-5300 | |
| 5MMDDR.2048-01 | SO-DIMM DDR2 RAM 2048 MB PC2-5300 | |
| | Heat sinks | |
| 5AC801.HS00-00 | APC810 heat sink for CPU boards with L2400, L7400, U7500 or Celeron M 423 dual-core processor | |
| 5AC801.HS00-01 | APC810 heat sink for CPU boards with T7400, T9400 or P8400 dual-core processor | |
| 5AC801.HS00-02 | APC810 heat sink for CPU board with Atom processor N270 | |
| | Optional accessories | |
| | Drives | |

Table 45: 5PC810.SX01-00 - Order data

| Model number | Short description | Figure |
|----------------|---|--------|
| 5AC801.HDDI-00 | 40 GB slide-in compact SATA hard disk, 24/7 operation with extended temperature range. Note: Please see the manual for information about using this hard disk. | |
| 5AC801.HDDI-04 | 500 GB slide-in compact SATA hard disk; 24/7 operation. Note: Please see the manual for information about using this hard disk. | |
| 5AC801.SSDI-00 | 32 GB SATA SSD (SLC), slide-in compact | |
| 5AC801.SSDI-03 | 60 GB SATA SSD (MLC), slide-in compact | |
| 5AC801.SSDI-04 | 128 GB SATA SSD (MLC), slide-in compact | |
| 5ACPCI.RAIC-06 | PCI RAID system SATA 2x 500 GB; Note: Please see the manual for information about using this hard disk. | |
| | Fan kit | |
| 5PC810.FA01-00 | APC810 fan kit for 5PC810.SX01-00 system unit | |
| | Serial port adapter | |
| 5AC600.485I-00 | RS232/422/485 interface, for installation in an APC620, APC810 or PPC700 | |
| 5AC600.CANI-00 | CAN interface; for installation in an APC620, APC810 or PPC700 | |
| | Uninterruptible power supply | |
| 5AC600.UPSI-00 | UPS module for APC620, APC810, PPC800; for system units 5PC600.SX01-00 (starting with Rev. H0), 5PC600.SX02-00 (starting with Rev. G0), 5PC600.SX02-01 (starting with Rev. H0), 5PC600.SX05-00 (starting with Rev. F0), 5PC600.SX05-01 (starting with Rev. F0), 5PC600.SF03-00 (starting with Rev. A0), 5PC810.SX*. 5PC820.1505-00, 5PC820.1906-00. Order cable (5CAUPS.0005-00 or 5CAUPS.0030-00) and battery unit (5AC600.UPSB-00) separately | |
| | Accessories | |
| 5ACPCI.ETH1-01 | PCI Ethernet card 1x 10/100 | |
| 5ACPCI.ETH3-01 | PCI Ethernet card 3x 10/100 | |

Table 45: 5PC810.SX01-00 - Order data

3.1.1.3 Interfaces

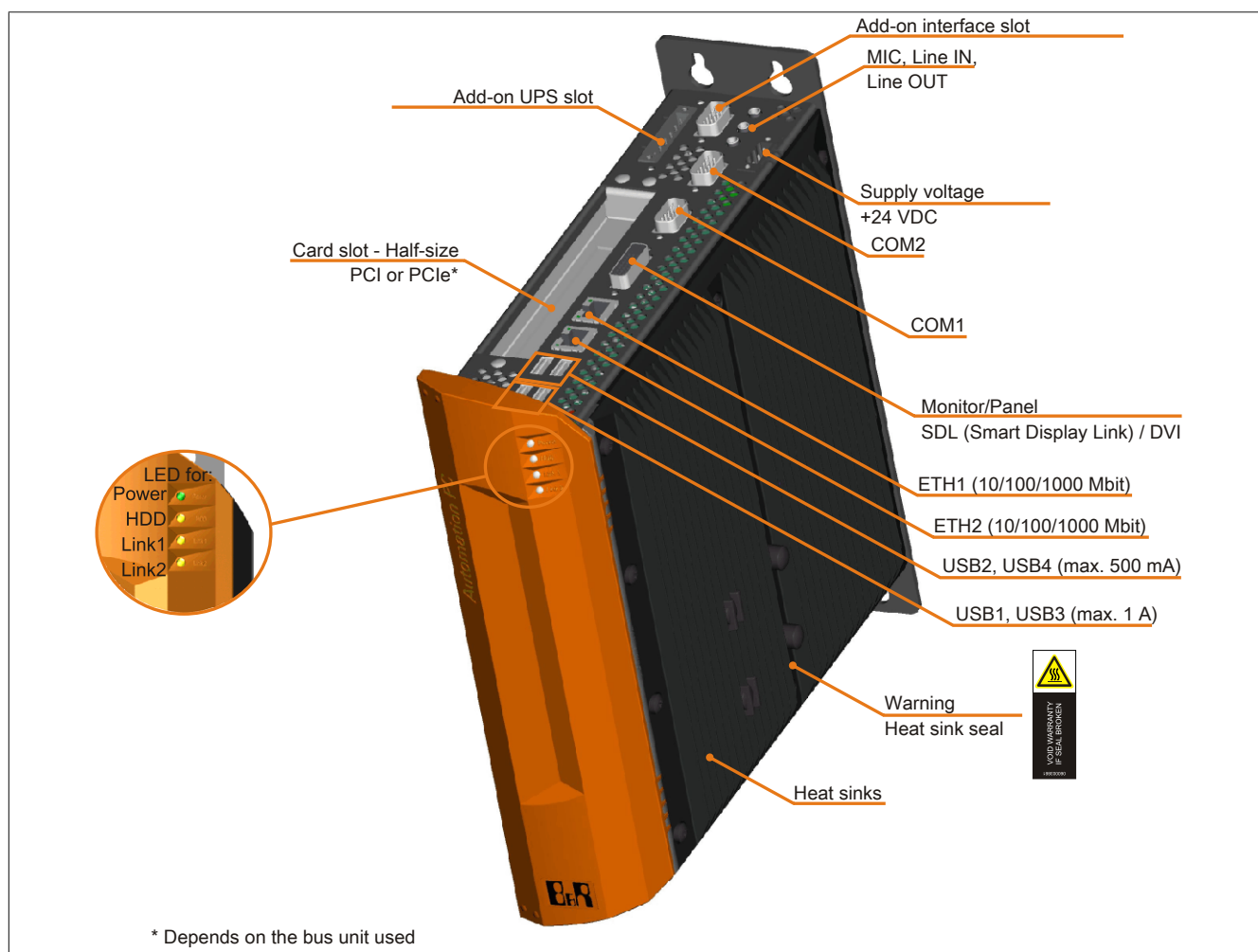


Figure 19: 5PC810.SX01-00 - Interfaces on top

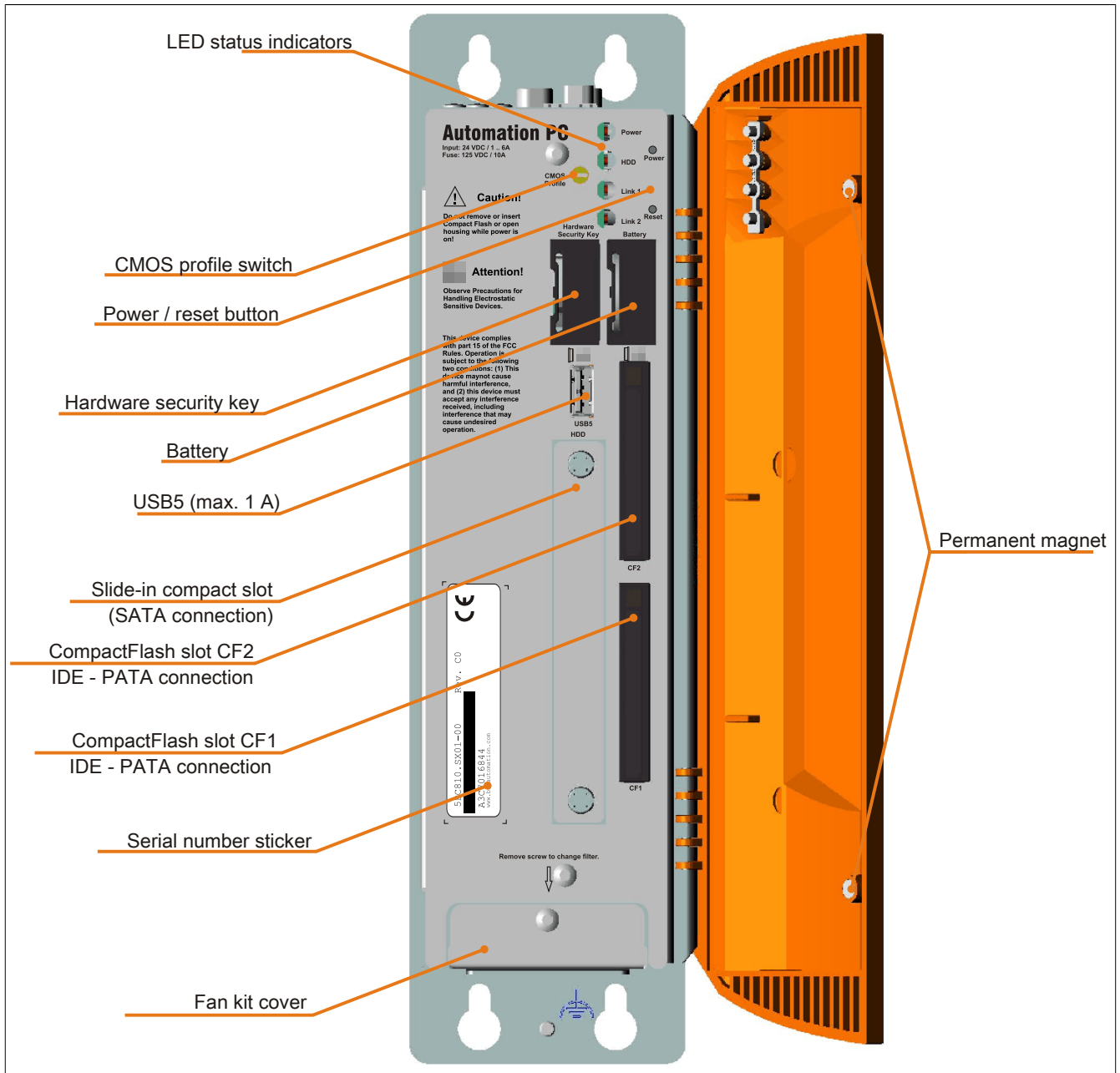


Figure 20: 5PC810.SX01-00 - Interfaces on front

3.1.1.4 Technical data

| Product ID | 5PC810.SX01-00 |
|---------------------------------|---|
| General information | |
| Dongle port | Yes |
| Cooling | Passive via heat sink and optionally supported with an active fan kit ¹⁾ |
| LEDs | Power, HDD, Link 1, Link 2 |
| B&R ID code | \$A3ED |
| Battery | |
| Type | Renata 950 mAh |
| Service life | 2½ years ²⁾ |
| Removable | Yes, accessible behind the orange front door |
| Design | Lithium ion |
| Power button | Yes |
| Reset button | Yes |
| Buzzer | Yes |
| Certification | |
| CE | Yes |
| cULus | Yes |
| cULus HazLoc Class 1 Division 2 | Yes |
| ATEX Zone 22 | Yes |
| GL | Yes |

Table 46: 5PC810.SX01-00 - Technical data

| | |
|--|--|
| Product ID | 5PC810.SX01-00 |
| Controller | |
| Boot loader | BIOS |
| Real-time clock Battery-buffered | Yes |
| Power failure logic Controller Buffer time | MTCX ³⁾ 10 ms |
| Graphics Controller | Depends on the CPU board being used |
| SRAM Size Battery-buffered Remanent variables in power failure mode | 512 kB Yes 192 kB (e.g. for Automation Runtime, see AS help documentation) |
| Memory Type Size | Depends on the CPU board being used Depends on the CPU board being used |
| Interfaces | |
| COM1 Type Design UART Max. baud rate | RS232, modem-capable, not electrically isolated 9-pin male DSUB connector 16550-compatible, 16-byte FIFO 115 kbit/s |
| COM2 Type Design UART Max. baud rate | RS232, modem-capable, not electrically isolated 9-pin male DSUB connector 16550-compatible, 16-byte FIFO 115 kbit/s |
| CompactFlash slot 1 Quantity Type | 1 Type I |
| CompactFlash slot 2 Quantity Type | 1 Type I |
| USB Quantity Type Design Transfer rate Current load | 5 USB 2.0 Type A Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) Max. 500 mA or 1 A per connection |
| Ethernet Quantity Design Transfer rate Max. baud rate | 2 Shielded RJ45 port 10/100/1000 Mbit/s 1 Gbit/s |
| Monitor/Panel interface Design Type | Female DVI-I connector SDL / DVI / Monitor |
| CAN Note | Optional |
| Audio Type Inputs Outputs | AC97 sound ⁴⁾ Microphone, Line IN Line OUT |
| Add-on interface slot Quantity | 1 |
| Inserts | |
| PCI / PCIe slots Quantity | 1 PCI slot or 1 PCIe slot ⁵⁾ |
| Slide-in drives | No |
| Slide-in compact drives | 1 |
| Automation Panel Link slot | No |
| Add-on UPS slot | Yes |
| Insert for fan kit | Yes |
| Electrical characteristics | |
| Nominal voltage | 24 VDC ±25% |
| Nominal current | 6 A |
| Starting current | Typ. 7 A, max. 50 A for <300 µs |
| Electrical isolation | Yes |
| Operating conditions | |
| Protection in accordance with EN 60529 | IP20 |
| Environmental conditions | |
| Temperature Operation Storage Transport | Component-dependent -20 to 60°C -20 to 60°C |

Table 46: 5PC810.SX01-00 - Technical data

| Product ID | 5PC810.SX01-00 |
|-----------------------------------|---|
| Relative humidity | |
| Operation | Component-dependent |
| Storage | Component-dependent |
| Transport | Component-dependent |
| Vibration ⁶⁾ | |
| Operation (continuous) | 2 to 9 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g |
| Operation (occasional) | 2 to 9 Hz: 3.5 mm amplitude / 9 to 200 Hz: 1 g |
| Storage | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
| Transport | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
| Shock ⁶⁾ | |
| Operation | 15 g, 11 ms |
| Storage | 30 g, 15 ms |
| Transport | 30 g, 15 ms |
| Altitude | |
| Operation | Max. 3000 m (component-dependent) ⁷⁾ |
| Mechanical characteristics | |
| Housing ⁸⁾ | |
| Material | Galvanized plate, plastic |
| Front cover | Colored orange plastic (similar to Pantone 144CV) |
| Paint | Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV) |
| Dimensions | |
| Width | 81.3 mm with heat sink 5AC801.HS00-00 and 5AC801.HS00-02 96.5 mm with heat sink 5AC801.HS00-01 |
| Height | 270 mm |
| Depth | 252.7 mm |
| Weight | Approx. 2200g (component-dependent) |

Table 46: 5PC810.SX01-00 - Technical data

- 1) A fan kit is absolutely necessary for the APC810 GM45.
- 2) At 50°C, 8.5 µA of the supplied components and a self-discharge of 40%.
- 3) Maintenance Controller Extended.
- 4) No longer supported by the GM45 chipset.
- 5) The PCI and PCIe slots available depend on the 5PC810.BX01-00 and 5PC810.BX01-01 bus unit being used.
- 6) Maximum values unless specified otherwise by another individual component.
- 7) The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level).
- 8) There may be visible deviations in the color and surface appearance depending on the process or batch.

3.1.1.5 Dimensions

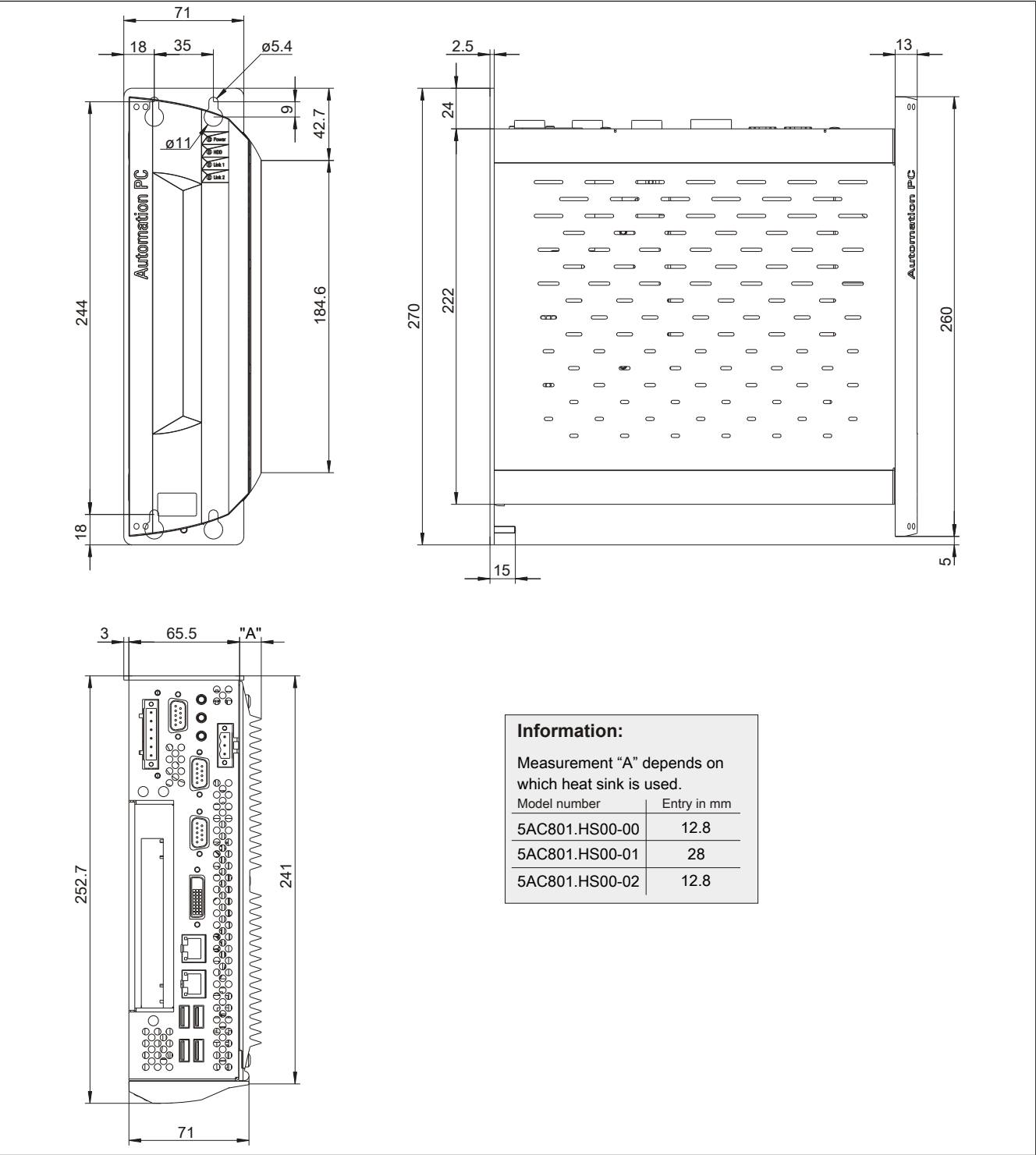


Figure 21: 5PC810.SX01-00 - Dimensions

3.1.1.6 Drilling template

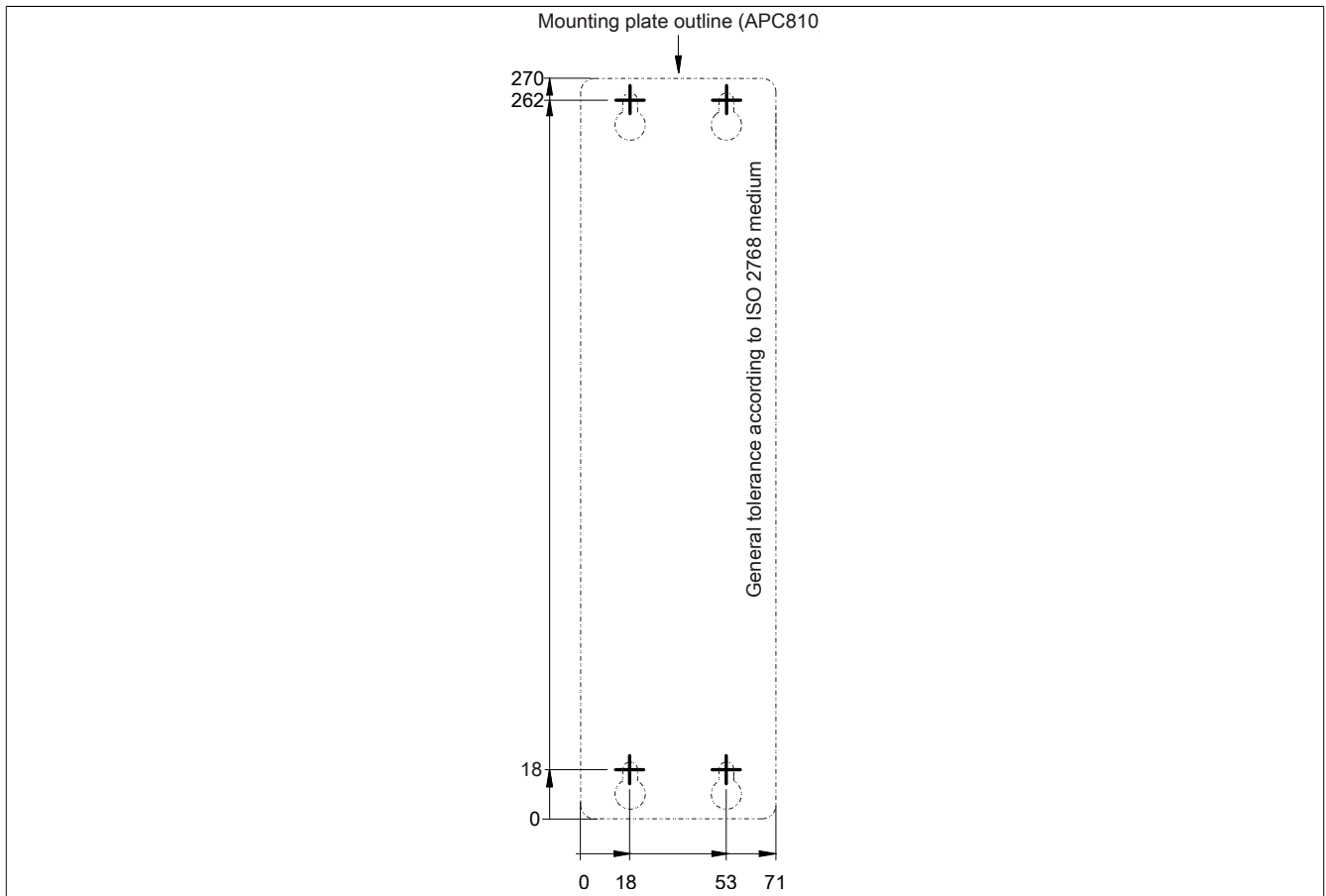


Figure 22: 5PC810.SX01-00 - Drilling template

3.1.2 5PC810.SX02-00

3.1.2.1 General information

- Slot for a bus unit with 2 PCI slots or 1 PCI and 1 PCIe slots
- 512 kB SRAM onboard
- Insert for 1 slide-in compact drive and 1 slide-in drive
- Automation Panel Link slot for connecting Automation Panels via SDL

3.1.2.2 Order data

| Model number | Short description | Figure |
|----------------|--|---|
| | System units |  |
| 5PC810.SX02-00 | APC810 system unit, 2 slots (PCI Express, PCI, depending on bus); 1 slot for Automation Panel Link transmitter; 1 slide-in compact and 1 slide-in slot; Smart Display Link/DVI/Monitor, 2x RS232, 5x USB 2.0, 2x ETH 10/100/1000, 24 VDC (order 0TB103.9 screw clamp or 0TB103.91 cage clamp terminals separately) | |
| | Required accessories | |
| | Bus units | |
| 5PC810.BX02-00 | APC810 bus, 2 PCI | |
| 5PC810.BX02-01 | APC810 bus, 1 PCI, 1 PCI Express (x4) | |
| | CPU boards | |
| 5PC800.B945-05 | Intel Atom N270 CPU board, 1.6 GHz, single core, 533 MHz FSB, 512 kB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| 5PC800.B945-10 | Intel Core Duo L2400 CPU board, 1.66 GHz, dual core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| 5PC800.B945-11 | Intel Core2 Duo L7400 CPU board, 1.5 GHz, dual core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 4 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| 5PC800.B945-12 | Intel Core2 Duo U7500 CPU board, 1.06 GHz, dual core, 533 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| 5PC800.B945-13 | Intel Celeron M 423 CPU board, 1.06 GHz, single core, 533 MHz FSB, 1 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| 5PC800.B945-14 | Intel Core2 Duo T7400 CPU board, 2.16 GHz, dual core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 4 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| | Terminal blocks | |
| 0TB103.9 | Connector, 24 VDC, 3-pin female, 3.31 mm ² screw clamp, protected against vibration by the screw flange | |
| 0TB103.91 | Connector, 24 VDC, 3-pin female, 3.31 mm ² cage clamp, protected against vibration by the screw flange | |
| | Main memory | |
| 5MMDDR.0512-01 | SO-DIMM DDR2 RAM 512 MB PC2-5300 | |
| 5MMDDR.1024-01 | SO-DIMM DDR2 RAM 1024 MB PC2-5300 | |
| 5MMDDR.2048-01 | SO-DIMM DDR2 RAM 2048 MB PC2-5300 | |
| | Heat sinks | |
| 5AC801.HS00-00 | APC810 heat sink for CPU boards with L2400, L7400, U7500 or Celeron M 423 dual-core processor | |
| 5AC801.HS00-01 | APC810 heat sink for CPU boards with T7400, T9400 or P8400 dual-core processor | |
| 5AC801.HS00-02 | APC810 heat sink for CPU board with Atom processor N270 | |
| | Optional accessories | |
| | Automation Panel Link insert cards | |
| 5AC801.RDYR-00 | APC810 ready relay | |
| 5AC801.SDL0-00 | Smart Display Link/DVI-D transmitter | |
| | Drives | |
| 5AC801.ADAS-00 | SATA hard disk adapter for operating a slide-in compact hard disk in a slide-in slot | |
| 5AC801.DVDS-00 | DVD-ROM SATA slide-in drive | |
| 5AC801.DVRS-00 | DVD-R/RW DVD+R/RW SATA drive, slide-in | |
| 5AC801.HDDI-00 | 40 GB slide-in compact SATA hard disk, 24/7 operation with extended temperature range. Note: Please see the manual for information about using this hard disk. | |

Table 47: 5PC810.SX02-00 - Order data

| Model number | Short description | Figure |
|----------------|---|--------|
| 5AC801.HDDI-04 | 500 GB slide-in compact SATA hard disk; 24/7 operation. Note: Please see the manual for information about using this hard disk. | |
| 5AC801.HDDS-00 | 40 GB slide-in SATA hard disk; 24/7 operation with extended temperature range. Note: Please see the manual for information about using this hard disk. | |
| 5AC801.SSDI-00 | 32 GB SATA SSD (SLC), slide-in compact | |
| 5AC801.SSDI-03 | 60 GB SATA SSD (MLC), slide-in compact | |
| 5AC801.SSDI-04 | 128 GB SATA SSD (MLC), slide-in compact | |
| 5ACPCI.RAIC-06 | PCI RAID system SATA 2x 500 GB; Note: Please see the manual for information about using this hard disk. | |
| | Fan kit | |
| 5PC810.FA02-01 | APC810 fan kit for 5PC810.SX02-00 (revisions > D0) | |
| | Serial port adapter | |
| 5AC600.485I-00 | RS232/422/485 interface, for installation in an APC620, APC810 or PPC700 | |
| 5AC600.CANI-00 | CAN interface; for installation in an APC620, APC810 or PPC700 | |
| | Uninterruptible power supply | |
| 5AC600.UPSI-00 | UPS module for APC620, APC810, PPC800; for system units 5PC600.SX01-00 (starting with Rev. H0), 5PC600.SX02-00 (starting with Rev. G0), 5PC600.SX02-01 (starting with Rev. H0), 5PC600.SX05-00 (starting with Rev. F0), 5PC600.SX05-01 (starting with Rev. F0), 5PC600.SF03-00 (starting with Rev. A0), 5PC810.SX*. 5PC820.1505-00, 5PC820.1906-00. Order cable (5CAUPS.0005-00 or 5CAUPS.0030-00) and battery unit (5AC600.UPSB-00) separately | |
| | Accessories | |
| 5ACPCI.ETH1-01 | PCI Ethernet card 1x 10/100 | |
| 5ACPCI.ETH3-01 | PCI Ethernet card 3x 10/100 | |

Table 47: 5PC810.SX02-00 - Order data

3.1.2.3 Interfaces

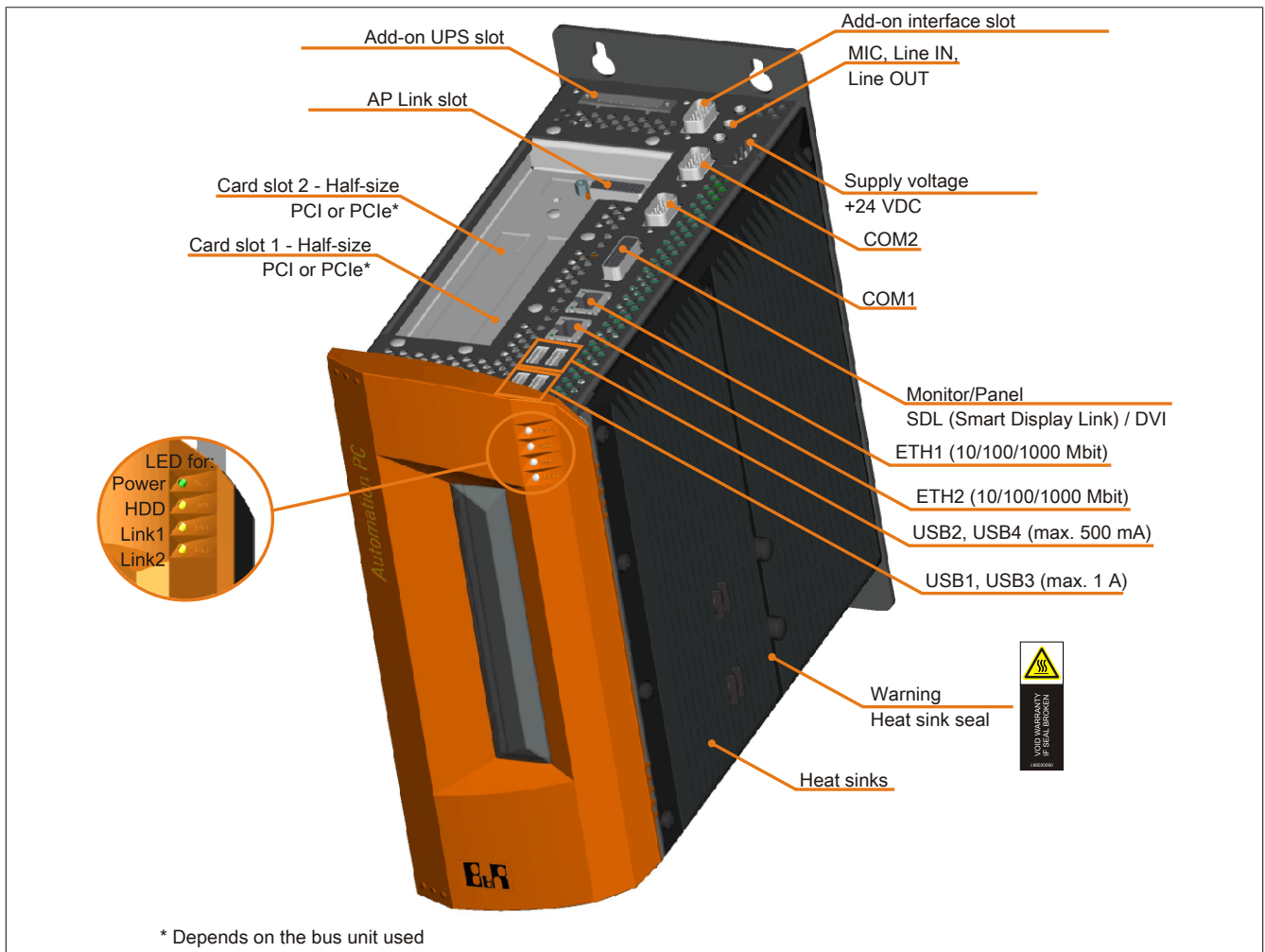


Figure 23: 5PC810.SX02-00 - Interfaces on top

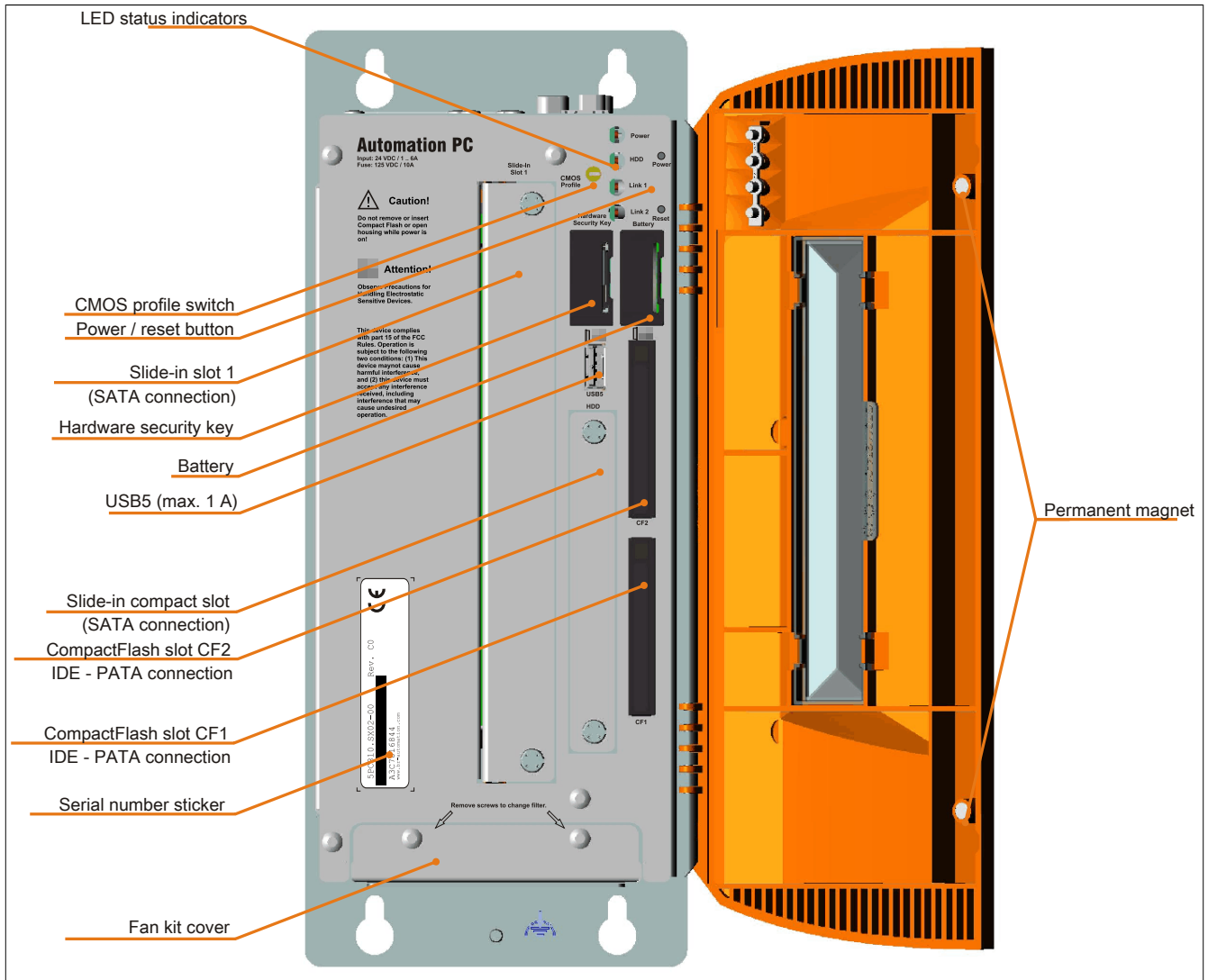


Figure 24: 5PC810.SX02-00 - Interfaces on front

3.1.2.4 Technical data

| Product ID | 5PC810.SX02-00 |
|---------------------------------|---|
| General information | |
| Dongle port | Yes |
| Cooling | Passive via heat sink and optionally supported with an active fan kit ¹⁾ |
| LEDs | Power, HDD, Link 1, Link 2 |
| B&R ID code | \$A3C7 |
| Battery | |
| Type | Renata 950 mAh |
| Service life | 2½ years ²⁾ |
| Removable | Yes, accessible behind the orange front door |
| Design | Lithium ion |
| Power button | Yes |
| Reset button | Yes |
| Buzzer | Yes |
| Certification | |
| CE | Yes |
| cULus | Yes |
| cULus HazLoc Class 1 Division 2 | Yes |
| ATEX Zone 22 | Yes |
| GL | Yes |
| Controller | |
| Boot loader | BIOS |
| Real-time clock | |
| Battery-buffered | Yes |
| Power failure logic | |
| Controller | MTCX ³⁾ |
| Buffer time | 10 ms |

Table 48: 5PC810.SX02-00 - Technical data

| Product ID | 5PC810.SX02-00 |
|--|--|
| Graphics Controller | Depends on the CPU board being used |
| SRAM Size Battery-buffered Remanent variables in power failure mode | 512 kB Yes 192 kB (e.g. for Automation Runtime, see AS help documentation) |
| Memory Type Size | Depends on the CPU board being used Depends on the CPU board being used |
| Interfaces | |
| COM1 Type Design UART Max. baud rate | RS232, modem-capable, not electrically isolated 9-pin male DSUB connector 16550-compatible, 16-byte FIFO 115 kbit/s |
| COM2 Type Design UART Max. baud rate | RS232, modem-capable, not electrically isolated 9-pin male DSUB connector 16550-compatible, 16-byte FIFO 115 kbit/s |
| CompactFlash slot 1 Quantity Type | 1 Type I |
| CompactFlash slot 2 Quantity Type | 1 Type I |
| USB Quantity Type Design Transfer rate Current load | 5 USB 2.0 Type A Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) Max. 500 mA or 1 A per connection |
| Ethernet Quantity Design Transfer rate Max. baud rate | 2 Shielded RJ45 port 10/100/1000 Mbit/s 1 Gbit/s |
| Monitor/Panel interface Design Type | Female DVI-I connector SDL / DVI / Monitor |
| CAN Note | Optional |
| Audio Type Inputs Outputs | AC97 sound ⁴⁾ Microphone, Line IN Line OUT |
| Add-on interface slot Quantity | 1 |
| Inserts | |
| PCI / PCIe slots Quantity | 2 PCI slots, or 1 PCI and 1 PCIe slot ⁵⁾ |
| Slide-in drives | 1 |
| Slide-in compact drives | 1 |
| Automation Panel Link slot | Yes |
| Add-on UPS slot | Yes |
| Insert for fan kit | Yes |
| Electrical characteristics | |
| Nominal voltage | 24 VDC ±25% |
| Nominal current | 6 A |
| Starting current | Typ. 7 A, max. 50 A for <300 µs |
| Electrical isolation | Yes |
| Operating conditions | |
| Protection in accordance with EN 60529 | IP20 |
| Environmental conditions | |
| Temperature Operation Storage Transport | Component-dependent -20 to 60°C -20 to 60°C |
| Relative humidity Operation Storage Transport | Component-dependent Component-dependent Component-dependent |

Table 48: 5PC810.SX02-00 - Technical data

| Product ID | 5PC810.SX02-00 |
|-----------------------------------|---|
| Vibration ⁶⁾ | |
| Operation (continuous) | 2 to 9 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g |
| Operation (occasional) | 2 to 9 Hz: 3.5 mm amplitude / 9 to 200 Hz: 1 g |
| Storage | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
| Transport | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
| Shock ⁶⁾ | |
| Operation | 15 g, 11 ms |
| Storage | 30 g, 15 ms |
| Transport | 30 g, 15 ms |
| Altitude | |
| Operation | Max. 3000 m (component-dependent) ⁷⁾ |
| Mechanical characteristics | |
| Housing ⁸⁾ | |
| Material | Galvanized plate, plastic |
| Front cover | Colored orange plastic (similar to Pantone 144CV) |
| Paint | Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV) |
| Dimensions | |
| Width | 120.8 mm with heat sink 5AC801.HS00-00 and 5AC801.HS00-02 136 mm with heat sink 5AC801.HS00-01 |
| Height | 270 mm |
| Depth | 254.6 mm |
| Weight | Approx. 2800g (component-dependent) |

Table 48: 5PC810.SX02-00 - Technical data

- 1) A fan kit is absolutely necessary for the APC810 GM45.
- 2) At 50°C, 8.5 µA of the supplied components and a self-discharge of 40%.
- 3) Maintenance Controller Extended.
- 4) No longer supported by the GM45 chipset.
- 5) The PCI and PCIe slots available depend on the 5PC810.BX02-00 and 5PC810.BX02-01 bus unit being used.
- 6) Maximum values unless specified otherwise by another individual component.
- 7) The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level).
- 8) There may be visible deviations in the color and surface appearance depending on the process or batch.

3.1.2.5 Dimensions

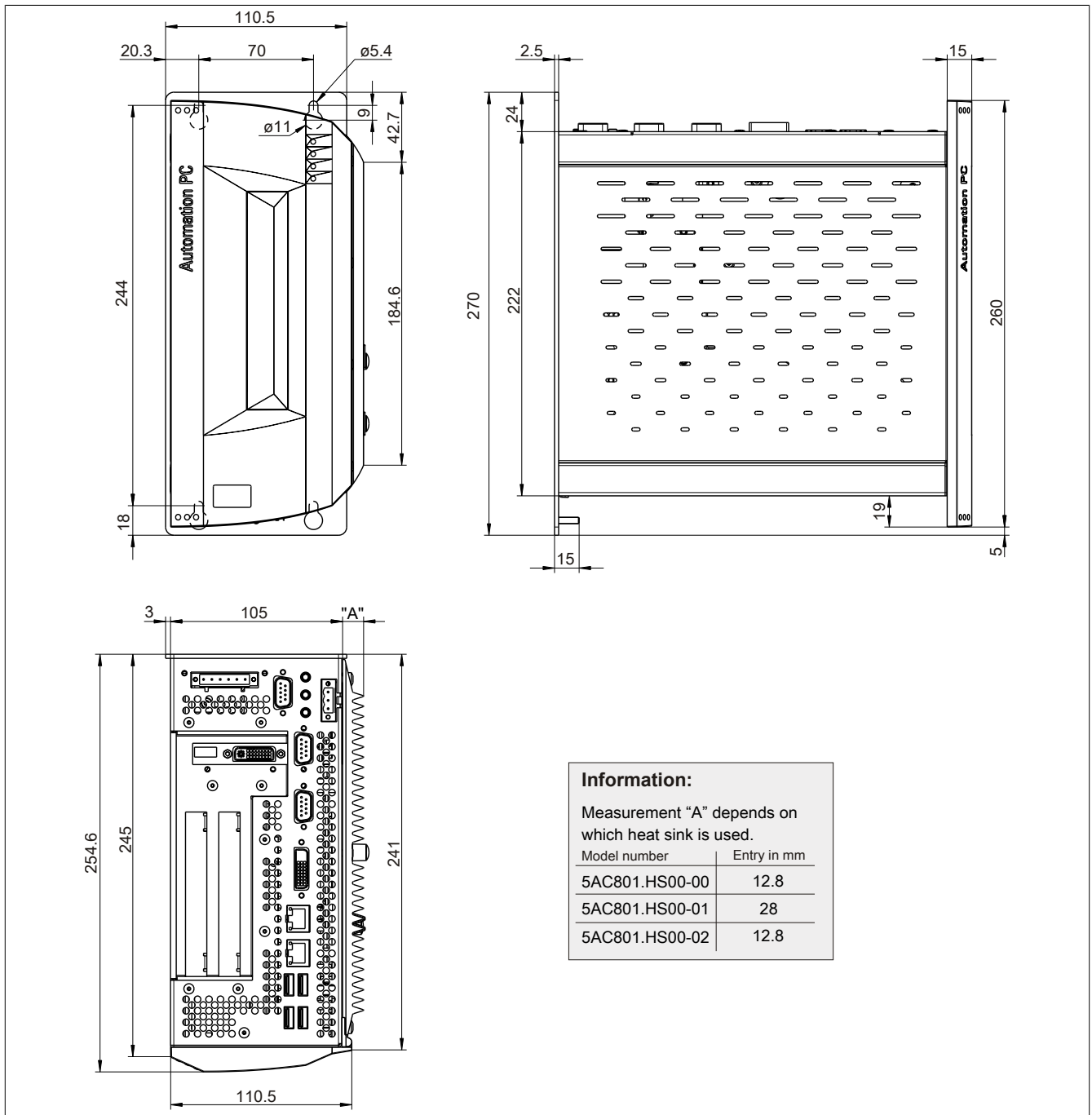


Figure 25: 5PC810.SX02-00 - Dimensions

3.1.2.6 Drilling template

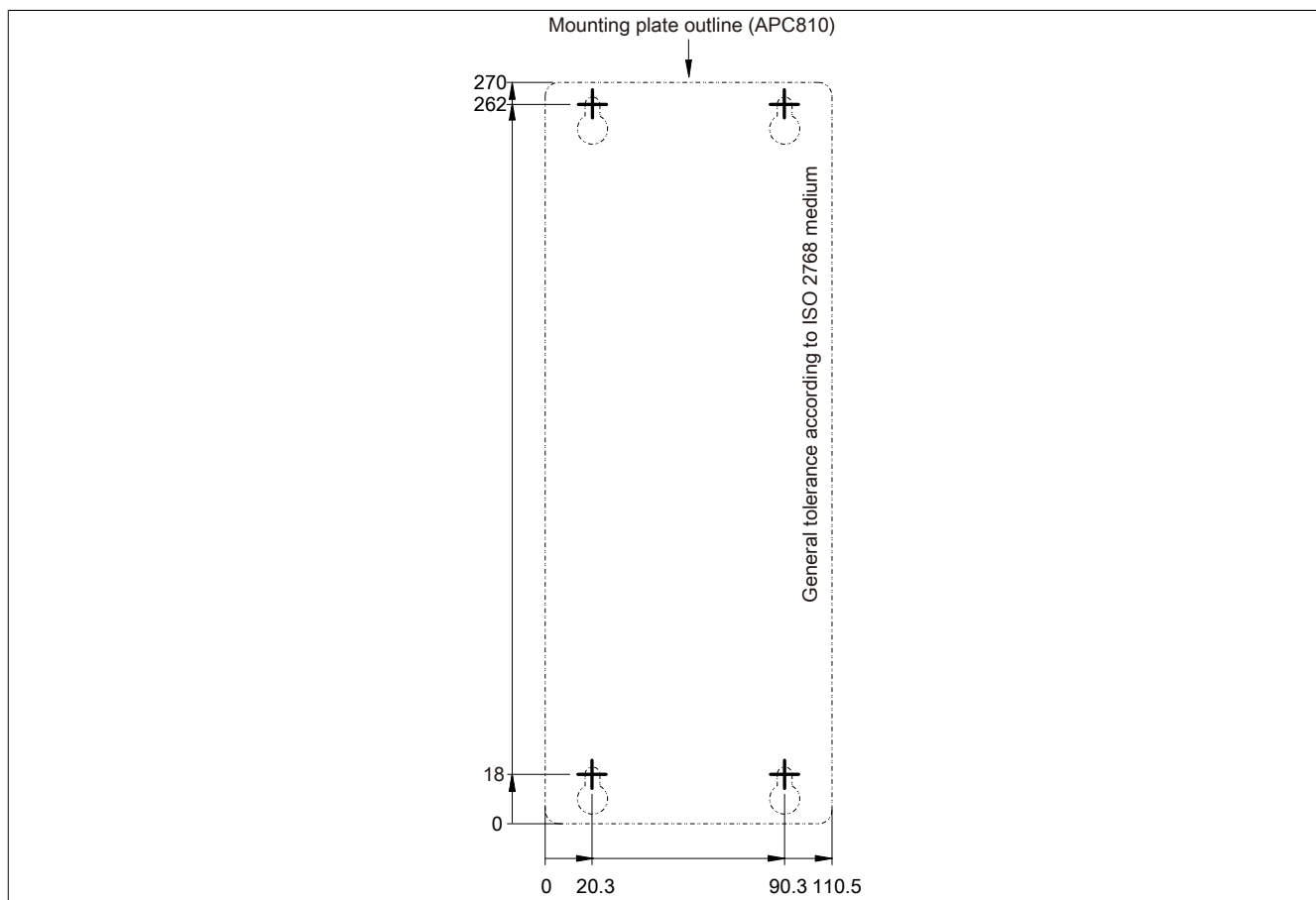


Figure 26: 5PC810.SX02-00 - Drilling template

3.1.3 5PC810.SX03-00

3.1.3.1 General information

- Slot for a bus unit with 2 PCI and 1 PCIe slots
- 512 kB SRAM onboard
- Insert for 1 slide-in compact drive and 1 slide-in drive
- Automation Panel Link slot for connecting Automation Panels via SDL

3.1.3.2 Order data


| Model number | Short description | Figure |
|------------------------------------|---|---|
| System units | |  |
| 5PC810.SX03-00 | APC810 system unit, 3 slots (PCI Express, PCI, depending on bus); 1 slot for Automation Panel Link transmitter; 1 slide-in compact and 1 slide-in slot; Smart Display Link/ DVI/Monitor, 2x RS232, 5x USB 2.0, 2x ETH 10/100/1000, AC97 sound, 24 VDC (order 0TB103.9 screw clamp or 0TB103.91 cage clamp terminals separately) | |
| Required accessories | | |
| Bus units | | |
| 5PC810.BX03-00 | APC810 bus, 2 PCI, 1 PCI Express (x4) | |
| CPU boards | | |
| 5PC800.B945-05 | Intel Atom N270 CPU board, 1.6 GHz, single core, 533 MHz FSB, 512 kB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| 5PC800.B945-10 | Intel Core Duo L2400 CPU board, 1.66 GHz, dual core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| 5PC800.B945-11 | Intel Core2 Duo L7400 CPU board, 1.5 GHz, dual core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 4 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| 5PC800.B945-12 | Intel Core2 Duo U7500 CPU board, 1.06 GHz, dual core, 533 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| 5PC800.B945-13 | Intel Celeron M 423 CPU board, 1.06 GHz, single core, 533 MHz FSB, 1 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| 5PC800.B945-14 | Intel Core2 Duo T7400 CPU board, 2.16 GHz, dual core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 4 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| Terminal blocks | | |
| 0TB103.9 | Connector, 24 VDC, 3-pin female, 3.31 mm² screw clamp, protected against vibration by the screw flange | |
| 0TB103.91 | Connector, 24 VDC, 3-pin female, 3.31 mm² cage clamp, protected against vibration by the screw flange | |
| Main memory | | |
| 5MMDDR.0512-01 | SO-DIMM DDR2 RAM 512 MB PC2-5300 | |
| 5MMDDR.1024-01 | SO-DIMM DDR2 RAM 1024 MB PC2-5300 | |
| 5MMDDR.2048-01 | SO-DIMM DDR2 RAM 2048 MB PC2-5300 | |
| Heat sinks | | |
| 5AC801.HS00-00 | APC810 heat sink for CPU boards with L2400, L7400, U7500 or Celeron M 423 dual-core processor | |
| 5AC801.HS00-01 | APC810 heat sink for CPU boards with T7400, T9400 or P8400 dual-core processor | |
| 5AC801.HS00-02 | APC810 heat sink for CPU board with Atom processor N270 | |
| Optional accessories | | |
| Automation Panel Link insert cards | | |
| 5AC801.RDYR-00 | APC810 ready relay | |
| 5AC801.SDL0-00 | Smart Display Link/DVI-D transmitter | |
| Drives | | |
| 5AC801.ADAS-00 | SATA hard disk adapter for operating a slide-in compact hard disk in a slide-in slot | |
| 5AC801.DVDS-00 | DVD-ROM SATA slide-in drive | |
| 5AC801.DVRS-00 | DVD-R/RW DVD+R/RW SATA drive, slide-in | |
| 5AC801.HDDI-00 | 40 GB slide-in compact SATA hard disk, 24/7 operation with extended temperature range. Note: Please see the manual for information about using this hard disk. | |

Table 49: 5PC810.SX03-00 - Order data

| Model number | Short description | Figure |
|----------------|---|--------|
| 5AC801.HDDI-04 | 500 GB slide-in compact SATA hard disk; 24/7 operation. Note: Please see the manual for information about using this hard disk. | |
| 5AC801.HDDS-00 | 40 GB slide-in SATA hard disk; 24/7 operation with extended temperature range. Note: Please see the manual for information about using this hard disk. | |
| 5AC801.SSDI-00 | 32 GB SATA SSD (SLC), slide-in compact | |
| 5AC801.SSDI-03 | 60 GB SATA SSD (MLC), slide-in compact | |
| 5AC801.SSDI-04 | 128 GB SATA SSD (MLC), slide-in compact | |
| 5ACPCI.RAIC-06 | PCI RAID system SATA 2x 500 GB; Note: Please see the manual for information about using this hard disk. | |
| | Fan kit | |
| 5PC810.FA03-00 | APC810 fan kit for 5PC810.SX03-00 system unit | |
| | Serial port adapter | |
| 5AC600.485I-00 | RS232/422/485 interface, for installation in an APC620, APC810 or PPC700 | |
| 5AC600.CANI-00 | CAN interface; for installation in an APC620, APC810 or PPC700 | |
| | Uninterruptible power supply | |
| 5AC600.UPSI-00 | UPS module for APC620, APC810, PPC800; for system units 5PC600.SX01-00 (starting with Rev. H0), 5PC600.SX02-00 (starting with Rev. G0), 5PC600.SX02-01 (starting with Rev. H0), 5PC600.SX05-00 (starting with Rev. F0), 5PC600.SX05-01 (starting with Rev. F0), 5PC600.SF03-00 (starting with Rev. A0), 5PC810.SX*. 5PC820.1505-00, 5PC820.1906-00. Order cable (5CAUPS.0005-00 or 5CAUPS.0030-00) and battery unit (5AC600.UPSB-00) separately | |
| | Accessories | |
| 5ACPCI.ETH1-01 | PCI Ethernet card 1x 10/100 | |
| 5ACPCI.ETH3-01 | PCI Ethernet card 3x 10/100 | |

Table 49: 5PC810.SX03-00 - Order data

3.1.3.3 Interfaces

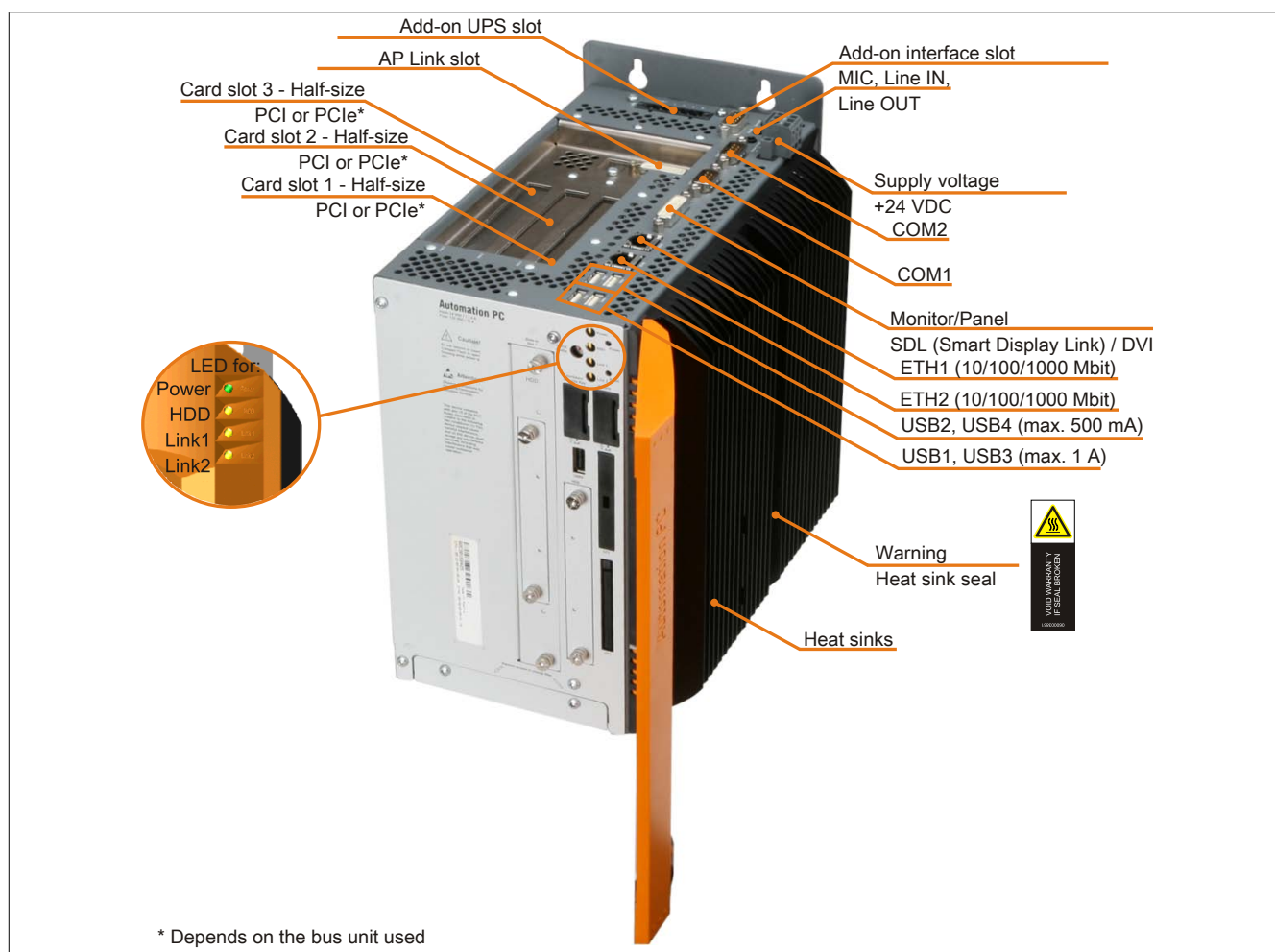


Figure 27: 5PC810.SX03-00 - Interfaces on top

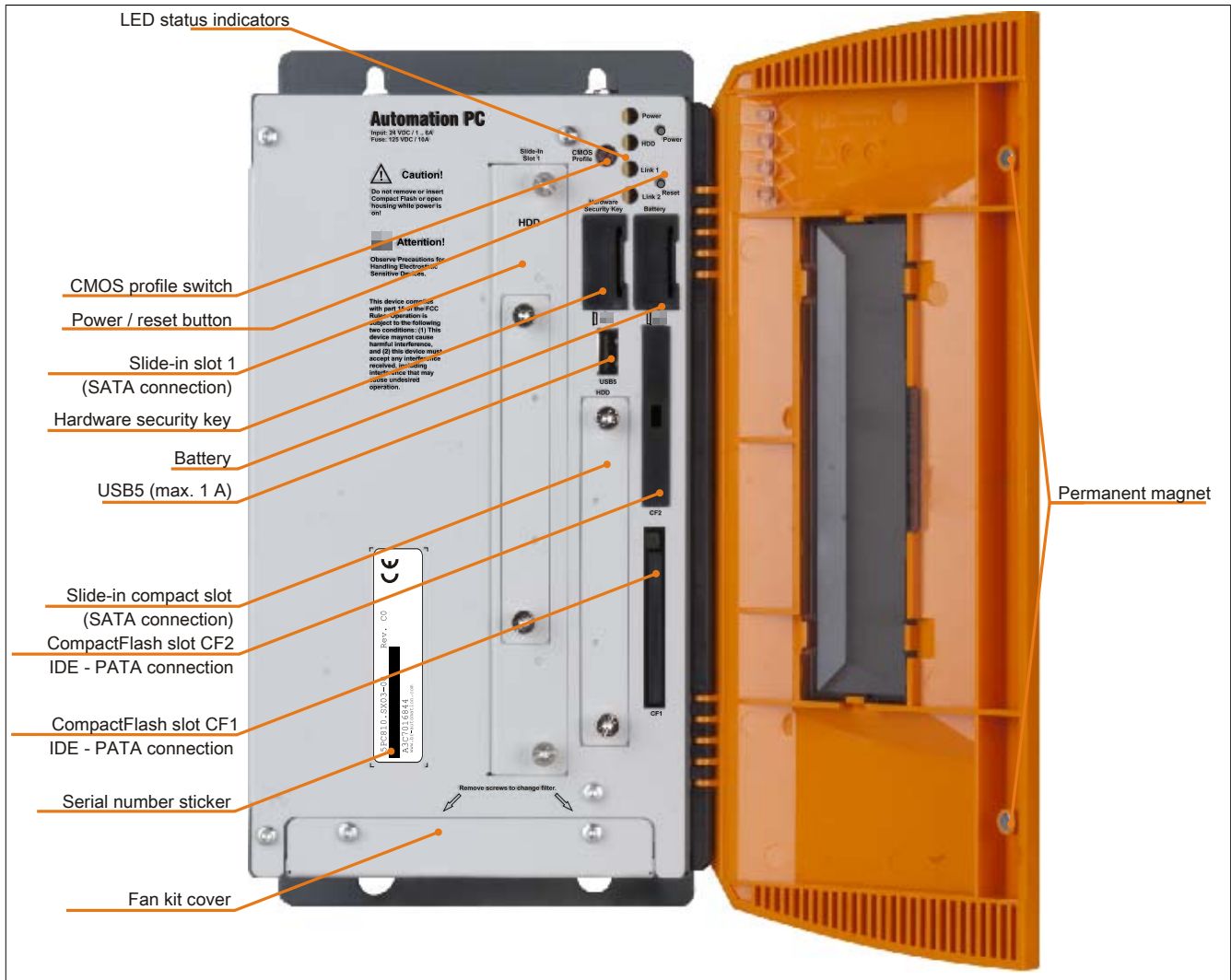


Figure 28: 5PC810.SX03-00 - Interfaces on front

3.1.3.4 Technical data

| Product ID | 5PC810.SX03-00 |
|----------------------------|---|
| General information | |
| Dongle port | Yes |
| Cooling | Passive via heat sink and optionally supported with an active fan kit ¹⁾ |
| LEDs | Power, HDD, Link 1, Link 2 |
| B&R ID code | \$B2C3 |
| Battery | |
| Type | Renata 950 mAh |
| Service life | 2½ years ²⁾ |
| Removable | Yes, accessible behind the orange front door |
| Design | Lithium ion |
| Power button | Yes |
| Reset button | Yes |
| Buzzer | Yes |
| Certification | |
| CE | Yes |
| cULus | Yes |
| Controller | |
| Boot loader | BIOS |
| Real-time clock | |
| Battery-buffered | Yes |
| Power failure logic | |
| Controller | MTCX ³⁾ |
| Buffer time | 10 ms |
| Graphics | |
| Controller | Depends on the CPU board being used |

Table 50: 5PC810.SX03-00 - Technical data

| Product ID | 5PC810.SX03-00 |
|--|---|
| SRAM | |
| Size | 512 kB |
| Battery-buffered | Yes |
| Remanent variables in power failure mode | 192 kB (e.g. for Automation Runtime, see AS help documentation) |
| Memory | |
| Type | Depends on the CPU board being used |
| Size | Depends on the CPU board being used |
| Interfaces | |
| COM1 | |
| Type | RS232, modem-capable, not electrically isolated |
| Design | 9-pin male DSUB connector |
| UART | 16550-compatible, 16-byte FIFO |
| Max. baud rate | 115 kbit/s |
| COM2 | |
| Type | RS232, modem-capable, not electrically isolated |
| Design | 9-pin male DSUB connector |
| UART | 16550-compatible, 16-byte FIFO |
| Max. baud rate | 115 kbit/s |
| CompactFlash slot 1 | |
| Quantity | 1 |
| Type | Type I |
| CompactFlash slot 2 | |
| Quantity | 1 |
| Type | Type I |
| USB | |
| Quantity | 5 |
| Type | USB 2.0 |
| Design | Type A |
| Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) |
| Current load | Max. 500 mA or 1 A per connection |
| Ethernet | |
| Quantity | 2 |
| Design | Shielded RJ45 port |
| Transfer rate | 10/100/1000 Mbit/s |
| Max. baud rate | 1 Gbit/s |
| Monitor/Panel interface | |
| Design | Female DVI-I connector |
| Type | SDL / DVI / Monitor |
| CAN | |
| Note | Optional |
| Audio | |
| Type | AC97 sound ⁴⁾ |
| Inputs | Microphone, Line IN |
| Outputs | Line OUT |
| Add-on interface slot | |
| Quantity | 1 |
| Inserts | |
| PCI / PCIe slots | |
| Quantity | 2 PCI and 1 PCIe slot ⁵⁾ |
| Slide-in drives | 1 |
| Slide-in compact drives | 1 |
| Automation Panel Link slot | Yes |
| Add-on UPS slot | Yes |
| Insert for fan kit | Yes |
| Electrical characteristics | |
| Nominal voltage | 24 VDC ±25% |
| Nominal current | 6 A |
| Starting current | Typ. 7 A, max. 50 A for <300 µs |
| Electrical isolation | Yes |
| Operating conditions | |
| Protection in accordance with EN 60529 | IP20 |
| Environmental conditions | |
| Temperature | |
| Operation | Component-dependent |
| Storage | -20 to 60°C |
| Transport | -20 to 60°C |
| Relative humidity | |
| Operation | Component-dependent |
| Storage | Component-dependent |
| Transport | Component-dependent |
| Vibration ⁶⁾ | |
| Operation (continuous) | 2 to 9 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g |
| Operation (occasional) | 2 to 9 Hz: 3.5 mm amplitude / 9 to 200 Hz: 1 g |
| Storage | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
| Transport | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |

Table 50: 5PC810.SX03-00 - Technical data

| Product ID | 5PC810.SX03-00 |
|----------------------------|---|
| Shock ⁶⁾ | |
| Operation | 15 g, 11 ms |
| Storage | 30 g, 15 ms |
| Transport | 30 g, 15 ms |
| Altitude | |
| Operation | Max. 3000 m (component-dependent) ⁷⁾ |
| Mechanical characteristics | |
| Housing ⁸⁾ | |
| Material | Galvanized plate, plastic |
| Front cover | Colored orange plastic (similar to Pantone 144CV) |
| Paint | Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV) |
| Dimensions | |
| Width | 140.8 mm with heat sink 5AC801.HS00-00 and 5AC801.HS00-02 156.5 mm with heat sink 5AC801.HS00-01 |
| Height | 270 mm |
| Depth | 254.6 mm |
| Weight | Approx. 3200g (component-dependent) |

Table 50: 5PC810.SX03-00 - Technical data

- 1) A fan kit is absolutely necessary for the APC810 GM45.
- 2) At 50°C, 8.5 µA of the supplied components and a self-discharge of 40%.
- 3) Maintenance Controller Extended.
- 4) No longer supported by the GM45 chipset.
- 5) Bus unit 5PC810.BX03-00 with 2 PCI and 1 PCIe slots can be used.
- 6) Maximum values unless specified otherwise by another individual component.
- 7) The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level).
- 8) There may be visible deviations in the color and surface appearance depending on the process or batch.

3.1.3.5 Dimensions

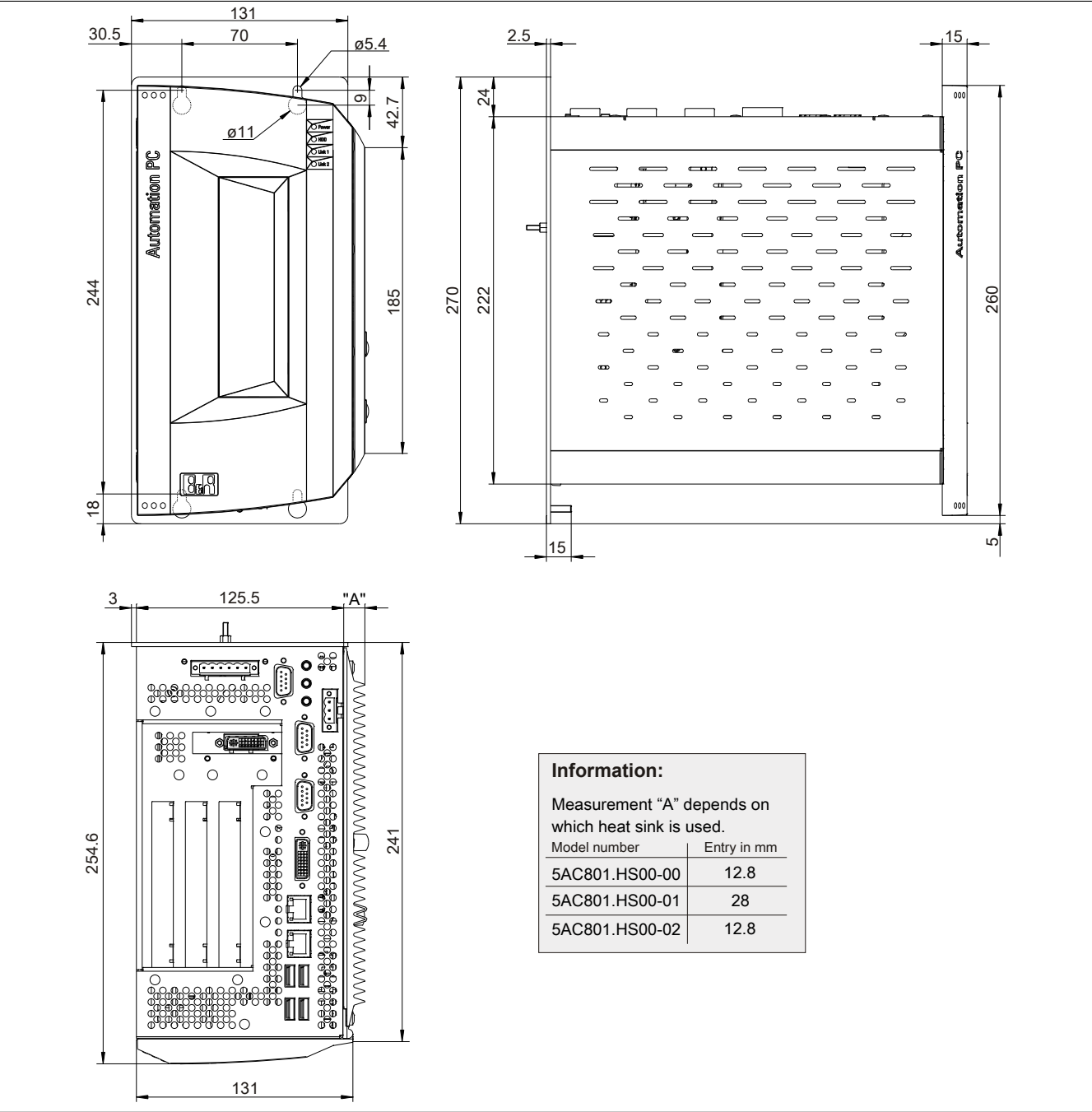


Figure 29: 5PC810.SX03-00 - Dimensions

3.1.3.6 Drilling template

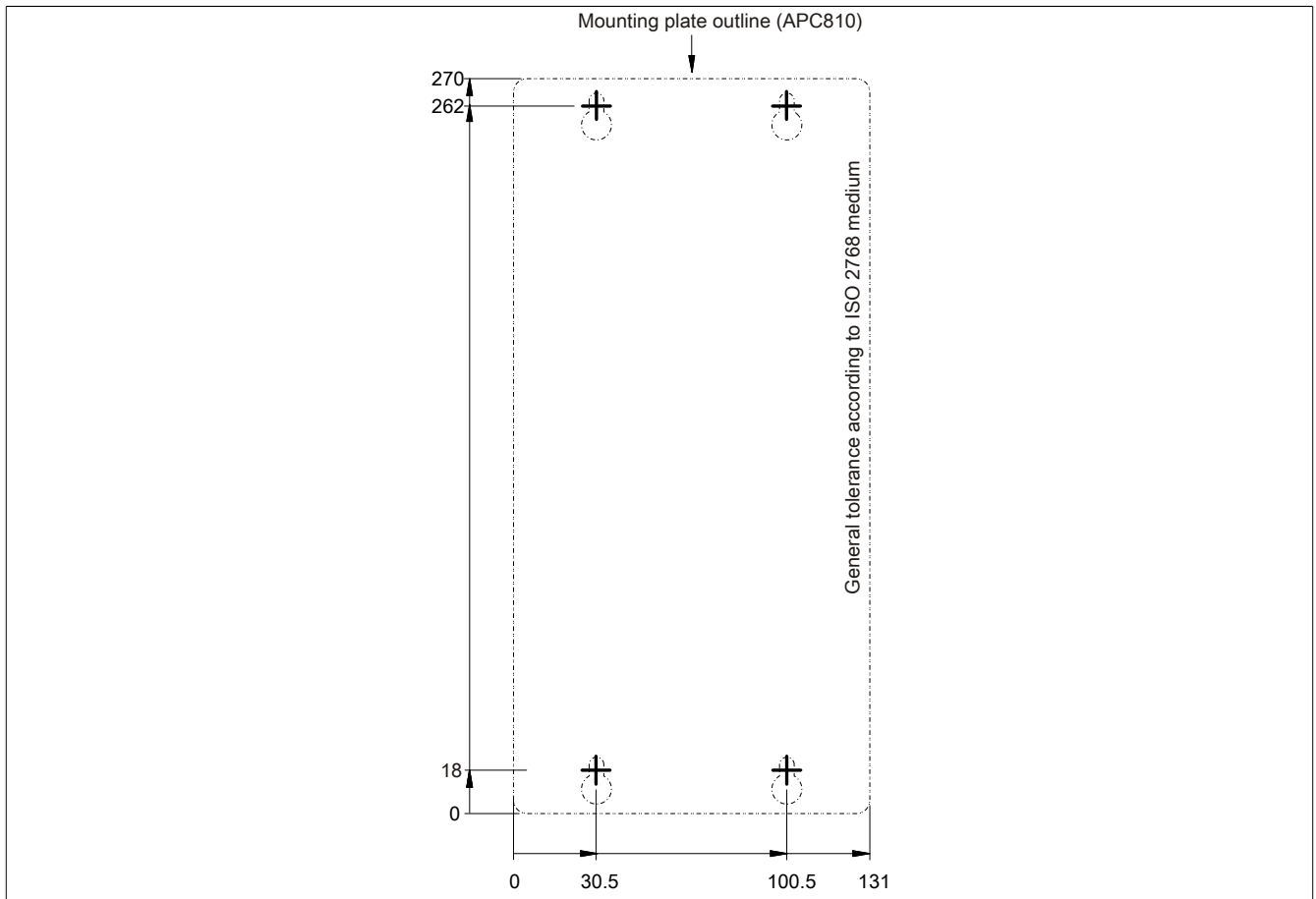


Figure 30: 5PC810.SX03-00 - Drilling template

3.1.4 5PC810.SX05-00

3.1.4.1 General information

- Slot for a bus unit with 4 PCI and 1 PCIe slots, 2 PCI and 3 PCIe slots or 5 PCI slots
- 512 kB SRAM onboard
- Insert for 1 slide-in compact drive and 2 slide-in drives
- Automation Panel Link slot for connecting Automation Panels via SDL

3.1.4.2 Order data

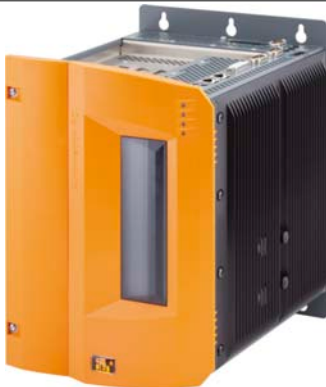
| Model number | Short description | Figure |
|---|--|---|
| System units | |  |
| 5PC810.SX05-00 | APC810 system unit, 5 slots (PCI Express, PCI, depending on bus); 1 slot for Automation Panel Link transmitter; 1 slide-in compact and 2 slide-in slots; Smart Display Link/ DVI/Monitor, 2x RS232, 5x USB 2.0, 2x ETH 10/100/1000, 24 VDC (order 0TB103.9 screw clamp or 0TB103.91 cage clamp terminals separately) | |
| Required accessories | | |
| Bus units | | |
| 5PC810.BX05-00 | APC810 bus, 4 PCI, 1 PCI Express (x1) | |
| 5PC810.BX05-01 | APC810 bus, 2 PCI, 3 PCI Express (x1) | |
| 5PC810.BX05-02 | APC810 bus, 5 PCI | |
| CPU boards | | |
| 5PC800.B945-05 | Intel Atom N270 CPU board, 1.6 GHz, single core, 533 MHz FSB, 512 kB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| 5PC800.B945-10 | Intel Core Duo L2400 CPU board, 1.66 GHz, dual core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| 5PC800.B945-11 | Intel Core2 Duo L7400 CPU board, 1.5 GHz, dual core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 4 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| 5PC800.B945-12 | Intel Core2 Duo U7500 CPU board, 1.06 GHz, dual core, 533 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| 5PC800.B945-13 | Intel Celeron M 423 CPU board, 1.06 GHz, single core, 533 MHz FSB, 1 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| 5PC800.B945-14 | Intel Core2 Duo T7400 CPU board, 2.16 GHz, dual core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 4 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| Terminal blocks | | |
| 0TB103.9 | Connector, 24 VDC, 3-pin female, 3.31 mm² screw clamp, protected against vibration by the screw flange | |
| 0TB103.91 | Connector, 24 VDC, 3-pin female, 3.31 mm² cage clamp, protected against vibration by the screw flange | |
| Main memory | | |
| 5MMDDR.0512-01 | SO-DIMM DDR2 RAM 512 MB PC2-5300 | |
| 5MMDDR.1024-01 | SO-DIMM DDR2 RAM 1024 MB PC2-5300 | |
| 5MMDDR.2048-01 | SO-DIMM DDR2 RAM 2048 MB PC2-5300 | |
| Heat sinks | | |
| 5AC801.HS00-00 | APC810 heat sink for CPU boards with L2400, L7400, U7500 or Celeron M 423 dual-core processor | |
| 5AC801.HS00-01 | APC810 heat sink for CPU boards with T7400, T9400 or P8400 dual-core processor | |
| 5AC801.HS00-02 | APC810 heat sink for CPU board with Atom processor N270 | |
| Optional accessories | | |
| Automation Panel Link insert cards | | |
| 5AC801.RDYR-00 | APC810 ready relay | |
| 5AC801.SDL0-00 | Smart Display Link/DVI-D transmitter | |
| Drives | | |
| 5AC801.ADAS-00 | SATA hard disk adapter for operating a slide-in compact hard disk in a slide-in slot | |
| 5AC801.DVDS-00 | DVD-ROM SATA slide-in drive | |
| 5AC801.DVRS-00 | DVD-R/RW DVD+R/RW SATA drive, slide-in | |

Table 51: 5PC810.SX05-00 - Order data

| Model number | Short description | Figure |
|----------------|---|--------|
| 5AC801.HDDI-00 | 40 GB slide-in compact SATA hard disk, 24/7 operation with extended temperature range. Note: Please see the manual for information about using this hard disk. | |
| 5AC801.HDDI-04 | 500 GB slide-in compact SATA hard disk; 24/7 operation. Note: Please see the manual for information about using this hard disk. | |
| 5AC801.HDDS-00 | 40 GB slide-in SATA hard disk; 24/7 operation with extended temperature range. Note: Please see the manual for information about using this hard disk. | |
| 5AC801.SSDI-00 | 32 GB SATA SSD (SLC), slide-in compact | |
| 5AC801.SSDI-03 | 60 GB SATA SSD (MLC), slide-in compact | |
| 5AC801.SSDI-04 | 128 GB SATA SSD (MLC), slide-in compact | |
| 5ACPCI.RAIC-06 | PCI RAID system SATA 2x 500 GB; Note: Please see the manual for information about using this hard disk. | |
| | Fan kit | |
| 5PC810.FA05-00 | APC810 fan kit for 5PC810.SX05-00 system unit | |
| | Serial port adapter | |
| 5AC600.485I-00 | RS232/422/485 interface, for installation in an APC620, APC810 or PPC700 | |
| 5AC600.CANI-00 | CAN interface; for installation in an APC620, APC810 or PPC700 | |
| | Uninterruptible power supply | |
| 5AC600.UPSI-00 | UPS module for APC620, APC810, PPC800; for system units 5PC600.SX01-00 (starting with Rev. H0), 5PC600.SX02-00 (starting with Rev. G0), 5PC600.SX02-01 (starting with Rev. H0), 5PC600.SX05-00 (starting with Rev. F0), 5PC600.SX05-01 (starting with Rev. F0), 5PC600.SF03-00 (starting with Rev. A0), 5PC810.SX*. 5PC820.1505-00, 5PC820.1906-00. Order cable (5CAUPS.0005-00 or 5CAUPS.0030-00) and battery unit (5AC600.UPSB-00) separately | |
| | Accessories | |
| 5ACPCI.ETH1-01 | PCI Ethernet card 1x 10/100 | |
| 5ACPCI.ETH3-01 | PCI Ethernet card 3x 10/100 | |

Table 51: 5PC810.SX05-00 - Order data

3.1.4.3 Interfaces

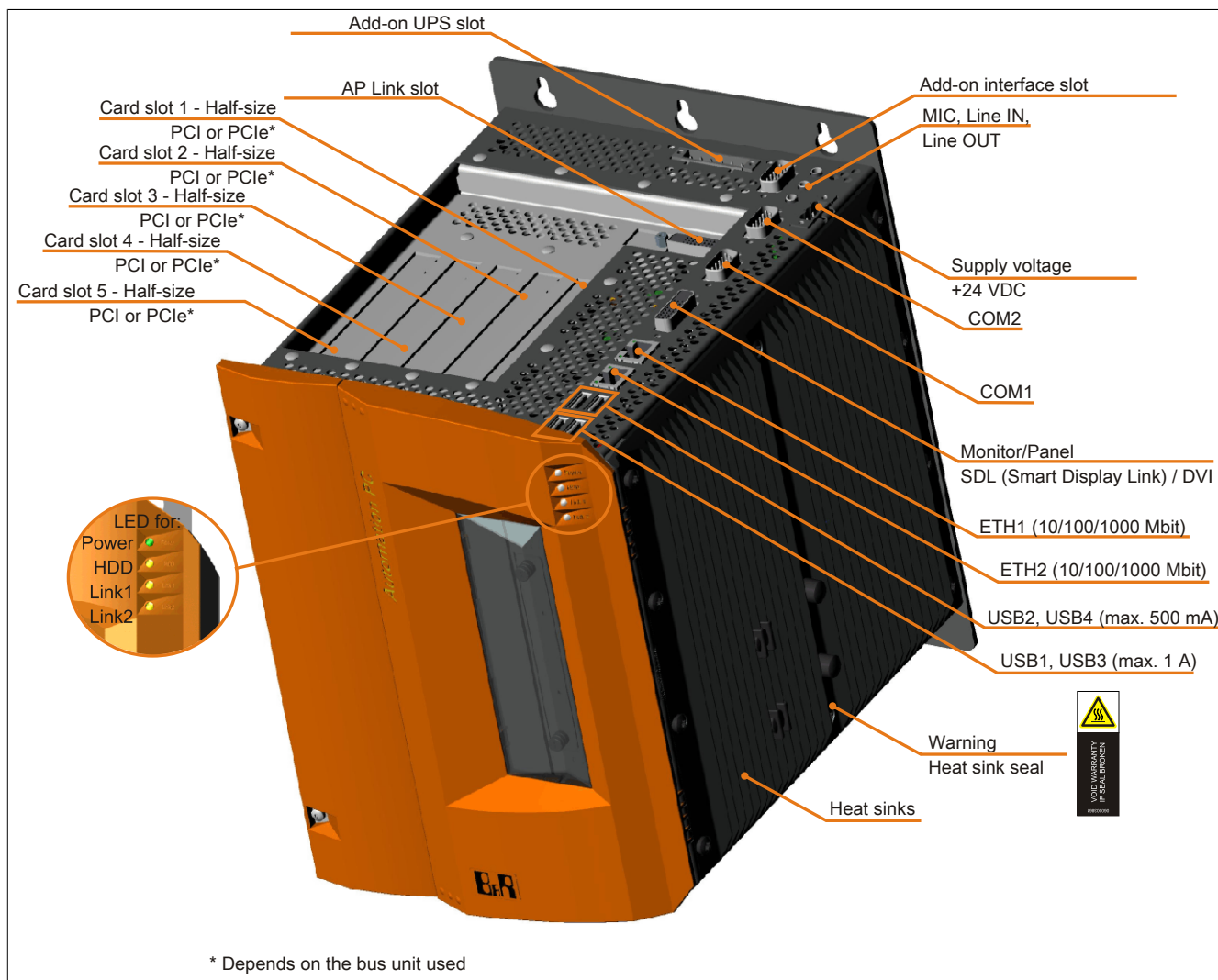


Figure 31: 5PC810.SX05-00 - Interfaces on top

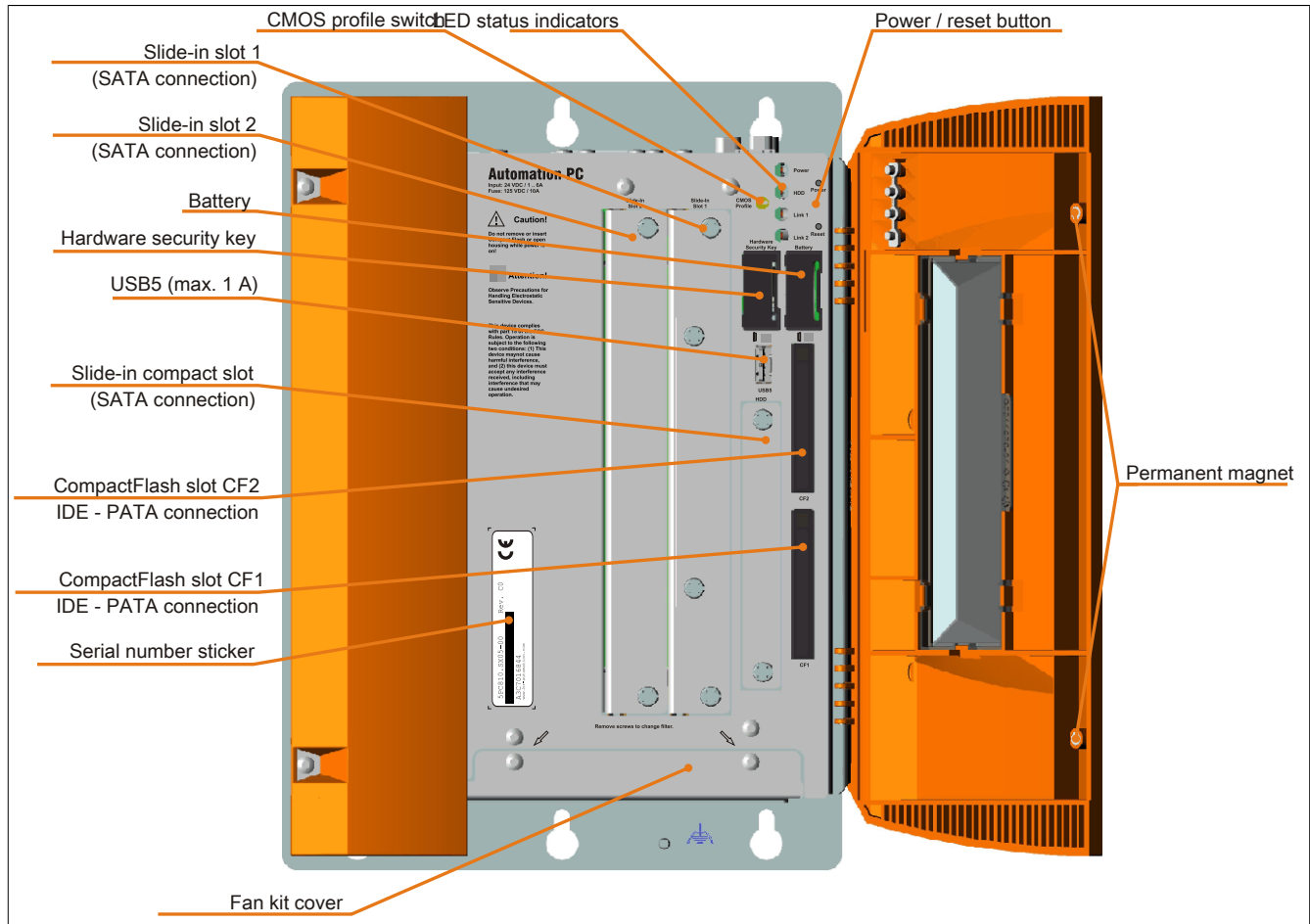


Figure 32: 5PC810.SX05-00 - Interfaces on front

3.1.4.4 Technical data

| Product ID | 5PC810.SX05-00 |
|--|---|
| General information | |
| Dongle port | Yes |
| Cooling | Passive via heat sink and optionally supported with an active fan kit ¹⁾ |
| LEDs | Power, HDD, Link 1, Link 2 |
| B&R ID code | \$A3EE |
| Battery | |
| Type | Renata 950 mAh |
| Service life | 2½ years ²⁾ |
| Removable | Yes, accessible behind the orange front door |
| Design | Lithium ion |
| Power button | Yes |
| Reset button | Yes |
| Buzzer | Yes |
| Certification | |
| CE | Yes |
| cULus | Yes |
| Controller | |
| Boot loader | BIOS |
| Real-time clock | |
| Battery-buffered | Yes |
| Power failure logic | |
| Controller | MTCX ³⁾ |
| Buffer time | 10 ms |
| Graphics | |
| Controller | Depends on the CPU board being used |
| SRAM | |
| Size | 512 kB |
| Battery-buffered | Yes |
| Remanent variables in power failure mode | 192 kB (e.g. for Automation Runtime, see AS help documentation) |
| Memory | |
| Type | Depends on the CPU board being used |
| Size | Depends on the CPU board being used |

Table 52: 5PC810.SX05-00 - Technical data

| Product ID | 5PC810.SX05-00 |
|--|---|
| Interfaces | |
| COM1 | |
| Type | RS232, modem-capable, not electrically isolated |
| Design | 9-pin male DSUB connector |
| UART | 16550-compatible, 16-byte FIFO |
| Max. baud rate | 115 kbit/s |
| COM2 | |
| Type | RS232, modem-capable, not electrically isolated |
| Design | 9-pin male DSUB connector |
| UART | 16550-compatible, 16-byte FIFO |
| Max. baud rate | 115 kbit/s |
| CompactFlash slot 1 | |
| Quantity | 1 |
| Type | Type I |
| CompactFlash slot 2 | |
| Quantity | 1 |
| Type | Type I |
| USB | |
| Quantity | 5 |
| Type | USB 2.0 |
| Design | Type A |
| Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) |
| Current load | Max. 500 mA or 1 A per connection |
| Ethernet | |
| Quantity | 2 |
| Design | Shielded RJ45 port |
| Transfer rate | 10/100/1000 Mbit/s |
| Max. baud rate | 1 Gbit/s |
| Monitor/Panel interface | |
| Design | Female DVI-I connector |
| Type | SDL / DVI / Monitor |
| CAN | |
| Note | Optional |
| Audio | |
| Type | AC97 sound ⁴⁾ |
| Inputs | Microphone, Line IN |
| Outputs | Line OUT |
| Add-on interface slot | |
| Quantity | 1 |
| Inserts | |
| PCI / PCIe slots | |
| Quantity | 4 PCI slots and 1 PCIe slots or 2 PCI slots and 3 PCIe slots or 5 PCI slots ⁵⁾ |
| Slide-in drives | 2 |
| Slide-in compact drives | 1 |
| Automation Panel Link slot | Yes |
| Add-on UPS slot | Yes |
| Insert for fan kit | Yes |
| Electrical characteristics | |
| Nominal voltage | 24 VDC ±25% |
| Nominal current | 6 A |
| Starting current | Typ. 7 A, max. 50 A for <300 µs |
| Electrical isolation | Yes |
| Operating conditions | |
| Protection in accordance with EN 60529 | IP20 |
| Environmental conditions | |
| Temperature | |
| Operation | Component-dependent |
| Storage | -20 to 60°C |
| Transport | -20 to 60°C |
| Relative humidity | |
| Operation | Component-dependent |
| Storage | Component-dependent |
| Transport | Component-dependent |
| Vibration ⁶⁾ | |
| Operation (continuous) | 2 to 9 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g |
| Operation (occasional) | 2 to 9 Hz: 3.5 mm amplitude / 9 to 200 Hz: 1 g |
| Storage | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
| Transport | 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g |
| Shock ⁶⁾ | |
| Operation | 15 g, 11 ms |
| Storage | 30 g, 15 ms |
| Transport | 30 g, 15 ms |

Table 52: 5PC810.SX05-00 - Technical data

| Product ID | 5PC810.SX05-00 |
|---|---|
| Altitude Operation | Max. 3000 m (component-dependent) ⁷⁾ |
| Mechanical characteristics | |
| Housing ⁸⁾ Material Front cover Paint | Galvanized plate, plastic Colored orange plastic (similar to Pantone 144CV) Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV) |
| Dimensions Width Height Depth | 201.7 mm with heat sink 5AC801.HS00-00 and 5AC801.HS00-02 216.9 mm with heat sink 5AC801.HS00-01 270 mm 254.5 mm |
| Weight | Approx. 3900g (component-dependent) |

Table 52: 5PC810.SX05-00 - Technical data

- 1) A fan kit is absolutely necessary for the APC810 GM45.
- 2) At 50°C, 8.5 µA of the supplied components and a self-discharge of 40%.
- 3) Maintenance Controller Extended.
- 4) No longer supported by the GM45 chipset.
- 5) The PCI and PCIe slots available depend on the 5PC810.BX05-00, 5PC810.BX05-01 and 5PC810.BX05-02 bus unit being used.
- 6) Maximum values unless specified otherwise by another individual component.
- 7) The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level).
- 8) There may be visible deviations in the color and surface appearance depending on the process or batch.

3.1.4.5 Dimensions

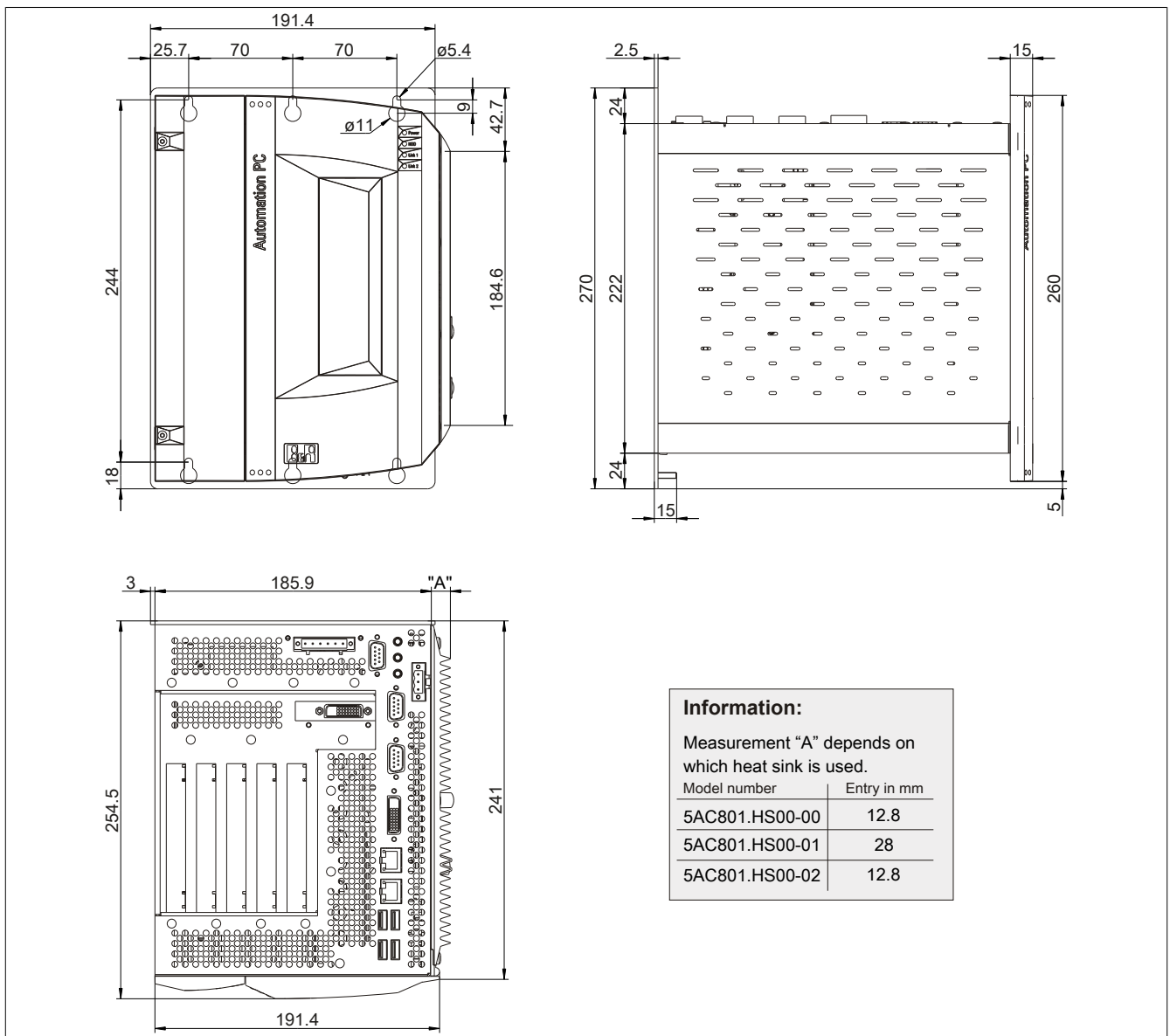


Figure 33: 5PC810.SX05-00 - Dimensions

3.1.4.6 Drilling template

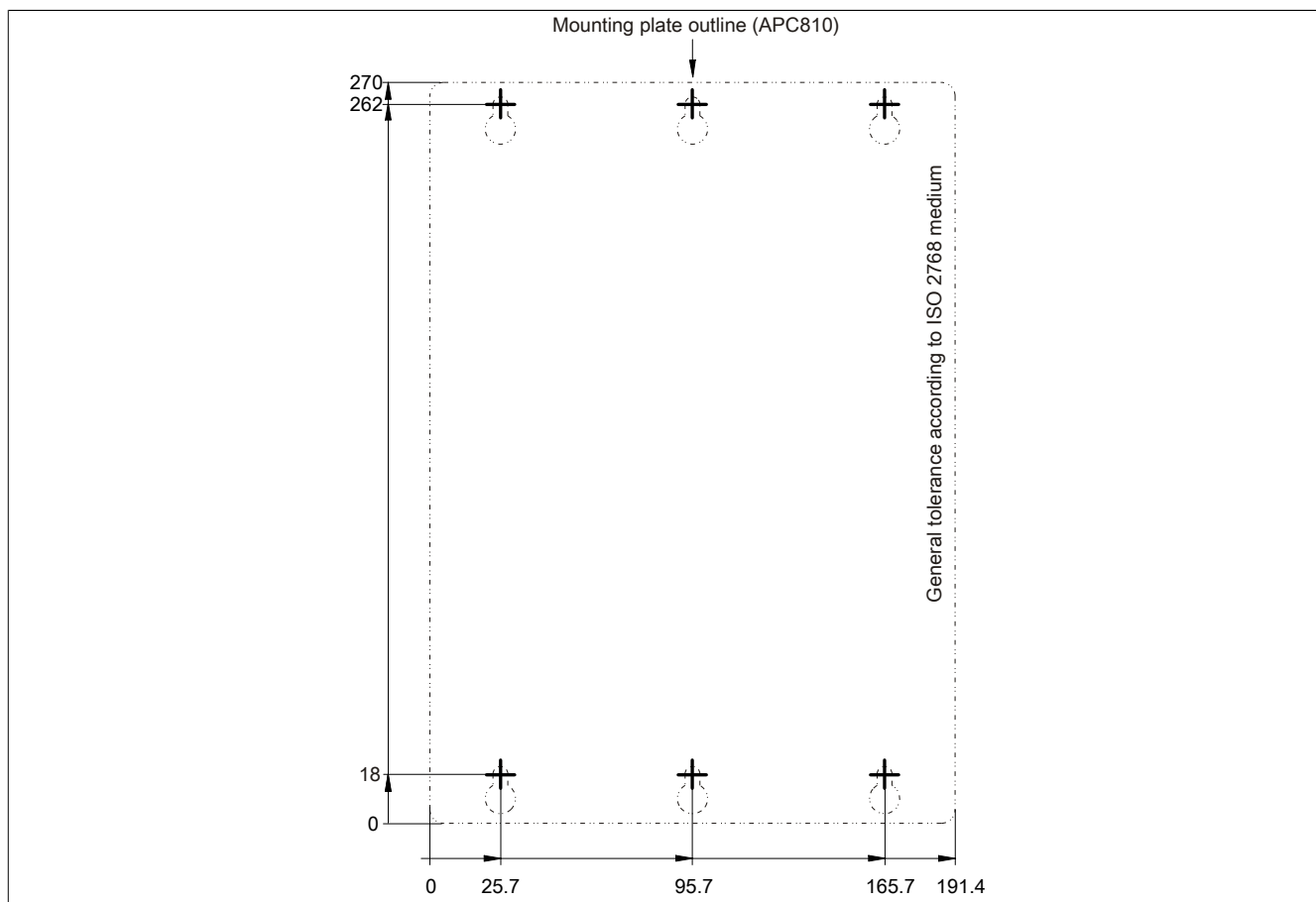


Figure 34: 5PC810.SX05-00 - Drilling template

3.2 Bus units

3.2.1 General information

Bus units are compatible with system units with 1, 2, 3 or 5 card slots and provide support for PCI and/or PCI Express.

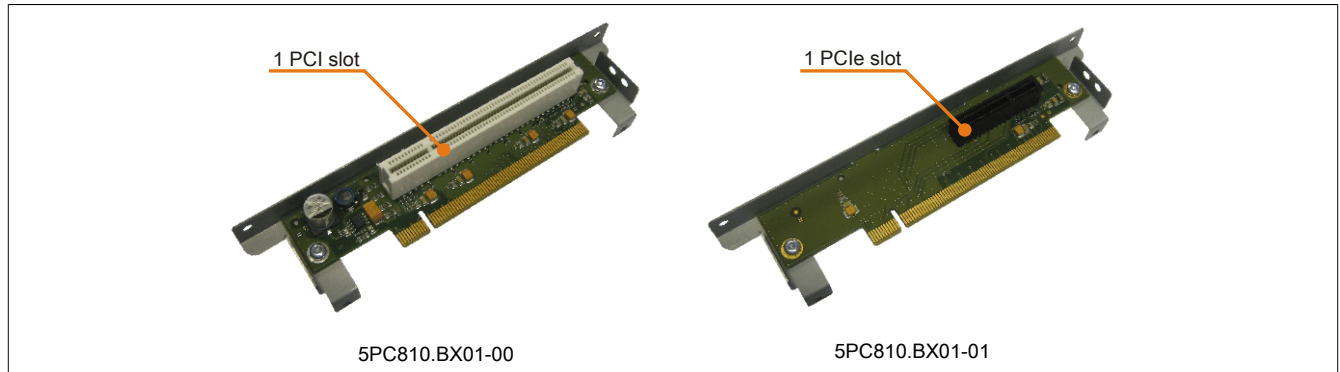


Figure 35: 1-slot bus units

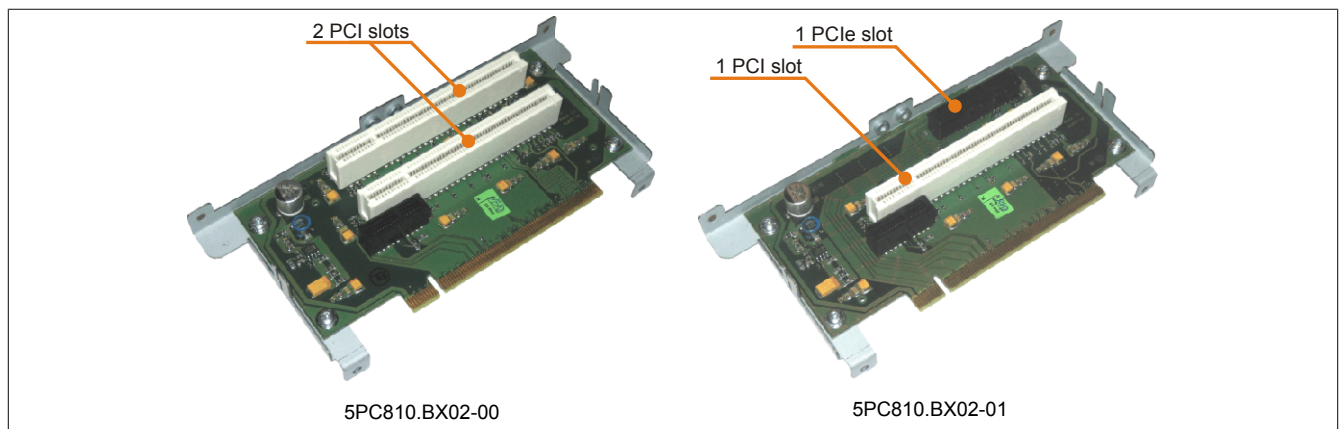


Figure 36: 2-slot bus units

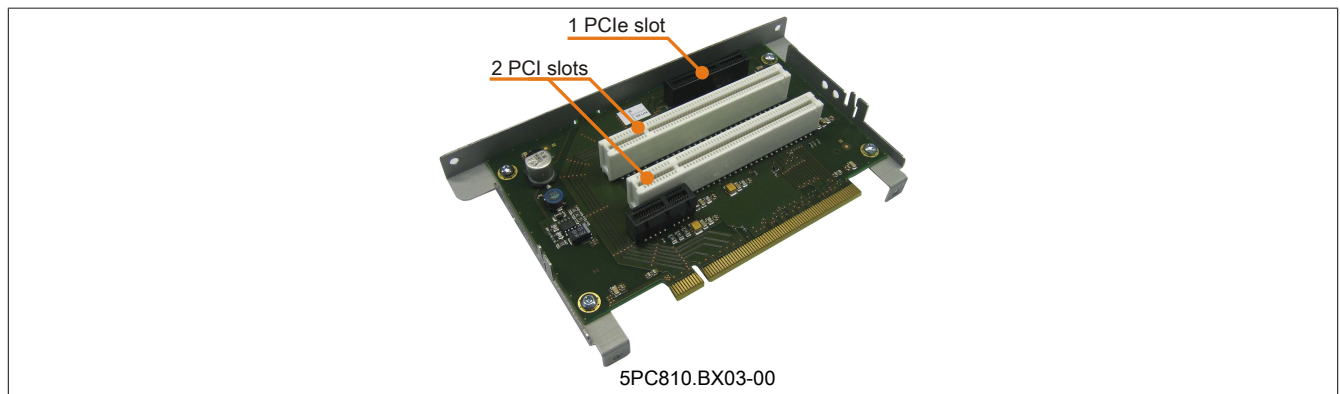


Figure 37: 3-slot bus units

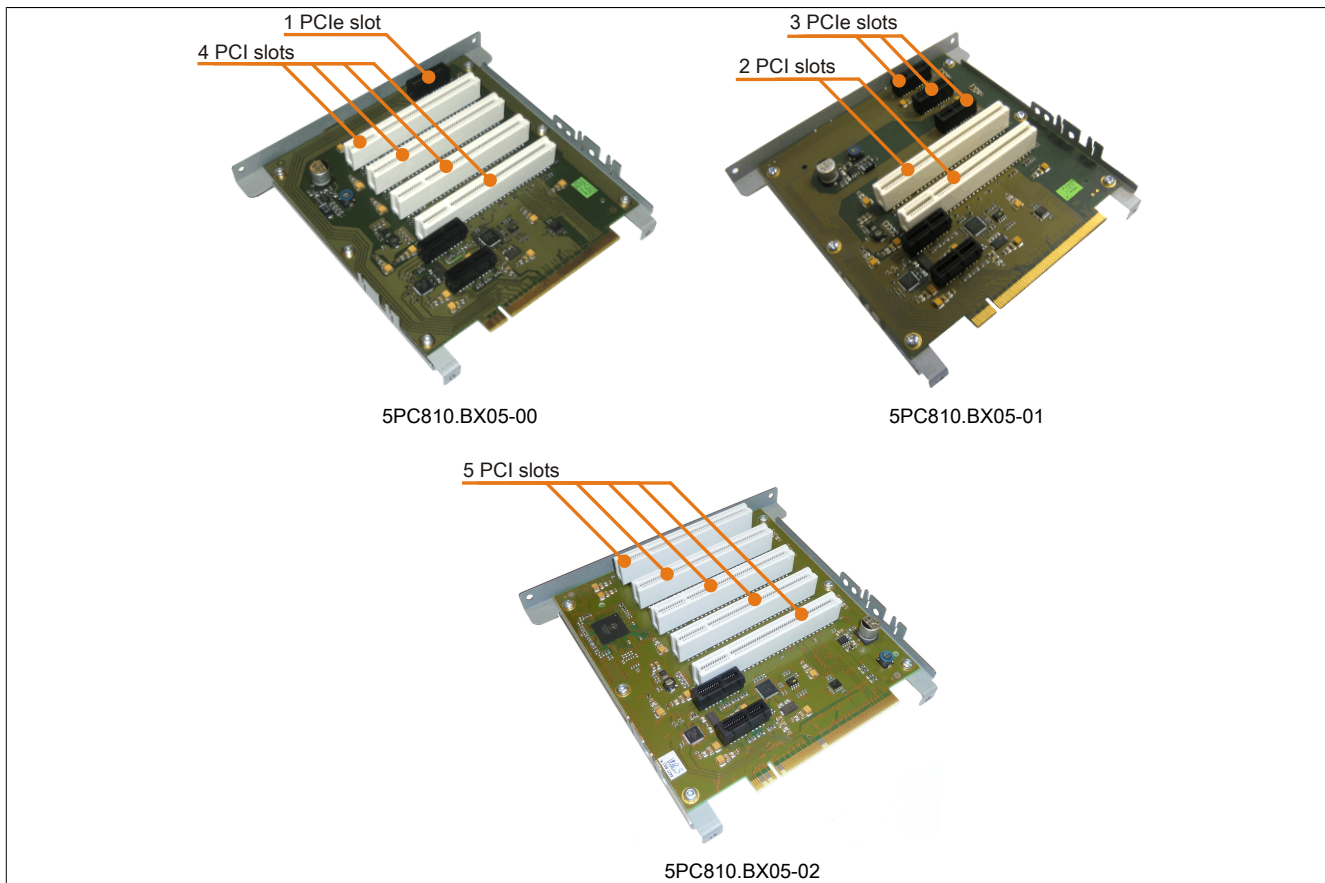


Figure 38: 5-slot bus units

3.2.2 Order data

| Model number | Short description | Figure |
|------------------|---------------------------------------|--------|
| Bus units | | |
| 5PC810.BX01-00 | APC810 bus, 1 PCI | |
| 5PC810.BX01-01 | APC810 bus, 1 PCI Express (x4) | |
| 5PC810.BX02-00 | APC810 bus, 2 PCI | |
| 5PC810.BX02-01 | APC810 bus, 1 PCI, 1 PCI Express (x4) | |
| 5PC810.BX03-00 | APC810 bus, 2 PCI, 1 PCI Express (x4) | |
| 5PC810.BX05-00 | APC810 bus, 4 PCI, 1 PCI Express (x1) | |
| 5PC810.BX05-01 | APC810 bus, 2 PCI, 3 PCI Express (x1) | |
| 5PC810.BX05-02 | APC810 bus, 5 PCI | |

Table 53: 5PC810.BX01-00, 5PC810.BX01-01, 5PC810.BX02-00, 5PC810.BX02-01, 5PC810.BX03-00, 5PC810.BX05-00, 5PC810.BX05-01, 5PC810.BX05-02 - Order data

3.2.3 Technical data

| Product ID | 5PC810.BX01-00 | 5PC810.BX01-01 | 5PC810.BX02-00 | 5PC810.BX02-01 | 5PC810.BX03-00 | 5PC810.BX05-00 | 5PC810.BX05-01 | 5PC810.BX05-02 |
|---------------------------------|-------------------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------|
| General information | | | | | | | | |
| Certification | Yes | | | | | | | |
| CE | Yes | - | Yes | - | - | - | - | - |
| cULus HazLoc Class 1 Division 2 | Yes | - | Yes | - | - | - | - | - |
| ATEX Zone 22 | Yes | - | Yes | - | - | - | - | - |
| GL | Yes | Yes | Yes | Yes | - | - | - | - |
| Inserts | | | | | | | | |
| PCI slots | 1 | - | 2 | 1 | 2 | 4 | 2 | 5 |
| Quantity | 32-bit | - | 32-bit | 32-bit | 32-bit | 32-bit | 32-bit | 32-bit |
| Type | PCI half-size | - | PCI half-size | PCI half-size | PCI half-size | PCI half-size | PCI half-size | PCI half-size |
| Design | 2.2 ¹⁾ | - | 2.2 ¹⁾ | 2.2 ¹⁾ | 2.2 ¹⁾ | 2.2 ¹⁾ | 2.2 ¹⁾ | 2.2 ¹⁾ |
| Standard | 33 MHz | - | 33 MHz | 33 MHz | 33 MHz | 33 MHz | 33 MHz | 33 MHz |
| Bus speed | - | - | - | - | - | - | - | Yes, slots 4 and 5 |
| PCI to PCI bridge | - | - | - | - | - | - | - | - |

Table 54: 5PC810.BX01-00, 5PC810.BX01-01, 5PC810.BX02-00, 5PC810.BX02-01, 5PC810.BX03-00, 5PC810.BX05-00, 5PC810.BX05-01, 5PC810.BX05-02 - Technical data

| Product ID | 5PC810. BX01-00 | 5PC810. BX01-01 | 5PC810. BX02-00 | 5PC810. BX02-01 | 5PC810. BX03-00 | 5PC810. BX05-00 | 5PC810. BX05-01 | 5PC810. BX05-02 |
|------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| PCIe slots | - | 1 | - | 1 | 1 | 1 | 3 | - |
| Quantity | - | 1 | - | 1 | 1 | 1 | 3 | - |
| Design | - | PCIe half-size | - | PCIe half-size | PCIe half-size | PCIe half-size | PCIe half-size | - |
| Standard | - | 1.0 a | - | 1.0 a | 1.0 a | 1.0 a | 1.0 a | - |
| Bus speed | - | x4 (10 GB/s) | - | x4 (10 GB/s) | x4 (10 GB/s) | x1 (2.5 GB/s) | x1 (2.5 GB/s) | - |

Table 54: 5PC810.BX01-00, 5PC810.BX01-01, 5PC810.BX02-00, 5PC810.BX02-01,
5PC810.BX03-00, 5PC810.BX05-00, 5PC810.BX05-01, 5PC810.BX05-02 - Technical data

- 1) Due to mechanical limitations, a 64-bit PCI card cannot be inserted in every system unit or card slot. A table in the user's manual provides an overview of the slots where 64-bit cards can be inserted.

3.3 945GME CPU boards

3.3.1 General information

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

3.3.2 Order data


| Model number | Short description | Figure |
|----------------|---|---|
| | CPU boards |  |
| 5PC800.B945-00 | Intel Core Duo L2400 CPU board, 1.66 GHz, dual core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111B Ethernet controller | |
| 5PC800.B945-01 | Intel Core2 Duo L7400 CPU board, 1.5 GHz, dual core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 4 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111B Ethernet controller | |
| 5PC800.B945-02 | Intel Core2 Duo U7500 CPU board, 1.06 GHz, dual core, 533 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111B Ethernet controller | |
| 5PC800.B945-03 | Intel Celeron M 423 CPU board, 1.06 GHz, single core, 533 MHz FSB, 1 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111B Ethernet controller | |
| 5PC800.B945-04 | Intel Core2 Duo T7400 CPU board, 2.16 GHz, dual core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 4 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111B Ethernet controller | |
| 5PC800.B945-05 | Intel Atom N270 CPU board, 1.6 GHz, single core, 533 MHz FSB, 512 kB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| | Required accessories | |
| | Main memory | |
| 5MMDR.0512-01 | SO-DIMM DDR2 RAM 512 MB PC2-5300 | |
| 5MMDR.1024-01 | SO-DIMM DDR2 RAM 1024 MB PC2-5300 | |
| 5MMDR.2048-01 | SO-DIMM DDR2 RAM 2048 MB PC2-5300 | |

Table 55: 5PC800.B945-00, 5PC800.B945-01, 5PC800.B945-02, 5PC800.B945-03, 5PC800.B945-04, 5PC800.B945-05 - Order data


| Model number | Short description | Figure |
|----------------|---|---|
| | CPU boards |  |
| 5PC800.B945-10 | Intel Core Duo L2400 CPU board, 1.66 GHz, dual core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| 5PC800.B945-11 | Intel Core2 Duo L7400 CPU board, 1.5 GHz, dual core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| 5PC800.B945-12 | Intel Core2 Duo U7500 CPU board, 1.06 GHz, dual core, 533 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| 5PC800.B945-13 | Intel Celeron M 423 CPU board, 1.06 GHz, single core, 533 MHz FSB, 1 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| 5PC800.B945-14 | Intel Core2 Duo T7400 CPU board, 2.16 GHz, dual core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| | Required accessories | |
| | Main memory | |
| 5MMDDR.0512-01 | SO-DIMM DDR2 RAM 512 MB PC2-5300 | |
| 5MMDDR.1024-01 | SO-DIMM DDR2 RAM 1024 MB PC2-5300 | |
| 5MMDDR.2048-01 | SO-DIMM DDR2 RAM 2048 MB PC2-5300 | |

Table 56: 5PC800.B945-10, 5PC800.B945-11, 5PC800.B945-12, 5PC800.B945-13, 5PC800.B945-14 - Order data

3.3.3 5PC800.B945-0x - Technical data

| Product ID | 5PC800.B945-00 | 5PC800.B945-01 | 5PC800.B945-02 | 5PC800.B945-03 | 5PC800.B945-04 | 5PC800.B945-05 |
|---|---|-------------------------|-------------------------|------------------------|-------------------------|-------------------|
| General information | | | | | | |
| Certification | Yes | | | | | |
| CE | - | - | - | - | - | Yes |
| cULus | - | - | - | - | - | Yes |
| GL | - | - | - | - | - | Yes |
| Controller | | | | | | |
| Boot loader | Embedded AMI BIOS | | | | | |
| Processor | | | | | | |
| Type | Intel® Core™ Duo L2400 | Intel® Core™2 Duo L7400 | Intel® Core™2 Duo U7500 | Intel® Celeron® M 423, | Intel® Core™2 Duo T7400 | Intel® Atom™ N270 |
| Clock frequency | 1660 MHz | 1500 MHz | 1060 MHz | 1060 MHz | 2160 MHz | 1660 MHz |
| Number of cores | 2 | 2 | 2 | 1 | 2 | 1 |
| Architectures | 65 nm | 65 nm | 65 nm | 65 nm | 65 nm | 45 nm |
| L1 cache | 32 kB | 32 kB | 32 kB | 32 kB | 32 kB | 24 kB |
| L2 cache | 2 MB | 4 MB | 2 MB | 1 MB | 4 MB | 512 kB |
| External bus | 667 MHz | 667 MHz | 533 MHz | 533 MHz | 667 MHz | 533 MHz |
| Intel® 64 Architecture | No | Yes | Yes | No | Yes | No |
| Intel® Virtualization Technology (VT-x) | Yes | Yes | Yes | No | Yes | No |
| Enhanced Intel SpeedStep® Technology | Yes | Yes | Yes | No | Yes | Yes |
| Chipset | Intel® 945GME Intel® 82801 GHM (ICH7M-DH) | | | | | |
| Real-time clock | | | | | | |
| Accuracy | At 25°C: typ. 12 ppm (1 seconds) per day | | | | | |
| Battery-buffered | Yes | | | | | |
| Memory socket | | | | | | |
| Type | DDR2 | | | | | |
| Size | Max. 3 GB | | | | | |
| Graphics | | | | | | |
| Controller | Intel® Graphics Media Accelerator 950 | | | | | |
| Memory | Up to 224 MB ¹⁾ | | | | | |
| Color depth | Max. 32-bit | | | | | |
| Resolution | | | | | | |
| DVI | 2x Intel-compliant SDVO ports, 1920 x 1080 | | | | | |
| RGB | 400 MHz RAMDAC, resolutions up to 2048 x 1536 @ 75 Hz (QXGA) and 1920 x 1080 @ 85 Hz (HDTV) | | | | | |
| Mass memory management | 2x SATA, 1x IDE | | | | | |
| Power management | ACPI 2.0, S3 Support (suspend to RAM) | | | | | |

Table 57: 5PC800.B945-00, 5PC800.B945-01, 5PC800.B945-02, 5PC800.B945-03, 5PC800.B945-04, 5PC800.B945-05 - Technical data

1) Allocated in main memory.

3.3.4 5PC800.B945-1x - Technical data

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

Table 58: 5PC800.B945-10, 5PC800.B945-11, 5PC800.B945-12, 5PC800.B945-13, 5PC800.B945-14 - Technical data

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

Table 58: 5PC800.B945-10, 5PC800.B945-11, 5PC800.B945-12, 5PC800.B945-13, 5PC800.B945-14 - Technical data

1) Allocated in main memory.

3.4 Heat sinks

3.4.1 Order data


| Model number | Short description | Figure |
|----------------|---|--|
| | Heat sinks |  |
| 5AC801.HS00-00 | APC810 heat sink for CPU boards with L2400, L7400, U7500 or Celeron M 423 dual-core processor | |
| 5AC801.HS00-01 | APC810 heat sink for CPU boards with T7400, T9400 or P8400 dual-core processor | |
| 5AC801.HS00-02 | APC810 heat sink for CPU board with Atom processor N270 | |
| | Required accessories | |
| | CPU boards | |
| 5PC800.B945-00 | Intel Core Duo L2400 CPU board, 1.66 GHz, dual core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111B Ethernet controller | |
| 5PC800.B945-01 | Intel Core2 Duo L7400 CPU board, 1.5 GHz, dual core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 4 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111B Ethernet controller | |
| 5PC800.B945-02 | Intel Core2 Duo U7500 CPU board, 1.06 GHz, dual core, 533 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111B Ethernet controller | |
| 5PC800.B945-03 | Intel Celeron M 423 CPU board, 1.06 GHz, single core, 533 MHz FSB, 1 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111B Ethernet controller | |
| 5PC800.B945-04 | Intel Core2 Duo T7400 CPU board, 2.16 GHz, dual core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 4 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111B Ethernet controller | |
| 5PC800.B945-05 | Intel Atom N270 CPU board, 1.6 GHz, single core, 533 MHz FSB, 512 kB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| 5PC800.B945-10 | Intel Core Duo L2400 CPU board, 1.66 GHz, dual core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| 5PC800.B945-11 | Intel Core2 Duo L7400 CPU board, 1.5 GHz, dual core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 4 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| 5PC800.B945-12 | Intel Core2 Duo U7500 CPU board, 1.06 GHz, dual core, 533 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| 5PC800.B945-13 | Intel Celeron M 423 CPU board, 1.06 GHz, single core, 533 MHz FSB, 1 MB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |
| 5PC800.B945-14 | Intel Core2 Duo T7400 CPU board, 2.16 GHz, dual core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 4 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | |

Table 59: 5AC801.HS00-00, 5AC801.HS00-01, 5AC801.HS00-02 - Order data

3.4.2 Technical data

| Product ID | 5AC801.HS00-00 | 5AC801.HS00-01 | 5AC801.HS00-02 |
|-----------------------------------|--|----------------------|----------------|
| General information | | | |
| Ideal for CPU boards | 5PC800.B945-00 = -10 5PC800.B945-01 = -11 5PC800.B945-02 = -12 5PC800.B945-03 = -13 | 5PC800.B945-04 = -14 | 5PC800.B945-05 |
| Certification | | | |
| CE | | Yes | |
| GL | - | - | Yes |
| cULus HazLoc Class 1 Division 2 | - | Yes | - |
| ATEX Zone 22 | - | Yes | - |
| Mechanical characteristics | | | |
| Materials | Aluminum, black-coated with copper heat pipes | | |

Table 60: 5AC801.HS00-00, 5AC801.HS00-01, 5AC801.HS00-02 - Technical data

| Product ID | 5AC801.HS00-00 | 5AC801.HS00-01 | 5AC801.HS00-02 |
|------------|----------------|----------------|----------------|
| Dimensions | | | |
| Width | 228.7 mm | | |
| Height | 218 mm | | |
| Depth | 12.8 mm | 28 mm | 12.8 mm |
| Weight | Approx. 1700 g | Approx. 2000 g | Approx. 1700 g |

Table 60: 5AC801.HS00-00, 5AC801.HS00-01, 5AC801.HS00-02 - Technical data

3.5 Main memory

3.5.1 General information

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

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

If two 2 GB modules are inserted, only 3 GB of main memory can be used.

3.5.2 Order data


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

Table 61: 5MMDDR.0512-01, 5MMDDR.1024-01, 5MMDDR.2048-01 - Order data

3.5.3 Technical data

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

Table 62: 5MMDDR.0512-01, 5MMDDR.1024-01, 5MMDDR.2048-01 - Technical data

Information:

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

3.6 Drives

3.6.1 5AC801.HDDI-00

3.6.1.1 General information

This 40 GB slide-in compact hard disk is specified for 24-hour operation, features an extended temperature range and can be used in APC810 and PPC800 system units.

When used in an APC810

When inserted in the slide-in compact slot, the slide-in compact drive is accessed internally via SATA.

3.6.1.2 Order data


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

Table 63: 5AC801.HDDI-00 - Order data

3.6.1.3 Technical data

Information:

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

| Product ID | 5AC801.HDDI-00 |
|----------------------------|--------------------------------------|
| General information | |
| Certification | |
| CE | Yes |
| cULus | Yes |
| GL | Yes |
| Hard disk drive | |
| Capacity | 40 GB |
| Number of heads | 1 |
| Number of sectors | 78,140,160 |
| Bytes per sector | 512 |
| Cache | 8 MB |
| Speed | 5400 rpm \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 | 5.6 ms |
| Data transfer rate | |
| Internal | Max. 450 Mbit/s |
| To/From host | Max. 150 MB/s (Ultra DMA mode 5) |
| Positioning time | |
| Minimum (track to track) | 1 ms |
| Nominal (read only) | 12.5 ms |
| Maximum (read only) | 23 ms |

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

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

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

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

3.6.1.4 Temperature humidity diagram

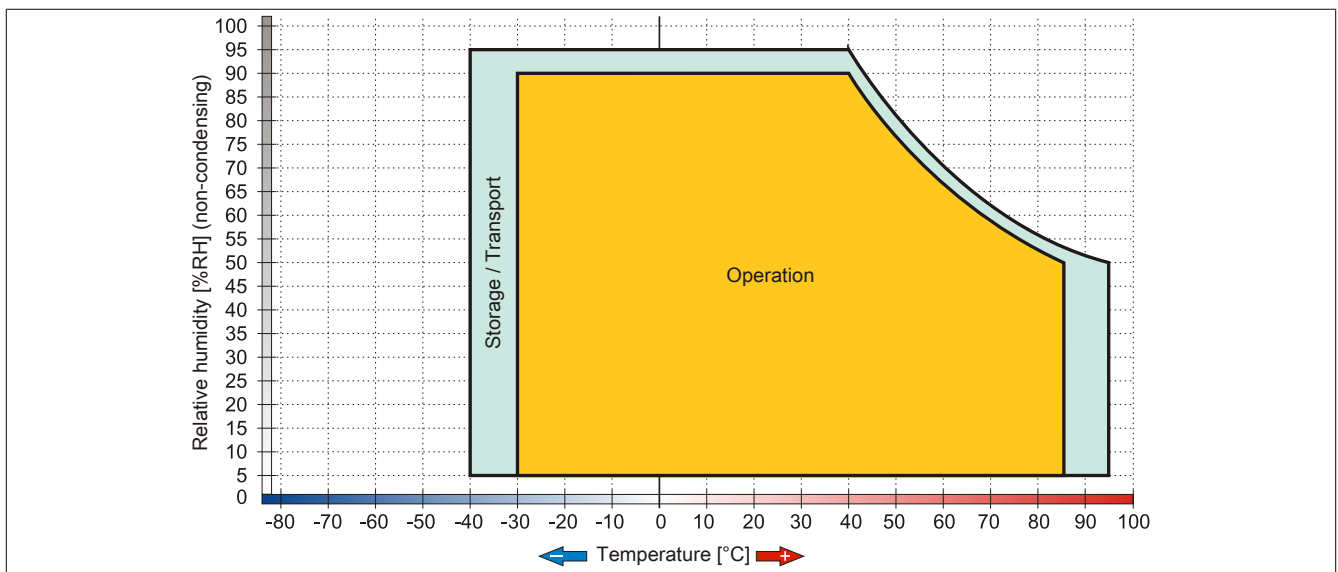


Figure 39: 5AC801.HDDI-00 - Temperature humidity diagram

3.6.2 5AC801.HDDI-01

3.6.2.1 General information

This 80 GB slide-in compact hard disk is specified for 24-hour operation, features an extended temperature range and can be used in APC810 and PPC800 system units.

When used in an APC810

When inserted in the slide-in compact slot, the slide-in compact drive is accessed internally via SATA.

3.6.2.2 Order data


| Model number | Short description | Figure |
|----------------|--|---|
| | Drives | |
| 5AC801.HDDI-01 | 80 GB slide-in compact SATA hard disk; 24/7 operation with extended temperature range. Note: Please see the manual for information about using this hard disk. |  |

Table 65: 5AC801.HDDI-01 - Order data

3.6.2.3 Technical data

| Product ID | 5AC801.HDDI-01 |
|---------------------------------|---|
| General information | |
| Certification | |
| CE | Yes |
| cULus | Yes |
| Hard disk drive | |
| Capacity | 80 GB |
| Number of heads | 2 |
| Number of sectors | 156,301,488 |
| 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 | 5.6 ms |
| Data transfer rate | |
| Internal | Max. 450 Mbit/s |
| To/From host | Max. 150 MB/s (Ultra DMA mode 5) |
| Positioning time | |
| Minimum (track to track) | 1 ms |
| Nominal (read only) | 12.5 ms |
| Maximum (read only) | 23 ms |
| Environmental conditions | |
| Temperature ²⁾ | |
| Operation ³⁾ | -30 to 85°C |
| 24-hour operation ⁴⁾ | -30 to 85°C |
| Storage | -40 to 95°C |
| Transport | -40 to 95°C |
| Relative humidity ⁵⁾ | |
| Operation | 5 to 90%, non-condensing |
| Storage | 5 to 95%, non-condensing |
| Transport | 5 to 95%, non-condensing |
| Vibration | |
| Operation | 5 to 500 Hz: 2 g; no unrecoverable errors |
| Storage | 5 to 500 Hz: 5 g; no unrecoverable errors |
| Transport | 5 to 500 Hz: 5 g; no unrecoverable errors |

Table 66: 5AC801.HDDI-01 - Technical data

| Product ID | 5AC801.HDDI-01 |
|----------------------------|---|
| Shock | |
| Operation | 300 g and 2 ms duration; no unrecoverable errors 150 g and 11 ms duration; no unrecoverable errors |
| Storage | 300 g and 2 ms duration; no unrecoverable errors 150 g and 11 ms duration; no unrecoverable errors |
| Transport | 300 g and 2 ms duration; no unrecoverable errors 150 g and 11 ms duration; no unrecoverable errors |
| Altitude | |
| Operation | -300 to 5000 m |
| Storage | -300 to 12192 m |
| Mechanical characteristics | |
| Installation | Fixed ⁶⁾ |
| Dimensions | |
| Width | 13 mm |
| Height | 98 mm |
| Depth | 105 mm |
| Weight | 133 g |
| Manufacturer information | |
| Manufacturer | Seagate |
| Manufacturer product ID | ST980817SM |

Table 66: 5AC801.HDDI-01 - Technical data

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

3.6.2.4 Temperature humidity diagram

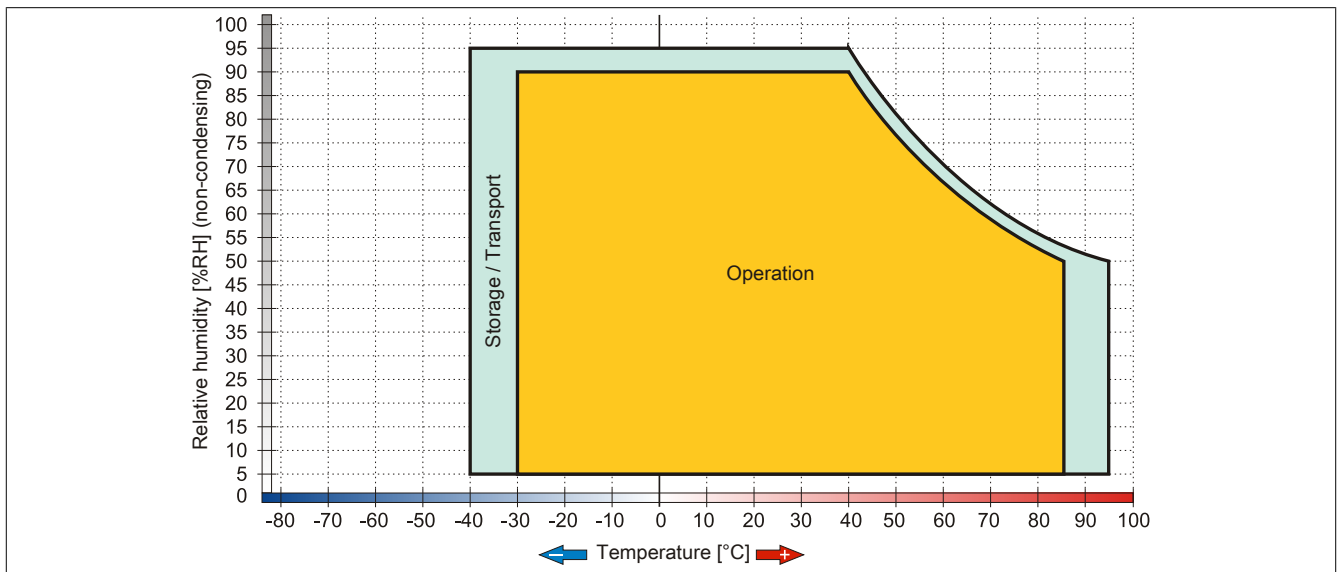


Figure 40: 5AC801.HDDI-01 - Temperature humidity diagram

3.6.3 5AC801.HDDI-02

3.6.3.1 General information

This 160 GB slide-in compact hard disk is specified for 24-hour operation, features an extended temperature range and can be used in APC810 and PPC800 system units.

When used in a APC810

When inserted in the slide-in compact slot, the slide-in compact drive is accessed internally via SATA.

3.6.3.2 Order data


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

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

3.6.3.3 Technical data

Information:

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

| Product ID | 5AC801.HDDI-02 |
|---------------------------------|--------------------------------------|
| General information | |
| Certification | |
| CE | Yes |
| GL | Yes |
| Hard disk drive | |
| Capacity | 160 GB |
| Number of heads | 3 |
| Number of sectors | 312,581,808 |
| Bytes per sector | 512 |
| Cache | 8 MB |
| Speed | 5400 rpm $\pm 1\%$ |
| 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 | |
| Minimum (track to track) | 1.5 ms |
| Nominal (read only) | 12 ms |
| Maximum (read only) | 22 ms |
| Environmental conditions | |
| Temperature ²⁾ | |
| Operation | -15 to 80°C |
| 24-hour operation ³⁾ | -15 to 80°C |
| Storage | -40 to 95°C |
| Transport | -40 to 95°C |

Table 68: 5AC801.HDDI-02 - Technical data

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

Table 68: 5AC801.HDDI-02 - Technical data

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

3.6.3.4 Temperature humidity diagram

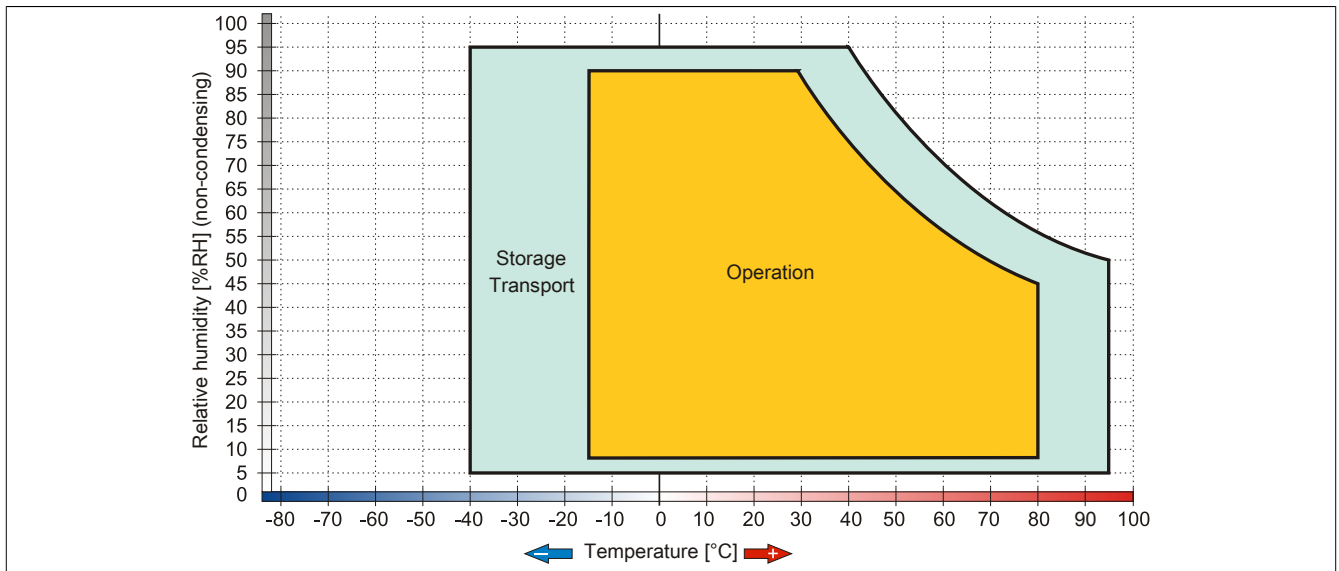


Figure 41: 5AC801.HDDI-02 - Temperature humidity diagram

3.6.4 5AC801.HDDI-03

3.6.4.1 General information

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

When used in an APC810

When inserted in the slide-in compact slot, the slide-in compact drive is accessed internally via SATA.

3.6.4.2 Order data


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

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

3.6.4.3 Technical data

Information:

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

| Product ID | 5AC801.HDDI-03 |
|---------------------------------|--|
| General information | |
| Certification | |
| CE | Yes |
| cULus | Yes |
| cULus HazLoc Class 1 Division 2 | Yes |
| ATEX Zone 22 | Yes |
| GL | Yes |
| Hard disk drive | |
| Capacity | 250 GB |
| Number of heads | 1 |
| Number of sectors | 488,397,168 |
| Bytes per sector | 512 |
| Cache | 8 MB |
| Speed | 5400 rpm $\pm 0.2\%$ |
| 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 mode 0-4, multiword DMA mode 0-2, UDMA mode 0-6 |
| Data transfer rate | |
| Internal | Max. 1175 Mbit/s |
| To/From host | Max. 150 MB/s (SATA I), max. 300 MB/s (SATA II) |
| Positioning time | |
| Minimum (track to track) | 1 ms |
| Nominal (read only) | 14 ms |
| Maximum (read only) | 30 ms |

Table 70: 5AC801.HDDI-03 - Technical data

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

Table 70: 5AC801.HDDI-03 - Technical data

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

3.6.4.4 Temperature humidity diagram

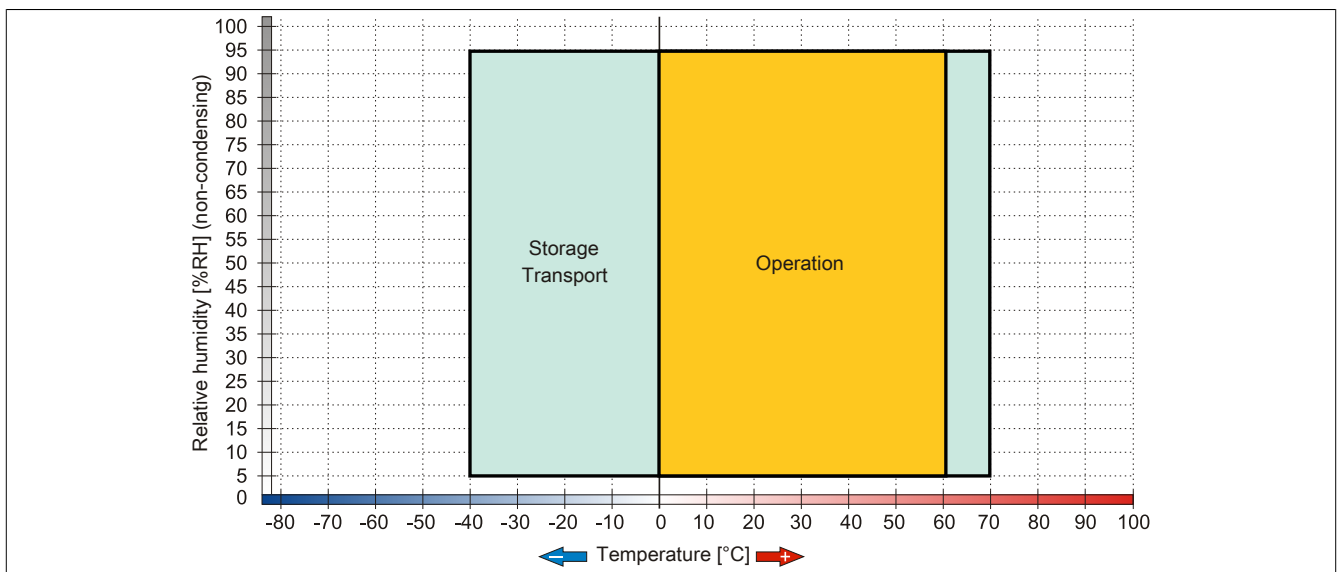


Figure 42: 5AC801.HDDI-03 - Temperature humidity diagram

3.6.5 5AC801.HDDI-04

3.6.5.1 General information

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

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

When used in an APC810

When inserted in the slide-in compact slot, the slide-in compact drive is accessed internally via SATA.

3.6.5.2 Order data


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

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

3.6.5.3 Technical data

Information:

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

| Product ID | 5AC801.HDDI-04 |
|---------------------------------|---|
| General information | |
| Certification | |
| CE | Yes |
| cULus | Yes |
| GL | Yes |
| Hard disk drive | |
| Capacity | 500 GB |
| Number of heads | 2 |
| Number of sectors | 976,773,168 |
| Bytes per sector | 512 (logical) / 4096 (physical) |
| Cache | 16 MB |
| Speed | 5400 rpm ±0.2% |
| Startup time | Typ. 3.5 s (from 0 rpm to read access) |
| Service life | 5 years |
| MTBF | 1,000,000 POH ¹⁾ |
| S.M.A.R.T. support | Yes |
| Interface | SATA |
| Access time | 5.5 ms |
| Supported transfer modes | SATA II |
| Data transfer rate | |
| Internal | Max. 147 MB/s |
| To/From host | Max. 150 MB/s (SATA I), max. 300 MB/s (SATA II) |
| Positioning time | |
| Nominal (read only) | 11 ms |
| Maximum (read only) | 21 ms |
| Environmental conditions | |
| Temperature ²⁾ | |
| Operation ³⁾ | 0 to 60°C |
| 24-hour operation ⁴⁾ | 0 to 60°C |
| Storage | -40 to 70°C |
| Transport | -40 to 70°C |

Table 72: 5AC801.HDDI-04 - Technical data

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

Table 72: 5AC801.HDDI-04 - Technical data

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

3.6.5.4 Temperature humidity diagram

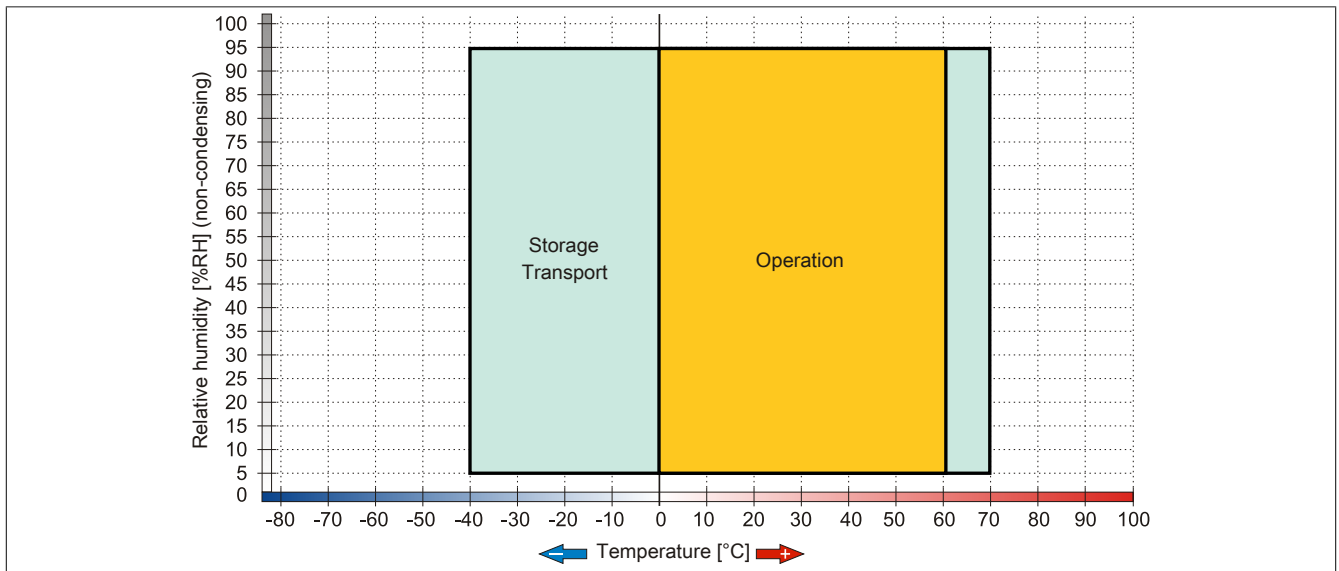


Figure 43: 5AC801.HDDI-04 - Temperature humidity diagram

3.6.6 5AC801.SSDI-00

3.6.6.1 General information

This 32 GB slide-in compact SSD (solid-state drive) is based on single-level cell (SLC) technology and can be used in APC810 and PPC800 system units.

When used in an APC810

Information:

The slide-in compact SSD cannot be used with the 5AC801.ADAS-00 adapter in slide-in slot 2 of the 5-slot variant of the APC810.

When inserted in the slide-in compact slot, the slide-in compact drive is accessed internally via SATA.

3.6.6.2 Order data


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

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

3.6.6.3 Technical data

Caution!

A sudden loss of power may result in data loss! In very rare cases, the mass storage device may also become damaged.

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

Information:

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

| Product ID | 5AC801.SSDI-00 |
|----------------------------|--|
| General information | |
| Certification | |
| CE | Yes |
| cULus | Yes |
| GL | Yes |
| Solid state drive | |
| Capacity | 32 GB |
| Data reliability | <1 unrecoverable error in 10 ¹⁵ bit read accesses |
| MTBF | 2,000,000 hours |
| Power on/off cycles | 50,000 |
| S.M.A.R.T. support | Yes |
| Interface | SATA |
| Maintenance | None |
| Continuous reading | Max. 250 MB/s |
| Continuous writing | Max. 170 MB/s |

Table 74: 5AC801.SSDI-00 - Technical data

| Product ID | 5AC801.SSDI-00 |
|-------------------------------|--|
| IOPS ¹⁾ | |
| 4k read | 35,000 |
| 4k write | 3,300 |
| Endurance | |
| Guaranteed data volume | |
| Guaranteed | 700 TB |
| Results for 5 years | 350 GB/day |
| SLC flash | Yes |
| Wear leveling | Static |
| Error correction coding (ECC) | Yes |
| Compatibility | SATA revision 2.6 compliant, compatible with SATA 1.5 Gbit/s and 3 Gbit/s interface rates ATA/ATAPI-7 SSD Enhanced SMART ATA feature set Native Command Queuing (NCQ) |
| Environmental conditions | |
| Temperature | |
| Operation | 0 to 70°C |
| Storage | -55 to 95°C |
| Transport | -55 to 95°C |
| Relative humidity | |
| Operation | 5 to 95%, non-condensing |
| Storage | 5 to 95%, non-condensing |
| Transport | 5 to 95%, non-condensing |
| Vibration | |
| Operation | 7 to 800 Hz: 2.17 g |
| Storage | 10 to 500 Hz: 3.13 g |
| Transport | 10 to 500 Hz: 3.13 g |
| Shock | |
| Operation | 1000 g, 0.5 ms |
| Storage | 1000 g, 0.5 ms |
| Transport | 1000 g, 0.5 ms |
| Altitude | |
| Operation | -300 to 12192 m |
| Storage | -300 to 12192 m |
| Transport | -300 to 12192 m |
| Mechanical characteristics | |
| Installation | Fixed ²⁾ |
| Dimensions | |
| Width | 13 mm |
| Height | 98 mm |
| Depth | 105 mm |
| Weight | 118 g |
| Manufacturer information | |
| Manufacturer | Intel |
| Manufacturer product ID | SSDSA2SH032G1 |

Table 74: 5AC801.SSDI-00 - Technical data

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

3.6.6.4 Temperature humidity diagram

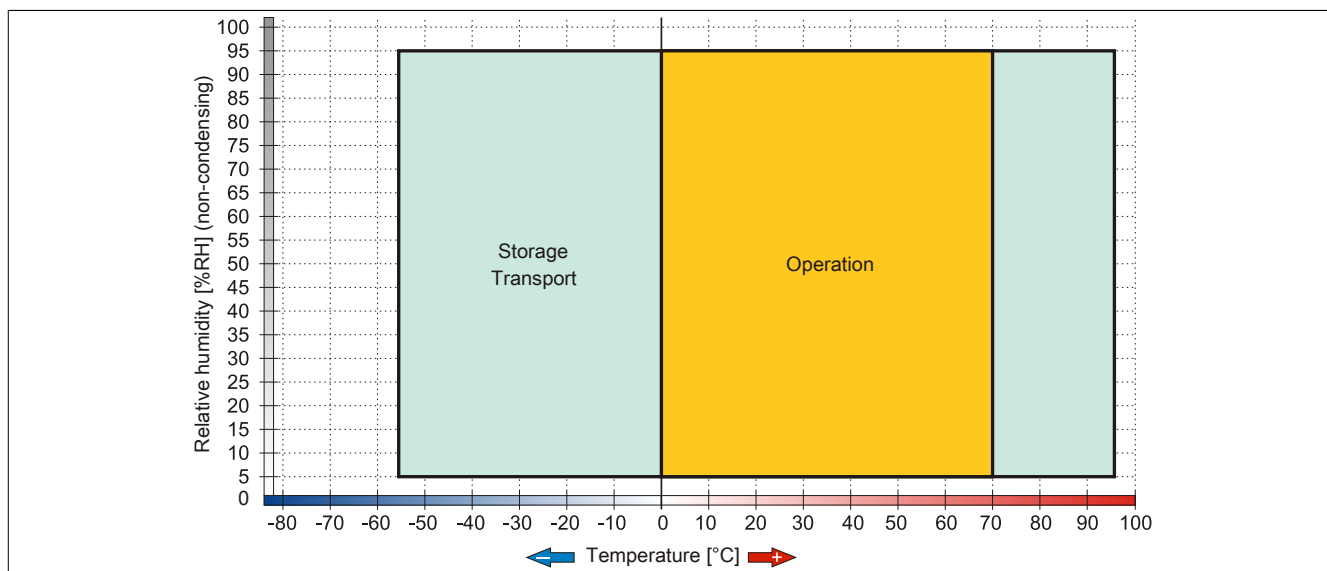


Figure 44: 5AC801.SSDI-00 - Temperature humidity diagram

3.6.6.5 Benchmark

The following two benchmarks show a comparison of the Intel solid-state drive (5AC801.SSDI-00) and the Seagate hard disk (5AC801.HDDI-00) for cyclic reading and writing.

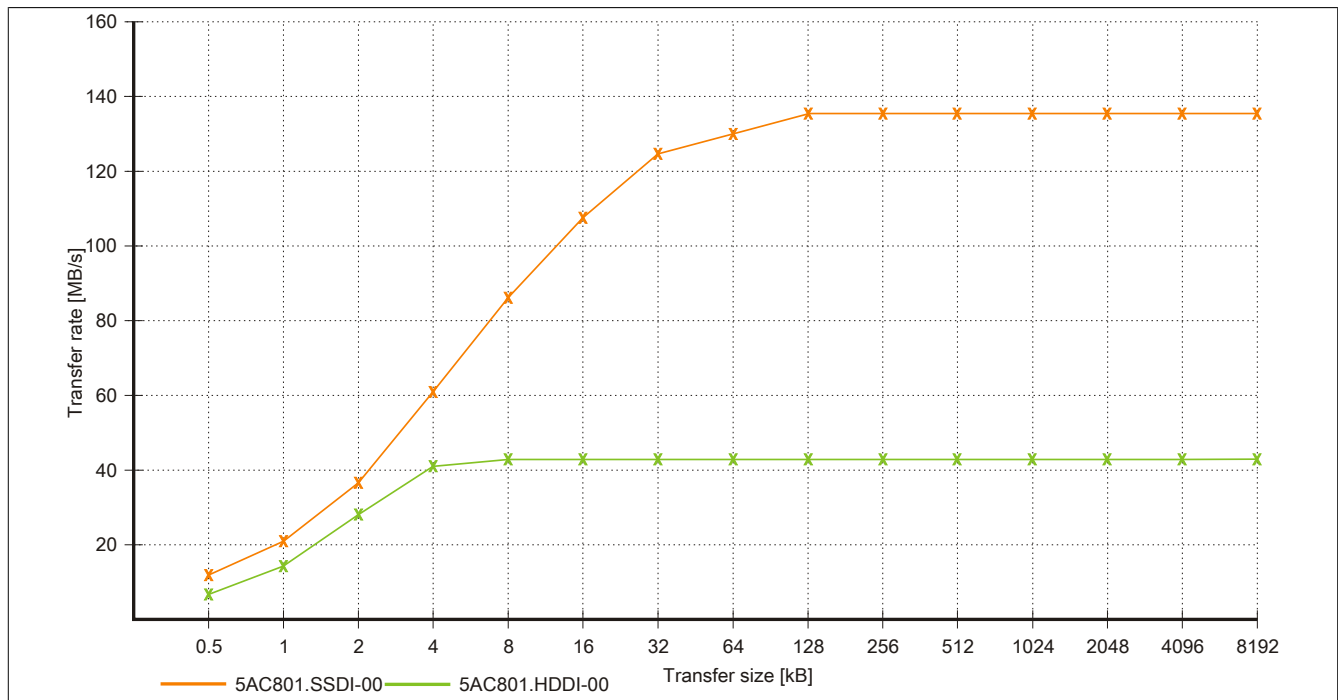


Figure 45: 5AC801.SSDI-00 - ATTO disk benchmark v2.34 - Cyclic read

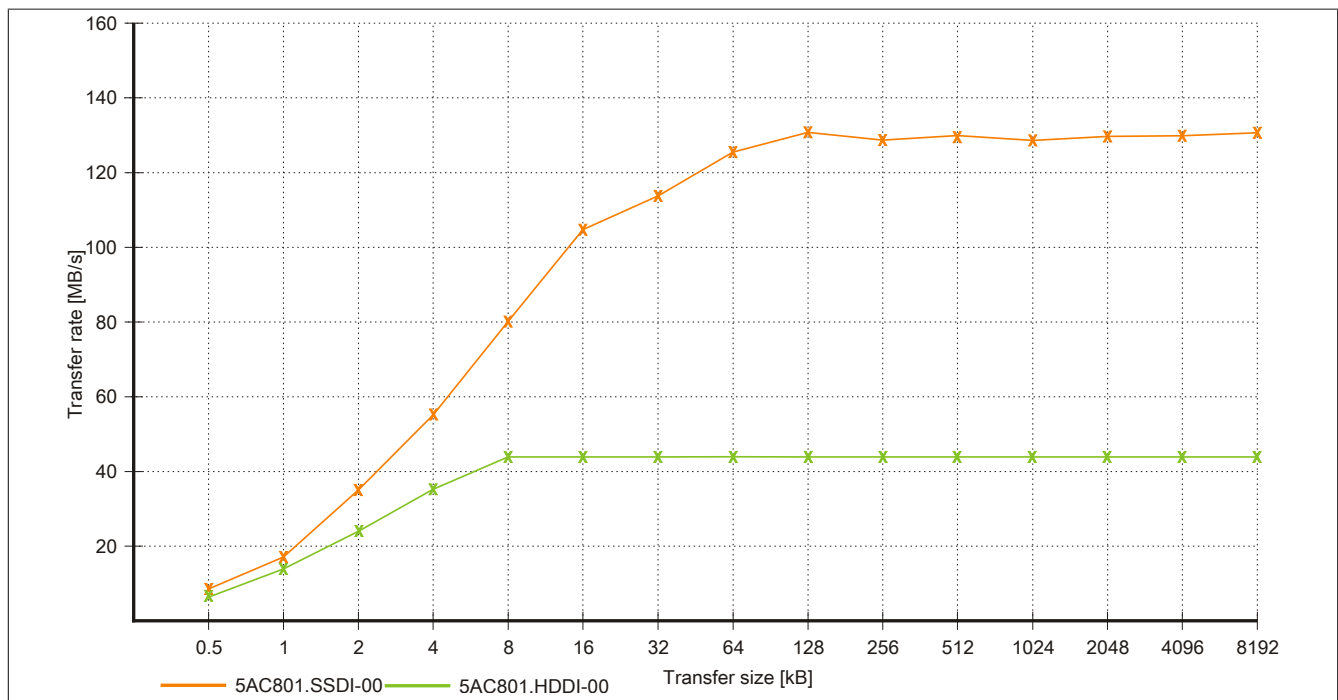


Figure 46: 5AC801.SSDI-00 - ATTO disk benchmark v2.34 - Cyclic write

3.6.7 5AC801.SSDI-01

3.6.7.1 General information

This 60 GB slide-in compact SSD (solid-state drive) is based on multi-level cell (MLC) technology and can be used in APC810 and PPC800 system units.

When used in an APC810

Information:

The slide-in compact SSD cannot be used with the 5AC801.ADAS-00 adapter in slide-in slot 2 of the 5-slot variant of the APC810.

When inserted in the slide-in compact slot, the slide-in compact drive is accessed internally via SATA.

3.6.7.2 Order data


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

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

3.6.7.3 Technical data

Caution!

A sudden loss of power may result in data loss! In very rare cases, the mass storage device may also become damaged.

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

Information:

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

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

Table 76: 5AC801.SSDI-01 - Technical data

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

Table 76: 5AC801.SSDI-01 - Technical data

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

3.6.7.4 Temperature humidity diagram

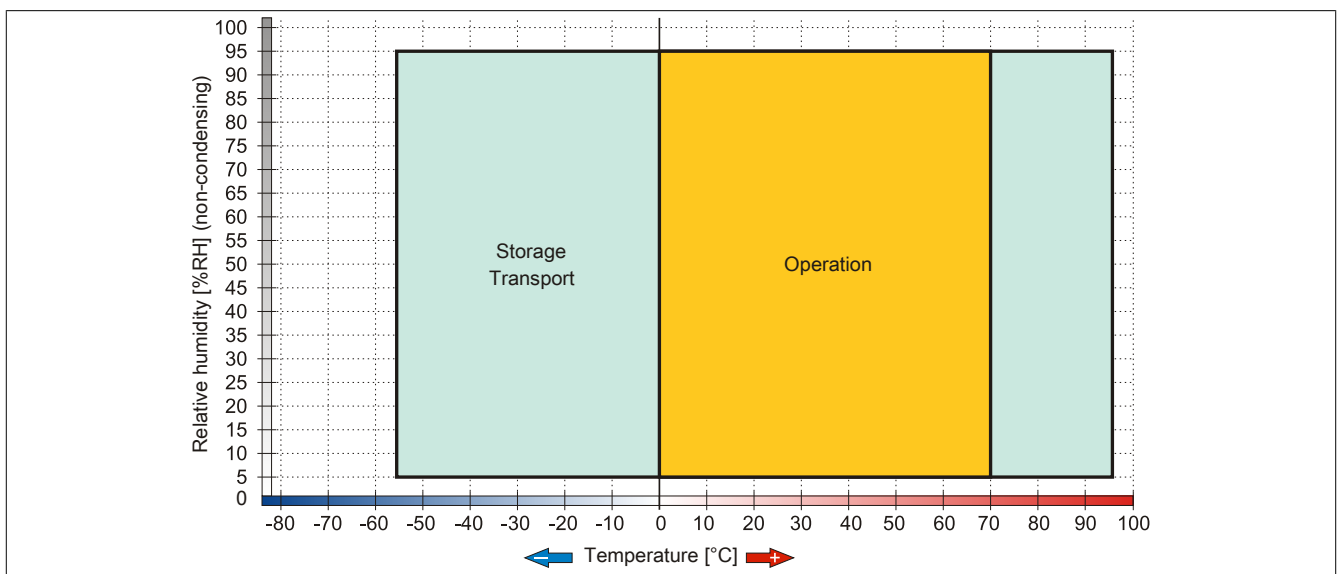


Figure 47: 5AC801.SSDI-01 - Temperature humidity diagram

3.6.8 5AC801.SSDI-02

3.6.8.1 General information

This 180 GB slide-in compact SSD (solid-state drive) is based on multi-level cell (MLC) technology and can be used in APC810 and PPC800 system units.

When used in an APC810

Information:

The slide-in compact SSD cannot be used with the 5AC801.ADAS-00 adapter in slide-in slot 2 of the 5-slot variant of the APC810.

When inserted in the slide-in compact slot, the slide-in compact drive is accessed internally via SATA.

3.6.8.2 Order data


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

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

3.6.8.3 Technical data

Caution!

A sudden loss of power may result in data loss! In very rare cases, the mass storage device may also become damaged.

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

Information:

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

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

Table 78: 5AC801.SSDI-02 - Technical data

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

Table 78: 5AC801.SSDI-02 - Technical data

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

3.6.8.4 Temperature humidity diagram

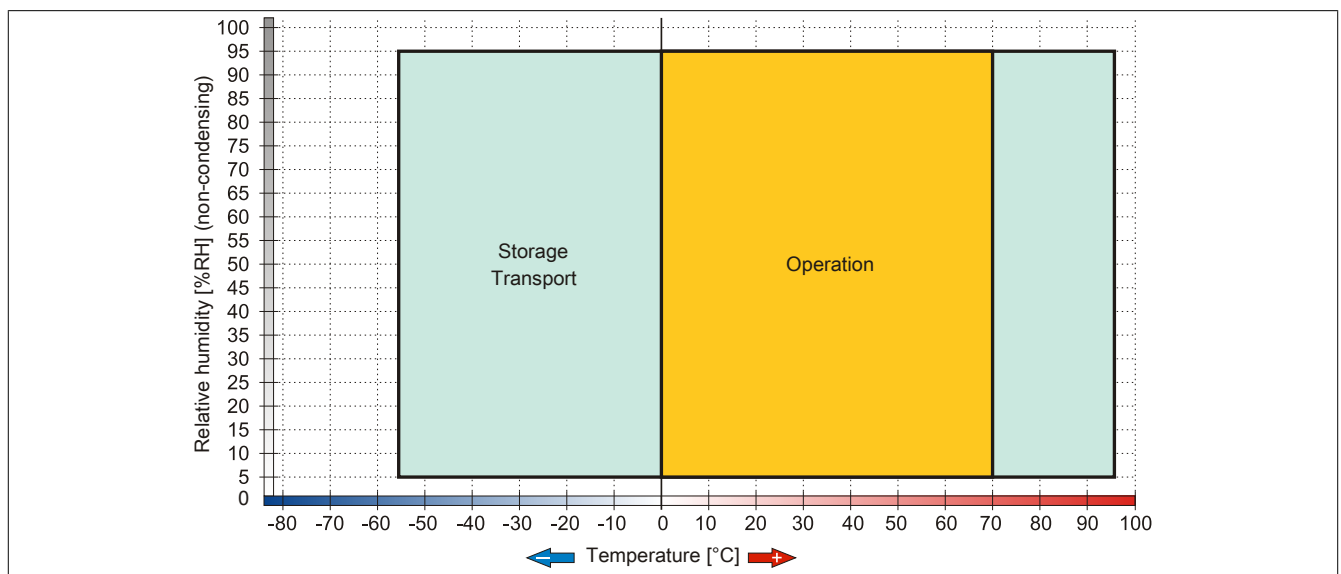


Figure 48: 5AC801.SSDI-02 - Temperature humidity diagram

3.6.9 5AC801.SSDI-03

3.6.9.1 General information

This 60 GB slide-in compact SSD (solid-state drive) is based on multi-level cell (MLC) technology and can be used in APC810 and PPC800 system units.

When used in an APC810

Information:

The slide-in compact SSD cannot be used with the 5AC801.ADAS-00 adapter in slide-in slot 2 of the 5-slot variant of the APC810.

When inserted in the slide-in compact slot, the slide-in compact drive is accessed internally via SATA.

3.6.9.2 Order data


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

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

3.6.9.3 Technical data

Caution!

A sudden loss of power may result in data loss! In very rare cases, the mass storage device may also become damaged.

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

Information:

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

| Product ID | 5AC801.SSDI-03 |
|----------------------------|---|
| General information | |
| Certification | |
| CE | Yes |
| cULus | Yes |
| GL | Yes |
| Solid state drive | |
| Capacity | 60 GB |
| Data reliability | <1 unrecoverable error in 10 ¹⁵ bit read accesses |
| MTBF | 1,500,000 hours |
| S.M.A.R.T. support | Yes |
| Interface | SATA |
| Maintenance | None |
| Continuous reading | Max. 510 MB/s |
| Continuous writing | Max. 430 MB/s |
| IOPS ¹⁾ | |
| 4k read | Max. 60,000 (random) |
| 4k write | Max. 25,000 (random) |
| Endurance | |
| MLC flash | Yes |
| Compatibility | SATA 3.0 compliant ACS-2 SSD Enhanced SMART ATA feature set Native Command Queuing (NCQ) |

Table 80: 5AC801.SSDI-03 - Technical data

| Product ID | 5AC801.SSDI-03 |
|----------------------------|--------------------------|
| Environmental conditions | |
| Temperature | |
| Operation | 0 to 70°C |
| Storage | -40 to 95°C |
| Transport | -40 to 95°C |
| Relative humidity | |
| Operation | 8 to 95%, non-condensing |
| Storage | 8 to 95%, non-condensing |
| Transport | 8 to 95%, non-condensing |
| Vibration | |
| Operation | 10 to 2000 Hz: 20 g |
| Storage | 10 to 2000 Hz: 20 g |
| Transport | 10 to 2000 Hz: 20 g |
| Shock | |
| Operation | 1500 g, 0.5 ms |
| Storage | 1500 g, 0.5 ms |
| Transport | 1500 g, 0.5 ms |
| Altitude | |
| Operation | -300 to 12192 m |
| Storage | -300 to 12192 m |
| Transport | -300 to 12192 m |
| Mechanical characteristics | |
| Installation | Fixed ²⁾ |
| Dimensions | |
| Width | 13 mm |
| Height | 98 mm |
| Depth | 105 mm |
| Weight | 118 g |
| Manufacturer information | |
| Manufacturer | Toshiba |
| Manufacturer product ID | THNSNH060GBST |

Table 80: 5AC801.SSDI-03 - Technical data

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

3.6.9.4 Temperature humidity diagram

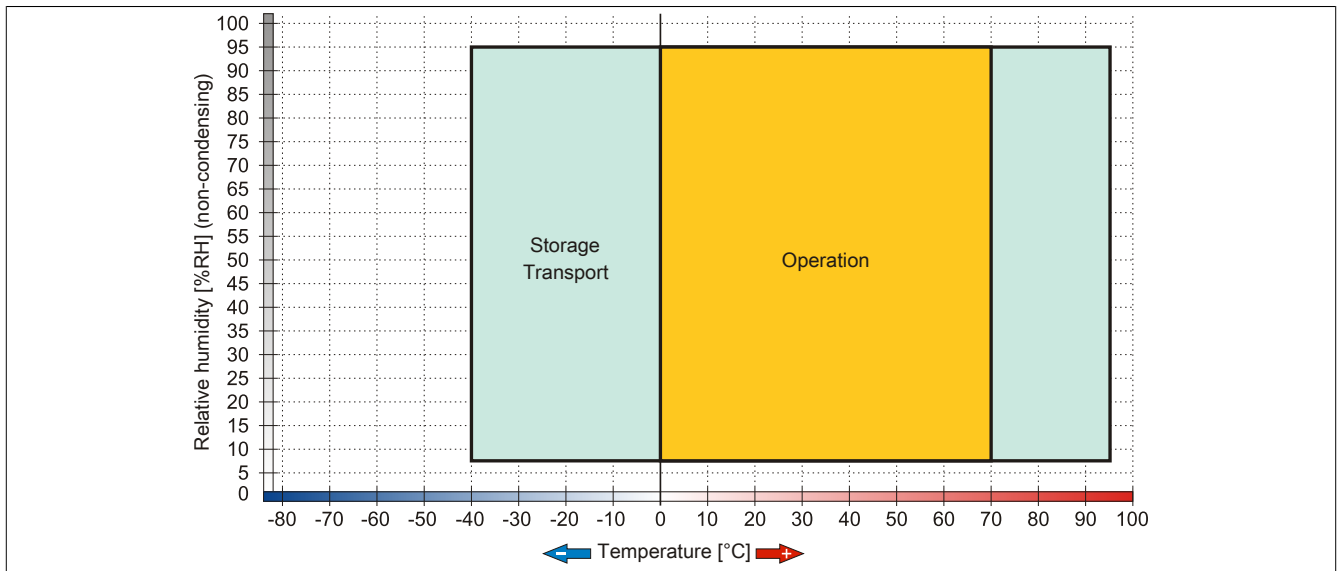


Figure 49: 5AC801.SSDI-03 - Temperature humidity diagram

3.6.10 5AC801.SSDI-04

3.6.10.1 General information

This 128 GB slide-in compact SSD (solid-state drive) is based on multi-level cell (MLC) technology and can be used in APC810 and PPC800 system units.

When used in an APC810

Information:

The slide-in compact SSD cannot be used with the 5AC801.ADAS-00 adapter in slide-in slot 2 of the 5-slot variant of the APC810.

When inserted in the slide-in compact slot, the slide-in compact drive is accessed internally via SATA.

3.6.10.2 Order data


| Model number | Short description | Figure |
|----------------|--|--|
| | Drives |  |
| 5AC801.SSDI-04 | 128 GB SATA SSD (MLC), slide-in compact | |
| | Optional accessories | |
| | Drives | |
| 5MMSSD.0128-01 | 128 GB SATA SSD (MLC); replacement for 5AC801.SSDI-04 and 5AC901.CSSD-04; SSD for 5PP5IO.GMAC-00; note: please see the manual for information about using this SSD | |

Table 81: 5AC801.SSDI-04 - Order data

3.6.10.3 Technical data

Caution!

A sudden loss of power may result in data loss! In very rare cases, the mass storage device may also become damaged.

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

Information:

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

| Product ID | 5AC801.SSDI-04 |
|----------------------------|--|
| General information | |
| Certification | |
| CE | Yes |
| cULus | Yes |
| GL | Yes |
| Solid state drive | |
| Capacity | 128 GB |
| Data reliability | <1 unrecoverable error in 10 ¹⁵ bit read accesses |
| MTBF | 1,500,000 hours |
| S.M.A.R.T. support | Yes |
| Interface | SATA |
| Maintenance | None |
| Continuous reading | Max. 510 MB/s |
| Continuous writing | Max. 450 MB/s |
| IOPS ¹⁾ | |
| 4k read | Max. 80,000 (random) |
| 4k write | Max. 35,000 (random) |

Table 82: 5AC801.SSDI-04 - Technical data

| | |
|-----------------------------------|---|
| Product ID | 5AC801.SSDI-04 |
| Endurance | |
| MLC flash | Yes |
| Compatibility | SATA 3.0 compliant ACS-2 SSD Enhanced SMART ATA feature set Native Command Queuing (NCQ) |
| Environmental conditions | |
| Temperature | |
| Operation | 0 to 70°C |
| Storage | -40 to 95°C |
| Transport | -40 to 95°C |
| Relative humidity | |
| Operation | 8 to 95%, non-condensing |
| Storage | 8 to 95%, non-condensing |
| Transport | 8 to 95%, non-condensing |
| Vibration | |
| Operation | 10 to 2000 Hz: 20 g |
| Storage | 10 to 2000 Hz: 20 g |
| Transport | 10 to 2000 Hz: 20 g |
| Shock | |
| Operation | 1500 g, 0.5 ms |
| Storage | 1500 g, 0.5 ms |
| Transport | 1500 g, 0.5 ms |
| Altitude | |
| Operation | -300 to 12192 m |
| Storage | -300 to 12192 m |
| Transport | -300 to 12192 m |
| Mechanical characteristics | |
| Installation | Fixed ²⁾ |
| Dimensions | |
| Width | 13 mm |
| Height | 98 mm |
| Depth | 105 mm |
| Weight | 118 g |
| Manufacturer information | |
| Manufacturer | Toshiba |
| Manufacturer product ID | THNSNH128GBST |

Table 82: 5AC801.SSDI-04 - Technical data

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

3.6.10.4 Temperature humidity diagram

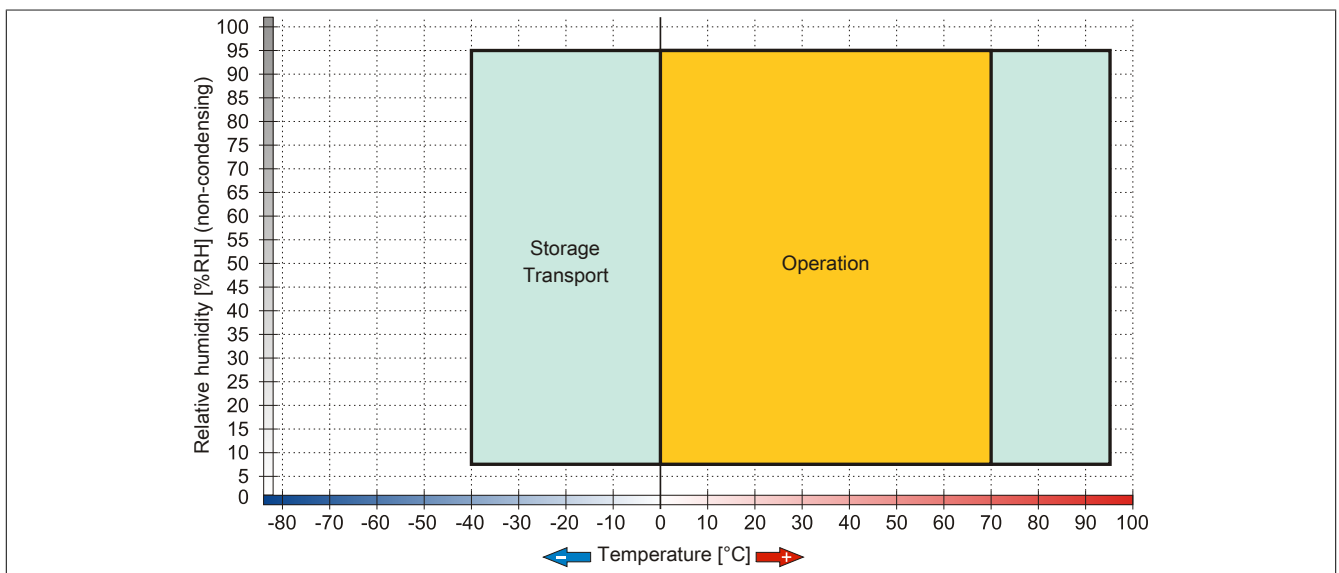


Figure 50: 5AC801.SSDI-04 - Temperature humidity diagram

3.6.11 5MMSSD.0060-00

3.6.11.1 General information

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

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

3.6.11.2 Order data


| Model number | Short description | Figure |
|----------------|---|---|
| | Drives | |
| 5MMSSD.0060-00 | 60 GB SATA SSD (MLC); replacement for 5AC801.SSDI-01 and 5AC901.CSSD-01; SSD for 5PP510.GMAC-00; note: please see the manual for information about using this SSD |  |

Table 83: 5MMSSD.0060-00 - Order data

3.6.11.3 Technical data

Caution!

A sudden loss of power may result in data loss! In very rare cases, the mass storage device may also become damaged.

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

Information:

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

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

Table 84: 5MMSSD.0060-00 - Technical data

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

Table 84: 5MMSSD.0060-00 - Technical data

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

3.6.11.4 Temperature humidity diagram

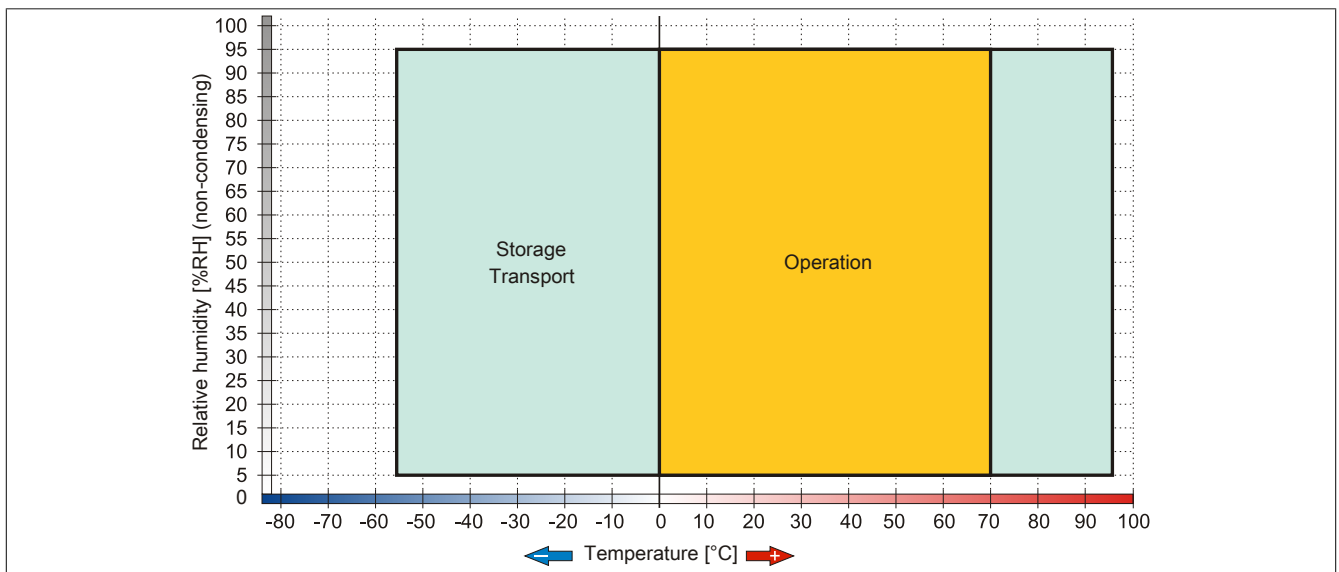


Figure 51: 5MMSSD.0060-00 - Temperature humidity diagram

3.6.12 5MMSSD.0060-01

3.6.12.1 General information

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

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

3.6.12.2 Order data


| Model number | Short description | Figure |
|----------------|---|---|
| | Drives | |
| 5MMSSD.0060-01 | 60 GB SATA SSD (MLC); replacement for 5AC801.SSDI-03 and 5AC901.CSSD-03; SSD for 5PP510.GMAC-00; note: please see the manual for information about using this SSD |  |

Table 85: 5MMSSD.0060-01 - Order data

3.6.12.3 Technical data

Caution!

A sudden loss of power may result in data loss! In very rare cases, the mass storage device may also become damaged.

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

Information:

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

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

Table 86: 5MMSSD.0060-01 - Technical data

| Product ID | 5MMSSD.0060-01 |
|-----------------------------------|---------------------|
| Vibration | |
| Operation | 10 to 2000 Hz: 20 g |
| Storage | 10 to 2000 Hz: 20 g |
| Transport | 10 to 2000 Hz: 20 g |
| Shock | |
| Operation | 1500 g, 0.5 ms |
| Storage | 1500 g, 0.5 ms |
| Transport | 1500 g, 0.5 ms |
| Altitude | |
| Operation | -300 to 12192 m |
| Storage | -300 to 12192 m |
| Transport | -300 to 12192 m |
| Mechanical characteristics | |
| Dimensions | |
| Width | 9.5 mm |
| Height | 69 mm |
| Depth | 100 mm |
| Weight | 78 g |
| Manufacturer information | |
| Manufacturer | Toshiba |
| Manufacturer product ID | THNSNH060GBST |

Table 86: 5MMSSD.0060-01 - Technical data

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

3.6.12.4 Temperature humidity diagram

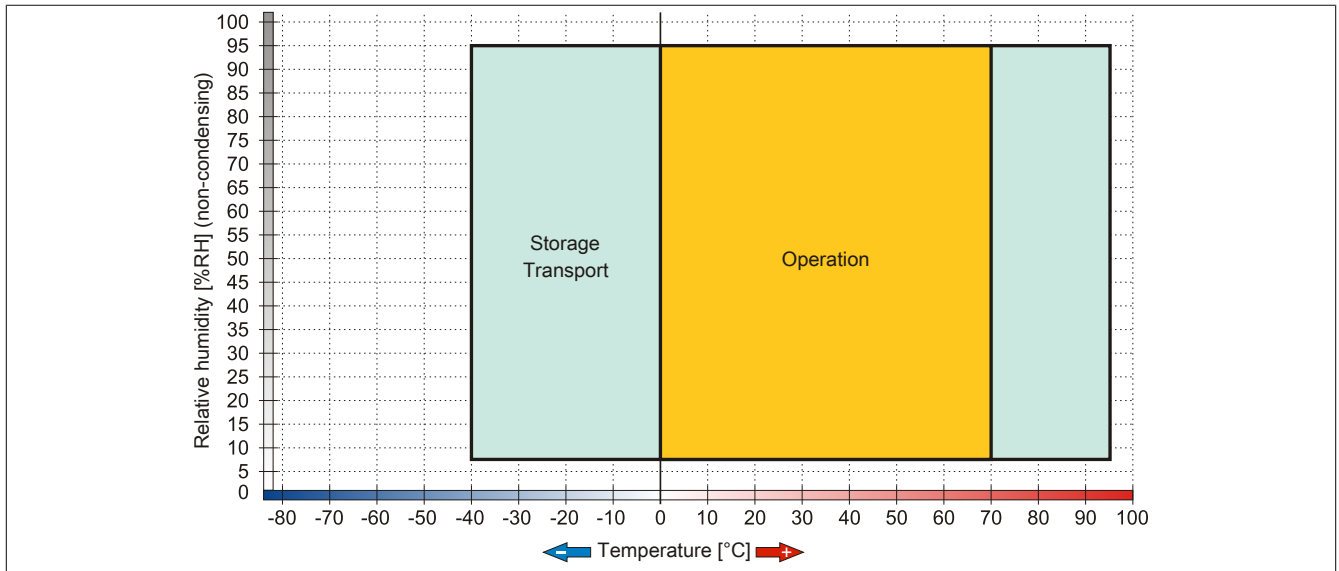


Figure 52: 5MMSSD.0060-01 - Temperature humidity diagram

3.6.13 5MMSSD.0128-01

3.6.13.1 General information

This 128 GB slide-in compact SSD (solid-state drive) is based on multi-level cell (MLC) technology and can be used as a replacement or accessory part.

- Replacement for 5AC801.SSDI-04 or 5AC901.CSSD-04 SSD drives
- Accessory for the APC510 (optional SSD for I/O board)

3.6.13.2 Order data


| Model number | Short description | Figure |
|----------------|--|---|
| | Drives | |
| 5MMSSD.0128-01 | 128 GB SATA SSD (MLC); replacement for 5AC801.SSDI-04 and 5AC901.CSSD-04; SSD for 5PP5IO.GMAC-00; note: please see the manual for information about using this SSD |  |

Table 87: 5MMSSD.0128-01 - Order data

3.6.13.3 Technical data

Caution!

A sudden loss of power may result in data loss! In very rare cases, the mass storage device may also become damaged.

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

Information:

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

| | |
|---------------------------------|---|
| Product ID | 5MMSSD.0128-01 |
| General information | |
| Certification | |
| CE | Yes |
| cULus | Yes |
| Solid state drive | |
| Capacity | 128 GB |
| Data reliability | <1 unrecoverable error in 10 ¹⁵ bit read accesses |
| MTBF | 1,500,000 hours |
| S.M.A.R.T. support | Yes |
| Interface | SATA |
| Maintenance | None |
| Continuous reading | Max. 510 MB/s |
| Continuous writing | Max. 450 MB/s |
| IOPS ¹⁾ | |
| 4k read | Max. 80,000 (random) |
| 4k write | Max. 35,000 (random) |
| Endurance | |
| MLC flash | Yes |
| Compatibility | SATA 3.0 compliant ACS-2 SSD Enhanced SMART ATA feature set Native Command Queuing (NCQ) |
| Environmental conditions | |
| Temperature | |
| Operation | 0 to 70°C |
| Storage | -40 to 95°C |
| Transport | -40 to 95°C |

Table 88: 5MMSSD.0128-01 - Technical data

| Product ID | 5MMSSD.0128-01 |
|----------------------------|--------------------------|
| Relative humidity | |
| Operation | 8 to 95%, non-condensing |
| Storage | 8 to 95%, non-condensing |
| Transport | 8 to 95%, non-condensing |
| Vibration | |
| Operation | 10 to 2000 Hz: 20 g |
| Storage | 10 to 2000 Hz: 20 g |
| Transport | 10 to 2000 Hz: 20 g |
| Shock | |
| Operation | 1500 g, 0.5 ms |
| Storage | 1500 g, 0.5 ms |
| Transport | 1500 g, 0.5 ms |
| Altitude | |
| Operation | -300 to 12192 m |
| Storage | -300 to 12192 m |
| Transport | -300 to 12192 m |
| Mechanical characteristics | |
| Dimensions | |
| Width | 9.5 mm |
| Height | 69 mm |
| Depth | 100 mm |
| Weight | 78 g |
| Manufacturer information | |
| Manufacturer | Toshiba |
| Manufacturer product ID | THNSNH128GBST |

Table 88: 5MMSSD.0128-01 - Technical data

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

3.6.13.4 Temperature humidity diagram

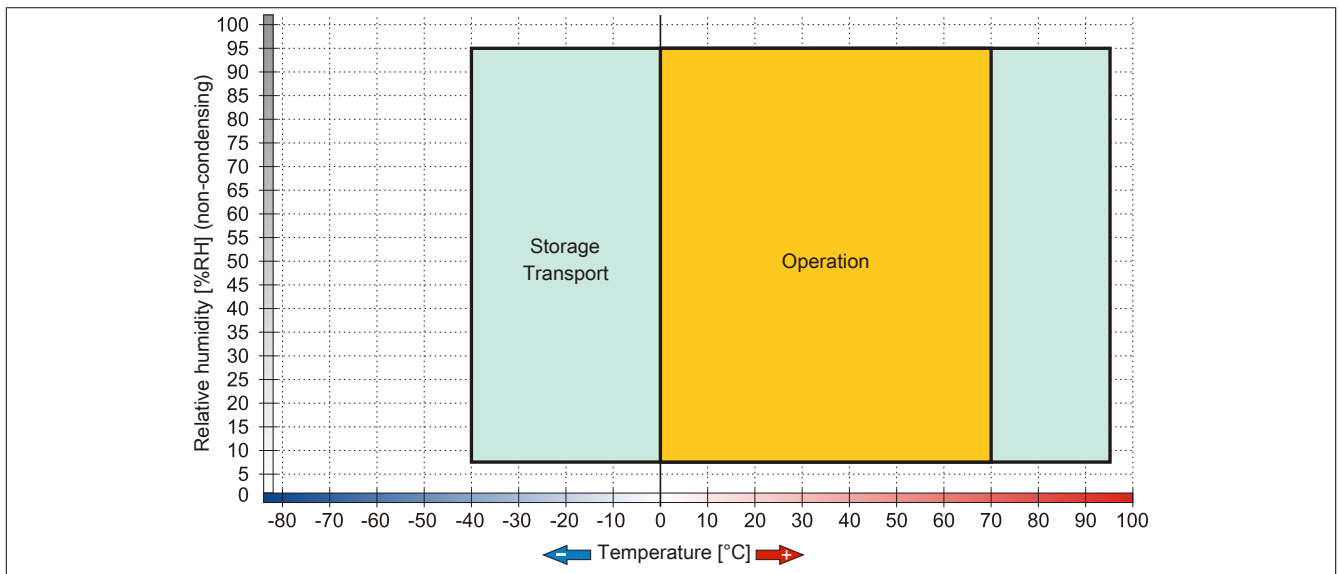


Figure 53: 5MMSSD.0128-01 - Temperature humidity diagram

3.6.14 5MMSSD.0180-00

3.6.14.1 General information

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

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

3.6.14.2 Order data


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

Table 89: 5MMSSD.0180-00 - Order data

3.6.14.3 Technical data

Caution!

A sudden loss of power may result in data loss! In very rare cases, the mass storage device may also become damaged.

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

Information:

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

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

Table 90: 5MMSSD.0180-00 - Technical data

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

Table 90: 5MMSSD.0180-00 - Technical data

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

3.6.14.4 Temperature humidity diagram

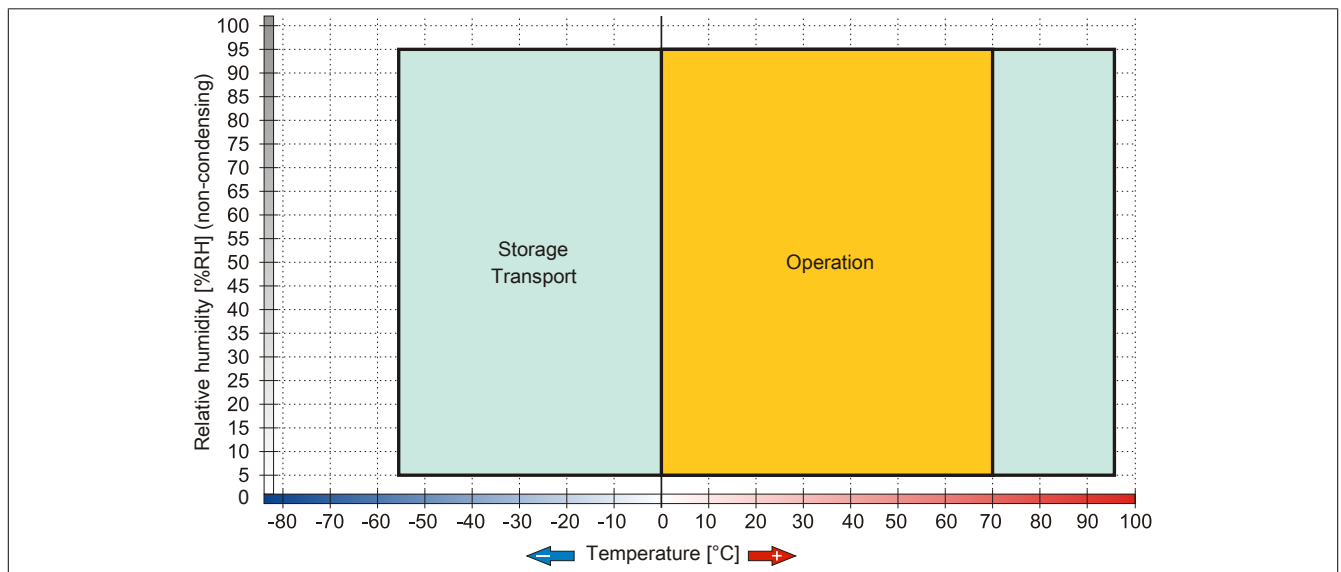


Figure 54: 5MMSSD.0180-00 - Temperature humidity diagram

3.6.15 5AC801.ADAS-00

3.6.15.1 General information

The hard disk adapter is a slide-in adapter that allows slide-in compact drives to be installed and operated on a B&R Industrial PC. This adapter can be used in APC810 and PPC800 system units with a slide-in drive slot.

When used in an APC810

Information:

The slide-in compact adapter can only be inserted into slide-in slot 1 for mechanical reasons (closing the front door).

3.6.15.2 Order data


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

Table 91: 5AC801.ADAS-00 - Order data

3.6.15.3 Technical data

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

Table 92: 5AC801.ADAS-00 - Technical data

3.6.16 5AC801.HDDS-00

3.6.16.1 General information

This 160 GB hard disk is specified for 24-hour operation, features an extended temperature range and can be used in APC810 and PPC800 system units with a slide-in drive slot.

Information:

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

When used in an APC810

When inserted in slide-in slot 1 or slide-in drive 2, the slide-in drive is accessed internally via SATA and USB.

3.6.16.2 Order data


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

Table 93: 5AC801.HDDS-00 - Order data

3.6.16.3 Technical data

Information:

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

| Product ID | 5AC801.HDDS-00 |
|--------------------------|--------------------------------------|
| General information | |
| Certification | |
| CE | Yes |
| cULus | Yes |
| GL | Yes |
| Hard disk drive | |
| Capacity | 40 GB |
| Number of heads | 1 |
| Number of sectors | 78,140,160 |
| Bytes per sector | 512 |
| Cache | 8 MB |
| Speed | 5400 rpm $\pm 1\%$ |
| 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 | 5.6 ms |
| Data transfer rate | |
| Internal | Max. 450 Mbit/s |
| To/From host | Max. 150 MB/s (Ultra DMA mode 5) |
| Positioning time | |
| Minimum (track to track) | 1 ms |
| Nominal (read only) | 12.5 ms |
| Maximum (read only) | 23 ms |

Table 94: 5AC801.HDDS-00 - Technical data

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

Table 94: 5AC801.HDDS-00 - Technical data

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

3.6.16.4 Temperature humidity diagram

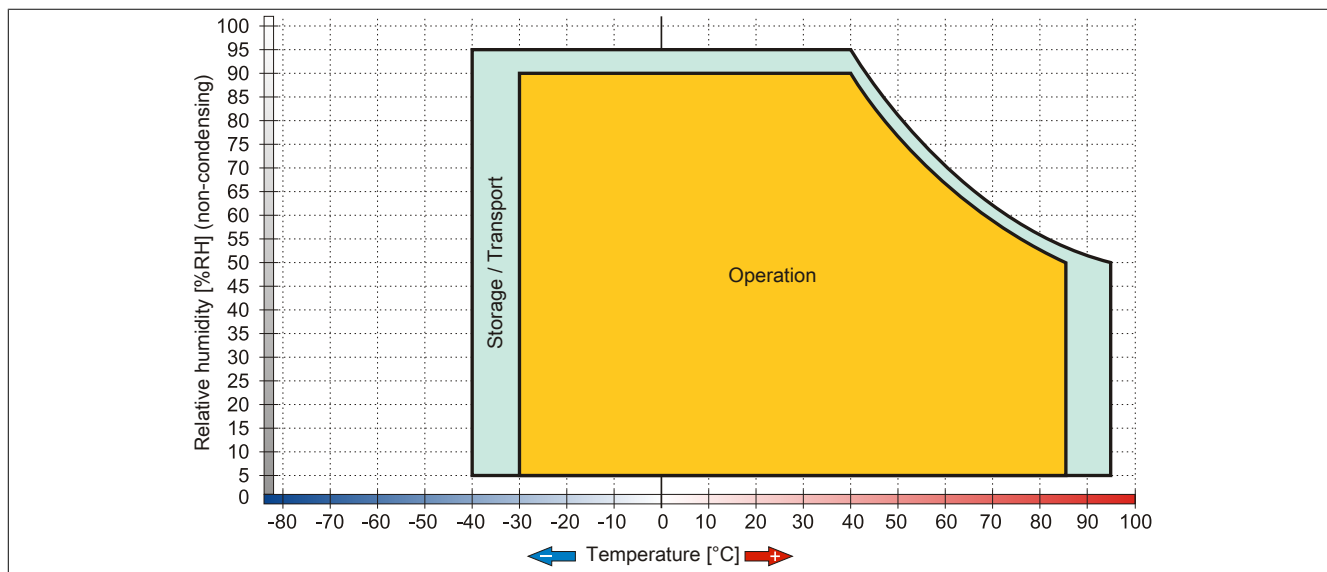


Figure 55: 5AC801.HDDS-00 - Temperature humidity diagram

3.6.17 5AC801.DVDS-00

3.6.17.1 General information

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

Information:

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

When used in an APC810

When inserted in slide-in slot 1 or slide-in drive 2, the slide-in drive is referred to internally as SATA and USB.

3.6.17.2 Order data


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

Table 95: 5AC801.DVDS-00 - Order data

3.6.17.3 Technical data

Information:

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

| Product ID | 5AC801.DVDS-00 |
|---------------------|---|
| General information | |
| Certification | |
| CE | Yes |
| cULus | Yes |
| GL | Yes |
| CD / DVD drive | |
| Data transfer rate | Max. 1.5 Gbit/s |
| Speed | Max. 5090 rpm $\pm 1\%$ |
| 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 (dual layer), DVD-R (single/multi-border), DVD-R DL (single/multi-border), DVD-RW (single/multi-border), DVD+R (single/multi-session), DVD+R DL (single/multi-session), DVD+RW (single/multi-session), DVD-RAM (4.7 GB, 2.6 GB) |
| Laser class | Class 1 laser |
| Service life | 60000 POH (power-on hours) |
| Interface | SATA |
| Startup time | |
| CD | Max. 19 seconds (from 0 rpm to read access) |
| DVD | Max. 19 seconds (from 0 rpm to read access) |
| Access time | |
| CD | Average of 130 ms |
| DVD | Average of 140 ms |

Table 96: 5AC801.DVDS-00 - Technical data

| Product ID | 5AC801.DVDS-00 |
|--|--|
| Readable media 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 |
| Read speed CD DVD | 24x 8x |
| Environmental conditions | |
| Temperature ¹⁾ Operation Storage Transport | 5 to 55°C ²⁾ -20 to 60°C -40 to 65°C |
| Relative humidity Operation Storage Transport | 8 to 80%, non-condensing 5 to 95%, non-condensing 5 to 95%, non-condensing |
| Vibration Operation Storage Transport | 5 to 500 Hz: 0.2 g 5 to 500 Hz: 2 g 5 to 500 Hz: 2 g |
| Shock Operation Storage 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 96: 5AC801.DVDS-00 - Technical data

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

3.6.17.4 Temperature humidity diagram

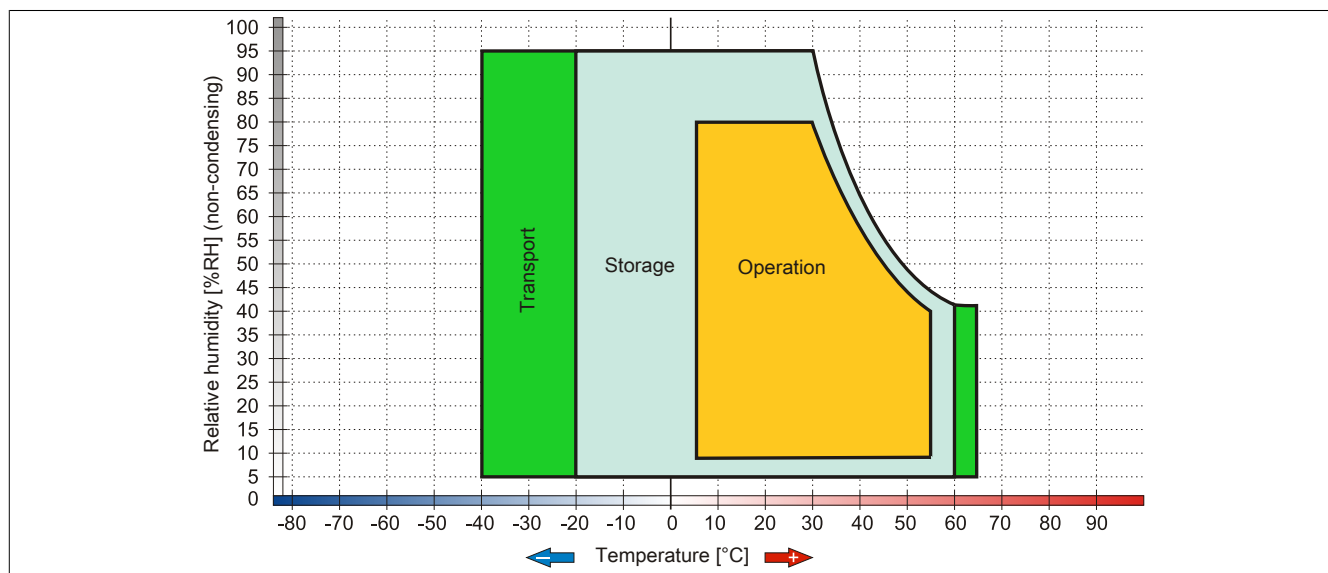


Figure 56: 5AC801.DVDS-00 - Temperature humidity diagram

3.6.17.5 Hot plugging

Hardware revision B0 of the 5AC801.DVDS-00 slide-in DVD-ROM does not offer SATA hot plugging functionality. Hot plugging is possible for other hardware revisions.

3.6.18 5AC801.DVRS-00

3.6.18.1 General information

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

Information:

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

When used in an APC810

When inserted in slide-in slot 1 or slide-in drive 2, the slide-in drive is referred to internally as SATA and USB.

3.6.18.2 Order data


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

Table 97: 5AC801.DVRS-00 - Order data

3.6.18.3 Technical data

Information:

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

| Product ID | 5AC801.DVRS-00 |
|----------------------------|--|
| General information | |
| Certification | |
| CE | Yes |
| cULus | Yes |
| GL | Yes |
| CD / DVD drive | |
| Data buffer capacity | 2 MB |
| Data transfer rate | Max. 33.3 MB/s |
| Speed | Max. 5160 rpm $\pm 1\%$ |
| 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-R, DVD-R (dual layer), DVD-RW, DVD-Video DVD-RAM (4.7GB, 2.6GB) DVD+R, DVD+R (dual layer), DVD+RW |
| Laser class | Class 1 laser |
| Service life | 60000 POH (power-on hours) |
| Interface | SATA |
| Startup time | |
| CD | Max. 14 seconds (from 0 rpm to read access) |
| DVD | Max. 15 seconds (from 0 rpm to read access) |
| Access time | |
| CD | On average 140 ms (24x) |
| DVD | On average 150 ms (8x) |

Table 98: 5AC801.DVRS-00 - Technical data

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

Table 98: 5AC801.DVRS-00 - Technical data

- 1) RAM drivers are not provided by the manufacturer. Support of RAM function by "Nero" burning software (model number 5SWUT1.0000-00) or other burning software packages or drivers from third-party providers.
- 2) Temperature specifications refer to operation at 500 meters. The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level).
- 3) Drive surface temperature.

3.6.18.4 Temperature humidity diagram

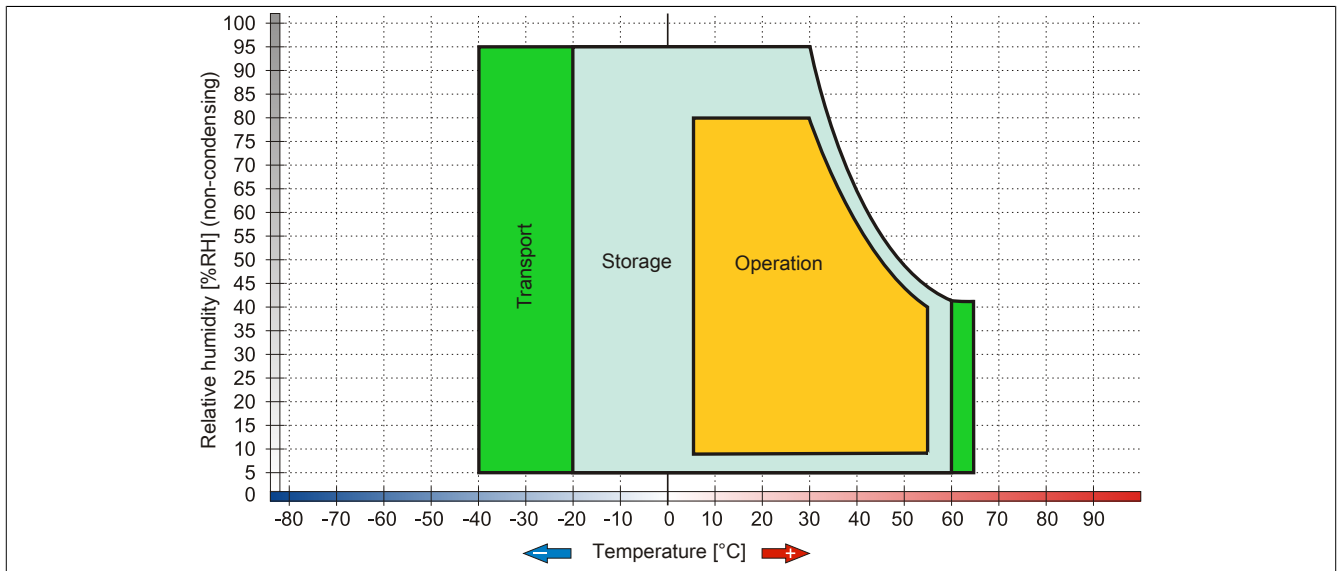


Figure 57: 5AC801.DVRS-00 - Temperature humidity diagram

3.6.19 5ACPCI.RAIC-01

3.6.19.1 General information

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

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

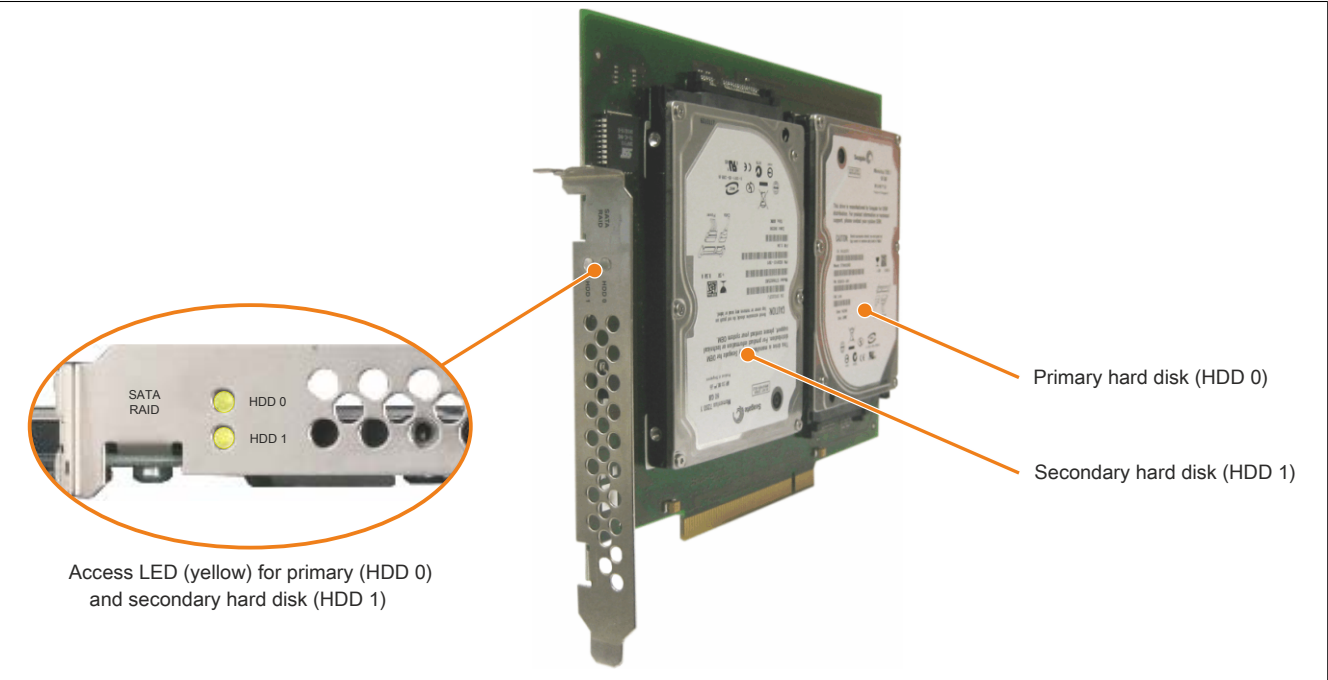


Figure 58: PCI SATA RAID controller

Information:

The PCI SATA RAID controller cannot be used in place of a universal power supply (UPS). If the operating system is not shut down properly, then this will be detected as an error state (with RAID 1 sets) at the next system startup and a complete rebuild is performed. This generally takes at least 50 minutes (configurable) to complete.

3.6.19.2 Order data

| Model number | Short description | Figure |
|----------------------|---|--------|
| Drives | | |
| 5ACPCI.RAIC-01 | PCI RAID system SATA 2x 60 GB; Note: Please see the manual for information about using this hard disk. | |
| Optional accessories | | |
| Drives | | |
| 5ACPCI.RAIC-02 | 60 GB SATA hard disk replacement part for 5ACPCI.RAIC-01; Note: Please see the manual for information about using this hard disk. | |


A photograph of a PCI RAID controller card. The card is green and populated with two 3.5-inch SATA hard drives. The drives are silver and black, with labels indicating they are 60 GB. The card has a metal mounting bracket on the left side with multiple screw holes. The SATA connectors are visible at the bottom of the card.

Table 99: 5ACPCI.RAIC-01 - Order data

3.6.19.3 Technical data

Information:

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

| | |
|-----------------------------------|--|
| Product ID | 5ACPCI.RAIC-01 |
| General information | |
| Number of hard disks | 2 |
| Certification | |
| CE | Yes |
| cULus | Yes |
| Controller | |
| Type | SII 3512 SATA link |
| Specification | Serial ATA 1.0 |
| Data transfer rate | Max. 1.5 Gbit/s (150 MB/s) |
| RAID level | Supports RAID 0, 1 |
| BIOS extension ROM requirements | Approx. 32 kB |
| Hard disk drive | |
| Capacity | 60 GB |
| Number of heads | 3 |
| Number of sectors | 117,210,240 |
| Bytes per sector | 512 |
| Cache | 8 MB |
| Speed | 7200 rpm \pm 1% |
| Startup time | Typ. 4 s (from 0 rpm to read access) |
| Service life | 5 years |
| S.M.A.R.T. support | Yes |
| Access time | 4.2 ms |
| Supported transfer modes | SATA 1.0, PIO mode 0-4, multiword DMA mode 0-2, UDMA 0-5 |
| Data transfer rate | |
| Internal | Max. 539 Mbit/s |
| To/From host | Max. 150 MB/s |
| Positioning time | |
| Minimum (track to track) | 1.5 ms |
| Nominal (read only) | 10.5 ms |
| Maximum (read only) | 22 ms |
| Electrical characteristics | |
| Power consumption | 0.3A at 3.3V (PCI bus) 1A at 5V (PCI bus) |
| Environmental conditions | |
| Temperature ¹⁾ | |
| Operation ²⁾ | 5 to 55°C |
| 24-hour operation ³⁾ | 5 to 40°C |
| Storage | -40 to 70°C |
| Transport | -40 to 70°C |
| Relative humidity | |
| Operation | 5 to 90%, non-condensing |
| Storage | 5 to 95%, non-condensing |
| Transport | 5 to 95%, non-condensing |
| Vibration ⁴⁾ | |
| Operation (continuous) | 5 to 500 Hz: 0.125 g (1.225 m/s ² 0-peak) duration 1 octave per minute; no damage |
| Operation (occasional) | 5 to 500 Hz: 0.25 g (2.45 m/s ² 0-peak) duration 1 octave per minute; no damage |
| Storage | At max. 5 to 500 Hz and 5 g (49 m/s ² 0-peak) duration 0.5 octave per minute; no damage |
| Transport | At max. 5 to 500 Hz and 5 g (49 m/s ² 0-peak) duration 0.5 octave per minute; no damage |
| Shock | |
| Operation | At max. 125 g (1226 m/s ² 0-peak) and 2 ms duration; no unrecoverable errors |
| Storage | At max. 400 g (3924 m/s ² 0-peak) and 2 ms duration; no damage |
| | At max. 450 g (4424 m/s ² 0-peak) and 1 ms duration; no damage |
| | At max. 200 g (1962 m/s ² 0-peak) and 0.5 ms duration; no damage |
| Transport | At max. 400 g (3924 m/s ² 0-peak) and 2 ms duration; no damage |
| | At max. 450 g (4424 m/s ² 0-peak) and 1 ms duration; no damage |
| | At max. 200 g (1962 m/s ² 0-peak) and 0.5 ms duration; no damage |
| Altitude | |
| Operation | -300 to 3048 m |
| Storage | -300 to 12192 m |
| Mechanical characteristics | |
| Installation ⁵⁾ | Fixed |
| Dimensions | |
| Width | 70 mm |
| Length | 100 mm |
| Height | 9.5 mm |

Table 100: 5ACPCI.RAIC-01 - Technical data

| Product ID | 5ACPCI.RAIC-01 |
|--------------------------|---------------------------|
| Weight | 350 g |
| Manufacturer information | |
| Manufacturer | Seagate |
| Manufacturer product ID | Momentum 7200.1 ST96023AS |

Table 100: 5ACPCI.RAIC-01 - Technical data

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

3.6.19.4 Temperature humidity diagram

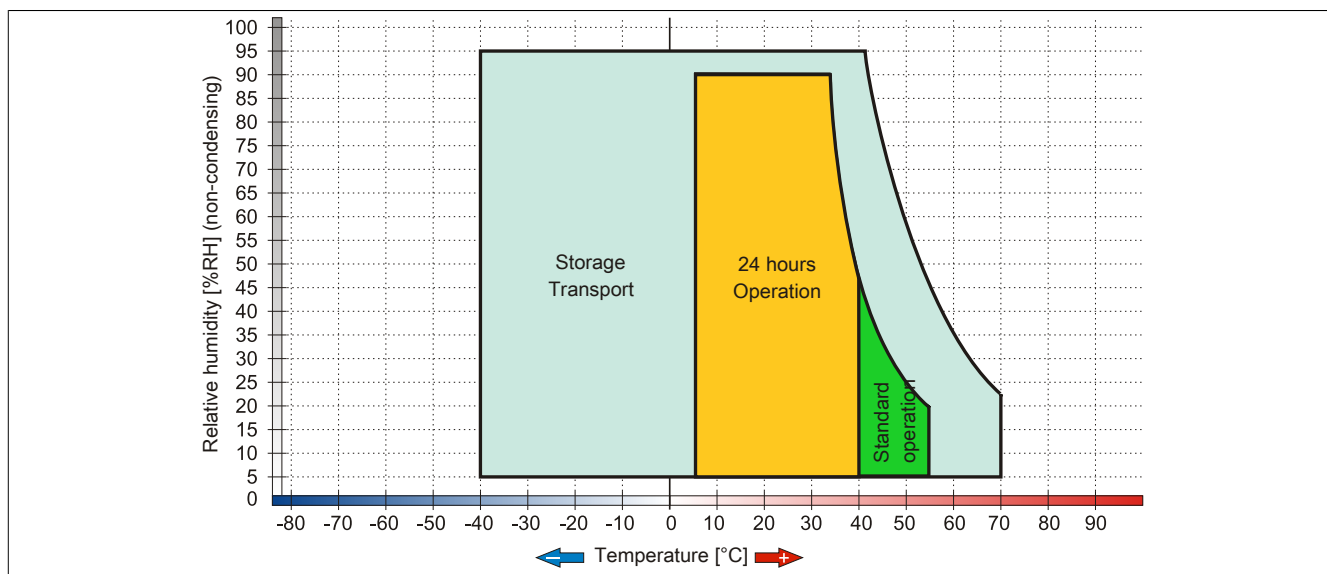


Figure 59: 5ACPCI.RAIC-01 - Temperature humidity diagram

3.6.19.5 Driver support

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

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

Information:

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

3.6.19.6 Configuration

For information about configuring a SATA RAID set, see 3 "Installation", section 7 "Configuring a SATA RAID set" on page 222.

3.6.19.7 Replacing a HDD

A hard drive can be easily replaced in the event of an error when using the RAID1 (mirroring) configuration without having to reinstall the system. The replacement SATA HDD 60GB 5ACPCI.RAIC-02 is available as a replacement part for a HDD.

For instructions on replacing the drive, see chapter 7 "Maintenance and service", section 11 "Replacing a PCI SATA RAID hard disk in a RAID 1 set" on page 425.

3.6.20 5ACPCI.RAIC-02

3.6.20.1 General information

This hard disk can be used as a replacement for a HDD used with the 5ACPCI.RAIC-01 PCI SATA RAID controller.

3.6.20.2 Order data


| Model number | Short description | Figure |
|----------------|---|---|
| 5ACPCI.RAIC-02 | Drives 60 GB SATA hard disk replacement part for 5ACPCI.RAIC-01; Note: Please see the manual for information about using this hard disk. |  |

Table 101: 5ACPCI.RAIC-02 - Order data

3.6.20.3 Technical data

Information:

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

| Product ID | 5ACPCI.RAIC-02 |
|---------------------------------|--|
| General information | |
| Certification | |
| CE | Yes |
| cULus | Yes |
| Hard disk drive | |
| Capacity | 60 GB |
| Number of heads | 3 |
| Number of sectors | 117,210,240 |
| Bytes per sector | 512 |
| Cache | 8 MB |
| Speed | 7200 rpm \pm 1% |
| Startup time | Typ. 4 s (from 0 rpm to read access) |
| Service life | 5 years |
| S.M.A.R.T. support | Yes |
| Access time | 4.2 ms |
| Supported transfer modes | SATA 1.0, PIO mode 0-4, multiword DMA mode 0-2, UDMA 0-5 |
| Data transfer rate | |
| Internal | Max. 539 Mbit/s |
| To/From host | Max. 150 MB/s |
| Positioning time | |
| Minimum (track to track) | 1.5 ms |
| Nominal (read only) | 10.5 ms |
| Maximum (read only) | 22 ms |
| Environmental conditions | |
| Temperature ¹⁾ | |
| Operation ²⁾ | 5 to 55°C |
| 24-hour operation ³⁾ | 5 to 40°C |
| Storage | -40 to 70°C |
| Transport | -40 to 70°C |
| Relative humidity | |
| Operation | 5 to 90%, non-condensing |
| Storage | 5 to 95%, non-condensing |
| Transport | 5 to 95%, non-condensing |
| Vibration ⁴⁾ | |
| Operation (continuous) | 5 to 500 Hz: 0.125 g (1.225 m/s ² 0-peak) duration 1 octave per minute; no damage |
| Operation (occasional) | 5 to 500 Hz: 0.25 g (2.45 m/s ² 0-peak) duration 1 octave per minute; no damage |
| Storage | At max. 5 to 500 Hz and 5 g (49 m/s ² 0-peak) duration 0.5 octave per minute; no damage |
| Transport | At max. 5 to 500 Hz and 5 g (49 m/s ² 0-peak) duration 0.5 octave per minute; no damage |

Table 102: 5ACPCI.RAIC-02 - Technical data

| Product ID | 5ACPCI.RAIC-02 |
|----------------------------|--|
| Shock | At max. 125 g (1226 m/s ² 0-peak) and 2 ms duration; no unrecoverable errors |
| Operation | At max. 400 g (3924 m/s ² 0-peak) and 2 ms duration; no damage |
| Storage | At max. 450 g (4424 m/s ² 0-peak) and 1 ms duration; no damage |
| Transport | At max. 200 g (1962 m/s ² 0-peak) and 0.5 ms duration; no damage At max. 400 g (3924 m/s ² 0-peak) and 2 ms duration; no damage At max. 450 g (4424 m/s ² 0-peak) and 1 ms duration; no damage At max. 200 g (1962 m/s ² 0-peak) and 0.5 ms duration; no damage |
| Altitude | |
| Operation | -300 to 3048 m |
| Storage | -300 to 12192 m |
| Mechanical characteristics | |
| Dimensions | |
| Width | 70 mm |
| Length | 100 mm |
| Height | 9.5 mm |
| Weight | 350 g |
| Manufacturer information | |
| Manufacturer | Seagate |
| Manufacturer product ID | Momentum 7200.1 ST96023AS |

Table 102: 5ACPCI.RAIC-02 - Technical data

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

3.6.20.4 Temperature humidity diagram

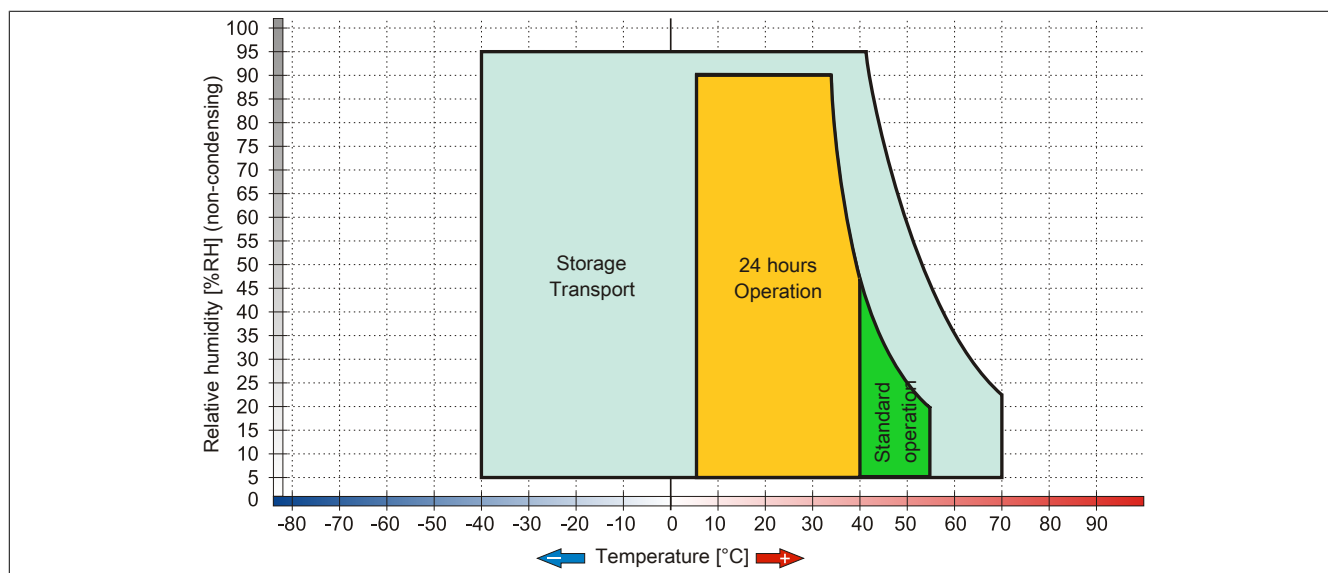


Figure 60: 5ACPCI.RAIC-02 - Temperature humidity diagram

3.6.21 5ACPCI.RAIC-03

3.6.21.1 General information

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

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

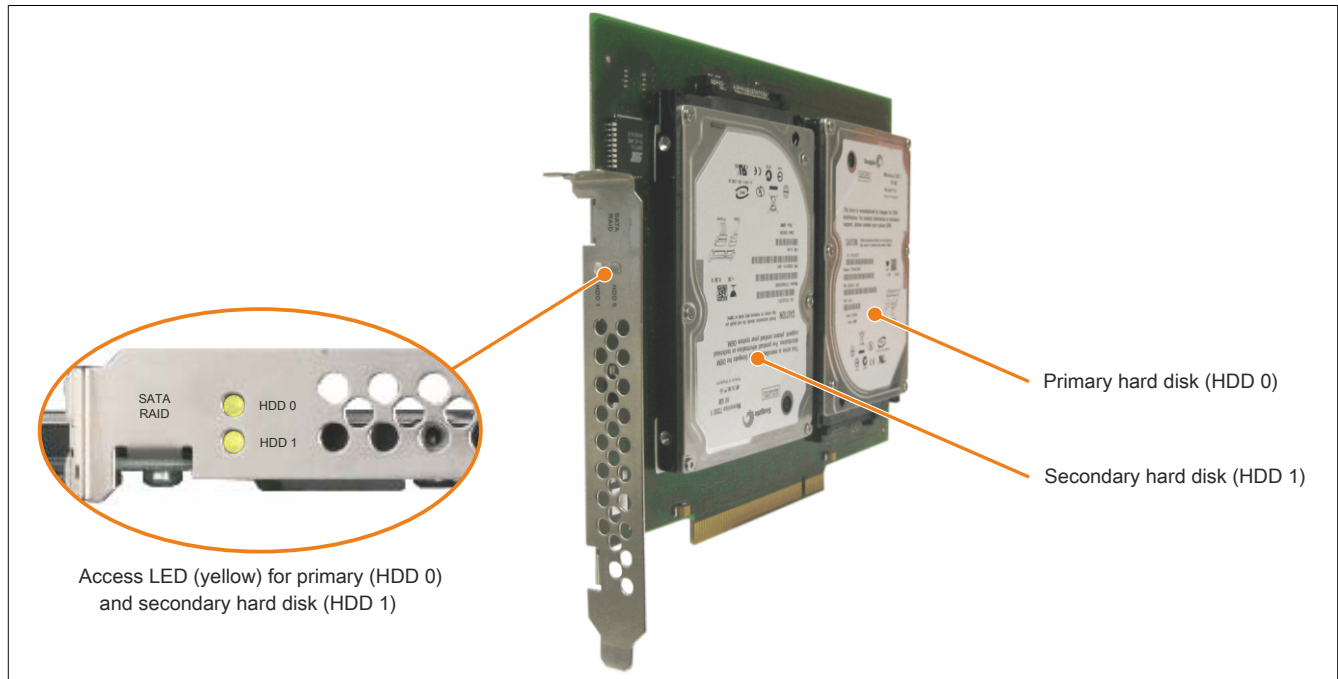


Figure 61: PCI SATA RAID controller

Information:

The PCI SATA RAID controller cannot be used in place of a universal power supply (UPS). If the operating system is not shut down properly, then this will be detected as an error state (with RAID 1 sets) at the next system startup and a complete rebuild is performed. If 160 GB of memory are used, this generally takes approximately 160 minutes (configurable) to complete.

3.6.21.2 Order data

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

Table 103: 5ACPCI.RAIC-03 - Order data

3.6.21.3 Technical data

Information:

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

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

Table 104: 5ACPCI.RAIC-03 - Technical data

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

Table 104: 5ACPCI.RAIC-03 - Technical data

- 1) Temperature values at an elevation of 305 meters. The temperature specification must be reduced linearly by 1°C every 305 meters. The temperature increase and decrease can be a maximum of 3°C per minute.
- 2) Standard operation refers to 333 POH (power-on hours) per month.
- 3) 24-hour operation refers to 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) Installed in PCI slot.

3.6.21.4 Temperature humidity diagram

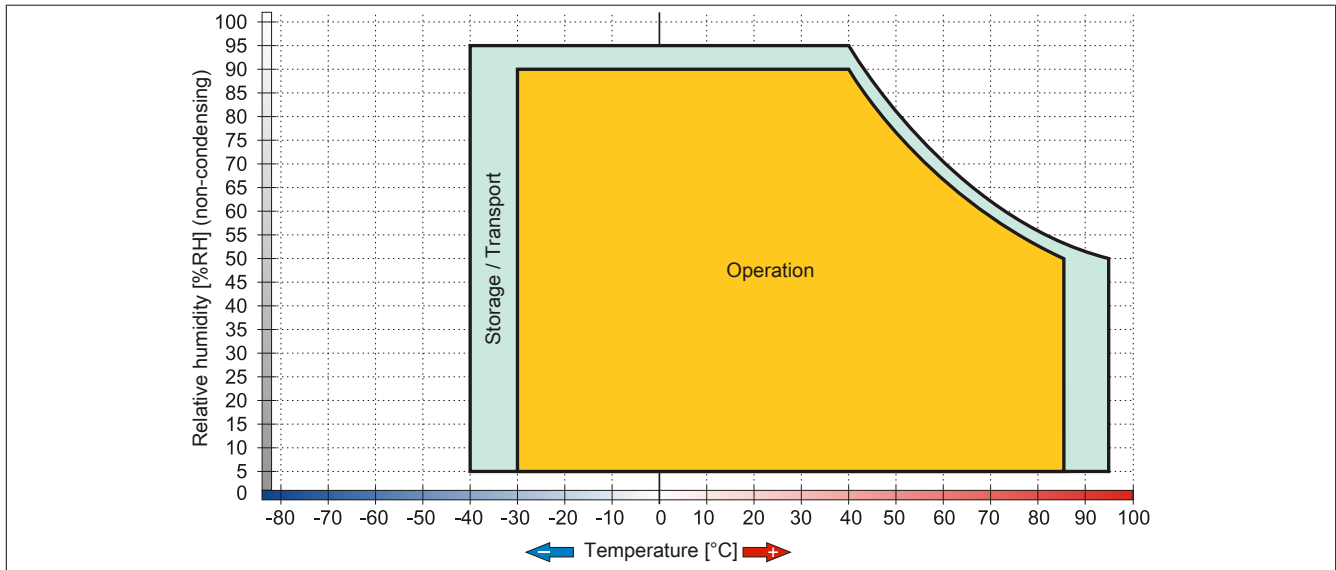


Figure 62: 5ACPCI.RAIC-03 - Temperature humidity diagram

3.6.21.5 Driver support

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

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

Information:

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

3.6.21.6 Configuration

For information about configuring a SATA RAID set, see 3 "Installation", section 7 "Configuring a SATA RAID set" on page 222.

3.6.21.7 Replacing a HDD

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

For instructions on replacing the drive, see 7 "Maintenance and service", section 11 "Replacing a PCI SATA RAID hard disk in a RAID 1 set" on page 425.

3.6.22 5ACPCI.RAIC-04

3.6.22.1 General information

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

3.6.22.2 Order data


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

Table 105: 5ACPCI.RAIC-04 - Order data

3.6.22.3 Technical data

Information:

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

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

Table 106: 5ACPCI.RAIC-04 - Technical data

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

Table 106: 5ACPCI.RAIC-04 - Technical data

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

3.6.22.4 Temperature humidity diagram

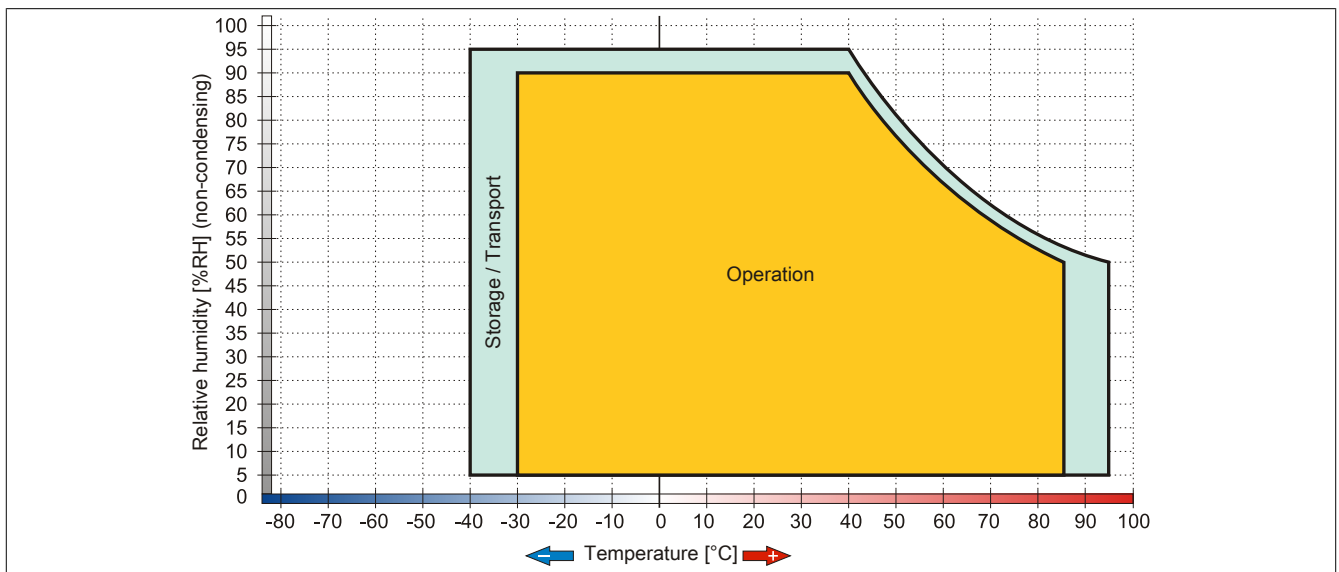


Figure 63: 5ACPCI.RAIC-04 - Temperature humidity diagram

3.6.23 5ACPCI.RAIC-05

3.6.23.1 General information

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

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

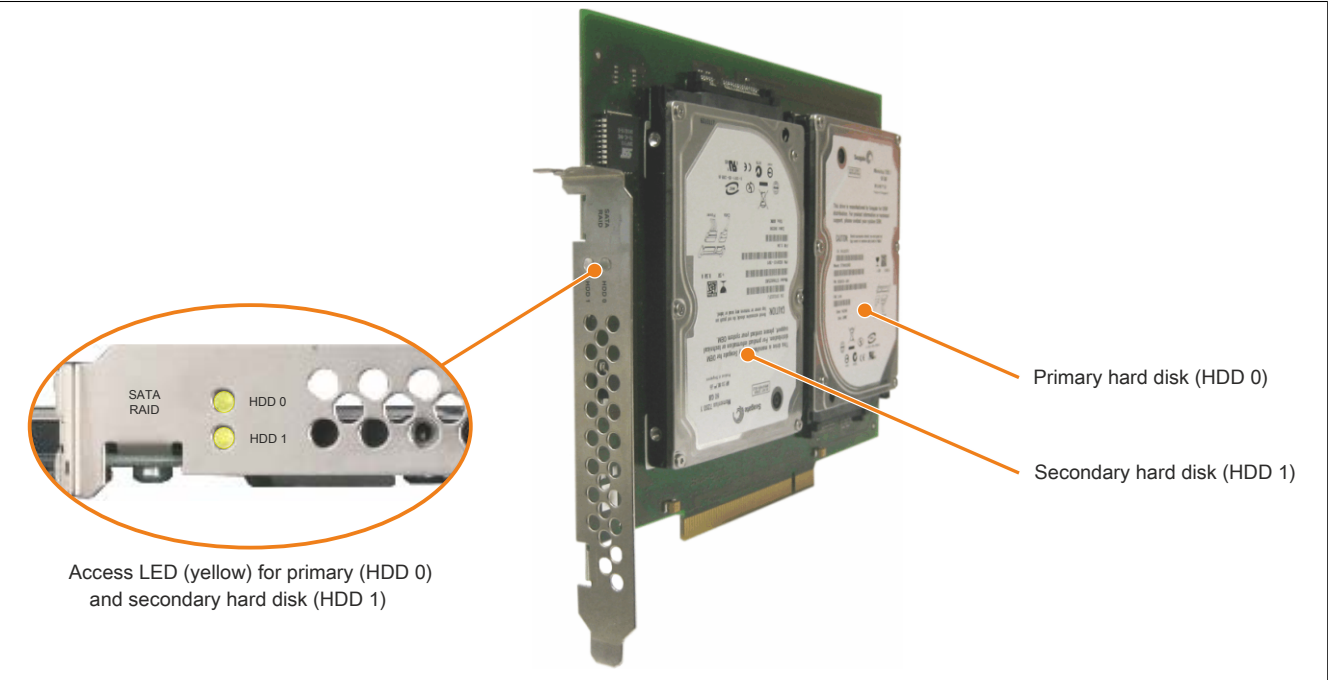


Figure 64: PCI SATA RAID controller

Information:

The PCI SATA RAID controller cannot be used in place of a universal power supply (UPS). If the operating system is not shut down properly, then this will be detected as an error state (with RAID 1 sets) at the next system startup and a complete rebuild is performed. If 250 GB of memory are used, this generally takes approximately 250 minutes (configurable) to complete.

3.6.23.2 Order data


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

Table 107: 5ACPCI.RAIC-05 - Order data

3.6.23.3 Technical data

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

Table 108: 5ACPCI.RAIC-05 - Technical data

- 1) Temperature values at an elevation of 305 meters. The temperature specification must be reduced linearly by 1°C every 305 meters. The temperature increase and decrease can be a maximum of 20°C per hour.
- 2) Standard operation refers to 333 POH (power-on hours) per month.
- 3) 24-hour operation refers to 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) Installed in PCI slot.

3.6.23.4 Temperature humidity diagram

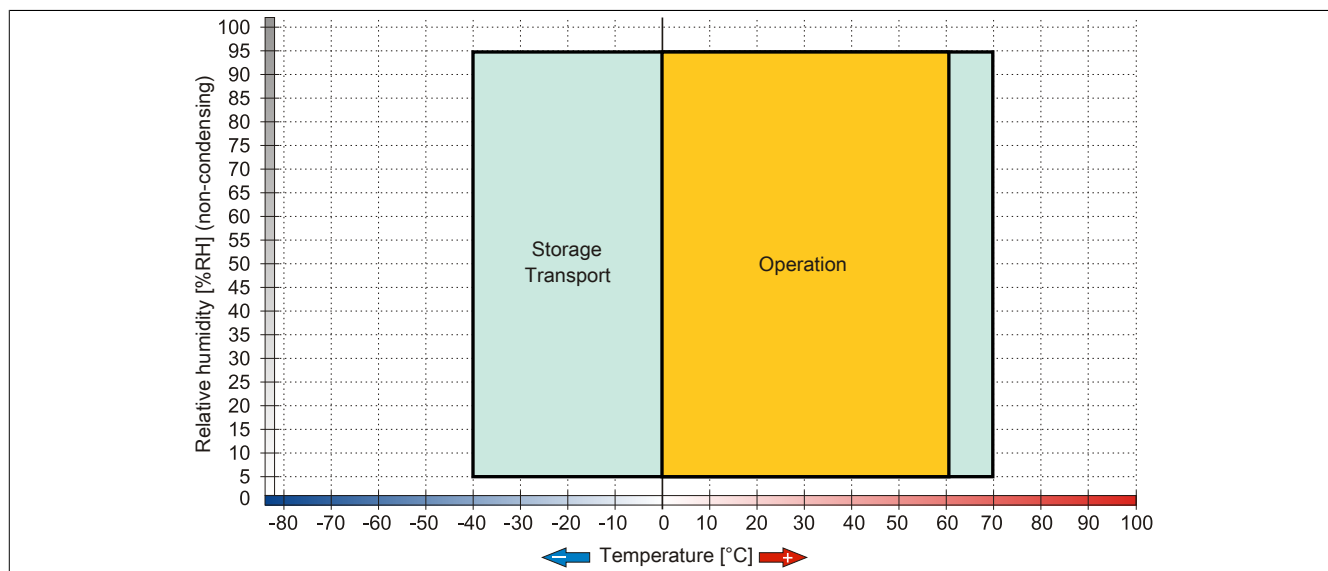


Figure 65: 5ACPCI.RAIC-05 - Temperature humidity diagram

3.6.23.5 Driver support

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

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

Information:

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

3.6.23.6 Configuration

For information about configuring a SATA RAID set, see 3 "Installation", section 7 "Configuring a SATA RAID set" on page 222.

3.6.23.7 Replacing a HDD

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

For information about performing a replacement, see "Replacing a PCI SATA RAID hard disk in a RAID 1 set" on page 425.

3.6.24 5ACPCI.RAIC-06

3.6.24.1 General information

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

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

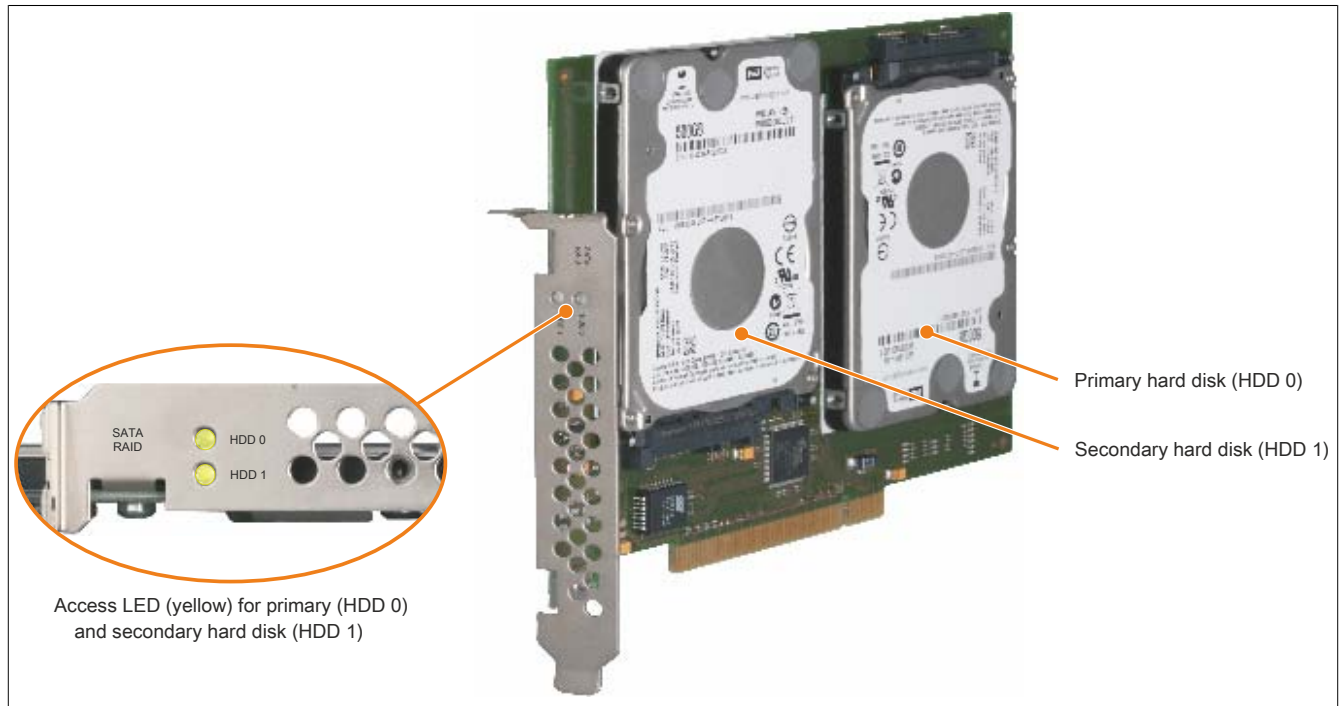


Figure 66: PCI SATA RAID controller

Information:

The PCI SATA RAID controller cannot be used in place of a universal power supply (UPS). If the operating system is not shut down properly, then this will be detected as an error state (with RAID 1 sets) at the next system startup and a complete rebuild is performed. If 500 GB of memory are used, this generally takes approximately 500 minutes (configurable) to complete.

3.6.24.2 Order data


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

Table 109: 5ACPCI.RAIC-06 - Order data

3.6.24.3 Technical data

Information:

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

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

Table 110: 5ACPCI.RAIC-06 - Technical data

1) Technical data for a hard disk.

2) With 8760 POH (power-on hours) per year and 25°C surface temperature.

3) Temperature values at an elevation of 305 meters. The temperature specification must be reduced linearly by 1°C every 305 meters. The temperature increase and decrease can be a maximum of 20°C per hour.

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

3.6.24.4 Temperature humidity diagram

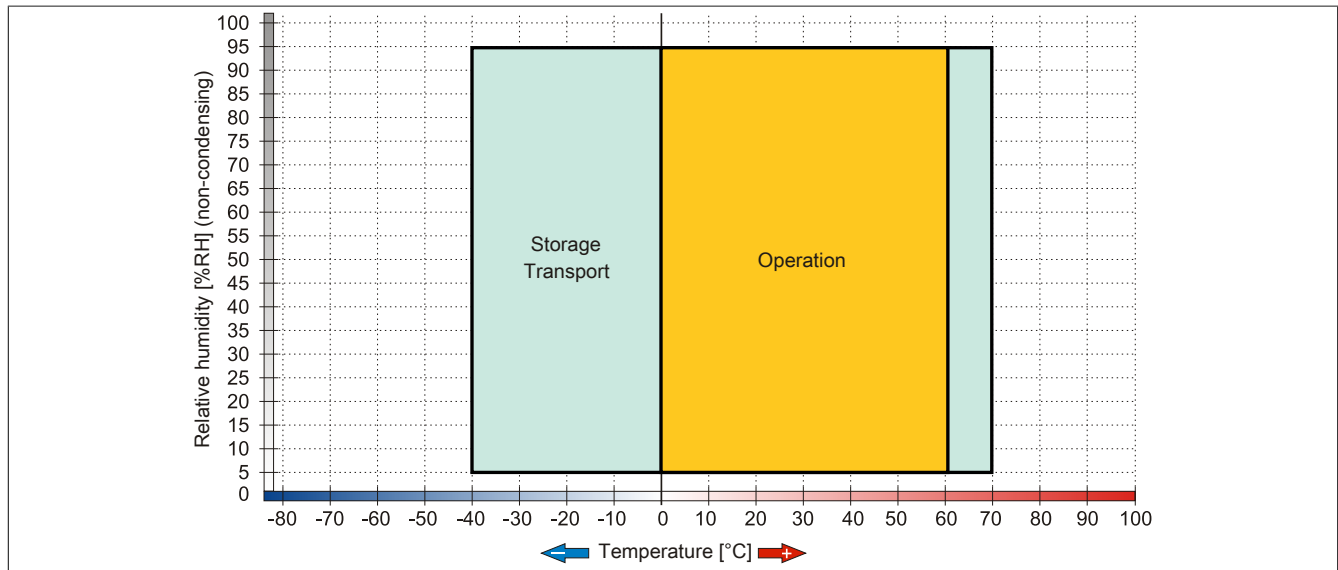


Figure 67: 5ACPCI.RAIC-06 - Temperature humidity diagram

3.6.24.5 Driver support

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

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

Information:

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

3.6.24.6 Configuration

For information about configuring a SATA RAID set, see 3 "Installation", section 7 "Configuring a SATA RAID set" on page 222.

3.6.24.7 Replacing a HDD

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

For information about performing a replacement, see "Replacing a PCI SATA RAID hard disk in a RAID 1 set" on page 425.

3.6.25 5MMHDD.0250-00

3.6.25.1 General information

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

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

3.6.25.2 Order data


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

Table 111: 5MMHDD.0250-00 - Order data

3.6.25.3 Technical data

Information:

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

| Product ID | 5MMHDD.0250-00 |
|---------------------------------|--|
| General information | |
| Certification | |
| CE | Yes |
| cULus | Yes |
| Hard disk drive | |
| Capacity | 250 GB |
| Number of heads | 1 |
| Number of sectors | 488,397,168 |
| Bytes per sector | 512 |
| Cache | 8 MB |
| Speed | 5400 rpm $\pm 0.2\%$ |
| 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 mode 0-4, multiword DMA mode 0-2, UDMA mode 0-6 |
| Data transfer rate | |
| Internal | Max. 1175 Mbit/s |
| To/From host | Max. 150 MB/s (SATA I), max. 300 MB/s (SATA II) |
| Positioning time | |
| Minimum (track to track) | 1 ms |
| Nominal (read only) | 14 ms |
| Maximum (read only) | 30 ms |
| Environmental conditions | |
| Temperature ²⁾ | |
| Operation ³⁾ | 0 to 60°C |
| 24-hour operation ⁴⁾ | 0 to 60°C |
| Storage | -40 to 70°C |
| Transport | -40 to 70°C |

Table 112: 5MMHDD.0250-00 - Technical data

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

Table 112: 5MMHDD.0250-00 - Technical data

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

3.6.25.4 Temperature humidity diagram

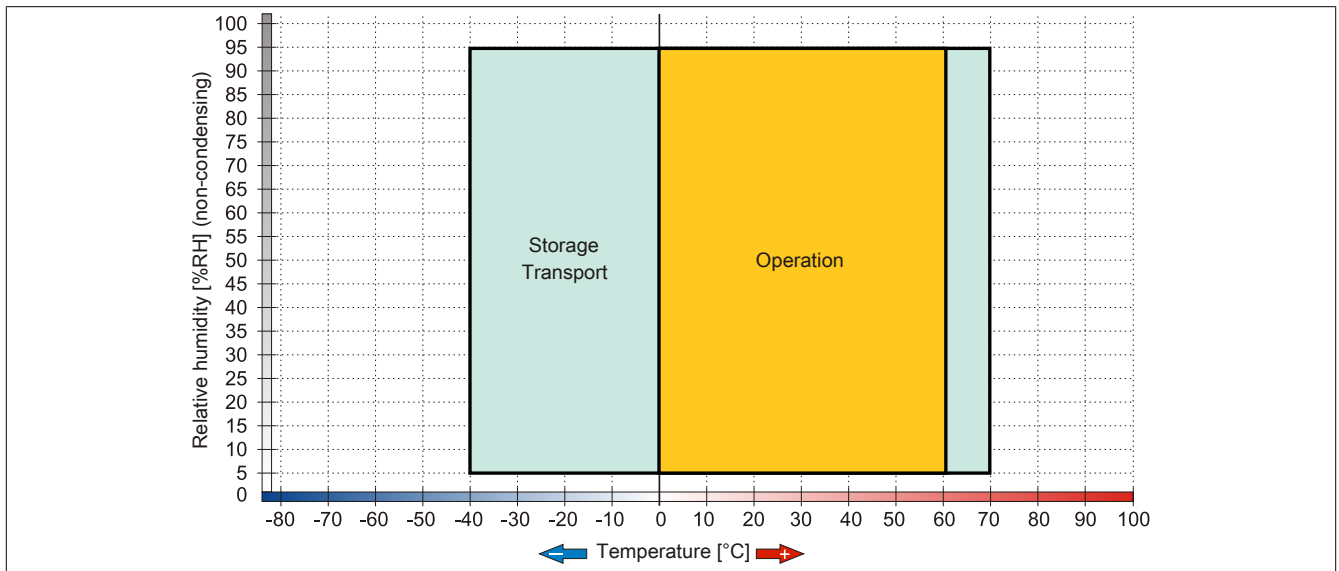


Figure 68: 5MMHDD.0250-00 - Temperature humidity diagram

3.6.26 5MMHDD.0500-00

3.6.26.1 General information

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

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

3.6.26.2 Order data


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

Table 113: 5MMHDD.0500-00 - Order data

3.6.26.3 Technical data

Information:

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

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

Table 114: 5MMHDD.0500-00 - Technical data

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

Table 114: 5MMHDD.0500-00 - Technical data

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

3.6.26.4 Temperature humidity diagram

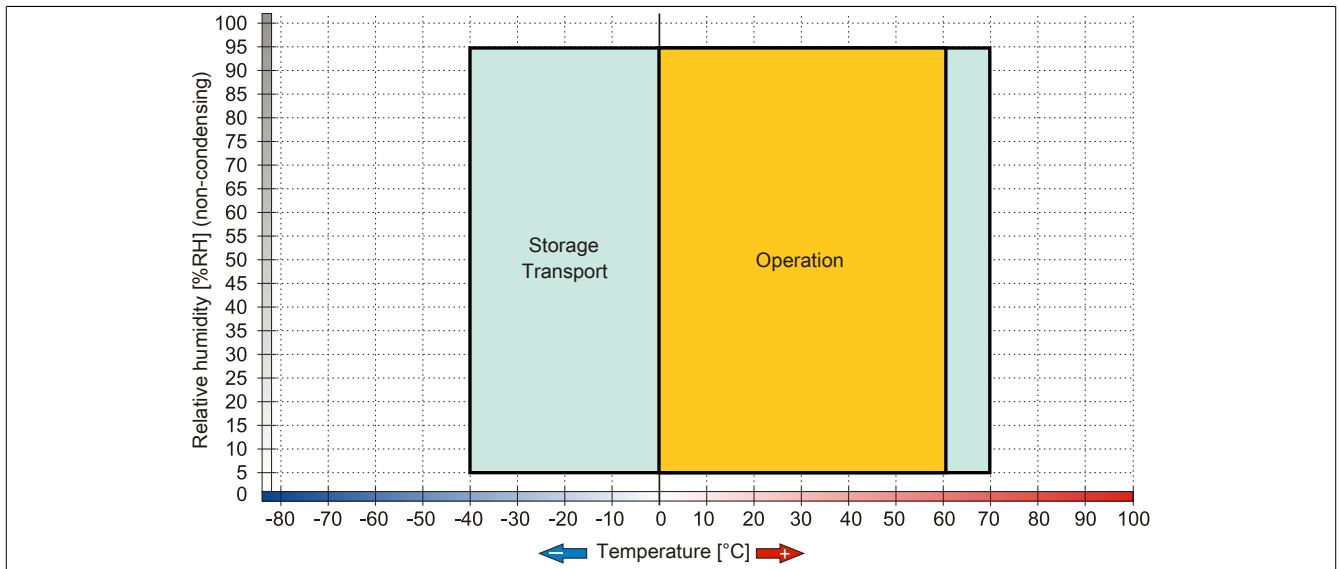


Figure 69: 5MMHDD.0500-00 - Temperature humidity diagram

3.7 Fan kit

Information:

Fans are necessary when using components that must work within certain temperature limits, e.g. RAID controllers, DVD combos and PCI cards.

Fan and dust filters 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).

For additional information about when fans are switched on, see Appendix A.

3.7.1 5PC810.FA01-00

3.7.1.1 General information

This fan kit is an optional addition for 1-slot system units.

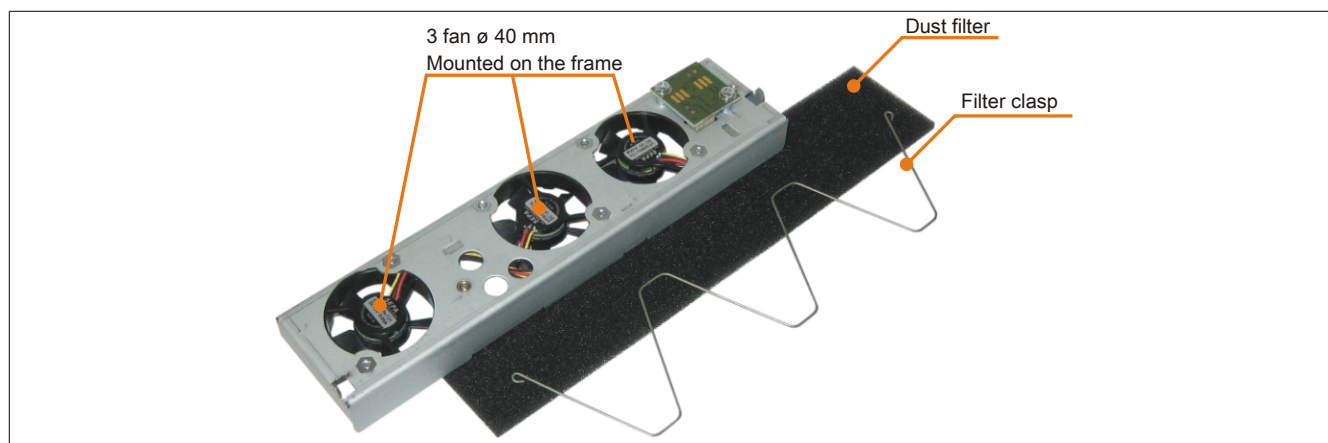


Figure 70: 5PC810.FA01-00 - Fan kit

3.7.1.2 Order data

| Model number | Short description | Figure |
|----------------|--|--------|
| | Fan kits | |
| 5PC810.FA01-00 | APC810 fan kit for 5PC810.SX01-00 system unit | |
| | Optional accessories | |
| | Accessories | |
| 5AC801.FA01-00 | APC810 replacement fan filter for 5PC810.SX01-00; 5 pcs. | |

Table 115: 5PC810.FA01-00 - Order data

3.7.1.3 Technical data

| Product ID | 5PC810.FA01-00 |
|---------------------------------|--|
| General information | |
| Number of fans | 3 |
| Speed | Max. 6100 rpm |
| Noise level | 21 dB |
| Service life | 29,000 hours at 70°C 95,000 hours at 20°C |
| Type | Double ball bearings |
| Certification | |
| CE | Yes |
| cULus HazLoc Class 1 Division 2 | Yes |
| ATEX Zone 22 | Yes |
| GL | Yes |

Table 116: 5PC810.FA01-00 - Technical data

| Product ID | 5PC810.FA01-00 |
|----------------------------|----------------|
| Mechanical characteristics | |
| Dimensions | |
| Fan | |
| Width | 40 mm |
| Height | 40 mm |
| Depth | 10 mm |

Table 116: 5PC810.FA01-00 - Technical data

For information about installing/replacing fan kits, see chapter "Maintenance and service", section 6 "Installing and replacing fan kits" on page 406.

3.7.2 5PC810.FA02-01

3.7.2.1 General information

These fan kits are an optional addition for 2-slot system units.

The only difference between the 5PC810.5A02-01 and the 5PC810.FA02-00 fan kit is that additional guide elements have been integrated that are similar to the fan kits for the 1-slot and 5-slot models. This makes it easier to install or replace the fan kit. Starting with Revision D0, only the 5PC810.5A02-01 fan kit can be installed for the 5PC810.SX02-00 system unit.

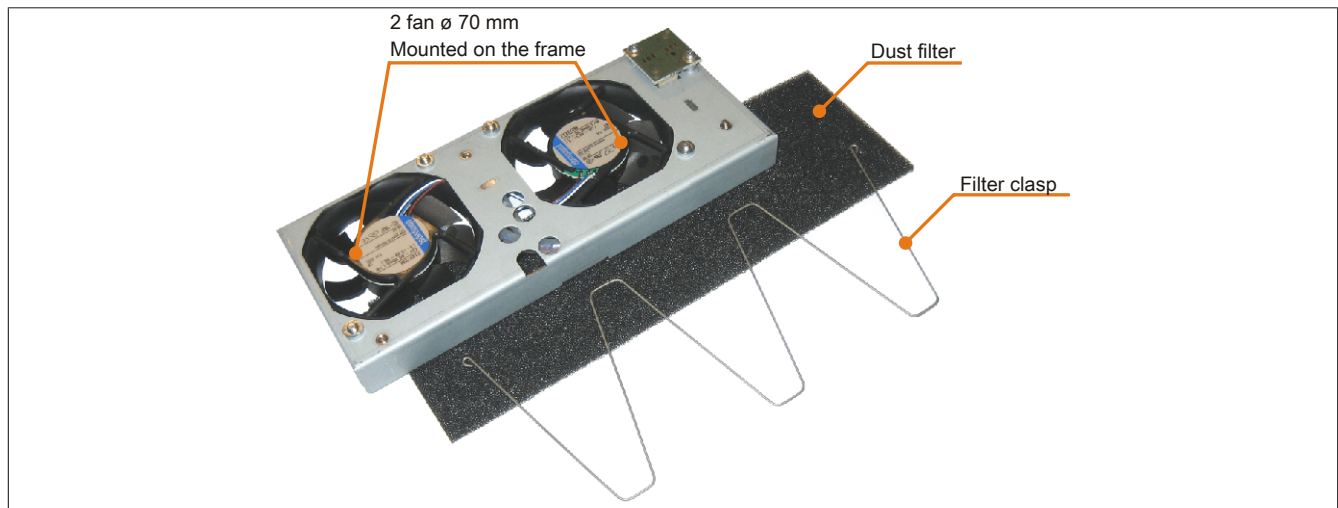


Figure 71: 5PC810.FA02-00 and 5PC810.FA02-01 - Fan kit

3.7.2.2 Order data

| Model number | Short description | Figure |
|----------------|--|--------|
| | Fan kits | |
| 5PC810.FA02-00 | APC810 fan kit for 5PC810.SX02-00 system unit | |
| 5PC810.FA02-01 | APC810 fan kit for 5PC810.SX02-00 (revisions > D0) | |
| | Optional accessories | |
| | Accessories | |
| 5AC801.FA02-00 | APC810 replacement fan filter for 5PC810.SX02-00; 5 pcs. | |

Table 117: 5PC810.FA02-00, 5PC810.FA02-01 - Order data

3.7.2.3 Technical data

| Product ID | 5PC810.FA02-00 | 5PC810.FA02-01 |
|---------------------|---------------------------|----------------|
| General information | | |
| Number of fans | 2 | |
| Speed | Max. 4300 rpm \pm 12.5% | |
| Noise level | 32 dB | |
| Service life | 60,000 hours (at 40°C) | |
| Type | Double ball bearings | |

Table 118: 5PC810.FA02-00, 5PC810.FA02-01 - Technical data

| Product ID | 5PC810.FA02-00 | 5PC810.FA02-01 |
|-----------------------------------|----------------|----------------|
| Certification | | |
| CE | | Yes |
| cULus HazLoc Class 1 Division 2 | - | Yes |
| ATEX Zone 22 | - | Yes |
| GL | - | Yes |
| Mechanical characteristics | | |
| Dimensions | | |
| Fan | | |
| Width | | 70 mm |
| Height | | 70 mm |
| Depth | | 15 mm |

Table 118: 5PC810.FA02-00, 5PC810.FA02-01 - Technical data

For information about installing/replacing fan kits, see chapter "Maintenance and service", section 6 "Installing and replacing fan kits" on page 406.

3.7.3 5PC810.FA03-00

3.7.3.1 General information

This fan kit is an optional addition for 3-slot system units.

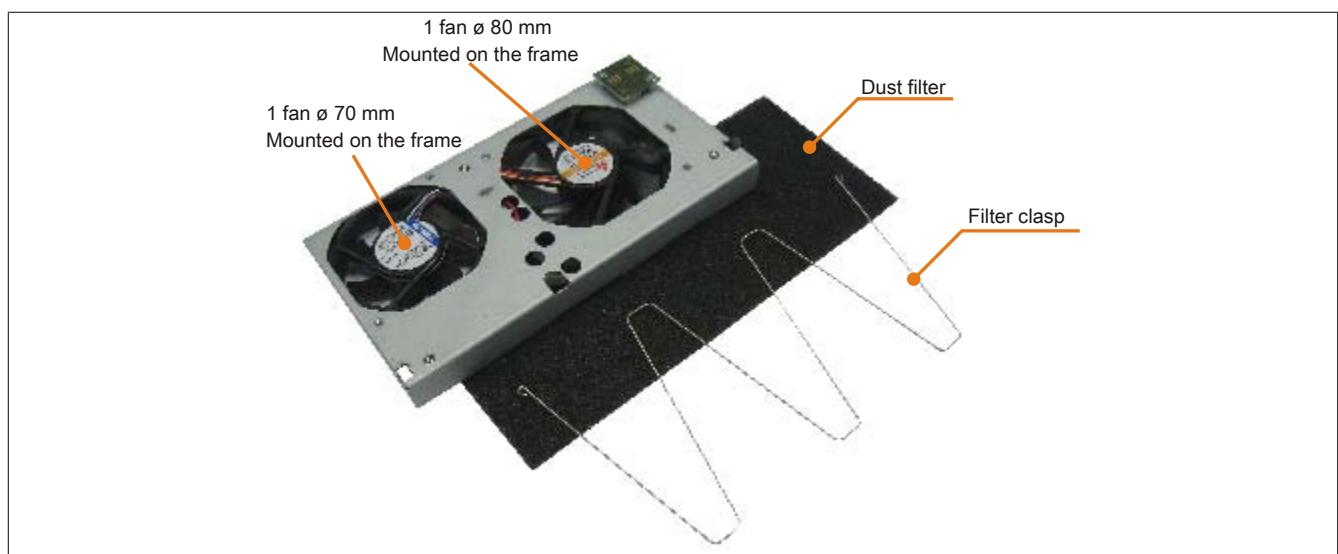


Figure 72: 5PC810.FA03-00 - Fan kit

3.7.3.2 Order data

| Model number | Short description | Figure |
|----------------|--|--------|
| | Fan kits | |
| 5PC810.FA03-00 | APC810 fan kit for 5PC810.SX03-00 system unit | |
| | Optional accessories | |
| | Accessories | |
| 5AC801.FA03-00 | APC810 replacement fan filter for 5PC810.SX03-00; 5 pcs. | |

Table 119: 5PC810.FA03-00 - Order data

3.7.3.3 Technical data

| Product ID | 5PC810.FA03-00 |
|----------------------------|--|
| General information | |
| Number of fans | 2 |
| Speed | Fan 1: Max. 4300 rpm $\pm 12.5\%$ Fan 2: Max. 3200 rpm $\pm 10\%$ |

Table 120: 5PC810.FA03-00 - Technical data

| Product ID | 5PC810.FA03-00 |
|----------------------------|--|
| Noise level | Fan 1: 32 dB Fan 2: 33 dB |
| Service life | Fan 1: 60,000 hours (at 40°C) Fan 2: 75,000 hours (at 40°C) |
| Type | Double ball bearings |
| Certification CE | Yes |
| Mechanical characteristics | |
| Dimensions | |
| Fan | |
| Width | Fan 1: 70 mm Fan 2: 80 mm |
| Height | Fan 1: 70 mm Fan 2: 80 mm |
| Depth | Fan 1: 15 mm Fan 2: 15 mm |

Table 120: 5PC810.FA03-00 - Technical data

For information about installing/replacing fan kits, see chapter "Maintenance and service", section 6 "Installing and replacing fan kits" on page 406.

3.7.4 5PC810.FA05-00

3.7.4.1 General information

This fan kit is an optional addition for 5-slot system units.

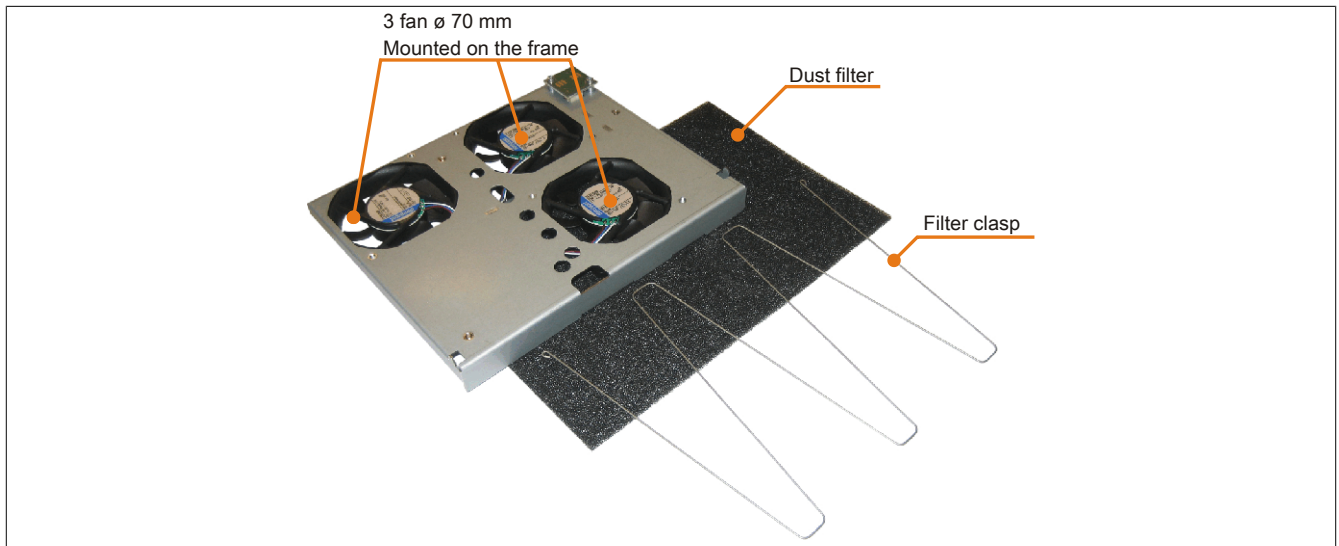


Figure 73: 5PC810.FA05-00 - Fan kit

3.7.4.2 Order data

| Model number | Short description | Figure |
|----------------|--|--------|
| | Fan kits | |
| 5PC810.FA05-00 | APC810 fan kit for 5PC810.SX05-00 system unit | |
| | Optional accessories | |
| | Accessories | |
| 5AC801.FA05-00 | APC810 replacement fan filter for 5PC810.SX05-00; 5 pcs. | |

Table 121: 5PC810.FA05-00 - Order data

3.7.4.3 Technical data

| | |
|-----------------------------------|--------------------------|
| Product ID | 5PC810.FA05-00 |
| General information | |
| Number of fans | 3 |
| Speed | Max. 4300 rpm $\pm 10\%$ |
| Noise level | 32 dB |
| Service life | 60,000 hours (at 40°C) |
| Type | Double ball bearings |
| Certification CE | Yes |
| Mechanical characteristics | |
| Dimensions | |
| Fan | |
| Width | 70 mm |
| Height | 70 mm |
| Depth | 15 mm |

Table 122: 5PC810.FA05-00 - Technical data

For information about installing/replacing fan kits, see chapter "Maintenance and service", section 6 "Installing and replacing fan kits" on page 406.

3.8 AP Link cards

AP Link cards can be installed in the APC810 system units 5PC810.SX02-00, 5PC810.SX03-00 and 5PC810.SX05-00.

3.8.1 5AC801.SDL0-00

3.8.1.1 General information

A second graphics line can be created using an AP Link graphics adapter card. This makes it possible to transfer DVI and SDL signals. RGB signals are not supported. Details can be found in the technical data for the CPU board being used.

Information:

It is only possible to install AP Link SDL transmitters when using the 5PC810.SX02-00, 5PC810.SX03-00 and 5PC810.SX05-00 system units.

For additional information about installing the AP Link SDL transmitter, please see "AP Link installation" on page 424.

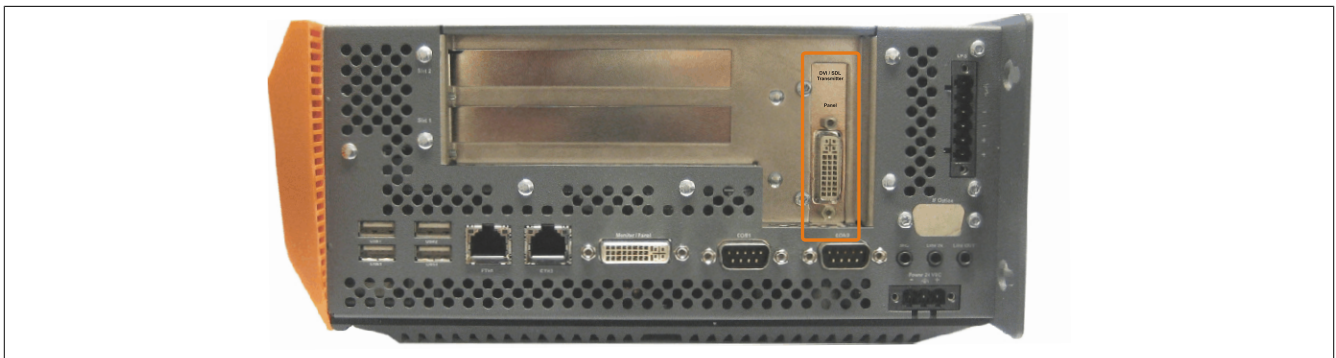


Figure 74: 5PC810.SX02-00 - Installation example in system unit

3.8.1.2 Order data


| Model number | Short description | Figure |
|----------------|---|---|
| | Automation Panel Link interfaces | |
| 5AC801.SDL0-00 | Smart Display Link/DVI-D transmitter |  |

Table 123: 5AC801.SDL0-00 - Order data

3.8.1.3 Technical data

| Product ID | 5AC801.SDL0-00 |
|----------------------------|------------------------|
| General information | |
| Certification | |
| CE | Yes |
| GL | Yes |
| Interfaces | |
| Monitor/Panel interface | |
| Design | Female DVI-D connector |
| Type | SDL/DVI |

Table 124: 5AC801.SDL0-00 - Technical data

3.8.1.4 Pinout

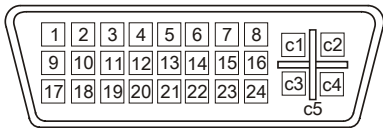
| Pin | Assignment | Description | Pin | Assignment | Description | DVI 24-pin, female  |
|-----|---|---|-----|---------------------------|---------------------------------|---|
| 1 | TMDS data 2- | DVI lane 2 (negative) | 16 | HPD | Hot plug detect | |
| 2 | TMDS data 2+ | DVI lane 2 (positive) | 17 | TMDS data 0- | DVI lane 0 (negative) | |
| 3 | TMDS data 2/4 SHIELD | Shield for data pair 2 and 4 | 18 | TMDS data 0+ | DVI lane 0 (positive) | |
| 4 | SDL- | SDL lane (negative) | 19 | TMDS Data 0/ XUSB1 SHIELD | Shield for data pair 0 and USB1 | |
| 5 | SDL+ | SDL lane (positive) | 20 | XUSB1- | USB lane 1 (negative) | |
| 6 | DDC clock | DDC-based control signal (clock) | 21 | XUSB1+ | USB lane 1 (positive) | |
| 7 | DDC data | DDC-based control signal (data) | 22 | TMDS clock shield | Shield for clock pair | |
| 8 | NC | Not connected | 23 | TMDS clock+ | DVI clock (positive) | |
| 9 | TMDS data 1- | DVI lane 1 (negative) | 24 | TMDS clock - | DVI clock (negative) | |
| 10 | TMDS DATA 1+ | DVI lane 1 (negative) HDMI clock (positive) | C1 | NC | Not connected | |
| 11 | TMDS DATA 1/ XUSB0 SHIELD | Shield for data pair 1 and USB0 | C2 | NC | Not connected | |
| 12 | XUSB0- | USB lane 0 (negative) | C3 | NC | Not connected | |
| 13 | XUSB0+ | USB lane 0 (positive) | C4 | NC | Not connected | |
| 14 | +5 V power ¹⁾ | +5 V power supply | C5 | NC | Not connected | |
| 15 | Ground (return for +5 V, HSync and VSync) | Ground | | | | |

Table 125: DVI interface - Pinout

1) Protected internally by a multifuse.

3.8.1.5 Cable lengths and resolutions for SDL transmission

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

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

Table 126: Cable lengths and resolutions for SDL transmission

3.8.2 5AC801.RDYR-00

3.8.2.1 General information

Since the 5AC801.RDYR-00 ready relay switches the relay contacts as soon as the B&R Automation PC 810 has booted and is supplied internally with all voltages, it is possible to connect additional devices to the relay that will also be switched on.

The 5AC801.RDYR-00 ready relay can only be installed in an AP Link slot.

Information:

It is only possible to install the ready relay when using the 5PC810.SX02-00, 5PC810.SX03-00 and 5PC810.SX05-00 system units.

For additional information about installing the ready relay, see "AP Link installation" on page 424.

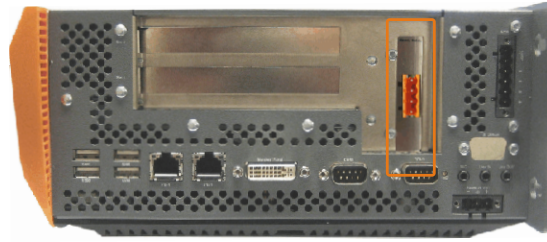


Figure 75: Installation example with the 5PC810.SX02-00 system unit

3.8.2.2 Order data

| Model number | Short description | Figure |
|----------------|---|--------|
| | Automation Panel Link interfaces | |
| 5AC801.RDYR-00 | APC810 ready relay | |
| | Required accessories | |
| | Terminal blocks | |
| 0TB704.9 | Accessory terminal block, 4-pin, screw clamps 2.5 mm² | |
| 0TB704.91 | Accessory terminal block, 4-pin, cage clamp 2.5 mm² | |

Table 127: 5AC801.RDYR-00 - Order data

3.8.2.3 Pinout

| Ready relay - Pinout | |
|--|-------------------------|
| 4-pin multipoint connector - Pinout N.O. and N.C., max. 30 VDC, max. 10 A | |
| Pin | Assignment |
| 1 | Normally open contact |
| 2 | Root |
| 3 | Normally closed contact |
| 4 | NC |
| | |

The diagram shows a cross-section of a 4-pin multipoint connector. The pins are labeled 1, 2, 3, and 4. Pin 1 is the top contact, Pin 2 is the central root, Pin 3 is the bottom contact, and Pin 4 is the side contact. The diagram illustrates the internal structure of the connector, showing the contacts and the root.

Table 128: 5AC801.RDYR-00 ready relay - Pinout

3.9 Ready relay

3.9.1 5AC801.RDYR-01

3.9.2 General information

Since the 5AC801.RDYR-01 ready relay switches the relay contacts as soon as the B&R Automation PC 810 has booted and is supplied internally with all voltages, it is possible to connect additional devices to the relay that will also be switched on.

The 5AC801.RDYR-01 ready relay can only be used in the add-on UPS slot on the APC810 (this slot must be available for this purpose).

The information sheet included in delivery explains how to attach the labels to the Automation PC 810.

Information:

For information about installing the ready relay, see chapter 7 "Maintenance and service", section 13 "Installing the ready relay /2 in the add-on UPS slot" on page 428.

3.9.3 Order data


| Model number | Short description | Figure |
|--------------------|---|--|
| Accessories | |  |
| 5AC801.RDYR-01 | Ready relay for APC810 for installation on an add-on UPS slot | |

Table 129: 5AC801.RDYR-01 - Order data

3.9.4 Pinout

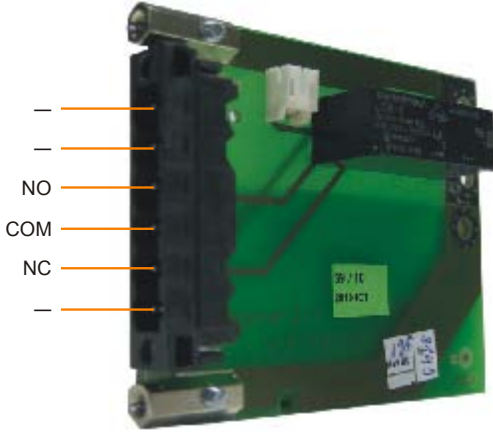
| Pin | Assignment | Description | Figure |
|-----|------------|---------------------|--|
| 1 | - | Not connected |  |
| 2 | - | Not connected | |
| 3 | NO | Normally open | |
| 4 | COM | Change-over contact | |
| 5 | NC | Normally closed | |
| 6 | - | Not connected | |

Table 130: 5AC801.RDYR-01 - Pinout

3.9.5 Contents of delivery

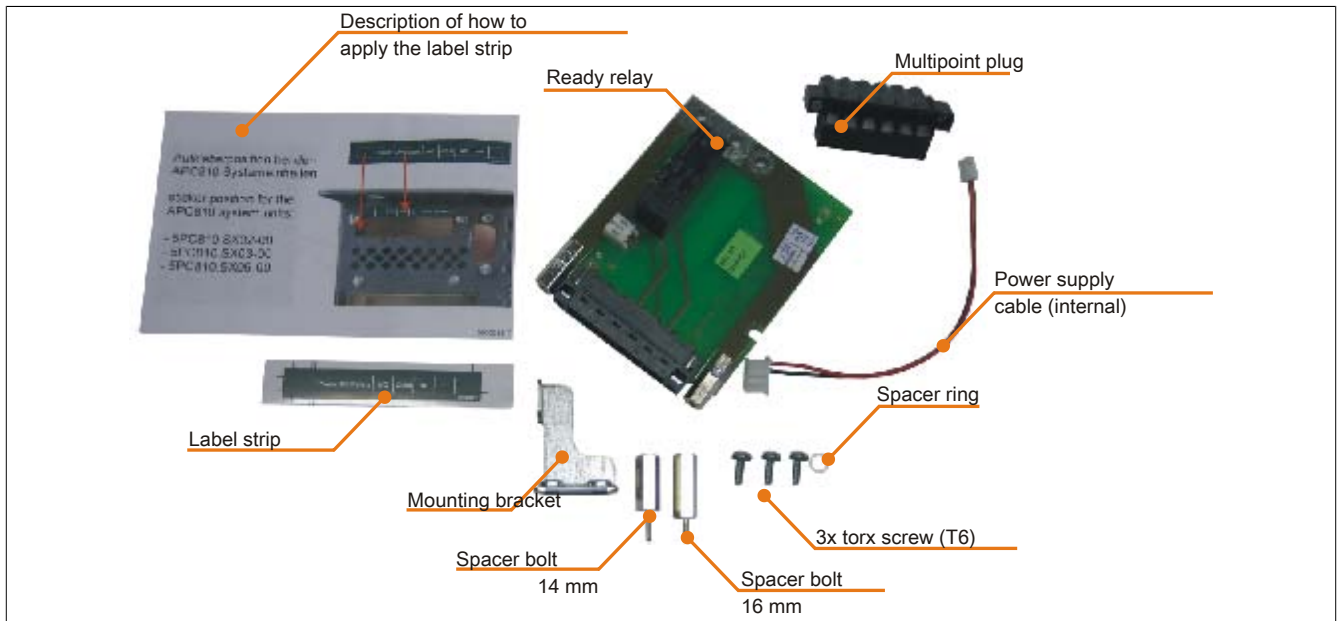


Figure 76: 5AC801.RDYR-01 - Contents of delivery

3.10 Add-on interfaces (IF option)

3.10.1 General information

An additional interface (CAN or combined RS232/422/485) can be installed in the APC810's IF optional slot.

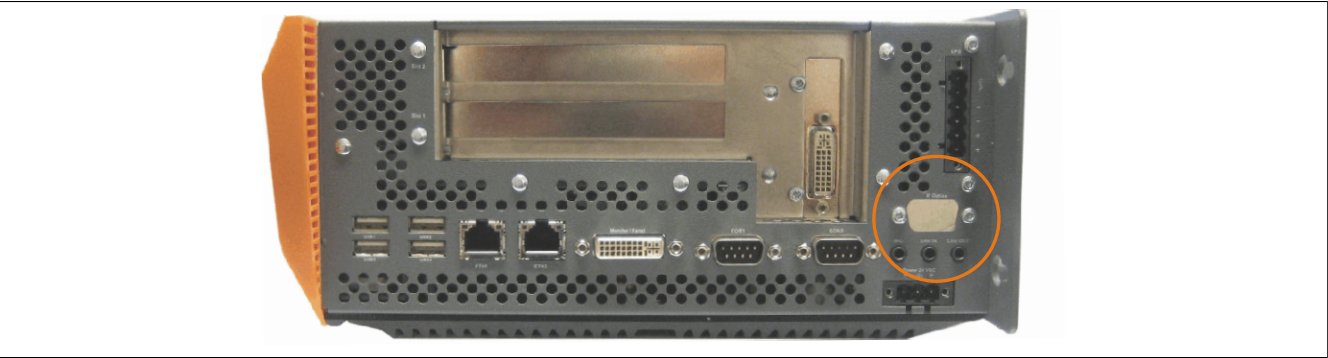


Figure 77: Add-on interfaces (IF option)

Information:

Am add-on interface drive can be inserted, removed or replaced at any time.

Information:

Turn off power before inserting or removing an add-on interface.

3.10.2 5AC600.CANI-00

3.10.2.1 General information

The add-on CAN interface is equipped with an Intel 82527 CAN controller that conforms to the CAN 2.0 specification, Part A/B. The CAN controller can trigger an NMI (non-maskable interrupt).

3.10.2.2 Order data


| Model number | Short description | Figure |
|-----------------|--|---|
| Serial adapters | |  |
| 5AC600.CANI-00 | CAN interface; for installation in an APC620, APC810 or PPC700 | |

Table 131: 5AC600.CANI-00 - Order data

3.10.2.3 Technical data

| Product ID | 5AC600.CANI-00 |
|----------------------|--|
| General information | |
| Certification | |
| CE | Yes |
| cULus | Yes |
| Interfaces | |
| CAN | |
| Quantity | 1 |
| Controller | Bosch CC770 (compatible with Intel 82527 CAN controller) |
| Design | 9-pin male DSUB connector |
| Terminating resistor | |
| Type | Can be enabled or disabled using a sliding switch |
| Default setting | Disabled |

Table 132: 5AC600.CANI-00 - Technical data

3.10.2.4 Pinout

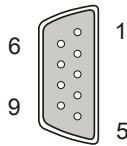
| Add-on CAN | | 9-pin male DSUB connector  |
|---------------|-----------------------|--|
| Type | Electrically isolated | |
| Transfer rate | Max. 500 kbit/s | |
| Bus length | Max. 1000 meters | |
| Pin | Assignment | |
| 1 | NC | |
| 2 | CAN low | |
| 3 | GND | |
| 4 | NC | |
| 5 | NC | |
| 6 | Reserved | |
| 7 | CAN high | |
| 8 | NC | |
| 9 | NC | |

Table 133: CAN - Pinout

3.10.2.5 I/O address and IRQ

| Resource | Default setting | Additional setting options |
|-------------|-----------------|----------------------------|
| I/O address | 384h / 385h | - |
| IRQ | IRQ10 | NMI ¹ |

Table 134: Add-on CAN - I/O address and IRQ

¹ NMI = Non-maskable interrupt.

The IRQ setting can be changed in BIOS Setup. It is possible for conflicts with other resources to occur when changing this setting.

| I/O address | Register | Function |
|-------------|------------------|---|
| 384h | Address register | Defines the register number to access. |
| 385h | Data registers | Access to the register defined in the address register. |

3.10.2.6 Bus length and cable type

The type of cable used depends largely on the required bus length and the number of nodes. The bus length is mainly determined by the bit rate. In accordance with CiA (CAN in Automation) the maximum bus length is 1000 meters.

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

| Distance [m] | Transfer rate [kbit/s] |
|--------------|------------------------|
| ≤1000 | Typ. 50 |
| ≤200 | Typ. 250 |
| ≤60 | Typ. 500 |

Table 135: CAN - Bus length and transfer rate

The material used for the cable should preferably have all or most of the following properties in order to achieve an optimal transfer rate.

| CAN cables | Property |
|----------------------|---|
| Signal lines | |
| Cable cross section | 2x 0.25 mm ² (24AWG/19), tinned Cu stranded wire |
| Wire insulation | PE |
| Conductor resistance | ≤ 82 Ω / km |
| Stranding | Wires stranded in pairs |
| Shield | Paired shield with aluminum foil |
| Grounding line | |
| Cable cross section | 1x 0.34 mm ² (22AWG/19), tinned Cu stranded wire |
| Wire insulation | PE |
| Conductor resistance | ≤ 59 Ω / km |
| Outer sheathing | |
| Materials | PUR mixture |
| Features | Halogen-free |
| Cable shielding | From tinned copper wires |

Table 136: CAN - Cable requirements

3.10.2.7 Terminating resistor

CAN networks are cabled using a bus structure where both ends of the bus are equipped with terminating resistors. The add-on CAN interface has an integrated terminating resistor (factory setting: disabled with the setting "Off").

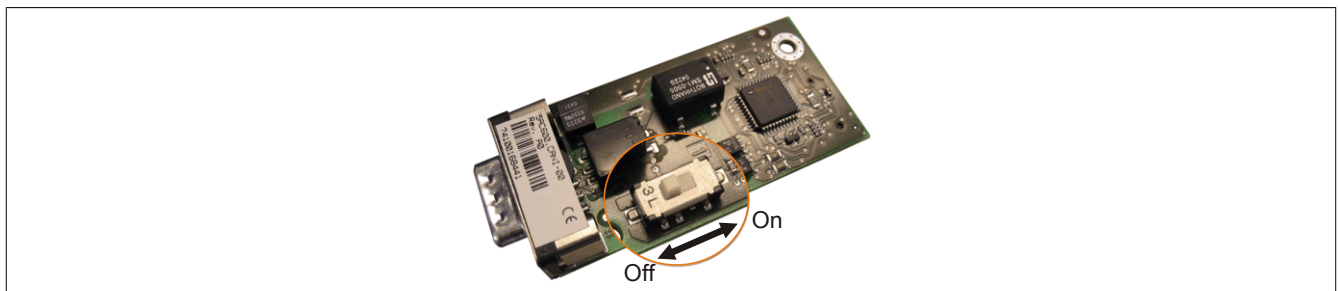


Figure 78: 5AC600.CANI-00 - Terminating resistor for add-on CAN interface

3.10.2.8 Contents of delivery

The screws included in the mounting kit are used for installation.

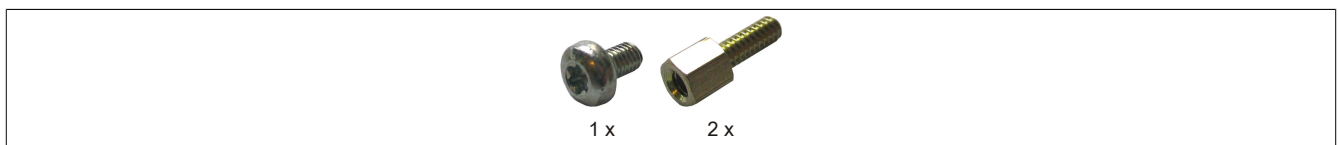


Figure 79: 5AC600.CANI-00 - Contents of delivery / mounting material

3.10.2.9 Driver support

Due to the dual core processors, driver version 2.36 of INACAN.SYS included in the PVI 2.6.0.3105 installer is required for operation.

Information:

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

3.10.3 5AC600.485I-00

3.10.3.1 General information

This serial interface is a combined RS232/RS422/RS485 interface. The operating mode (RS232/RS422/RS485) is selected automatically depending on the electrical connection.

3.10.3.2 Order data


| Model number | Short description | Figure |
|----------------|--|---|
| 5AC600.485I-00 | Serial adapters RS232/422/485 interface, for installation in an APC620, APC810 or PPC700 |  |

Table 137: 5AC600.485I-00 - Order data

3.10.3.3 Technical data

| Product ID | 5AC600.485I-00 |
|----------------------------|---|
| General information | |
| Certification | |
| CE | Yes |
| cULus | Yes |
| GL | Yes |
| Interfaces | |
| COM1 | |
| Type | RS232, not modem-capable, electrically isolated |
| Design | 9-pin male DSUB connector |
| Max. baud rate | 115 kbit/s |

Table 138: 5AC600.485I-00 - Technical data

3.10.3.4 Pinout

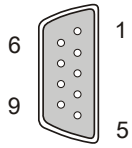
| Add-on RS232/422/485 | | | |
|----------------------|--|-----------------------|--|
| | RS232 | RS422/485 | 9-pin male DSUB connector  |
| Type | RS232 not modem compatible; Electrically isolated | | |
| UART | 16550-compatible, 16-byte FIFO | | |
| Transfer rate | Max. 115 kbit/s | | |
| Bus length | Max. 15 meters | Max. 1200 meters | |
| Pin | RS232 - Pinout | RS422 - Pinout | |
| 1 | NC | TXD\ | |
| 2 | RXD | NC | |
| 3 | TXD | NC | |
| 4 | NC | TXD | |
| 5 | GND | GND | |
| 6 | NC | RXD\ | |
| 7 | RTS | NC | |
| 8 | CTS | NC | |
| 9 | NC | RXD | |

Table 139: RS232/RS422 - Pinout

3.10.3.5 I/O address and IRQ

| Resource | Default setting | Additional setting options |
|-------------|-----------------|----------------------------|
| I/O address | 2E8h | 238, 2F8, 338, 3E8, 3F8 |
| IRQ | IRQ10 | IRQ 3, 4, 5, 7, 11, 12 |

Table 140: Add-on RS232/422/485 - I/O address and IRQ

Setting for the I/O address and IRQ can be changed in BIOS Setup ("Advanced" - "Baseboard / Panel features" - "Legacy devices", "COM E"). It is possible for conflicts with other resources to occur when changing this setting.

3.10.3.6 RS232 - Bus length and cable type

The maximum transfer rate of 115 kbit/s depends on the type of cable being used.

| Distance [m] | Transfer rate [kbit/s] |
|--------------|------------------------|
| ≤15 | Typ. 64 |
| ≤10 | Typ. 115 |
| ≤5 | Typ. 115 |

Table 141: RS232 - Bus length and transfer rate

The material used for the cable should preferably have all or most of the following properties in order to achieve an optimal transfer rate.

| RS232 cables | |
|-----------------|--|
| Signal lines | 4x 0.16 mm ² (26AWG), tinned Cu stranded wire PE ≤ 82 Ω / km Wires stranded in pairs Paired shield with aluminum foil |
| Grounding line | 1x 0.34 mm ² (22AWG/19), tinned Cu stranded wire PE ≤ 59 Ω / km |
| Outer sheathing | PUR mixture Halogen-free From tinned copper wires |
| Materials | |
| Features | |
| Cable shielding | |

Table 142: RS232 - Cable requirements

3.10.3.7 RS422 - Bus length and cable type

The RTS line must be switched on to switch the transmitter to active.

The maximum transfer rate of 115 kbit/s depends on the type of cable being used.

| Distance [m] | Transfer rate [kbit/s] |
|--------------|------------------------|
| 1200 | Typ. 115 |

Table 143: RS422 - Bus length and transfer rate

The material used for the cable should preferably have all or most of the following properties in order to achieve an optimal transfer rate.

| RS422 cables | | Property |
|-----------------|---|----------|
| Signal lines | 4x 0.25 mm ² (24AWG/19), tinned Cu stranded wire PE ≤ 82 Ω / km wires stranded in pairs Paired shield with aluminum foil | |
| Grounding line | 1x 0.34 mm ² (22AWG/19), tinned Cu stranded wire PE ≤ 59 Ω / km | |
| Outer sheathing | PUR mixture Halogen-free From tinned copper wires | |
| Materials | | |
| Features | | |
| Cable shielding | | |

Table 144: RS422 - Cable requirements

3.10.3.8 When operated as an RS485 interface

When operated in this mode, the pins of the RS422 default interface (1, 4, 6 and 9) must be used. Pins should be connected as shown.

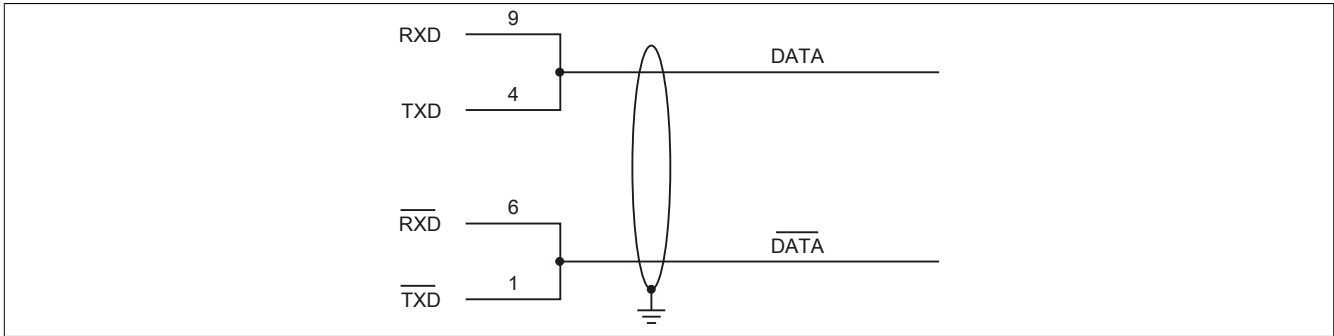


Figure 80: Add-on RS232/422/485 interface - Operated in RS485 mode

The RTS line must be switched by the driver for each transmission or reception; there is no automatic switch-back mechanism. This cannot be configured in Windows.

The voltage drop resulting from long cable lengths can lead to greater potential differences between bus stations, which can hinder communication. This can be improved by running ground wire with the others.

The line ends of the RS485 interface should (at least for longer line lengths or larger transfer rates) be closed. Normally a passive terminator can be used on the bus ends by connecting each of the signal lines with a 120 Ω resistor.

3.10.3.9 RS485 - Bus length and cable type

The maximum transfer rate of 115 kbit/s depends on the type of cable being used.

| Distance [m] | Transfer rate [kbit/s] |
|--------------|------------------------|
| 1200 | Typ. 115 |

Table 145: RS485 - Bus length and transfer rate

The material used for the cable should preferably have all or most of the following properties in order to achieve an optimal transfer rate.

| RS485 cables | Property |
|----------------------|---|
| Signal lines | |
| Cable cross section | 4x 0.25 mm ² (24AWG/19), tinned Cu stranded wire |
| Wire insulation | PE |
| Conductor resistance | $\leq 82 \Omega / \text{km}$ |
| Stranding | Wires stranded in pairs |
| Shield | Paired shield with aluminum foil |
| Grounding line | |
| Cable cross section | 1x 0.34 mm ² (22AWG/19), tinned Cu stranded wire |
| Wire insulation | PE |
| Conductor resistance | $\leq 59 \Omega / \text{km}$ |
| Outer sheathing | |
| Materials | PUR mixture |
| Features | Halogen-free |
| Cable shielding | From tinned copper wires |

Table 146: RS422 - Cable requirements

3.10.3.10 Contents of delivery

The screws included in the mounting kit are used for installation.

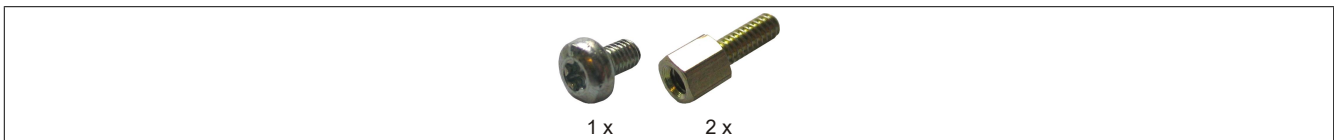


Figure 81: 5AC600.485I-00 - Contents of delivery / mounting material

Chapter 3 • Installation

1 Installation

Devices are installed using the mounting plates found on the housing. These plates are designed for M5 screws.

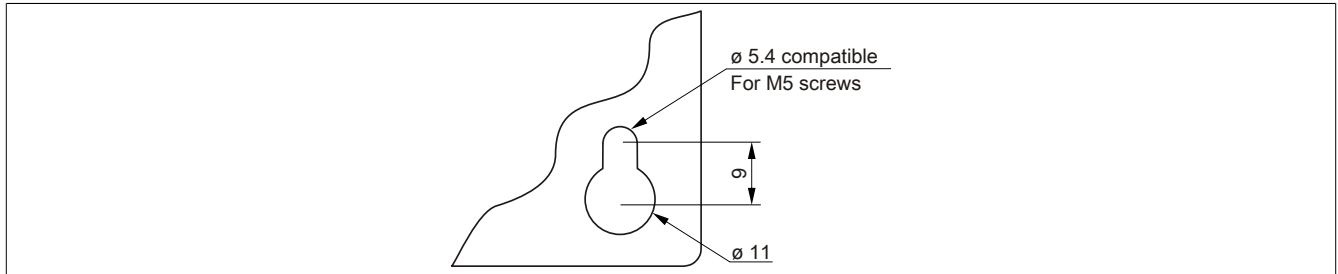


Figure 82: Mounting plates

The exact position of the mounting holes is illustrated in the drilling templates in 2 "Technical data", section "Individual components" on page 75.

1.1 Procedure

1. Drill the necessary holes in the control cabinet. The exact position of the mounting holes is illustrated in the drilling templates.
2. Mount the B&R Industrial PC to the control cabinet using M5 screws.

1.2 Important installation information

- Environmental conditions must be taken into consideration.
- This device must be mounted to a flat surface.
- This device is only certified for operation in closed rooms.
- This device must not be subjected to direct sunlight.
- Ventilation holes must not be covered.
- This device must be mounted in one of the approved orientations.
- The wall or control cabinet must be able to withstand four times the total weight of the device.
- The flex radius of connected cables (DVI, SDL, USB, etc.) must not be exceeded.

1.3 Mounting orientation

The APC810 must be mounted as described in the following sections.

1.3.1 Vertical mounting orientation

APC810 systems with or without a fan kit can be mounted in this orientation.

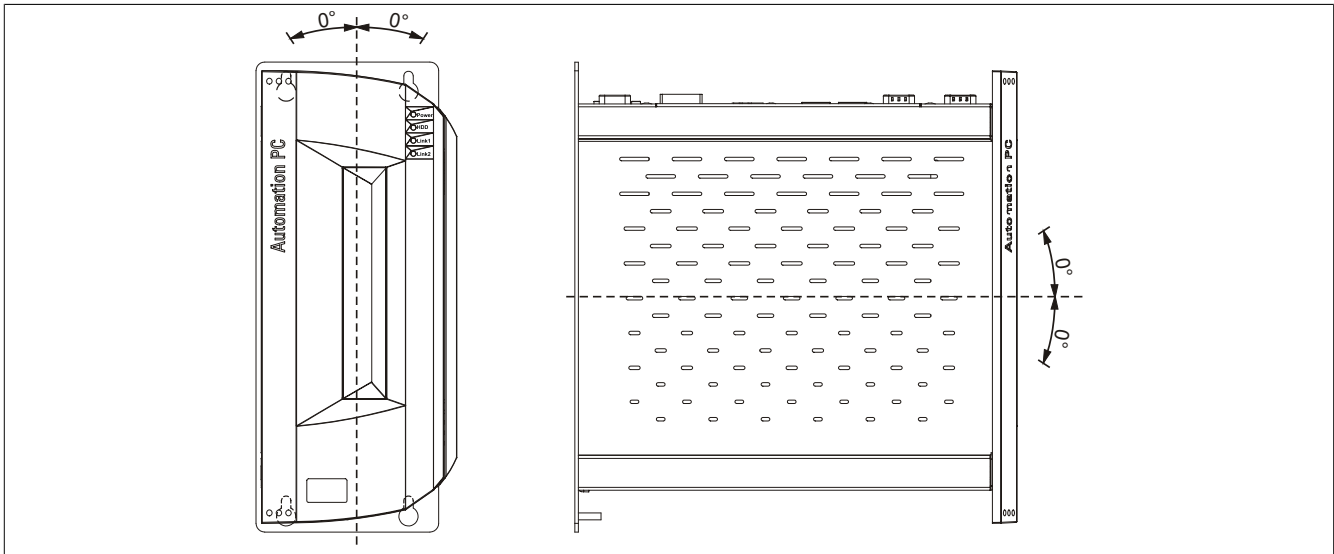


Figure 83: Vertical mounting orientation

In order to facilitate natural air circulation, devices must be mounted according to the spacing indicated in the section "Spacing for air circulation" on page 188.

1.3.2 Horizontal mounting orientation

Operation in the horizontal mounting orientation (heat sink on top) requires the use of a fan kit. The maximum ambient temperature specification must be reduced by 5°C.

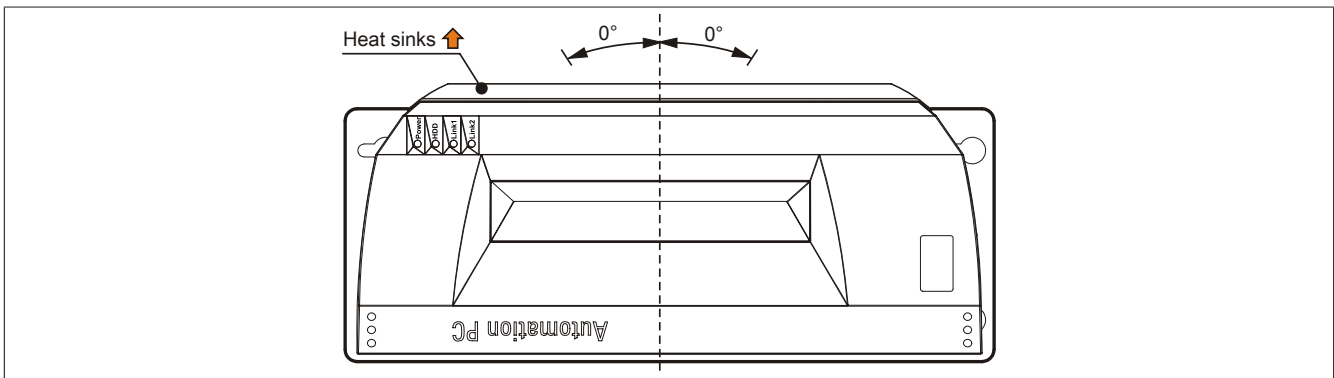


Figure 84: Horizontal mounting orientation

In order to facilitate natural air circulation, devices must be mounted according to the spacing indicated in the section "Spacing for air circulation" on page 188.

1.4 Spacing for air circulation

In order to guarantee sufficient air circulation, allow the specified amount of space above, below, to the side and behind the Automation PC 810 devices. The minimum specified spacing is indicated in the following diagram. This applies to all Automation PC 810 variants.

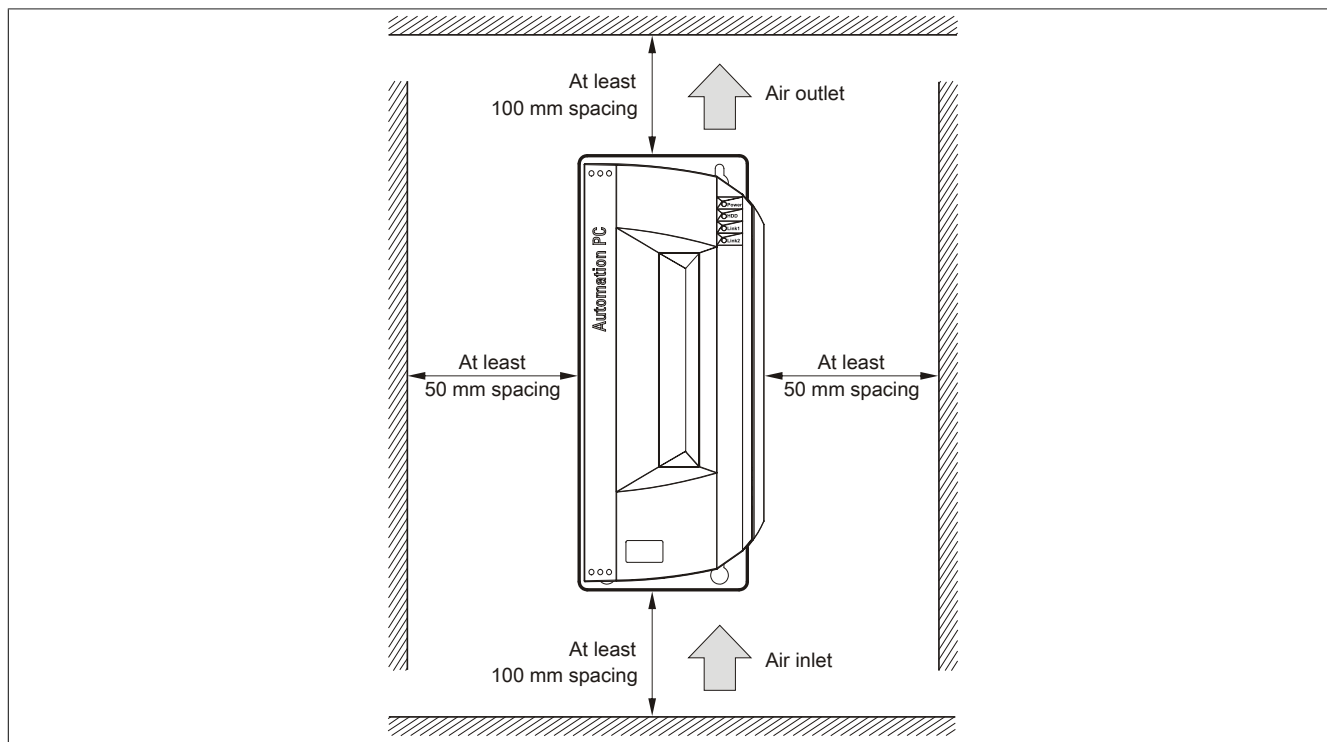


Figure 85: Standard mounting - Spacing

These defined distances are valid for both the vertical and horizontal mounting orientations for the APC810.

Information:

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

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

2 Cable connections

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

Information:

The maximum torque for the locating screws is 0.5 Nm.

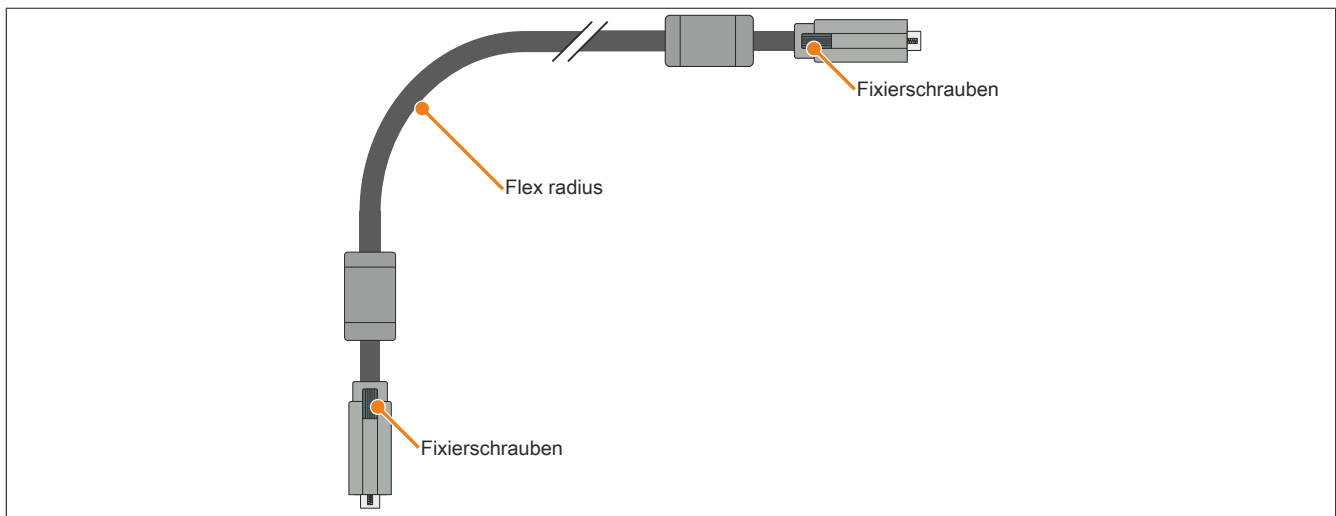


Figure 86: Flex radius - Cable connection

Information:

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

3 Grounding concept

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

The functional ground on the device has 2 connections:

- Supply voltage
- Ground connection

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

- The device should be connected to the central grounding point in the control cabinet using the shortest route possible.
- A cable with a minimum cross section of 2.5 mm^2 per connection should be used. If a cable with wire end sleeves is connected to the 0TB103.9 or 0TB103.91 terminal block, then a cable with maximum 1.5 mm^2 per connection is possible.
- Note the line shielding concept; all connected data cables are used as shielded lines.

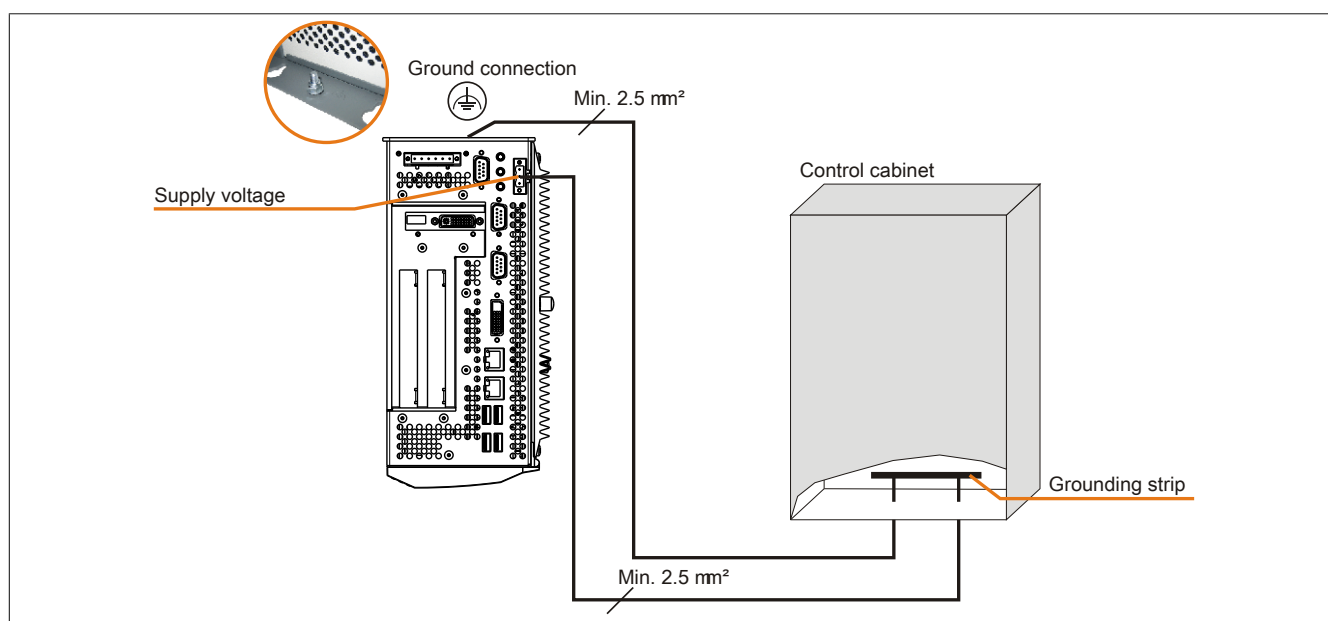


Figure 87: Grounding concept

4 General instructions for performing temperature testing

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

4.1 Procedure

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

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

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

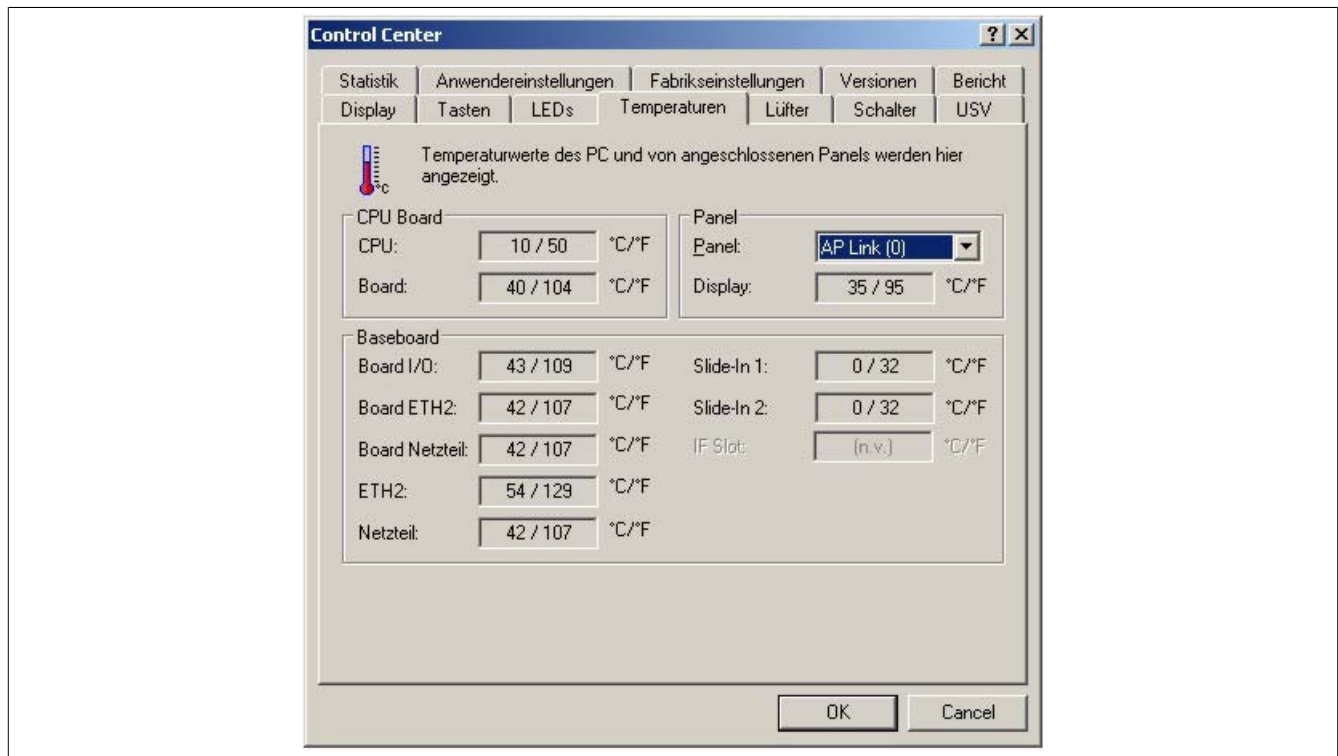
For information about the locations of temperature sensors and the maximum specified values, please see section "Temperatursensorpositionen" in chapter 2 "Technical data".

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

4.2 Evaluating temperatures in Windows operating systems

4.2.1 Evaluating with the B&R Control Center

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



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

Information:

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

4.2.2 Evaluating with the BurnInTest tool from Passmark

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

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

Information:

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

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

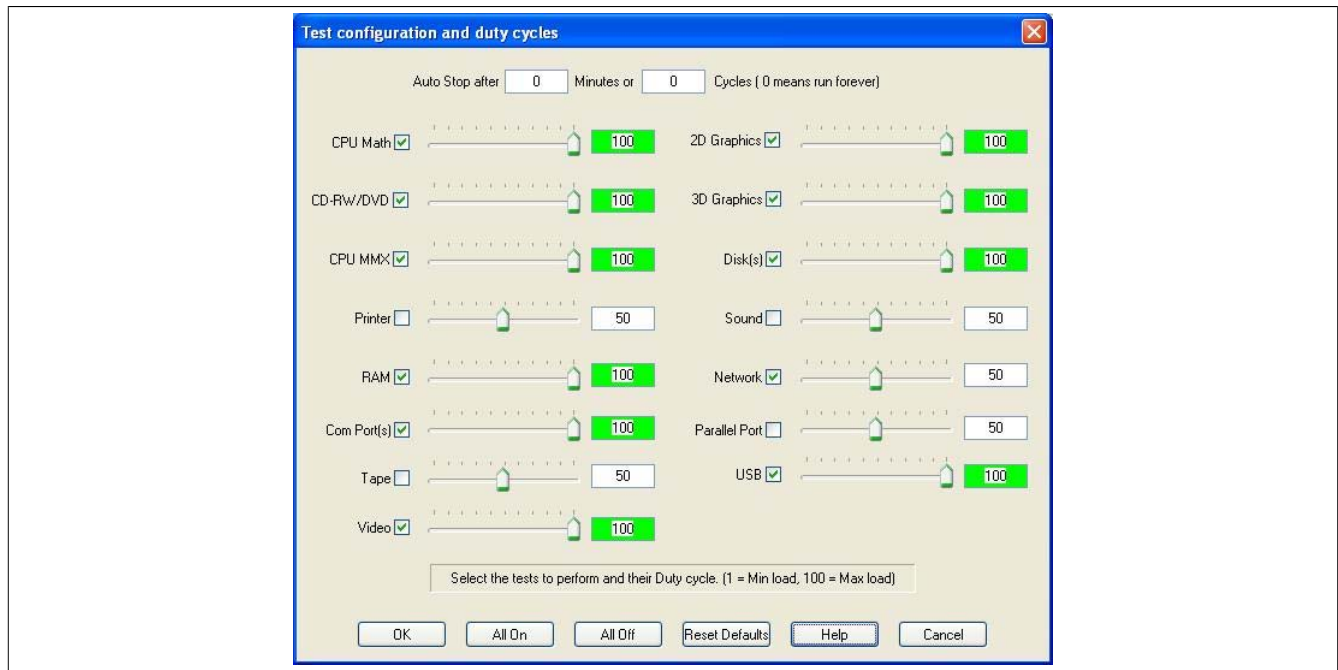


Figure 88: Settings for Passmark BurnInTest Pro V4 and a 2-slot APC810 with DVD

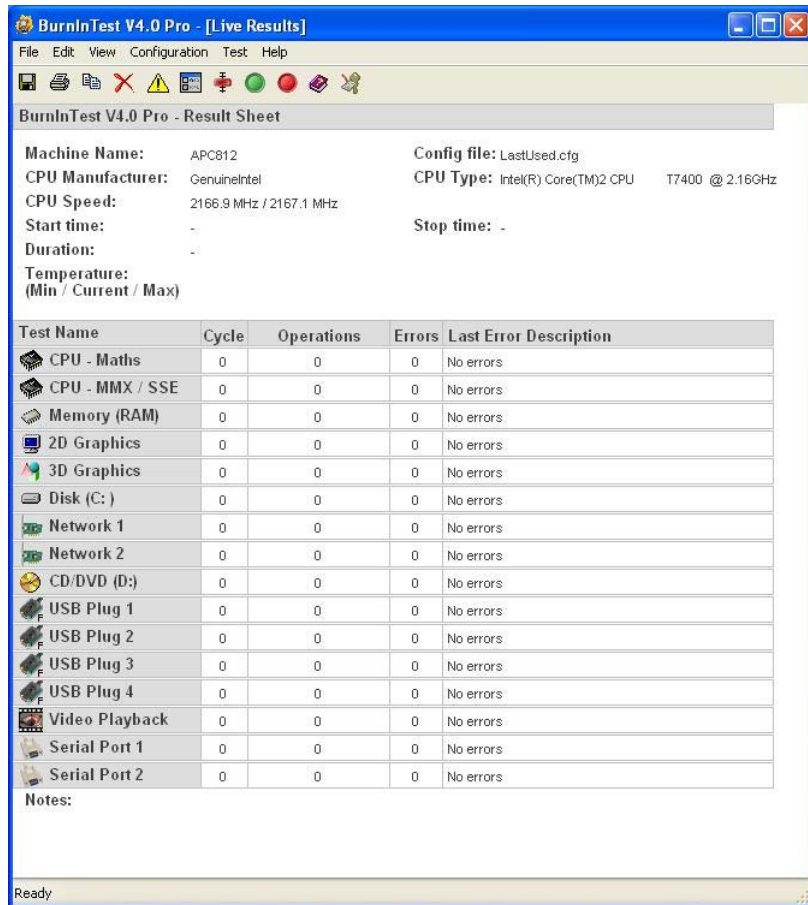


Figure 89: Test overview of a 2-slot APC810 with DVD

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

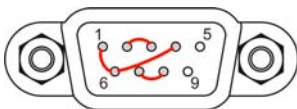
Information:

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



Information:

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



4.3 Evaluating temperatures in operating systems other than Windows

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

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

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

Information:

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

4.4 Evaluating the measurement results

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

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

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

Example using a 2-slot APC810

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

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

Table 147: Evaluation example using a 2-slot APC810

5 Connection examples

The following examples provide an overview of the configuration options for connecting Automation Panel 800 and Automation Panel 900 and/or Automation Panel 800 devices with the APC810. The following questions will be answered:

- How are Automation Panel 900 devices connected to the monitor/panel output of the APC810? What needs to be considered?
- How are Automation Panel 800 devices connected to the monitor/panel output of the APC810? What needs to be considered?
- How are Automation Panel 900 devices connected simultaneously to the monitor/panel output on the APC810's optional SDL AP Link? What needs to be considered?
- What are the "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 numbered internally?
- Are there limitations to the segment length? If so, what are they?
- What cables and link modules are needed?
- Do BIOS settings have to be changed for a specific configuration?

5.1 Selecting display units

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

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

Table 148: Selecting display units

5.2 One Automation Panel 900 system via onboard DVI

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

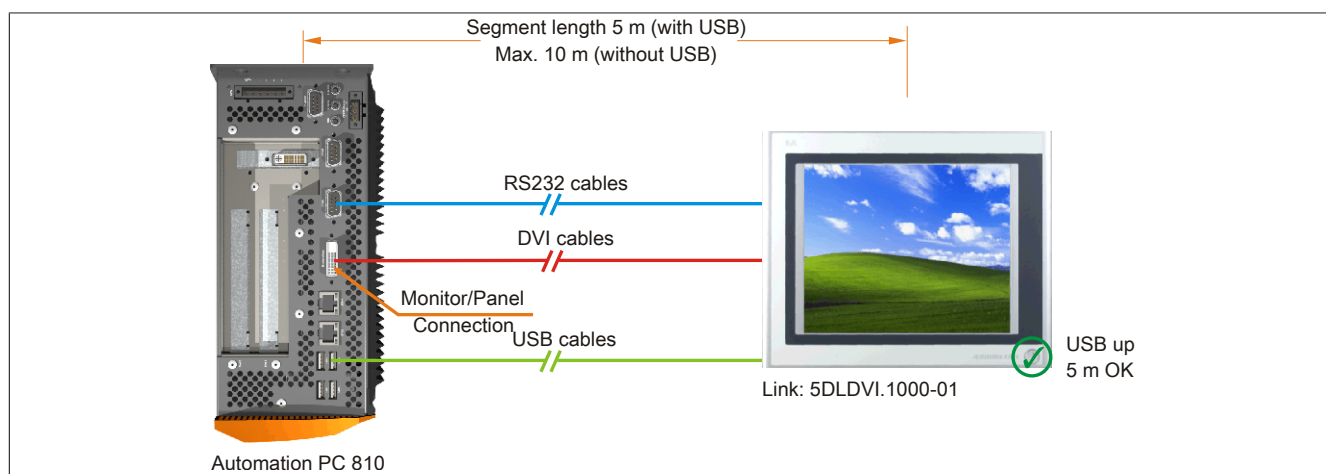


Figure 90: One Automation Panel 900 system via onboard DVI

5.2.1 Base system requirements

The following table lists the possible APC810 system unit and CPU board combinations necessary 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 |
|----------------|------------------|----------------|----------------|----------------|------------|
| | 5PC810.SX01-00 | 5PC810.SX02-00 | 5PC810.SX03-00 | 5PC810.SX05-00 | Resolution |
| 5PC800.B945-00 | ✓ | ✓ | ✓ | ✓ | Max. SXGA |
| 5PC800.B945-10 | | | | | |
| 5PC800.B945-01 | ✓ | ✓ | ✓ | ✓ | Max. SXGA |
| 5PC800.B945-11 | | | | | |
| 5PC800.B945-02 | ✓ | ✓ | ✓ | ✓ | Max. SXGA |
| 5PC800.B945-12 | | | | | |
| 5PC800.B945-03 | ✓ | ✓ | ✓ | ✓ | Max. SXGA |
| 5PC800.B945-13 | | | | | |
| 5PC800.B945-04 | ✓ | ✓ | ✓ | ✓ | Max. SXGA |
| 5PC800.B945-14 | | | | | |
| 5PC800.B945-05 | ✓ | ✓ | ✓ | ✓ | Max. SXGA |

Table 149: Possible system unit and CPU board combinations

5.2.2 Link modules

Information:

A corresponding Link module must be selected for each 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); 24 VDC (order screw clamp 0TB103.9 or cage clamp 0TB103.91 separately) | For Automation Panel 900 |

Table 150: Link modules

5.2.3 Cables

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

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

Table 151: Cables for DVI configurations

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

Table 151: Cables for DVI configurations

Information:

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

5.2.4 Possible Automation Panel devices, resolutions and segment lengths

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

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

Table 152: Possible Automation Panel devices, resolutions and segment lengths

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

Information:

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

5.2.5 BIOS settings

No special BIOS settings are necessary for operation.

5.3 One Automation Panel 900 system via onboard SDL

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

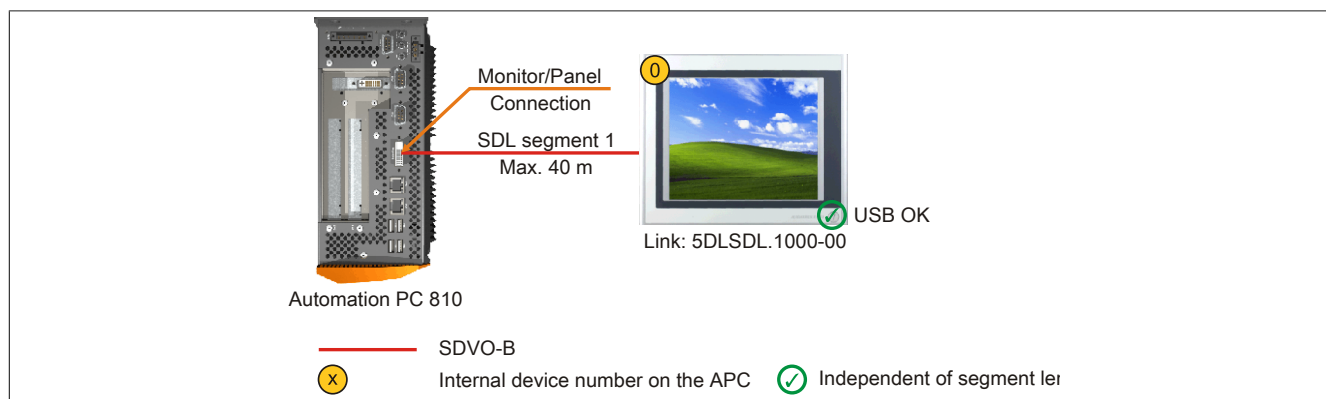


Figure 91: One Automation Panel 900 system via onboard SDL

5.3.1 Base system requirements

The following table lists the possible APC810 system unit and CPU board combinations necessary 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 |
|----------------------------------|------------------|----------------|----------------|----------------|-----------------------|
| | 5PC810.SX01-00 | 5PC810.SX02-00 | 5PC810.SX03-00 | 5PC810.SX05-00 | |
| 5PC800.B945-00 5PC800.B945-10 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-01 5PC800.B945-11 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-02 5PC800.B945-12 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-03 5PC800.B945-13 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-04 5PC800.B945-14 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-05 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |

Table 153: Possible system unit and CPU board combinations

5.3.2 Link modules

Information:

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

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

Table 154: Link modules

5.3.3 Cables

Select an Automation Panel 900 cable from the following table.

| Model number | Description | Length |
|----------------|-----------------------|--------------|
| 5CASDL.0018-00 | SDL cable, 1.8 m | 1.8 m ±30 mm |
| 5CASDL.0050-00 | SDL cable, 5 m | 5 m ±30 mm |
| 5CASDL.0100-00 | SDL cable, 10 m | 10 m ±50 mm |
| 5CASDL.0150-00 | SDL cable, 15 m | 15 m ±100 mm |
| 5CASDL.0200-00 | SDL cable, 20 m | 20 m ±100 mm |
| 5CASDL.0250-00 | SDL cable, 25 m | 25 m ±100 mm |
| 5CASDL.0300-00 | SDL cable, 30 m | 30 m ±100 mm |
| 5CASDL.0018-03 | SDL flex cable, 1.8 m | 1.8 m ±20 mm |
| 5CASDL.0050-03 | SDL flex cable, 5 m | 5 m ±45 mm |
| 5CASDL.0100-03 | SDL flex cable, 10 m | 10 m ±90 mm |

Table 155: Cables for SDL configurations

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

Table 155: Cables for SDL configurations

Information:

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

5.3.3.1 Cable lengths and resolutions for SDL transmission

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

| SDL 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 | FHD 1920 x 1080 |
| 1.8 | 5CASDL.0018-00 | 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.0018-01 |
| | 5CASDL.0018-03 | 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.0050-00 |
| | 5CASDL.0050-01 | 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 | 5CASDL.0050-03 |
| 10 | 5CASDL.0100-00 | 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.0100-01 |
| | 5CASDL.0100-03 | 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 | - | 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 | - | 5CASDL.0200-03 |
| | 5CASDL.0250-00 | 5CASDL.0250-00 | 5CASDL.0250-00 | - | - | - |
| 25 | 5CASDL.0250-03 | 5CASDL.0250-03 | 5CASDL.0250-03 | - | - | - |
| | 5CASDL.0300-00 | 5CASDL.0300-00 | - | - | - | - |
| | 5CASDL.0300-03 | 5CASDL.0300-03 | 5CASDL.0300-13 | 5CASDL.0300-13 | - | 5CASDL.0300-13 |
| 30 | 5CASDL.0300-00 | 5CASDL.0300-00 | - | - | - | - |
| | 5CASDL.0300-03 | 5CASDL.0300-03 | 5CASDL.0300-13 | 5CASDL.0300-13 | - | 5CASDL.0300-13 |
| 40 | 5CASDL.0400-13 | 5CASDL.0400-13 | 5CASDL.0400-13 | 5CASDL.0400-13 | - | 5CASDL.0400-13 |

Table 156: Cable lengths and resolutions for SDL transmission

5.3.4 Settings in BIOS

No special BIOS settings are necessary for operation.

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

Touch screen functionality

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

5.4 One Automation Panel 800 system via onboard SDL

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

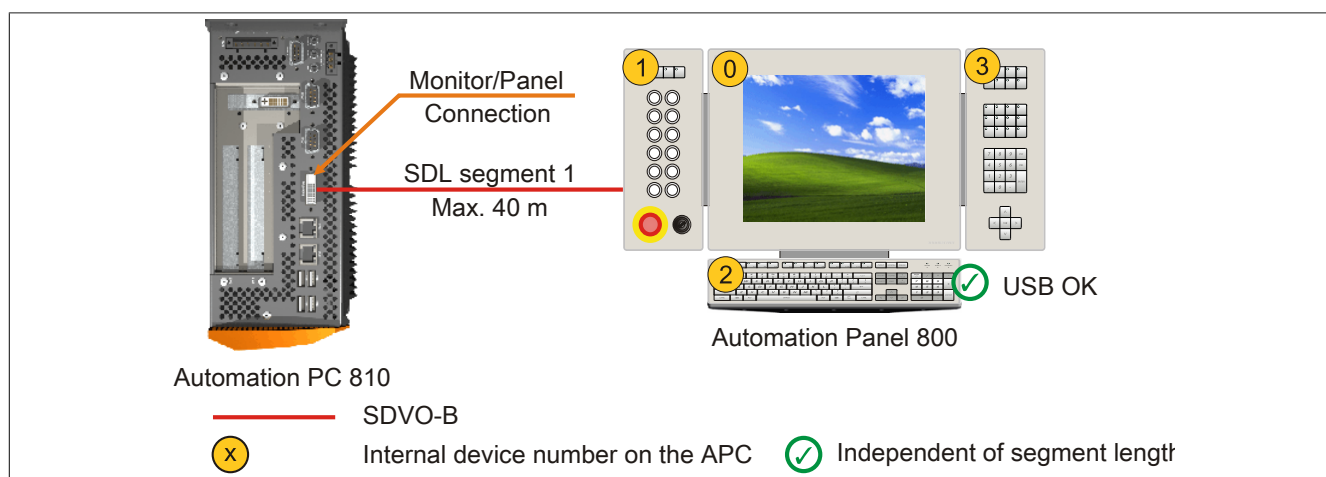


Figure 92: One Automation Panel 800 system via onboard SDL

5.4.1 Base system requirements

The following table lists the possible APC810 system unit and CPU board combinations necessary 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 |
|----------------|------------------|----------------|----------------|----------------|--------------------------|
| | 5PC810.SX01-00 | 5PC810.SX02-00 | 5PC810.SX03-00 | 5PC810.SX05-00 | |
| 5PC800.B945-00 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-10 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-01 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-11 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-02 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-12 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-03 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-13 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-04 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-14 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-05 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |

Table 157: Possible system unit and CPU board combinations

5.4.2 Cables

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

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

Table 158: Cables for SDL configurations

Information:

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

5.4.2.1 Cable lengths and resolutions for SDL transmission

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

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

Table 159: Cable lengths and resolutions for SDL transmission

5.4.3 Settings in BIOS

No special BIOS settings are necessary for operation.

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

Touch screen functionality

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

5.5 One AP900 and one AP800 via onboard SDL

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

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

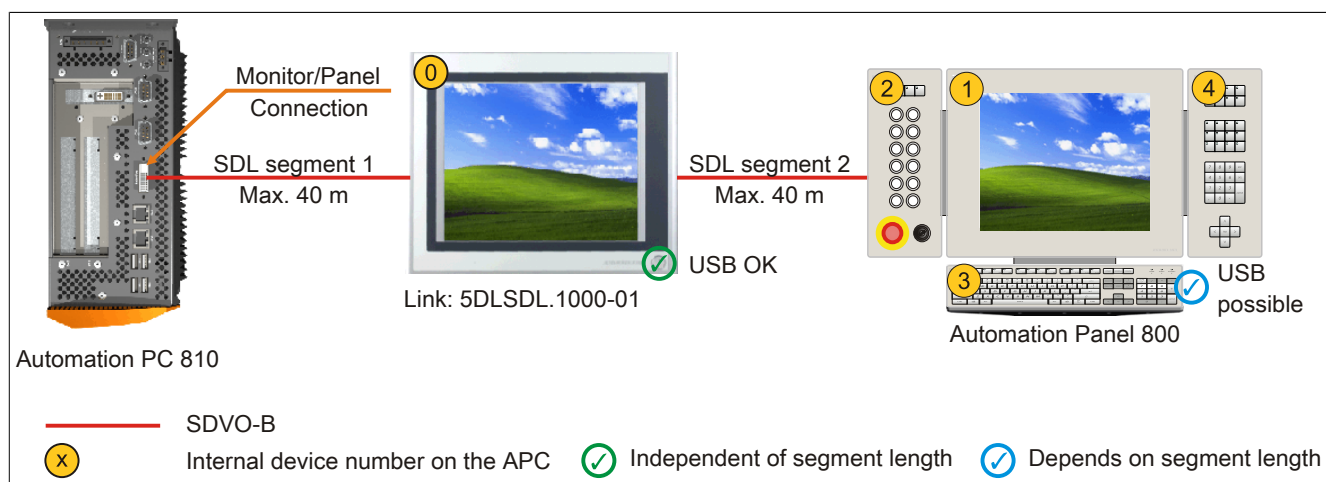


Figure 93: One AP900 system and one AP800 system via onboard SDL

5.5.1 Base system requirements

The following table lists the possible APC810 system unit and CPU board combinations necessary 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 |
|----------------------------------|------------------|----------------|----------------|----------------|--------------------------|
| | 5PC810.SX01-00 | 5PC810.SX02-00 | 5PC810.SX03-00 | 5PC810.SX05-00 | |
| 5PC800.B945-00 5PC800.B945-10 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-01 5PC800.B945-11 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-02 5PC800.B945-12 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-03 5PC800.B945-13 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-04 5PC800.B945-14 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-05 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |

Table 160: Possible system unit and CPU board combinations

5.5.2 Link modules

Information:

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

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

Table 161: Link modules

5.5.3 Cables

For a selection of SDL cables for connecting the AP900 display to an AP900 display, see "Cables" on page 198.

For a selection of SDL cables for connecting the AP800 display to an AP900 display, see "Cables" on page 200.

Information:

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

5.5.4 Settings in BIOS

No special BIOS settings are necessary for operation.

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

Touch screen functionality

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

5.6 Four Automation Panel 900 systems via onboard SDL

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

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

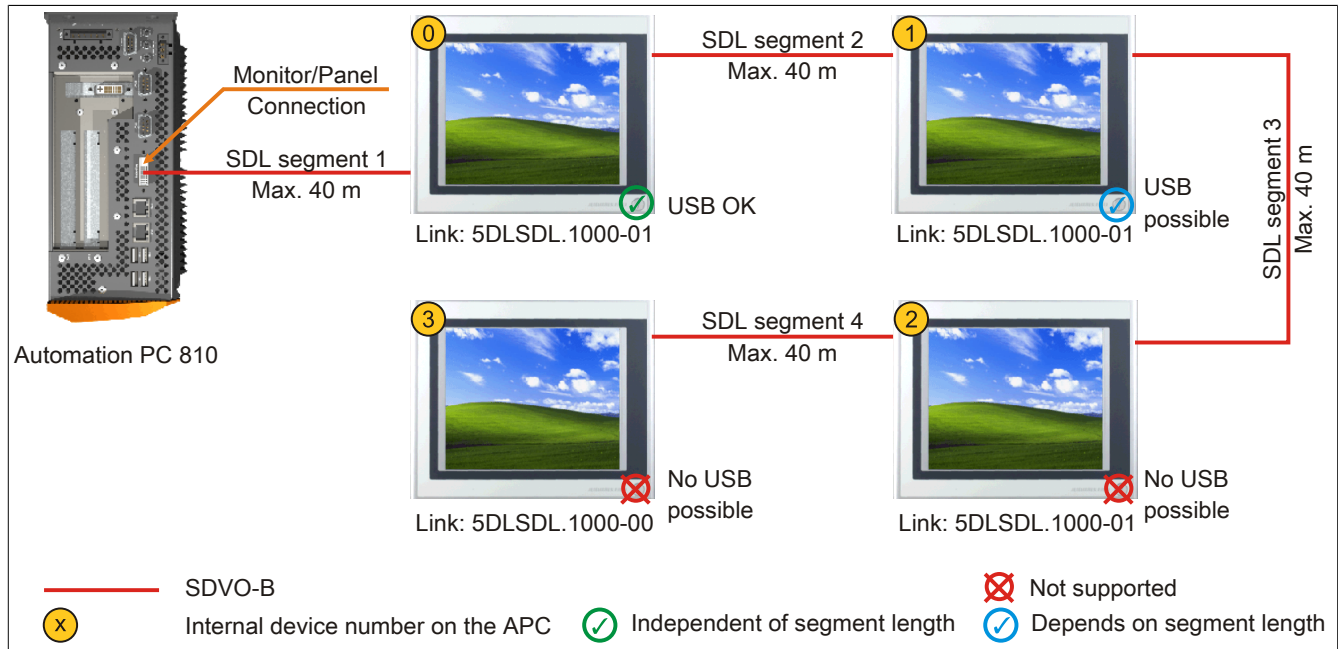


Figure 94: Four Automation Panel 900 systems via onboard SDL

5.6.1 Base system requirements

The following table lists the possible APC810 system unit and CPU board combinations necessary 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 |
|----------------|------------------|----------------|----------------|----------------|-----------------------|
| | 5PC810.SX01-00 | 5PC810.SX02-00 | 5PC810.SX03-00 | 5PC810.SX05-00 | |
| 5PC800.B945-00 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-10 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-01 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-11 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-02 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-12 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-03 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-13 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-04 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-14 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-05 | ✓ | ✓ | ✓ | ✓ | Max. UXGA |

Table 162: Possible system unit and CPU board combinations

5.6.2 Link modules

Information:

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

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

Table 163: Link modules

5.6.3 Cables

Select an Automation Panel 900 cable from the following table.

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

Table 164: Cables for SDL configurations

Information:

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

5.6.3.1 Cable lengths and resolutions for SDL transmission

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

| SDL 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 | FHD 1920 x 1080 |
| 1.8 | 5CASDL.0018-00 | 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.0018-01 |
| | 5CASDL.0018-03 | 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.0050-00 |
| | 5CASDL.0050-01 | 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 | 5CASDL.0050-03 |
| 10 | 5CASDL.0100-00 | 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.0100-01 |
| | 5CASDL.0100-03 | 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 | - | 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 | - | 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 | - | 5CASDL.0300-13 |
| 40 | 5CASDL.0400-13 | 5CASDL.0400-13 | 5CASDL.0400-13 | 5CASDL.0400-13 | - | 5CASDL.0400-13 |

Table 165: Cable lengths and resolutions for SDL transmission

5.6.4 Settings in BIOS

No special BIOS settings are necessary for operation.

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

Touch screen functionality

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

5.7 One Automation Panel 900 via SDL AP Link

An Automation Panel 900 unit is connected to the optional SDL transmitter (AP Link) via an SDL cable. USB devices can only be connected directly to the Automation Panel (i.e. without a hub).

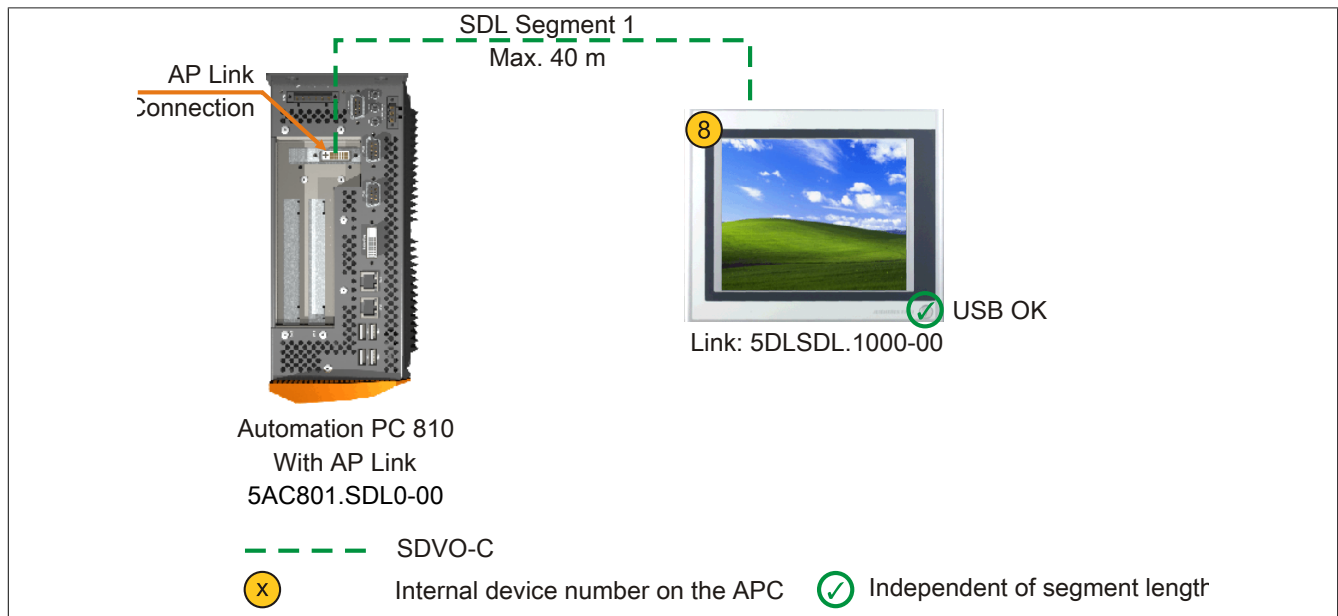


Figure 95: One Automation Panel 900 system via SDL AP Link

5.7.1 Base system requirements

The following table lists the possible APC810 system unit and CPU board combinations necessary 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 5PC810.SX01-00 ¹⁾ | 5PC810.SX02-00 | 5PC810.SX03-00 | 5PC810.SX05-00 | Limitation Resolution |
|----------------------------------|--|----------------|----------------|----------------|--------------------------|
| 5PC800.B945-00 5PC800.B945-10 | - | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-01 5PC800.B945-11 | - | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-02 5PC800.B945-12 | - | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-03 5PC800.B945-13 | - | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-04 5PC800.B945-14 | - | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-05 | - | ✓ | ✓ | ✓ | Max. UXGA |

Table 166: Possible system unit and CPU board combinations

1) AP Link cannot be installed.

5.7.2 Link modules

Information:

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

| Model number | Description | Note |
|----------------|---|--------------------------|
| 5DLSDL.1000-00 | Automation Panel Link SDL receiver Connection for SDL In; transmission of display, touch screen, USB 1.1, matrix key and service data; 24 VDC (order screw clamp 0TB103.9 or cage clamp 0TB103.91 separately) | For Automation Panel 900 |
| 5AC801.SDL0-00 | APC810 AP Link SDL transmitter Automation Panel SDL link transmitter | For Automation PC 810 |

Table 167: Link modules

5.7.3 Cables

Select an Automation Panel 900 cable from the following table.

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

Table 168: Cables for SDL configurations

Information:

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

5.7.3.1 Cable lengths and resolutions for SDL transmission

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

| SDL 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 | FHD 1920 x 1080 |
| 1.8 | 5CASDL.0018-00 | 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.0018-01 |
| | 5CASDL.0018-03 | 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.0050-00 |
| | 5CASDL.0050-01 | 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 | 5CASDL.0050-03 |
| 10 | 5CASDL.0100-00 | 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.0100-01 |
| | 5CASDL.0100-03 | 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 | - | 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 | - | 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 | - | 5CASDL.0300-13 |
| 40 | 5CASDL.0400-13 | 5CASDL.0400-13 | 5CASDL.0400-13 | 5CASDL.0400-13 | - | 5CASDL.0400-13 |

Table 169: Cable lengths and resolutions for SDL transmission

5.7.4 Settings in BIOS

No special BIOS settings are necessary for operation.

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

Touch screen functionality

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

5.8 Four Automation Panel 900 units via SDL AP Link

An Automation Panel 900 unit is connected to the optional SDL transmitter (AP Link) via an SDL cable. Three other Automation Panels of the same type are connected to this Automation Panel and operated via SDL. All four of the panels show the same content (display clone).

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

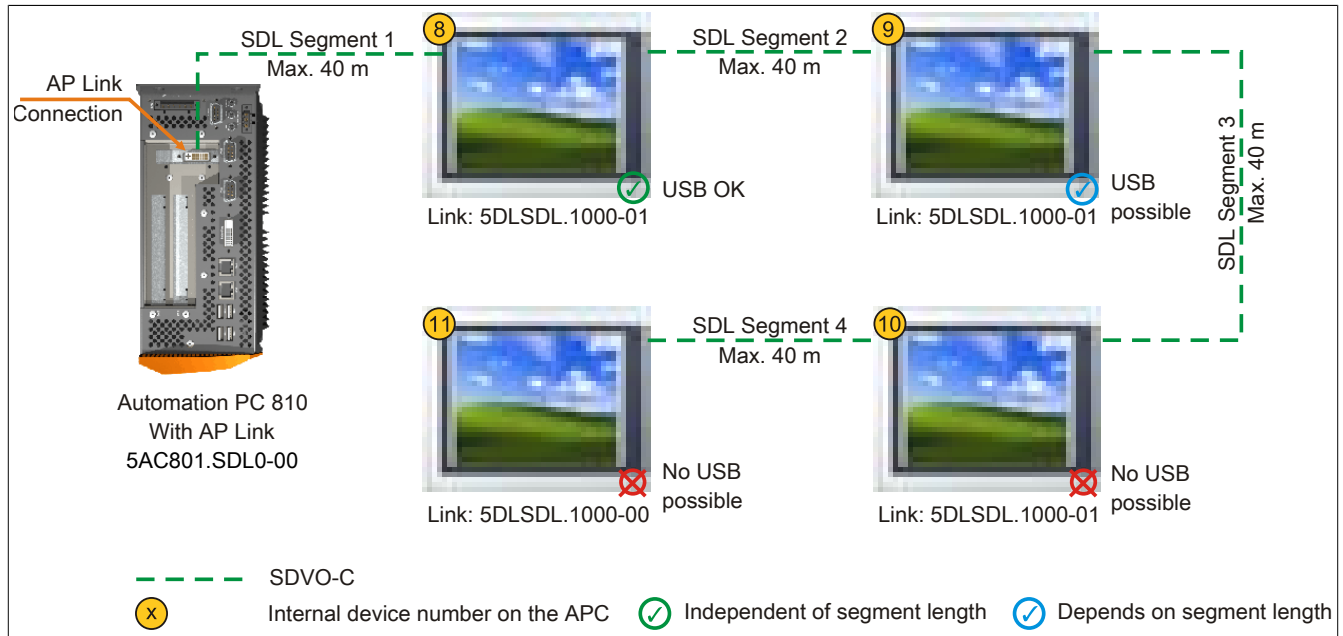


Figure 96: Four Automation Panel 900 systems via SDL AP Link

5.8.1 Base system requirements

The following table lists the possible APC810 system unit and CPU board combinations necessary 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 |
|----------------------------------|------------------------------|----------------|----------------|----------------|--------------------------|
| | 5PC810.SX01-00 ¹⁾ | 5PC810.SX02-00 | 5PC810.SX03-00 | 5PC810.SX05-00 | |
| 5PC800.B945-00 5PC800.B945-10 | - | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-01 5PC800.B945-11 | - | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-02 5PC800.B945-12 | - | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-03 5PC800.B945-13 | - | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-04 5PC800.B945-14 | - | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-05 | - | ✓ | ✓ | ✓ | Max. UXGA |

Table 170: Possible system unit and CPU board combinations

1) AP Link cannot be installed.

5.8.2 Link modules

Information:

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

| Model number | Description | Note |
|----------------|---|--------------------------|
| 5DLSDL.1000-00 | Automation Panel Link SDL receiver Connection for SDL In; transmission of display, touch screen, USB 1.1, matrix key and service data; 24 VDC (order screw clamp 0TB103.9 or cage clamp 0TB103.91 separately) | For Automation Panel 900 |
| 5DLSDL.1000-01 | Automation Panel Link SDL transceiver Connections for SDL In and SDL Out; transmission of display, touch screen, USB 1.1, matrix key and service data; 24 VDC (order screw clamp 0TB103.9 or cage clamp 0TB103.91 separately) | For Automation Panel 900 |
| 5AC801.SDL0-00 | APC810 AP Link SDL transmitter Automation Panel SDL link transmitter | For Automation PC 810 |

Table 171: Link modules

5.8.3 Cables

Select an Automation Panel 900 cable from the following table.

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

Table 172: Cables for SDL configurations

Information:

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

5.8.3.1 Cable lengths and resolutions for SDL transmission

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

| SDL 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 | FHD 1920 x 1080 |
| 1.8 | 5CASDL.0018-00 | 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.0018-01 |
| | 5CASDL.0018-03 | 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.0050-00 |
| | 5CASDL.0050-01 | 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 | 5CASDL.0050-03 |
| 10 | 5CASDL.0100-00 | 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.0100-01 |
| | 5CASDL.0100-03 | 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 | - | 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 | - | 5CASDL.0200-03 |

Table 173: Cable lengths and resolutions for SDL transmission

| SDL 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 | FHD 1920 x 1080 |
| 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 | - | 5CASDL.0300-13 |
| 40 | 5CASDL.0400-13 | 5CASDL.0400-13 | 5CASDL.0400-13 | 5CASDL.0400-13 | - | 5CASDL.0400-13 |

Table 173: Cable lengths and resolutions for SDL transmission

5.8.4 Settings in BIOS

No special BIOS settings are necessary for operation.

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

Touch screen functionality

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

5.9 Two Automation Panel 900 systems via onboard SDL and SDL AP Link

An Automation Panel 900 (max. UXGA) is connected to the integrated SDL interface (onboard) via an SDL cable. A second Automation Panel 900 (max. UXGA) is connected to the optional SDL transmitter (AP Link) via an SDL cable. The Automation Panels show different content (extended desktop) and can be different types.

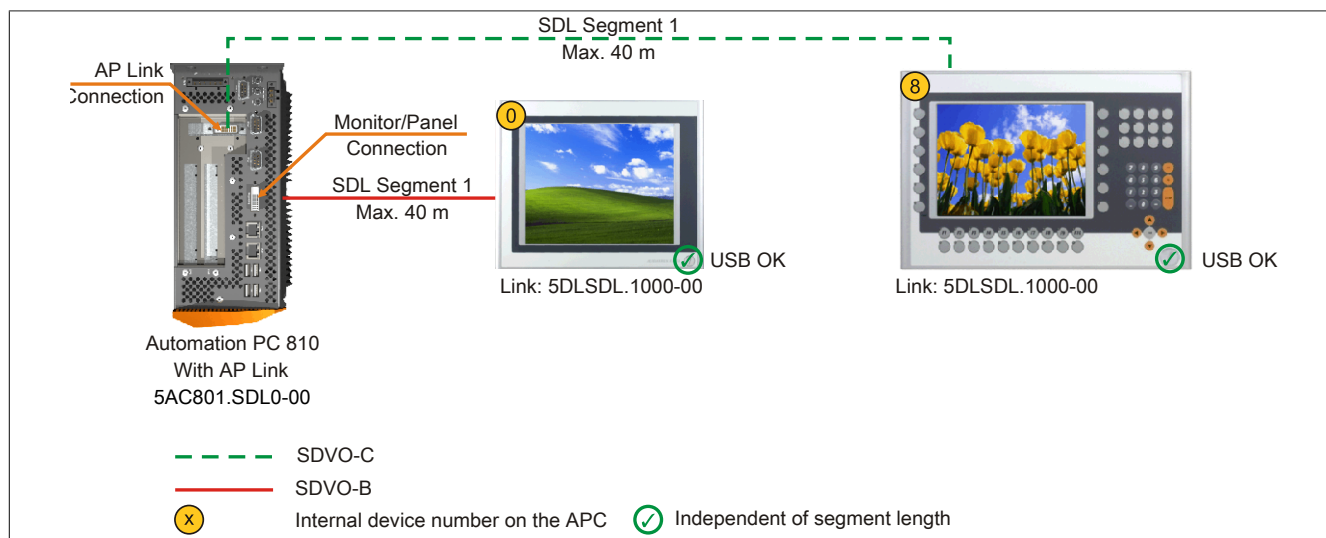


Figure 97: Two Automation Panel 900 systems via onboard SDL and SDL AP Link

5.9.1 Base system requirements

The following table lists the possible APC810 system unit and CPU board combinations necessary 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 |
|----------------|------------------------------|----------------|----------------|----------------|--------------------------|
| | 5PC810.SX01-00 ¹⁾ | 5PC810.SX02-00 | 5PC810.SX03-00 | 5PC810.SX05-00 | |
| 5PC800.B945-00 | - | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-10 | - | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-01 | - | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-11 | - | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-02 | - | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-12 | - | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-03 | - | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-13 | - | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-04 | - | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-14 | - | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-05 | - | ✓ | ✓ | ✓ | Max. UXGA |

Table 174: Possible system unit and CPU board combinations

1) AP Link cannot be installed.

5.9.2 Link modules

Information:

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

| Model number | Description | Note |
|----------------|---|--------------------------|
| 5DLSDL.1000-00 | Automation Panel Link SDL receiver Connection for SDL In; transmission of display, touch screen, USB 1.1, matrix key and service data; 24 VDC (order screw clamp 0TB103.9 or cage clamp 0TB103.91 separately) | For Automation Panel 900 |
| 5AC801.SDL0-00 | APC810 AP Link SDL transmitter Automation Panel SDL link transmitter | For Automation PC 810 |

Table 175: Link modules

5.9.3 Cables

Select an Automation Panel 900 cable from the following table.

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

Table 176: Cables for SDL configurations

Information:

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

5.9.3.1 Cable lengths and resolutions for SDL transmission

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

| SDL 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 | FHD 1920 x 1080 |
| 1.8 | 5CASDL.0018-00 | 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.0018-01 |
| | 5CASDL.0018-03 | 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.0050-00 |
| | 5CASDL.0050-01 | 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 | 5CASDL.0050-03 |
| 10 | 5CASDL.0100-00 | 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.0100-01 |
| | 5CASDL.0100-03 | 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 | - | 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 | - | 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 | - | 5CASDL.0300-13 |
| 40 | 5CASDL.0400-13 | 5CASDL.0400-13 | 5CASDL.0400-13 | 5CASDL.0400-13 | - | 5CASDL.0400-13 |

Table 177: Cable lengths and resolutions for SDL transmission

5.9.4 Settings in BIOS

No special BIOS settings are necessary for operation.

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

Touch screen functionality

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

5.10 Eight Automation Panel 900 units via onboard SDL and SDL AP Link

Four Automation Panel 900 units (max. UXGA) are connected to the integrated SDL interface (onboard) via SDL. Four additional Automation Panel 900 units (max. UXGA) are connected to the optional SDL transmitter (AP Link). The Automation Panels in each line must be the same type. The two lines show different content (extended desktop), but panels in the same line 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) on both lines. Past a distance of 30 m, USB is only available for the first panel on each line. USB devices can only be connected directly to the Automation Panel (without hub).

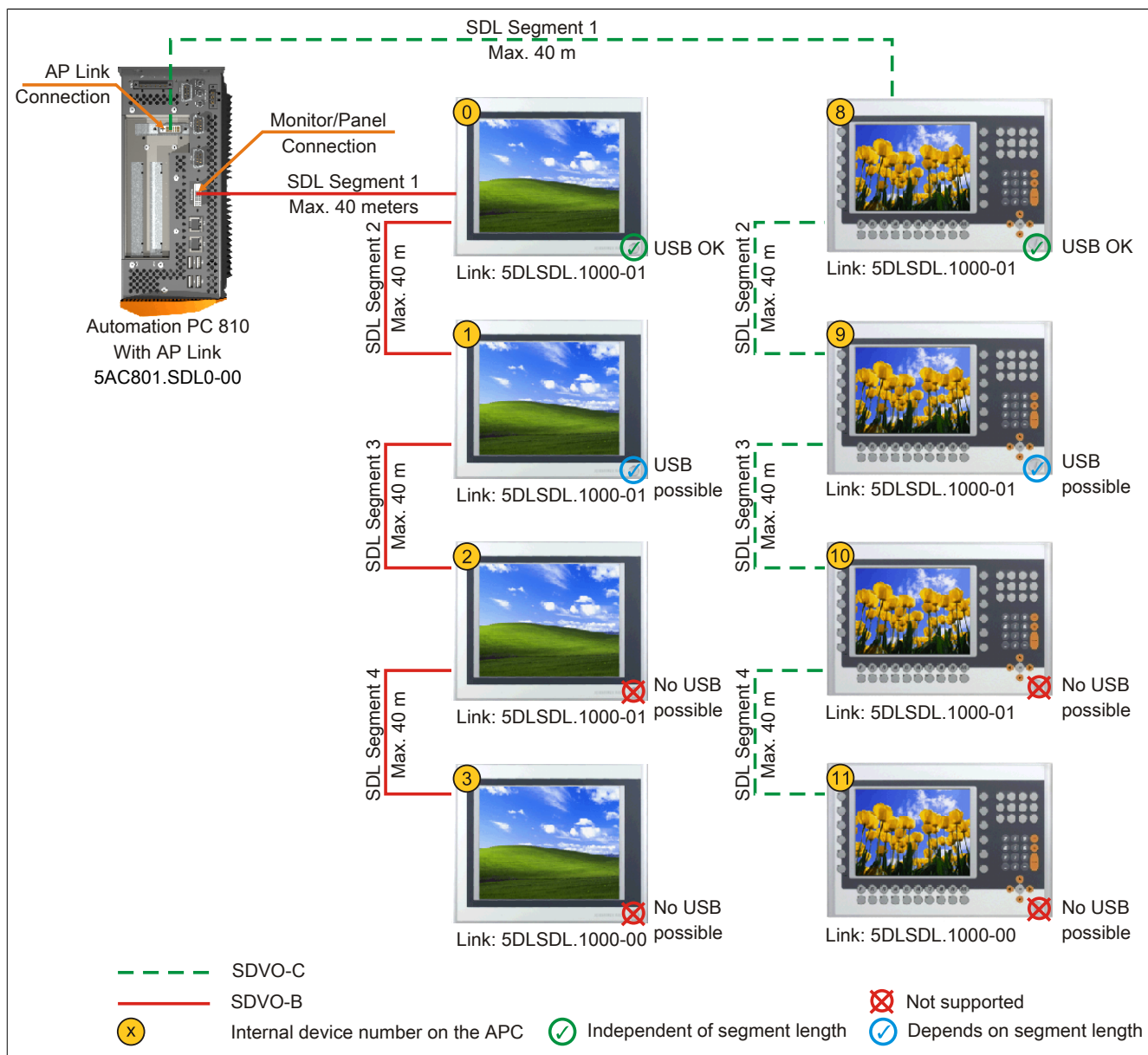


Figure 98: Eight Automation Panel 900 systems via onboard SDL and SDL AP Link

5.10.1 Base system requirements

The following table lists the possible APC810 system unit and CPU board combinations necessary 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 |
|----------------------------------|------------------------------|----------------|----------------|----------------|-----------------------|
| | 5PC810.SX01-00 ¹⁾ | 5PC810.SX02-00 | 5PC810.SX03-00 | 5PC810.SX05-00 | |
| 5PC800.B945-00 5PC800.B945-10 | - | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-01 5PC800.B945-11 | - | ✓ | ✓ | ✓ | Max. UXGA |

Table 178: Possible system unit and CPU board combinations

| CPU board | With system unit | | | | Limitation Resolution |
|----------------------------------|------------------------------|----------------|----------------|----------------|--------------------------|
| | 5PC810.SX01-00 ¹⁾ | 5PC810.SX02-00 | 5PC810.SX03-00 | 5PC810.SX05-00 | |
| 5PC800.B945-02 5PC800.B945-12 | - | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-03 5PC800.B945-13 | - | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-04 5PC800.B945-14 | - | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-05 | - | ✓ | ✓ | ✓ | Max. UXGA |

Table 178: Possible system unit and CPU board combinations

1) AP Link cannot be installed.

5.10.2 Link modules

Information:

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

| Model number | Description | Note |
|----------------|---|--------------------------|
| 5DLSDL.1000-00 | Automation Panel Link SDL receiver Connection for SDL In; transmission of display, touch screen, USB 1.1, matrix key and service data; 24 VDC (order screw clamp 0TB103.9 or cage clamp 0TB103.91 separately) | For Automation Panel 900 |
| 5DLSDL.1000-01 | Automation Panel Link SDL transceiver Connections for SDL In and SDL Out; transmission of display, touch screen, USB 1.1, matrix key and service data; 24 VDC (order screw clamp 0TB103.9 or cage clamp 0TB103.91 separately) | For Automation Panel 900 |
| 5AC801.SDL0-00 | APC810 AP Link SDL transmitter Automation Panel SDL link transmitter | For Automation PC 810 |

Table 179: Link modules

5.10.3 Cables

Select an Automation Panel 900 cable from the following table.

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

Table 180: Cables for SDL configurations

Information:

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

5.10.3.1 Cable lengths and resolutions for SDL transmission

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

| SDL 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 | FHD 1920 x 1080 |
| 1.8 | 5CASDL.0018-00 | 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.0018-01 |
| | 5CASDL.0018-03 | 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.0050-00 |
| | 5CASDL.0050-01 | 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 | 5CASDL.0050-03 |
| 10 | 5CASDL.0100-00 | 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.0100-01 |
| | 5CASDL.0100-03 | 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 | - | 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 | - | 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 | - | 5CASDL.0300-13 |
| 40 | 5CASDL.0400-13 | 5CASDL.0400-13 | 5CASDL.0400-13 | 5CASDL.0400-13 | - | 5CASDL.0400-13 |

Table 181: Cable lengths and resolutions for SDL transmission

5.10.4 Settings in BIOS

No special BIOS settings are necessary for operation.

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

Touch screen functionality

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

5.11 Six AP900 and two AP800 units via onboard SDL and SDL AP Link

Three Automation Panel 900 (max. UXGA) units and one Automation Panel 800 are connected to the integrated SDL interface (onboard) via SDL. In addition, three Automation Panel 900 (max. UXGA) units and one Automation Panel 800 are operated on the optional SDL transmitter. The Automation Panels in each line must be of the same type. The two lines show different content (extended desktop), but displays in the same line show the same content (display clone).

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

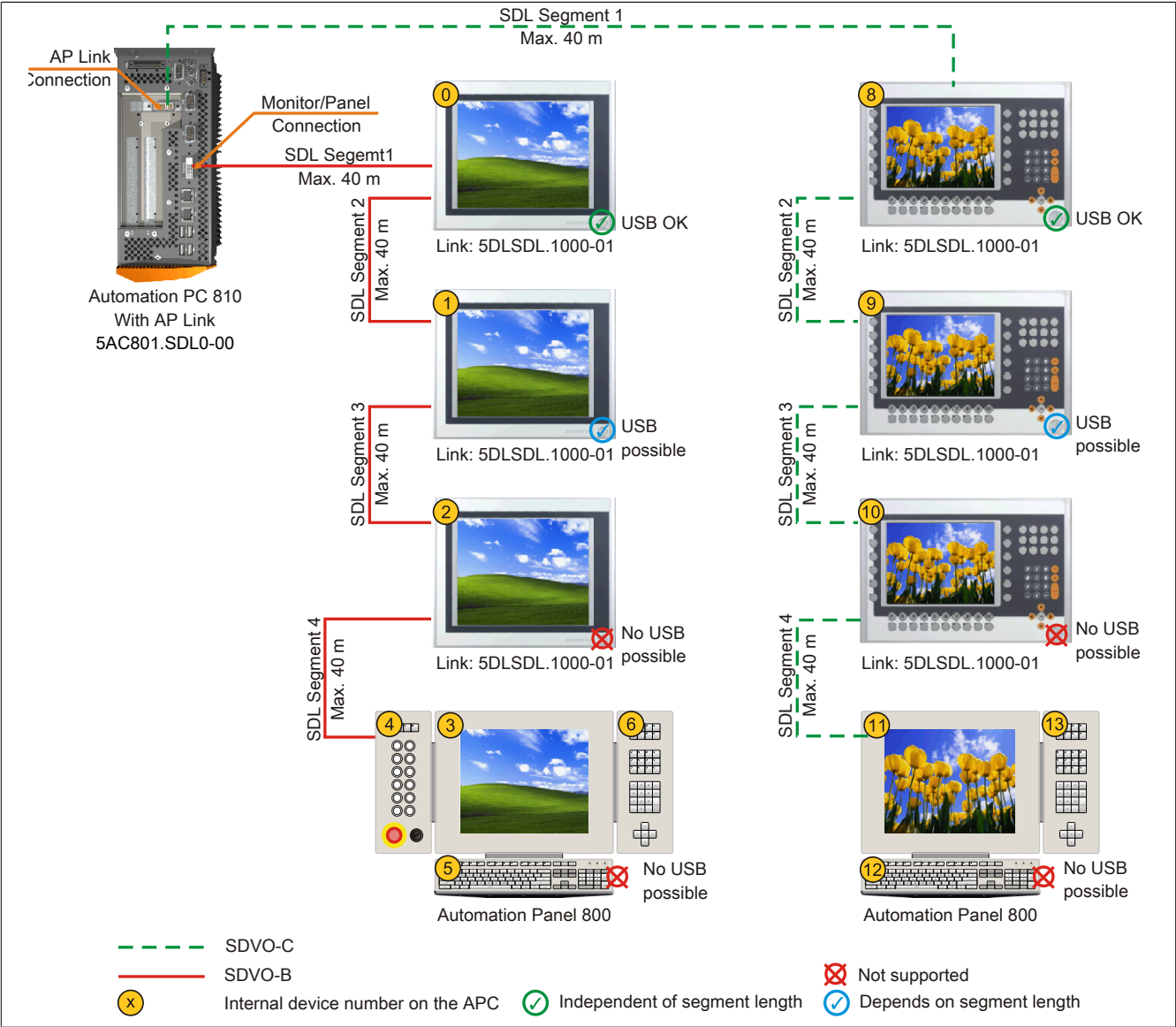


Figure 99: Six AP900 and two AP800 systems via onboard SDL and SDL AP Link

5.11.1 Base system requirements

The following table lists the possible APC810 system unit and CPU board combinations necessary 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).

In order to connect an Automation Panel 800 and an Automation Panel 900 on the same line, the devices must have the same display type.

| CPU board | With system unit | | | | Limitation Resolution |
|----------------------------------|------------------------------|----------------|----------------|----------------|--------------------------|
| | 5PC810.SX01-00 ¹⁾ | 5PC810.SX02-00 | 5PC810.SX03-00 | 5PC810.SX05-00 | |
| 5PC800.B945-00 5PC800.B945-10 | - | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-01 5PC800.B945-11 | - | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-02 5PC800.B945-12 | - | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-03 5PC800.B945-13 | - | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-04 5PC800.B945-14 | - | ✓ | ✓ | ✓ | Max. UXGA |
| 5PC800.B945-05 | - | ✓ | ✓ | ✓ | Max. UXGA |

Table 182: Possible system unit and CPU board combinations

1) AP Link cannot be installed.

5.11.2 Link modules

Information:

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

| Model number | Description | Note |
|----------------|---|--------------------------|
| 5DLSDL.1000-01 | Automation Panel Link SDL transceiver Connections for SDL In and SDL Out; transmission of display, touch screen, USB 1.1, matrix key and service data; 24 VDC (order screw clamp 0TB103.9 or cage clamp 0TB103.91 separately) | For Automation Panel 900 |
| 5AC801.SDL0-00 | APC810 AP Link SDL transmitter Automation Panel SDL link transmitter | For Automation PC 810 |

Table 183: Link modules

5.11.3 Cables

For a selection of SDL cables for connecting the AP900 display to an AP900 display, see "Cables" on page 198.

For a selection of SDL cables for connecting the AP800 display to an AP900 display, see "Cables" on page 200.

Information:

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

5.11.3.1 Cable lengths and resolutions for SDL transmission

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

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

Table 184: Segment lengths, resolutions and SDL cables

| 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 |
| 30 | - | - | 5CASDL.0300-10 | - | - |
| | - | - | 5CASDL.0300-13 | - | - |
| | - | - | 5CASDL.0300-30 | - | - |
| 40 | - | - | 5CASDL.0400-10 | - | - |
| | - | - | 5CASDL.0400-13 | - | - |
| | - | - | 5CASDL.0400-30 | - | - |

Table 184: Segment lengths, resolutions and SDL cables

5.11.4 Settings in BIOS

No special BIOS settings are necessary for operation.

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

Touch screen functionality

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

6 Connecting peripheral USB devices

Warning!

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

6.1 Locally on the APC810

Many different peripheral USB devices can be connected to the 5 USB ports on this device. USB ports USB1, USB3 and USB5 can each handle a load of 1 A, and USB ports USB2 and USB4 can each handle a load of 500 mA. The maximum transfer rate is USB 2.0.



Figure 100: Local connection of USB peripheral devices on the APC810

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



Figure 101: Remote connection of USB peripheral devices on 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 or the USB interfaces on Automation Panel 800 devices. These can each handle a load of 500 mA. The maximum transfer rate is USB 1.1.

Information:

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



Figure 102: Remote connection of USB peripheral devices on the APC800/900 via SDL

7 Configuring a SATA RAID set

Information:

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

The "RAID Configuration Utility" in BIOS must be started in order to make the necessary settings. After POST, pressing <Ctrl+S> or <F4> opens the RAID BIOS.

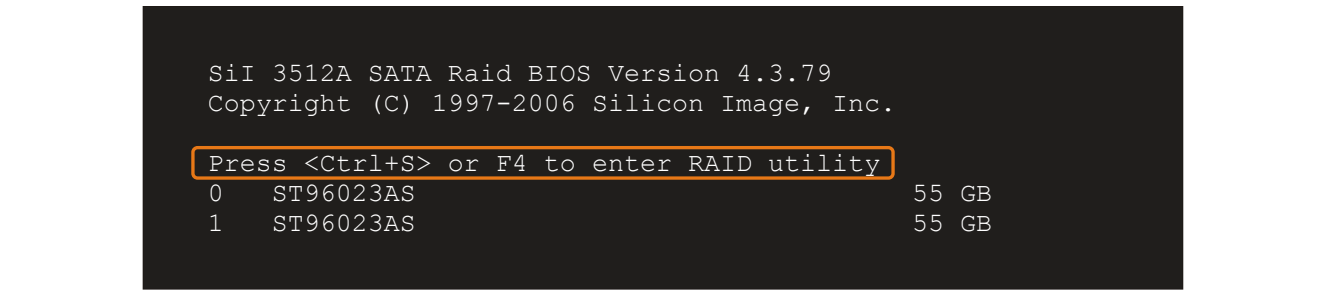


Figure 103: Open the RAID Configuration Utility

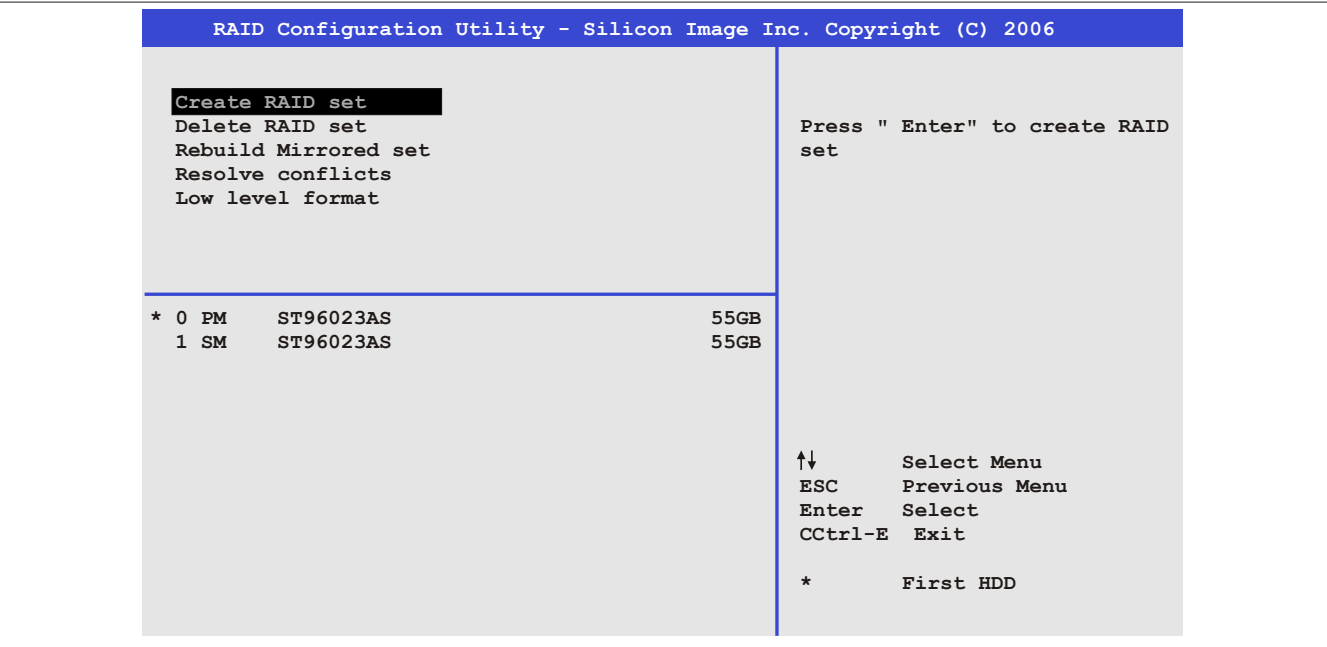


Figure 104: RAID Configuration Utility - Menu

The following keys can be used once inside BIOS Setup:

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

Table 185: BIOS-relevant keys in the RAID Configuration Utility

7.1 Create RAID set

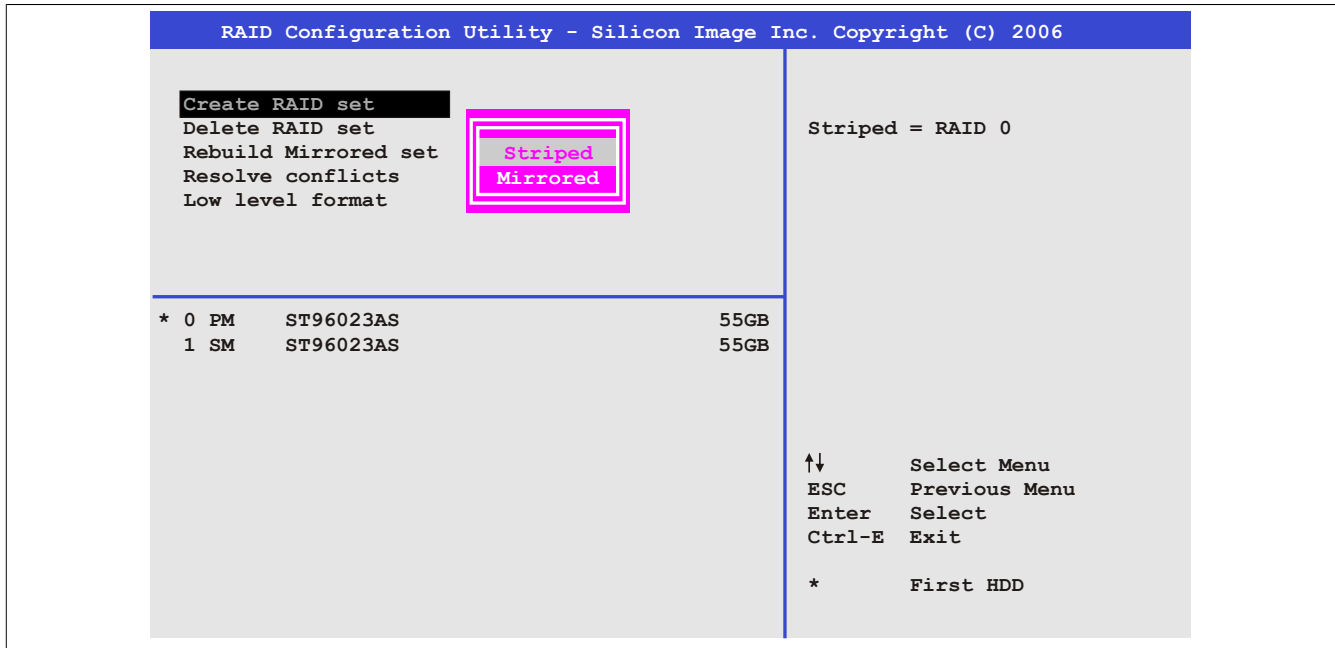


Figure 105: RAID Configuration Utility - Menu

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

7.2 Create RAID set - Striped

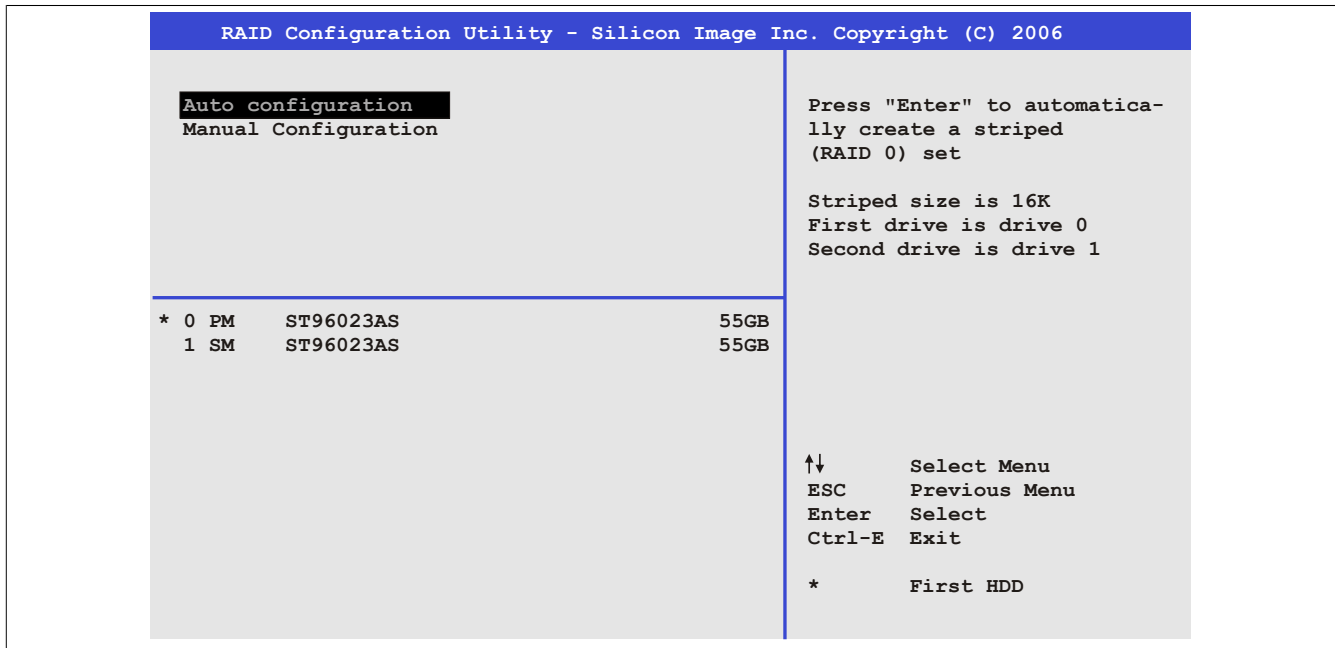


Figure 106: RAID Configuration Utility - Create RAID set - Striped

"Auto configuration"

Auto configuration optimizes all settings.

"Manual configuration"

Allows the first and second HDD to be specified as well as the "Chunk size" (= block size, application-dependent).

7.3 Create RAID set - Mirrored

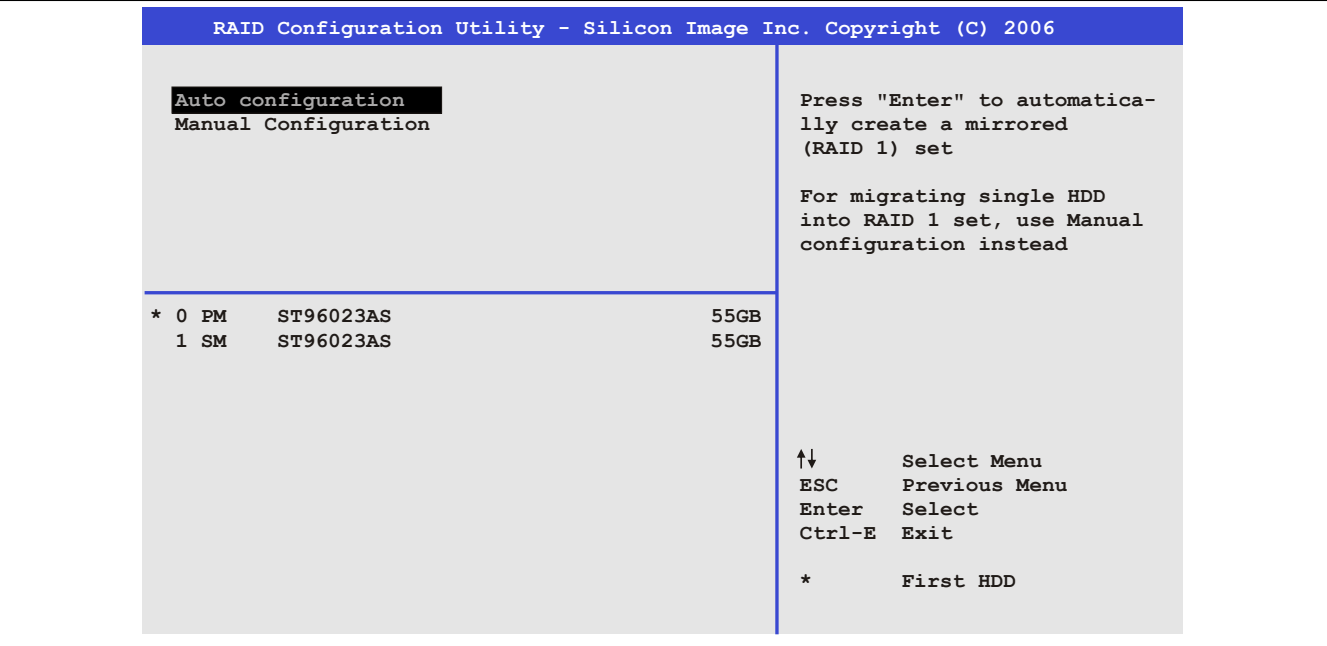


Figure 107: RAID Configuration Utility - Create RAID set - Mirrored

"Auto configuration"

Auto configuration optimizes all settings.

"Manual configuration"

Allows the "Source" and "Target" HDD to be specified as well as whether a rebuild (mirror) should be performed immediately (takes approx. 50 minutes).

7.4 Delete RAID set

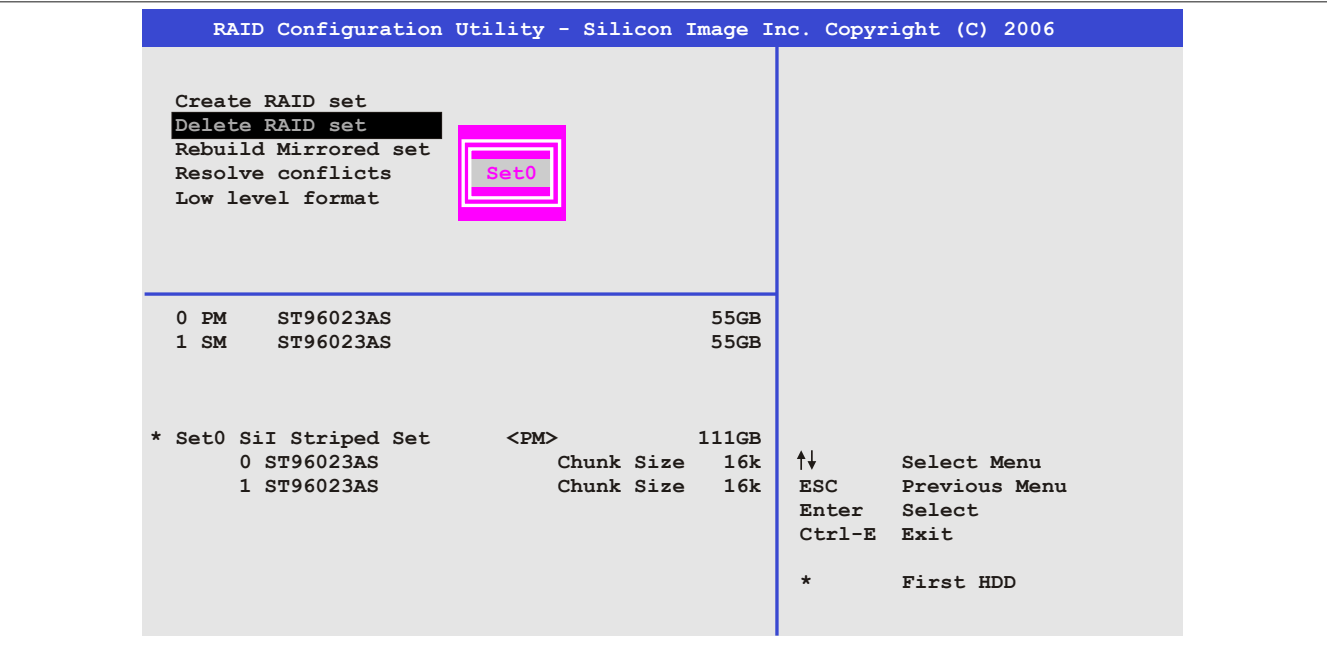


Figure 108: RAID Configuration Utility - Delete RAID set

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

7.5 Rebuild mirrored set

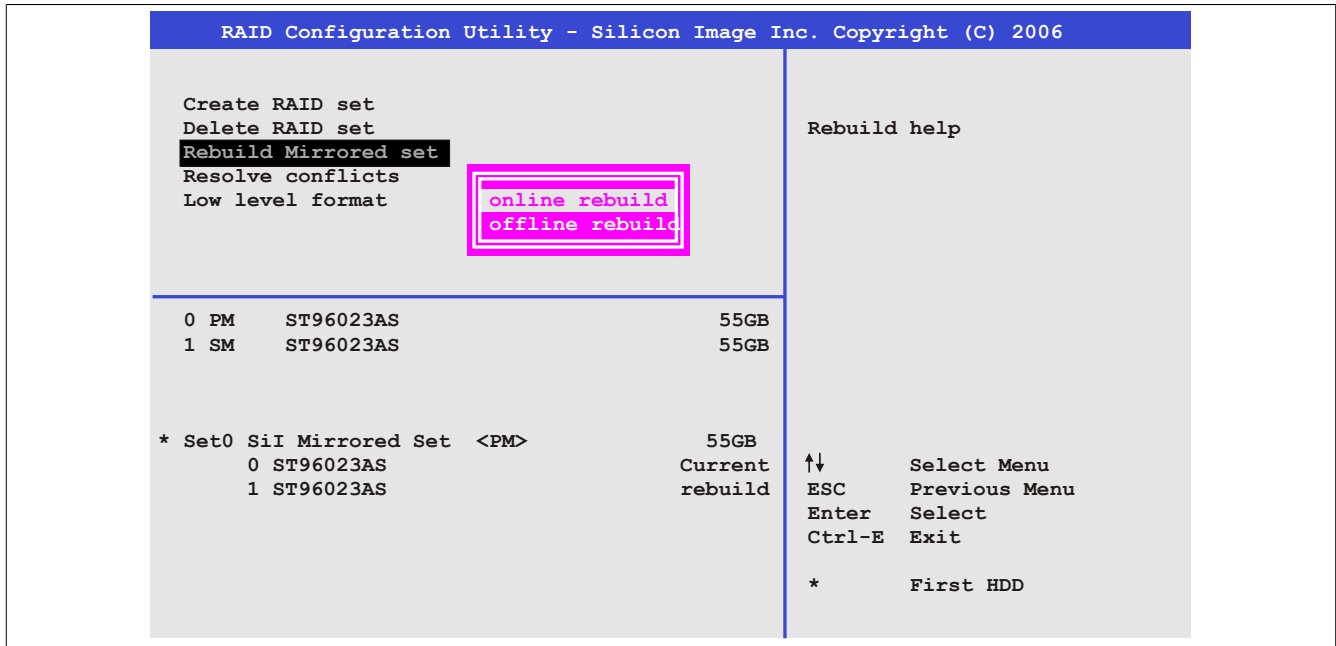


Figure 109: RAID Configuration Utility - Rebuild mirrored set

The "Rebuild mirrored set" menu option can be used to restart a rebuild procedure in a RAID 1 set if an error occurs, if a rebuild procedure was interrupted or if a hard disk was replaced.

If "Online rebuild" is selected, then the rebuild is executed during operation after the system is booted. The installed SATA RAID configuration program may display an event pop-up message: `SATA Raid detected a new event` before restarting the rebuild. The entire rebuild takes approximately 50 minutes.

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

7.6 Resolve conflicts

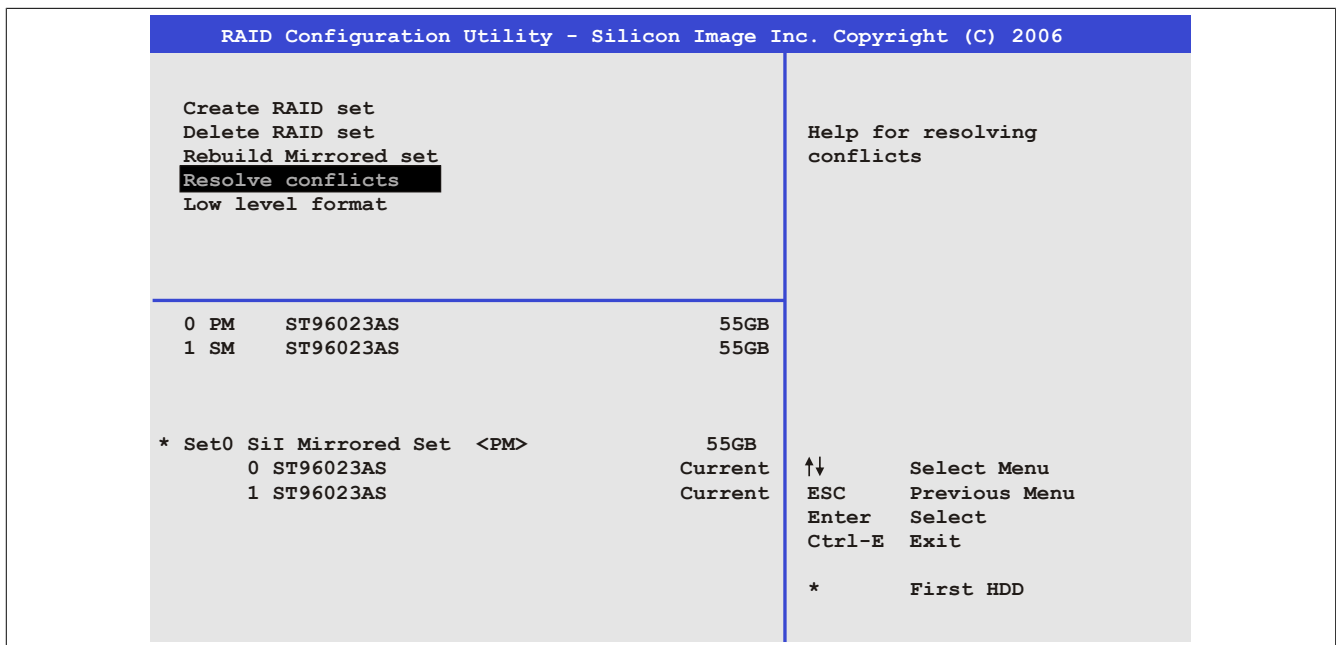


Figure 110: RAID Configuration Utility - Resolve conflicts

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

7.7 Low level format

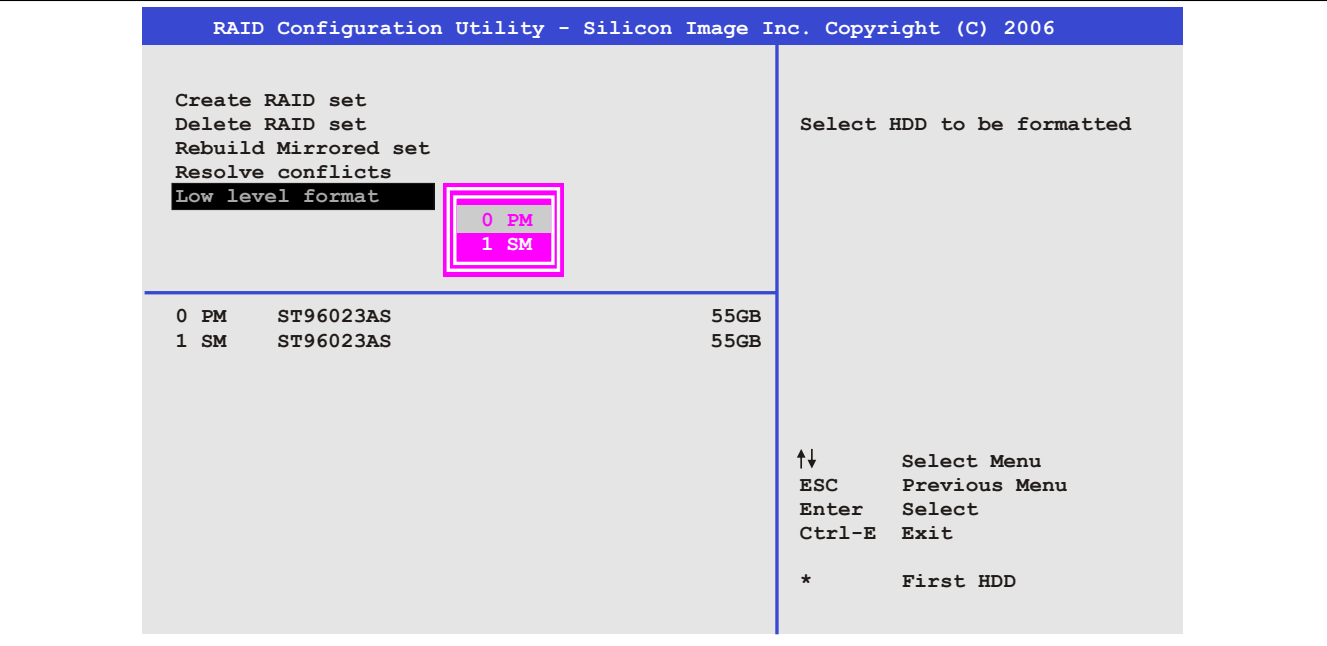


Figure 111: RAID Configuration Utility - Low level format

Individual hard disks can be configured using the "Low level format" menu option. 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 Known problems / issues

The following points listed are known as of 07-May-08 in the first production lot of APC800 devices:

- The hardware security key interface is supported beginning with MTCX FPGA version 00.06 and higher.
- The status indicator of the Link or Activity LED for the ETH1 interface did not function correctly. However, this did not affect the network connection. The status indicator functions correctly beginning with hardware revisions 5PC810.SX92-00 (revision B0) and 5PC800.B945-0x (revision B0).
- It was sporadically possible that the ETH2 interface was not initialized during startup and would therefore not function. The problem could be corrected by a reset or warm restart (Ctrl+Alt+Del). This problem is corrected in MTCX FPGA version 00.03.
- First Boot Agent Windows XP embedded and built-in SATA HDD drive: The BIOS setting "Legacy IDE channels" under "Advanced - IDE configuration" must be set to "PATA only" before inserting a CompactFlash card with a Windows XP embedded image and executing the First Boot Agent. Alternatively, the SATA drive can be removed first.
- When using two graphic lines, the Windows XP graphics driver assigns the labels "Digital display" to the monitor/panel connector and "Digital display 2" to the AP Link connector. In "extended desktop" mode, the following behavior is observed: If the cable for the digital display device on the monitor/panel interface is disconnected, digital display 2 become the primary display automatically, with the graphics driver settings also switching over accordingly. The next time the system is rebooted, the image content is routed from the monitor/panel interface to the AP Link interface. If the "SDVO/DVI Hot plugging support" option is set to "Enabled" in BIOS (found under "Advanced - Graphics - Configuration"), then the image content is automatically routed from the disconnected monitor/panel interface to the second graphics line on the AP Link interface.
- Special features of "quick switching": If the APC810 is in standby mode, i.e. the Power LED is red (e.g. during Windows XP shutdown), then buffering takes a little more time due to the capacitors and lower power consumption. If the "Power loss control" option is set to "Power on" or "Last state" in BIOS, then the system might not restart because a power off/on was not detected. To make sure that these system units will restart after a power off/on, the cutoff time should be set to at least 10 seconds.
- With MTCX PX32 firmware \geq V00.11 and higher, the reset button is only triggered by edges. This means that the device boots even when the reset button is pressed. With MTCX PX32 firmware $<$ V00.11, the system does not start after pressing (ca. 10 seconds) and releasing the reset button.
- Hardware revision B0 of the 5AC801.DVDS-00 slide-in DVD-ROM does not offer SATA hot plugging functionality. Hot plugging is possible for other hardware revisions.
- Using two different types of CompactFlash cards can cause problems with Automation PCs and Panel PCs. For example, it is possible that one of the two cards is not detected during system startup. This is caused by different 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 end of the time frame provided for startup. The problem described can occur because the startup time for the CompactFlash cards fluctuates due to the different components being used. Depending on the CompactFlash cards being used, this error may occur never, sometimes or always.
- During daisy chain operation of multiple AP800/AP900 devices via SDL, it is possible that the touch controller status shows a red "X" in the Control Center applet for the touch screen driver when the touch controller is detected. The functionality of the touch system is not affected by this. This can be avoided by setting a panel locking time of 50 ms. The panel locking time can be configured with the B&R Key Editor.

Chapter 4 • Software

1 BIOS options

Information:

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

1.1 General information

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

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

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

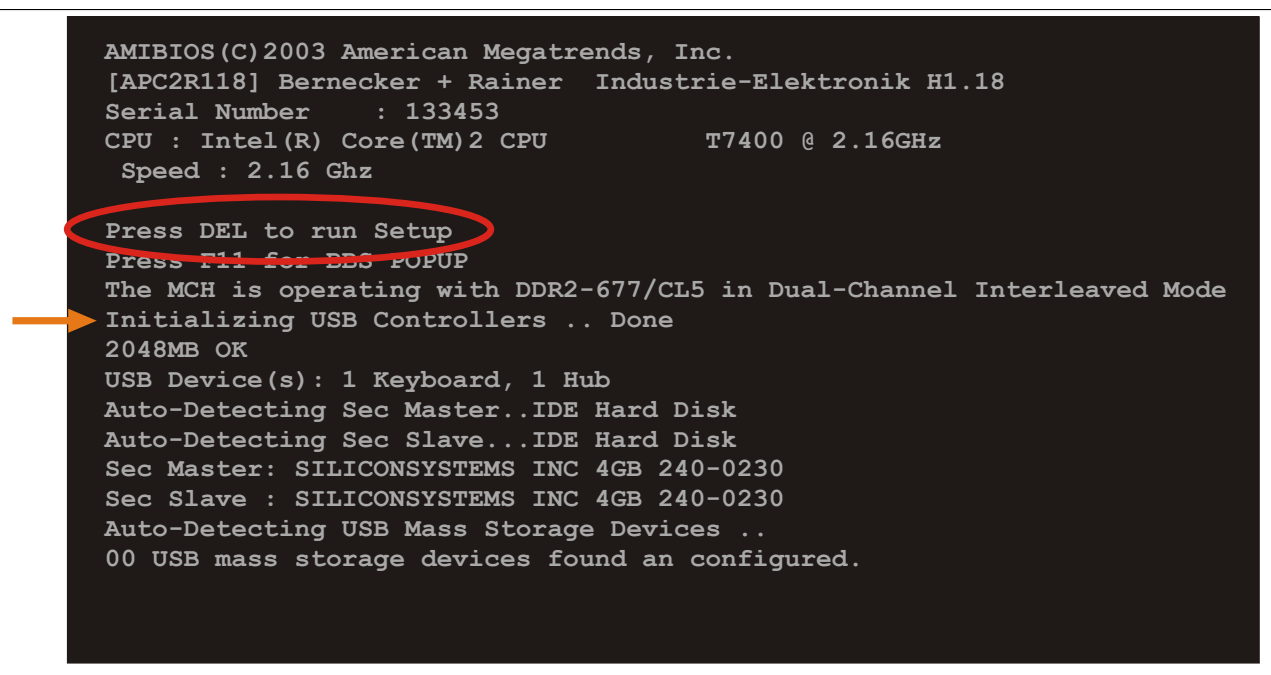
1.2 BIOS setup and boot procedure

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

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

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

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

The image shows a BIOS boot screen with white text on a black background. The text includes system information like 'AMIBIOS(C)2003 American Megatrends, Inc.', '[APC2R118] Bernecker + Rainer Industrie-Elektronik H1.18', 'Serial Number : 133453', 'CPU : Intel(R) Core(TM)2 CPU T7400 @ 2.16GHz', and 'Speed : 2.16 Ghz'. Below this, it says 'Press DEL to run Setup' and 'Press F11 for BIOS POPUP'. The line 'Press DEL to run Setup' is circled in red. An orange arrow points to the line 'Initializing USB Controllers .. Done'. The screen continues with 'The MCH is operating with DDR2-677/CL5 in Dual-Channel Interleaved Mode', '2048MB OK', 'USB Device(s): 1 Keyboard, 1 Hub', and auto-detecting IDE and USB mass storage devices.

```
AMIBIOS(C)2003 American Megatrends, Inc.  
[APC2R118] Bernecker + Rainer Industrie-Elektronik H1.18  
Serial Number      : 133453  
CPU : Intel(R) Core(TM)2 CPU          T7400 @ 2.16GHz  
Speed : 2.16 Ghz  
  
Press DEL to run Setup  
Press F11 for BIOS POPUP  
The MCH is operating with DDR2-677/CL5 in Dual-Channel Interleaved Mode  
Initializing USB Controllers .. Done  
2048MB OK  
USB Device(s): 1 Keyboard, 1 Hub  
Auto-Detecting Sec Master..IDE Hard Disk  
Auto-Detecting Sec Slave...IDE Hard Disk  
Sec Master: SILICONSYSTEMS INC 4GB 240-0230  
Sec Slave : SILICONSYSTEMS INC 4GB 240-0230  
Auto-Detecting USB Mass Storage Devices ..  
00 USB mass storage devices found an configured.
```

Figure 112: Boot screen

1.2.1 BIOS Setup keys

The following keys are enabled during POST:

Information:

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

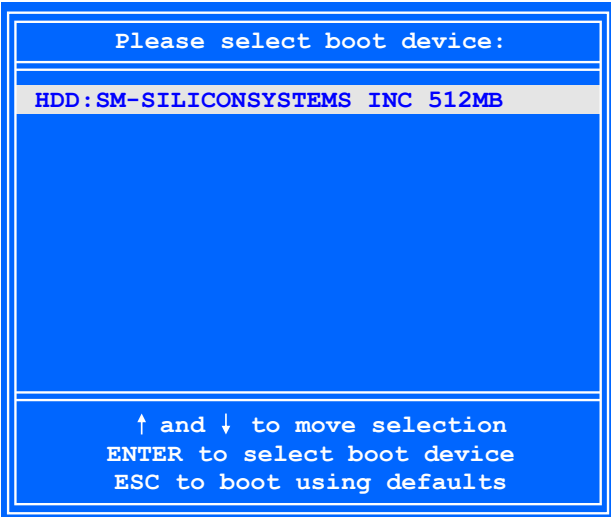
| Keys | Function |
|---------|--|
| Del | Opens the main BIOS Setup screen |
| F12 | Network boot |
| F11 | Opens the boot menu. This lists all bootable devices that are connected to the system. Selecting a device with cursor ↑, cursor ↓ and the pressing <ENTER> will boot from that device. |
| |  |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

Table 186: BIOS-relevant keys for POST

The following keys can be used once inside BIOS Setup:

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

Table 187: BIOS-relevant keys

1.3 Main

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

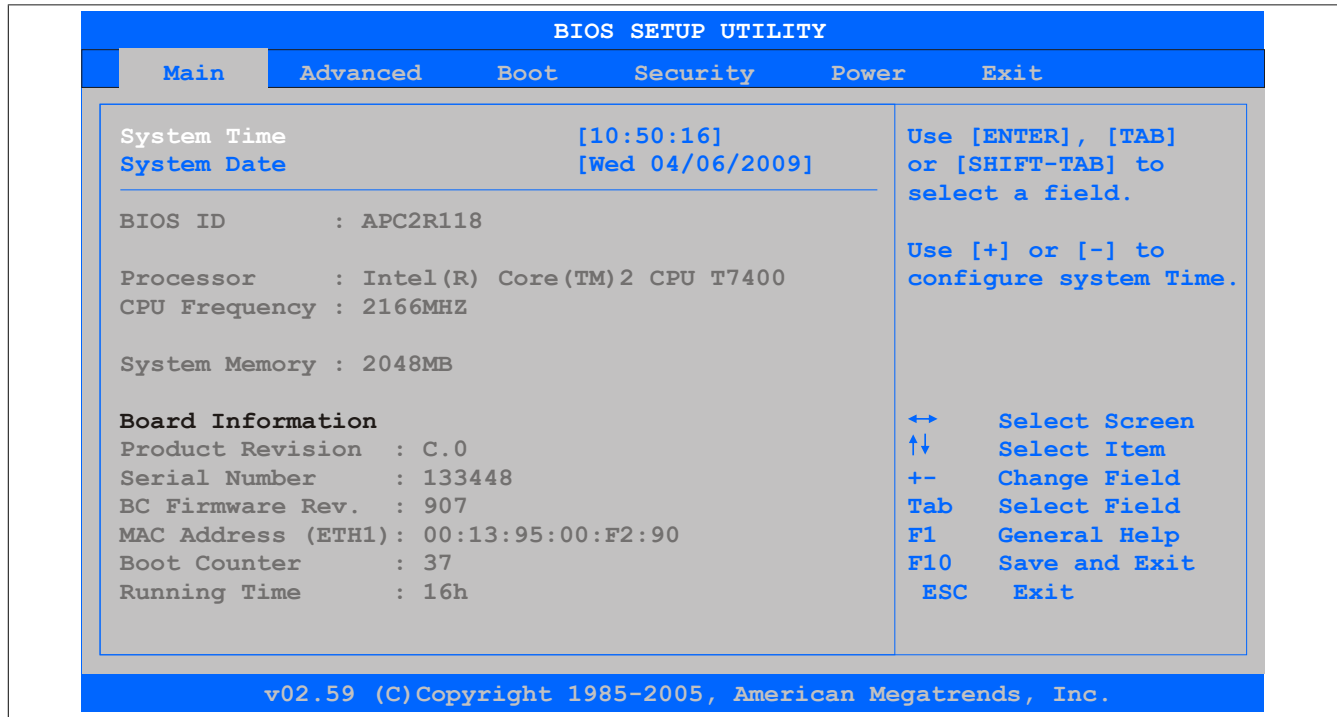


Figure 113: 945GME BIOS Main menu

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

Table 188: 945GME Main menu - Configuration options

1.4 Advanced

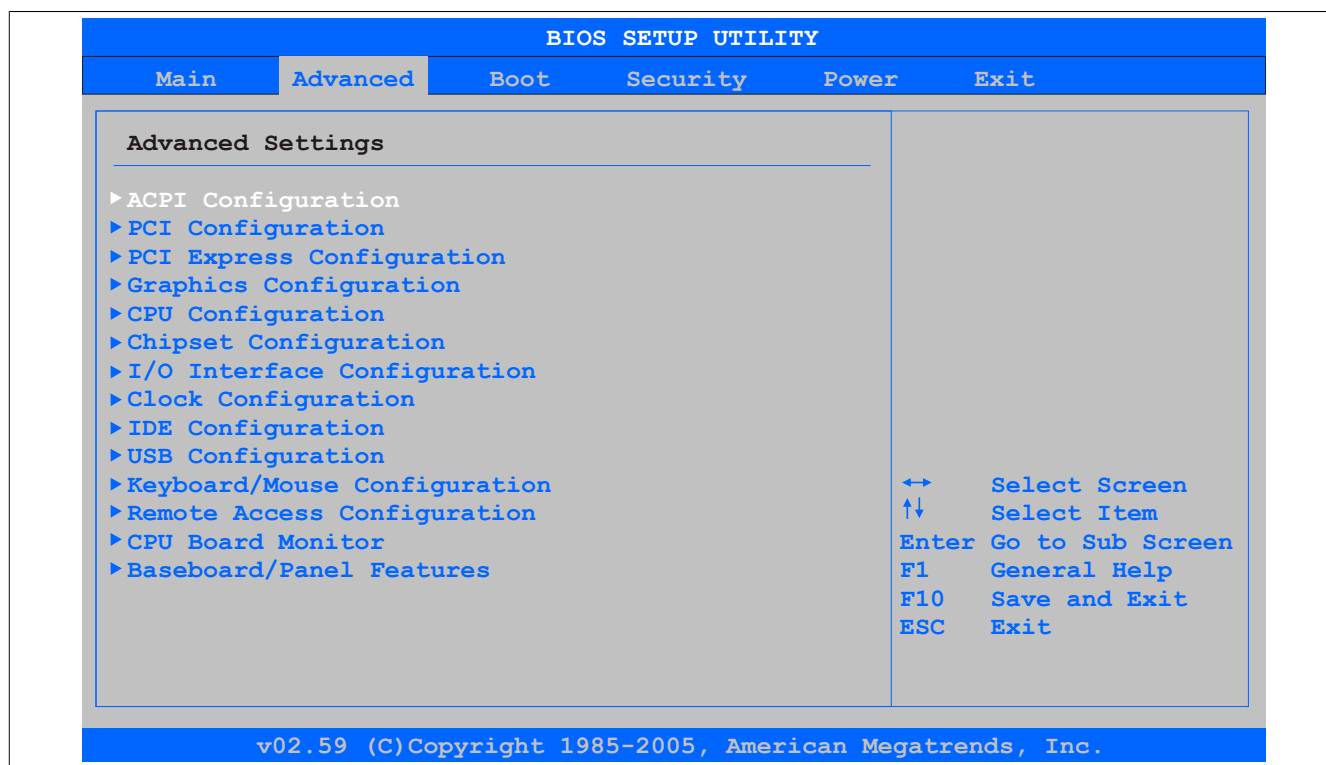


Figure 114: 945GME Advanced menu

| BIOS setting | Function | Configuration options | Effect |
|-------------------------------------|---|-----------------------|---|
| ACPI configuration | Configures ACPI devices | Enter | Opens the submenu See "ACPI configuration" on page 233 |
| PCI configuration | Configures PCI devices | Enter | Opens the submenu See "PCI configuration" on page 234 |
| PCI Express configuration | Configures PCI Express settings | Enter | Opens the submenu See "PCI Express configuration" on page 237 |
| Graphics configuration | Configures graphics settings | Enter | Opens the submenu See "Graphics configuration" on page 239 |
| CPU configuration | Configures CPU settings | Enter | Opens the submenu See "CPU configuration" on page 241 |
| Chipset configuration | Configures chipset settings | Enter | Opens the submenu See "Chipset settings" on page 242 |
| I/O interface configuration | Configures I/O device settings | Enter | Opens the submenu See "I/O interface configuration" on page 243 |
| Clock configuration | Configures clock settings | Enter | Opens the submenu See "Clock configuration" on page 243 |
| IDE configuration | Configures IDE functions | Enter | Opens the submenu See "IDE configuration" on page 244 |
| USB configuration | Configures USB settings | Enter | Opens the submenu See "USB configuration" on page 249 |
| Keyboard/Mouse configuration | Configures keyboard/mouse settings | Enter | Opens the submenu See "Keyboard/Mouse configuration" on page 250 |
| Remote access configuration | Configures remote access settings | Enter | Opens the submenu See "Remote access configuration" on page 251 |
| CPU board monitor | Displays the current voltages and temperature of the processor in use | Enter | Opens the submenu See "CPU board monitor" on page 253 |
| Baseboard/Panel features | Displays and configures device-specific settings | Enter | Opens the submenu See "Baseboard/Panel features" on page 254 |

Table 189: 945GME Advanced menu - Configuration options

1.4.1 ACPI configuration

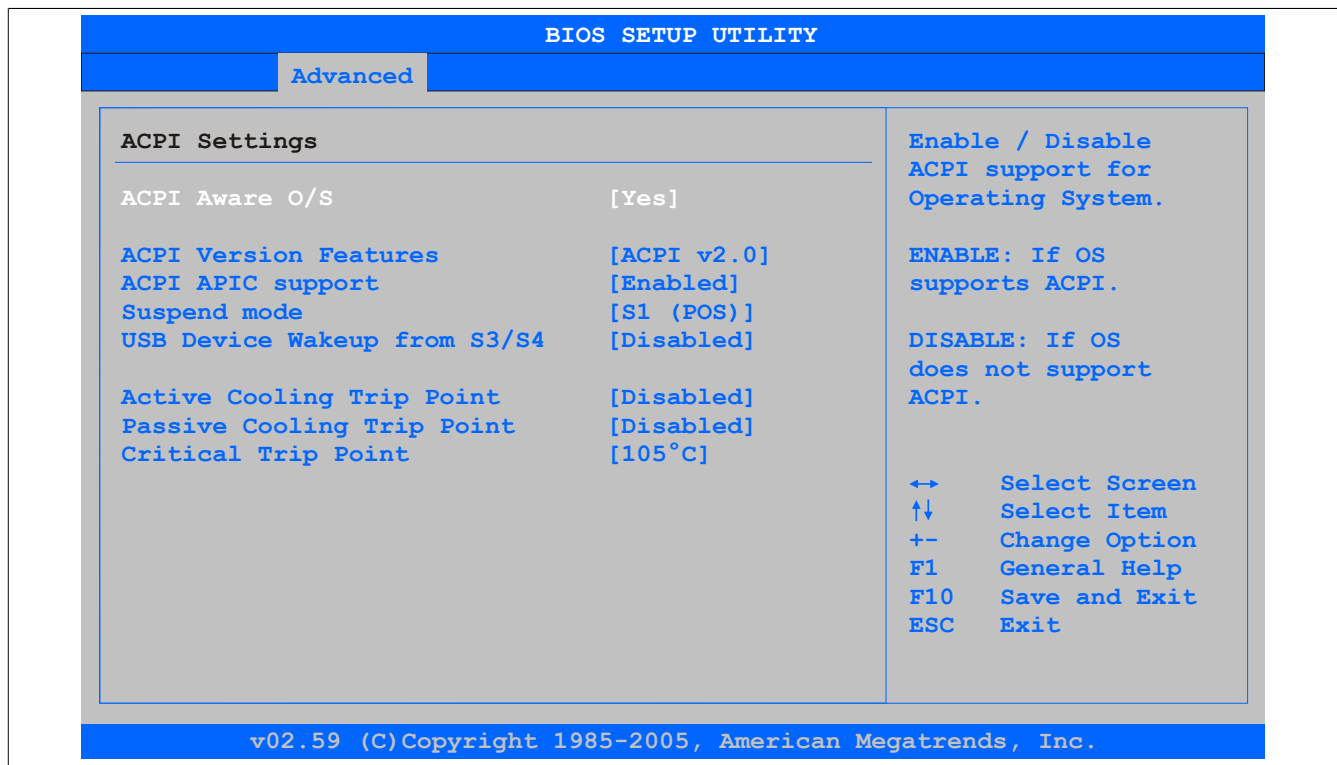


Figure 115: 945GME Advanced - ACPI configuration

| BIOS setting | Function | Configuration options | Effect |
|------------------------------|---|---|--|
| ACPI aware O/S | This function determines if the operating system supports the ACPI function (Advanced Configuration and Power Interface). | Yes | The operating system supports ACPI. |
| | | No | The operating system does not support ACPI. |
| ACPI version features | Option for setting the power option specifications to be supported. The ACPI functions must be supported by the drivers and operating systems being used. | ACPI v1.0 | Uses ACPI functions in accordance with v1.0 |
| | | ACPI v2.0 | Uses ACPI functions in accordance with v2.0 |
| | | ACPI v3.0 | Uses ACPI functions in accordance with v3.0 |
| ACPI APIC support | This option controls the support of the advanced programmable interrupt controller in the processor. | Enabled | Enables this function |
| | | Disabled | Disables the function |
| Suspend mode | Selects the ACPI status to be used when Suspend mode is enabled | S1 (POS) | Sets S1 as Suspend mode. Only a few functions are disabled and are available again at the touch of a button |
| | | S3 (STR) | Sets S3 as Suspend mode. The current state of the operating system is written to RAM, which is then the only component to receive power. |
| USB device wakeup from S3/S4 | This options makes it possible for activity on a connected USB device to wake the system up from the S3/S4 standby mode. | Enabled | Enables this function |
| | | Disabled | Disables this function |
| Active cooling trip point | This function can be used to switch on an optional CPU fan via the operating system 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. Configurable in increments of 10 degrees. |
| Passive cooling trip point | This function can be used to set a CPU temperature at which the operating system reduces the CPU speed. | Disabled | Disables this function |
| | | 50°C, 60°C, 70°C, 80°C, 90°C | Temperature setting for the passive cooling trip point. Configurable in increments of 10 degrees. |
| Critical trip point | Option for configuring a CPU temperature at which the operating system automatically shuts down | 80°C, 85°C, 90°C, 95°C, 100°C, 105°C, 110°C | Temperature setting for the critical trip point. Configurable in increments of 5 degrees. |

Table 190: 945GME Advanced - ACPI configuration - Configuration options

1.4.2 PCI configuration

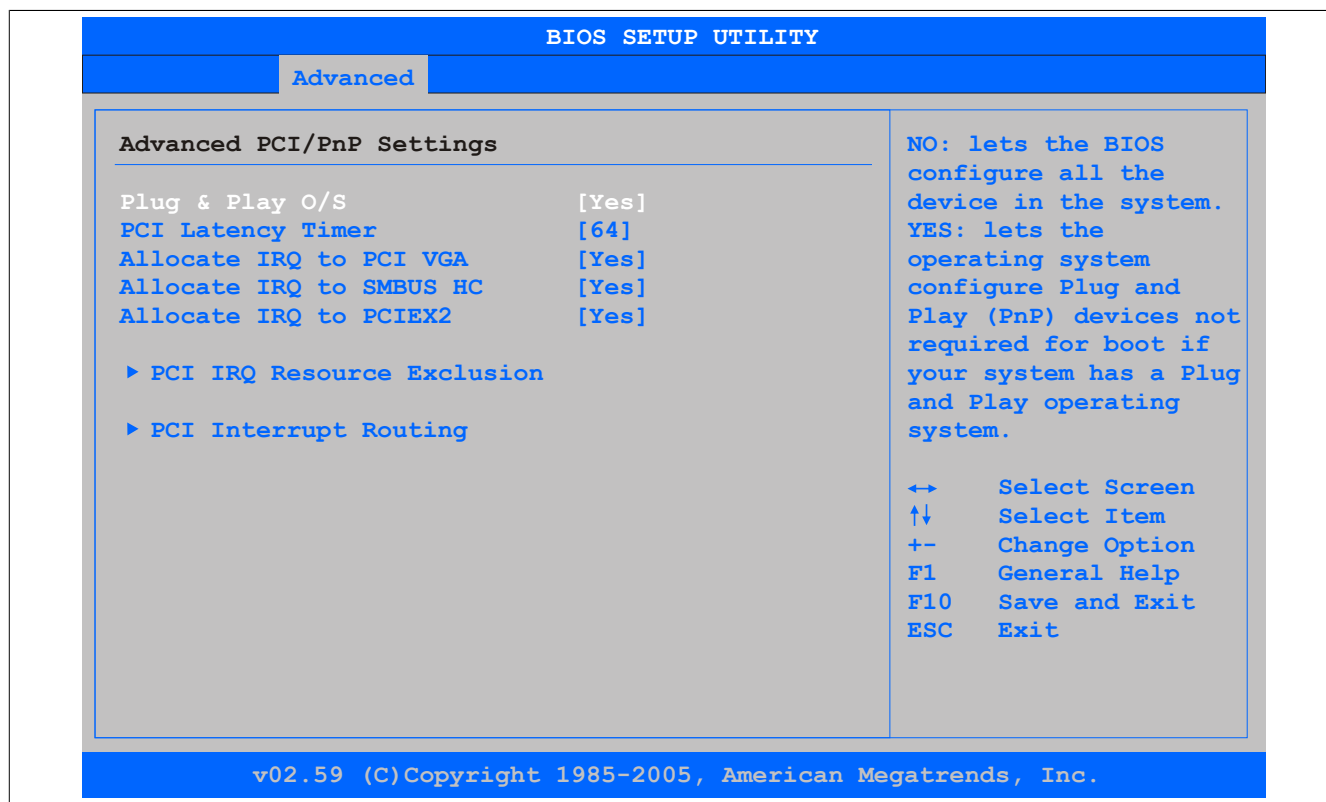


Figure 116: 945GME Advanced - PCI configuration

| BIOS setting | Function | Configuration options | Effect |
|-----------------------------------|--|-------------------------------------|---|
| Plug & Play O/S | Informs BIOS if the operating system is capable of handling plug and play | Yes | Resource allocation handled by the operating system |
| | | No | Resource allocation handled by BIOS |
| PCI latency timer | Option for controlling how long (in PCI ticks) one PCI bus card can continue to use the master after another PCI card has requested access | 32, 64, 96, 128, 160, 192, 224, 248 | Manually sets the value in PCI ticks |
| Allocate IRQ to PCI VGA | This function is used to determine if an interrupt is assigned to the PCI VGA. | Yes | Interrupt assigned automatically |
| | | No | Interrupt not assigned |
| Allocate IRQ to SMBUS HC | This function is used to set whether the SM (system management) bus controller is assigned a PCI interrupt. | Yes | PCI interrupt assigned automatically |
| | | No | Interrupt not assigned |
| Allocate IRQ to PCIEX2 | This function is used to whether the PCIEX2 is assigned a PCI interrupt | Yes | PCI interrupt assigned automatically |
| | | No | Interrupt not assigned |
| 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 235 |
| PCI interrupt routing | Configures PCI interrupt routing | Enter | Opens the submenu See "PCI interrupt routing" on page 236 |

Table 191: 945GME Advanced - PCI configuration - Configuration options

1.4.2.1 PCI IRQ resource exclusion

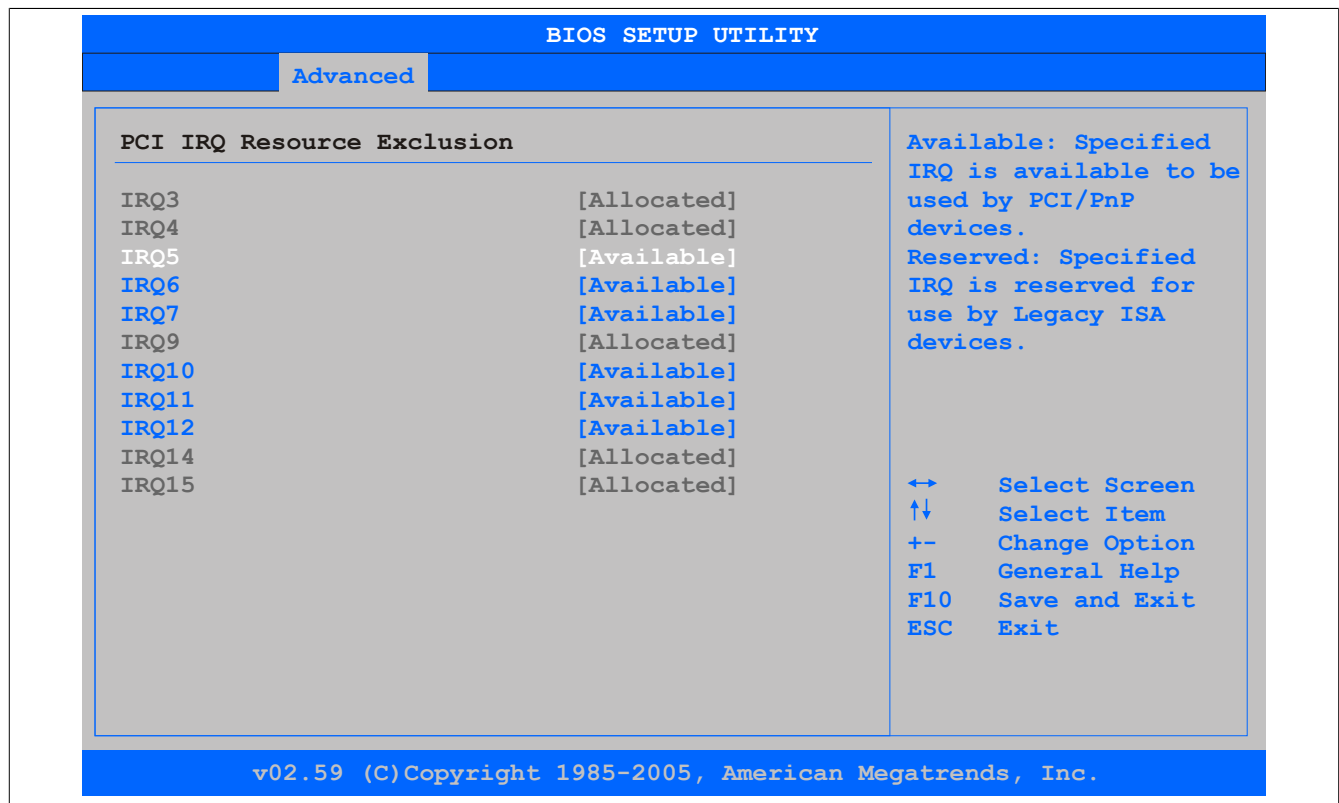


Figure 117: 945GME Advanced - PCI IRQ resource exclusion

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

Table 192: 945GME Advanced - PCI IRQ resource exclusion - Configuration options

1.4.2.2 PCI interrupt routing

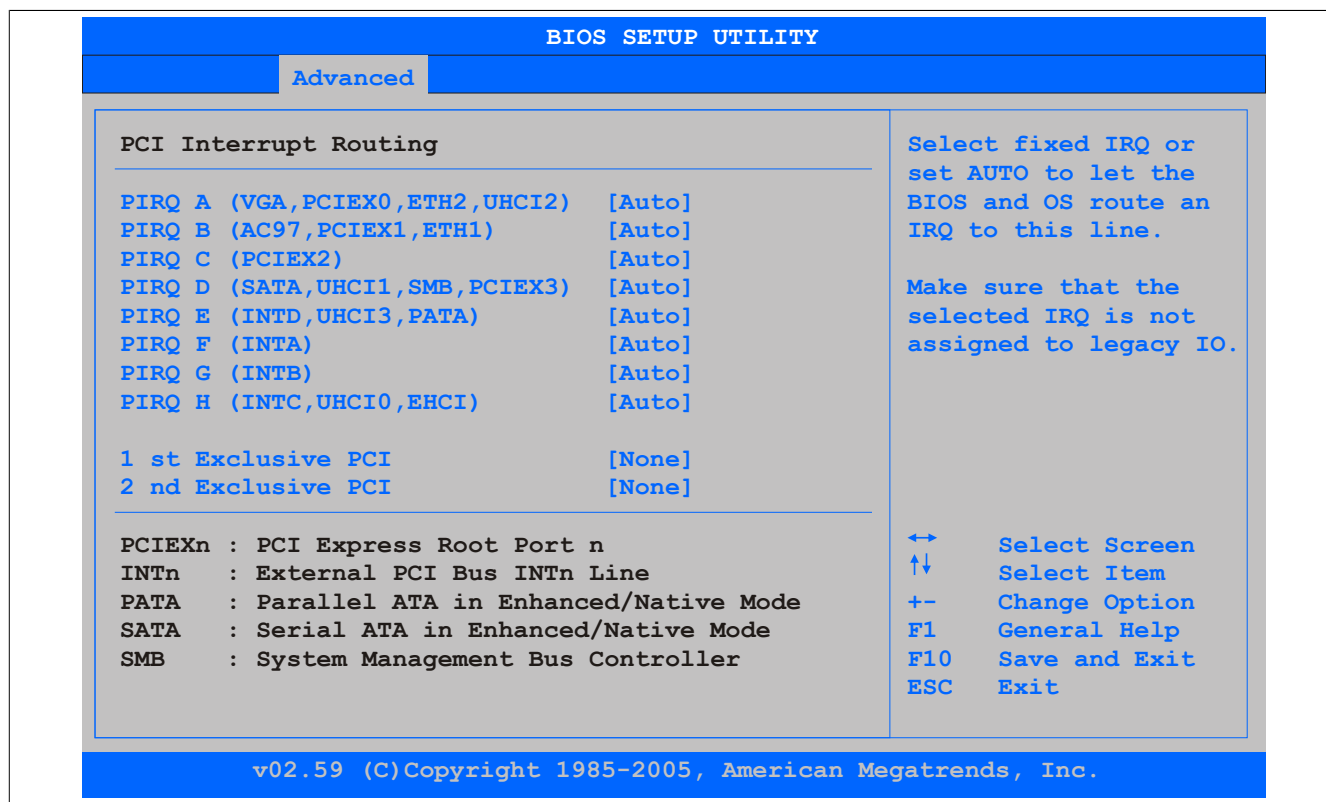


Figure 118: 945GME Advanced - PCI interrupt routing

| BIOS setting | Function | Configuration options | Effect |
|--------------------------------|--|-----------------------|---|
| PIRQ A (VGA,PCIEX0,ETH2,UHCI2) | Option for configuring PIRQ A | Auto | Automatic assignment by BIOS and the operating system |
| | | 5,6,7,9,10,11,12 | Manual assignment |
| PIRQ B (AC97,PCIEX1,ETH1) | Option for configuring PIRQ B | Auto | Automatic assignment by BIOS and the operating system |
| | | 5,6,7,9,10,11,12 | Manual assignment |
| PIRQ C (PCIEX2) | Option for configuring PIRQ C | Auto | Automatic assignment by BIOS and the operating system |
| | | 5,6,7,9,10,11,12 | Manual assignment |
| PIRQ D (SATA,UHCI1,SMB,PCIEX3) | Option for configuring PIRQ D | Auto | Automatic assignment by BIOS and the operating system |
| | | 5,6,7,9,10,11,12 | Manual assignment |
| PIRQ E (INTD,UHCI3,PATA) | Option for configuring PIRQ E | Auto | Automatic assignment by BIOS and the operating system |
| | | 5,6,7,9,10,11,12 | Manual assignment |
| PIRQ F (INTA) | Option for configuring PIRQ F | Auto | Automatic assignment by BIOS and the operating system |
| | | 5,6,7,9,10,11,12 | Manual assignment |
| PIRQ G (INTB) | Option for configuring PIRQ G | Auto | Automatic assignment by BIOS and the operating system |
| | | 5,6,7,9,10,11,12 | Manual assignment |
| PIRQ H (INTC,UHCI0,EHCI) | Option for configuring PIRQ H | Auto | Automatic assignment by BIOS and the operating system |
| | | 5,6,7,9,10,11,12 | Manual assignment |
| 1st exclusive PCI | This option is used to determine if the IRQ listed under PIRQ x is handled exclusively (no IRQ sharing). | None | No interrupt assigned |
| | | x | Assigns the PIRQ as the 1st exclusive PCI IRQ |

Information:

This is only displayed if a PIRQ is configured manually (e.g. 5).

Table 193: 945GME Advanced - PCI interrupt routing - Configuration options

| BIOS setting | Function | Configuration options | Effect |
|-------------------|--|-----------------------|--|
| 2nd Exclusive PCI | <p>This option is used to determine if the IRQ listed under PIRQ x is handled exclusively (no IRQ sharing).</p> <p>Information:</p> <p>This is only displayed if two PIRQs are configured manually.</p> | <p>None</p> <p>x</p> | <p>No interrupt assigned</p> <p>Assigns the PIRQ as the 2nd exclusive PCI IRQ.</p> |

Table 193: 945GME Advanced - PCI interrupt routing - Configuration options

1.4.3 PCI Express configuration

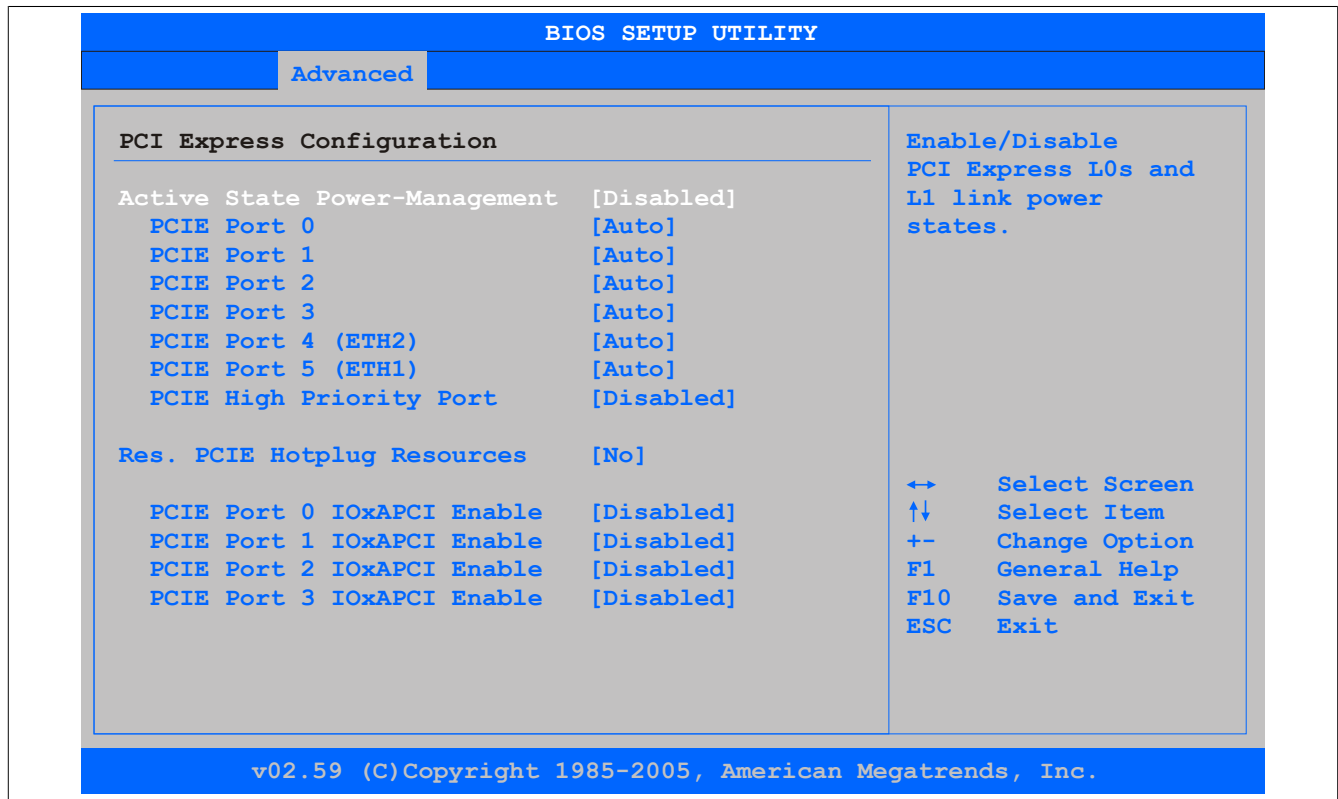


Figure 119: 945GME Advanced - PCI Express configuration

| BIOS setting | Function | Configuration options | Effect |
|-------------------------------|--|--|---|
| Active state power management | Option for configuring a power saving function (L0s/L1) for PCIE slots if they do not require full power | <p>Enabled</p> <p>Disabled</p> | <p>Enables this function</p> <p>Disables this function</p> |
| PCIE port 0 | <p>This option enables or disables the PCI Express interface function.</p> <p>Information:</p> <p>If no PCI Express devices are being used, this option should be disabled.</p> | <p>Auto</p> <p>Enabled</p> <p>Disabled</p> | <p>Automatic assignment by BIOS and the operating system</p> <p>Enables this function</p> <p>Disables this function</p> |
| PCIE port 1 | <p>This option enables or disables the PCI Express interface function.</p> <p>Information:</p> <p>If no PCI Express devices are being used, this option should be disabled.</p> | <p>Auto</p> <p>Enabled</p> <p>Disabled</p> | <p>Automatic assignment by BIOS and the operating system</p> <p>Enables this function</p> <p>Disables this function</p> |
| PCIE port 2 | <p>This option enables or disables the PCI Express interface function.</p> <p>Information:</p> <p>If no PCI Express devices are being used, this option should be disabled.</p> | <p>Auto</p> <p>Enabled</p> <p>Disabled</p> | <p>Automatic assignment by BIOS and the operating system</p> <p>Enables this function</p> <p>Disables this function</p> |
| PCIE port 3 | This option enables or disables the PCI Express interface function. | Auto | Automatic assignment by BIOS and the operating system |

Table 194: 945GME Advanced - PCI Express configuration - Configuration options

| BIOS setting | Function | Configuration options | Effect |
|---------------------------------|--|-----------------------|---|
| | Information: If no PCI Express devices are being used, this option should be disabled. | Enabled | Enables this function |
| | | Disabled | Disables this function |
| PCIE Port 4 (ETH2) | This option enables or disables the PCI Express interface function. Information: If no PCI Express devices are being used, this option should be disabled. | Auto | Automatic assignment by BIOS and the operating system |
| | | Enabled | Enables this function |
| | | Disabled | Disables this function |
| PCIE Port 5 (ETH1) | This option enables or disables the PCI Express interface function. Information: If no PCI Express devices are being used, this option should be disabled. | Auto | Automatic assignment by BIOS and the operating system |
| | | Enabled | Enables this function |
| | | Disabled | Disables this function |
| PCIE high priority port | This option enables or disables the priority port for PCIE. | Disabled | Disables this function |
| | | Port 0 | Enables port 0 as the priority port |
| | | Port 1 | Enables port 1 as the priority port |
| | | Port 2 | Enables port 2 as the priority port |
| | | Port 3 | Enables port 3 as the priority port |
| | | ETH2 | Enables ETH2 as the priority port |
| | | ETH1 | Enables ETH1 as the priority port |
| Res. PCIE hot plugging resource | This option is used to reserve an I/O and memory resource for an unused PCIE port. A PCIE port must be set to "Enabled" and resources must be reserved in order for ExpressCard hot-plugging to be supported on the respective port. | Yes | Resource reserved |
| | | No | Resource not reserved |
| PCIE port 0 IOxAPCI enable | This option enables or disables the APIC (Advanced Programmable Interrupt Controller) on PCIE port 0. The IRQ resources available to the system are expanded when APIC mode is enabled. | Enabled | Enables this function |
| | | Disabled | Disables this function |
| PCIE port 1 IOxAPCI enable | This option enables or disables the APIC (Advanced Programmable Interrupt Controller) on PCIE port 1. The IRQ resources available to the system are expanded when APIC mode is enabled. | Enabled | Enables this function |
| | | Disabled | Disables this function |
| PCIE port 2 IOxAPCI enable | This option enables or disables the APIC (Advanced Programmable Interrupt Controller) on PCIE port 2. The IRQ resources available to the system are expanded when APIC mode is enabled. | Enabled | Enables this function |
| | | Disabled | Disables this function |
| PCIE port 3 IOxAPCI enable | This option enables or disables the APIC (Advanced Programmable Interrupt Controller) on PCIE port 3. The IRQ resources available to the system are expanded when APIC mode is enabled. | Enabled | Enables this function |
| | | Disabled | Disables this function |

Table 194: 945GME Advanced - PCI Express configuration - Configuration options

1.4.4 Graphics configuration

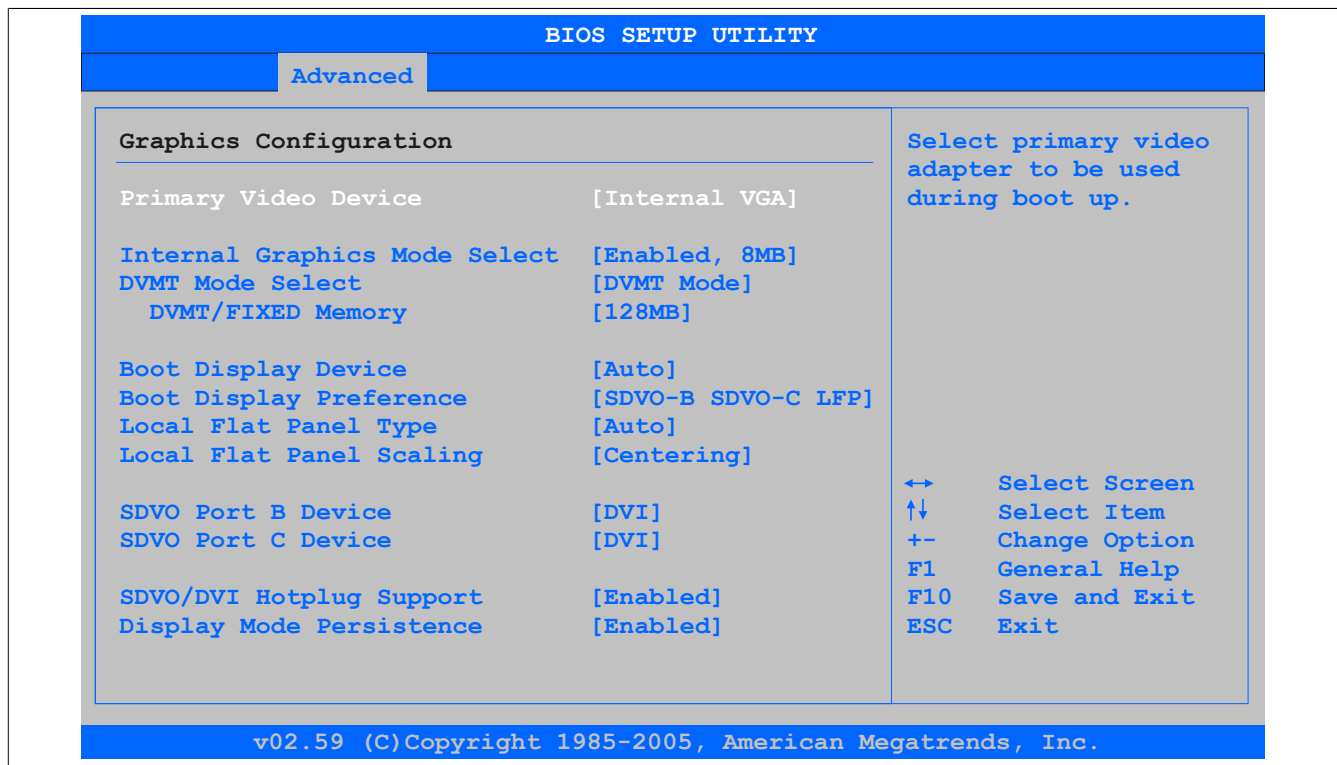


Figure 120: 945GME Advanced - Graphics configuration

| BIOS setting | Function | Configuration options | Effect |
|-------------------------------|--|--|--|
| Primary video device | Option for selecting the primary display device | Internal VGA | Uses the internal graphics chip on the CPU board as the video device (monitor/panel interface) |
| | | PCI / Int. VGA | Uses the graphics chip of a connected graphics card as the display device |
| Internal graphics mode select | Option for setting the amount of memory used for the internal graphics controller | Disabled | Nothing reserved, disables the graphics controller |
| | | Enabled, 1MB | Provides 1 MB main memory |
| | | Enabled, 8MB | Provides 8 MB main memory |
| DVMT mode select | Option for determining the DVMT mode (Dynamic Video Memory Technology) of the DVMT graphics driver | Fixed mode | Allocates a fixed amount of memory to the graphics chip, which is then no longer available to the PC |
| | | DVMT mode | Memory consumption controlled dynamically by the DVMT graphics driver. Only the amount of memory that is required is reserved. |
| | | Combo mode | At least 64 MB reserved by the DVMT graphics driver (up to 224 MB possible) |
| DVMT/FIXED memory | Option for setting the amount of memory used for DVMT mode | 64 MB | Allows 64 MB of main memory to be used |
| | | 128 MB | Allows 128 MB of main memory to be used |
| | | Maximum DVMT | Allows the remaining available main memory to be used |
| Boot display device | Determines which video channel should be enabled for a display device during booting | Auto | Automatic selection |
| | | CRT only | Uses only the CRT (Cathode Ray Tube) channel |
| | | SDVO only | Uses only the SDVO (Serial Digital Video Out) channel |
| | | CRT + SDVO | Uses the CRT and SDVO channel |
| | | LFP only | Uses only the LFP (Local Flat Panel) channel |
| | | CRT + LFP | Uses the CRT and LFP channel |
| Boot display preference | This option determines the order in which the devices on the connected LFP and SDVO channels should be checked and booted. | LFP SDVO-B SDVO-C | Local Flat Panel - Serial Digital Video B output - Serial Video C output |
| | | LFP SDVO-C SDVO-B | Local Flat Panel - Serial Digital Video C output - Serial Video B output |
| | | SDVO-B SDVO-C LFP | Serial Digital Video B output - Serial Digital Video C output - Local Flat Panel |
| | | SDVO-C SDVO-B LFP | Serial Digital Video C output - Serial Digital Video B output - Local Flat Panel |
| Local flat panel type | This option can be used to set a predefined profile for the LVDS channel. | Information: The setting only affects the system if the "Boot display device" option is set to "Auto". | |
| | | | |
| Local flat panel type | This option can be used to set a predefined profile for the LVDS channel. | Auto | Automatic detection and configuration using the EDID data |

Table 195: 945GME Advanced - Graphics configuration - Configuration options

| BIOS setting | Function | Configuration options | Effect |
|-------------------------------|---|------------------------|---|
| | | VGA 1x18 (002h) | 640 x 480 |
| | | VGA 1x18 (013h) | 640 x 480 |
| | | SVGA 1x18 (004h) | 800 x 600 |
| | | XGA 1x18 (006h) | 1024 x 768 |
| | | XGA 2x18 (007h) | 1024 x 768 |
| | | XGA 1x24 (008h) | 1024 x 768 |
| | | XGA 2x24 (012h) | 1024 x 768 |
| | | SXGA 2x24 (00Ah) | 1280 x 1024 |
| | | SXGA 2x24 (018h) | 1280 x 1024 |
| | | UXGA 2x24 (00Ch) | 1600 x 1200 |
| | | Customized EDID 1 | User-defined profile |
| | | Customized EDID 2 | User-defined profile |
| | | Customized EDID 3 | User-defined profile |
| Local flat panel scaling | Determines the screen content should be output depending on the configured local flat panel type | Centering | Centers the screen contents on the display |
| | | Expand text | Expands text across the entire display |
| | | Expand graphics | Expands graphics across the entire display |
| | | Expand text & graphics | Expands text and graphics across the entire display |
| SDVO port B device | Option for selecting the display device that is connected to SDVO Port B | None | No display device connected |
| | | DVI | Optimizes video signal output for a DVI-compatible display device |
| | | TV | Optimizes video signal output for a TV-compatible display device |
| | | CRT | Optimizes video signal output for a CRT-compatible display device |
| | | LVDS | Optimizes video signal output for a LVDS-compatible display device |
| | | DVI-analog | Optimizes video signal output for an analog DVI-compatible display device |
| SDVO port C device | Option for selecting the display device that is connected to SDVO Port A | None | No display device connected |
| | | DVI | Optimizes video signal output for a DVI-compatible display device |
| | | TV | Optimizes video signal output for a TV-compatible display device |
| | | CRT | Optimizes video signal output for a CRT-compatible display device |
| | | LVDS | Optimizes video signal output for a LVDS-compatible display device |
| | | DVI-analog | Optimizes video signal output for an analog DVI-compatible display 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 a DVI monitor is detected automatically and enabled if connected while the operating system is running. "Configuration mode persistence" means that a dual DVI configuration, for example, is automatically restored when both DVI monitors are reconnected, even if only one of them was connected and enabled during a previous boot. | Enabled | Enables "Hot plugging" and "Configuration mode persistence" mode |
| | | Disabled | Disables "Hot plugging" and "Configuration mode persistence" mode |
| Display mode persistence | "Display mode persistence" means that the operating system can remember and restore past display configurations. For example, a dual DVI configuration is automatically restored when both DVI monitors are reconnected, even if only one of them was connected and enabled during a previous boot. | Enabled | Enables this function |
| | | Disabled | Disables this function |

Table 195: 945GME Advanced - Graphics configuration - Configuration options

1.4.5 CPU configuration

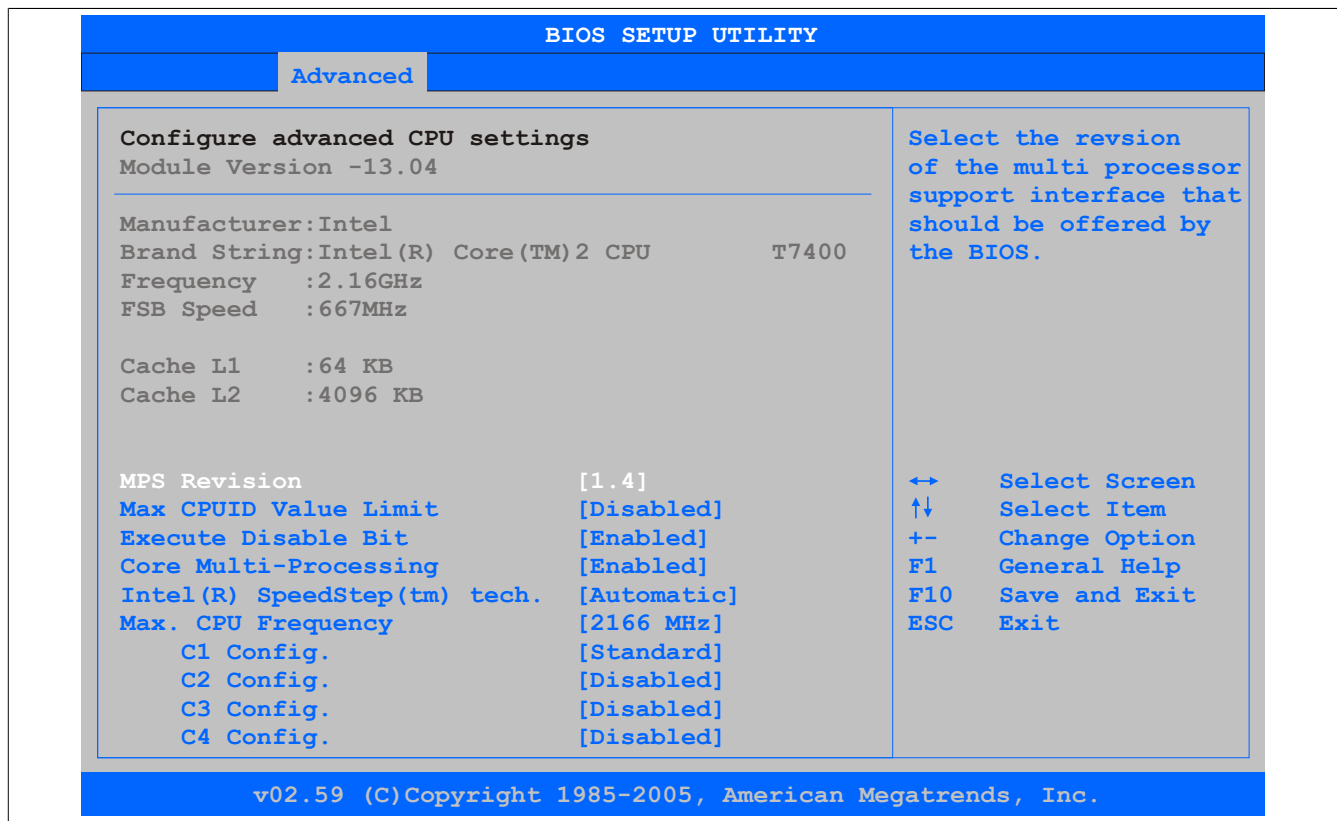


Figure 121: 945GME Advanced - CPU configuration

| BIOS setting | Function | Configuration options | Effect |
|------------------------------|--|-----------------------|--|
| MPS revision | This option supports the use of multiple CPUs (MPS=multiprocessor system). | 1.1 | Sets MPS support to Revision 1.1 |
| | | 1.4 | Sets MPS support to Revision 1.4 |
| Max CPUID value limit | Option for limiting the CPUID input value. This may be necessary for older operating systems. | Enabled | The processor limits the maximum CPUID input value to 03h if necessary when the the processor supports a higher value. |
| | | Disabled | The processor returns the current maximum value when the CPUID input value is requested. |
| Execute disable bit | Option for enabling/disabling hardware support for prevention of data execution | Enabled | Enables this function |
| | | Disabled | Disables this function |
| Core multi-processing | This option can be used to disable a core when using a dual-core processor. | Enabled | Uses both cores in a dual-core processor |
| | | Disabled | Uses only one core in a dual-core processor |
| Intel(R) Speedster(tm) tech. | Option for controlling the Intel(R) SpeedStep(TM) technology. The processor clock speed is increased or decreased according to the number of calculations that must be made. As a result, the power consumption depends largely on the processor load. | Automatic | The processor speed is regulated by the operating system. |
| | | Maximum speed | The processor speed is set to a maximum. |
| | | Minimum speed | The processor speed is set to a minimum. |
| | | Disabled | Disables SpeedStep technology |
| Max. CPU frequency | Option for setting the maximum processor speed if the value "Automatic" or "Maximum speed" is set for the option "Intel(R) SpeedStep(tm) tech." | xxxx MHz | Limits the processor speed to the configured value |
| C1 config | Power management for the Intel Core Duo processor | Standard | Standard C1 support |
| | | Enhanced | Enhanced C1 support |
| C2 config | Power management for the Intel Core Duo processor | Standard | Standard C2 support |
| | | Enhanced | Enhanced C2 support |
| | | Disabled | Disables C2 support |
| C3 config | Power management for the Intel Core Duo processor | Standard | Standard C3 support |
| | | Enhanced | Enhanced C3 support |
| | | Disabled | Disables C3 support |
| C4 config | Power management for the Intel Core Duo processor | Standard | Standard C4 support |
| | | Enhanced | Enhanced C4 support |
| | | Disabled | Disables C4 support |

Table 196: 945GME Advanced - CPU configuration - Configuration options

1.4.6 Chipset settings

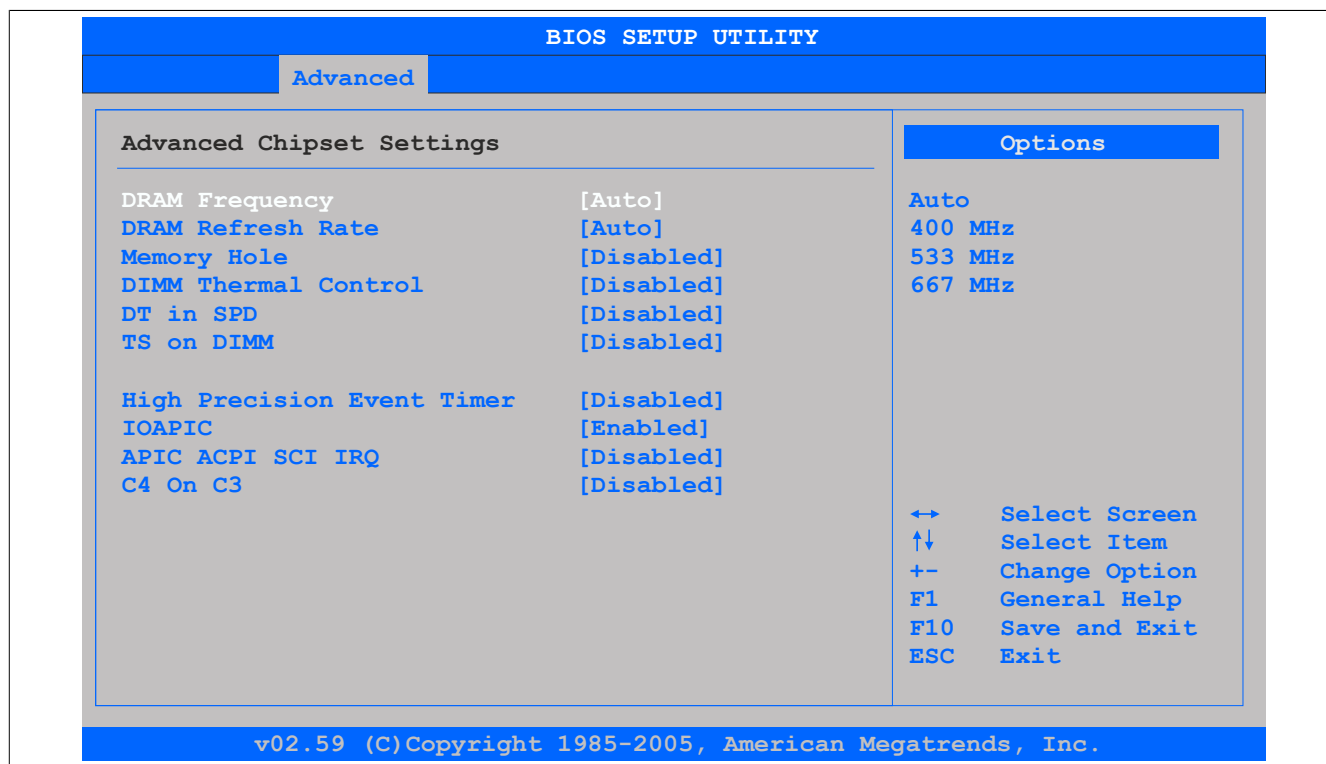


Figure 122: 945GME Advanced - Chipset settings

| BIOS setting | Function | Configuration options | Effect |
|----------------------------|---|--|---|
| DRAM frequency | Option for setting the RAM frequency | Auto | BIOS sets the frequency automatically. |
| | | 400, 533, 667 MHz | The desired clock frequency is set manually. |
| | | | |
| DRAM refresh rate | Option for configuring the DRAM refresh rate | Auto | Reads the DRAM refresh rate from the SPD data of the DRAM module |
| | | 7.8 μ s | The DRAM refresh rate is set manually. |
| | | 3.9 μ s | The DRAM refresh rate is set manually. |
| Memory hole | Option for ISA cards with a frame buffer. This does not apply to the APC810. | Disabled | Disables this function |
| | | 15MB-16MB | Reserves the address range |
| DIMM thermal control | Option for setting the maximum surface temperature of the DIMM module. The module is cooled by limiting the memory bandwidth if the defined surface temperature is reached. | Disabled | Surface temperature not limited |
| | | 40°C, 50°C, 60°C, 70°C, 80°C, 85°C, 90°C | Temperature limit value for the limitation |
| DT in SPD | Option to determine whether the GMCH (graphics and memory controller hub) supports DT (delta temperature) in the SPD (serial presence detect) management algorithm of the DIMM module | Enabled | Enables this function |
| | | Disabled | Disables this function |
| TS on DIMM | Option to determine whether the GMCH (graphics and memory controller hub) supports the TS (thermal sensor) in the thermal management algorithm of the DIMM module | Enabled | Enables this function |
| | | Disabled | Disables this function |
| High precision event timer | The HPET is a timer inside the PC. It is able to trigger an interrupt with a high degree of accuracy, which allows other programs to better synchronize a variety of applications. | Enabled | Enables this function. This function is recommended for multimedia applications. |
| | | Disabled | Disables this function |
| IOAPIC | This option is used to enable or disable the APIC (Advanced Programmable Interrupt Controller). | Enabled | The IRQ resources available to the system are expanded when 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 | Uses IRQ20 for SCI |
| | | Disabled | Uses IRQ9 for SCI. |
| C4 on C3 | Fine-tunes the power saving function on an ACPI operating system | Enabled | Brings the processor to C4 if the operating system is initiated in a C3 state |
| | | Disabled | Disables this function |

Table 197: 945GME Advanced - Chipset settings - Configuration options

1.4.7 I/O interface configuration

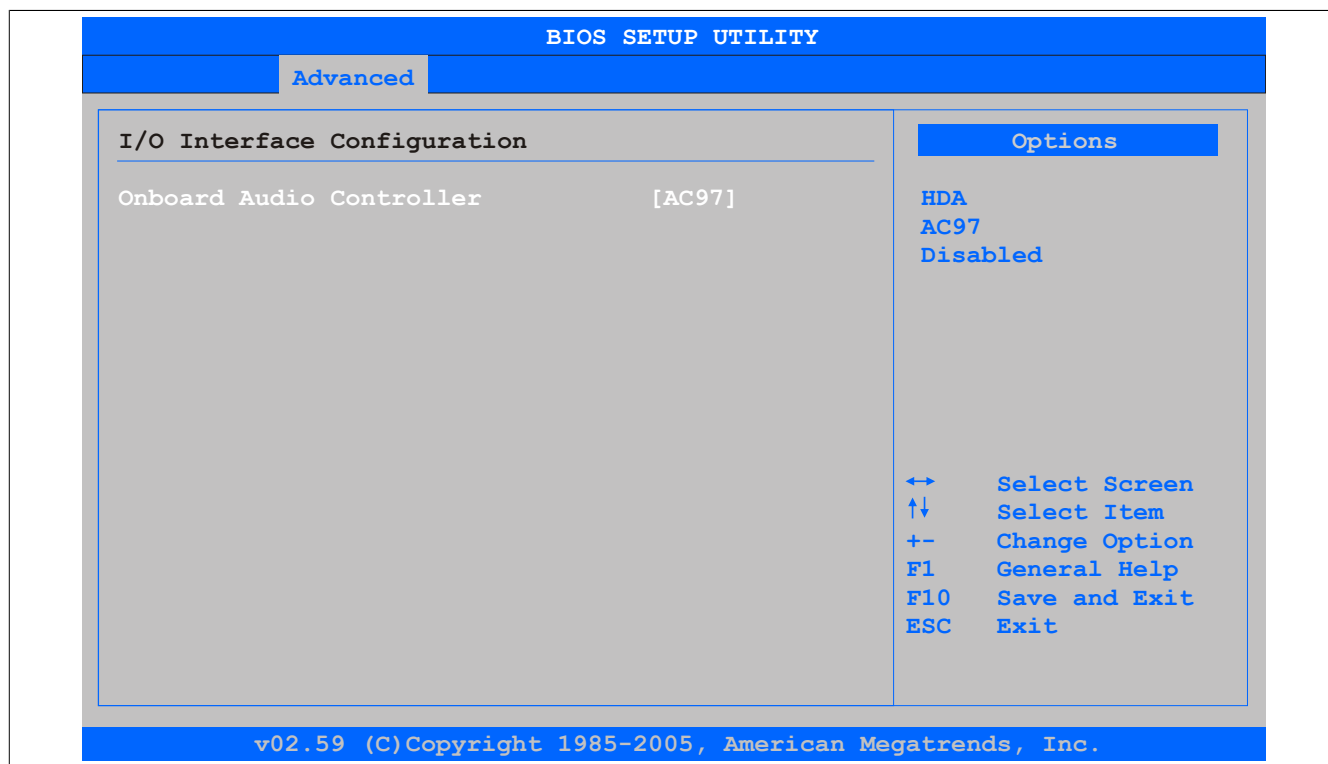


Figure 123: 945GME Advanced - I/O interface configuration

| BIOS setting | Function | Configuration options | Effect |
|--------------------------|--|-----------------------|-------------------------------------|
| Onboard audio controller | Option for selecting or turning off the audio mode | HDA | Enables High Definition Audio sound |
| | | AC97 | Enables AC'97 sound |
| | | Disabled | Disables the audio controller |

Table 198: 945GME Advanced - I/O interface configuration - Configuration options

1.4.8 Clock configuration

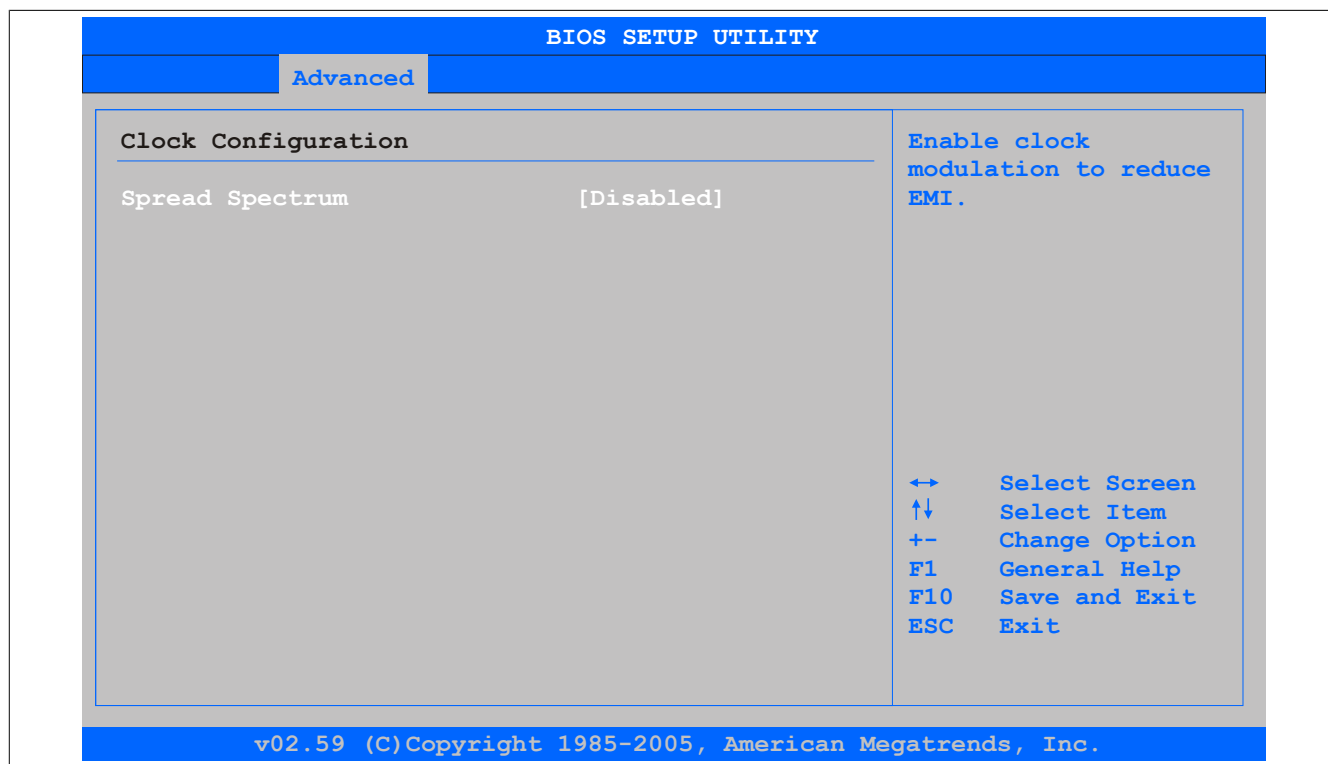


Figure 124: 945GME Advanced - Clock configuration

| BIOS setting | Function | Configuration options | Effect |
|-----------------|---|-----------------------|------------------------|
| Spread spectrum | This option is used to modulate the cycle frequency to slightly reduce electromagnetic interference | Enabled | Enables this function |
| | | Disabled | Disables this function |

Table 199: 945GME Advanced - Clock configuration - Configuration options

1.4.9 IDE configuration

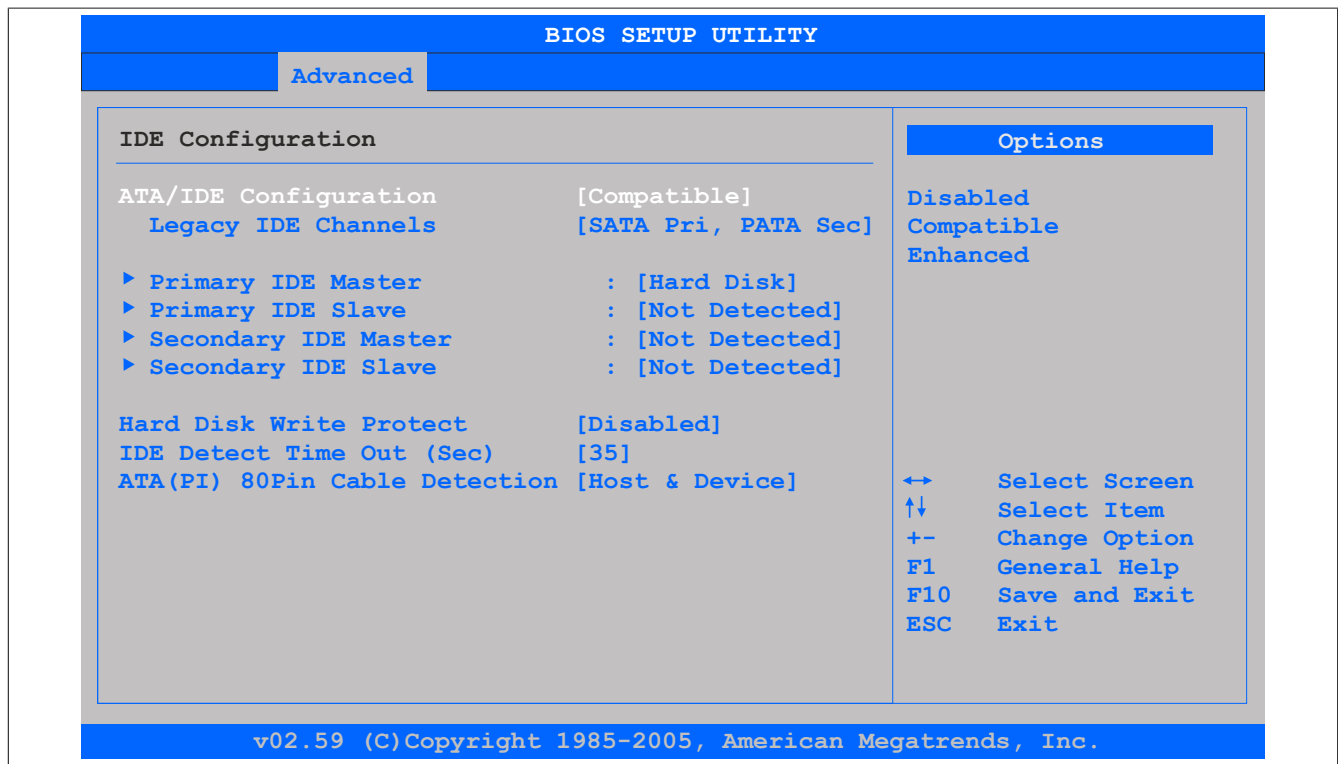


Figure 125: 945GME Advanced - IDE configuration

| BIOS setting | Function | Configuration options | Effect |
|---------------------------------------|---|-----------------------|--|
| ATA/IDE Configuration | Option for configuring the integrated PATA and SATA controllers | Compatible | Both controllers run in Legacy or Compatible mode. |
| | | Disabled | Disables both controllers |
| | | Enhanced | Both controllers run in Enhanced or Native mode. |
| Legacy IDE channels ¹⁾ | Option for configuring the Legacy IDE channels in Compatible mode. | SATA Pri, PATA Sec | Assigns SATA drives as primary and PATA drives as secondary |
| | | SATA only | Uses SATA drives only |
| | | PATA only | Uses PATA drives only |
| Configure SATA as ²⁾ | Allows the serial ATA connections supported by the southbridge to be defined | IDE | The serial ATA hard drive is used as a parallel ATA physical drive. |
| | | RAID | RAID 0, 1, 5, 10 or Intel® Matrix Storage technology can be configured here with the serial ATA hard drive. |
| | | AHCI | The AHCI setting enables the internal memory driver for SATA functions, which increases the storage performance for random read-write access by allowing the drive itself to determine the sequence of commands. |
| Configure SATA channels ³⁾ | Allows SATA or PATA drives to be configured as primary or secondary devices | Before PATA | Sets the SATA drives as primary devices and PATA as secondary |
| | | Behind PATA | Sets the PATA drives as primary devices and SATA as secondary |
| AHCI/RAID SATA hot plug ⁴⁾ | Allows the configuration of hot plugging support for AHCI/RAID systems | Enabled | Enables hot plugging support |
| | | Disabled | Disables hot plugging support |
| Primary IDE master | Option for configuring the drive in the system that is connected to the IDE primary master port | Enter | Opens the submenu See "Primary IDE master" on page 245 |
| Primary IDE slave | Option for configuring the drive in the system that is connected to the IDE primary slave port | Enter | Opens the submenu See "Primary IDE slave" on page 246 |
| Secondary IDE master | Option for configuring the drive in the system that is connected to the IDE secondary master port | Enter | Opens the submenu See "Secondary IDE master" on page 247 |
| Secondary IDE slave | Option for configuring the drive in the system that is connected to the IDE secondary slave port | Enter | Opens the submenu See "Secondary IDE slave" on page 248 |
| Hard disk write protect | Option for enabling/disabling write protection for the hard drive | Enabled | Enables this function |
| | | Disabled | Disables this function |

Table 200: 945GME Advanced - IDE configuration - Configuration options

| BIOS setting | Function | Configuration options | Effect |
|--------------------------------|--|---|---|
| IDE detect time out (sec) | Configures the time overrun limit for ATA/ATAPI device detection | 0, 5, 10, 15, 20, 25, 30, 35 | Time setting in seconds |
| ATA(PI) 80-pin cable detection | Configures whether an 80-pin cable is connected to the drive, to the controller or to both | Host & device | Uses both IDE controllers (motherboard, disk drive) |
| | | Host | Uses the IDE controller on the motherboard |
| | | Device | Uses the IDE controller on the disk drive |
| | | <div><div></div><div><div>Information:</div><div>This option is not available on the APC810 CPU board. This setting therefore does not apply.</div></div></div> | |

Table 200: 945GME Advanced - IDE configuration - Configuration options

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

1.4.9.1 Primary IDE master

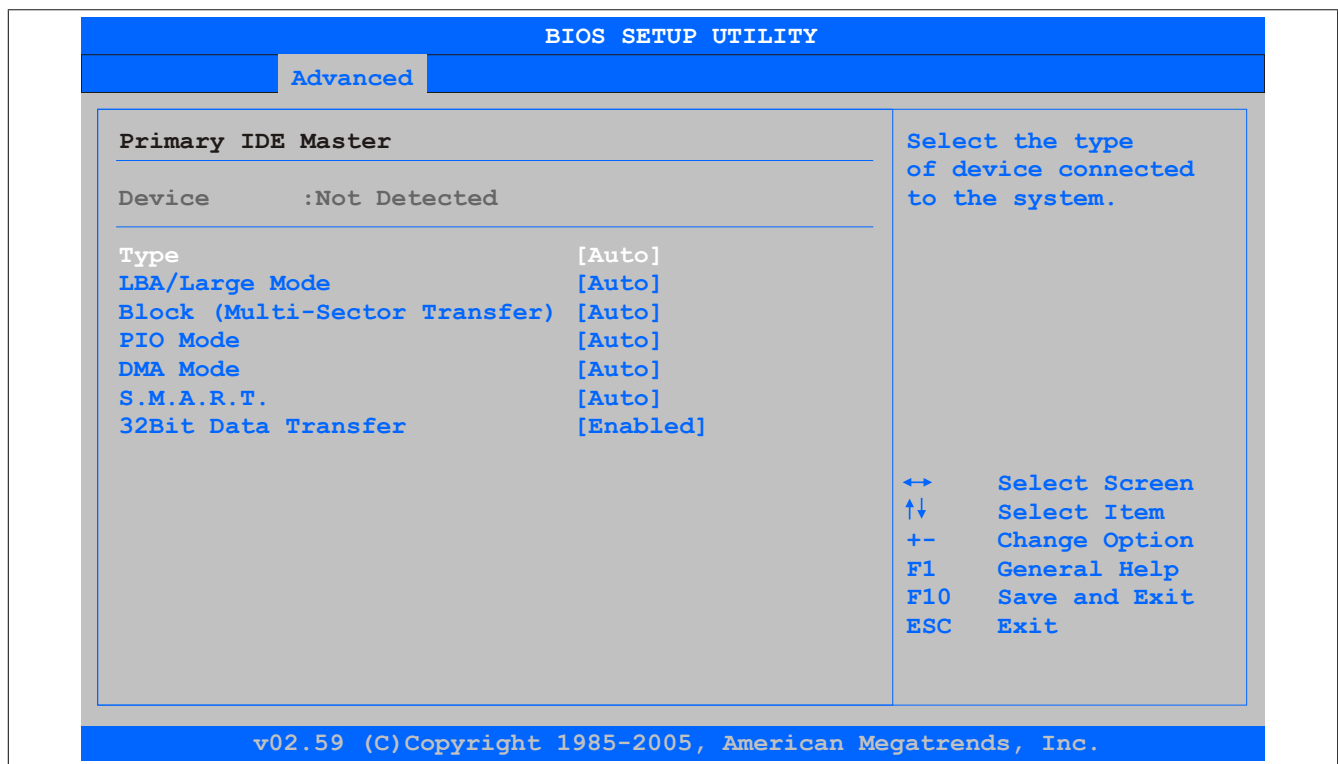


Figure 126: 945GME Advanced - Primary IDE master

| BIOS setting | Function | Configuration options | Effect |
|-------------------------------|--|--|---|
| Type | Configures the type of drive connected to the primary master | Not installed | No drive installed |
| | | Auto | Automatically detects the drive and configures the necessary values |
| | | CD/DVD | CD/DVD drive |
| | | ARMD | ARMD drive (zip drive) |
| LBA/Large mode | This option enables IDE logical block addressing / large mode | Disabled | Disables this function |
| | | Auto | Automatically enables this function if supported by the system |
| Block (multi-sector transfer) | This option enables block mode for IDE hard drives. If this option is enabled, the number of blocks per request is read from the configuration sector of the hard drive. | Disabled | Disables this function |
| | | Auto | Automatically enables this function if supported by the system |
| PIO mode | PIO mode determines the data rate of the hard drive. | Auto | Configures PIO mode automatically |
| | | 0, 1, 2, 3, 4 | Configures PIO mode manually |
| | | <div><div></div><div>Information: This option is not available on the APC810. This setting therefore does not apply.</div></div> | |

Table 201: 945GME Advanced - Primary IDE master - Configuration options

| BIOS setting | Function | Configuration options | Effect |
|----------------------|---|-----------------------|---|
| DMA mode | Defines the data transfer rate to and from the primary master drive. DMA mode must be enabled activated in the Windows Device Manager in order to guarantee maximum performance. This is only possible when manually setting up the drive. | Auto | Defines the transfer rate automatically |
| | | Disabled | Defines the transfer rate manually |
| S.M.A.R.T. | Monitoring function for hard drives (Self-Monitoring, Analysis and Reporting Technology) | Auto | Detected and enabled automatically |
| | | Enabled | Enables this function |
| | | Disabled | Disables this function |
| 32 bit data transfer | Enables 32-bit data transfer | Enabled | Enables this function |
| | | Disabled | Disables this function |

Table 201: 945GME Advanced - Primary IDE master - Configuration options

1.4.9.2 Primary IDE slave

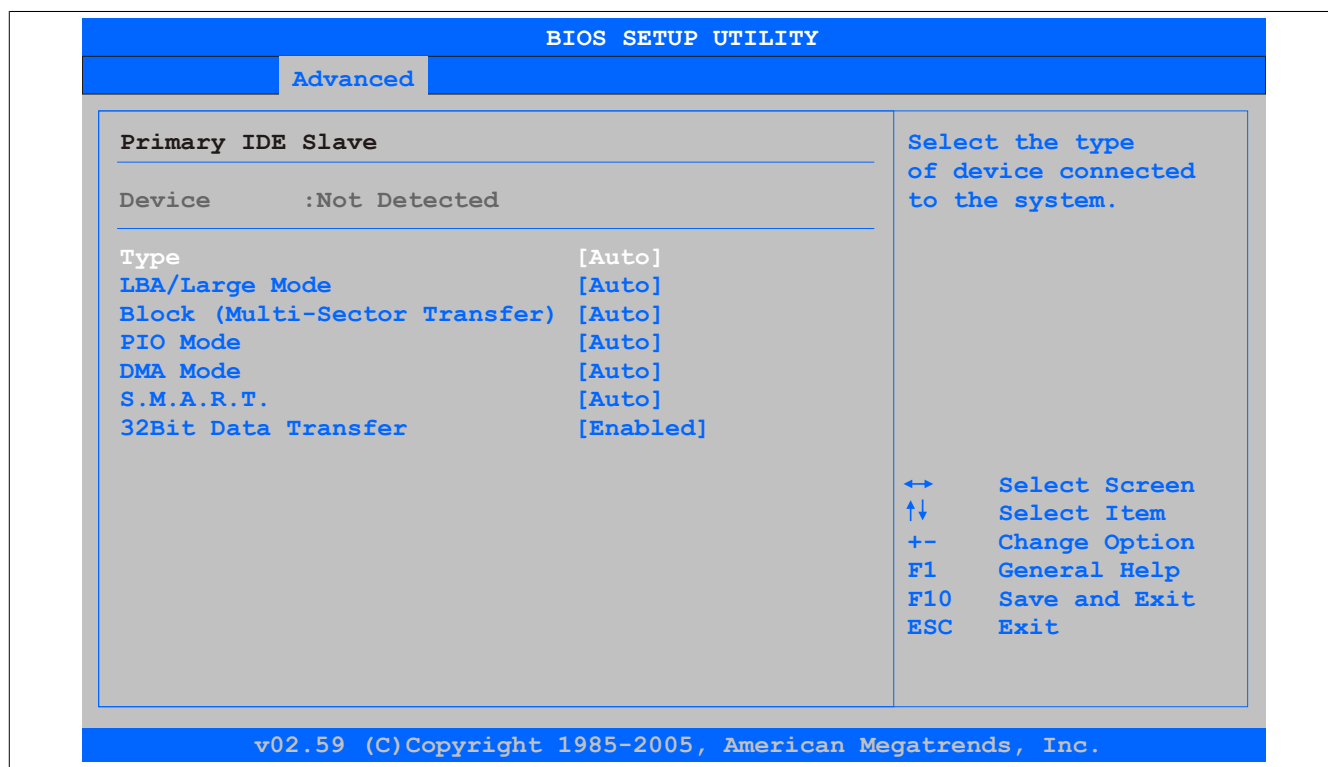


Figure 127: 945GME Advanced - Primary IDE slave

| BIOS setting | Function | Configuration options | Effect |
|-------------------------------|--|-----------------------|---|
| Type | Configures the type of drive connected to the primary slave | Not installed | No drive installed |
| | | Auto | Automatically detects the drive and configures the necessary values |
| | | CD/DVD | CD/DVD drive |
| | | ARMD | ARMD drive (zip drive) |
| LBA/Large mode | This option enables IDE logical block addressing / large mode | Disabled | Disables this function |
| | | Auto | Automatically enables this function if supported by the system |
| Block (multi-sector transfer) | This option enables block mode for IDE hard drives. If this option is enabled, the number of blocks per request is read from the configuration sector of the hard drive. | Disabled | Disables this function |
| | | Auto | Automatically enables this function if supported by the system |
| PIO mode | PIO mode determines the data rate of the hard drive. | Auto | Configures PIO mode automatically |
| | | 0, 1, 2, 3, 4 | Configures PIO mode manually |

Information:

This option is not available on the APC810. This setting therefore does not apply.

Table 202: 945GME Advanced - Primary IDE slave - Configuration options

| BIOS setting | Function | Configuration options | Effect |
|----------------------|---|-----------------------|---|
| DMA mode | The data transfer rate to and from the primary slave drive is defined here. DMA mode must be enabled activated in the Windows Device Manager in order to guarantee maximum performance. This is only possible when manually setting up the drive. | Auto | Defines the transfer rate automatically |
| | | Disabled | Defines the transfer rate manually |
| S.M.A.R.T. | Monitoring function for hard drives (Self-Monitoring, Analysis and Reporting Technology) | Auto | Detected and enabled automatically |
| | | Enabled | Enables this function |
| | | Disabled | Disables this function |
| 32 bit data transfer | Enables 32-bit data transfer | Enabled | Enables this function |
| | | Disabled | Disables this function |

Table 202: 945GME Advanced - Primary IDE slave - Configuration options

1.4.9.3 Secondary IDE master

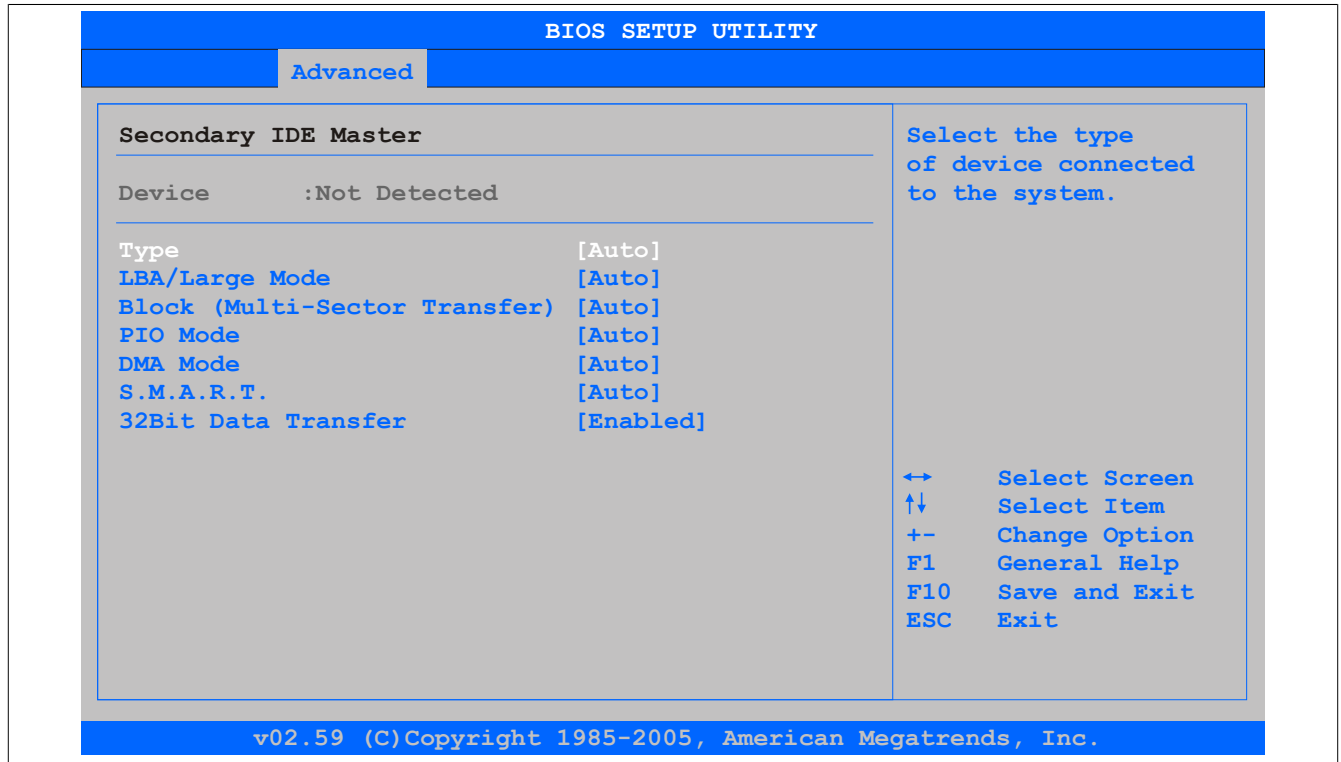


Figure 128: 945GME Advanced - Secondary IDE master

| BIOS setting | Function | Configuration options | Effect |
|-------------------------------|--|-----------------------|---|
| Type | Configures the type of drive connected to the secondary master | Not installed | No drive installed |
| | | Auto | Automatically detects the drive and configures the necessary values |
| | | CD/DVD | CD/DVD drive |
| | | ARMD | ARMD drive (zip drive) |
| LBA/Large mode | This option enables IDE logical block addressing / large mode | Disabled | Disables this function |
| | | Auto | Automatically enables this function if supported by the system |
| Block (multi-sector transfer) | This option enables block mode for IDE hard drives. If this option is enabled, the number of blocks per request is read from the configuration sector of the hard drive. | Disabled | Disables this function |
| | | Auto | Automatically enables this function if supported by the system |
| PIO mode | PIO mode determines the data rate of the hard drive. | Auto | Configures PIO mode automatically |
| | | 0, 1, 2, 3, 4 | Configures PIO mode manually |

Information:

This option is not available on the APC810. This setting therefore does not apply.

Table 203: 945GME Advanced - Secondary IDE master - Configuration options

| BIOS setting | Function | Configuration options | Effect |
|----------------------|--|-----------------------|---|
| DMA mode | The data transfer rate to and from the secondary master drive is defined here. DMA mode must be enabled activated in the Windows Device Manager in order to guarantee maximum performance. This is only possible when manually setting up the drive. | Auto | Defines the transfer rate automatically |
| | | Disabled | Defines the transfer rate manually |
| S.M.A.R.T. | Monitoring function for hard drives (Self-Monitoring, Analysis and Reporting Technology) | Auto | Detected and enabled automatically |
| | | Enabled | Enables this function |
| | | Disabled | Disables this function |
| 32 bit data transfer | Enables 32-bit data transfer | Enabled | Enables this function |
| | | Disabled | Disables this function |

Table 203: 945GME Advanced - Secondary IDE master - Configuration options

1.4.9.4 Secondary IDE slave

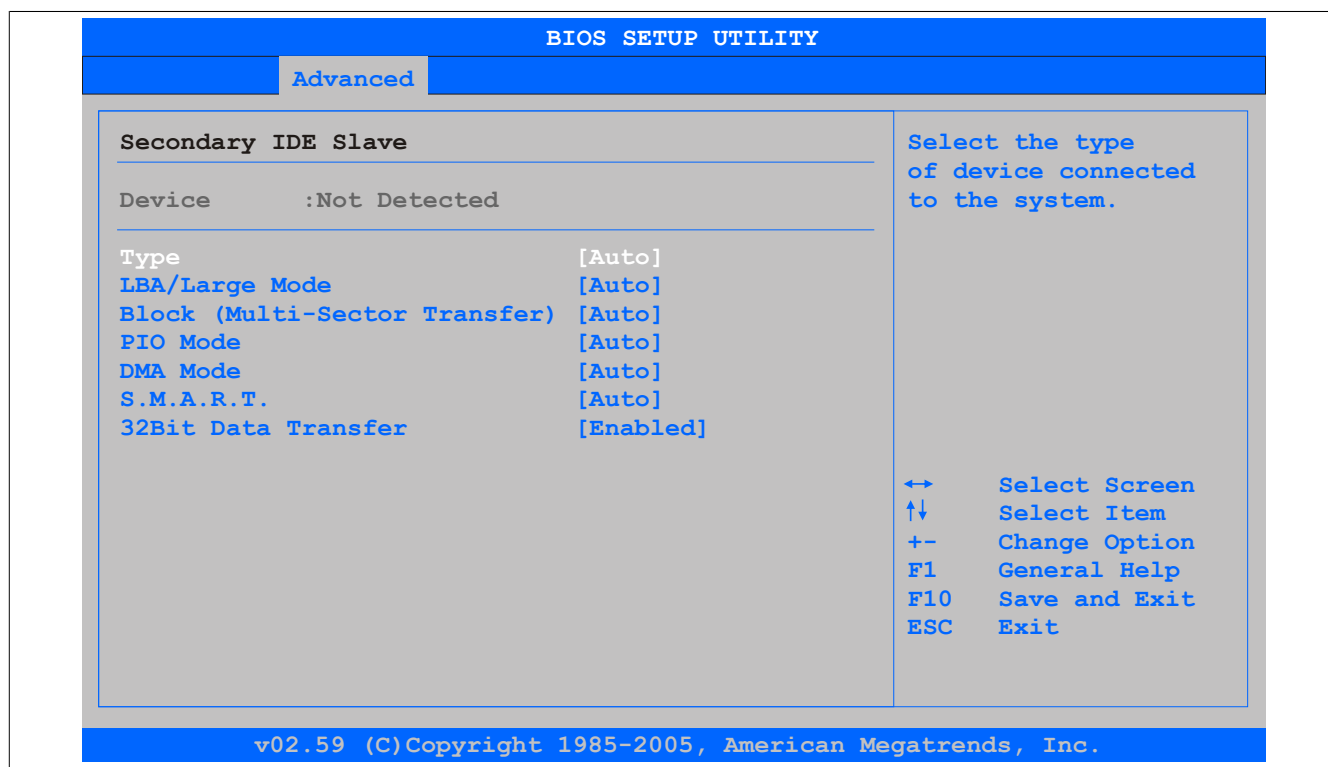


Figure 129: 945GME Advanced - Secondary IDE slave

| BIOS setting | Function | Configuration options | Effect |
|-------------------------------|--|-----------------------|---|
| Type | Configures the type of drive connected to the secondary slave | Not installed | No drive installed |
| | | Auto | Automatically detects the drive and configures the necessary values |
| | | CD/DVD | CD/DVD drive |
| | | ARMD | ARMD drive (zip drive) |
| LBA/Large mode | This option enables IDE logical block addressing / large mode | Disabled | Disables this function |
| | | Auto | Automatically enables this function if supported by the system |
| Block (multi-sector transfer) | This option enables block mode for IDE hard drives. If this option is enabled, the number of blocks per request is read from the configuration sector of the hard drive. | Disabled | Disables this function |
| | | Auto | Automatically enables this function if supported by the system |
| PIO mode | PIO mode determines the data rate of the hard drive. | Auto | Configures PIO mode automatically |
| | | 0, 1, 2, 3, 4 | Configures PIO mode manually |

Information:

This option is not available on the APC810. This setting therefore does not apply.

Table 204: 945GME Advanced - Secondary IDE slave - Configuration options

| BIOS setting | Function | Configuration options | Effect |
|----------------------|--|-----------------------|---|
| DMA mode | The data transfer rate to and from the secondary slave is defined here. DMA mode must be enabled activated in the Windows Device Manager in order to guarantee maximum performance. This is only possible when manually setting up the drive. | Auto | Defines the transfer rate automatically |
| | | Disabled | Defines the transfer rate manually |
| S.M.A.R.T. | Monitoring function for hard drives (Self-Monitoring, Analysis and Reporting Technology) | Auto | Detected and enabled automatically |
| | | Enabled | Enables this function |
| | | Disabled | Disables this function |
| 32 bit data transfer | Enables 32-bit data transfer | Enabled | Enables this function |
| | | Disabled | Disables this function |

Table 204: 945GME Advanced - Secondary IDE slave - Configuration options

1.4.10 USB configuration

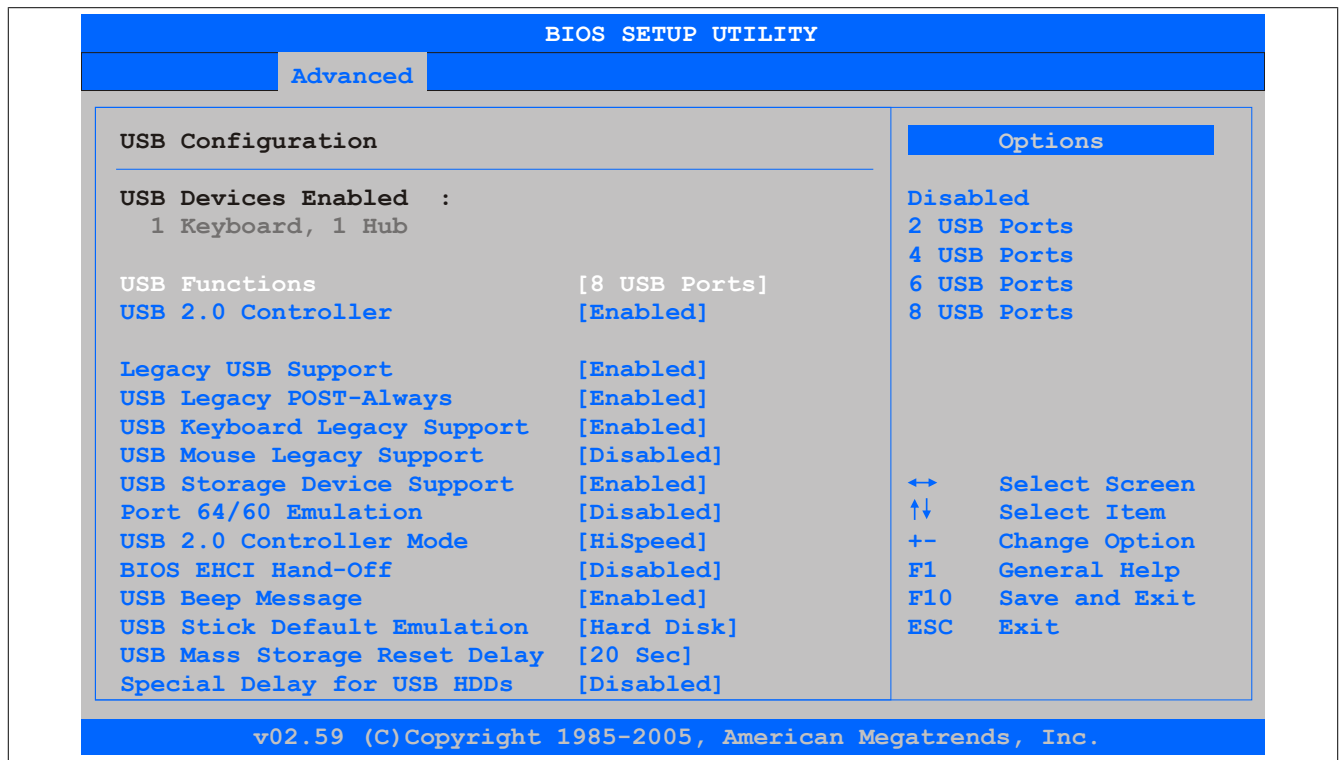


Figure 130: 945GME Advanced - USB configuration

| BIOS setting | Function | Configuration options | Effect |
|-----------------------------|---|-----------------------|--|
| USB function | Enables/Disables USB ports USB numbers (USB1, USB3, etc.) are printed on the APC810 housing. | Disabled | Disables the USB port |
| | | 2 USB ports | Enables USB1 and USB3 |
| | | 4 USB ports | Enables USB1, USB2, USB3 and USB4 |
| | | 6 USB ports | Enables USB1, USB2, USB3, USB4 and USB5 |
| | | 8 USB ports | Enables USB1, USB2, USB3, USB4, USB5 and USB on an AP via SDL |
| USB 2.0 controller | Option for enabling or disabling USB 2.0 mode | Enabled | Uses USB 2.0 for all USB ports |
| | | Disabled | Uses USB 1.1 for all USB ports |
| Legacy USB support | Enables/Disables Legacy USB support. USB ports do not function during startup. USB support is available again after the operating system has started. A USB keyboard is still recognized during POST. | Enabled | Enables this function |
| | | Disabled | Disables this function |
| | | Auto | Automatic enabling |
| USB Legacy POST-always | Option to enable Legacy USB support during POST (power-on self test) regardless of the setting made for Legacy USB support | Enabled | Allows BIOS Setup to be opened during POST using a USB keyboard |
| | | Disabled | Disables this function |
| USB keyboard Legacy support | Enables/Disables USB keyboard support | Enabled | Enables this function |
| | | Disabled | Disables this function |
| USB mouse Legacy support | Enables/Disables USB mouse support | Enabled | Enables this function |
| | | Disabled | Disables this function |
| USB storage device support | Enables/Disables USB mass storage device support | Enabled | Enables this function |
| | | Disabled | Disables this function |
| Port 64/60 emulation | Enables/Disables port 64/60 emulation | Enabled | Allows USB keyboard functionality in Windows NT |
| | | Disabled | Allows USB keyboard functionality on all systems except Windows NT |

Table 205: 945GME Advanced - USB configuration - Configuration options

| BIOS setting | Function | Configuration options | Effect |
|------------------------------|--|--|--|
| USB 2.0 controller mode | Configures the USB controller | FullSpeed | 12 MBps |
| | | HiSpeed | 480 MBps |
| BIOS EHCI hand-off | Allows support for operating systems to be set up without the fully automatic EHCI function | Enabled | Enables this function |
| | | Disabled | Disables this function |
| USB beep message | Option for emitting a tone each time a USB device is detected by BIOS during POST | Enabled | Enables this function |
| | | Disabled | Disables this function |
| USB stick default emulation | Configures how a USB device is to be used | Auto | USB devices with less than 530 MB of memory are simulated as floppy disk drives. Devices with larger memory capacity are simulated as hard drives. |
| | | Hard disk drive | An HDD-formatted drive can be used as an FDD (e.g. zip drive) to start the system. |
| USB mass storage reset delay | Option for configuring the time that POST waits for USB memory storage devices after the device start command is issued | 10 sec, 20 sec, 30 sec, 40 sec | Sets the value manually |
| Special delay for USB HDDs | Option for setting a boot delay prior to counting the number of USB 2.0 devices in order to allow more time for USB devices that generally take longer to boot (e.g. USB hard disks) | Disabled | Disables this function Doesn't add a boot delay |
| | | 1 sec, 2 sec, 3 sec, 4 sec, 5 sec, 7 sec, 10 sec | Adds a boot delay of 1, 2, 3, 4, 5, 7 or 10 seconds |

Table 205: 945GME Advanced - USB configuration - Configuration options

1.4.11 Keyboard/Mouse configuration

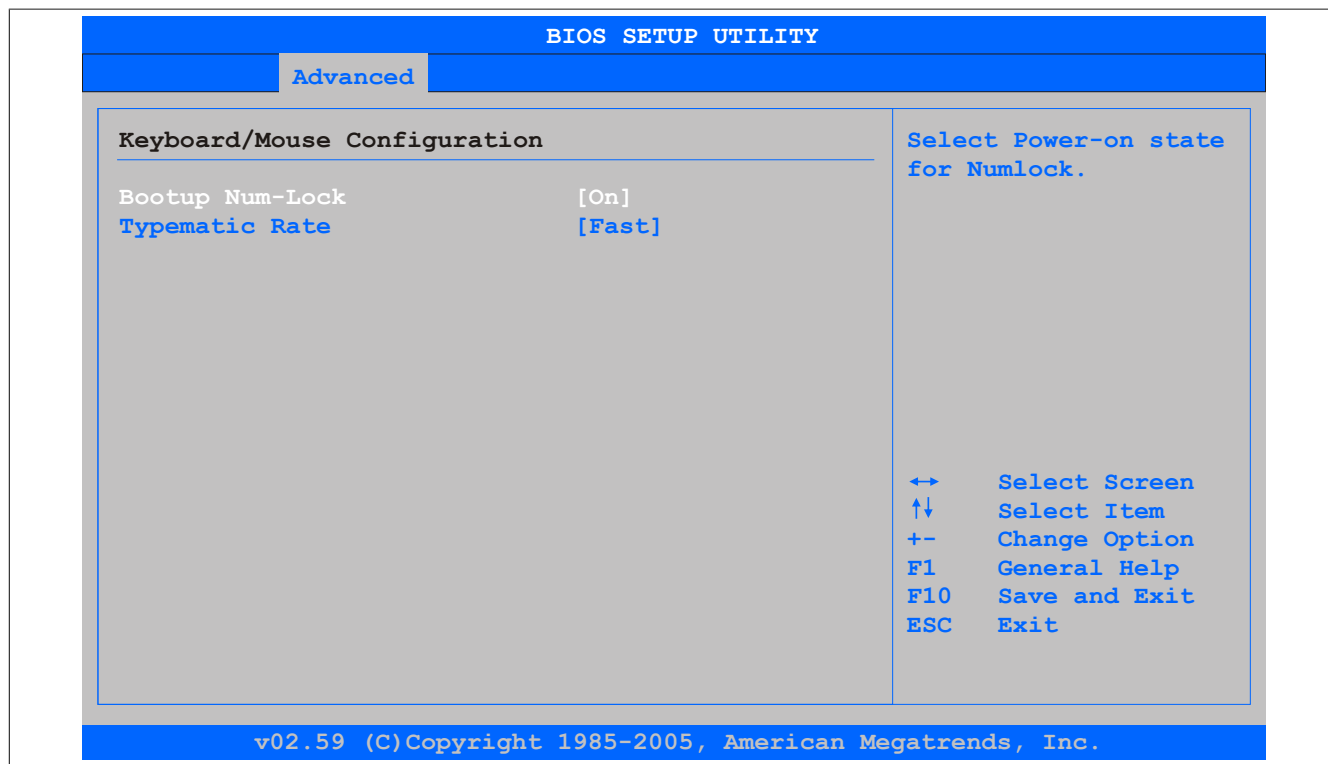


Figure 131: 945GME Advanced - Keyboard/Mouse configuration

| BIOS setting | Function | Configuration options | Effect |
|-----------------|--|-----------------------|--|
| Bootup Num-lock | Define the state of the NumLock key on the numeric keypad when booting | Off | Only enables the cursor (movement) functions of the numeric keypad |
| | | On | Enables the numeric keypad |
| Typematic rate | Configures the key repeat function | Slow | Slow key repeat |
| | | Fast | Fast key repeat |

Table 206: 945GME Advanced - Keyboard/Mouse configuration - Configuration options

1.4.12 Remote access configuration

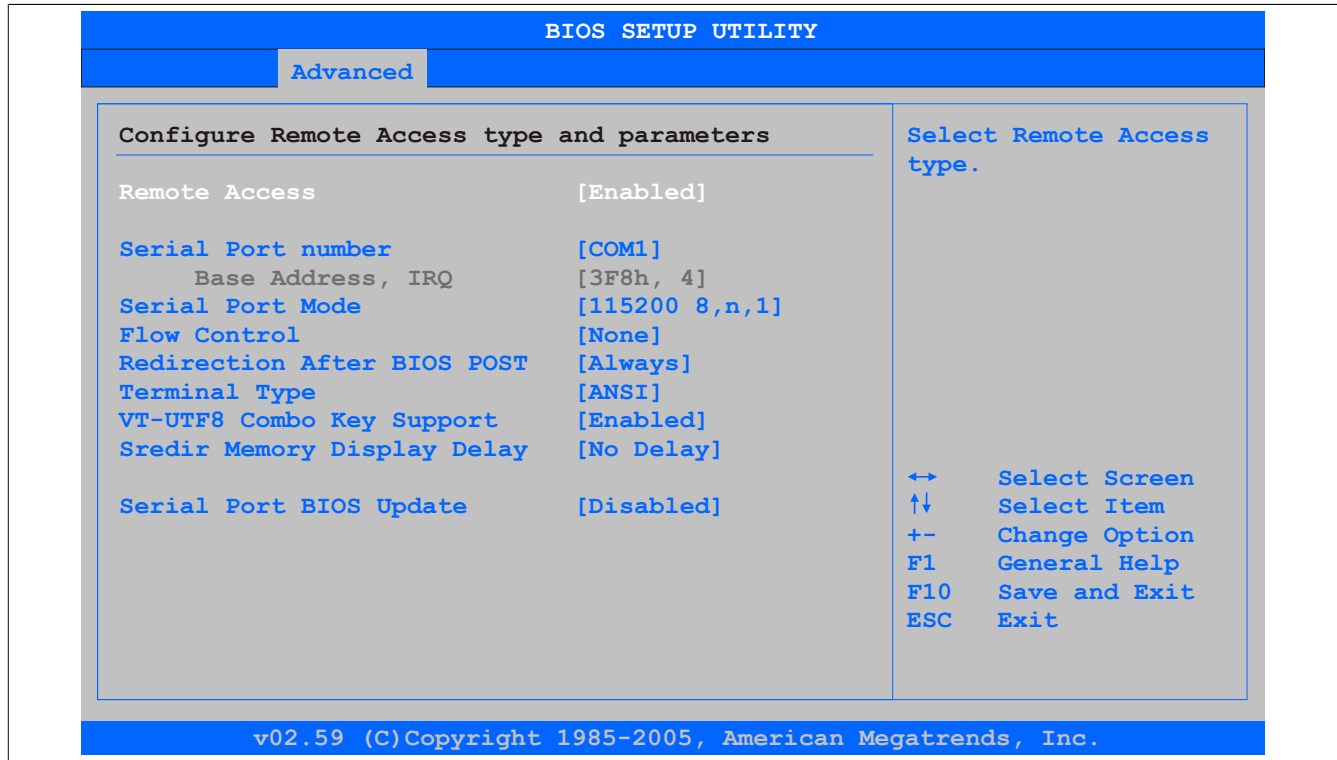


Figure 132: 945GME Advanced - Remote access configuration

| BIOS setting | Function | Configuration options | Effect |
|-----------------------------|--|--|---|
| Remote access | Enables/Disables the remote access function | Enabled | Enables this function |
| | | Disabled | Disables this function |
| Serial port number | This option is used to configure the serial interface as long as <i>Remote access</i> is not set to "Disabled". | COM1 | Enables the COM1 interface as a remote access interface |
| | | COM2 | Enables the COM2 interface as a remote access interface |
| Base address, IRQ | Displays the logical address and interrupt for the serial port as <i>Remote access</i> is not set to "Disabled". | None | - |
| Serial port Mode | Defines the serial port transfer rate as long as <i>Remote access</i> is not set to "Disabled". | 115200 8,n,1 57600 8,n,1 38400 8,n,1 19200 8,n,1 09600 8,n,1 | Sets the value manually |
| Flow control | Determines how the transfer is controlled via the interface Information: The setting must be the same on the terminal and the server. | None | Operates the interface without transfer control |
| | | Hardware | Uses hardware for interface transfer control. This mode must be supported by the cable. |
| | | Software | Uses software for interface transfer control |
| Redirection After BIOS POST | Configures redirection after startup as long as <i>Remote access</i> is not set to "Disabled" | Disabled | Disables redirection after startup |
| | | Boot loader | Enables redirection during system startup and when charging |
| | | Always | Keeps redirection enabled permanently |
| Terminal type | Configures the type of connection as long as <i>Remote access</i> is not set to "Disabled". | ANSI, VT100, VT-UTF8 | Configures the connection type manually |
| VT-UTF8 combo key support | This option can be used to enable VT-UTF8 combo key support for ANSI and VT100 interfaces as long as <i>Remote access</i> is not set to "Disabled". | Enabled | Enables this function |
| | | Disabled | Disables this function |

Table 207: 945GME Advanced - Remote access configuration - Configuration options

| BIOS setting | Function | Configuration options | Effect |
|-----------------------------|--|---------------------------------------|-------------------------|
| Sredir memory display delay | This option can be used to set the memory output delay as long as <i>Remote access</i> is not set to "Disabled" (Sredir -> serial redirection). | No delay | No delay |
| | | Delay 1 sec, Delay 2 sec, Delay 4 sec | Sets the value manually |
| Serial port BIOS update | Loads updates to the processor via the serial interface during system startup Information: Disabling this option reduced the boot time. | Enabled | Enables this function |
| | | Disabled | Disables this function |

Table 207: 945GME Advanced - Remote access configuration - Configuration options

1.4.13 CPU board monitor

Information:

The voltage values (e.g. core voltage, battery voltage) displayed on this BIOS Setup screen represent uncalibrated values for informational purposes. They cannot be used to draw any conclusions about hardware alarms or error conditions. The hardware components used have automatic diagnostic functions that can be applied in the event of error.

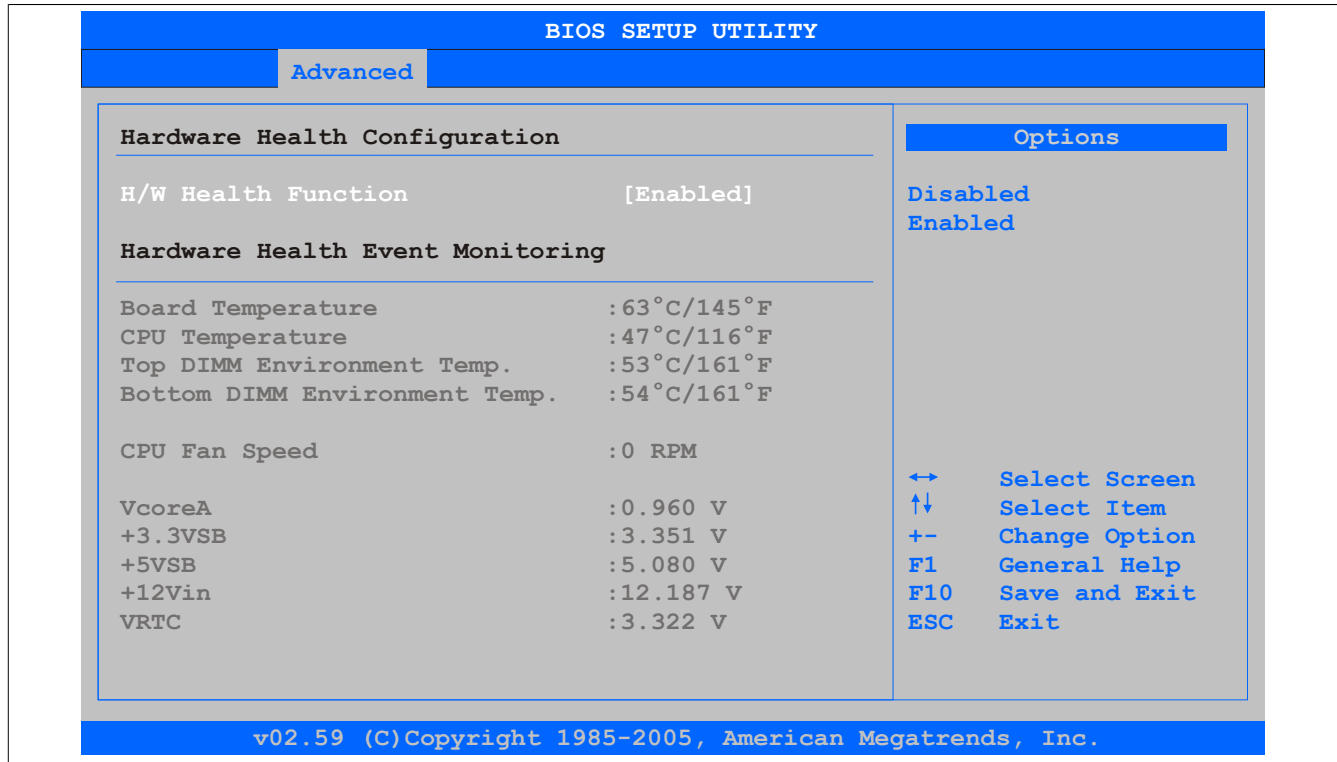


Figure 133: 945GME Advanced - CPU board monitor

| BIOS setting | Function | Configuration options | Effect |
|-------------------------------|--|-----------------------|---|
| H/W health function | Option for displaying all values on this screen | Enabled Disabled | Displays all values Displays no value on this screen |
| 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 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 208: 945GME Advanced - CPU board monitor - Configuration options

1.4.14 Baseboard/Panel features

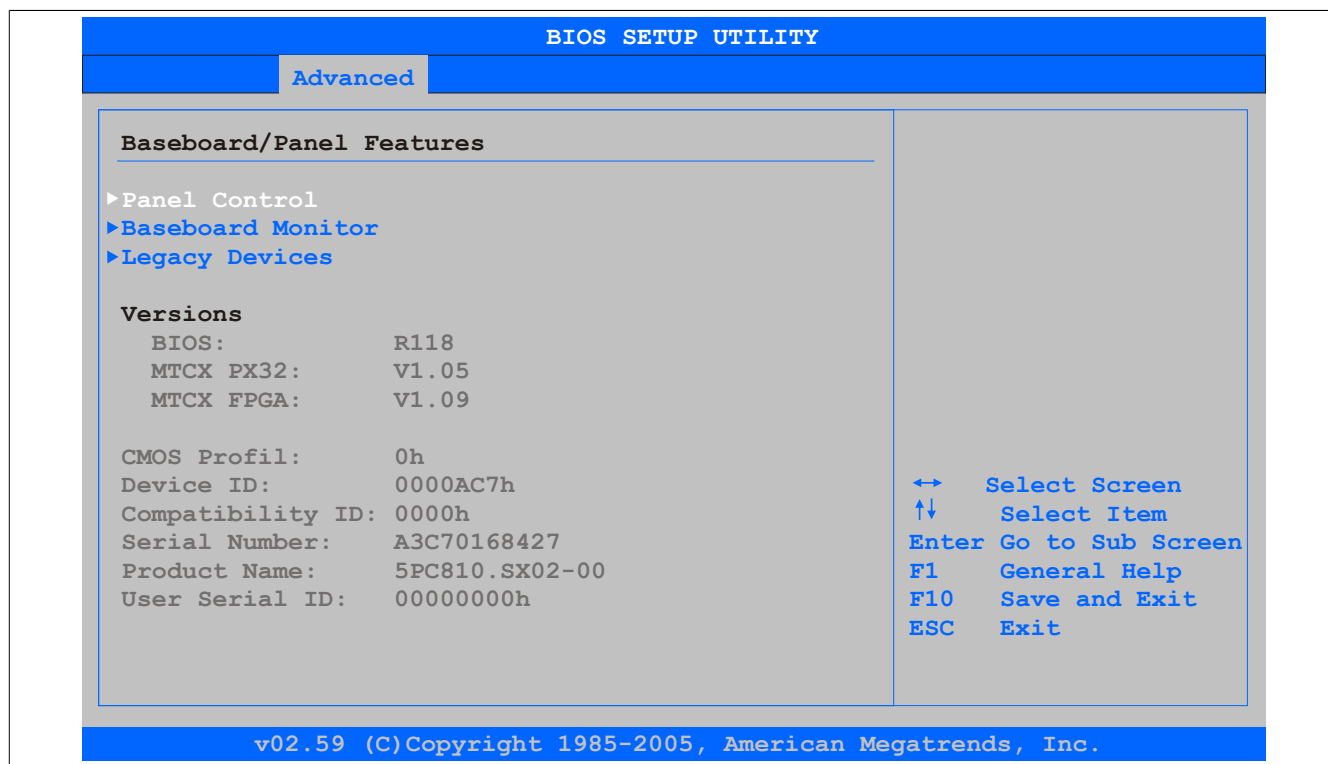


Figure 134: 945GME Advanced - Baseboard/Panel features

| BIOS setting | Function | Configuration options | Effect |
|--------------------------|--|-----------------------|--|
| Panel control | Configures special settings for connected panels (display units) | Enter | Opens the submenu See "Panel control" on page 255 |
| Baseboard monitor | Displays various temperatures and fan speeds | Enter | Opens the submenu See "Baseboard monitor" on page 256 |
| Legacy devices | Configures special settings for interfaces | Enter | Opens the submenu See "Legacy devices" on page 257 |
| 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 | Displays 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 ID. This ID is needed for Automation Runtime. | None | - |
| Serial number | Displays the B&R serial number | None | - |
| Product name | Displays the B&R model number | None | - |
| User serial ID | Displays the user serial ID. This 8-digit hexadecimal value can be freely specified by the user (e.g. to give the device a unique ID) and can only be changed using the "B&R Control Center" included with the ADI driver. | None | - |

Table 209: 945GME Advanced - Baseboard/Panel features - Configuration options

1.4.14.1 Panel control

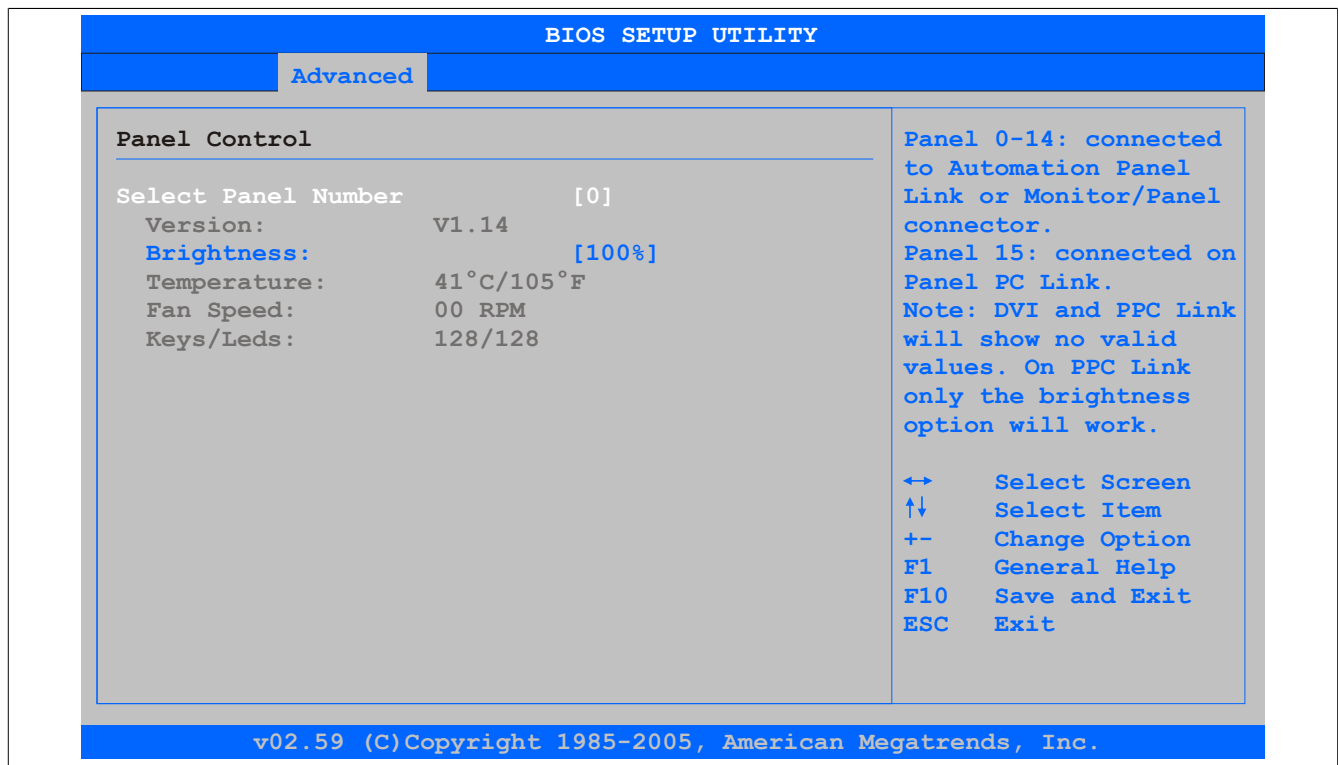


Figure 135: 945GME Advanced - Panel control

| BIOS setting | Function | Configuration options | Effect |
|---------------------|--|---|--|
| Select panel number | Selects the panel number for which the values should be displayed and/or changed | 0...15 | Selects panel 0-15 Panel 15 is specifically intended for Panel PC 800 systems. |
| Version | Displays the firmware version of the SDLR controller | None | - |
| Brightness | Sets the brightness of the selected panel | 0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100% | Sets the brightness (in %) of the selected panel. Changes 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 the fan speed for the selected panel | None | - |
| Keys/LEDs | Displays the available keys and LEDs on the selected panel | None | - |

Table 210: 945GME Advanced - Panel control - Configuration options

1.4.14.2 Baseboard monitor

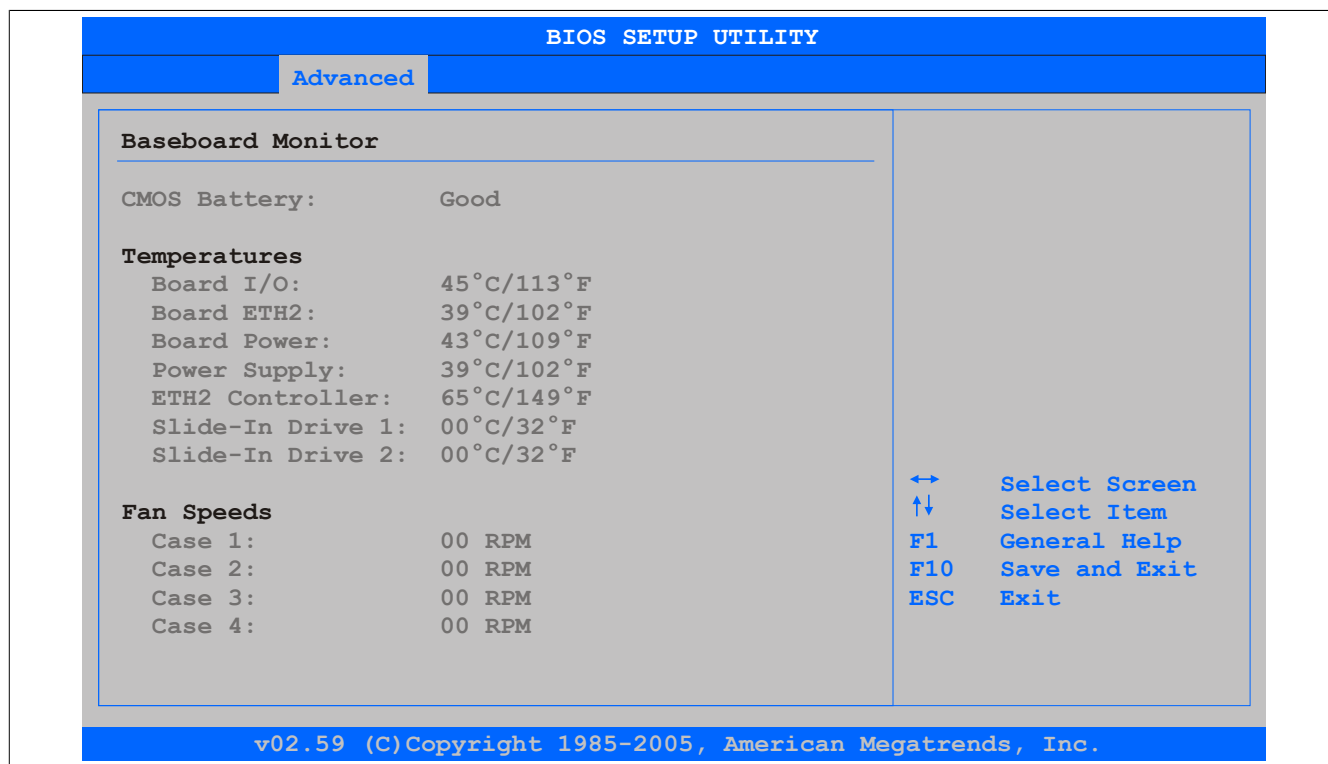


Figure 136: 945GME Advanced - Baseboard monitor

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

Table 211: 945GME Advanced - Baseboard monitor - Configuration options

1.4.14.3 Legacy devices

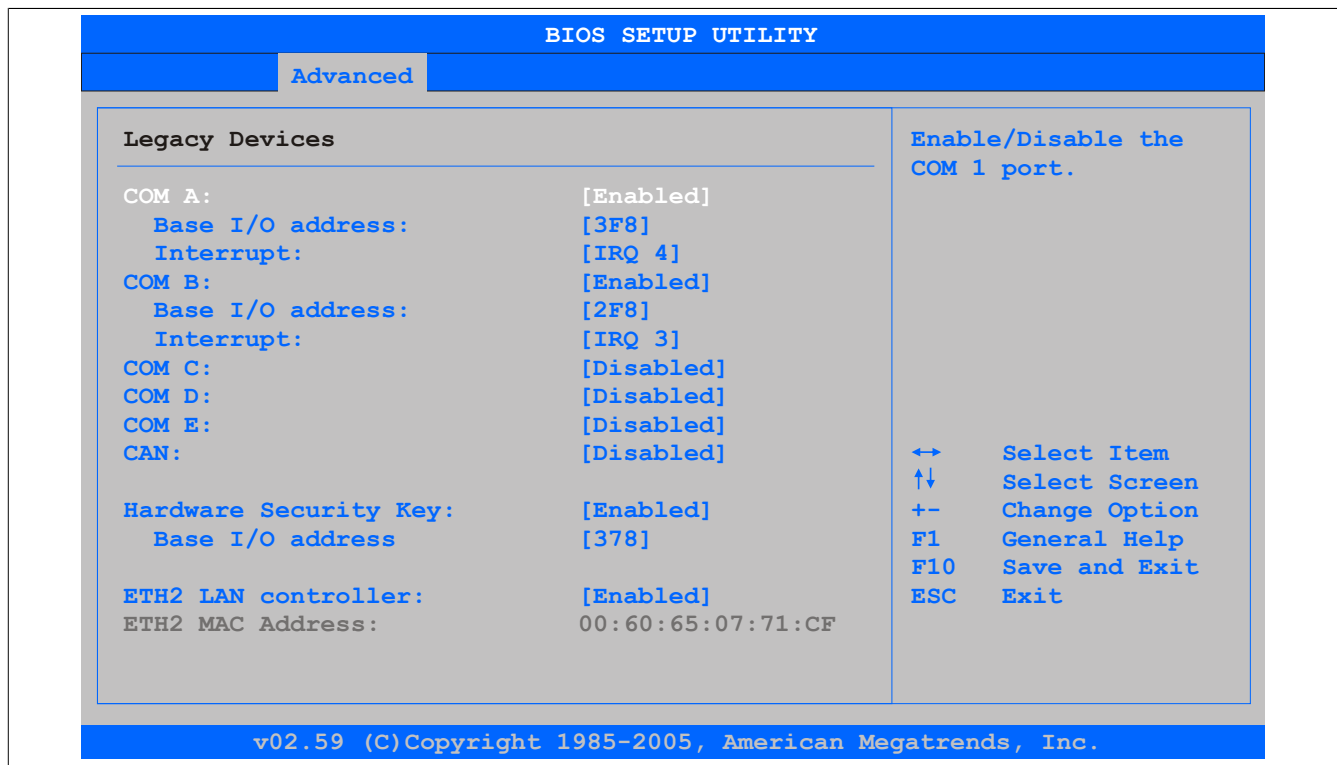


Figure 137: 945GME Advanced - Legacy devices

| BIOS setting | Function | Configuration options | Effect |
|-----------------------|---|---|--|
| COM A | Settings for the COM1 serial interface | Enabled Disabled | Enables the interface Disables the interface |
| Base I/O address | Selects the base I/O address of the COM port | 238, 2E8, 2F8, 328, 338, 3E8, 3F8 | Assigns the selected base I/O address |
| Interrupt | Selects the interrupt for the COM port | IRQ 3, IRQ 4, IRQ 5, IRQ 6, IRQ 7, IRQ 10, IRQ 11, IRQ 12 | Assigns the selected interrupt |
| COM B | Settings for the COM2 serial interface | Disabled Enabled | Disables the interface Enables the interface |
| Base I/O address | Selects the base I/O address of the COM port | 238, 2E8, 2F8, 328, 338, 3E8, 3F8 | Assigns the selected base I/O address |
| Interrupt | Selects the interrupt for the COM port | IRQ 3, IRQ 4, IRQ 5, IRQ 6, IRQ 7, IRQ 10, IRQ 11, IRQ 12 | Assigns the selected interrupt |
| COM C | Sets the COM port for the touch screen connected to the monitor/panel interface | Enabled Disabled | Enables the interface Disables the interface |
| Base I/O address | Selects the base I/O address of the COM port | 238, 2E8, 2F8, 328, 338, 3E8, 3F8 | Assigns the selected base I/O address |
| Interrupt | Selects the interrupt for the COM port | IRQ 3, IRQ 4, IRQ 5, IRQ 6, IRQ 7, IRQ 10, IRQ 11, IRQ 12 | Assigns the selected interrupt |
| COM D | Sets the COM port for the touch screen connected to the AP Link interface | Enabled Disabled | Enables the interface Disables the interface |
| Base I/O address | Selects the base I/O address of the COM port | 238, 2E8, 2F8, 328, 338, 3E8, 3F8 | Assigns the selected base I/O address |
| Interrupt | Selects the interrupt for the COM port | IRQ 3, IRQ 4, IRQ 5, IRQ 6, IRQ 7, IRQ 10, IRQ 11, IRQ 12 | Assigns the selected interrupt |
| COM E | Configures the COM port of the 5AC600.4851-00 B&R add-on interface (IF option) | Enabled Disabled | Enables the interface Disables the interface |
| Base I/O address | Selects the base I/O address of the COM port | 238, 2E8, 2F8, 328, 338, 3E8, 3F8 | Assigns the selected base I/O address |
| Interrupt | Selects the interrupt for the COM port | IRQ 3, IRQ 4, IRQ 5, IRQ 6, IRQ 7, IRQ 10, IRQ 11, IRQ 12 | Assigns the selected interrupt |
| CAN | Configures the CAN port of the 5AC600.CANI-00 B&R add-on CAN interface (IF option) | Disabled Enabled | Disables the interface Enables the interface |
| Base I/O address | Displays the base I/O address of the CAN port | None | - |
| Interrupt | Selects the interrupt for the CAN port | IRQ 10, NMI | Assigns the selected interrupt |
| Hardware security key | Configures settings for the hardware security key (dongle) | Disabled Enabled | Disables the interface Enables the interface |
| Base I/O address | Displays the base I/O address of the hardware security interface | 278, 378, 3BC | Assigns the base I/O address for the parallel port |

Table 212: 945GME Advanced - Legacy devices - Configuration options

| BIOS setting | Function | Configuration options | Effect |
|---------------------|---|-----------------------|-------------------------|
| ETH2 LAN controller | Option for turning the onboard LAN controller (ETH2) on and off | Enabled | Enables the controller |
| | | Disabled | Disables the controller |
| ETH2 MAC address | Displays the MAC address of the Ethernet 2 controller | None | - |

Table 212: 945GME Advanced - Legacy devices - Configuration options

1.5 Boot

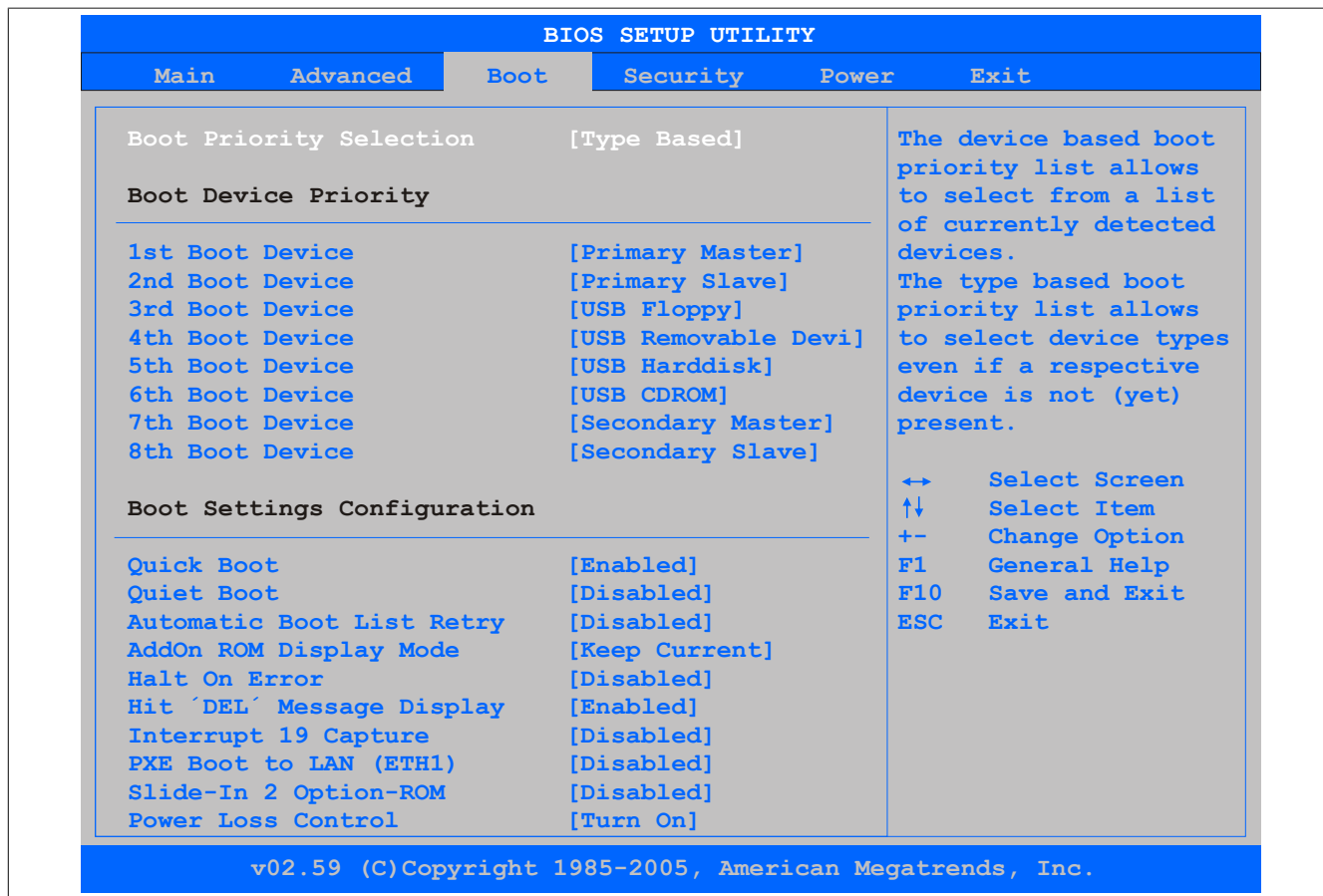


Figure 138: 945GME Boot menu

| BIOS setting | Function | Configuration options | Effect |
|-------------------------|---|---|--|
| Boot priority selection | Option for determining the method for how drives should be booted | Device based | Only lists devices that are recognized by the system. The order of devices in this list can be changed. Information: It is only possible to use either "Device based" or "Type based". Using both together is not permitted. |
| | | Type based | The boot sequence of a device type list can be changed. It is also possible to add device types that are not connected to this list. Information: It is only possible to use either "Device based" or "Type based". Using both together is not permitted. |
| 1st boot device | Option for selecting drives to be used for booting | Disabled, Primary master, Primary slave, Secondary master, Secondary slave, Legacy floppy, USB floppy, USB hard disk, USB CDROM, USB 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 | Specifies the desired boot sequence |
| 2nd boot device | | | |
| 3rd boot device | | | |
| 4th boot device | | | |
| 5th boot device | | | |
| 6th boot device | | | |
| 7th boot device | | | |
| 8th boot device | | | |

Table 213: 945GME Boot menu - Configuration options

| BIOS setting | Function | Configuration options | Effect |
|---------------------------|---|-----------------------|---|
| Quick boot | This function reduces the boot time by skipping some POST procedures. | Enabled | Enables this function |
| | | Disabled | Disables this function |
| Quiet boot | Determines whether the POST message or the OEM logo (default = black background) is displayed | Enabled | Displays the OEM logo instead of the POST message |
| | | Disabled | Displays the POST message |
| Automatic boot list retry | This option can be used to attempt to restart the operating system automatically if it fails to start the first time. | Enabled | Enables this function |
| | | Disabled | Disables this function |
| Add-on ROM display mode | Sets the display mode for the ROM (during the booting procedure) | Force BIOS | Displays an additional part of BIOS |
| | | Keep current | Displays BIOS information |
| Halt on error | This option determines the system should resume after a startup error during POST . | Enabled | Pauses the system. The system pauses each time an error occurs. |
| | | Disabled | Does not pause the system. All errors are ignored. |
| Hit 'DEL' message display | Configures settings for the "Hit 'DEL'" message | Enabled | Displays the message |
| | | Disabled | Does not display the message |
| Interrupt 19 capture | This function can be used to include BIOS interruptions. | Enabled | Enables this function |
| | | Disabled | Disables this function |
| PXE boot to LAN (ETH1) | Enables/disables the function to boot from LAN (ETH1) | Enabled | Enables this function |
| | | Disabled | Disables this function |
| Slide-in 2 optional ROM | Enables/Disables optional ROM for a slide-in 2 drive | Enabled | Enables this function |
| | | Disabled | Disables this function |
| Power loss control | Specifies whether the system should be on/off following power loss | Remain off | System remains off |
| | | Turn on | System powered on |
| | | Last state | Enables the previous state |

Information:

The message is not displayed if "Quiet boot" is enabled.

Table 213: 945GME Boot menu - Configuration options

1.6 Security

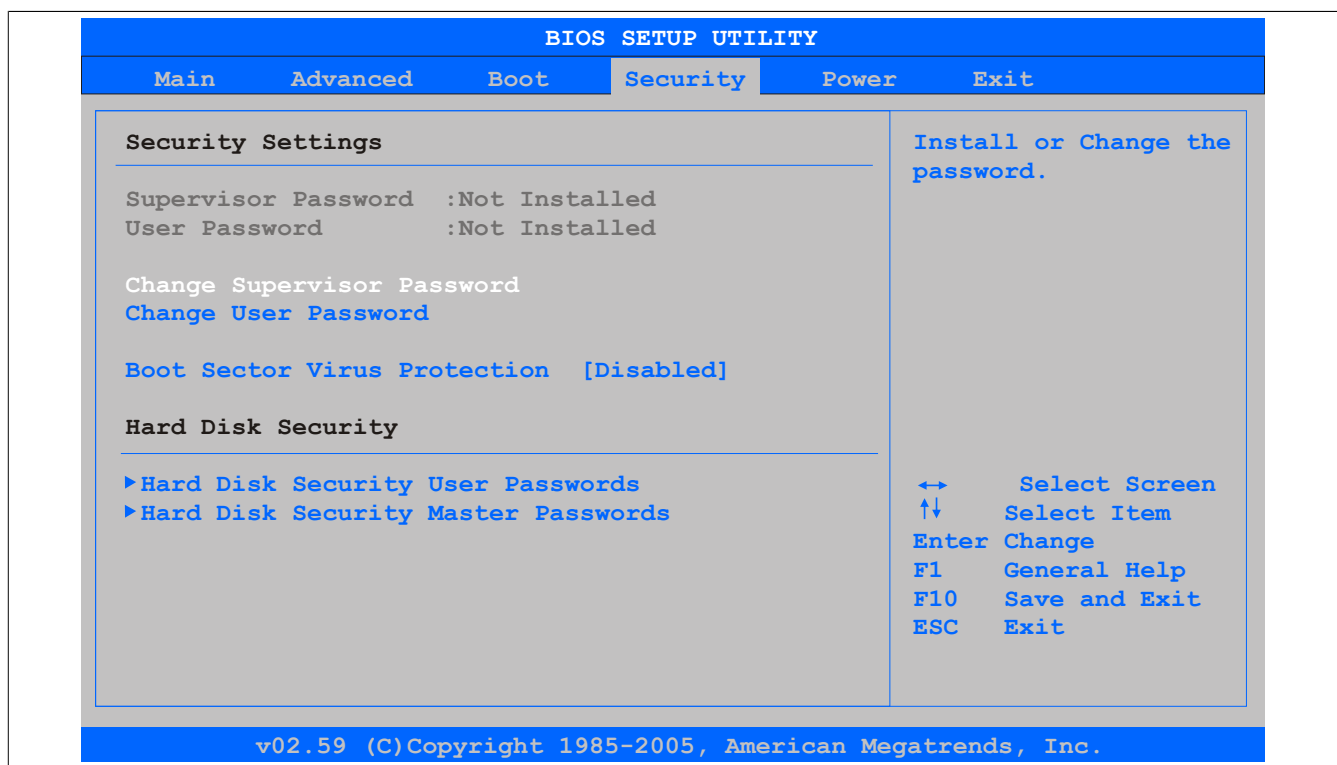


Figure 139: 945GME Security menu

| BIOS setting | Function | Configuration options | Effect |
|----------------------------|---|-----------------------|----------------|
| Supervisor password | Displays whether a supervisor password has been set | None | - |
| User password | Displays whether a user password has been set | None | - |
| Change supervisor password | Function for entering/changing a supervisor password. A supervisor password is necessary to edit all BIOS settings. | Enter | Password entry |

Table 214: 945GME Security menu - Configuration options

| BIOS setting | Function | Configuration options | Effect |
|-------------------------------------|--|-----------------------|---|
| Change user password | Function for entering/changing a user password. The user password allows the user to edit only certain BIOS settings. | Enter | Password entry |
| Boot sector virus protection | This option is used to issue a warning when the boot sector is accessed by a program or virus. Information: This option only protects the boot sector, not the entire hard drive. | Enabled | Enables this function |
| | | Disabled | Disables this function |
| Hard disk security user passwords | Creates the hard disk security user password | Enter | Opens the submenu See "Hard disk security user password" on page 260 |
| Hard disk security master passwords | Creates the hard disk security master password | Enter | Opens the submenu See "Hard disk security master password" on page 261 |

Table 214: 945GME Security menu - Configuration options

1.6.1 Hard disk security user password

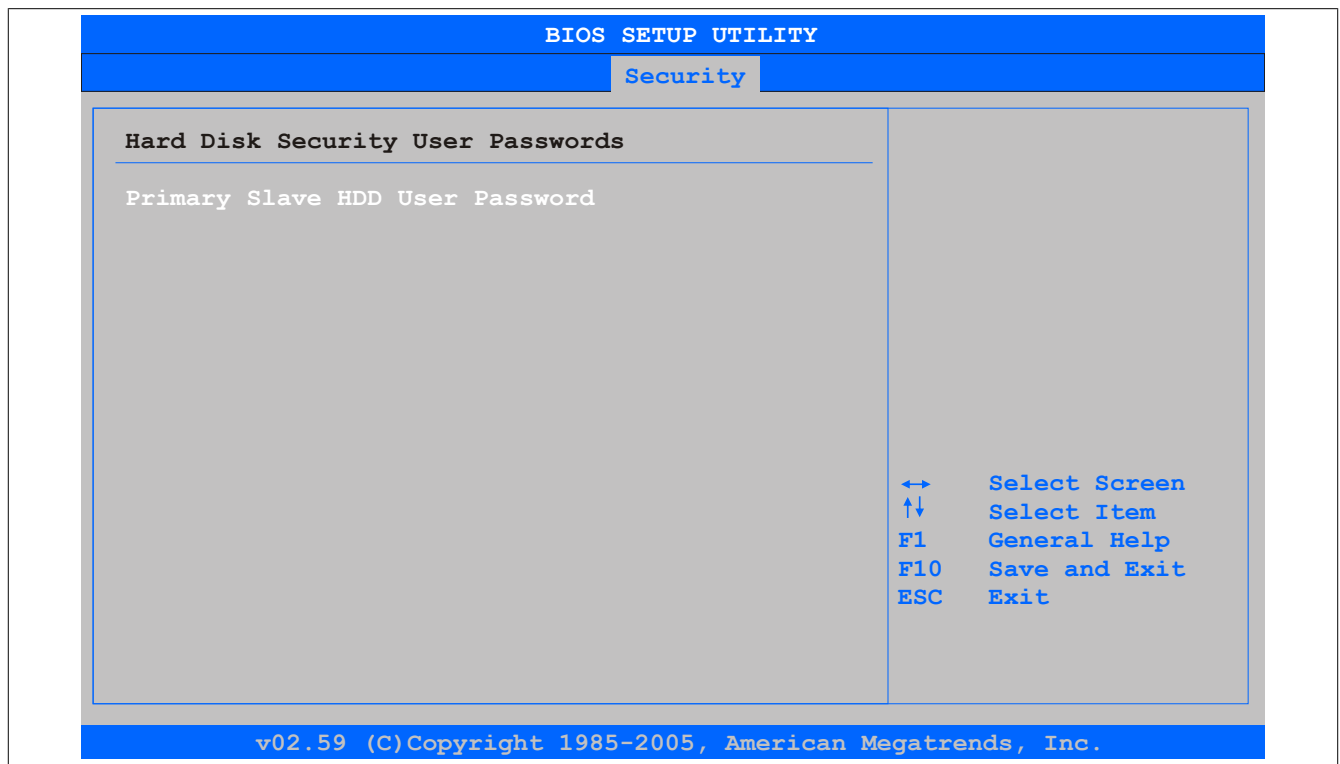


Figure 140: 945GME Security - Hard disk security user password

| BIOS setting | Function | Configuration options | Effect |
|---------------------------------|---|-----------------------|----------------|
| Primary slave HDD user password | This function makes it possible to configure or change the user password for each hard drive without having to reboot the device. The user password allows the user to edit only certain BIOS settings. | Enter | Password entry |

Table 215: 945GME Security - Hard disk security user password

1.6.2 Hard disk security master password

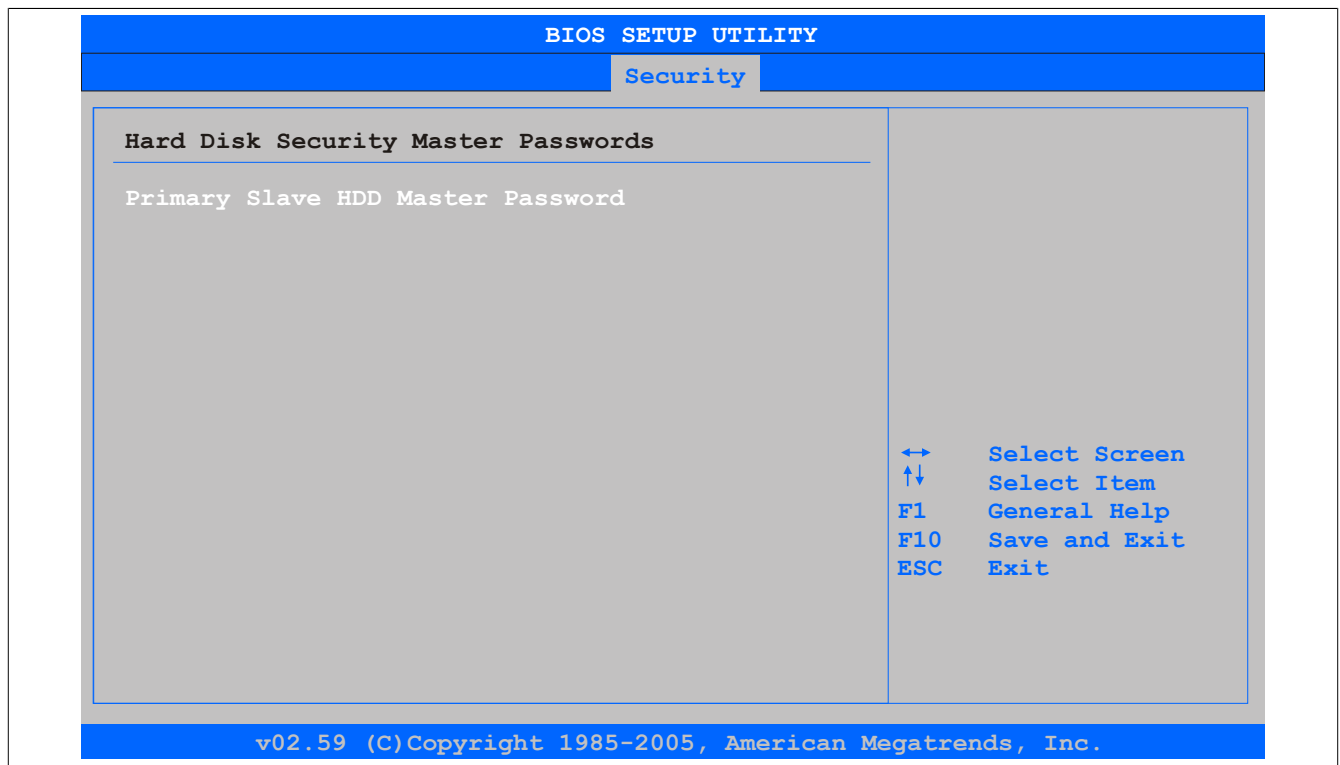


Figure 141: 945GME Security - Hard disk security master password

| BIOS setting | Function | Configuration options | Effect |
|-----------------------------------|---|-----------------------|----------------|
| Primary slave HDD master password | This function makes it possible to configure or change the master password for each hard drive without having to reboot the device. | Enter | Password entry |

Table 216: 945GME Security - Hard disk security master password

1.7 Power

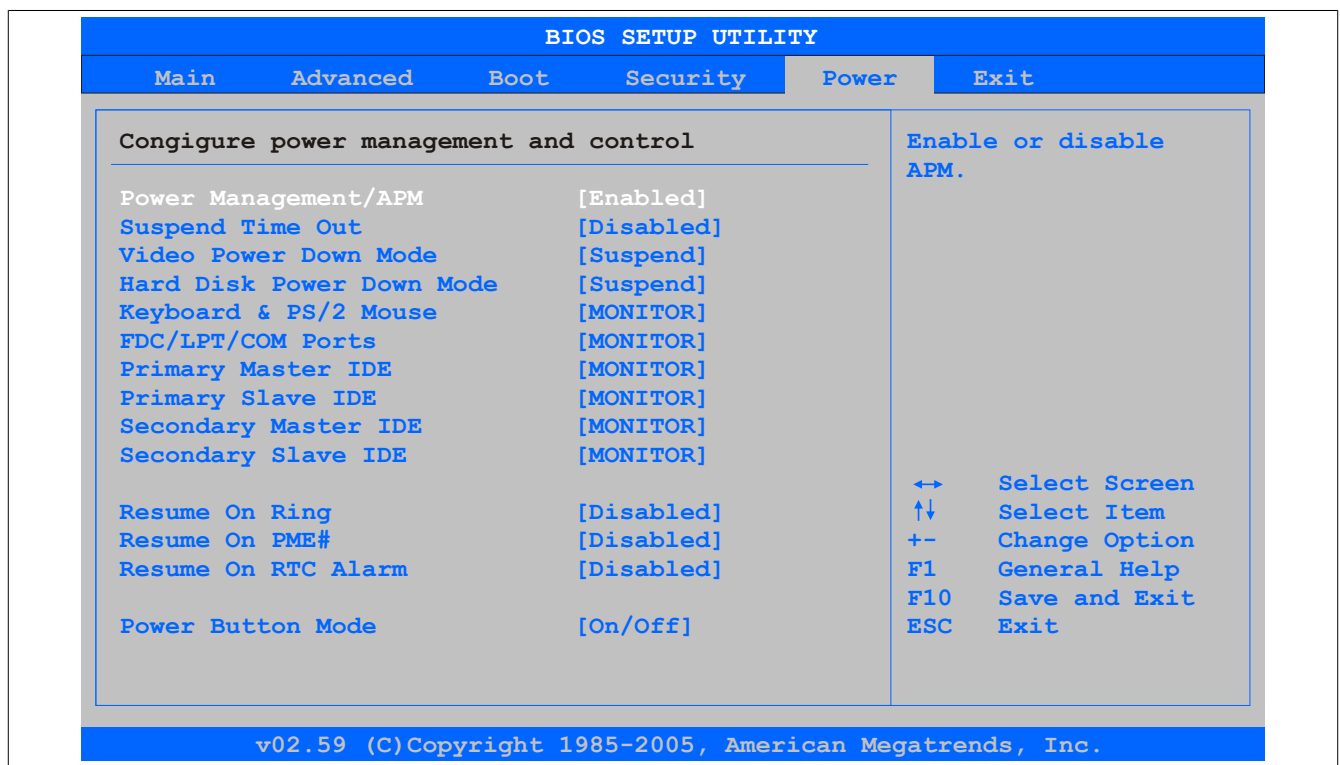


Figure 142: 945GME Power menu

| BIOS setting | Function | Configuration options | Effect |
|---------------------------|--|--|---|
| Power management/APM | This option enables or disables APM functionality. This is advanced plug and play and power management functionality. | Enabled | Enables this function |
| | | Disabled | Disables this function |
| Suspend time out | This option can be used to configure how long the system must be inactive before entering suspend mode (all components except the CPU are shut down as far as possible). | 1 min, 2 min, 4 min, 8 min, 10 min, 20 min, 30 min, 40 min, 50 min, 60 min | Sets the value manually |
| | | Disabled | Disables this function |
| Video power down mode | This option can be used to set the energy saving mode for the monitor. | Disabled | Does not switch off the monitor |
| | | Standby | Switches the monitor to standby mode |
| | | Suspend | Switches the monitor to suspend mode |
| Hard disk power down mode | This option is used to set the energy saving mode for the hard drive | Disabled | Does not switch off the monitor |
| | | Standby | Switches the monitor to standby mode |
| | | Suspend | Switches the monitor to suspend mode |
| Keyboard & PS/2 mouse | Configures the monitoring of activity during energy saving mode | MONITOR | Returns the system to its normal state from the respective energy saving mode when activity is detected on the keyboard or PS/2 mouse |
| | | IGNORE | Ignores activity |
| FDC/LPT/COM ports | Configures the monitoring of activity during energy saving mode | MONITOR | Returns the system to its normal state from the respective energy saving mode when activity is detected on the parallel port, serial port 1&2 or the floppy drive port. |
| | | IGNORE | Ignores activity |
| Primary master IDE | Configures the monitoring of activity during energy saving mode | MONITOR | Returns the system to its normal state from the respective energy saving mode when activity is detected on the IRQ of the respective interface or device |
| | | IGNORE | Ignores activity |
| Primary slave IDE | Configures the monitoring of activity during energy saving mode | MONITOR | Returns the system to its normal state from the respective energy saving mode when activity is detected on the IRQ of the respective interface or device |
| | | IGNORE | Ignores activity |
| Secondary master IDE | Configures the monitoring of activity during energy saving mode | MONITOR | Returns the system to its normal state from the respective energy saving mode when activity is detected on the IRQ of the respective interface or device |
| | | IGNORE | Ignores activity |
| Secondary slave IDE | Configures the monitoring of activity during energy saving mode | MONITOR | Returns the system to its normal state from the respective energy saving mode when activity is detected on the IRQ of the respective interface or device |
| | | IGNORE | Ignores activity |
| Resume on ring | Returns the PC from energy saving mode when the modem receives an incoming call | Enabled | Enables this function |
| | | Disabled | Disables this function |
| Resume on PME# | Configures whether the PME wakeup function is enabled or disabled | Enabled | Enables this function |
| | | Disabled | Disables this function |
| Resume on RTC alarm | This option can be used to enable the alarm and enter the date and time during system startup. | Enabled | Enables this function |
| | | Disabled | Disables this function |
| Power button mode | This function determines what the power button does. | On/Off | Switches the system on/off |
| | | Suspend | Suppresses this function |

Table 217: 945GME Power menu - Configuration options

1.8 Exit

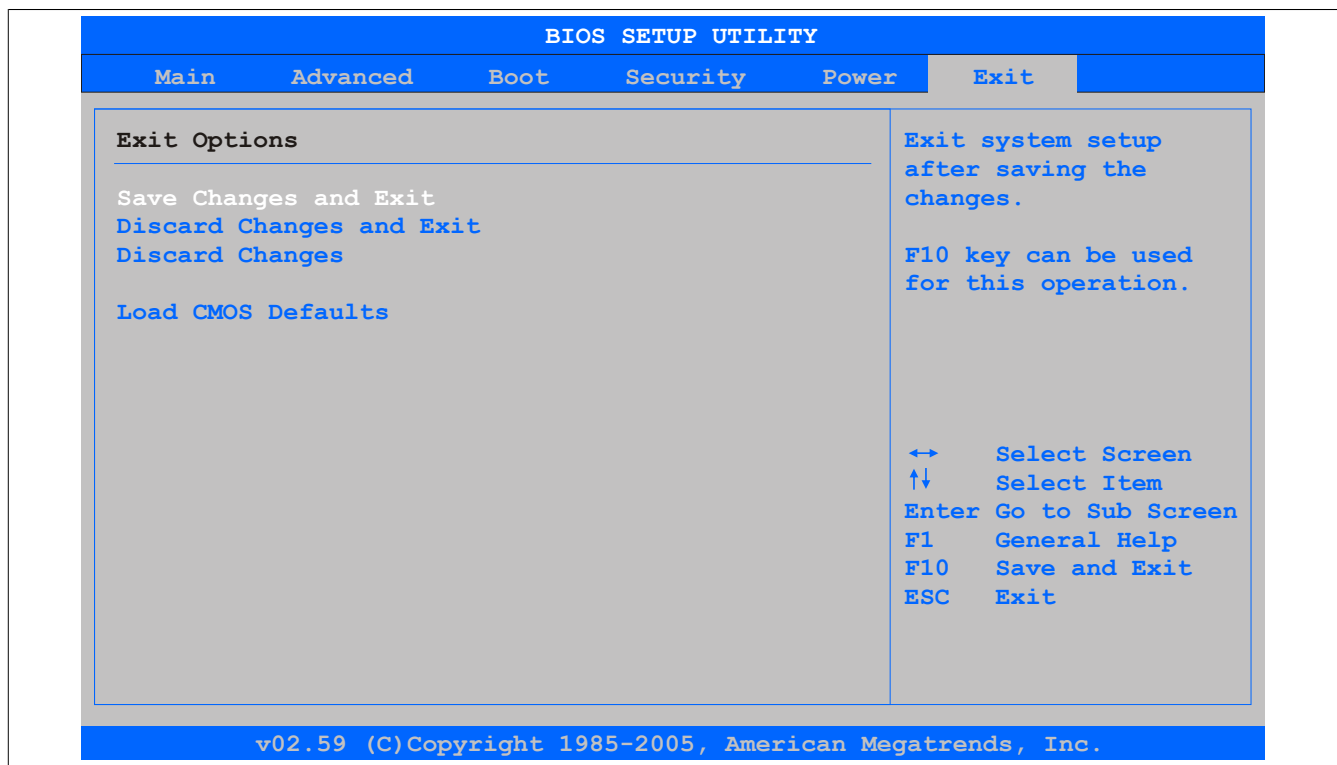


Figure 143: 945GME Exit menu

| BIOS setting | Function | Configuration options | Effect |
|--------------------------|--|-----------------------|--------|
| Save changes and exit | Selecting this option closes BIOS Setup. Any changes made are saved to CMOS after confirmation, and the system is rebooted. | OK / Cancel | |
| Discard changes and exit | Selecting this option closes BIOS Setup without saving any changes made. The start procedure is continued. | OK / Cancel | |
| Discard changes | This option can be used to reset any settings that may have been made but have been forgotten in the meantime (provided they have not yet been saved). | OK / Cancel | |
| Load CMOS defaults | This option loads the CMOS default values defined by the DIP switch settings. These values are loaded for all BIOS settings. | OK / Cancel | |

Table 218: 855GME (XTX) Exit menu - Configuration options

1.9 BIOS default settings

The various positions of the CMOS profile hex switch can be used to load predefined BIOS profile settings.

Information:

The factory default switch position represents the optimal BIOS default values for this system and should therefore not be changed.

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

| Profile number | Optimized for | Switch position | Note |
|----------------|--|-----------------|---|
| Profile 0 | Reserved | 0 | |
| Profile 1 | System unit 5PC810.SX01-00 / 5PC810.SX02-00 / 5PC810.SX03-00 | 1 | The default settings for this profile can be found in the APC810 user's manual. This can be downloaded at no cost from the B&R website. |
| 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 at no cost from the B&R website. |
| Profile 4 | Reserved | 4 | |
| Profile 5 | System unit 5PC820.1505-00 / 5PC820.1906-00 | 5 | The default settings for this profile can be found in the PPC800 user's manual. This can be downloaded at no cost from the B&R website. |

Table 219: Profile overview

The following pages provide an overview of the BIOS default settings for the different CMOS profile switch positions. Settings highlighted in yellow are variations from the BIOS default profile (=profile 0).

1.9.1 Main

| Setting / Option | Profile 0 | Profile 1 | Profile 2 | 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 220: 945GME Main (Profile setting overview)

1.9.2 Advanced

1.9.2.1 ACPI configuration

| Setting / Option | Profile 0 | Profile 1 | Profile 2 | My setting |
|------------------------------|-----------|-----------|-----------|------------|
| ACPI aware O/S | Yes | Yes | Yes | |
| ACPI version features | ACPI v2.0 | ACPI v2.0 | ACPI v2.0 | |
| ACPI APIC support | Enabled | Enabled | Enabled | |
| Suspend mode | S1 (POS) | S1 (POS) | S1 (POS) | |
| USB device wakeup from S3/S4 | Disabled | Disabled | Disabled | |
| Active cooling trip point | Disabled | Disabled | Disabled | |
| Passive cooling trip point | Disabled | Disabled | Disabled | |
| Critical trip point | 105°C | 105°C | 105°C | |

Table 221: 945GME Advanced - ACPI configuration - Profile setting overview

1.9.2.2 PCI configuration

| Setting / Option | Profile 0 | Profile 1 | Profile 2 | My setting |
|--------------------------|-----------|-----------|-----------|------------|
| Plug & Play O/S | No | Yes | Yes | |
| PCI latency timer | 64 | 64 | 64 | |
| Allocate IRQ to PCI VGA | Yes | Yes | Yes | |
| Allocate IRQ to SMBUS HC | Yes | Yes | Yes | |
| Allocate IRQ to PCIEX2 | Yes | Yes | Yes | |

Table 222: 945GME Advanced - PCI configuration - Profile setting overview

| Setting / Option | Profile 0 | Profile 1 | Profile 2 | My setting |
|------------------------------------|-----------|-----------|-----------|------------|
| PCI IRQ resource exclusion | | | | |
| IRQ3 | Allocated | Allocated | Allocated | |
| IRQ4 | Allocated | Allocated | Allocated | |
| IRQ5 | Available | Available | Available | |
| IRQ6 | Available | Available | Available | |
| IRQ7 | Available | Available | Available | |
| IRQ9 | Allocated | Allocated | Allocated | |
| IRQ10 | Available | Available | Available | |
| IRQ11 | Allocated | Available | Available | |
| IRQ12 | Available | Available | Available | |
| IRQ14 | Allocated | Allocated | Allocated | |
| IRQ15 | Allocated | Allocated | Allocated | |
| PCI interrupt routing | | | | |
| PIRQ A (VGA,PCIEX0, ETH2,UHCI2) | Auto | Auto | Auto | |
| PIRQ B (AC97,PCIEX1, ETH1) | Auto | Auto | Auto | |
| PIRQ C (PCIEX2) | Auto | Auto | Auto | |
| PIRQ D (SATA,UHCI1,SMB, PCIEX3) | Auto | Auto | Auto | |
| PIRQ E (INTD,UHCI3,PATA) | Auto | Auto | Auto | |
| PIRQ F (INTA) | Auto | Auto | Auto | |
| PIRQ G (INTB) | Auto | Auto | Auto | |
| PIRQ H (INTC,UHCI0,EHCI) | Auto | Auto | Auto | |
| 1st Exclusive PCI | - | - | - | |
| 2nd Exclusive PCI | - | - | - | |

Table 222: 945GME Advanced - PCI configuration - Profile setting overview

1.9.2.3 PCI Express configuration

| Setting / Option | Profile 0 | Profile 1 | Profile 2 | My setting |
|---------------------------------|-----------|-----------|-----------|------------|
| Active State Power-Management | Disabled | Disabled | Disabled | |
| PCIe port 0 | Auto | Auto | Auto | |
| PCIe port 1 | Auto | Auto | Auto | |
| PCIe Port 2 (IF slot) | Auto | Auto | Auto | |
| PCIe port 3 | Auto | Auto | Auto | |
| PCIe Port 4 (ETH2) | Auto | Auto | Auto | |
| PCIe Port 5 (ETH1) | Auto | Auto | Auto | |
| PCIe high priority port | Disabled | Disabled | Disabled | |
| Res. PCIe hot plugging resource | No | No | No | |
| PCIe Port 0 IOxAPIC enable | Disabled | Disabled | Disabled | |
| PCIe Port 1 IOxAPIC enable | Disabled | Disabled | Disabled | |
| PCIe Port 2 IOxAPIC enable | Disabled | Disabled | Disabled | |
| PCIe Port 3 IOxAPIC enable | Disabled | Disabled | Disabled | |

Table 223: 945GME Advanced - PCI Express configuration - Profile setting overview

1.9.2.4 Graphics configuration

| Setting / Option | Profile 0 | Profile 1 | Profile 2 | My setting |
|-------------------------------|-------------------|-------------------|-------------------|------------|
| Primary video device | Internal VGA | Internal VGA | Internal VGA | |
| Internal graphics mode select | Enabled, 8MB | Enabled, 8MB | Enabled, 8MB | |
| DVMT mode select | DVMT mode | DVMT mode | DVMT mode | |
| DVMT/FIXED memory | 128 MB | 128 MB | 128 MB | |
| Boot display device | Auto | Auto | Auto | |
| Boot display preference | SDVO-B SDVO-C LFP | SDVO-B SDVO-C LFP | SDVO-B SDVO-C LFP | |
| Local flat panel type | Auto | Auto | Auto | |
| Local flat panel scaling | Centering | Centering | Centering | |
| SDVO port B device | DVI | DVI | DVI | |
| SDVO port C device | DVI | DVI | DVI | |
| SDVO/DVI hot plugging support | Enabled | Enabled | Enabled | |
| Display mode persistence | Enabled | Enabled | Enabled | |

Table 224: 945GME Advanced - Graphics configuration - Profile setting overview

1.9.2.5 CPU configuration

| Setting / Option | Profile 0 | Profile 1 | Profile 2 | My setting |
|------------------------------|-----------|-----------|-----------|------------|
| MPS revision | 1.4 | 1.4 | 1.4 | |
| Max CPUID value limit | Disabled | Disabled | Disabled | |
| Execute disable bit | Enabled | Enabled | Enabled | |
| Core multi-processing | Enabled | Enabled | Enabled | |
| Intel(R) SpeedStep(tm) tech. | Automatic | Automatic | Automatic | |
| Max. CPU frequency | xxxx MHz | xxxx MHz | xxxx MHz | |
| C1 config. | Standard | Standard | Standard | |
| C2 config. | Disabled | Disabled | Disabled | |
| C3 config. | Disabled | Disabled | Disabled | |
| C4 config. | Disabled | Disabled | Disabled | |

Table 225: 945GME Advanced - CPU configuration - Profile setting overview

1.9.2.6 Chipset configuration

| Setting / Option | Profile 0 | Profile 1 | Profile 2 | My setting |
|----------------------------|-----------|-----------|-----------|------------|
| DRAM frequency | Auto | Auto | Auto | |
| DRAM refresh rate | Auto | Auto | Auto | |
| Memory hole | Disabled | Disabled | Disabled | |
| DIMM thermal control | Disabled | Disabled | Disabled | |
| DT in SPD | Disabled | Disabled | Disabled | |
| TS on DIMM | Disabled | Disabled | Disabled | |
| High precision event timer | Disabled | Disabled | Disabled | |
| IOAPIC | Enabled | Enabled | Enabled | |
| APIC ACPI SCI IRQ | Disabled | Disabled | Disabled | |
| C4 on C3 | Disabled | Disabled | Disabled | |

Table 226: 945GME Advanced - Chipset configuration - Profile setting overview

1.9.2.7 I/O interface configuration

| Setting / Option | Profile 0 | Profile 1 | Profile 3 | My setting |
|--------------------------|-----------|-----------|-----------|------------|
| Onboard audio controller | AC97 | AC97 | AC97 | |

Table 227: 945GME Advanced - I/O interface configuration - Profile setting overview

1.9.2.8 Clock configuration

| Setting / Option | Profile 0 | Profile 1 | Profile 2 | My setting |
|------------------|-----------|-----------|-----------|------------|
| Spread spectrum | Disabled | Disabled | Disabled | |

Table 228: 945GME Advanced - Clock configuration - Profile setting overview

1.9.2.9 IDE configuration

| Setting / Option | Profile 0 | Profile 1 | Profile 2 | My setting |
|--------------------------------|--------------------|--------------------|--------------------|------------|
| ATA/IDE Configuration | Compatible | Compatible | Compatible | |
| Legacy IDE channels | SATA Pri, PATA Sec | SATA Pri, PATA Sec | SATA Pri, PATA Sec | |
| Configure SATA as | - | - | - | |
| Configure SATA as Channels | - | - | - | |
| AHCI/RAID SATA hot plug | - | - | - | |
| Hard disk write protect | Disabled | Disabled | Disabled | |
| IDE detect timeout (sec) | 35 | 35 | 35 | |
| ATA(Pi) 80-pin cable detection | Host & device | Host & device | Host & device | |
| Primary IDE master | | | | |
| Type | Auto | Auto | Auto | |
| LBA/Large mode | Auto | Auto | Auto | |
| Block (multi-sector transfer) | Auto | Auto | Auto | |
| PIO mode | Auto | Auto | Auto | |
| DMA mode | Auto | Auto | Auto | |
| S.M.A.R.T. | Auto | Auto | Auto | |
| 32Bit data transfer | Enabled | Enabled | Enabled | |
| Primary IDE slave | | | | |
| Type | Auto | Auto | Auto | |
| LBA/Large mode | Auto | Auto | Auto | |
| Block (multi-sector transfer) | Auto | Auto | Auto | |
| PIO mode | Auto | Auto | Auto | |
| DMA mode | Auto | Auto | Auto | |
| S.M.A.R.T. | Auto | Auto | Auto | |
| 32Bit data transfer | Enabled | Enabled | Enabled | |
| Secondary IDE master | | | | |
| Type | Auto | Auto | Auto | |
| LBA/Large mode | Auto | Auto | Auto | |
| Block (multi-sector transfer) | Auto | Auto | Auto | |
| PIO mode | Auto | Auto | Auto | |
| DMA mode | Auto | Auto | Auto | |
| S.M.A.R.T. | Auto | Auto | Auto | |
| 32Bit data transfer | Enabled | Enabled | Enabled | |
| Secondary IDE slave | | | | |
| Type | Auto | Auto | Auto | |
| LBA/Large mode | Auto | Auto | Auto | |
| Block (multi-sector transfer) | Auto | Auto | Auto | |
| PIO mode | Auto | Auto | Auto | |
| DMA mode | Auto | Auto | Auto | |
| S.M.A.R.T. | Auto | Auto | Auto | |
| 32Bit data transfer | Enabled | Enabled | Enabled | |

Table 229: 945GME Advanced - IDE configuration - Profile setting overview

1.9.2.10 USB configuration

| Setting / Option | Profile 0 | Profile 1 | Profile 2 | My setting |
|------------------------------|-----------------|-----------------|-----------------|------------|
| USB function | 8 USB ports | 8 USB ports | 8 USB ports | |
| USB 2.0 controller | Enabled | Enabled | Enabled | |
| Legacy USB support | Enabled | Enabled | Enabled | |
| USB Legacy POST-always | Enabled | Enabled | Enabled | |
| USB keyboard Legacy support | Enabled | Enabled | Enabled | |
| USB mouse Legacy support | Disabled | Disabled | Disabled | |
| USB storage device support | Enabled | Enabled | Enabled | |
| Port 64/60 emulation | Disabled | Disabled | Disabled | |
| USB 2.0 controller mode | HiSpeed | HiSpeed | HiSpeed | |
| BIOS EHCI hand-off | Disabled | Disabled | Disabled | |
| USB beep message | Enabled | Enabled | Enabled | |
| USB stick default emulation | Hard disk drive | Hard disk drive | Hard disk drive | |
| USB mass storage reset delay | 20 Sec | 20 Sec | 20 Sec | |

Table 230: 945GME Advanced - USB configuration - Profile setting overview

1.9.2.11 Keyboard/Mouse configuration

| Setting / Option | Profile 0 | Profile 1 | Profile 2 | My setting |
|------------------|-----------|-----------|-----------|------------|
| Bootup Num-lock | On | On | On | |
| Typematic rate | Fast | Fast | Fast | |

Table 231: 945GME Advanced - Keyboard/Mouse configuration - profile setting overview

1.9.2.12 Remote access configuration

| Setting / Option | Profile 0 | Profile 1 | Profile 2 | My setting |
|-----------------------------|-----------|-----------|-----------|------------|
| Remote access | Disabled | Disabled | Disabled | |
| Serial Port Number | - | - | - | |
| Base address, IRQ | - | - | - | |
| Serial port Mode | - | - | - | |
| Flow control | - | - | - | |
| Redirection After BIOS POST | - | - | - | |
| Terminal type | - | - | - | |
| VT-UTF8 combo key support | - | - | - | |
| Sredir memory display delay | - | - | - | |
| Serial port BIOS update | Disabled | Disabled | Disabled | |

Table 232: 945GME Advanced - Remote access configuration - Profile setting overview

1.9.2.13 CPU board monitor

| Setting / Option | Profile 0 | Profile 1 | Profile 2 | My setting |
|---------------------|-----------|-----------|-----------|------------|
| H/W health function | Enabled | Enabled | Enabled | |

Table 233: 945GME Advanced CPU board monitor profile setting overview

1.9.2.14 Baseboard/Panel features

| Setting / Option | Profile 0 | Profile 1 | Profile 2 | My setting |
|--------------------------|-----------|-----------|-----------|------------|
| Panel control | | | | |
| Select panel number | - | - | - | |
| Version | - | - | - | |
| Brightness | 100% | 100% | 100% | |
| Temperature | - | - | - | |
| Fan speed | - | - | - | |
| Keys/LEDs | - | - | - | |
| Baseboard monitor | | | | |
| CMOS battery | - | - | - | |
| Board I/O | - | - | - | |
| Board ETH2 | - | - | - | |
| Board power | - | - | - | |
| Power supply | - | - | - | |
| Slide-in drive 1 | - | - | - | |
| Slide-in drive 2 | - | - | - | |
| ETH2 controller | - | - | - | |
| Case 1 | - | - | - | |
| Case 2 | - | - | - | |
| Case 3 | - | - | - | |
| Case 4 | - | - | - | |
| Legacy devices | | | | |
| COM A | Enabled | Enabled | Enabled | |
| Base I/O address | 3F8 | 3F8 | 3F8 | |
| Interrupt | IRQ4 | IRQ4 | IRQ4 | |
| COM B | Enabled | Enabled | Enabled | |
| Base I/O address | 2F8 | 2F8 | 2F8 | |
| Interrupt | IRQ3 | IRQ3 | IRQ3 | |
| COM C | Enabled | Disabled | Disabled | |
| Base I/O address | 3E8 | - | - | |
| Interrupt | IRQ11 | - | - | |
| COM D | Disabled | Disabled | Disabled | |
| Base I/O address | - | - | - | |
| Interrupt | - | - | - | |
| COM E | Disabled | Disabled | Disabled | |
| Base I/O address | - | - | - | |
| Interrupt | - | - | - | |
| CAN | Disabled | Disabled | Disabled | |
| Hardware security key | Enabled | Enabled | Enabled | |
| Base I/O address | 378 | 378 | 378 | |
| ETH2 LAN Controller | Enabled | Enabled | Enabled | |
| ETH2 MAC Address | - | - | - | |

Table 234: 945GME Advanced - Baseboard/Panel Features profile setting overview

1.9.3 Boot

| Setting / Option | Profile 0 | Profile 1 | Profile 2 | My setting |
|---------------------------|----------------------|----------------------|----------------------|------------|
| Boot priority selection | Type based | Type based | Type based | |
| 1st boot device | Onboard LAN | Primary master | Primary master | |
| 2nd boot device | Primary master | Primary Slave | Primary Slave | |
| 3rd boot device | Primary Slave | USB floppy | USB floppy | |
| 4th boot device | USB floppy | USB removable device | USB removable device | |
| 5th boot device | USB removable device | USB hard disk | USB hard disk | |
| 6th boot device | USB CDROM | USB CDROM | USB CDROM | |
| 7th boot device | Secondary master | Secondary master | Secondary master | |
| 8th boot device | Secondary slave | Secondary slave | Secondary slave | |
| Quick boot | Enabled | Enabled | Enabled | |
| Quiet boot | Disabled | Disabled | Disabled | |
| Automatic boot list retry | Disabled | Disabled | Disabled | |
| Add-on ROM display mode | Keep current | Keep current | Keep current | |
| Halt on error | Disabled | Disabled | Disabled | |
| Hit "DEL" message display | Enabled | Enabled | Enabled | |
| Interrupt 19 capture | Disabled | Disabled | Disabled | |
| PXE boot to LAN (ETH1) | Enabled | Disabled | Disabled | |
| Slide-in 2 optional ROM | Enabled | Disabled | Enabled | |
| Power loss control | Turn on | Turn on | Turn on | |

Table 235: 945GME Main (Profile setting overview)

1.9.4 Security

| Setting / Option | Profile 0 | Profile 1 | Profile 2 | My setting |
|------------------------------------|-----------|-----------|-----------|------------|
| Supervisor password | - | - | - | |
| User password | - | - | - | |
| Boot sector virus protection | Disabled | Disabled | Disabled | |
| Hard disk security user password | - | - | - | |
| Hard disk security master password | - | - | - | |

Table 236: 945GME Security profile setting overview

1.9.5 Power

| Setting / Option | Profile 0 | Profile 1 | Profile 2 | My setting |
|---------------------------|-----------|-----------|-----------|------------|
| Power management/APM | Enabled | Enabled | Enabled | |
| Suspend time out | Disabled | Disabled | Disabled | |
| Video power down mode | Suspend | Suspend | Suspend | |
| Hard disk power down mode | Suspend | Suspend | Suspend | |
| Keyboard & PS/2 mouse | MONITOR | MONITOR | MONITOR | |
| FDC/LPT/COM ports | MONITOR | MONITOR | MONITOR | |
| Primary master IDE | MONITOR | MONITOR | MONITOR | |
| Primary slave IDE | MONITOR | MONITOR | MONITOR | |
| Secondary master IDE | MONITOR | MONITOR | MONITOR | |
| Secondary slave IDE | MONITOR | MONITOR | MONITOR | |
| Resume on ring | Disabled | Disabled | Disabled | |
| Resume on PME# | Disabled | Disabled | Disabled | |
| Resume on RTC alarm | Disabled | Disabled | Disabled | |
| Power button mode | On/Off | On/Off | On/Off | |

Table 237: 945GME 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 beep codes.

| Beep code | Description | Necessary user action |
|-----------|--|---|
| 1x short | Memory refresh failed | Load BIOS defaults. If the error persists, send the industrial PC to B&R for testing. |
| 2x short | Parity error: POST error (error in one of the hardware testing procedures) | Check that the card has been inserted properly. If the error persists, send the industrial PC to B&R for testing. |
| 3x short | Base 64 kB memory failure: Basic memory error, RAM error within the initial 64 kB | Send the industrial PC to B&R for testing. |
| 4x short | Timer not operational: System timer | Send the industrial PC to B&R for testing. |
| 5x short | Processor error: Defective processor | Send the industrial PC to B&R for testing. |
| 6x short | 8042 gate A20 failure: Defective keyboard controller (block 8042/gate A20). The processor cannot switch to protected mode. | Send the industrial PC to B&R for testing. |
| 7x short | Processor exception interrupt error: Virtual mode exception error (CPU generated an interrupt error) | Send the industrial PC to B&R for testing. |
| 8x short | Display memory read/write error: Video memory not accessible, defective graphic card or not installed (not a fatal error) | Check that the graphics card has been inserted correctly, replace if necessary. If the error persists, send the industrial PC to B&R for testing. |
| 9x short | ROM checksum error: ROM BIOS checksum incorrect; defective EPROM, EEPROM or flash ROM component; defective BIOS or incorrectly updated | Send the industrial PC to B&R for testing. |
| 10x short | CMOS shutdown register read/write error: Unable to read/write from/to CMOS | Send the industrial PC to B&R for testing. |
| 11x short | Cache error / external cache bad: Defective L2 cache on the main-board | Send the industrial PC to B&R for testing. |

Table 238: 945GME BIOS - POST messages

1.11 Allocation of resources

1.11.1 RAM address assignment

| RAM address | Address in hexadecimal | Resource |
|--|------------------------|--|
| (TOM - 192 kB) – TOM ¹⁾ | N.A. | ACPI reclaim, MPS and NVS area ²⁾ |
| (TOM - 8 MB - 192 kB) – (TOM - 192 kB) | N.A. | VGA frame buffer ³⁾ |
| 1024 kB – (TOM - 8 MB - 192 kB) | 100000h - N.A. | Extended memory |
| 869 kB – 1024 kB | 0E0000h - 0FFFFFFh | Runtime BIOS |
| 832 kB – 869 kB | 0D0000h - 0DFFFFh | Upper memory |
| 640 kB – 832 kB | 0A0000h - 0CFFFFh | Video memory and BIOS |
| 639 kB – 640 kB | 09FC00h - 09FFFFh | Extended BIOS data |
| 0 – 639 kB | 000000h - 09FC00h | Conventional memory |

Table 239: RAM address assignment

- 1) TOM = Top of memory: Max. installed DRAM.
 2) Only if ACPI Aware OS is set to "YES" in the setup.
 3) The VGA frame buffer can be reduced to 1 MB in the setup.

1.11.2 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 |
| 02F8h - 02FFh | COM2 |
| 0376h - 0376h | Secondary IDE channel command port |
| 0377h - 0377h | Secondary IDE channel status port |
| 0378h - 037Fh | Hardware security key (LPT1) |
| 0384h - 0385h | CAN controller |
| 03B0h - 03DFh | Video system |
| 03E8h - 03EFh | COM3 |
| 03F6h - 03F6h | Primary IDE channel command port |
| 03F7h - 03F7h | Primary IDE channel status port |
| 03F8h - 03FFh | COM1 |
| 0480h - 04BFh | Motherboard resources |
| 04D0h - 04D1h | Motherboard resources |
| 0800h - 087Fh | Motherboard resources |
| 0CF8h - 0CFBh | PCI config address register |
| 0CFCh - 0CFFh | PCI config data register |
| 0D00h - FFFFh | PCI / PCI Express bus ¹⁾ |
| 4100h - 417Fh | MTCX |
| FF00h - FF07h | IDE bus master register |

Table 240: 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 range.

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) | | | | ○ | • | ○ | ○ | ○ | | | ○ | ○ | ○ | | | | | |
| COM2 (serial port B) | | | | • | ○ | ○ | ○ | ○ | | | ○ | ○ | ○ | | | | | |
| ACPI ¹⁾ | | | | | | | | | | • | | | | | | | | |
| Real-time clock | | | | | | | | | • | | | | | | | | | |
| Coprocessor (FPU) | | | | | | | | | | | | | | • | | | | |
| Primary IDE channel | | | | | | | | | | | | | | | • | | | |
| Secondary IDE channel | | | | | | | | | | | | | | | | • | | |
| B&R | COM3 (COM C) | | | ○ | ○ | ○ | ○ | ○ | | | ○ | ○ | ○ | | | | | • |
| | COM4 (COM D) | | | ○ | ○ | ○ | ○ | ○ | | | ○ | ○ | ○ | | | | | • |
| | COM5 (COM E) | | | ○ | ○ | ○ | ○ | ○ | | | ○ | ○ | ○ | | | | | • |
| | CAN | | | ○ | ○ | ○ | ○ | ○ | | | ○ | ○ | ○ | | | | ○ | • |

Table 241: IRQ interrupt assignments in PIC mode

- 1) Advanced Configuration and Power Interface.

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

1.11.4 Interrupt assignments in APIC mode

A total of 23 IRQs are available in APIC (Advanced Programmable Interrupt Controller) mode. Enabling this option is only effective if done before the Windows operating system is installed.

| IRQ | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | NMI | NONE |
|-----------------------|--------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|------|
| System timer | • | | | | | | | | | | | | | | | | | | | | | | | | | |
| Keyboard | | • | | | | | | | | | | | | | | | | | | | | | | | | |
| IRQ cascade | | | • | | | | | | | | | | | | | | | | | | | | | | | |
| COM1 (serial port A) | | | | ○ | • | ○ | ○ | ○ | | | ○ | ○ | ○ | | | | | | | | | | | | | |
| COM2 (serial port B) | | | | • | ○ | ○ | ○ | ○ | | | ○ | ○ | ○ | | | | | | | | | | | | | |
| ACPI ¹⁾ | | | | | | | | | • | | | | | | | | | | | | | | | | | |
| Real-time clock | | | | | | | | • | | | | | | | | | | | | | | | | | | |
| Coprocessor (FPU) | | | | | | | | | | | | | | • | | | | | | | | | | | | |
| Primary IDE channel | | | | | | | | | | | | | | | • | | | | | | | | | | | |
| Secondary IDE channel | | | | | | | | | | | | | | | | • | | | | | | | | | | |
| B&R | COM3 (COM C) | | | ○ | ○ | ○ | ○ | ○ | | | ○ | ○ | ○ | | | | | | | | | | | | | • |
| | COM4 (COM D) | | | ○ | ○ | ○ | ○ | ○ | | | ○ | ○ | ○ | | | | | | | | | | | | | • |
| | COM5 (COM E) | | | ○ | ○ | ○ | ○ | ○ | | | ○ | ○ | ○ | | | | | | | | | | | | | • |
| | CAN | | | ○ | ○ | ○ | ○ | ○ | | | ○ | ○ | ○ | | | | | | | | | | | ○ | | • |
| PIRQ A ²⁾ | | | | | | | | | | | | | | | | • | | | | | | | | | | |
| PIRQ B ³⁾ | | | | | | | | | | | | | | | | | • | | | | | | | | | |
| PIRQ C ⁴⁾ | | | | | | | | | | | | | | | | | | • | | | | | | | | |
| PIRQ D ⁵⁾ | | | | | | | | | | | | | | | | | | | • | | | | | | | |
| PIRQ E ⁶⁾ | | | | | | | | | | | | | | | | | | | | • | | | | | | |
| PIRQ F ⁷⁾ | | | | | | | | | | | | | | | | | | | | | • | | | | | |
| PIRQ G ⁸⁾ | | | | | | | | | | | | | | | | | | | | | | • | | | | |
| PIRQ H ⁹⁾ | | | | | | | | | | | | | | | | | | | | | | | • | | | |

Table 242: IRQ interrupt assignments in APIC mode

- 1) Advanced Configuration and Power Interface.
- 2) PIRQ A: for PCIe; UHCI host controller 3, VGA controller, PCI Express root port 0, Intel High Definition Audio controller, PCI-EX to SATA bridge
- 3) PIRQ B: for PCIe; AC'97 audio, PCI express root port 1, onboard gigabit LAN controller
- 4) PIRQ C: for PCIe; UHCI host controller 1, SMBus controller, PCI Express root port 3, Serial ATA controller in enhanced/native mode
- 5) PIRQ D: for PCIe, UHCI host controller 3, parallel ATA controller in enhanced/native mode
- 6) PIRQ E: PCI Bus INTD
- 7) PIRQ F: PCI Bus INTA
- 8) PIRQ G: PCI Bus INTB
- 9) PIRQ H: PCI bus INTC, UHCI host controller 0, EHCI host controller

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

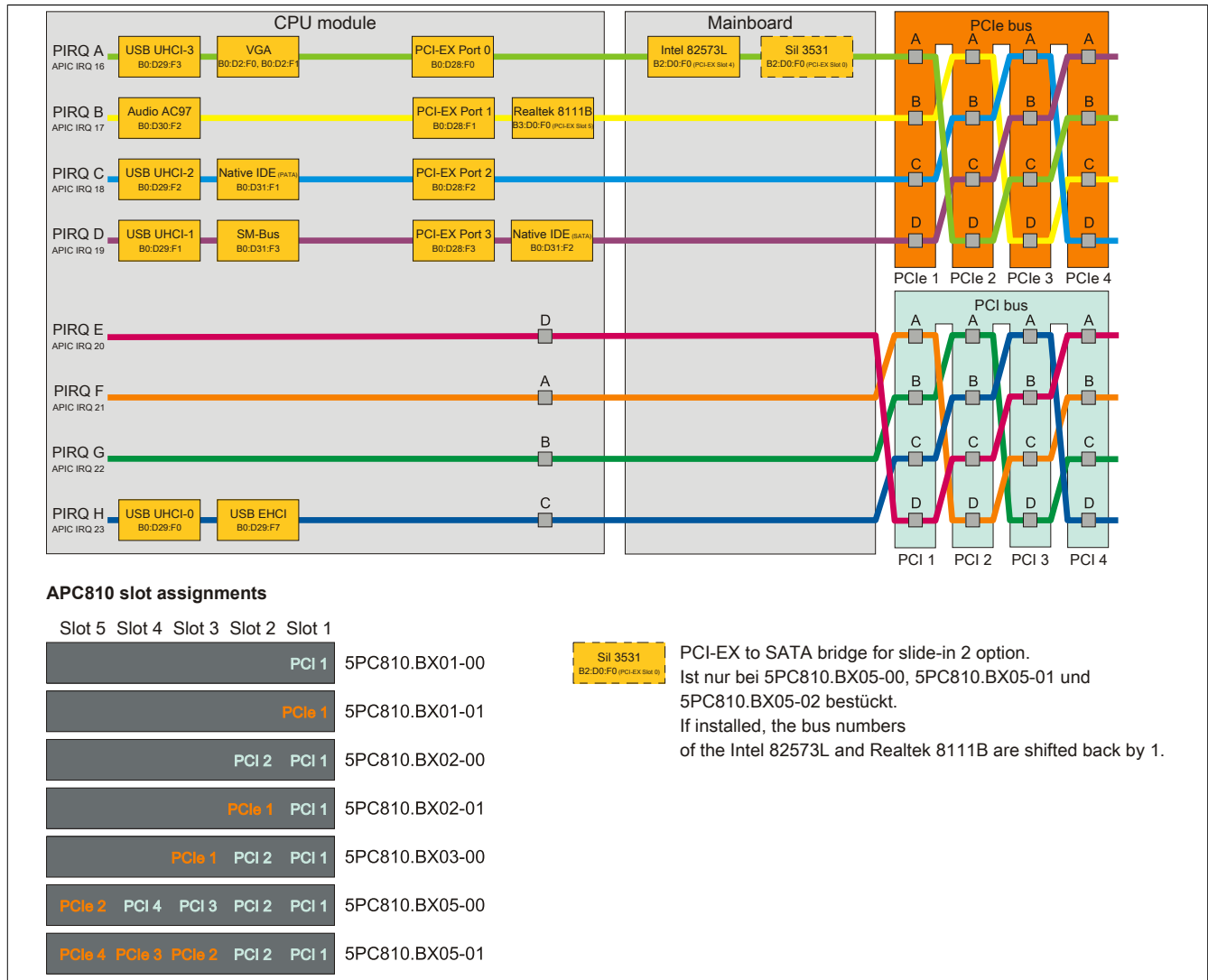
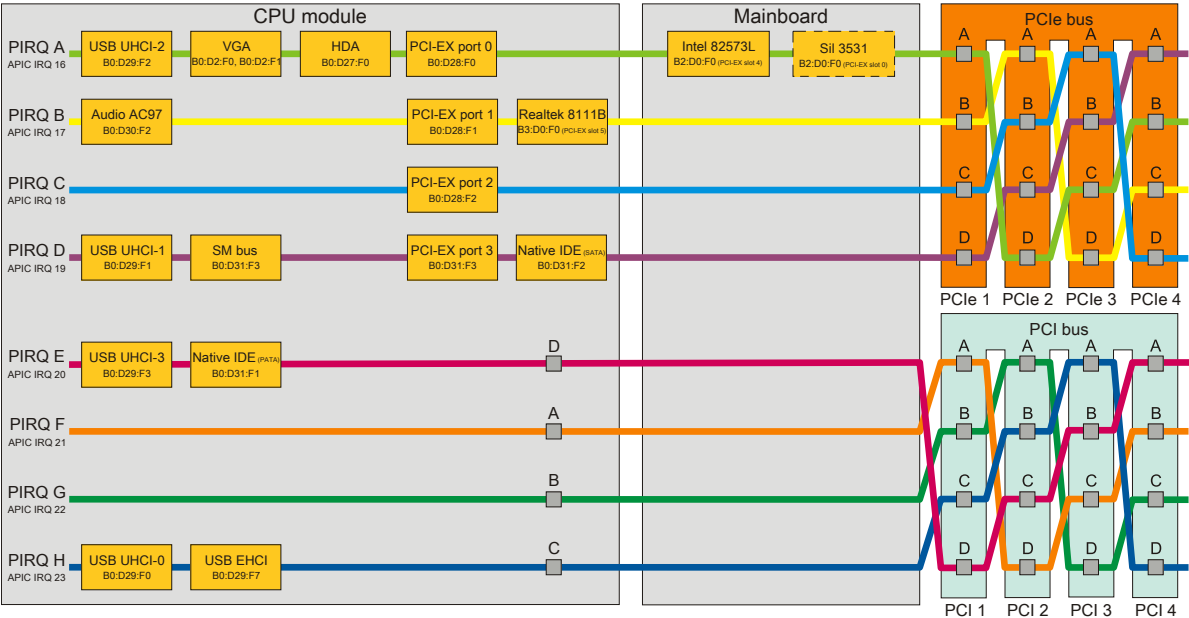


Figure 144: PCI and PCIe routing with enabled 945GME APIC CPU board (COM Express) for BIOS ≤ version 1.12



APC810 slot assignments

Slot 5 Slot 4 Slot 3 Slot 2 Slot 1

| | |
|--|----------------|
| PCI 1 | 5PC810.BX01-00 |
| PCIe 1 | 5PC810.BX01-01 |
| PCI 2 PCI 1 | 5PC810.BX02-00 |
| PCIe 1 PCI 1 | 5PC810.BX02-01 |
| PCIe 1 PCI 2 PCI 1 | 5PC810.BX03-00 |
| PCIe 2 PCI 4 PCI 3 PCI 2 PCI 1 | 5PC810.BX05-00 |
| PCIe 4 PCIe 3 PCIe 2 PCI 2 PCI 1 | 5PC810.BX05-01 |

SII 3531 PCI-EX to SATA bridge for slide-in 2 option.
Only installed on 5PC810.BX05-00, 5PC810.BX05-01 and 5PC810.BX05-02.
If installed, the bus numbers of the Intel 82573L and Realtek 8111B are shifted back by 1.

Figure 145: PCI and PCIe routing with enabled 945GME APIC CPU board (COM Express) for BIOS \geq version 1.14 (bus units 5PC810.BX0x-0x)

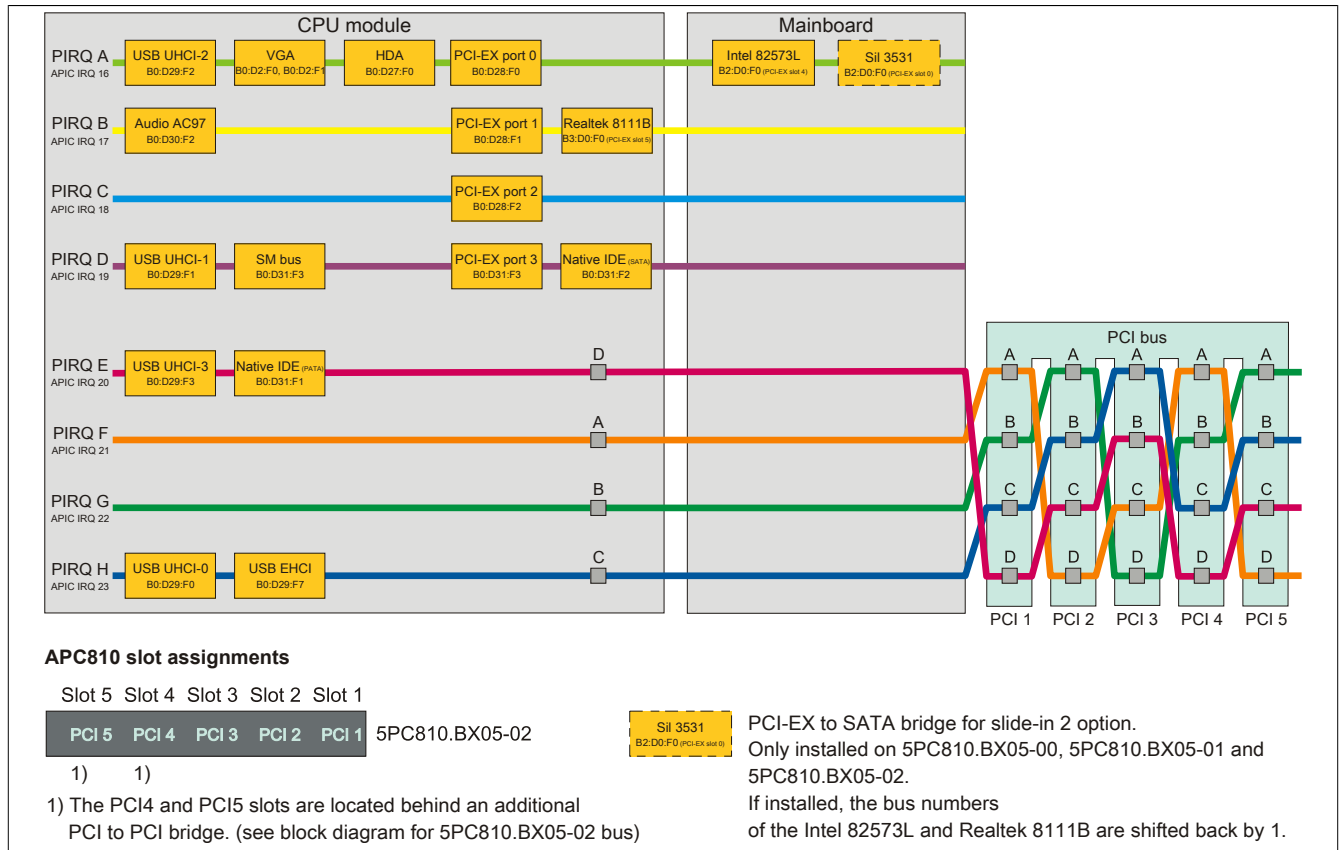


Figure 146: PCI and PCIe routing with enabled 945GME APIC CPU board (COM Express) for BIOS ≥ version 1.14 (bus unit 5PC810.BX05-02)

2 Upgrade information

Warning!

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

2.1 BIOS upgrade

An upgrade may be necessary in order to accomplish the following:

- Updating implemented functions or adding newly implemented functions or components to BIOS Setup (information about changes can be found in the Readme file for the BIOS upgrade).

2.1.1 Important information

Information:

Customized BIOS settings are deleted when upgrading BIOS.

Before starting an upgrade, it helps to determine the various software versions.

2.1.1.1 Which BIOS version and firmware are already installed on the APC810?

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

- After switching on the APC810, the BIOS Setup screen can be accessed by pressing .
- From the BIOS main menu "Advanced", select "Baseboard/Panel features".

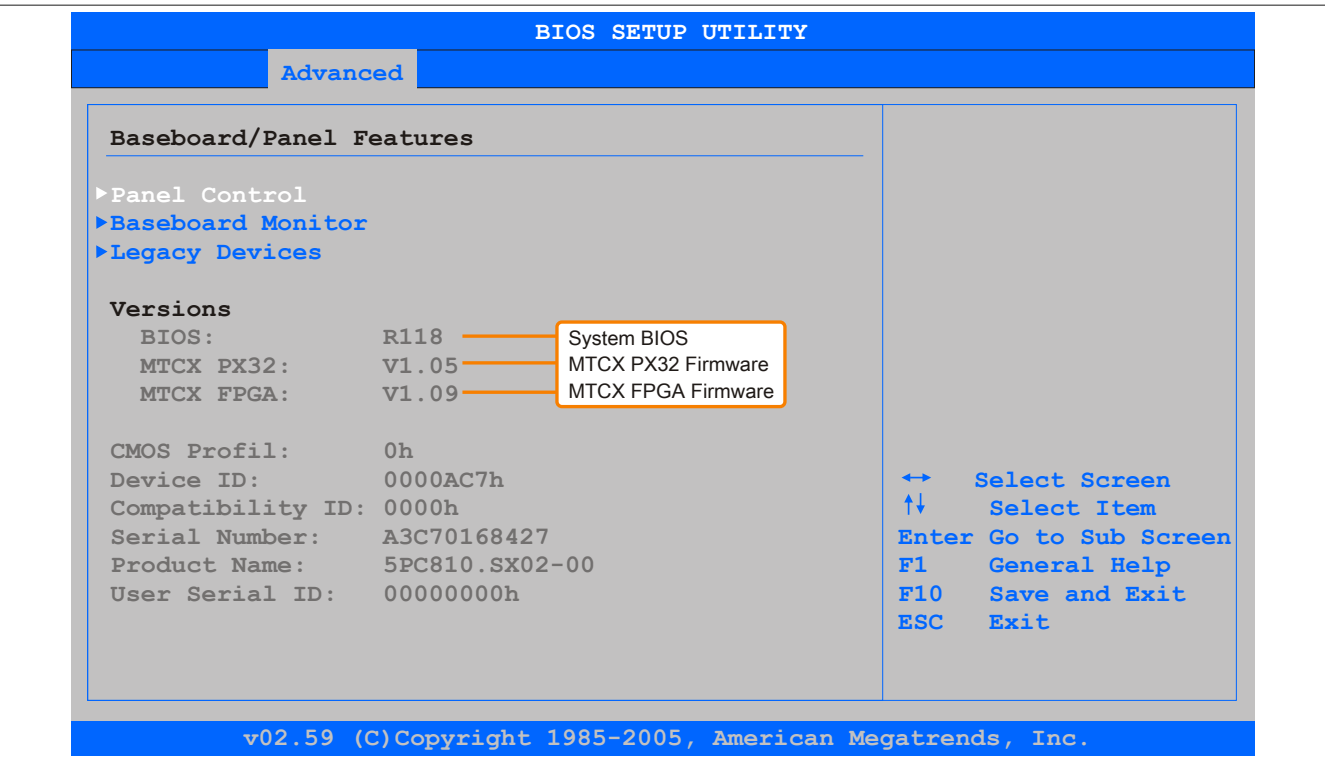


Figure 147: Software version

2.1.1.2 Which firmware is installed on the Automation Panel Link transmitter?

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

- After switching on the APC810, the BIOS Setup screen can be accessed by pressing .
- From the BIOS main menu "Advanced", select "Baseboard/Panel features" and then "Panel control".

Information:

The version can only be displayed when an Automation Panel with an AP Link SDL transmitter (5AC801.SDL0-00) is connected.

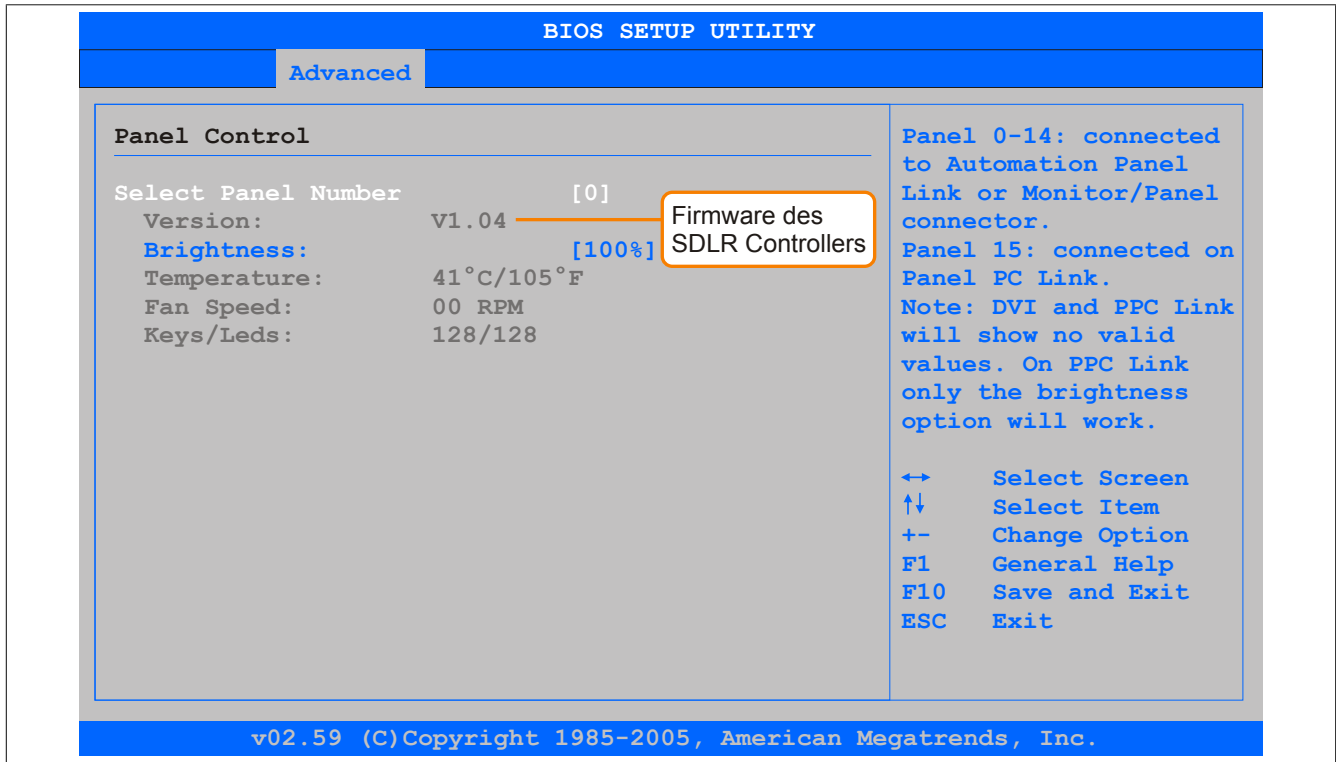


Figure 148: Firmware version of the AP Link SDL transmitter

2.1.2 Procedure with MS-DOS

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

Information:

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

Information about creating a bootable diskette in Windows XP can be found on page 282.

Information on creating a USB flash drive for a B&R upgrade can be found on page 284.

Information on creating a CompactFlash card for a B&R upgrade can be found on page 285.

3. Copy the contents of the .zip file to the bootable media. If the B&R upgrade was already added when creating the bootable media with the B&R Embedded OS Installer, then this step is not necessary.
4. Connect the bootable media to the B&R device and reboot.
5. The following boot menu will be shown after startup:

```
1. Upgrade AMI BIOS for B945
2. Exit
```

Item 1:

BIOS is automatically upgraded (default after 5 seconds).

Item 2:

Returns to the shell (MS-DOS)

Information:

If a button is not pressed within 5 seconds, then item 1 "Upgrade AMI BIOS for B945" is automatically carried out to update the industrial PC.

6. The system must be rebooted after a successful upgrade.
7. Reboot and press to enter BIOS Setup and load the setup defaults, then select "Save changes and exit".

2.2 Firmware upgrade

The "Firmware upgrade (MTCX, SDLT, SDLR, UPS)" software makes it possible to update the firmware for multiple controllers (MTCX, SDLT, SDLR, UPSI) depending on the APC810 system variant.

The latest firmware upgrade is available in the Downloads section of the B&R website (www.br-automation.com).

2.2.1 Procedure

Proceed as follows to carry out a firmware upgrade:

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

Information:

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

Information about creating a bootable diskette in Windows XP can be found on page 282.

Information on creating a USB flash drive for a B&R upgrade can be found on page 284.

Information on creating a CompactFlash card for a B&R upgrade can be found on page 285.

3. Copy the contents of the .zip file to the bootable media. If the B&R upgrade was already added when creating the bootable media with the B&R Embedded OS Installer, then this step is not necessary.
4. Connect the bootable media to the B&R device and reboot.
5. The following boot menu will be shown after startup:

Information:

The following boot menu options including descriptions are based on Version 1.00 of the APC800 upgrade (MTCX, SDLR, SDLT, UPSI) disk. In some cases, these descriptions might not match the version you are currently using.

```

1. Upgrade MTCX (APC810) PX32 and FPGA
2. Upgrade SDLT (APC810) only
3. Upgrade SDLR (AP800/AP900) on monitor/panel
3.1 Upgrade SDLR on AP 0 (AP800/AP900)
3.2 Upgrade SDLR on AP 1 (AP800/AP900)
3.3 Upgrade SDLR on AP 2 (AP800/AP900)
3.4 Upgrade SDLR on AP 3 (AP800/AP900)
3.5 Upgrade all SDLR (AP800/AP900)
3.6 Return to main menu
4. Upgrade SDLR (AP800/AP900) on AP link slot
4.1 Upgrade SDLR on AP 8 (AP800/AP900)
4.2 Upgrade SDLR on AP 9 (AP800/AP900)
4.3 Upgrade SDLR on AP 10 (AP800/AP900)
4.4 Upgrade SDLR on AP 11 (AP800/AP900)
4.5 Upgrade all SDLR (AP800/AP900)
4.6 Return to main menu
5. Upgrade add-on UPS (firmware and battery settings)
5.1 Upgrade add-on UPS firmware (5AC600.UPSI-00)
5.2 Upgrade Battery Settings (5AC600.UPSB-00)
5.3 Return to main menu
6. Exit

```

Item 1:

Automatically upgrades the PX32 and FPGA of the MTCX (default after 5 seconds)

Item 2:

Automatically updates the FPGA of the SDLT controller on the AP Link slot

Item 3:

Opens Submenu 1 for upgrading the SDLR controller on the monitor/panel interface

3.1 Upgrade SDLR on AP 0 (AP800/AP900)

Automatically updates the SDLR controller on the Automation Panel 0 interface

3.2 Upgrade SDLR on AP 1 (AP800/AP900)

Automatically updates the SDLR controller on the Automation Panel 1 interface

3.3 Upgrade SDLR on AP 2 (AP800/AP900)

Automatically updates the SDLR controller on the Automation Panel 2 interface

3.4 Upgrade SDLR on AP 3 (AP800/AP900)

Automatically updates the SDLR controller on the Automation Panel 3 interface

3.5 Upgrade all SDLR (AP800/AP900)

Automatically updates all SDLR controllers on all Automation Panels on the monitor/panel interface (default selection after 5 sec)

3.6 Return to main menu

Returns to the main menu

Item 4:

Opens Submenu 2 for upgrading the SDLR controller on the AP Link slot

4.1 Upgrade SDLR on AP 8 (AP800/AP900)

Automatically updates the SDLR controller on the Automation Panel 8 interface

4.2 Upgrade SDLR on AP 9 (AP800/AP900)

Automatically updates the SDLR controller on the Automation Panel 9 interface

4.3 Upgrade SDLR on AP 10 (AP800/AP900)

Automatically updates the SDLR controller on the Automation Panel 10 interface

4.4 Upgrade SDLR on AP 11 (AP800/AP900)

Automatically updates the SDLR controller on the Automation Panel 11 interface

4.5 Upgrade all SDLR (AP800/AP900)

Automatically updates all SDLR controllers on all Automation Panels on the AP Link slot (default selection after 5 sec).

4.6 Return to main menu

Returns to the main menu

Item 5:

Opens Submenu 3 for upgrading the add-on UPS firmware and battery settings

5.1 Upgrade add-on UPS firmware (5AC600.UPSI-00)

Updates the firmware for the add-on UPSI

5.2 Upgrade battery settings (5AC600.UPSB-00)

Automatically updates the battery settings for 5AC600.UPSB-00

5.3 Return to main menu

Returns to the main menu

Item 6:

Returns to the shell (MS-DOS)

Information:

The system must be powered off and back on again after a successful upgrade.

2.2.2 Possible upgrade problems and software dependencies (for V1.00)

- 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 less 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 version greater than or equal to V01.04. Daisy chain mode is not possible with this type of a combination.
- If a UPS (e.g. 5AC600.UPSI-00) + battery unit (e.g. 5AC600.UPSB-00) is connected to the system and ready to be operated, then either the battery must be disconnected or the Power button pushed after upgrading the MTCX or SDLT (to put the system in standby mode) before powering the system off and back on. If this is not done, the firmware upgrade will not work since the UPS is buffering the system.

- The "Legacy mouse support" and "Keyboard controller reset" functions are only provided starting with the MTCX PX32 V00.12 and MTCX FPGA V00.09 combination (included on APC810 MTCX upgrade disk V00.05).

2.3 Creating an MS-DOS boot diskette in Windows XP

1. Insert a blank 1.44 MB HD diskette into the disk drive.
2. Open Windows Explorer.
3. Right-click on the 3½ floppy diskette icon and select "Format".

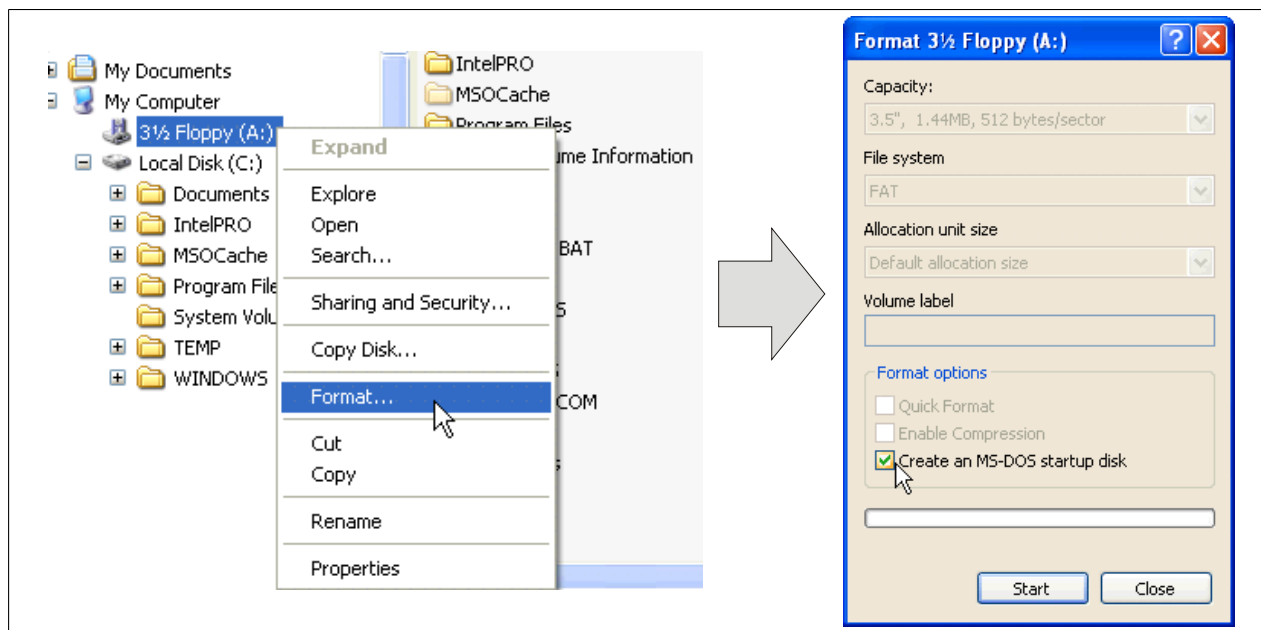


Figure 149: Creating a bootable diskette in Windows XP - Step 1

4. Select the **"Create an MS-DOS startup disk"** option, click on **"Start"** and acknowledge the warning message with "OK".

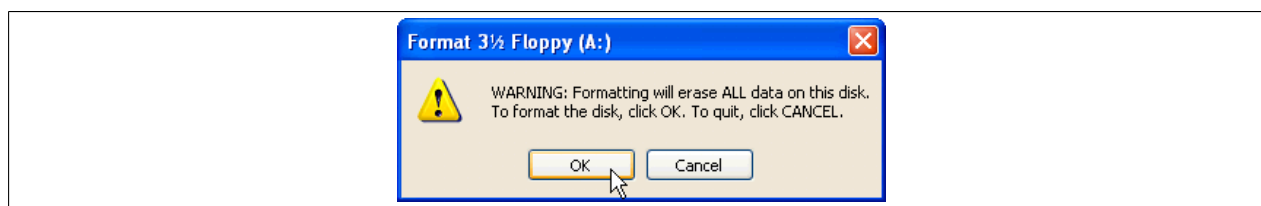


Figure 150: Creating a bootable diskette in Windows XP - Step 2

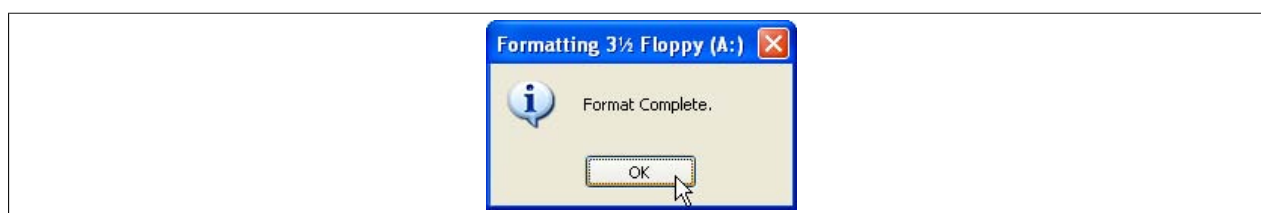


Figure 151: Creating a bootable diskette in Windows XP - Step 3

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

To do this, all files (hidden system files, etc.) must be visible on the diskette.

In Windows Explorer, go to the "Tools" menu, select "Folder options" and open the "View" tab. Then deselect the option "Hide protected operating system files (Recommended)" (enabled by default) and enable the option "Show hidden files and folders".

| before | | | | 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 |

Figure 152: 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 |

Figure 153: Creating a bootable diskette in Windows XP - Step 5

Now all files (selected) except Command.com, IO.sys and MSDOS.sys can be deleted.

2.4 Creating a bootable USB flash drive for B&R upgrade files

When used in connection with a B&R Industrial PC, it is possible to upgrade (e.g. upgrade BIOS) from one of the USB flash drives available from B&R. To do this, the USB flash drive must be prepared accordingly. This is done with the B&R Embedded OS Installer, which can be downloaded at no cost from the B&R website (www.br-automation.com).

2.4.1 Requirements

The following is required to create a bootable USB flash drive:

- B&R USB flash drive
- B&R Industrial PC
- USB media drive
- B&R Embedded OS Installer (V3.00 or higher)

2.4.2 Procedure

1. Connect the USB flash drive to the PC.
2. If the drive list is not refreshed automatically, the list can be updated using the command **Drives > Refresh**.
3. Select the desired USB flash drive in the drive list.
4. Change to the **Action** tab and select **Install a B&R update to a USB flash drive** as the type of action.
5. Enter the path to the MS-DOS operating system files. If the files are part of a .zip archive, then click on the button **From .zip file**. If the files are stored in a directory on the hard drive, then click on the button **From folder**.
6. In the **B&R upgrade** text box, it is also possible to enter the path to the .zip file for the B&R upgrade disk and select the file.
7. Click on the **Start action** button in the toolbar.

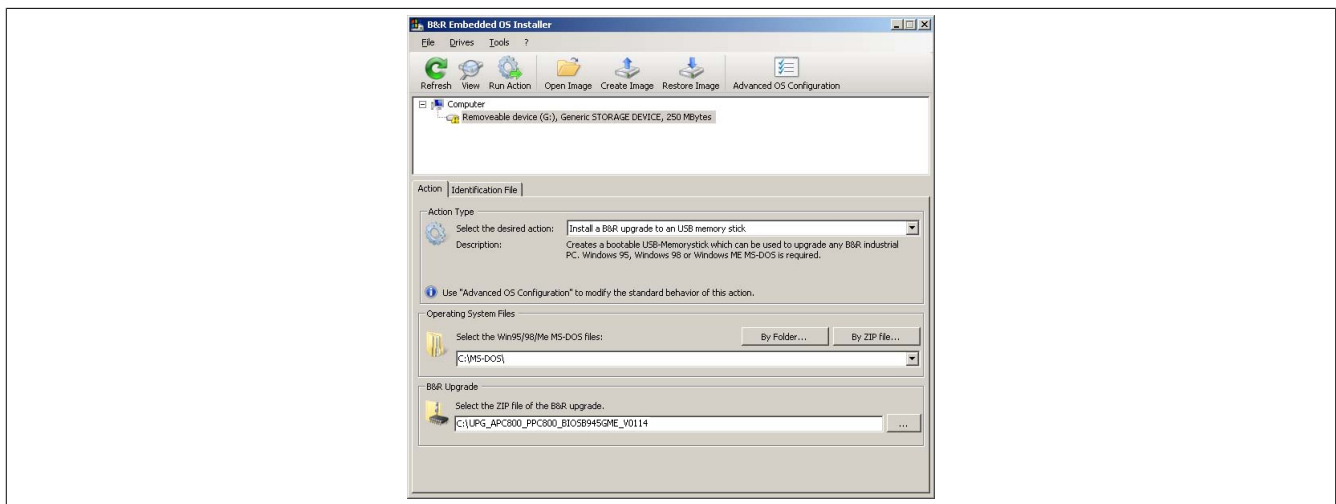


Figure 154: Creating a USB flash drive for B&R upgrade files

2.4.3 How to access MS-DOS

Information on creating an MS-DOS boot diskette can be found in section see "Creating an MS-DOS boot diskette in Windows XP" on page 282. The files from the diskette are then copied to the hard drive.

2.5 Creating a bootable CompactFlash card for B&R upgrade files

When used in connection with a B&R industrial PC, it is possible to upgrade (e.g. upgrade BIOS) from one of the CompactFlash cards available from B&R. To do this, the CompactFlash card must be prepared accordingly. This is done with the B&R Embedded OS Installer, which can be downloaded at no cost from the B&R website (www.br-automation.com).

2.5.1 Requirements

The following peripherals are required for creating a bootable CompactFlash card:

- CompactFlash card
- B&R Industrial PC
- USB media drive
- B&R Embedded OS Installer (at least V3.10)

2.5.2 Procedure

1. Insert the CompactFlash card in the CF slot on the industrial PC.
2. If the drive list is not refreshed automatically, the list can be updated using the command **Drives > Refresh**.
3. Select the desired CompactFlash card from the drive list.
4. Change to the **Action** tab and select **Install a B&R Update to a CompactFlash card** as the type of action.
5. Enter the path to the MS-DOS operating system files. If the files are part of a .zip archive, then click on the button **From .zip file**. If the files are stored in a directory on the hard drive, then click on the button **From folder**.
6. In the **B&R upgrade** text box, it is also possible to enter the path to the .zip file for the B&R upgrade disk and select the file.
7. Click on the **Start action** button in the toolbar.

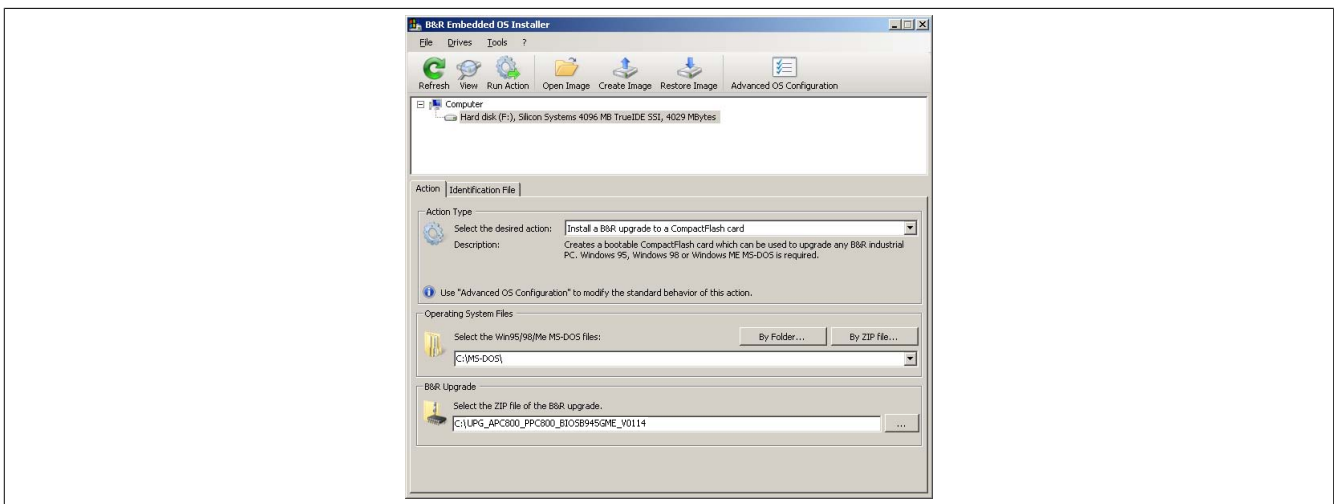


Figure 155: Creating a CompactFlash card for B&R upgrade files

2.5.3 How to access MS-DOS

Information on creating an MS-DOS boot diskette can be found in section see "Creating an MS-DOS boot diskette in Windows XP" on page 282. The files from the diskette are then copied to the hard drive.

2.6 Upgrade problems

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

3 Microsoft DOS

3.1 Order data


| Model number | Short description | Figure |
|---------------|---|---|
| | MS-DOS | |
| 9S0000.01-010 | OEM Microsoft MS-DOS 6.22, German floppy disks, only supplied together with a new PC |  DOS622 English Disk 1- Setup Recovery Disk Only allowed to be used for backup or archiving purposes for B&R automation devices! www.br-automation.com <small>©1983-2000 Microsoft Corporation. All rights reserved.</small> |
| 9S0000.01-020 | OEM Microsoft MS-DOS 6.22, English floppy disks, only supplied together with a new PC | |

Table 243: 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:

- AC97 sound is not supported.
- USB 2.0: only USB 1.1 rates can be achieved.
- A second graphics line (for e.g. extended desktop mode) cannot be used.
- Some "ACPI control" functions in BIOS cannot be used.

3.3 Resolutions and color depths

The following table shows the tested resolutions and color depths on the monitor/panel interface 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 244: 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 245: Tested resolutions and color depths for RGB signals

4 Windows XP Professional

4.1 Order data


| Model number | Short description | Figure |
|-----------------|--|---|
| | Windows XP Professional |  |
| 5SWWXP.0600-ENG | Microsoft OEM Windows XP Professional Service Pack 3, CD, English. Only available with a new device. | |
| 5SWWXP.0600-GER | Microsoft OEM Windows XP Professional Service Pack 3, CD, German. Only available with a new device. | |
| 5SWWXP.0600-MUL | Microsoft OEM Windows XP Professional Service Pack 3, CD, multilingual. Only available with a new device. | |
| 5SWWXP.0500-ENG | Microsoft OEM Windows XP Professional Service Pack 2c, CD, English. Only available with a new device. | |
| 5SWWXP.0500-GER | Microsoft OEM Windows XP Professional Service Pack 2c, CD, German. Only available with a new device. | |
| 5SWWXP.0500-MUL | Microsoft OEM Windows XP Professional Service Pack 2c, CD, multilingual. Only available with a new device. | |

Table 246: 5SWWXP.0600-ENG, 5SWWXP.0600-GER, 5SWWXP.0600-MUL, 5SWWXP.0500-ENG, 5SWWXP.0500-GER, 5SWWXP.0500-MUL - Order data

4.2 Overview

| Model number | Edition | Target system | Chipset | Service Pack | Language | Preinstalled | Memory required on the disk | Minimum amount of RAM |
|-----------------|--------------|---|--|--------------|--------------|--------------|-----------------------------|-----------------------|
| 5SWWXP.0600-ENG | Professional | APC510 APC511 APC620 APC810 APC820 APC910 PPC700 PPC725 PPC800 PP500 | 945GME GM45 QM77/HM76 NM10 US15W | SP3 | English | Optional | ≤ 2.1 GB | 128 MB |
| 5SWWXP.0600-GER | Professional | APC510 APC511 APC620 APC810 APC820 APC910 PPC700 PPC725 PPC800 PP500 | 945GME GM45 QM77/HM76 NM10 US15W | SP3 | German | Optional | ≤ 2.1 GB | 128 MB |
| 5SWWXP.0600-MUL | Professional | APC510 APC511 APC620 APC810 APC820 APC910 PPC700 PPC725 PPC800 PP500 | 945GME GM45 QM77/HM76 NM10 US15W | SP3 | Multilingual | Optional | ≤ 2.1 GB | 128 MB |
| 5SWWXP.0500-ENG | Professional | APC620 APC810 APC820 PPC700 PPC725 PPC800 | 945GME GM45 | SP2c | English | Optional | ≤ 2.1 GB | 128 MB |
| 5SWWXP.0500-GER | Professional | APC620 APC810 APC820 PPC700 PPC725 PPC800 | 945GME GM45 | SP2c | German | Optional | ≤ 2.1 GB | 128 MB |
| 5SWWXP.0500-MUL | Professional | APC620 APC810 APC820 PPC700 PPC725 PPC800 | 945GME GM45 | SP2c | Multilingual | Optional | ≤ 2.1 GB | 128 MB |

4.3 Installation

Upon request, B&R can preinstall the required Windows XP Professional version on the desired mass storage device (e.g. CompactFlash card, etc.). All of the drivers required for operation (graphics, network, etc.) are also installed in this process.

4.3.1 Installation on a PCI SATA RAID controller - 5ACPCI.RAIC-03, 5ACPCI.RAIC-05, 5ACPCI.RAIC-06

The following steps are necessary to install Windows XP Professional on a PCI SATA RAID controller:

1. Download the RAID driver from the B&R website www.br-automation.com and copy the files to a diskette.
2. Connect the media drive (5MD900.USB2-01 or 5MD900.USB2-00) to the USB port.
3. Insert the diskette and Windows XP Professional CD in the media drive and boot from the CD.
4. Press the F6 key during installation to install a third-party SCSI or driver.
5. Press the "s" key when asked about installing an additional drive. Insert the diskette into the floppy drive. Press "Enter" and select the driver.
6. Follow the installation instructions.
7. The installer will copy the files to the Windows XP Professional folder and restart the Automation PC 810.

4.3.2 For variants with 5 PCI slots

The following steps are necessary when installing to a slide-in HDD being operated in slide-in slot 2 (located behind the PCI to SATA bridge) on the APC810:

1. Download the Si3531 SATA 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 or 5MD900.USB2-00) to the USB port.
3. Insert the diskette and Windows XP Professional CD in the media drive and boot from the CD.
4. Press the F6 key during installation to install a third-party SCSI or driver.
5. Press the "s" key when asked about installing an additional drive. Insert the diskette into the floppy drive. Press "Enter" and select the driver.
6. Follow the installation instructions.
7. The installer will copy the files to the Windows XP Professional folder and restart the Automation PC 810.

Information:

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

4.4 Drivers

Current drivers for all approved operating systems are available in the Downloads section of the B&R website www.br-automation.com.

Information:

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

5 Windows 7

5.1 General information

Windows® 7 offers a wealth of innovative features and performance improvements. The 64-bit variants can also exploit the full power of current PC architectures. Faster switching to power saving mode, quicker restores, less memory usage and high-speed detection of USB devices are just a few of the advantages provided by Windows® 7. Both English and German are available in Windows® 7 Professional, while Windows® 7 Ultimate supports up to 35 different languages (up to 36 languages in Service Pack 1). Product activation is not necessary on B&R PCs, which is a huge advantage for simple logistical procedures relating to machine automation.

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

5.2 Order data


| Model number | Short description | Figure |
|-----------------|---|---|
| | Windows 7 Professional/Ultimate |  |
| 5SWWI7.0100-ENG | Microsoft OEM Windows 7 Professional 32-bit, DVD, English. Only available with a new device. | |
| 5SWWI7.1100-ENG | Microsoft OEM Windows 7 Professional 32-bit, Service Pack 1, DVD, English. Only available with a new device. | |
| 5SWWI7.0100-GER | Microsoft OEM Windows 7 Professional 32-bit, DVD, German. Only available with a new device. | |
| 5SWWI7.1100-GER | Microsoft OEM Windows 7 Professional 32-bit, Service Pack 1, DVD, German. Only available with a new device. | |
| 5SWWI7.0300-MUL | Microsoft OEM Windows 7 Ultimate 32-bit, DVD, multilingual. Only available with a new device. | |
| 5SWWI7.1300-MUL | Microsoft OEM Windows 7 Ultimate 32-bit, Service Pack 1, DVD, multilingual. Only available with a new device. | |
| 5SWWI7.0200-ENG | Microsoft OEM Windows 7 Professional 64-bit, DVD, English. Only available with a new device. | |
| 5SWWI7.1200-ENG | Microsoft OEM Windows 7 Professional 64-bit, Service Pack 1, DVD, English. Only available with a new device. | |
| 5SWWI7.0200-GER | Microsoft OEM Windows 7 Professional 64-bit, DVD, German. Only available with a new device. | |
| 5SWWI7.1200-GER | Microsoft OEM Windows 7 Professional 64-bit, Service Pack 1, DVD, German. Only available with a new device. | |
| 5SWWI7.0400-MUL | Microsoft OEM Windows 7 Ultimate 64-bit, DVD, multilingual. Only available with a new device. | |
| 5SWWI7.1400-MUL | Microsoft OEM Windows 7 Ultimate 64-bit, Service Pack 1, DVD, multilingual. Only available with a new device. | |

Table 247: 5SWWI7.0100-ENG, 5SWWI7.1100-ENG, 5SWWI7.0100-GER, 5SWWI7.1100-GER, 5SWWI7.0300-MUL, 5SWWI7.1300-MUL, 5SWWI7.0200-ENG, 5SWWI7.1200-ENG, 5SWWI7.0200-GER, 5SWWI7.1200-GER, 5SWWI7.0400-MUL, 5SWWI7.1400-MUL - Order data

5.3 Overview

| Model number | Edition | Target system | Chipset | Service Pack | Architecture | Language | Preinstalled | Minimum size of the disk | Minimum amount of RAM |
|-----------------|--------------|---|--|--------------|--------------|----------|--------------|--------------------------|-----------------------|
| 5SWWI7.0100-ENG | Professional | APC510 APC511 APC810 APC910 PPC800 PP500 | 945GME GM45 QM77/HM76 US15W | | 32-bit | English | Optional | 16 GB | 1 GB |
| 5SWWI7.1100-ENG | Professional | APC510 APC511 APC810 APC910 PPC800 PP500 | 945GME GM45 QM77/HM76 NM10 US15W | SP1 | 32-bit | English | Optional | 16 GB | 1 GB |
| 5SWWI7.0100-GER | Professional | APC510 APC511 APC810 APC910 PPC800 PP500 | 945GME GM45 QM77/HM76 US15W | | 32-bit | German | Optional | 16 GB | 1 GB |
| 5SWWI7.1100-GER | Professional | APC510 APC511 APC810 APC910 PPC800 PP500 | 945GME GM45 QM77/HM76 NM10 US15W | SP1 | 32-bit | German | Optional | 16 GB | 1 GB |

| Model number | Edition | Target system | Chipset | Service Pack | Architecture | Language | Preinstalled | Minimum size of the disk | Minimum amount of RAM |
|-----------------|--------------|---|--|--------------|--------------|--------------|--------------|--------------------------|-----------------------|
| 5SWWI7.0300-MUL | Ultimate | APC510 APC511 APC810 APC910 PPC800 PP500 | 945GME GM45 QM77/HM76 US15W | | 32-bit | Multilingual | Optional | 16 GB ¹⁾ | 1 GB |
| 5SWWI7.1300-MUL | Ultimate | APC510 APC511 APC810 APC910 PPC800 PP500 | 945GME GM45 QM77/HM76 NM10 US15W | SP1 | 32-bit | Multilingual | Optional | 16 GB ¹⁾ | 1 GB |
| 5SWWI7.0200-ENG | Professional | APC810 APC910 PPC800 | 945GME Intel® Core™2 Duo GM45 QM77/HM76 | | 64-bit | English | Optional | 20 GB | 2 GB |
| 5SWWI7.1200-ENG | Professional | APC810 APC910 PPC800 | 945GME Intel® Core™2 Duo GM45 QM77/HM76 | SP1 | 64-bit | English | Optional | 20 GB | 2 GB |
| 5SWWI7.0200-GER | Professional | APC810 APC910 PPC800 | 945GME Intel® Core™2 Duo GM45 QM77/HM76 | | 64-bit | German | Optional | 20 GB | 2 GB |
| 5SWWI7.1200-GER | Professional | APC810 APC910 PPC800 | 945GME Intel® Core™2 Duo GM45 QM77/HM76 | SP1 | 64-bit | German | Optional | 20 GB | 2 GB |
| 5SWWI7.0400-MUL | Ultimate | APC810 APC910 PPC800 | 945GME Intel® Core™2 Duo GM45 QM77/HM76 | | 64-bit | Multilingual | Optional | 20 GB ¹⁾ | 2 GB |
| 5SWWI7.1400-MUL | Ultimate | APC810 APC910 PPC800 | 945GME Intel® Core™2 Duo GM45 QM77/HM76 | SP1 | 64-bit | Multilingual | Optional | 20 GB ¹⁾ | 2 GB |

1) The memory used by additional language packs is not taken into account in the minimum size of the disk.

5.4 Installation

Upon request, B&R can preinstall the required Windows 7 version on the desired mass storage device (e.g. CompactFlash card, etc.). All of the drivers required for operation (graphics, network, etc.) are also installed in this process.

5.4.1 Installation on a PCI SATA RAID controller - 5ACPCI.RAIC-03, 5ACPCI.RAIC-05, 5ACPCI.RAIC-06

The following steps are necessary for installing Windows 7 on the PCI SATA RAID controller:

1. Download the RAID driver for Windows 7 from the B&R website at www.br-automation.com and copy the data to a folder on a USB flash drive.
2. Boot using the Windows 7 DVD.
3. Follow the installation steps until a page appears asking "Where do you want to install Windows?".
4. Plug the USB flash drive with the RAID drivers into an available USB port.
5. Click on "Load driver" and navigate to the directory containing the RAID drivers. Then click Next to continue.
6. Remove the USB flash drive.
7. The Windows 7 installation can now be performed as usual.

5.4.2 For variants with 5 PCI slots

The following steps are necessary when installing to a slide-in HDD being operated in the slide-in slot 2 (located behind the PCI to SATA Bridge) on the APC810:

1. Download the SiI3531 SATA driver for Windows 7 from the B&R website at www.br-automation.com and copy the data to a folder on a USB flash drive.
2. Boot using the 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 changed in BIOS.

5.5 Special considerations, limitations

- Windows 7 does not contain a Beep.sys file, which means that an audible signal is no longer sounded (e.g. when pressing a key).
- There is currently no support for the Windows 7 system rating (although this does not apply to PP500, APC510, APC511, APC910 or PPC800 devices with an NM10 chipset).

5.6 Drivers

Current drivers for all approved operating systems are available in the Downloads section of the B&R website www.br-automation.com.

Information:

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

6 Windows XP Embedded

6.1 General information

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

6.2 Order data


| Model number | Short description | Figure |
|-----------------|---|---|
| | Windows XP Embedded |  |
| 5SWWXP.0426-ENG | Microsoft OEM Windows XP Embedded Feature Pack 2007, English; for APC810 with 945GME chipset; order CompactFlash separately (at least 512 MB) | |
| | Required accessories | |
| | CompactFlash | |
| 5CFCRD.016G-06 | CompactFlash 16 GB B&R (SLC) | |
| 5CFCRD.0512-03 | CompactFlash 512 MB Western Digital (SLC) | |
| 5CFCRD.1024-03 | CompactFlash 1 GB Western Digital (SLC) | |
| 5CFCRD.1024-06 | CompactFlash 1 GB B&R (SLC) | |
| 5CFCRD.2048-03 | CompactFlash 2 GB Western Digital (SLC) | |
| 5CFCRD.2048-06 | CompactFlash 2 GB B&R (SLC) | |
| 5CFCRD.4096-03 | CompactFlash 4 GB Western Digital (SLC) | |
| 5CFCRD.4096-06 | CompactFlash 4 GB B&R (SLC) | |
| 5CFCRD.8192-03 | CompactFlash 8 GB Western Digital (SLC) | |
| 5CFCRD.8192-06 | CompactFlash 8 GB B&R (SLC) | |

Table 248: 5SWWXP.0426-ENG - Order data

6.3 Overview

| Model number | Target system | Chipset | Language | Preinstalled | Minimum size of the disk | Minimum amount of RAM |
|-----------------|---------------|---------|----------|--------------|--------------------------|-----------------------|
| 5SWWXP.0426-ENG | APC810 | 945GME | English | Yes | 512 MB | 128 MB |

6.4 Features with FP2007 (Feature Pack 2007)

The feature list shows the most important device functions in Windows XP Embedded with Feature Pack 2007 (FP2007).

| Function | Present |
|--------------------------------------|--------------|
| Enhanced Write Filter (EWF) | ✓ |
| File Based Write Filter | ✓ |
| Administrator accounts | ✓ |
| User accounts | Configurable |
| Explorer shell | ✓ |
| Registry filter | ✓ |
| Internet Explorer 6.0 + SP2 | ✓ |
| Internet information service (IIS) | - |
| Terminal service | ✓ |
| Windows Firewall | ✓ |
| MSN Explorer | - |
| Outlook Express | - |
| Administrative Tools | ✓ |
| Remote Desktop | ✓ |
| Remote Assistance | - |
| .NET Framework | - |
| ASP.NET | - |
| Codepages / User locales / Keyboards | ✓ |
| Disk Management Service | ✓ |
| Windows Installer Service | ✓ |
| Class Installer | ✓ |
| CoDevice Installer | ✓ |
| Media Player | - |
| DirectX | - |
| Accessories | ✓ |
| Number of fonts | 89 |

Table 249: Device functions in Windows XP Embedded with FP2007

6.5 Installation

Upon request, Windows XP Embedded can be preinstalled by B&R on a suitable CompactFlash card (min. 512 MB). The system is then automatically configured when it is switched on for the first time. This procedure takes approximately 30 minutes, with the device being rebooted a number of times.

6.6 Drivers

All drivers required for operation are preinstalled along with the operating system. If an older version of the driver is still being used, the latest version can be downloaded and installed from the B&R website (www.br-automation.com). It is important that Enhanced Write Filter (EWF) is disabled for this.

6.6.1 Touch screen driver

The touch screen driver must be manually installed in order to operate Automation Panel 800 or Automation Panel 900 touch screen devices. The driver is available in the Downloads section of the B&R website (www.br-automation.com). Be sure to check that the "Enhanced Write Filter (EWF)" is enabled.

Information:

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

7 Windows Embedded Standard 2009

7.1 General information

Windows® Embedded Standard 2009 is the modular version of Windows® XP Professional. It is used if XP applications should be executed with a minimal operating system size. Together with CompactFlash memory, Windows® Embedded Standard 2009 makes it possible to use the Microsoft desktop operating system in harsh 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 problems even after an unexpected power failure. B&R offers complete images for industrial PCs, Power Panel and Mobile Panel devices to make the transition to Windows® Embedded Standard 2009 as easy as possible. In addition to Windows® Embedded Standard 2009, the standard Windows® XP Professional operating system is also available in English, German and a multilingual version.

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

7.2 Order data


| Model number | Short description | Figure |
|-----------------|---|---|
| | Windows Embedded Standard 2009 |  |
| 5SWWXP.0726-ENG | Microsoft OEM Windows Embedded Standard 2009, English; for APC810 with 945GME chipset; order CompactFlash separately (at least 1 GB). | |
| | Required accessories | |
| | CompactFlash | |
| 5CFCRD.016G-06 | CompactFlash 16 GB B&R (SLC) | |
| 5CFCRD.032G-06 | CompactFlash 32 GB B&R (SLC) | |
| 5CFCRD.1024-06 | CompactFlash 1 GB B&R (SLC) | |
| 5CFCRD.2048-06 | CompactFlash 2 GB B&R (SLC) | |
| 5CFCRD.4096-06 | CompactFlash 4 GB B&R (SLC) | |
| 5CFCRD.8192-06 | CompactFlash 8 GB B&R (SLC) | |

Table 250: 5SWWXP.0726-ENG - Order data

7.3 Overview

| Model number | Target system | Chipset | Language | Preinstalled | Minimum size of the disk | Minimum amount of RAM |
|-----------------|---------------|---------|----------|--------------|--------------------------|-----------------------|
| 5SWWXP.0726-ENG | APC810 | 945GME | English | Yes | 1 GB | 256 MB |

7.4 Features with WES2009 (Windows Embedded Standard 2009)

The following list of features shows the most important device functions included in Windows Embedded Standard 2009.

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

Table 251: Device functions in Windows Embedded Standard 2009

| Function | Present |
|--------------------------------------|---------|
| Local network bridge | ✓ |
| Codepages / User locales / Keyboards | ✓ |
| Disk Management Service | ✓ |
| Windows Installer Service | ✓ |
| Class Installer | ✓ |
| CoDevice Installer | ✓ |
| Media Player 6.4 | ✓ |
| DirectX 9.0c | ✓ |
| Accessories | ✓ |
| Number of fonts | 89 |

Table 251: Device functions in Windows Embedded Standard 2009

7.5 Installation

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

7.6 Drivers

All drivers required for operation are preinstalled along with the operating system. If an older version of the driver is still being used, the latest version can be downloaded and installed from the B&R website (www.br-automation.com). It is important that Enhanced Write Filter (EWF) is disabled for this.

7.6.1 Touch screen driver

In order to operate Automation Panel 800 or Automation Panel 900 touch screen devices, the touch screen driver must be installed manually or the touch screen interface updated in the device manager. The driver is available in the Downloads section of the B&R website (www.br-automation.com). It is important that Enhanced Write Filter (EWF) is enabled for this.

Information:

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

8 Windows Embedded Standard 7

8.1 General information

The successor to Windows® XP Embedded is Windows® Embedded Standard 7. As with previous versions, this embedded operating system offers full system support for B&R Industrial PCs. In addition to brand new features that are also included in Windows® 7 Professional, Windows® Embedded Standard 7 includes embedded components such as Enhanced Write Filter, File-Based Write Filter, Registry Filter and USB Boot. Windows® Embedded Standard 7 is available in two different versions. The main difference between them has to do with multilingual support. Windows® Embedded Standard 7 is only available in a single language, whereas Windows® Embedded Standard 7 Premium supports the installation of several languages simultaneously.

With Windows® Embedded Standard 7, Microsoft has made substantial improvements in the area of security. The AppLocker program, available in the premium version, can prevent the execution of unknown or potentially undesired applications that are being installed over a network or from drives that are directly connected. A tiered approach allows the differentiation between scripts (.ps1, .bat, .cmd, .vbs and .js), installation files (.msi, .msp) and libraries (.dll, .ocx). AppLocker can also be configured to record undesired activity and display it in the Event Viewer. Windows® Embedded Standard 7 is available in both a 32-bit and 64-bit version.⁵⁾ This ensures that even the most demanding applications have the level of support they need.

8.2 Order data


| Model number | Short description | Figure |
|-----------------|--|---|
| | Windows Embedded Standard 7 |  |
| 5SWWI7.1526-ENG | Microsoft OEM Windows Embedded Standard 7 32-bit, Service Pack 1, English; for APC810 with 945GME chipset; order CompactFlash separately (at least 16 GB) | |
| 5SWWI7.1626-ENG | Microsoft OEM Windows Embedded Standard 7 64-bit, Service Pack 1, English; for APC810 with 945GME chipset; order CompactFlash separately (at least 16 GB) | |
| 5SWWI7.1726-MUL | Microsoft OEM Windows Embedded Standard 7 Premium 32-bit, Service Pack 1, multilingual; for APC810 with 945GME chipset; order CompactFlash separately (at least 16 GB) | |
| 5SWWI7.1826-MUL | Microsoft OEM Windows Embedded Standard 7 Premium 64-bit, Service Pack 1, multilingual; for APC810 with 945GME chipset; order CompactFlash separately (at least 16 GB) | |
| | Required accessories | |
| | CompactFlash | |
| 5CFCRD.016G-06 | CompactFlash 16 GB B&R (SLC) | |
| 5CFCRD.032G-06 | CompactFlash 32 GB B&R (SLC) | |
| | Optional accessories | |
| | Windows Embedded Standard 7 | |
| 5SWWI7.1900-MUL | Microsoft OEM Windows Embedded Standard 7 32-bit, Service Pack 1, Language Pack DVD | |
| 5SWWI7.2000-MUL | Microsoft OEM Windows Embedded Standard 7 64-bit, Service Pack 1, Language Pack DVD | |

Table 252: 5SWWI7.1526-ENG, 5SWWI7.1626-ENG, 5SWWI7.1726-MUL, 5SWWI7.1826-MUL - Order data

⁵⁾ 64-bit versions are not supported by all systems

8.3 Overview

| Model number | Edition | Target sys-tem | Chipset | Service Pack | Architec-ture | Language | Preinstalled | Minimum size of the disk | Minimum amount of RAM |
|-----------------|----------|----------------|-----------------------------|--------------|---------------|--------------|--------------|--------------------------|-----------------------|
| 5SWWI7.1526-ENG | Embedded | APC810 | 945GME | SP1 | 32-bit | English | Optional | 16 GB | 1 GB |
| 5SWWI7.1626-ENG | Embedded | APC810 | 945GME Intel® Core™2 Duo | SP1 | 64-bit | English | Optional | 16 GB | 2 GB |
| 5SWWI7.1726-MUL | Premium | APC810 | 945GME | SP1 | 32-bit | Multilingual | Optional | 16 GB ¹⁾ | 1 GB |
| 5SWWI7.1826-MUL | Premium | APC810 | 945GME Intel® Core™2 Duo | SP1 | 64-bit | Multilingual | Optional | 16 GB ¹⁾ | 2 GB |

1) The memory used by additional language packs is not taken into account in the minimum size of the disk.

8.4 Features with WES7 (Windows Embedded Standard 7)

The following list of features shows the most important device functions included in Windows Embedded Standard 7.

| Function | Windows Embedded Standard 7 | Windows Embedded Standard 7 Premium |
|---|-----------------------------|-------------------------------------|
| Enhanced Write Filter (EWF) | ✓ | ✓ |
| File-Based Write Filter (FBWF) | ✓ | ✓ |
| Administrator accounts | ✓ | ✓ |
| User accounts | Configurable | Configurable |
| Windows Explorer shell | ✓ | ✓ |
| Registry filter | ✓ | ✓ |
| Internet Explorer 8.0 | ✓ | ✓ |
| Internet Information Service (IIS) 7.0 | ✓ | ✓ |
| Anti-malware (Windows Defender) | - | ✓ |
| Add-ons (Snipping Tool, Sticky Notes) | - | ✓ |
| Windows Firewall | ✓ | ✓ |
| .NET Framework 3.5 | ✓ | ✓ |
| 32-bit and 64-bit | ✓ | ✓ |
| Remote Desktop Protocol 7.0 | ✓ | ✓ |
| File Compression Utility | ✓ | ✓ |
| Windows Installer Service | ✓ | ✓ |
| Windows XP mode | - | - |
| Media Player 12 | ✓ | ✓ |
| DirectX | ✓ | ✓ |
| Multilingual user interface packs in the same image | - | ✓ |
| International components and language services | ✓ | ✓ |
| Language pack setup | ✓ | ✓ |
| Windows Update | Configurable | Configurable |
| Windows PowerShell 2.0 | ✓ | ✓ |
| BitLocker | - | ✓ |
| AppLocker | - | ✓ |
| Tablet PC support | - | ✓ |
| Windows Touch | - | ✓ |
| Boot from USB flash drive | ✓ | ✓ |
| Accessories | ✓ | ✓ |
| Page file | Configurable | Configurable |
| Number of fonts | 134 | 134 |

Table 253: Device functions in Windows Embedded Standard 7

8.5 Installation

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

Information:

If the EWF should be used, all mass storage devices should be disconnected from the system during installation oder SYSPREP (except for the boot drive). It is also possible to disable additional mass storage devices in BIOS.

8.6 Drivers

All drivers required for operation are preinstalled along with the operating system. If an older version of the driver is still being used, the latest version can be downloaded and installed from the B&R website (www.br-automation.com). It is important that Enhanced Write Filter (EWF) is disabled for this.

8.6.1 Touch screen driver

A touch screen driver will be installed automatically if a touch controller is detected during the Windows Embedded Standard 7 installation. If a touch controller is not detected during Windows Embedded Standard 7 installation, or if an Automation Panel 800 / 900 is connected at a later time, then the touch screen driver needs to be installed manually or the additional touch screen interface must be selected in the touch screen settings in the Windows Control Panel. The driver is available in the Downloads section of the B&R website (www.br-automation.com). It is important that both the Enhanced Write Filter (EWF) and the File Based Write Filter (FBWF) are disabled for this.

Information:

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

9 Windows CE

9.1 General information

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

9.2 Order data


| Model number | Short description | Figure |
|-----------------|--|---|
| 5SWWCE.0826-ENG | Microsoft OEM Windows CE 6.0 Professional, English; for APC810 with 945GME chipset; order CompactFlash separately (at least 128 MB). |  |
| | Required accessories | |
| | CompactFlash | |
| 5CFCRD.0128-03 | CompactFlash 128 MB Western Digital (SLC) | |
| 5CFCRD.016G-06 | CompactFlash 16 GB B&R (SLC) | |
| 5CFCRD.0256-03 | CompactFlash 256 MB Western Digital (SLC) | |
| 5CFCRD.0512-03 | CompactFlash 512 MB Western Digital (SLC) | |
| 5CFCRD.1024-03 | CompactFlash 1 GB Western Digital (SLC) | |
| 5CFCRD.1024-06 | CompactFlash 1 GB B&R (SLC) | |
| 5CFCRD.2048-03 | CompactFlash 2 GB Western Digital (SLC) | |
| 5CFCRD.2048-06 | CompactFlash 2 GB B&R (SLC) | |
| 5CFCRD.4096-03 | CompactFlash 4 GB Western Digital (SLC) | |
| 5CFCRD.4096-06 | CompactFlash 4 GB B&R (SLC) | |
| 5CFCRD.8192-03 | CompactFlash 8 GB Western Digital (SLC) | |
| 5CFCRD.8192-06 | CompactFlash 8 GB B&R (SLC) | |

Table 254: 5SWWCE.0826-ENG - Order data

9.3 Overview

| Model number | Target system | Chipset | Language | Preinstalled | Minimum size of the disk | Minimum amount of RAM |
|-----------------|---------------|---------|----------|--------------|--------------------------|-----------------------|
| 5SWWCE.0826-ENG | APC810 | 945GME | English | Yes | 128 MB | 128 MB |

9.4 Windows CE 6.0 features

Detailed information about Windows CE for B&R devices is available in the Downloads section of the B&R website (www.br-automation.com).

| Features | Windows CE 6.0 |
|--|---|
| Supported screen resolutions | VGA (TFT), SVGA (TFT), XGA (TFT) |
| Chipset | Intel 945GME |
| Color depth | 16-bit or 65,536 colors ¹⁾ |
| Graphics card driver | Intel(R) embedded graphics driver |
| Main memory | Automatic detection and use of up to 512 MB RAM |
| Boot time / Startup time | Approx. 25 seconds |
| Screen rotation | Not supported |
| Web browser | Internet Explorer |
| .NET | Compact Framework |
| Image size | Approx. 38 MB ²⁾ , uncompressed |
| Custom keys | Supported |
| PVI | Supported |
| Automation Device Interface | Supported |
| Remote Desktop Protocol for thin clients | Supported |
| B&R VNC Viewer | Supported |
| B&R Task Manager | Supported |
| B&R Picture Viewer | Supported |
| Compatible with zenOn | Yes |
| Compatible with Wonderware | No |
| Serial interfaces for any use | 3 |
| DirectX | No |
| Audio ports | "Line OUT" and "MIC" are supported. "Line IN" is not supported. |

Table 255: Windows CE 6.0 features

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

9.5 Requirements

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

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

9.6 Installation

Windows CE is usually preinstalled at B&R.

9.7 B&R Embedded OS Installer

The B&R Embedded OS Installer makes it possible to install existing B&R Windows CE images. The 4 files NK.BIN, BLDR, LOGOXRES.BMP and LOGOQVGA.BMP must be available from an already functioning B&R Windows CE installation.

The B&R Embedded OS Installer is available in the Downloads section of the B&R website (www.br-automation.com). Additional information is available in the online help documentation for the B&R Embedded OS Installer.

10 Automation Runtime

10.1 General information

An integral component of Automation Studio is the real-time operating system, which makes up the software kernel that 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
- Easy portability of applications between B&R target systems
- Deterministic behavior guaranteed by cyclic runtime system
- Multitasking according to deterministic runtime rules
- Configuration of priorities, time classes and jitter tolerance
- Up to eight different time classes with any number of subroutines
- Guaranteed response to time and jitter tolerance violations
- Exception handling
- Configurable jitter tolerance in all task classes
- Support for all relevant programming languages, including 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 (the hardware where Automation Runtime is installed). It allows application programs to access I/O systems (e.g. via fieldbus) and other devices (interfaces, networks, etc.).

10.2 Order data


| Model number | Short description | Figure |
|--------------|--|---|
| | Automation Runtime |  |
| 1A4600.10 | B&R Automation Runtime ARwin, incl. license sticker and copy protection | |
| 1A4600.10-2 | B&R Automation Runtime ARwin, ARNC0 | |
| 1A4600.10-3 | B&R Automation Runtime ARwin+PVIControls incl. license sticker and copy protection | |
| 1A4600.10-4 | B&R Automation Runtime ARwin+ARNC0+PVIControls | |
| 1A4601.06 | B&R Automation Runtime ARemb, incl. license sticker and copy protection | |
| 1A4601.06-2 | B&R Automation Runtime ARemb, ARNC0 | |

Table 256: 1A4600.10, 1A4600.10-2, 1A4600.10-3, 1A4600.10-4, 1A4601.06, 1A4601.06-2 - Order data

10.3 Automation Runtime Windows (ARwin)

System support is provided by ARwin with an AS 2.7 / AR 2.xx upgrade.

10.4 Automation Runtime Embedded (ARemb)

System support is provided by ARemb with an AS 3.0.90 / AR 4.00 upgrade.

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

The ADI (Automation Device Interface) enables access to specific functions on B&R devices. Settings for devices can be read and configured using the B&R Control Center applet in the Control Panel.

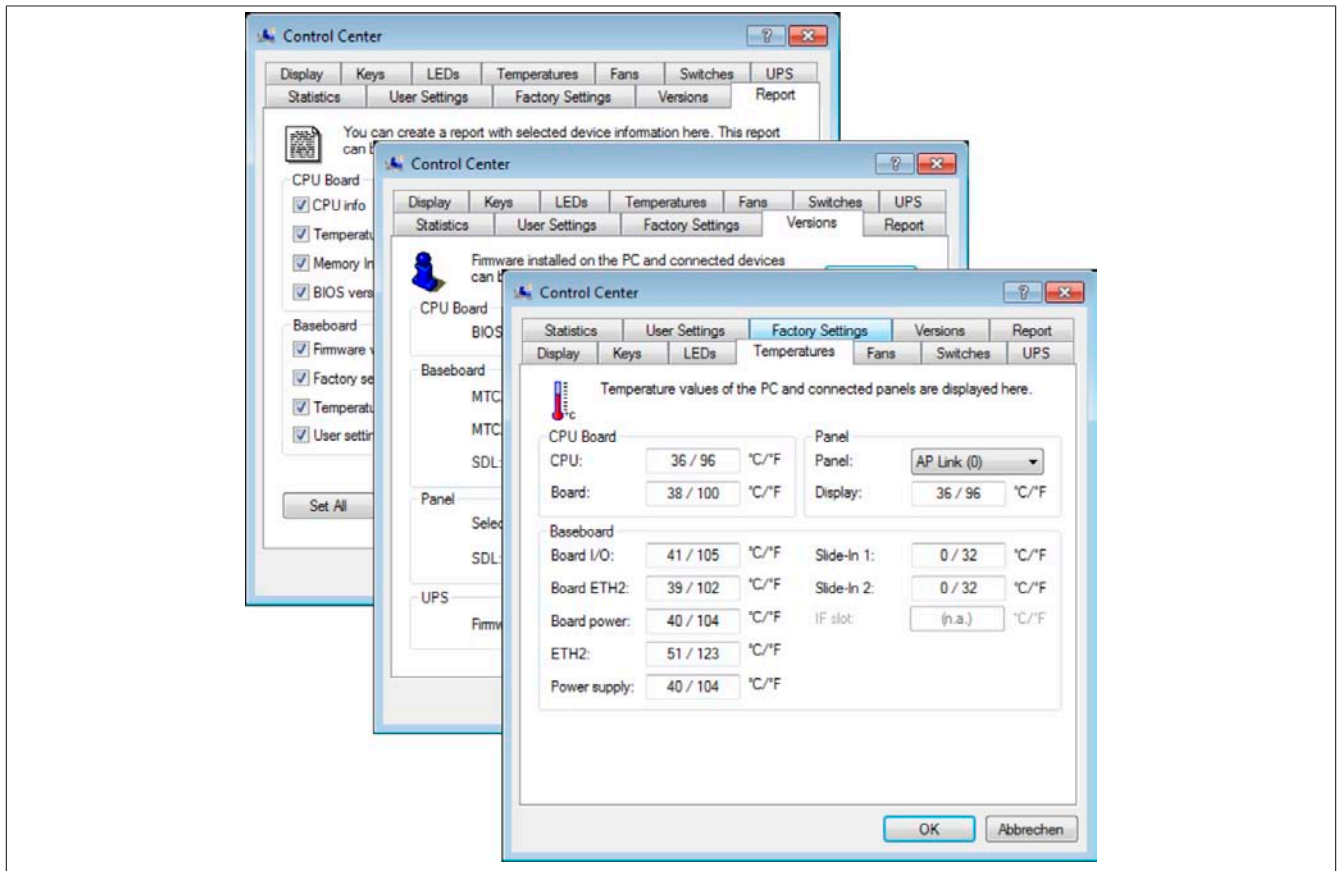


Figure 156: ADI Control Center screenshots - Examples

Information:

The temperature and voltage values (e.g. CPU temperature, core voltage, battery voltage) shown in the corresponding ADI window represent uncalibrated values for informational purposes. They cannot be used to draw any conclusions about hardware alarms or error conditions. The hardware components used have automatic diagnostic functions that can be applied in the event of error.

11.1 Functions

Information:

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

- Changing display-specific parameters
- Reading device-specific keys
- Updating the key configuration
- Enabling device-specific LEDs on a membrane keypad
- Reading and calibrating input devices (e.g. key switches, handwheels, joysticks, potentiometers)
- Reading temperatures, fan speeds, statistical data and switch settings
- Reading operating hours (power-on hours)
- Reading user and factory settings
- Reading software versions
- Updating and backing up BIOS and firmware
- Creating reports about the current system (support assistance)
- Setting the SDL equalizer value when adjusting SDL cables
- Changing the user serial ID

Supports the following systems:

- Automation PC 510
- Automation PC 511
- Automation PC 620
- Automation PC 810
- Automation PC 820
- Automation PC 910
- Panel PC 300
- Panel PC 700
- Panel PC 725
- Panel PC 800
- Power Panel 100/200
- Power Panel 300/400
- Power Panel 500
- Mobile Panel 40/50
- Mobile Panel 100/200
- Connected Automation Panel 800
- Connected Automation Panel 900

11.2 Installation

A detailed description of the Control Center can be found in the integrated online help documentation. The B&R Automation Device Interface (ADI) driver (also contains Control Center) is available in the Downloads section of the B&R website (www.br-automation.com).

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

Information:

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

If a more current ADI driver version exists (see the Downloads section of the B&R website), it can be installed later. It is important that Enhanced Write Filter (EWF) is disabled for this.

11.3 SDL Equalizer settings

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

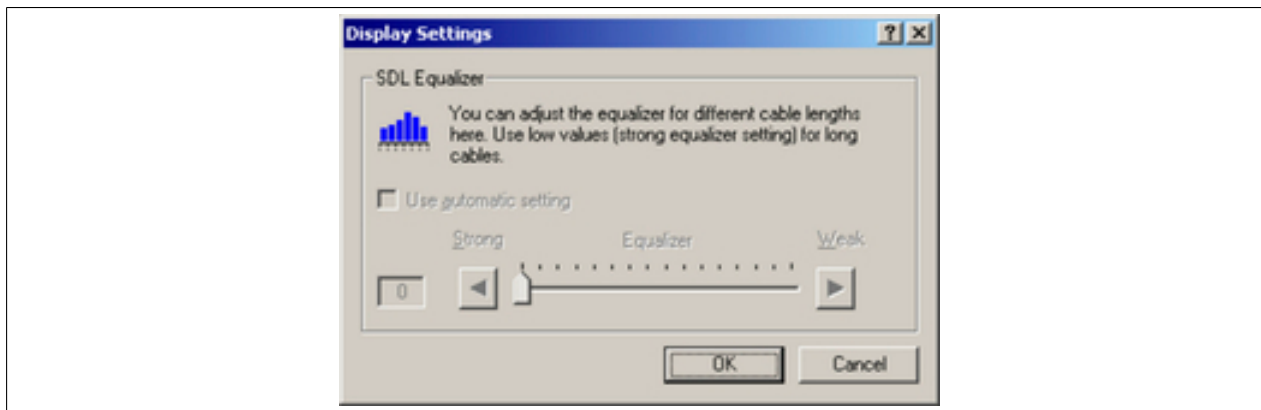


Figure 157: ADI Control Center - SDL Equalizer settings

The settings in this window can be used to configure the SDL Equalizer settings for the display. The equalizer is integrated into Automation Panel devices and adapts the DVI signal to different 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 the event of low-quality cables or poor DVI signal quality).

The optimal value for the cable length is defined by selecting "Use automatic setting".

The equalizer value can only be changed if the function is supported by Automation Panel 900 (Panel firmware version 1.04 or higher).

11.4 UPS configuration

This window displays the status values for an optionally installed B&R add-on UPS and allows the battery settings for the UPS to be edited, updated and backed up. It is also possible to configure the system settings for the UPS.

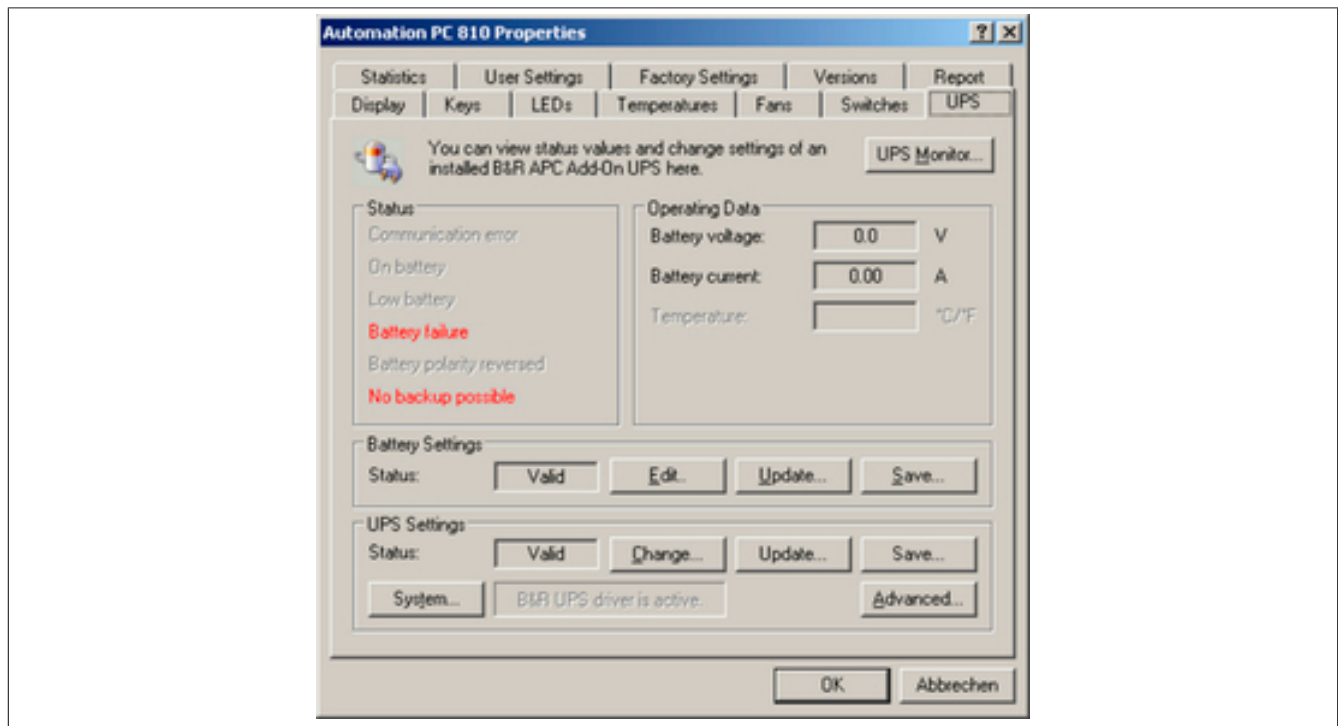


Figure 158: ADI Control Center - UPS settings

Caution!

The installed UPS must be selected and configured in the Power Options section of the Control Panel in order for battery operation to be supported.

Information:

The UPS service is supported in B&R Windows Embedded Version 2.10 and higher.

11.4.1 Installing the UPS service for the B&R add-on UPS

1. Open the **Control Center** in the **Control Panel**.
2. Select the **UPS** tab.
3. Under **UPS settings**, click on **System**. This opens the **Power options** in the Control Panel (**Power options** can also be opened directly from the **Control Panel**).
4. Go to the **UPS** tab and click **Select**.
5. Select "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. The UPS status and details will be displayed after a few seconds.
7. Click **OK**.

The text field next to **System** (on the **UPS** tab in the **Control Center**) also indicates whether the B&R UPS driver is active.

Information:

Administrator rights are required in order to change the energy options or display the UPS status.

11.4.2 Displaying UPS default values

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

The displayed values are updated automatically.

Information:

The status "Reversed battery polarity" is only displayed if using UPS firmware version 1.08 or higher. With UPS firmware versions 1.07 and older, switching between battery operation and normal operation can lead to a communication error.

3. Select "UPS monitor" to display UPS status changes since the last time the system or UPS driver was started.

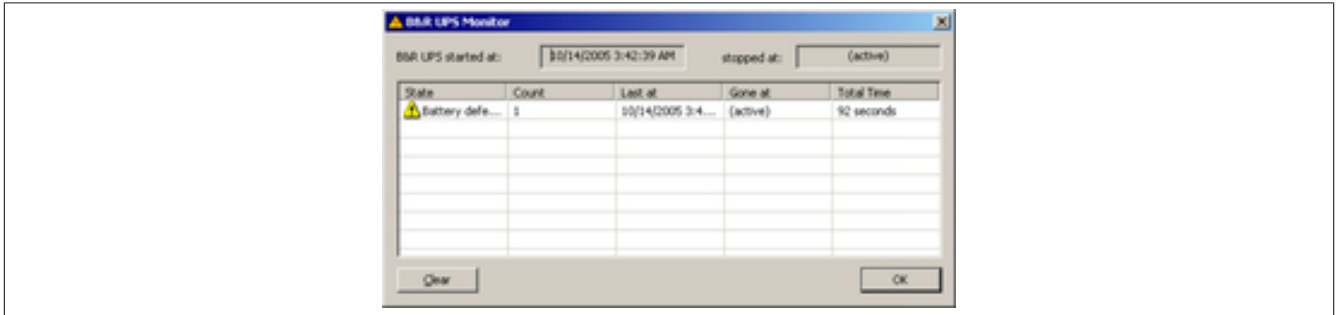


Figure 159: ADI Control Center - UPS monitor

The window is updated automatically when the status changes.

To remove a status from the list, click on **Clear**.

Information:

The current status of the UPS is also displayed on the UPS page in the power options when the UPS service is started in the Windows Control Panel.

Information:

In a German version of Windows XP Professional the battery status is shown as "Low" in the power options even if the battery is OK (Windows error). In an English version, three battery status levels are displayed: unknown, OK and replace. A low battery status is never displayed.

11.4.3 Changing UPS battery settings

1. Open the **Control Center** in the **Control Panel**.
2. Select the **UPS** tab.
3. Under **Battery settings**, click on **Edit**. This opens the "Open" dialog box.
4. Select and **open** the file containing the battery settings.



Figure 160: ADI Control Center - UPS battery settings

This window can be used to change the settings for the UPS battery.

Click **OK** to write the changed settings to the file. The battery settings for the UPS can then be updated with this file.

Information:

To make settings for non-B&R batteries, it is best to make a copy of a file that contains battery settings from B&R under a new name and then adjust the settings in this new 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, service life and deep discharge cycles.
- Service life 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 UPS batteries from B&R.

Information:

To change the current battery settings on the UPS, they must first be saved to a file.

11.4.4 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 canceled by clicking on **Cancel**. "Cancel" is disabled when writing to flash memory.

Information:

- The UPS cannot be operated while the battery settings are being updated.
- 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 UPS communication.

11.4.5 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**. This opens the "Save as" window.
4. Enter a filename or select an existing file and click on **Save**.

Information:

UPS settings can only be saved with UPS firmware version 1.10 and higher.

The transfer can be aborted by clicking on **Cancel** in the Download dialog box.

11.4.6 Configuring UPS system settings

1. Open the **Control Center** in the **Control Panel**.
2. Select the **UPS** tab.
3. Under **UPS settings**, click on **Change**. This opens the following window:

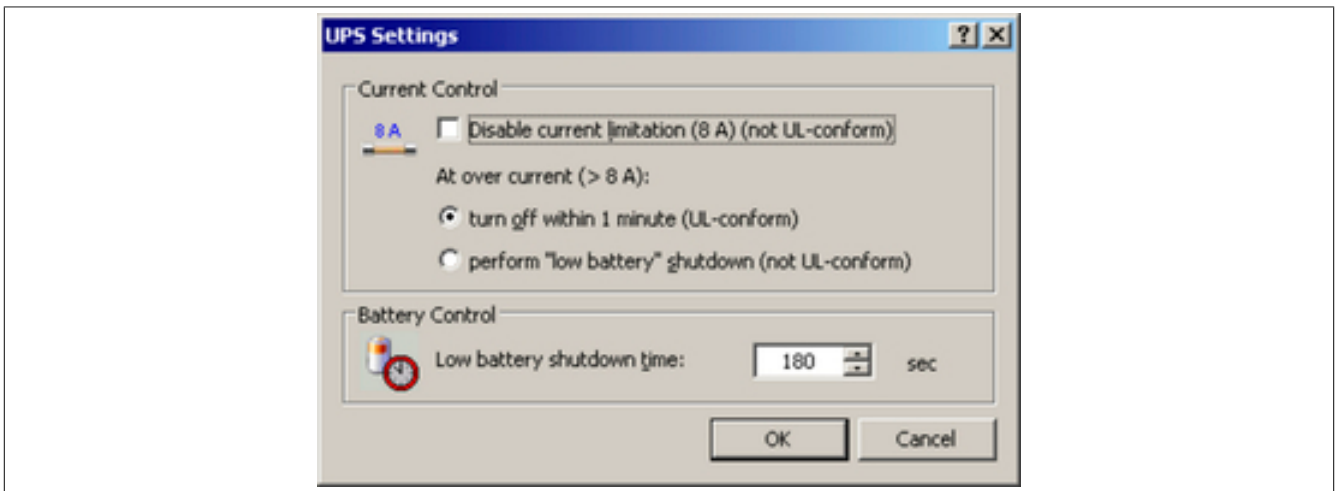


Figure 161: ADI Control Center - UPS settings

Additional information regarding UPS system settings can be found in the Windows help documentation.

Information:

- UPS settings can only be changed with UPS firmware version 1.10 and higher. If there are no modified settings on the UPS, then the factory or default settings are used.
- The UPS is automatically restarted after the UPS settings have been changed. This can cause a brief disruption in communication with the UPS.
- Administrator rights are required in order to change the energy options or display the UPS status.

11.4.6.1 Disabling 8 A current limitation

Information:

It is not UL compliant to switch off the 8 A current limitation on devices during battery operation!

"Low battery" shutdowns caused by overcurrent >8 A on devices running on the battery are not UL compliant!

Select the checkbox **Disable current limitation (8 A)**.

If current limitation is enabled (checkbox not selected), 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 be switched off within one minute 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 be switched off after the defined **Low battery shutdown time**. This will allow the operating system to shut down properly when the UPS service is enabled.

11.4.6.2 Changing the shutdown time of the UPS when the battery is low

Enter the **Low battery shutdown time** in seconds. This is the amount of time that the UPS will wait before shutting off the power supply when the battery level is low.

This prevents the UPS battery from becoming too low if the Windows UPS service is not enabled to have the operating system turn off the UPS.

If the UPS service is enabled, then the UPS will be turned off by the operating system in accordance with the **Shutdown time** UPS service in Windows (see "Changing additional UPS settings" on page 309) when the battery level is low. 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 with UPS firmware version 1.10 and higher. UPS firmware version 1.08 always uses a switch-off delay of 180 seconds. UPS firmware versions older than 1.08 do not shut down automatically when the battery level is low.

11.4.7 Changing additional UPS settings

1. Open the **Control Center** in the **Control Panel**.
2. Select the **UPS** tab.
3. Under **UPS settings**, click on **Advanced**. This opens the following window:

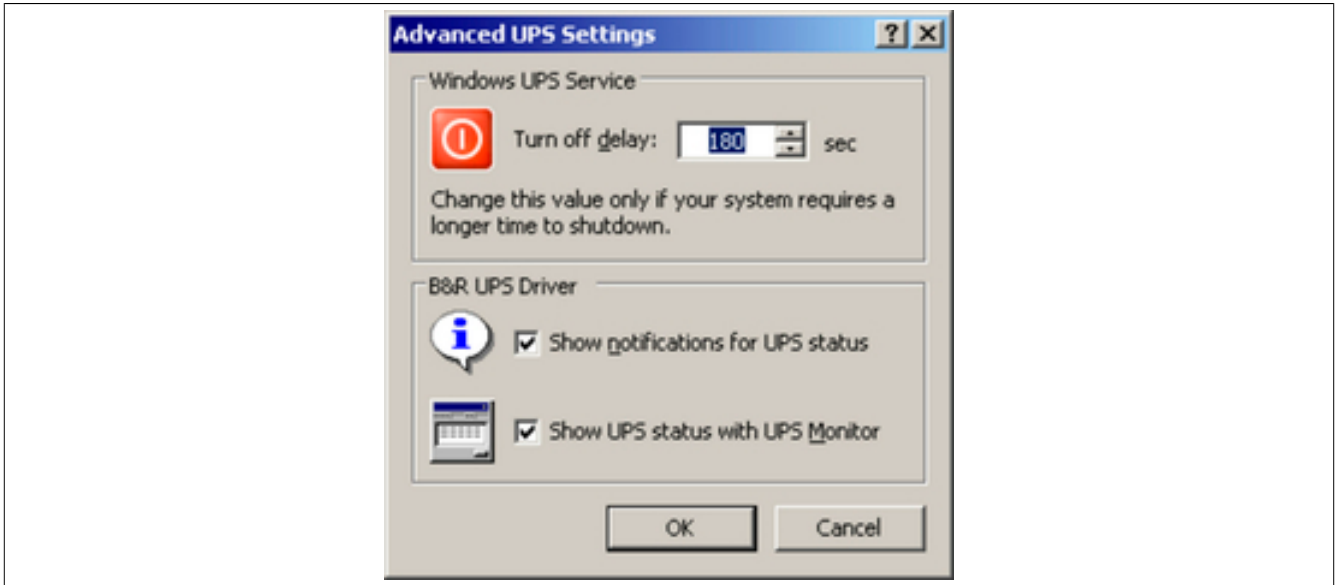


Figure 162: ADI Control Center - Advanced UPS settings

Information:

Administrator rights are required in order to display this window.

11.4.7.1 Changing the UPS shutdown time

The **Turn off delay** can be entered under **Windows UPS service** 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. low battery level), the Windows UPS service will send a shutdown command with the turn off delay time to the UPS and shut down the system.

Information:

This time is evaluated by the Windows UPS Service but cannot be set in the UPS system settings of the power options. This value should only be changed if the system requires longer than the default setting of 180 seconds to shut down.

Caution!

The time entered must be longer than the time required to shut down the operating system.

11.4.7.2 Enabling UPS notifications

Under **B&R UPS driver**, enable the checkbox **Show notifications for UPS status**. 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 notifications if so enabled in the UPS system settings in the power options. These messages are only displayed when the Windows Messenger service⁶⁾ is active and the PC is connected to a network. In addition, some conditions of the B&R add-on UPS are not detected by the Windows UPS Service and therefore do not trigger messages (e.g. when there are no battery settings on the UPS). Windows services can be found by opening the Control Panel and selecting "Services" under "Administrative tools".

If the checkbox **Show UPS status with UPS monitor** is also enabled, a new message is not displayed for every change. Instead, only a general message and request to start the B&R UPS monitor are shown. As long as the UPS monitor is active, no new messages will be displayed.

Information:

Regardless of these options, all changes to the UPS status are logged in the Windows event log (under "Application").

⁶⁾ The Windows Messenger service is supported starting with B&R Windows Embedded version 2.20 and higher.

11.4.8 Procedure following power failure

11.4.8.1 Overcurrent shutdown

If overcurrent >8 A is present during battery operation for a duration of 16 seconds, then an overcurrent shutdown takes place. A switch-off time of one minute is available to the system.

If power returns during this time, then the shutdown process is aborted.

Information:

Overcurrent shutdown has the highest priority.

11.4.8.2 Low battery shutdown

If the LowBatteryFlag is set during power failure, then a "low battery" shutdown is performed to prevent the battery from fully discharging. Once the switch-off time expires (3 minutes by default), the UPS shuts down.

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

11.4.8.3 Standard shutdown

The standard shutdown is in effect whenever the UPS service is active; the switch-off time is 3 minutes by default.

If power returns during the switch-off time, then the shutdown procedure is aborted.

If power returns during the shutdown process, then the shutdown timer will run until the B&R Industrial PC enters standby mode, at which point the system will be rebooted.

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

This software can be used to access B&R Automation Device Interface (ADI) functions directly from Windows applications created in one of the following development environments:

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

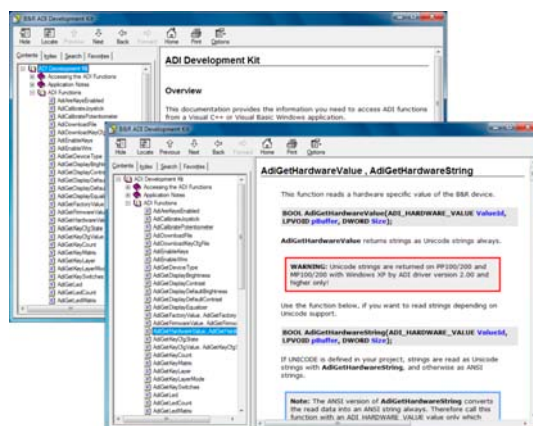


Figure 163: ADI Development Kit screenshots (version 3.60)

Features:

- One Microsoft Visual Basic module with ADI function declarations
- Header files and import libraries for Microsoft Visual C++
- Help files for Visual Basic and Visual C++
- Sample projects for Visual Basic and Visual C++
- ADI DLL (for application testing if no ADI driver is installed)

Supports the following systems (version 3.60 and higher):

- Automation PC 510
- Automation PC 511
- Automation PC 620
- Automation PC 810
- Automation PC 820
- Automation PC 910
- Panel PC 300
- Panel PC 700
- Panel PC 800
- Power Panel 100/200
- Power Panel 300/400
- Power Panel 500
- Mobile Panel 40/50
- Mobile Panel 100/200

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

A detailed description of how to use ADI functions can be found in the online help documentation.

The B&R Automation Device Interface (ADI) development kit is available at no cost in the Downloads section of the B&R website (www.br-automation.com).

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

This software can be used to access B&R Automation Device Interface (ADI) functions directly from .NET applications created using Microsoft Visual Studio 2005 or later.

Supported programming languages:

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

System requirements

- Development system: PC with Windows XP/7 and
 - Microsoft Visual Studio 2005 (or newer)
 - Microsoft .NET Framework 2.0 and/or Microsoft .NET Compact Framework 2.0 (or newer)

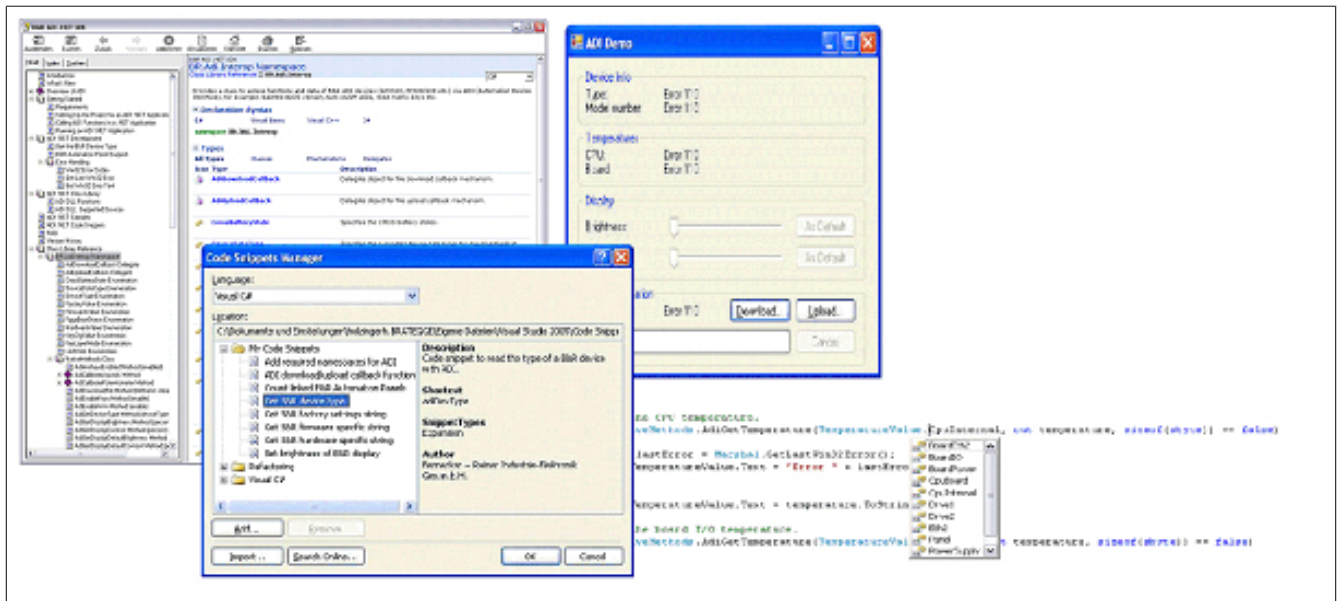


Figure 164: ADI .NET SDK screenshots (version 2.00)

Features (version 2.00 and higher):

- ADI .NET class library
- Help files in HTML Help 1.0 format (.chm) and MS Help 2.0 format (.HxS) (help documentation is in English)
- Sample projects and code snippets for Visual Basic, Visual C++ and Visual C#
- ADI DLL (for application testing if no ADI driver is installed)

Supports the following systems (version 2.00 and higher):

- Automation PC 510
- Automation PC 511
- Automation PC 620
- Automation PC 810
- Automation PC 820
- Automation PC 910
- Panel PC 300
- Panel PC 700
- Panel PC 800
- Power Panel 100/200
- Power Panel 300/400
- Power Panel 500
- Mobile Panel 40/50
- Mobile Panel 100/200

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

A detailed description of how to use ADI functions can be found in the online help documentation.

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

14 B&R Key Editor

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

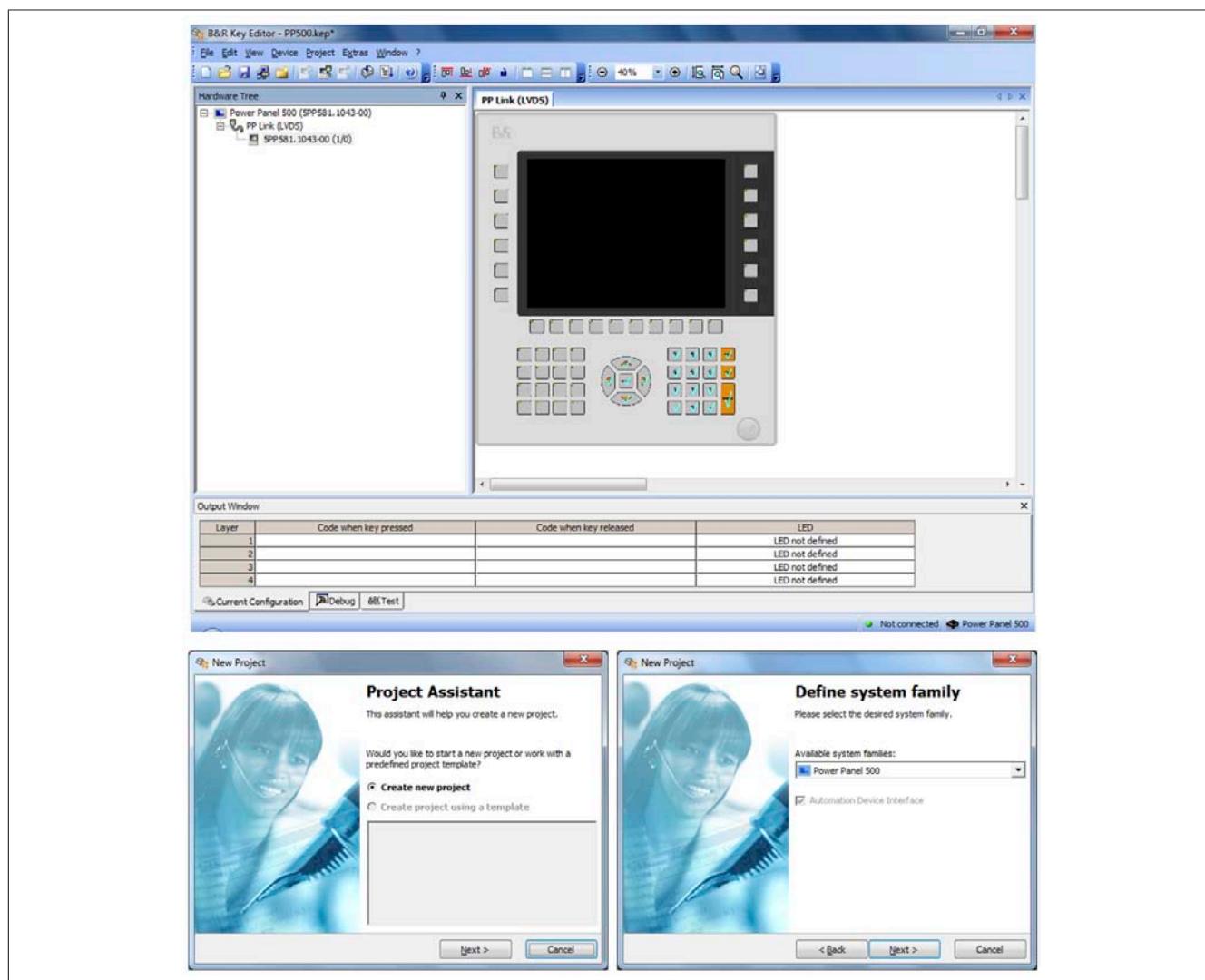


Figure 165: B&R Key Editor screenshots (version 3.30)

Features:

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

Supports the following systems (version 3.30):

- Automation PC 510
- Automation PC 511
- Automation PC 620
- Automation PC 810
- Automation PC 820
- Automation PC 910
- Automation Panel 800
- Automation Panel 830
- Automation Panel 900

- IPC2000, IPC2001, IPC2002
- IPC5000, IPC5600
- IPC5000C, IPC5600C
- Mobile Panel 40/50
- Mobile Panel 100/200
- Panel PC 300
- Panel PC 700
- Panel PC 800
- Power Panel 100/200
- Power Panel 300/400
- Power Panel 500

A detailed guide for configuring keys and LEDs can be found in the B&R Key Editor's online help documentation. The B&R Key Editor is available at no cost in the Downloads section of the B&R website (www.br-automation.com). It can also be found on the B&R HMI Drivers & Utilities DVD (model number 5SWHMI.0000-00).

Chapter 5 • Standards and certifications

1 Standards and guidelines

1.1 CE mark



This mark certifies that all harmonized EN standards for the applicable directives have been met for B&R products.

1.2 EMC directive

These devices meet the requirements of EC directive "2004/108/EC Electromagnetic compatibility" and are designed for the following areas:

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

1.3 Low voltage directive

These devices satisfy the requirements of EC directive "2006/95/EC Low voltage directive" and are designed for the following areas:

| | |
|---------------------------|---|
| EN 61131-2:2007 | Programmable logic controllers - Part 2: Equipment requirements and tests |
| EN 60204-1:2006 + A1:2009 | Safety of machinery - Electrical equipment of machines - Part 1: General requirements |

2 Certifications

Danger!

A complete system can only receive certification if ALL of the individual components it includes have the applicable certifications. If an individual component is being used that DOES NOT have an applicable certification, then the complete system will NOT RECEIVE certification.

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

Unless otherwise specified, the following certifications apply:

2.1 UL certification



Products with this label have been certified by Underwriters Laboratories and are listed as "Industrial Control Equipment". This mark is valid for the USA and Canada and simplifies the certification of your machines and systems in these areas.

Underwriters Laboratories (UL) in accordance with the UL508 standard - 17th Edition
Canadian (CSA) standard in accordance with C22.2 No. 142-M1987

2.2 Certifications for use in potentially explosive environments

2.2.1 UL Haz. Loc. Certifications



Products with this label have been certified by Underwriters Laboratories and are listed as "Industrial Control Equipment for Use in Hazardous Locations". This mark is valid for the USA and Canada and simplifies the certification of your machines and systems in these areas.

Underwriters Laboratories (UL) in accordance with standard ANSI/ISA 12.12.01:2011
Canadian (CSA) standard in accordance with C22.2 No. 213-M1987

Ind. Cont. Eq.
for Haz.Locs.
Cl. I, Div. 2,
Groups ABCD
Listed 2P61

2.2.2 ATEX certification



Products with this mark have been certified by an accredited certification body and have been approved for use in potentially explosive environments.

II 3D Ex tc IIIA T85°C Dc
IP20 Tamb: 0°C to 55°C
FTZU 11 E 0001U

2.2.3 Requirements for use in potentially explosive environments

General safety guidelines

Automation PC 810 devices are suitable for use in the environments described above as well as in environments that are not at risk of explosion. Wiring must follow national regulations and meet all legal requirements. Devices must be installed in suitable protective housings and final assembly must be inspected and approved by the local authorities. Additional equipment must be suitable for the operating location.

Devices with explosion protection are to be used as intended and are only permitted to be operated by knowledgeable and qualified personnel according to these operating instructions and the corresponding user's manual. Operation in any other way endangers the safety and functionality of the devices and the connected systems. The operator is responsible for following all applicable safety and accident prevention regulations, as well as adhering to standards.

Mounting and installation

Automation PC 810 systems must be installed according to the guidelines in the user's manual. In order to guarantee sufficient air circulation, the specified amount of space around the device must be observed. The maximum ambient temperature is 50°C. A fan kit must be used in conjunction with a 5PC800.BM45-xxx processor board. The tightening torque for the power supply terminals is 0.5 Nm. Cables must be able to handle a surface temperature of 75°C. Devices must remain voltage-free until installation work is complete. Devices must be used within a potential equalization system and connected to the potential offset. ATEX: Devices must be installed in a protective housing that meets minimum IP54 (EN 60529) and "tc" (EN 60079-31) protection requirements.

Maintenance

Accumulated dust must be removed regularly.

Breakdowns and disassembly

Devices must be shut down and protected against accidental startup. Defective devices must be replaced by knowledgeable and qualified personnel.

The battery (Renata CR2477N) or fuses must not be removed while voltage is applied or only removed when in non-hazardous areas.

Danger!

Explosion hazard: Replacing components may impair eligibility for Class I, Division 2!

Explosion hazard: Connectors must not be disconnected while voltage is applied or only disconnected when in non-hazardous areas.

Warning!

Only non-transmitting USB devices used in accordance with the operating manual are permitted!

Conformity test and certification

Devices marked "Ex" satisfy the requirements set forth in directives 2004/108/EC and 94/9/EC as well as the harmonized standards EN 61131-2:2007, EN 61000-6-2:2005, EN 61000-6-4:2007, cl. 5.3 EN 60079-0:2009, cl. 6.1.2 EN 60079-31:2009.

Devices marked with "c-UL-us" satisfy the requirements set forth in CSA Std C22.2 No. 213-M1987, CSA Std C22.2 No. 142-M1987, UL Std 508 - 17th Edition and ANSI/ISA 12.12.01:2011.

Product documentation in detail

Additional product information is available on the B&R website at www.br-automation.com or from these user's manuals.

2.3 GL certification (Germanischer Lloyd)



Some B&R products have been certified by Germanischer Lloyd and are approved for use in maritime environments. GL certificates (type approval) are generally accepted by other classification societies during ship acceptance procedures.

Germanischer Lloyd (GL) in accordance with standard GL 2003 (Category C EMC 1)

Category C concerns devices that are protected from weather. EMC 1 defines the radiated and conducted emission limits for devices installed on a ship's bridge.

Information:

HDD, SSD and CD/DVD drives are only permitted to be used for service purposes.

Line filter 5AC804.MFLT-00 is absolutely mandatory in the supply line when used in a maritime environment. Additional information can be found on page Connecting to the end device.

The following table lists revisions from which GL certification applies to individual components.

| Model number | Description | GL beginning with rev. |
|----------------|---|------------------------|
| 5PC810.SX01-00 | APC810 system unit, 1 slot (PCI Express, PCI, depending on bus); 1 compact slide-in slot; Smart Display Link/DVI/Monitor, 2x RS232, 5x USB 2.0, 2x ETH 10/100/1000, 24 VDC (order 0TB103.9 screw clamp or 0TB103.91 cage clamp terminals separately) | G0 |
| 5PC810.SX02-00 | APC810 system unit, 2 slots (PCI Express, PCI, depending on bus); 1 slot for Automation Panel Link transmitter; 1 slide-in compact and 1 slide-in slot; Smart Display Link/DVI/Monitor, 2x RS232, 5x USB 2.0, 2x ETH 10/100/1000, 24 VDC (order 0TB103.9 screw clamp or 0TB103.91 cage clamp terminals separately) | G0 |
| 5PC810.BX01-00 | APC810 bus, 1 PCI | D0 |
| 5PC810.BX01-01 | APC810 bus, 1 PCI Express (x4) | D0 |
| 5PC810.BX02-00 | APC810 bus, 2 PCI | D0 |
| 5PC810.BX02-01 | APC810 bus, 1 PCI, 1 PCI Express (x4) | D0 |
| 5PC800.B945-05 | Intel Atom N270 CPU board, 1.6 GHz, single core, 533 MHz FSB, 512 kB L2 cache; 945GME chipset; 2 slots for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek RTL8111C Ethernet controller | E0 |
| 5MMDDR.0512-01 | SO-DIMM DDR2 RAM 512 MB PC2-5300 | D0 |
| 5MMDDR.1024-01 | SO-DIMM DDR2 RAM 1024 MB PC2-5300 | D0 |
| 5MMDDR.2048-01 | SO-DIMM DDR2 RAM 2048 MB PC2-5300 | D0 |
| 5AC801.HS00-02 | APC810 heat sink for CPU board with Atom processor N270 | D0 |
| 5PC810.FA01-00 | APC810 fan kit for 5PC810.SX01-00 system unit | D0 |
| 5PC810.FA02-01 | APC810 fan kit for 5PC810.SX02-00 (revisions > D0) | D0 |
| 5AC600.485I-00 | RS232/422/485 interface, for installation in an APC620, APC810 or PPC700 | D0 |
| 5AC600.UPSB-00 | Battery unit 5Ah; for APC620, APC810 or PPC800 UPS | D0 |
| 5AC600.UPSI-00 | UPS module for APC620, APC810, PPC800; for system units 5PC600.SX01-00 (starting with Rev. H0), 5PC600.SX02-00 (starting with Rev. G0), 5PC600.SX02-01 (starting with Rev. H0), 5PC600.SX05-00 (starting with Rev. F0), 5PC600.SX05-01 (starting with Rev. F0), 5PC600.SF03-00 (starting with Rev. A0), 5PC810.SX*, 5PC820.1505-00, 5PC820.1906-00. Order cable (5CAUPS.0005-00 or 5CAUPS.0030-00) and battery unit (5AC600.UPSB-00) separately | E0 |
| 5CAUPS.0005-00 | UPS cable 0.5 m; for UPS 5AC600.UPSI-00 | D0 |
| 5CAUPS.0030-00 | UPS cable 3 m; for UPS 5AC600.UPSI-00 | D0 |
| 5AC801.ADAS-00 | SATA hard disk adapter for operating a slide-in compact hard disk in a slide-in slot | D0 |
| 5AC801.DVDS-00 | DVD-ROM SATA slide-in drive | D0 |
| 5AC801.DVRS-00 | DVD-R/RW DVD+R/RW SATA drive, slide-in | D0 |
| 5AC801.HDDI-00 | 40 GB slide-in compact SATA hard disk, 24/7 operation with extended temperature range. Note: Please see the manual for information about using this hard disk. | D0 |
| 5AC801.HDDI-02 | 160 GB SATA slide-in compact hard disk; 24/7 operation with extended temperature range. Note: Please see the manual for information about using this hard disk. | C0 |
| 5AC801.HDDI-03 | 250 GB slide-in compact SATA hard disk, 24/7 operation. Note: Please see the manual for information about using this hard disk. | D0 |
| 5AC801.HDDI-99 | APC810 slide-in compact HDD kit | D0 |
| 5AC801.HDDS-00 | 40 GB slide-in SATA hard disk; 24/7 operation with extended temperature range. Note: Please see the manual for information about using this hard disk. | D0 |
| 5AC801.SSDI-00 | 32 GB SATA SSD (SLC), slide-in compact | E0 |
| 5AC801.SSDI-01 | 60 GB SATA SSD (MLC), slide-in compact | C0 |
| 5AC801.SSDI-02 | 180 GB SATA SSD (MLC), slide-in compact | C0 |
| 5AC801.SSDI-03 | 60 GB SATA SSD (MLC), slide-in compact | A0 |
| 5AC801.SSDI-04 | 128 GB SATA SSD (MLC), slide-in compact | A0 |
| 5AC801.SDL0-00 | Smart Display Link/DVI-D transmitter | D0 |
| 5ACPCI.ETH1-01 | PCI Ethernet card 1x 10/100 | D0 |
| 5ACPCI.ETH3-01 | PCI Ethernet card 3x 10/100 | D0 |
| 5AC804.MFLT-00 | Line filter | D0 |
| 0TB103.9 | Connector, 24 VDC, 3-pin female, 3.31 mm ² screw clamp, protected against vibration by the screw flange | D0 |
| 0TB103.91 | Connector, 24 VDC, 3-pin female, 3.31 mm ² cage clamp, protected against vibration by the screw flange | D0 |
| 5CFCRD.0064-03 | CompactFlash 64 MB Western Digital (SLC) | E0 |

Table 257: Revision of individual components with GL certification

| Model number | Description | GL beginning with rev. |
|----------------|---|------------------------|
| 5CFCRD.0128-03 | CompactFlash 128 MB Western Digital (SLC) | E0 |
| 5CFCRD.0256-03 | CompactFlash 256 MB Western Digital (SLC) | E0 |
| 5CFCRD.0512-03 | CompactFlash 512 MB Western Digital (SLC) | E0 |
| 5CFCRD.1024-03 | CompactFlash 1 GB Western Digital (SLC) | E0 |
| 5CFCRD.2048-03 | CompactFlash 2 GB Western Digital (SLC) | F0 |
| 5CFCRD.4096-03 | CompactFlash 4 GB Western Digital (SLC) | E0 |
| 5CFCRD.8192-03 | CompactFlash 8 GB Western Digital (SLC) | E0 |
| 5CFCRD.0512-04 | CompactFlash 512 MB B&R (SLC) | D0 |
| 5CFCRD.1024-04 | CompactFlash 1 GB B&R (SLC) | D0 |
| 5CFCRD.2048-04 | CompactFlash 2 GB B&R (SLC) | D0 |
| 5CFCRD.4096-04 | CompactFlash 4 GB B&R (SLC) | D0 |
| 5CFCRD.8192-04 | CompactFlash 8 GB B&R (SLC) | D0 |
| 5CFCRD.016G-04 | CompactFlash 16 GB B&R (SLC) | E0 |
| 5CFCRD.0512-06 | CompactFlash 512 MB B&R (SLC) | D0 |
| 5CFCRD.1024-06 | CompactFlash 1 GB B&R (SLC) | D0 |
| 5CFCRD.2048-06 | CompactFlash 2 GB B&R (SLC) | D0 |
| 5CFCRD.4096-06 | CompactFlash 4 GB B&R (SLC) | D0 |
| 5CFCRD.8192-06 | CompactFlash 8 GB B&R (SLC) | D0 |
| 5CFCRD.016G-06 | CompactFlash 16 GB B&R (SLC) | D0 |
| 5CFCRD.032G-06 | CompactFlash 32 GB B&R (SLC) | C0 |
| 5AC900.1000-00 | DVI (male connector) to CRT (female connector) adapter. For connecting a standard monitor to a DVI-I interface. | C0 |

Table 257: Revision of individual components with GL certification

Certificate no. 11 858 - 10 HH

| | |
|--|--|
|  | |
| <h2>Type Approval Certificate</h2> | |
| <p>This is to certify that the undemoted product(s) has/have been tested in accordance with the relevant requirements of the GL Type Approval System.</p> | |
| Certificate No. | 11 858 - 10 HH |
| Company | Bernecker + Rainer Industrie-Elektronik GmbH B&R Straße 1 5142 Eggelsberg, Austria |
| Product Description | Automation PC |
| Type | Automation PC 810 ATOM, 4GB RAM, 1 or 2 PCI/PCIe Slots |
| Environmental Category | C, EMC1 |
| Technical Data / Range of Application | System unit: 5PC810.SX01-00 (one slot), 5PC810.SX02-00 (two slots) CPU board: 5PC800.B945-05 Cooling element: 5AC801.HS00-02 options: Ventilationkit: 5PC810.FA01-00, 5PC810.FA02-01 Main memory: 5MMDDR.XXXX-01 Slide-In compact disc: 5AC801.SSDI-XX, 5AC801.HDDI-XX Slide-In disc: 5AC801.DVDS-XX, 5AC801.DVRS-XX, 5AC801.HDDS-XX, 5AC801.ADAS-XX Serial adapter: 5AC600.485I-XX Compact flash: 5CFCRD.XXXX-XX UPS: module 5AC600.UPSI-XX, batterie unit 5AC600.UPSB-XX cable 5CAUPS.XXXX-XX, AP link transmitter: 5AC801.SDL0-00 Bus unit: 5PC810.BX01-XX (one slot), 5PC810.BX02-XX (two slots) PCI-card: 5ACPCI.XXX-XX |
| Test Standard | Guidelines for the Performance of Type Approvals Chapter 2, Edition 2003 Guidelines for the Use of Computers and Computer Systems, Edition 1994 |
| Documents | Test report : Mikes E34678-00-00HO, Mikes S34730-00-00MJ, Mikes E34677-00-00HO, Mikes S34731-00-00MJ Prüfbeschreibung V1.50 (06.10.2010) |
| Remarks | Filter 5AC804.MFLT-00 to be used in DC power line |
| Valid until | 2016-01-03 |
| Page | 1 of 1 |
| File No. | I.B.05 |
| Hamburg, | 2011-01-04 |
|  | |
|   | |
| Germanischer Lloyd Dr. Joannis Papanuskas Burkhard Lilienthal | |
| <small>This certificate is issued on the basis of "Guidelines for the Performance of Type Approvals Part 1, Procedure".</small> | |

Figure 166: GL certificate no. 11 858 - 10 HH

Chapter 6 • Accessories

The following accessories have successfully completed functional testing at B&R and are approved for use with this device. Nevertheless, it is important to observe any limitations that may apply to the complete system when operated with other individual components. When operating the complete system, the specifications for the individual components must be adhered to.

All components listed in this manual have been subjected to extensive system and compatibility testing and are approved for use. B&R can make no guarantee regarding the functionality of non-approved accessories.

1 Replacement CMOS batteries

1.1 0AC201.91 / 4A0006.00-000

1.1.1 General information

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

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

1.1.2 Order data


| Model number | Short description | Figure |
|---------------|--|--|
| | Batteries | |
| 0AC201.91 | Lithium batteries 4 pcs., 3 V / 950 mAh button cell We hereby state that the lithium cells contained in this shipment qualify as "partly regulated". Handle with care. If the package is damaged, inspect the cells, repack intact cells and protect the cells against short circuit. For emergency information, call RENATA SA at +41 61 319 28 27. |  |
| 4A0006.00-000 | Lithium battery, 3 V / 950 mAh, button cell | |

Table 258: 0AC201.91, 4A0006.00-000 - Order data

1.1.3 Technical data

Warning!

The battery must be replaced by a Type CR2477N Renata battery only. The use of another battery may present a risk of fire or explosion.

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

Information:

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

| Product ID | 0AC201.91 | 4A0006.00-000 |
|----------------------------|------------------------|---------------|
| General information | | |
| Storage time | Max. 3 years at 30°C | |
| Certification | Yes | |
| CE | Yes | Yes |
| cULus | Yes | - |
| Electrical characteristics | | |
| Capacity | 950 mAh | |
| Self-discharging | <1% per year (at 23°C) | |
| Voltage range | 3 V | |
| Environmental conditions | | |
| Temperature | | |
| Storage | -20 to 60°C | |

Table 259: 0AC201.91, 4A0006.00-000 - Technical data

| Product ID | 0AC201.91 | 4A0006.00-000 |
|-------------------|-----------|---------------|
| Relative humidity | | |
| Operation | | 0 to 95% |
| Storage | | 0 to 95% |
| Transport | | 0 to 95% |

Table 259: 0AC201.91, 4A0006.00-000 - Technical data

2 Power connectors

2.1 0TB103.9x

2.1.1 General information

The single-row 3-pin terminal block 0TB103 is used to connect the supply voltage.

2.1.2 Order data


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

Table 260: 0TB103.9, 0TB103.91 - Order data

2.1.3 Technical data

Information:

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

| Product ID | 0TB103.9 | | 0TB103.91 | |
|--|---|--|---------------------------|--|
| General information | | | | |
| Certification | | | | |
| CE | | | Yes | |
| cULus | | | Yes | |
| cULus HazLoc Class 1 Division 2 | | | Yes | |
| GL | | | Yes | |
| Terminal block | | | | |
| Note | Protected against vibration by the screw flange Nominal values according to UL | | | |
| Number of pins | 3 (female) | | | |
| Type of terminal clamp | Screw clamps | | Cage clamps ²⁾ | |
| Cable type | Only copper wires (no aluminum wires!) | | | |
| Distance between contacts | 5.08 mm | | | |
| Connection cross section | | | | |
| AWG wire | 26 to 14 AWG | | 26 to 12 AWG | |
| Wire end sleeves with plastic covering | | | 0.20 to 1.50 mm² | |
| Solid wires | | | 0.20 to 2.50 mm² | |
| Fine strand wires | 0.20 to 1.50 mm² | | 0.20 to 2.50 mm² | |
| With wire end sleeves | | | 0.20 to 1.50 mm² | |
| Fastening torque | 0.4 Nm | | - | |
| Electrical characteristics | | | | |
| Nominal voltage | 300 V | | | |
| Nominal current ¹⁾ | 10 A / contact | | | |
| Contact resistance | ≤ 5 mΩ | | | |

Table 261: 0TB103.9, 0TB103.91 - Technical data

1) The limit data for each I/O module must be taken into consideration.

2) Cage clamp terminal blocks cannot be used side-by-side.

3 Replacement fan

3.1 General information

Information:

Fan filters are subject to wear and should be checked with appropriate frequency to determine whether the air flow provides sufficient cooling. Replacing or cleaning the fan filter is appropriate at that time.

3.2 Order data


| Model number | Short description | Figure |
|----------------|--|---|
| | Accessories |  |
| 5AC801.FA01-00 | APC810 replacement fan filter for 5PC810.SX01-00; 5 pcs. | |
| 5AC801.FA02-00 | APC810 replacement fan filter for 5PC810.SX02-00; 5 pcs. | |
| 5AC801.FA03-00 | APC810 replacement fan filter for 5PC810.SX03-00; 5 pcs. | |
| 5AC801.FA05-00 | APC810 replacement fan filter for 5PC810.SX05-00; 5 pcs. | |

Table 262: 5AC801.FA01-00, 5AC801.FA02-00, 5AC801.FA03-00, 5AC801.FA05-00 - Order data

4 DVI/Monitor adapter

4.1 5AC900.1000-00

4.2 General information

This adapter enables a standard monitor to be connected to the DVI-I interface.

4.3 Order data


| Model number | Short description | Figure |
|----------------|---|---|
| | Miscellaneous | |
| 5AC900.1000-00 | DVI (male connector) to CRT (female connector) adapter. For connecting a standard monitor to a DVI-I interface. |  |

Table 263: 5AC900.1000-00 - Order data

5 CompactFlash cards

5.1 General information

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

5.2 General information

In order to be suited for use in industrial automation, CompactFlash cards must be highly reliable. The following items are very important to achieving the necessary level of reliability:

- The flash technology used
- An efficient algorithm for maximizing service life
- Good mechanisms for detecting and fixing errors in the flash memory

5.2.1 Flash technology

Currently, CompactFlash cards are available with MLC (multi-level cell) and SLC (single-level cell) flash blocks. SLC flash memory has a service life 10 times longer than MLC, which is why only CompactFlash cards with SLC flash blocks are suited for industrial applications.

5.2.2 Wear leveling

Wear leveling is an algorithm that can be used to maximize the service life 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 disk so that the same areas don't have to be cleared and reprogrammed over and over again.

5.2.2.1 No wear leveling

The earliest CompactFlash cards didn't have an algorithm for maximizing service life. The service life of a CompactFlash card was determined only by the guaranteed lifespan of the flash blocks.

5.2.2.2 Dynamic wear leveling

Dynamic wear leveling makes it possible to utilize unused flash blocks when writing to a file.

If the disk is 80% full with files, then only 20% can be used for wear leveling.

The service life of the CompactFlash card is therefore dependent on the amount of unused flash blocks.

5.2.2.3 Static wear leveling

Static wear leveling monitors which data is rarely modified. From time to time, the controller then moves this data to blocks that have already been used frequently in order to prevent further wear on those cells.

5.2.3 ECC error correction

Bit errors can be caused by inactivity or when a certain cell is being operated. Error correction coding (ECC) implemented via hardware or software can detect and correct many errors of this type.

5.2.4 S.M.A.R.T. support

Self-Monitoring, Analysis and Reporting Technology (S.M.A.R.T.) is an industry standard for mass storage devices that has been introduced to monitor important parameters and quickly detect imminent failures. Critical performance and calibration data is monitored and stored in order to help predict the probability of errors.

5.2.5 Maximum reliability

CompactFlash cards supplied by B&R use SLC flash blocks and static wear leveling together with a powerful ECC algorithm to provide maximum reliability.

5.3 5CFCRD.xxxx-06

5.3.1 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 different boot times.

see "Known problems/issues" on page 342

Information:

5CFCRD.xxxx-06 CompactFlash cards are supported on B&R devices with WinCE version ≥ 6.0 .

5.3.2 Order data


| Model number | Short description | Figure |
|----------------|-------------------------------|--|
| | CompactFlash |  |
| 5CFCRD.0512-06 | CompactFlash 512 MB B&R (SLC) | |
| 5CFCRD.1024-06 | CompactFlash 1 GB B&R (SLC) | |
| 5CFCRD.2048-06 | CompactFlash 2 GB B&R (SLC) | |
| 5CFCRD.4096-06 | CompactFlash 4 GB B&R (SLC) | |
| 5CFCRD.8192-06 | CompactFlash 8 GB B&R (SLC) | |
| 5CFCRD.016G-06 | CompactFlash 16 GB B&R (SLC) | |
| 5CFCRD.032G-06 | CompactFlash 32 GB B&R (SLC) | |

Table 264: 5CFCRD.0512-06, 5CFCRD.1024-06, 5CFCRD.2048-06, 5CFCRD.4096-06, 5CFCRD.8192-06, 5CFCRD.016G-06, 5CFCRD.032G-06 - Order data

5.3.3 Technical data

Caution!

A sudden loss of power may result in data loss! In very rare cases, the mass storage device may also become damaged.

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

Information:

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

| Product ID | 5CFCRD. 0512-06 | 5CFCRD. 1024-06 | 5CFCRD. 2048-06 | 5CFCRD. 4096-06 | 5CFCRD. 8192-06 | 5CFCRD. 016G-06 | 5CFCRD. 032G-06 |
|----------------------------|--|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| General information | | | | | | | |
| Capacity | 512 MB | 1 GB | 2 GB | 4 GB | 8 GB | 16 GB | 32 GB |
| Data retention | 10 years | | | | | | |
| Data reliability | <1 unrecoverable error in 10^{14} bit read accesses | | | | | | |
| Lifetime monitoring | Yes | | | | | | |
| MTBF | >3,000,000 hours (at 25°C) | | | | | | |
| Maintenance | None | | | | | | |
| Supported operating modes | PIO Mode 0-6, Multiword DMA Mode 0-4, Ultra DMA Mode 0-4 | | | | | | |
| Continuous reading | | | | | | | |
| Typical | 33 MB/s | 33 MB/s | 33 MB/s | 33 MB/s | 33 MB/s | 36 MB/s | 36 MB/s |
| Maximum | 35 MB/s | 35 MB/s | 35 MB/s | 34 MB/s | 34 MB/s | 37 MB/s | 37 MB/s |
| Continuous writing | | | | | | | |
| Typical | 15 MB/s | 15 MB/s | 15 MB/s | 14 MB/s | 14 MB/s | 28 MB/s | 28 MB/s |
| Maximum | 18 MB/s | 18 MB/s | 18 MB/s | 17 MB/s | 17 MB/s | 30 MB/s | 30 MB/s |

Table 265: 5CFCRD.0512-06, 5CFCRD.1024-06, 5CFCRD.2048-06, 5CFCRD.4096-06, 5CFCRD.8192-06, 5CFCRD.016G-06, 5CFCRD.032G-06 - Technical data

| Product ID | 5CFCRD. 0512-06 | 5CFCRD. 1024-06 | 5CFCRD. 2048-06 | 5CFCRD. 4096-06 | 5CFCRD. 8192-06 | 5CFCRD. 016G-06 | 5CFCRD. 032G-06 |
|-------------------------------------|--|--|--|--|--|---|---|
| Certification | | | | | | | |
| CE | Yes | | | | | | |
| cULus | Yes | | | | | | |
| cULus HazLoc Class 1 Division 2 | - | - | - | - | - | Yes | - |
| ATEX Zone 22 | - | - | - | - | - | Yes | - |
| GL | Yes | | | | | | |
| Endurance | | | | | | | |
| Guaranteed data volume | | | | | | | |
| Guaranteed ¹⁾ | 50 TB | 100 TB | 200 TB | 400 TB | 800 TB | 1600 TB | 3200 TB |
| Results for 5 years ¹⁾ | 27.40 GB/day | 54.79 GB/day | 109.9 GB/day | 219.8 GB/day | 438.6 GB/day | 876.72 GB/day | 1753.44 GB/day |
| Clear/Write cycles | | | | | | | |
| Guaranteed | 100,000 | | | | | | |
| SLC flash | Yes | | | | | | |
| Wear leveling | Static | | | | | | |
| Error correction coding (ECC) | Yes | | | | | | |
| S.M.A.R.T. support | Yes | | | | | | |
| Support | | | | | | | |
| Hardware | PP300/400, PP500, PPC300, PPC700, PPC725, PPC800, APC620, APC810, APC820 | | | | | | |
| Operating systems | | | | | | | |
| Windows 7 32-bit | No | No | No | No | No | Yes | Yes |
| Windows 7 64-bit | No | No | No | No | No | No | Yes |
| Windows Embedded Standard 7, 32-bit | No | No | No | No | Yes | Yes | Yes |
| Windows Embedded Standard 7, 64-bit | No | No | No | No | No | Yes | Yes |
| Windows XP Professional | No | No | No | Yes | Yes | Yes | Yes |
| Windows XP Embedded | | | | Yes | | | |
| Windows Embedded Standard 2009 | No | Yes | Yes | Yes | Yes | Yes | Yes |
| Windows CE 6.0 | Yes | Yes | Yes | Yes | Yes | Yes ²⁾ | Yes ²⁾ |
| Windows CE 5.0 | | | | No | | | |
| Software | | | | | | | |
| PVI Transfer | ≥ V3.2.3.8 (part of PVI Development Setup ≥ V2.06.00.3011) | ≥ V3.2.3.8 (part of PVI Development Setup ≥ V2.06.00.3011) | ≥ V3.2.3.8 (part of PVI Development Setup ≥ V2.06.00.3011) | ≥ V3.2.3.8 (part of PVI Development Setup ≥ V2.06.00.3011) | ≥ V3.2.3.8 (part of PVI Development Setup ≥ V2.06.00.3011) | ≥ V3.6.8.40 (part of PVI Development Setup ≥ V3.0.0.3020) | ≥V4.0.0.8 (part of PVI Development Setup ≥ V3.0.2.3014) |
| B&R Embedded OS Installer | ≥V3.10 | ≥V3.10 | ≥V3.10 | ≥V3.10 | ≥V3.10 | ≥V3.20 | ≥V3.21 |
| Environmental conditions | | | | | | | |
| Temperature | | | | | | | |
| Operation | 0 to 70°C | | | | | | |
| Storage | -65 to 150°C | | | | | | |
| Transport | -65 to 150°C | | | | | | |
| Relative humidity | | | | | | | |
| Operation | Max. 85% at 85°C | | | | | | |
| Storage | Max. 85% at 85°C | | | | | | |
| Transport | Max. 85% at 85°C | | | | | | |
| Vibration | | | | | | | |
| Operation | 20 g peak, 20 to 2000 Hz, 4 in each direction (JEDEC JESD22, method B103) 5.35 g RMS, 15 min per level (IEC 68-2-6) | | | | | | |
| Storage | 20 g peak, 20 to 2000 Hz, 4 in each direction (JEDEC JESD22, method B103) 5.35 g RMS, 15 min per level (IEC 68-2-6) | | | | | | |
| Transport | 20 g peak, 20 to 2000 Hz, 4 in each direction (JEDEC JESD22, method B103) 5.35 g RMS, 15 min per level (IEC 68-2-6) | | | | | | |
| Shock | | | | | | | |
| Operation | 1.5 kg peak, 0.5 ms 5 times (JEDEC JESD22, method B110) 30 g, 11 ms 1 times (IEC 68-2-27) | | | | | | |
| Storage | 1.5 kg peak, 0.5 ms 5 times (JEDEC JESD22, method B110) 30 g, 11 ms 1 times (IEC 68-2-27) | | | | | | |
| Transport | 1.5 kg peak, 0.5 ms 5 times (JEDEC JESD22, method B110) 30 g, 11 ms 1 times (IEC 68-2-27) | | | | | | |
| Altitude | | | | | | | |
| Operation | Max. 4572 m | | | | | | |
| Mechanical characteristics | | | | | | | |
| Dimensions | | | | | | | |
| Width | 42.8 ±0.10 mm | | | | | | |
| Length | 36.4 ±0.15 mm | | | | | | |
| Height | 3.3 ±0.10 mm | | | | | | |
| Weight | 10 g | | | | | | |

Table 265: 5CFCRD.0512-06, 5CFCRD.1024-06, 5CFCRD.2048-06, 5CFCRD.4096-06, 5CFCRD.8192-06, 5CFCRD.016G-06, 5CFCRD.032G-06 - Technical data

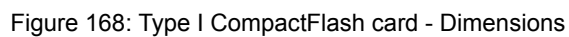
1) Endurance of B&R CFs (with linear written block size ≥ 128 kB).

2) Not supported by the B&R Embedded OS Installer.

5.3.5 Dimensions



5.3.5 Dimensions



5.3.6 Benchmark

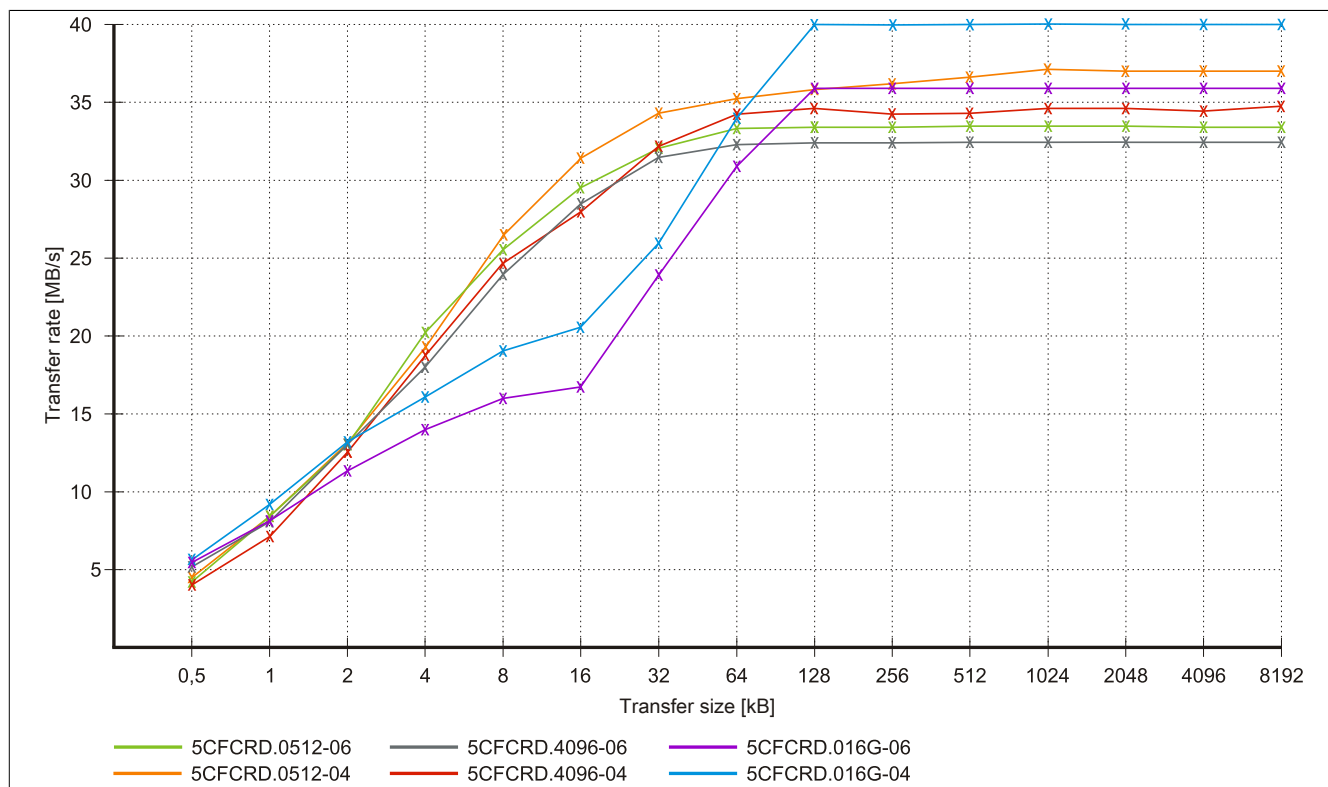


Figure 169: ATTO Disk Benchmark v2.34 read comparison - 5CFCRD.xxxx-04 and 5CFCRD.xxxx-06

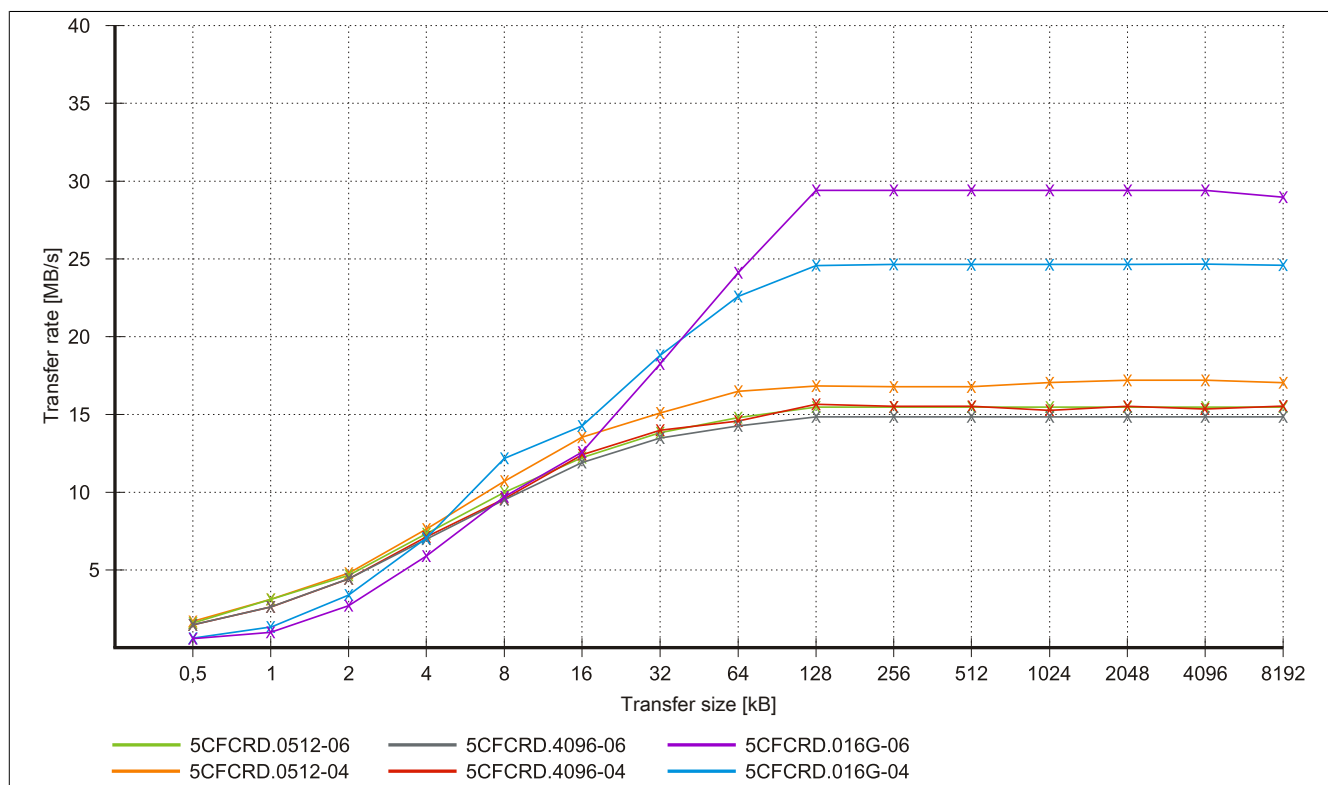


Figure 170: ATTO Disk Benchmark v2.34 write comparison - 5CFCRD.xxxx-04 and 5CFCRD.xxxx-06

5.4 5CFCRD.xxxx-04

5.4.1 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 different boot times.

see "Known problems/issues" on page 342

Information:

5CFCRD.xxxx-04 CompactFlash cards are supported on B&R devices with WinCE version ≥ 6.0 .

5.4.2 Order data


| Model number | Short description | Figure |
|----------------|-------------------------------|--|
| | CompactFlash |  |
| 5CFCRD.0512-04 | CompactFlash 512 MB B&R (SLC) | |
| 5CFCRD.1024-04 | CompactFlash 1 GB B&R (SLC) | |
| 5CFCRD.2048-04 | CompactFlash 2 GB B&R (SLC) | |
| 5CFCRD.4096-04 | CompactFlash 4 GB B&R (SLC) | |
| 5CFCRD.8192-04 | CompactFlash 8 GB B&R (SLC) | |
| 5CFCRD.016G-04 | CompactFlash 16 GB B&R (SLC) | |

Table 266: 5CFCRD.0512-04, 5CFCRD.1024-04, 5CFCRD.2048-04, 5CFCRD.4096-04, 5CFCRD.8192-04, 5CFCRD.016G-04 - Order data

5.4.3 Technical data

Caution!

A sudden loss of power may result in data loss! In very rare cases, the mass storage device may also become damaged.

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

Information:

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

| Product ID | 5CFCRD.0512-04 | 5CFCRD.1024-04 | 5CFCRD.2048-04 | 5CFCRD.4096-04 | 5CFCRD.8192-04 | 5CFCRD.016G-04 |
|----------------------------|--|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| General information | | | | | | |
| Capacity | 512 MB | 1 GB | 2 GB | 4 GB | 8 GB | 16 GB |
| Data retention | 10 years | | | | | |
| Data reliability | <1 unrecoverable error in 10^{14} bit read accesses | | | | | |
| Lifetime monitoring | Yes | | | | | |
| MTBF | >3,000,000 hours (at 25°C) | | | | | |
| Maintenance | None | | | | | |
| Supported operating modes | PIO Mode 0-6, Multiword DMA Mode 0-4, Ultra DMA Mode 0-4 | | | | | |
| Continuous reading | | | | | | |
| Typical | 35 MB/s (240X) ¹⁾ | 35 MB/s (240X) ¹⁾ | 35 MB/s (240X) ¹⁾ | 33 MB/s (220X) ¹⁾ | 27 MB/s (180X) ¹⁾ | 36 MB/s (240X) ¹⁾ |
| Maximum | 37 MB/s (260X) ¹⁾ | 37 MB/s (260X) ¹⁾ | 37 MB/s (260X) ¹⁾ | 34 MB/s (226X) ¹⁾ | 28 MB/s (186X) ¹⁾ | 37 MB/s (247X) ¹⁾ |

Table 267: 5CFCRD.0512-04, 5CFCRD.1024-04, 5CFCRD.2048-04, 5CFCRD.4096-04, 5CFCRD.8192-04, 5CFCRD.016G-04 - Technical data

| Product ID | 5CFCRD.0512-04 | 5CFCRD.1024-04 | 5CFCRD.2048-04 | 5CFCRD.4096-04 | 5CFCRD.8192-04 | 5CFCRD.016G-04 |
|-------------------------------------|--|--|--|--|--|---|
| Continuous writing | | | | | | |
| Typical | 17 MB/s (110X) | 17 MB/s (110X) | 17 MB/s (110X) | 16 MB/s (106X) | 15 MB/s (100X) | 18 MB/s (120X) |
| Maximum | 20 MB/s (133X) | 20 MB/s (133X) | 20 MB/s (133X) | 18 MB/s (120X) | 17 MB/s (110X) | 19 MB/s (126X) |
| Certification | | | | | | |
| CE | Yes | | | | | |
| cULus | Yes | | | | | |
| GL | Yes | | | | | |
| Endurance | | | | | | |
| Guaranteed data volume | | | | | | |
| Guaranteed ²⁾ | 50 TB | 100 TB | 200 TB | 400 TB | 800 TB | 1600 TB |
| Results for 5 years ²⁾ | 27.40 GB/day | 54.79 GB/day | 109.9 GB/day | 219.8 GB/day | 438.6 GB/day | 876.72 GB/day |
| Clear/Write cycles | | | | | | |
| Typical ³⁾ | 2,000,000 | | | | | |
| Guaranteed | 100,000 | | | | | |
| SLC flash | Yes | | | | | |
| Wear leveling | Static | | | | | |
| Error correction coding (ECC) | Yes | | | | | |
| S.M.A.R.T. support | No | | | | | |
| Support | | | | | | |
| Hardware | PP300/400, PP500, PPC300, PPC700, PPC725, PPC800, APC620, APC810, APC820 | | | | | |
| Operating systems | | | | | | |
| Windows 7 32-bit | No | No | No | No | No | Yes |
| Windows 7 64-bit | | | No | No | | |
| Windows Embedded Standard 7, 32-bit | No | No | No | No | Yes | Yes |
| Windows Embedded Standard 7, 64-bit | No | No | No | No | No | Yes |
| Windows XP Professional | No | No | No | Yes | Yes | Yes |
| Windows XP Embedded | | | | Yes | | |
| Windows Embedded Standard 2009 | No | Yes | Yes | Yes | Yes | Yes |
| Windows CE 6.0 | Yes | Yes | Yes | Yes | Yes | Yes ⁴⁾ |
| Windows CE 5.0 | | | | No | | |
| Software | | | | | | |
| PVI Transfer | ≥ V3.2.3.8 (part of PVI Development Setup ≥ V2.06.00.3011) | ≥ V3.2.3.8 (part of PVI Development Setup ≥ V2.06.00.3011) | ≥ V3.2.3.8 (part of PVI Development Setup ≥ V2.06.00.3011) | ≥ V3.2.3.8 (part of PVI Development Setup ≥ V2.06.00.3011) | ≥ V3.2.3.8 (part of PVI Development Setup ≥ V2.06.00.3011) | ≥ V3.6.8.40 (part of PVI Development Setup ≥ V3.0.0.3020) |
| B&R Embedded OS Installer | ≥V3.10 | ≥V3.10 | ≥V3.10 | ≥V3.10 | ≥V3.10 | ≥V3.20 |
| Environmental conditions | | | | | | |
| Temperature | | | | | | |
| Operation | 0 to 70°C | | | | | |
| Storage | -65 to 150°C | | | | | |
| Transport | -65 to 150°C | | | | | |
| Relative humidity | | | | | | |
| Operation | Max. 85% at 85°C | | | | | |
| Storage | Max. 85% at 85°C | | | | | |
| Transport | Max. 85% at 85°C | | | | | |
| Vibration | | | | | | |
| Operation | 20 g peak, 20 to 2000 Hz, 4 in each direction (JEDEC JESD22, method B103) 5.35 g RMS, 15 min per level (IEC 68-2-6) | | | | | |
| Storage | 20 g peak, 20 to 2000 Hz, 4 in each direction (JEDEC JESD22, method B103) 5.35 g RMS, 15 min per level (IEC 68-2-6) | | | | | |
| Transport | 20 g peak, 20 to 2000 Hz, 4 in each direction (JEDEC JESD22, method B103) 5.35 g RMS, 15 min per level (IEC 68-2-6) | | | | | |
| Shock | | | | | | |
| Operation | 1.5 kg peak, 0.5 ms 5 times (JEDEC JESD22, method B110) 30 g, 11 ms 1 times (IEC 68-2-27) | | | | | |
| Storage | 1.5 kg peak, 0.5 ms 5 times (JEDEC JESD22, method B110) 30 g, 11 ms 1 times (IEC 68-2-27) | | | | | |
| Transport | 1.5 kg peak, 0.5 ms 5 times (JEDEC JESD22, method B110) 30 g, 11 ms 1 times (IEC 68-2-27) | | | | | |
| Altitude | | | | | | |
| Operation | Max. 4572 m | | | | | |

Table 267: 5CFCRD.0512-04, 5CFCRD.1024-04, 5CFCRD.2048-04, 5CFCRD.4096-04, 5CFCRD.8192-04, 5CFCRD.016G-04 - Technical data

| Product ID | 5CFCRD.0512-04 | 5CFCRD.1024-04 | 5CFCRD.2048-04 | 5CFCRD.4096-04 | 5CFCRD.8192-04 | 5CFCRD.016G-04 |
|-----------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Mechanical characteristics | | | | | | |
| Dimensions | | | | | | |
| Width | 42.8 ±0.10 mm | | | | | |
| Length | 36.4 ±0.15 mm | | | | | |
| Height | 3.3 ±0.10 mm | | | | | |
| Weight | 10 g | | | | | |

Table 267: 5CFCRD.0512-04, 5CFCRD.1024-04, 5CFCRD.2048-04, 5CFCRD.4096-04, 5CFCRD.8192-04, 5CFCRD.016G-04 - Technical data

- 1) Speed specification with 1X = 150 Kb/s. All specifications refer to Samsung flash chips, CompactFlash cards in UDMA mode 4, 30 ns cycle time in True IDE mode with sequential write/read test.
- 2) Endurance of B&R CFs (with linear written block size ≥128 kB).
- 3) Depends on the average file size.
- 4) Not supported by the B&R Embedded OS Installer.

5.4.4 Temperature humidity diagram

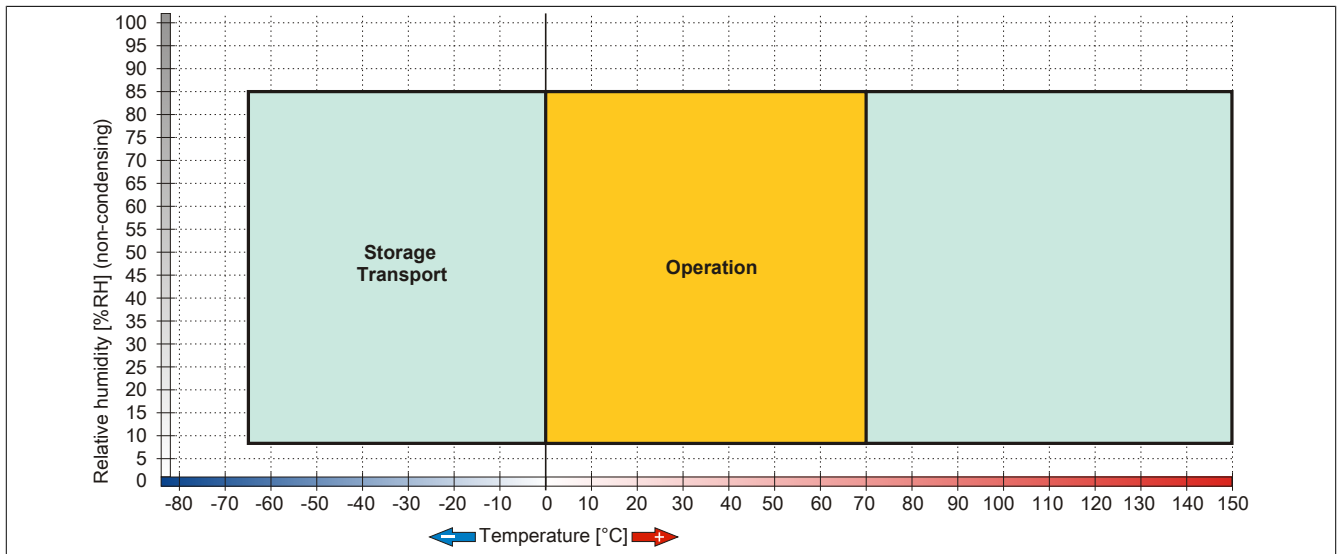


Figure 171: 5CFCRD.xxxx-04 CompactFlash cards - Temperature humidity diagram

5.4.5 Dimensions

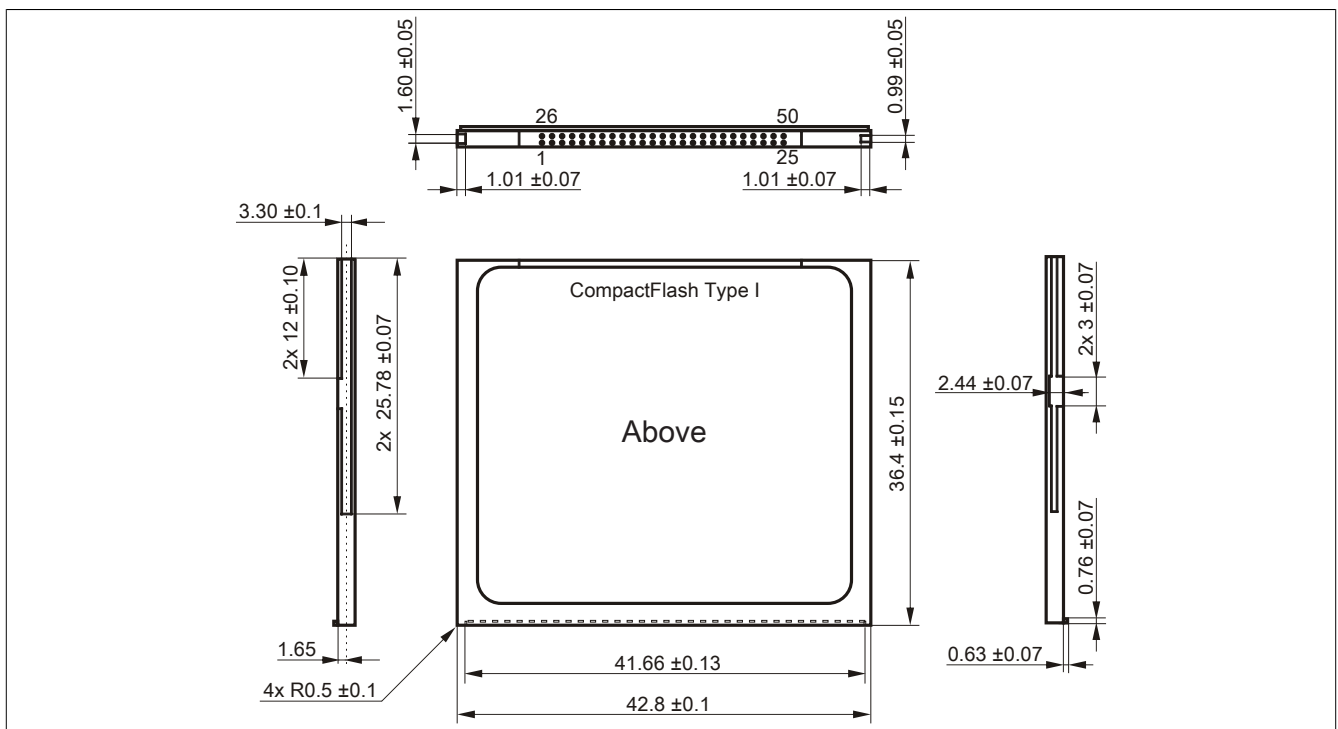


Figure 172: Type I CompactFlash card - Dimensions

5.4.6 Benchmark

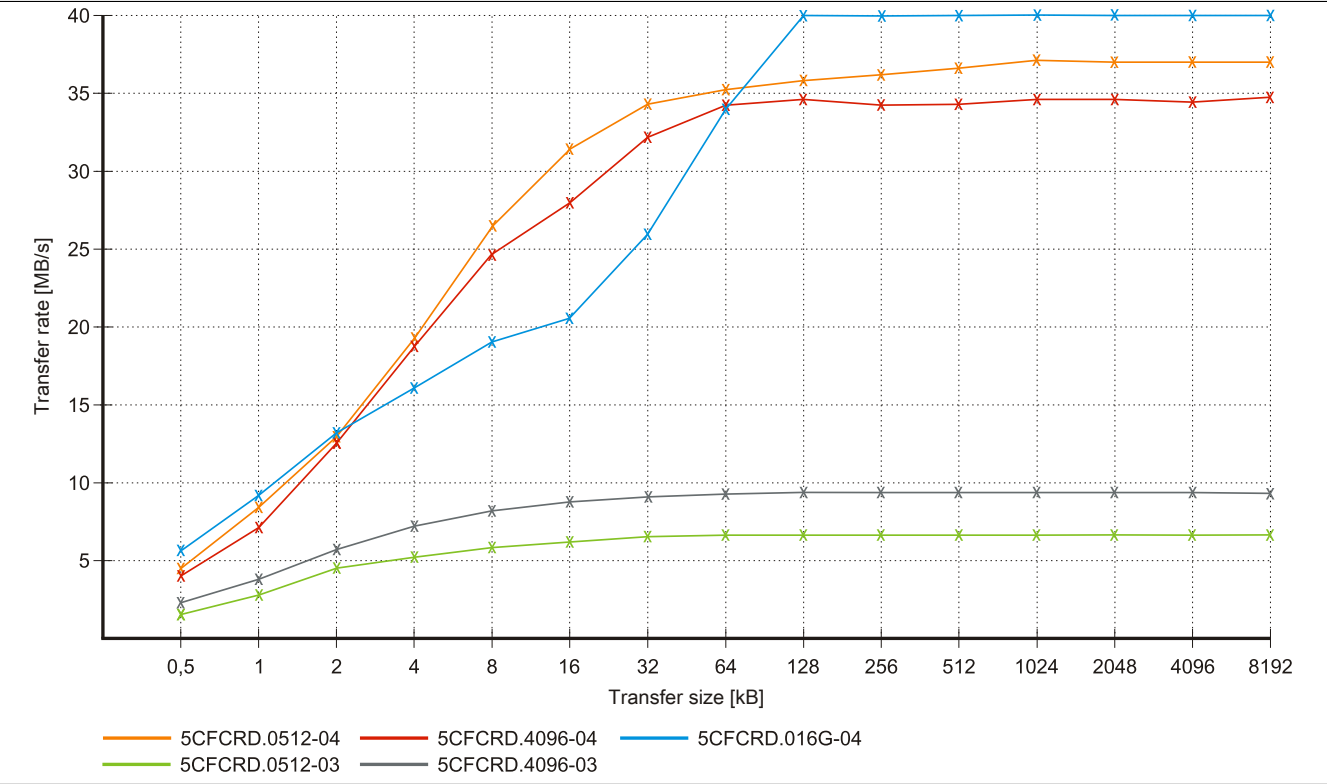


Figure 173: ATTO Disk Benchmark v2.34 read comparison - 5CFCRD.xxxx-03 and 5CFCRD.xxxx-04

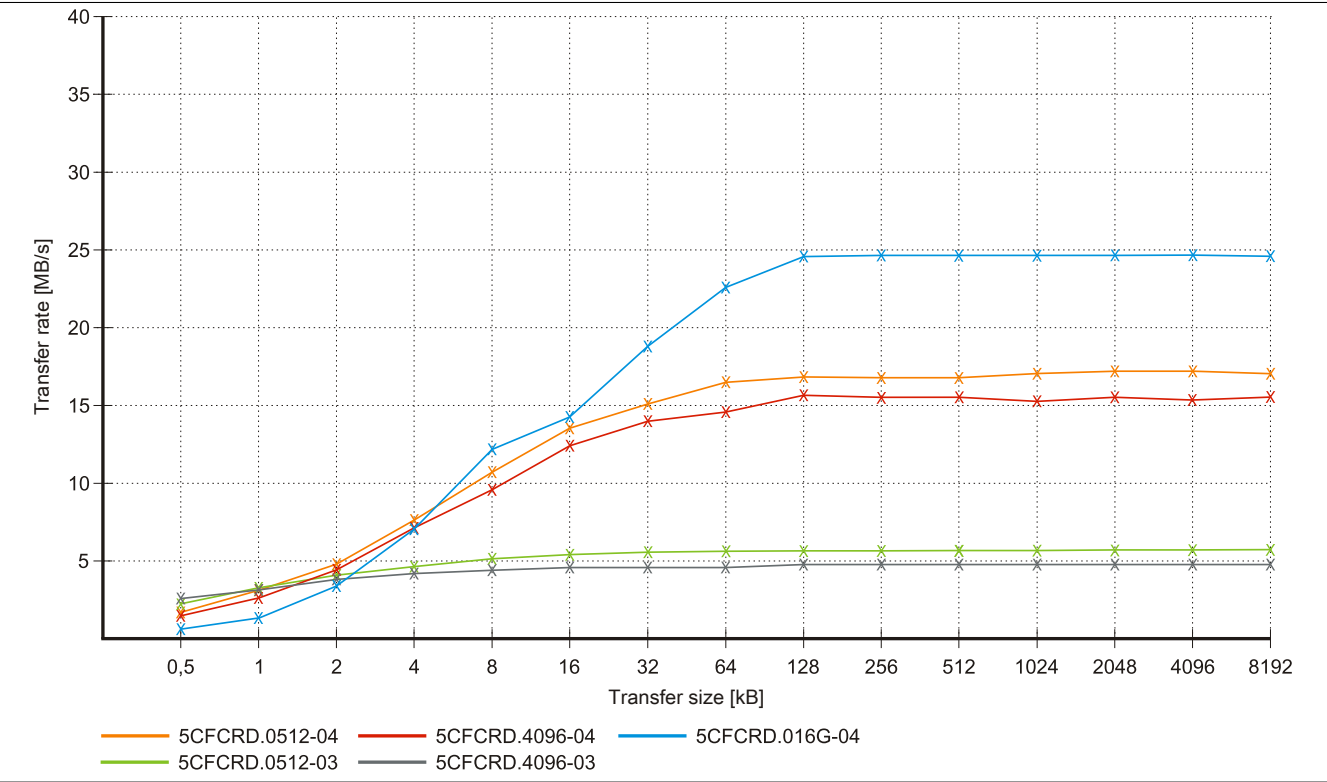


Figure 174: ATTO Disk Benchmark v2.34 write comparison - 5CFCRD.xxxx-03 and 5CFCRD.xxxx-04

5.5 5CFCRD.xxxx-03

5.5.1 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 different boot times.

see "Known problems/issues" on page 342

Information:

On Windows CE 5.0 devices, 5CFCRD.xxxx-03 CompactFlash cards up to 1 GB are supported.

Information:

On CompactFlash cards 5CFCRD.xxxx-03, only the sticker and the description have changed. The technical data has not been changed.

5.5.2 Order data


| Model number | Short description | Figure |
|----------------|---|--|
| | CompactFlash |  |
| 5CFCRD.0064-03 | CompactFlash 64 MB Western Digital (SLC) | |
| 5CFCRD.0128-03 | CompactFlash 128 MB Western Digital (SLC) | |
| 5CFCRD.0256-03 | CompactFlash 256 MB Western Digital (SLC) | |
| 5CFCRD.0512-03 | CompactFlash 512 MB Western Digital (SLC) | |
| 5CFCRD.1024-03 | CompactFlash 1 GB Western Digital (SLC) | |
| 5CFCRD.2048-03 | CompactFlash 2 GB Western Digital (SLC) | |
| 5CFCRD.4096-03 | CompactFlash 4 GB Western Digital (SLC) | |
| 5CFCRD.8192-03 | CompactFlash 8 GB Western Digital (SLC) | |

Table 268: 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

5.5.3 Technical data

Caution!

A sudden loss of power may result in data loss! In very rare cases, the mass storage device may also become damaged.

To prevent damage and loss of data, B&R recommends that you use a UPS device.

Information:

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

| Product ID | 5CFCRD.0064-03 | 5CFCRD.0128-03 | 5CFCRD.0256-03 | 5CFCRD.0512-03 | 5CFCRD.1024-03 | 5CFCRD.2048-03 | 5CFCRD.4096-03 | 5CFCRD.8192-03 |
|----------------------------|--|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| General information | | | | | | | | |
| Capacity | 64 MB | 128 MB | 256 MB | 512 MB | 1 GB | 2 GB | 4 GB | 8 GB |
| Data retention | 10 years | | | | | | | |
| Data reliability | <1 unrecoverable error in 10 ¹⁴ bit read accesses | | | | | | | |
| Lifetime monitoring | Yes | | | | | | | |
| MTBF | >4,000,000 hours (at 25°C) | | | | | | | |

Table 269: 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 | 8 MB/s | | | | | | | |
| Typical | | | | | | | | |
| Continuous writing | 6 MB/s | | | | | | | |
| Typical | | | | | | | | |
| Certification | Yes | | | | | | | |
| CE | | | | | | | | |
| cULus | | | | | | | | |
| GL | | | | | | | | |
| Endurance | | | | | | | | |
| Clear/Write cycles | >2,000,000 | | | | | | | |
| Typical | | | | | | | | |
| 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 | No No No No No No No Yes Yes Yes Yes Yes No | | | | | | | |
| 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 | | | | | | | | |
| Software | ≥V2.57 (part of PVI Development Setup ≥ V2.5.3.3005) ≥ V2.21 | | | | | | | |
| PVI Transfer | | | | | | | | |
| B&R Embedded OS Installer | | | | | | | | |
| Environmental conditions | | | | | | | | |
| Temperature | 0 to 70°C -50 to 100°C -50 to 100°C | | | | | | | |
| Operation | | | | | | | | |
| Storage | | | | | | | | |
| Transport | | | | | | | | |
| Relative humidity | 8 to 95%, non-condensing 8 to 95%, non-condensing 8 to 95%, non-condensing | | | | | | | |
| Operation | | | | | | | | |
| Storage | | | | | | | | |
| Transport | | | | | | | | |
| Vibration | 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) | | | | | | | |
| Operation | | | | | | | | |
| Storage | | | | | | | | |
| Transport | | | | | | | | |
| Shock | Max. 1000 g (9810 m/s² 0-peak) Max. 3000 g (29430 m/s² 0-peak) Max. 3000 g (29430 m/s² 0-peak) | | | | | | | |
| Operation | | | | | | | | |
| Storage | | | | | | | | |
| Transport | | | | | | | | |
| Altitude | Max. 24383 m | | | | | | | |
| Operation | | | | | | | | |
| Mechanical characteristics | | | | | | | | |
| Dimensions | 42.8 ±0.10 mm 36.4 ±0.15 mm 3.3 ±0.10 mm | | | | | | | |
| Width | | | | | | | | |
| Length | | | | | | | | |
| Height | | | | | | | | |
| Weight | 11.4 g | | | | | | | |

Table 269: 5CFCRD.0064-03, 5CFCRD.0128-03, 5CFCRD.0256-03, 5CFCRD.0512-03, 5CFCRD.1024-03, 5CFCRD.2048-03, 5CFCRD.4096-03, 5CFCRD.8192-03 - Technical data

1) Not supported by the B&R Embedded OS Installer.

5.5.4 Temperature humidity diagram

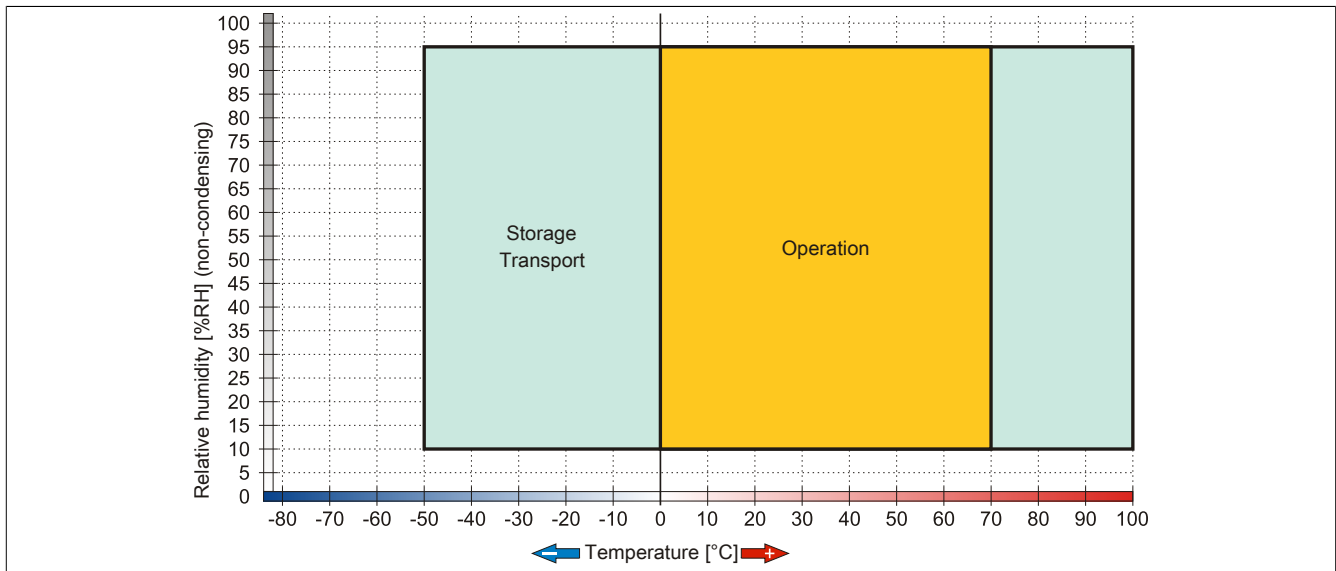


Figure 175: 5CFCRD.xxxx-03 CompactFlash cards - Temperature humidity diagram

5.5.5 Dimensions

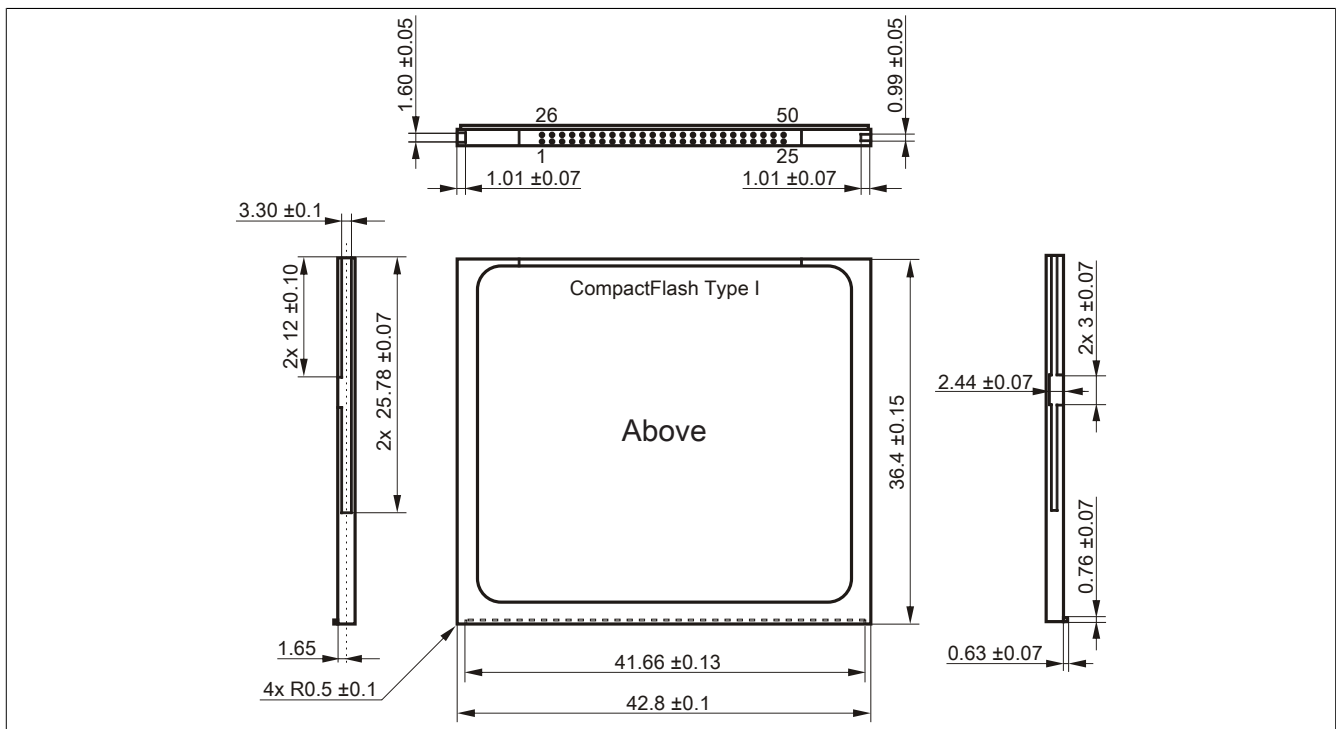


Figure 176: Type I CompactFlash card - Dimensions

5.6 Known problems/issues

The following is a known issue for devices with two CompactFlash slots:

- Using two different types of CompactFlash cards can cause problems with Automation PCs and Panel PCs. For example, it is possible that one of the two cards is not detected during system startup. This is caused by different 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 end of the time frame provided for startup. The problem described can occur because the startup time for the CompactFlash cards fluctuates due to the different components being used. Depending on the CompactFlash cards being used, this error may occur never, sometimes or always.

6 USB media drive

6.1 5MD900.USB2-01

6.1.1 General information

The USB media drive is a drive combination with diskette, DVD-RW/CD-RW drive, CompactFlash slot and USB ports (front and back). It is connected to a USB port on the B&R Industrial PC.

- Desktop or rack-mounted operation (mounting rail brackets)
- Integrated USB diskette drive
- Integrated DVD-RW/CD-RW drive
- Integrated IDE/ATAPI CompactFlash slot (hot pluggable)
- Integrated USB 2.0 connection (up to 480 Mbit high speed)
- +24 VDC supply (back)
- USB/B 2.0 connection (back side)
- Optional front cover

6.1.2 Order data


| Model number | Short description | Figure |
|----------------|---|--|
| | USB accessories |  |
| 5MD900.USB2-01 | USB 2.0 drive combination, consists of DVD-R/RW DVD+R/RW, FDD, CompactFlash slot (Type II), USB connection (Type A on front, Type B on back); 24 VDC, (order screw clamp 0TB103.9 or cage clamp 0TB103.91 separately) | |
| | Required accessories | |
| | Other | |
| 5SWUT1.0000-00 | OEM Nero CD-RW Software, only available with a CD writer. | |
| | Terminal blocks | |
| 0TB103.9 | Connector, 24 VDC, 3-pin female, 3.31 mm ² screw clamp, protected against vibration by the screw flange | |
| 0TB103.91 | Connector, 24 VDC, 3-pin female, 3.31 mm ² cage clamp, protected against vibration by the screw flange | |
| | USB accessories | |
| 5A5003.03 | Front cover, for remote CD-ROM drive 5A5003.02 and USB 2.0 drive combination 5MD900.USB2-00, 5MD900.USB2-01 and 5MD900.USB2-02 | |
| | USB cable | |
| 5CAUSB.0018-00 | USB 2.0 connection cable type A - type B, 1.8 m | |
| 5CAUSB.0050-00 | USB 2.0 connection cable type A - type B, 5 m | |

Table 270: 5MD900.USB2-01 - Order data

6.1.3 Interfaces

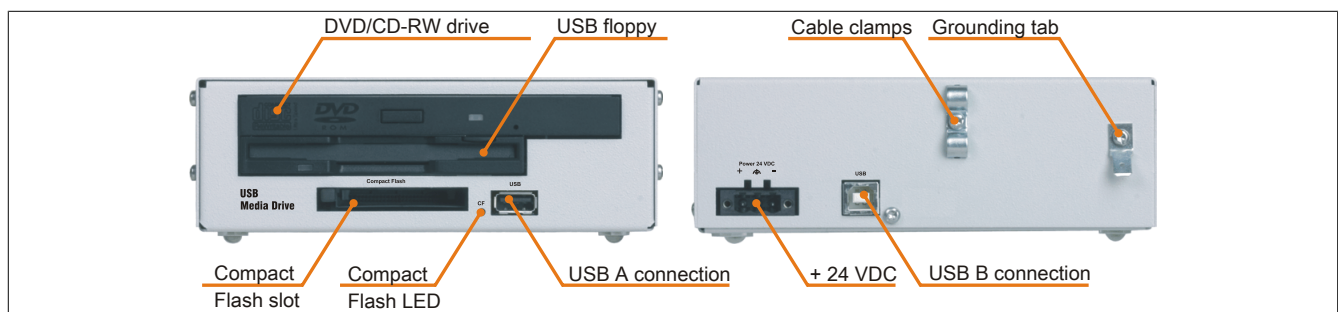


Figure 177: 5MD900.USB2-01 - Interfaces

6.1.4 Technical data

Information:

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

| Product ID | 5MD900.USB2-01 |
|--|--|
| General information | |
| Max. cable length | 5 m (not including hub) |
| Certification | |
| CE | Yes |
| cULus | Yes |
| Interfaces | |
| CompactFlash slot 1 | |
| Type | Type I |
| Connection | IDE/ATAPI |
| Activity LED | Signals read or write access to an inserted CompactFlash card |
| USB | |
| Type | USB 2.0 |
| Design | Type A front Type B back |
| Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) |
| Current load | Max. 500 mA |
| CD / DVD drive | |
| Data buffer capacity | 8 MB |
| Data transfer rate | Max. 33.3 MB/s |
| Speed | Max. 5090 rpm $\pm 1\%$ |
| Noise level | Approx. 48 dBA in a distance of 50 cm (full read access) |
| Compatible formats | CD-DA, CD-ROM mode 1/mode 2 CD-ROM XA mode 2 (form 1, form 2) Photo CD (single-/multi-session), Enhanced CD, CD text DVD-ROM, DVD-R, DVD-RW, DVD-Video DVD-RAM (4.7GB, 2.6GB) DVD+R, DVD+R (dual layer), DVD+RW |
| Laser class | Class 1 laser |
| Service life | 60000 POH (power-on hours) |
| Interface | IDE (ATAPI) |
| Startup time | |
| CD | Max. 14 seconds (0 rpm to read access) |
| DVD | Max. 15 seconds (0 rpm to read access) |
| Access time | |
| CD | 130 ms (24x) |
| DVD | 130 ms (8x) |
| Readable media | |
| CD | CD/CD-ROM (12 cm, 8 cm), CD-R, CD-RW |
| DVD | DVD-ROM, DVD-R, DVD-RW, DVD-RAM, DVD+R, DVD+R (dual layer), DVD+RW |
| Writable media | |
| CD | CD-R, CD-RW |
| DVD | DVD-R/RW, DVD-RAM (4.7 GB), DVD+R/RW, DVD+R (dual layer) |
| Read speed | |
| CD | 24x |
| DVD | 8x |
| Write speed | |
| CD-R | 10 to 24x |
| CD-RW | 10 to 24x |
| DVD+R | 3.3 - 8x |
| DVD+R (dual layer) | 2.4 - 4x |
| DVD+RW | 3.3 - 8x |
| DVD-R | 2 - 6x |
| DVD-R (dual layer) | 2 - 4x |
| DVD-RAM | 3 - 5x |
| DVD-RW | 2 - 6x |
| Write methods | |
| CD | Disk at once, session at once, packet write, track at once |
| DVD | Disk at once, incremental, overwrite, sequential, multi-session |
| Disk drive | |
| Data transfer rate | 250 kbit/s (720 kB) or 500 kbit/s (1.25 MB and 1.44 MB) |
| Diskette media | High density (2HD) or normal density (2DD) 3.5" diskettes |
| Capacity | 720 kB / 1.25 MB / 1.44 MB (formatted) |
| MTBF | 30000 POH (power-on hours) |
| Rotation speed | Up to 360 rpm |
| Electrical characteristics | |
| Nominal voltage | 24 VDC $\pm 25\%$ |
| Operating conditions | |
| Protection in accordance with EN 60529 | Front: IP65 (only with optional front cover), back: IP20 |
| Environmental conditions | |
| Temperature ¹⁾ | |
| Operation | 5 to 45°C |
| Storage | -20 to 60°C |
| Transport | -40 to 60°C |

Table 271: 5MD900.USB2-01 - Technical data

| Product ID | 5MD900.USB2-01 |
|----------------------------|--|
| Relative humidity | |
| Operation | 20 to 80% |
| Storage | 5 to 90% |
| Transport | 5 to 95% |
| Vibration | |
| Operation | 5 to 500 Hz: 0.3 g (2.9 m/s ² 0-peak) |
| Storage | 10 to 100 Hz: 2 g (19.6 m/s ² 0-peak) |
| Transport | 10 to 100 Hz: 2 g (19.6 m/s ² 0-peak) |
| Shock | |
| Operation | 5 g, 11 ms |
| Storage | 60 g, 11 ms |
| Transport | 60 g, 11 ms |
| Altitude | |
| Operation | Max. 3000 m |
| Mechanical characteristics | |
| Dimensions | |
| Width | 156 mm |
| Height | 52 mm |
| Depth | 140 mm |
| Weight | Approx. 1100 g (without front cover) |

Table 271: 5MD900.USB2-01 - Technical data

- 1) Temperature specifications refer to operation at 500 meters. The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level).

6.1.5 Dimensions

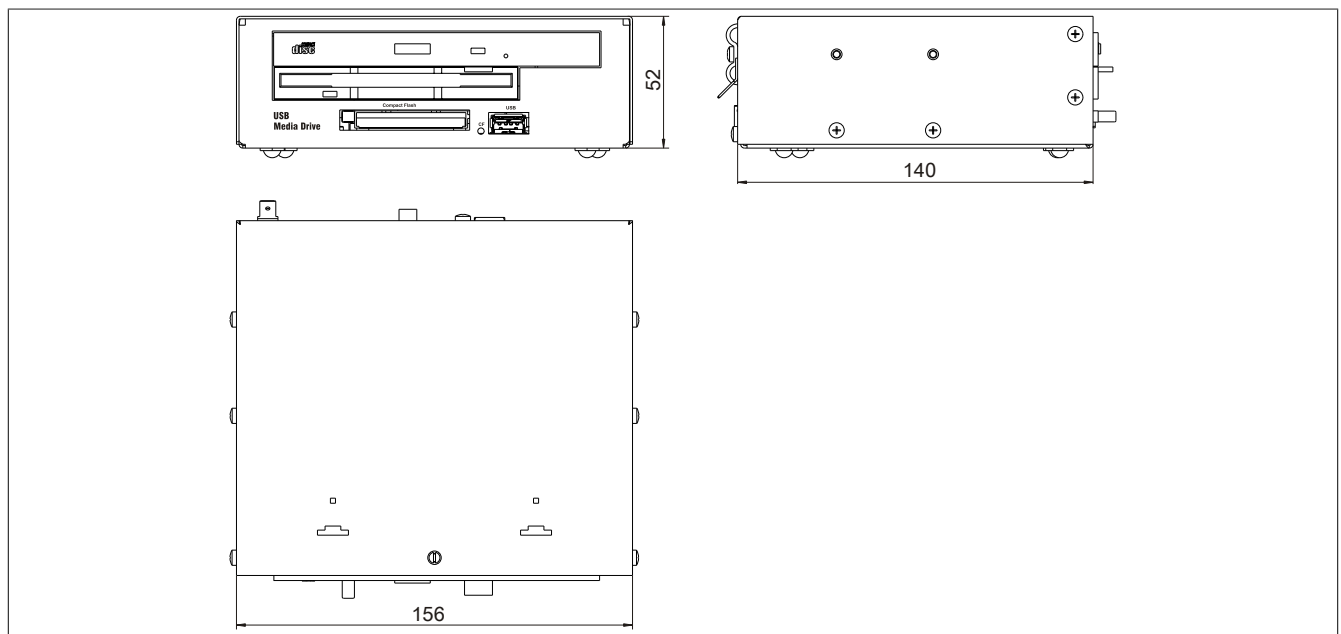


Figure 178: 5MD900.USB2-01 - Dimensions

6.1.6 Dimensions with front cover

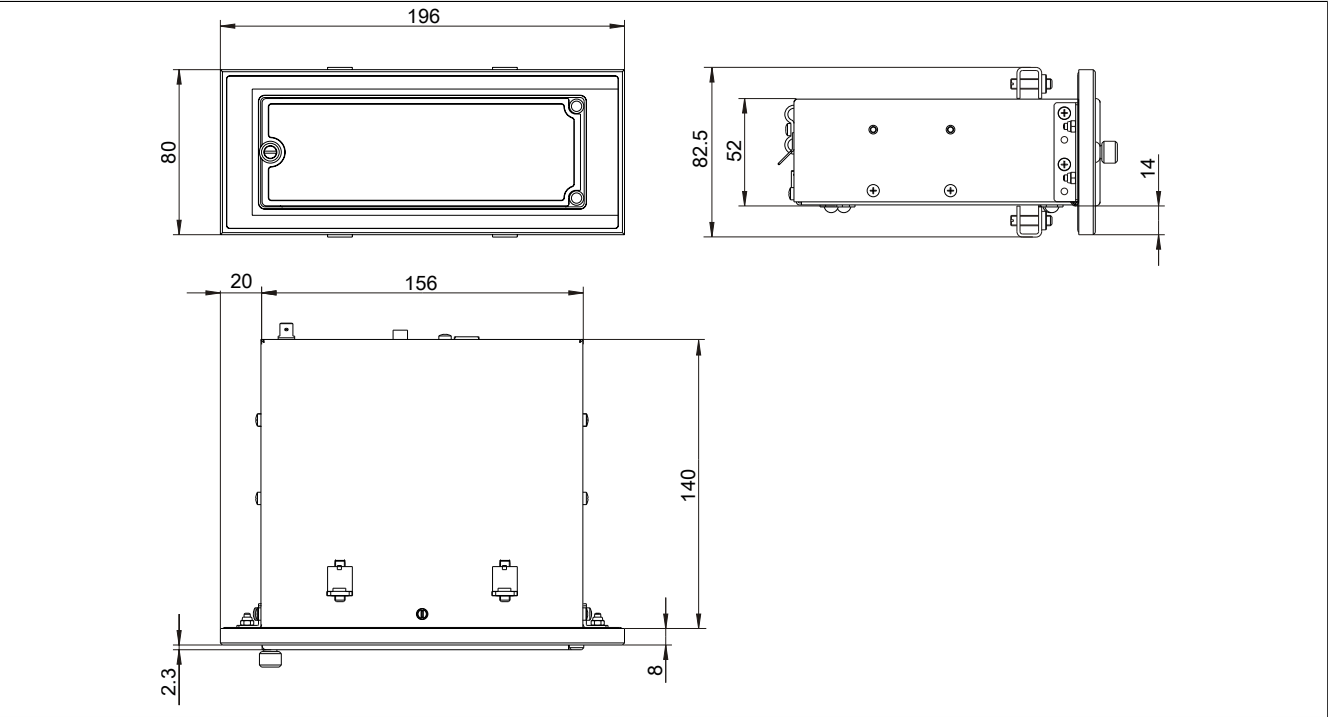


Figure 179: USB media drive with front cover - Dimensions

6.1.7 Cutout installation

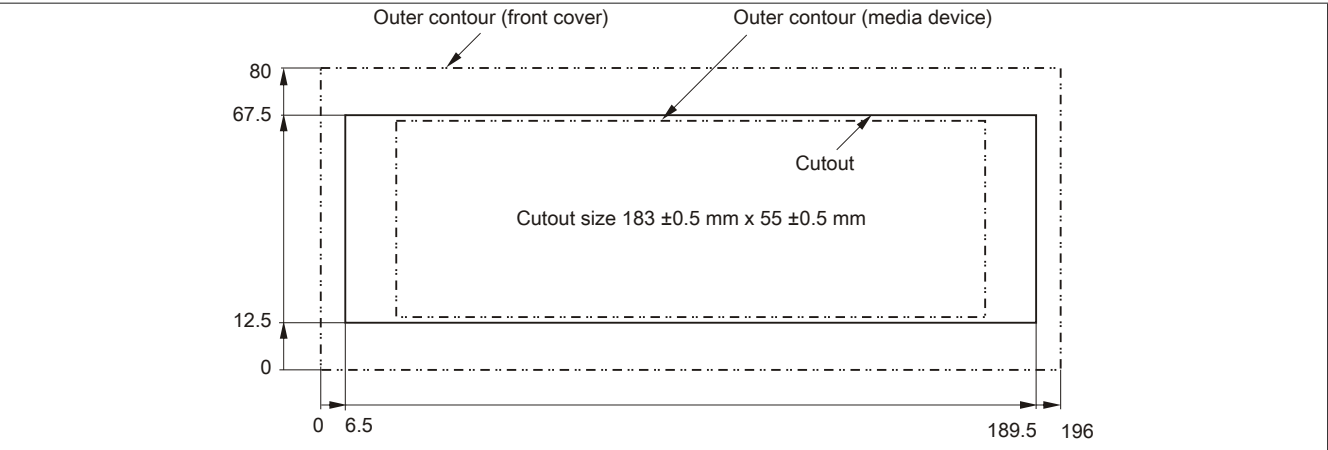


Figure 180: USB media drive with front cover - Installation cutout

6.1.8 Contents of delivery

| Quantity | Component |
|----------|------------------------|
| 1 | USB media drive |
| 2 | Mounting rail brackets |

Table 272: 5MD900.USB2-01 - Contents of delivery

6.1.9 Installation

The USB media drive can be operated as a desktop device (rubber feet) or as a rack-mounted device (2 mounting rail brackets included).

6.1.9.1 Mounting orientation

Because of limits to the mounting orientation with the components used (floppy, DVD-CDRW drive), the USB media drive is only permitted to be mounted and operated as shown in the following figure.

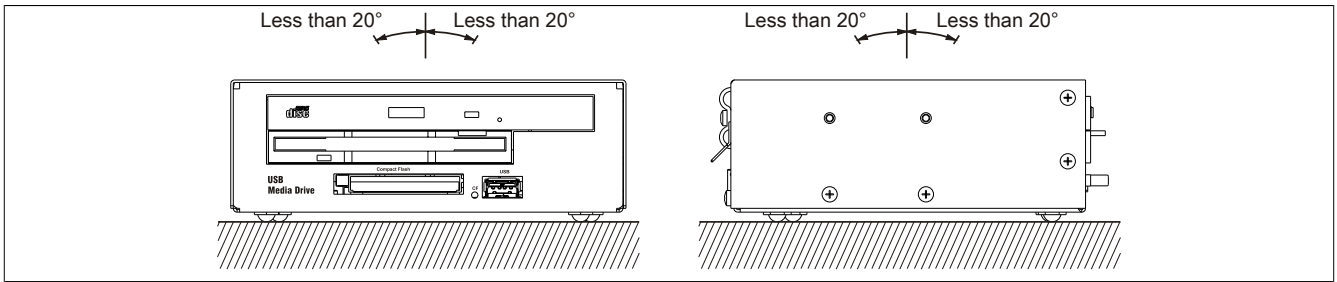


Figure 181: 5MD900.USB2-01 - Mounting orientation

6.2 5MD900.USB2-02

6.2.1 General information

The USB media drive features a DVD-R/RW DVD+R/RW drive, a CompactFlash slot and one USB port on both the front and back. It is connected to a USB port on the B&R Industrial PC.

- Desktop or rack-mounted operation (mounting rail brackets)
- Integrated DVD-R/RW DVD+R/RW drive
- Integrated IDE/ATAPI CompactFlash slot (hot pluggable)
- Integrated USB 2.0 connection
- +24 VDC supply (back)
- USB 2.0 connection (back)
- Optional front cover

6.2.2 Order data


| Model number | Short description | Figure |
|----------------|---|---|
| 5MD900.USB2-02 | USB accessories |  |
| | USB 2.0 drive combination, consists of DVD-R/RW DVD+R/RW, CompactFlash slot (Type II), USB connection (Type A on the front, Type B on the back); 24V DC (order screw clamp terminal 0TB103.9 or cage clamp terminal 0TB103.91 separately) | |
| | Required accessories | |
| | Other | |
| 5SWUT1.0000-00 | OEM Nero CD-RW Software, only available with a CD writer. | |
| 0TB103.9 | Terminal blocks | |
| | Connector, 24 VDC, 3-pin female, 3.31 mm ² screw clamp, protected against vibration by the screw flange | |
| | Connector, 24 VDC, 3-pin female, 3.31 mm ² cage clamp, protected against vibration by the screw flange | |
| 5CAUSB.0018-00 | USB cable | |
| | USB 2.0 connection cable type A - type B, 1.8 m | |
| | USB 2.0 connection cable type A - type B, 5 m | |

Table 273: 5MD900.USB2-02 - Order data

6.2.3 Interfaces

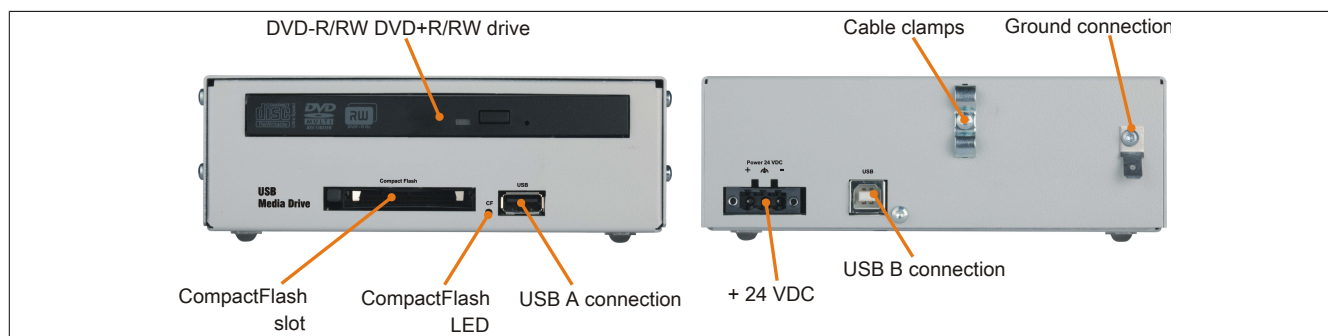


Figure 182: 5MD900.USB2-02 - Interfaces

6.2.4 Technical data

| Product ID | 5MD900.USB2-02 |
|----------------------------|---|
| General information | |
| Max. cable length | 5 m (not including hub) |
| Certification | |
| CE | Yes |
| cULus | Yes |
| Interfaces | |
| CompactFlash slot 1 | |
| Type | Type I |
| Connection | IDE/ATAPI |
| Activity LED | Signals read or write access to an inserted CompactFlash card |

Table 274: 5MD900.USB2-02 - Technical data

| Product ID | 5MD900.USB2-02 |
|--|--|
| USB | |
| Type | USB 2.0 |
| Design | Type A front Type B back |
| Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) |
| Current load | Max. 500 mA |
| CD / DVD drive | |
| Data buffer capacity | 2 MB |
| Data transfer rate | Max. 33.3 MB/s |
| Speed | Max. 5090 rpm $\pm 1\%$ |
| 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-R, DVD-RW, DVD-Video DVD-RAM (4.7GB, 2.6GB) DVD+R, DVD+R (dual layer), DVD+RW |
| Laser class | Class 1 laser |
| Service life | 60000 POH (power-on hours) |
| Interface | IDE (ATAPI) |
| Startup time | |
| CD | Max. 14 seconds (from 0 rpm to read access) |
| DVD | Max. 15 seconds (from 0 rpm to read access) |
| Access time | |
| CD | Typ. 140 ms (24x) |
| DVD | Typ. 150 ms (8x) |
| Readable media | |
| CD | CD/CD-ROM (12 cm, 8 cm), CD-R, CD-RW |
| DVD | DVD-ROM, DVD-R, DVD-RW, DVD-RAM, DVD+R, DVD+R (dual layer), DVD+RW |
| Writable media | |
| CD | CD-R, CD-RW |
| DVD | DVD-R/RW, DVD-RAM (4.7 GB), DVD+R/RW, DVD+R (dual layer) |
| Read speed | |
| CD | 24x |
| DVD | 8x |
| Write speed | |
| CD-R | 10 to 24x |
| CD-RW | 10 to 24x |
| DVD+R | 3.3 to 8x |
| DVD+R (dual layer) | 2.4 to 4x |
| DVD+RW | 3.3 to 8x |
| DVD-R | 2 to 6x |
| DVD-R (dual layer) | 2 to 4x |
| DVD-RAM | 3 to 5x |
| DVD-RW | 2 to 6x |
| Write methods | |
| CD | Disk at once, session at once, packet write, track at once |
| DVD | Disk at once, incremental, overwrite, sequential |
| Electrical characteristics | |
| Nominal voltage | 24 VDC $\pm 25\%$ |
| Operating conditions | |
| Protection in accordance with EN 60529 | Front: IP65 (only with optional front cover), back: IP20 |
| Environmental conditions | |
| Temperature ¹⁾ | |
| Operation | 5 to 45°C |
| Storage | -20 to 60°C |
| Transport | -40 to 60°C |
| Relative humidity | |
| Operation | 20 to 80% |
| Storage | 5 to 90% |
| Transport | 5 to 95% |
| Vibration | |
| Operation | 5 to 500 Hz: 0.3 g (2.9 m/s ² 0-peak) |
| Storage | 10 to 100 Hz: 2 g (19.6 m/s ² 0-peak) |
| Transport | 10 to 100 Hz: 2 g (19.6 m/s ² 0-peak) |
| Shock | |
| Operation | 5 g, 11 ms |
| Storage | 60 g, 11 ms |
| Transport | 60 g, 11 ms |
| Altitude | |
| Operation | Max. 3000 m |

Table 274: 5MD900.USB2-02 - Technical data

| Product ID | 5MD900.USB2-02 |
|----------------------------|--------------------------------------|
| Mechanical characteristics | |
| Dimensions | |
| Width | 156 mm |
| Height | 52 mm |
| Depth | 140 mm |
| Weight | Approx. 1100 g (without front cover) |

Table 274: 5MD900.USB2-02 - Technical data

- 1) Temperature specifications refer to operation at 500 meters. The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level).

6.2.5 Dimensions

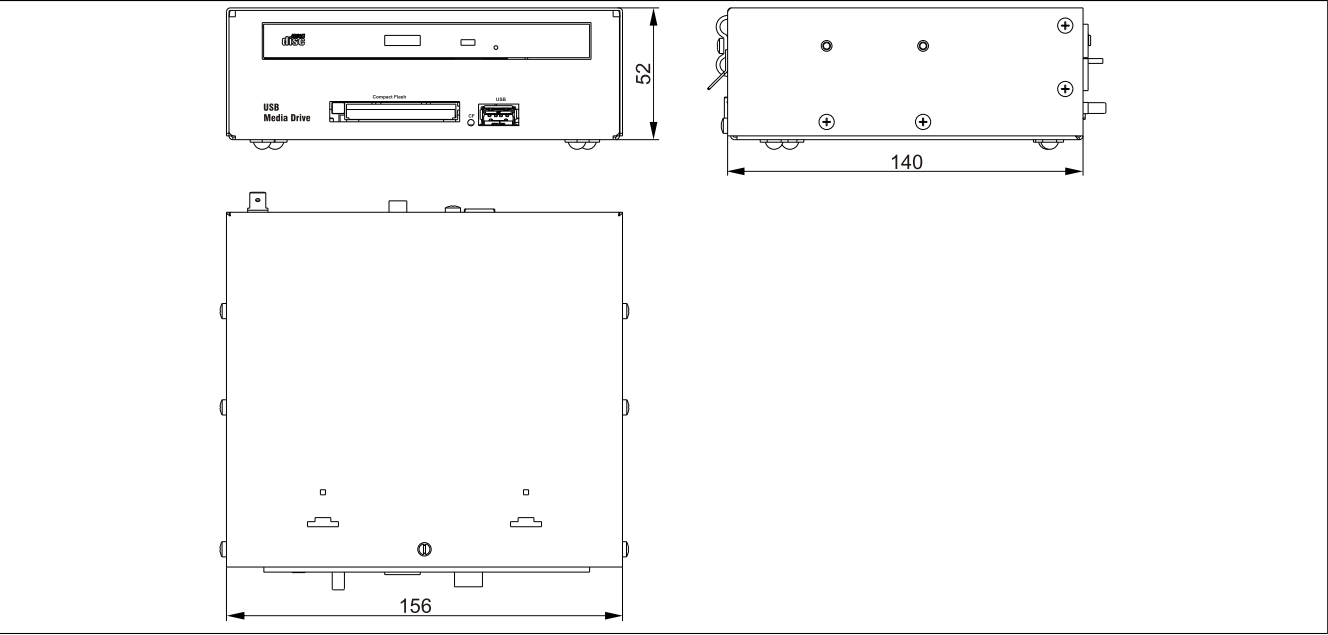


Figure 183: 5MD900.USB2-02 - Dimensions

6.2.6 Dimensions with front cover

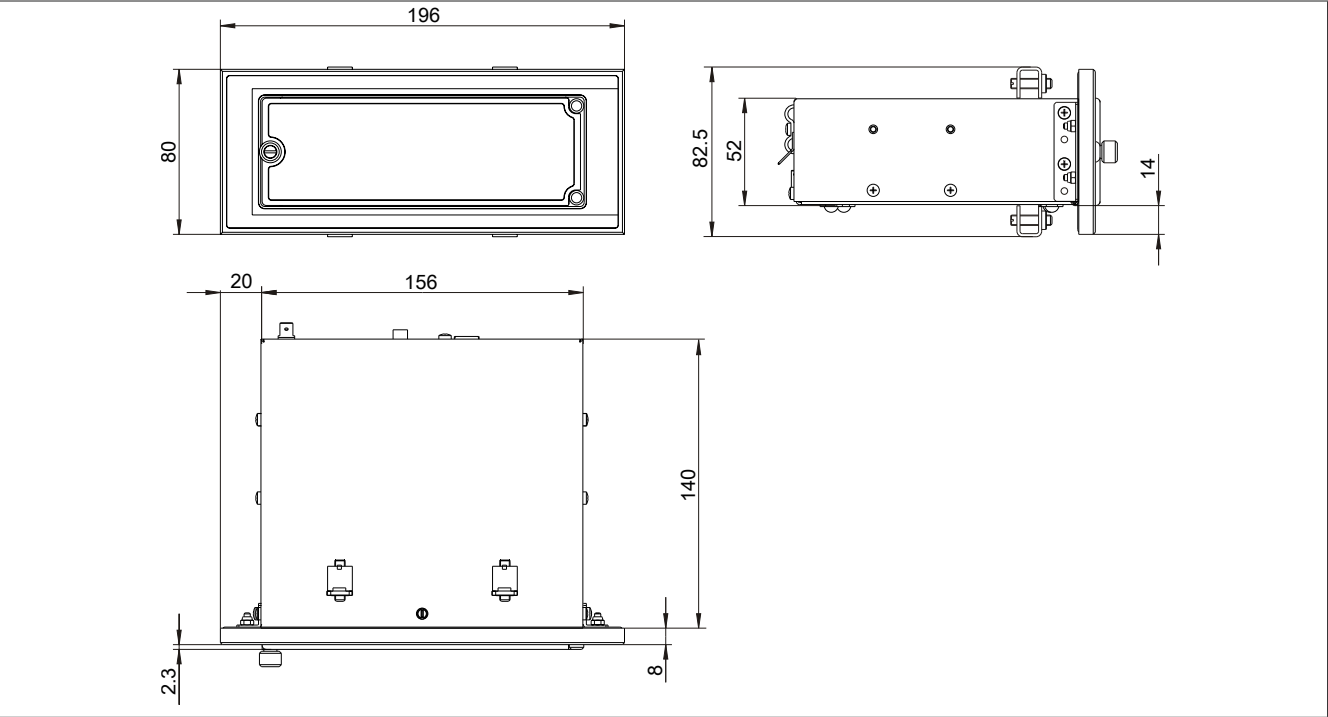


Figure 184: USB media drive with front cover - Dimensions

6.2.7 Cutout installation

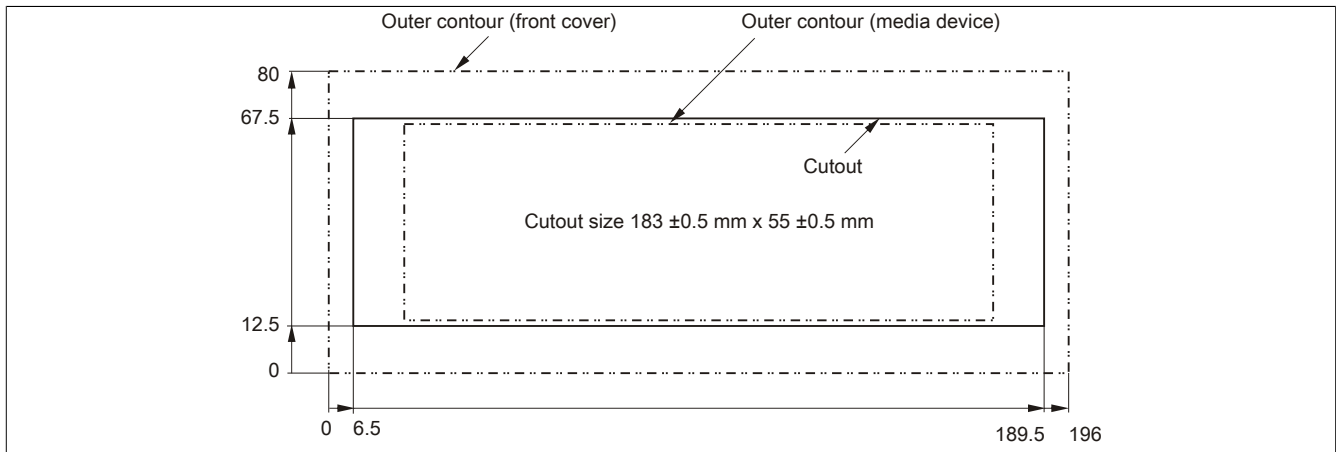


Figure 185: USB media drive with front cover - Installation cutout

6.2.8 Contents of delivery

| Quantity | Component |
|----------|------------------------|
| 1 | USB media drive |
| 2 | Mounting rail brackets |

Table 275: 5MD900.USB2-02 - Contents of delivery

6.2.9 Installation

The USB media drive can be operated as a desktop device (rubber feet) or as a rack-mounted device (2 mounting rail brackets included).

6.2.9.1 Mounting orientation

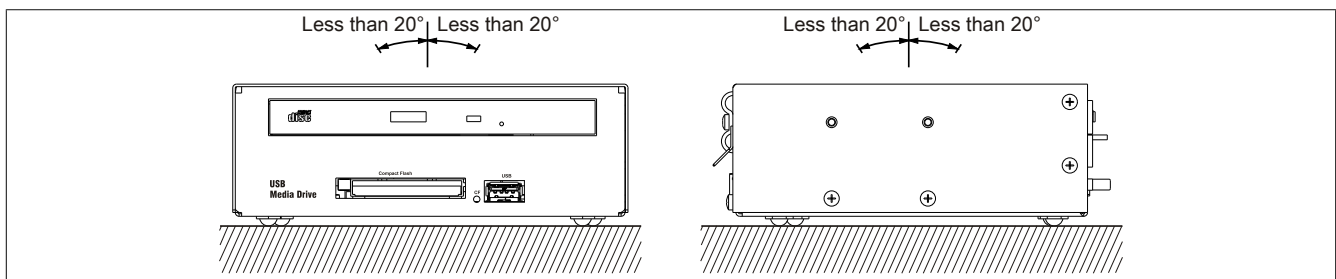


Figure 186: 5MD900.USB2-02 - Mounting orientation

6.3 5A5003.03

6.3.1 General information

This front cover can be mounted on the front of the USB media drive (model number 5MD900.USB2-00, 5MD900.USB2-01 or 5MD900.USB2-02) to protect the interface.

6.3.2 Order data


| Model number | Short description | Figure |
|--------------|--|---|
| | USB accessories | |
| 5A5003.03 | Front cover, for remote CD-ROM drive 5A5003.02 and USB 2.0 drive combination 5MD900.USB2-00, 5MD900.USB2-01 and 5MD900.USB2-02 |  |

Table 276: 5A5003.03 - Order data

6.3.3 Technical data

| Product ID | 5A5003.03 |
|-----------------------------------|--------------------------|
| General information | |
| Certification | |
| CE | Yes |
| cULus | Yes |
| Mechanical characteristics | |
| Front | |
| Panel membrane | |
| Light background | Similar to Pantone 427CV |
| Dimensions | |
| Width | 196 mm |
| Height | 80 mm |
| Depth | 8 mm |

Table 277: 5A5003.03 - Technical data

6.3.4 Dimensions

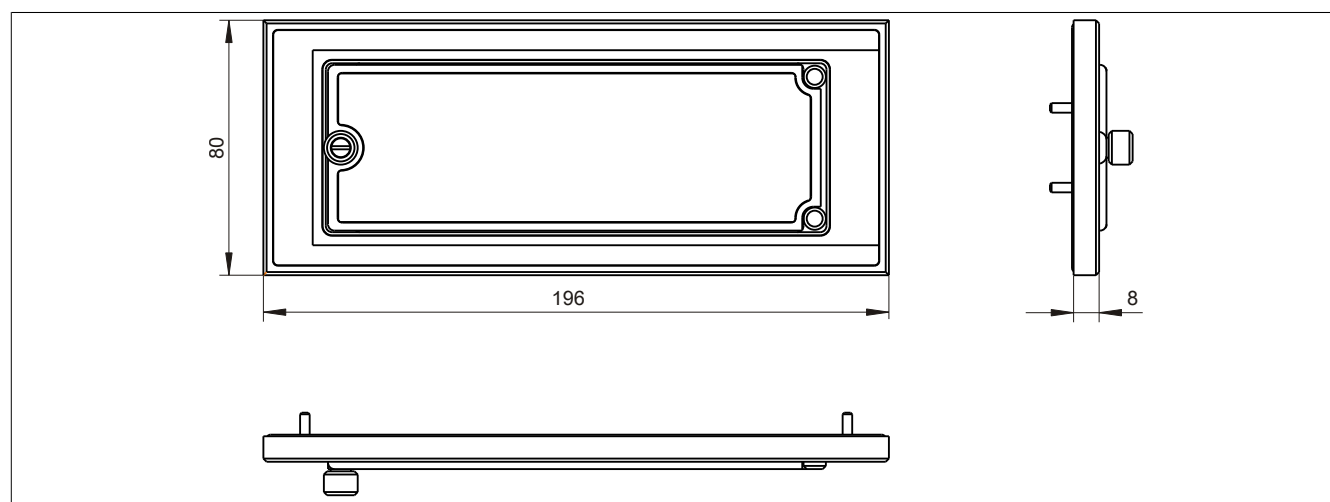


Figure 187: 5A5003.03 - Dimensions

6.3.5 Contents of delivery

| Quantity | Component |
|----------|---|
| 1 | Front cover 5A5003.03 for the USB media drive |
| 4 | M3 locknut |
| 4 | Cover retaining clip |

Table 278: 5A5003.03 - Contents of delivery

6.3.6 Installation

The front cover is attached with 2 mounting rail brackets (included with the USB media drive) and 4 M3 locknuts. The 4 retaining clips provided can be used to mount the USB media drive and front cover as a whole, for example in a control cabinet door.

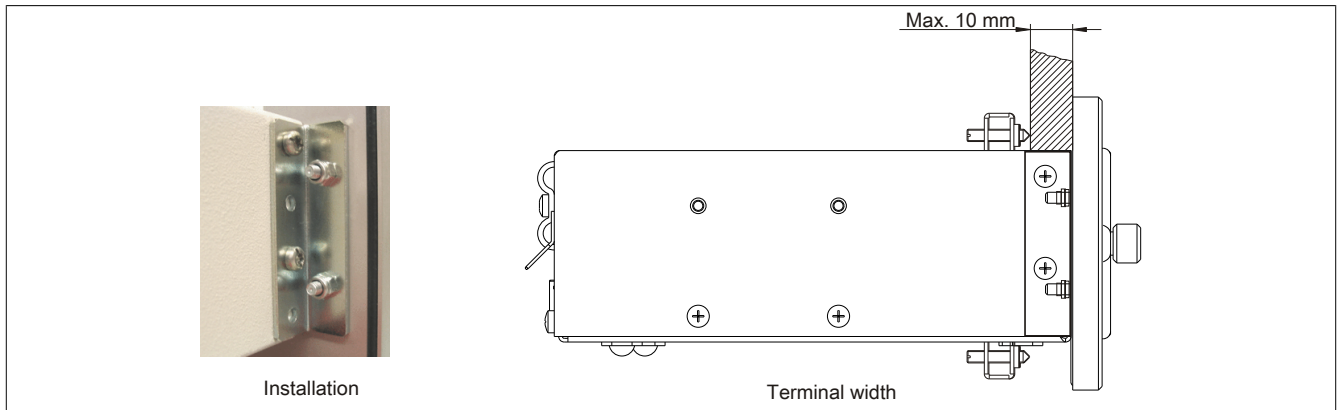


Figure 188: Front cover mounting and installation depth

6.3.6.1 Cutout installation

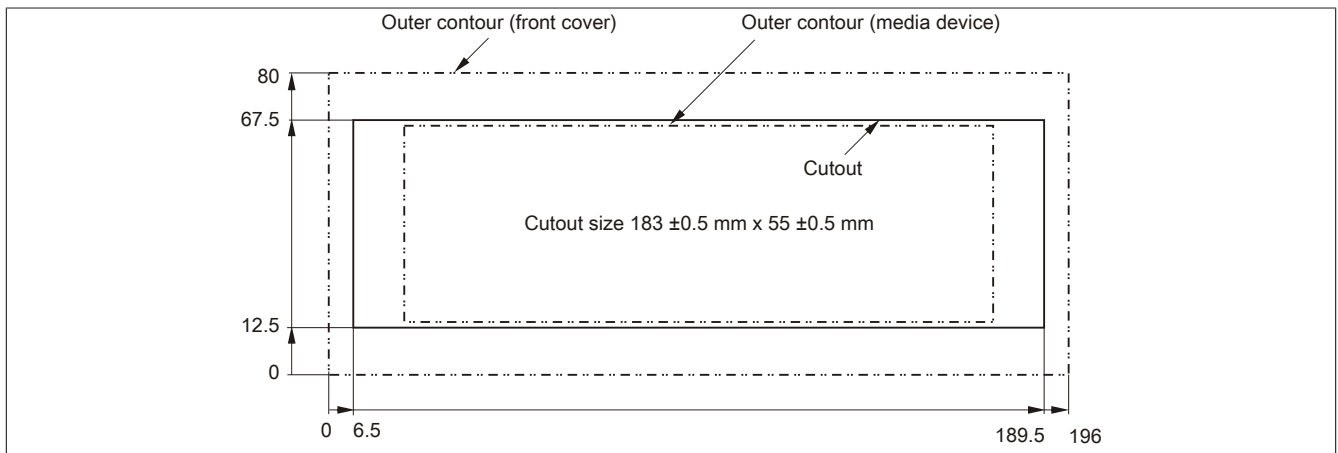


Figure 189: USB media drive with front cover - Installation cutout

7 USB flash drives

7.1 5MMUSB.2048-00

7.1.1 General information

USB flash drives are storage media that are easy to replace. Because of their fast data transfer (USB 2.0), USB flash drives are ideal for use as portable data storage. Without requiring additional drivers ("hot plugging", except in the case of Windows 98SE), the USB flash drive can immediately act as an additional drive where data can be read or written.

Information:

Due to the vast quantity of USB flash drives available on the market as well as their short product life cycle, we reserve the right to supply alternative products at any time. The following measures may therefore be necessary in order to boot from these flash drives as well:

- The flash drive must be reformatted or in some cases even repartitioned (set active partition).
- The flash drive must be the first bootable device in the BIOS boot order; alternatively, the IDE controllers can be disabled in BIOS. This can be avoided in most cases if the "fdisk /mbr" command is additionally executed on the USB flash drive.

7.1.2 Order data

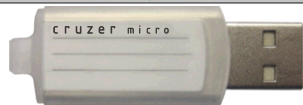
| Model number | Short description | Figure |
|----------------|------------------------------|---|
| | USB accessories |  |
| 5MMUSB.2048-00 | USB 2.0 flash drive, 2048 MB | |

Table 279: 5MMUSB.2048-00 - Order data

7.1.3 Technical data

Information:

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

| Product ID | 5MMUSB.2048-00 |
|-----------------------------------|---|
| General information | |
| Data retention | 10 years |
| LEDs | 1 LED (green) ¹⁾ |
| MTBF | 100,000 hours (at 25°C) |
| Type | USB 1.1, USB 2.0 |
| Maintenance | None |
| Certification CE | Yes |
| Interfaces | |
| USB | |
| Type | USB 1.1, USB 2.0 |
| Connection | To any USB Type A interface |
| Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) |
| Sequential reading | Max. 8.7 MB/s |
| Sequential writing | Max. 1.7 MB/s |
| Support | |
| Operating systems | |
| Windows XP Professional | Yes |
| Windows XP Embedded | Yes |
| Windows ME | Yes |
| Windows 2000 | Yes |
| Windows CE 5.0 | Yes |
| Windows CE 4.2 | Yes |
| Electrical characteristics | |
| Power consumption | 650 µA sleep mode, 150 mA read/write |

Table 280: 5MMUSB.2048-00 - Technical data

| Product ID | 5MMUSB.2048-00 |
|----------------------------|---|
| Environmental conditions | |
| Temperature | |
| Operation | 0 to 45°C |
| Storage | -20 to 60°C |
| Transport | -20 to 60°C |
| Relative humidity | |
| Operation | 10 to 90%, non-condensing |
| Storage | 5 to 90%, non-condensing |
| Transport | 5 to 90%, non-condensing |
| Vibration | |
| Operation | 10 to 500 Hz: 2 g (19.6 m/s ² 0-peak), oscillation rate 1/minute |
| Storage | 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 |
| Storage | 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 |
| Storage | Max. 12192 m |
| Transport | Max. 12192 m |
| Mechanical characteristics | |
| Dimensions | |
| Width | 19 mm |
| Length | 52.2 mm |
| Height | 7.9 mm |

Table 280: 5MMUSB.2048-00 - Technical data

1) Indicates data being transferred (sending and receiving).

7.1.4 Temperature humidity diagram

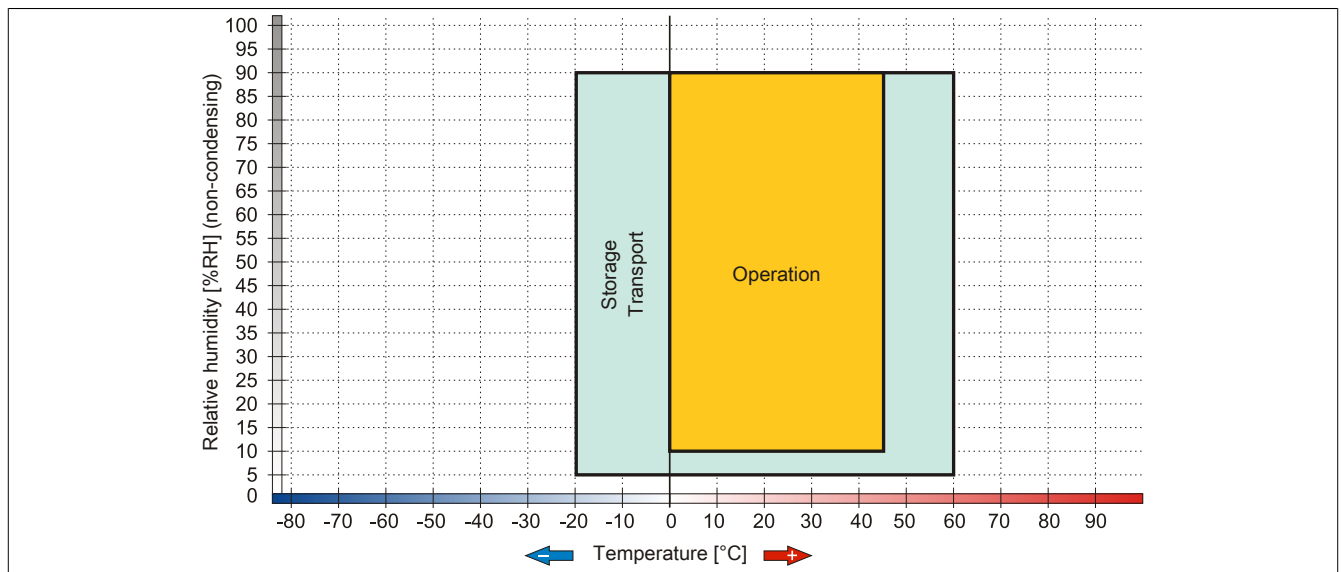


Figure 190: 5MMUSB.2048-00 - Temperature humidity diagram

7.2 5MMUSB.xxxx-01

7.2.1 General information

USB flash drives are storage media that are easy to replace. Because of their fast data transfer (USB 2.0), USB flash drives are ideal for use as portable data storage. Without requiring additional drivers ("hot plugging", except in the case of Windows 98SE), the USB flash drive can immediately act as an additional drive where data can be read or written.

Information:

Due to the vast quantity of USB flash drives available on the market as well as their short product life cycle, we reserve the right to supply alternative products at any time. The following measures may therefore be necessary in order to boot from these flash drives as well:

- The flash drive must be reformatted or in some cases even repartitioned (set active partition).
- The flash drive must be the first bootable device in the BIOS boot order; alternatively, the IDE controllers can be disabled in BIOS. This can be avoided in most cases if the "fdisk /mbr" command is additionally executed on the USB flash drive.

7.2.2 Order data


| Model number | Short description | Figure |
|----------------|-----------------------------------|---|
| | USB accessories |  |
| 5MMUSB.2048-01 | USB 2.0 flash drive, 2048 MB, B&R | |
| 5MMUSB.4096-01 | USB 2.0 flash drive, 4096 MB, B&R | |

Table 281: 5MMUSB.2048-01, 5MMUSB.4096-01 - Order data

7.2.3 Technical data

| Product ID | 5MMUSB.2048-01 | 5MMUSB.4096-01 |
|----------------------------|---|----------------|
| General information | | |
| Capacity | 2 GB | 4 GB |
| Data retention | >10 years | |
| LEDs | 1 LED (green) ¹⁾ | |
| MTBF | >3,000,000 hours | |
| Type | USB 1.1, USB 2.0 | |
| Maintenance | None | |
| Default file system | FAT16 | FAT32 |
| Certification CE | Yes | |
| Interfaces | | |
| USB | USB 1.1, USB 2.0 | |
| Type | To any USB Type A interface | |
| Connection | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) | |
| Transfer rate | Full speed max. 1 MB/s, High speed max. 32 MB/s | |
| Sequential reading | Full speed max. 0.9 MB/s, High speed max. 23 MB/s | |
| Sequential writing | | |
| Support | | |
| Operating systems | | |
| Windows 7 | Yes | |
| Windows XP Professional | Yes | |
| Windows XP Embedded | Yes | |
| Windows ME | Yes | |
| Windows 2000 | Yes | |
| Windows CE 5.0 | Yes | |
| Windows CE 4.2 | Yes | |
| Electrical characteristics | | |
| Power consumption | Max. 500 µA sleep mode, max. 120 mA read/write | |
| Environmental conditions | | |
| Temperature | | |
| Operation | 0 to 70°C | |
| Storage | -50 to 100°C | |
| Transport | -50 to 100°C | |

Table 282: 5MMUSB.2048-01, 5MMUSB.4096-01 - Technical data

| Product ID | 5MMUSB.2048-01 | 5MMUSB.4096-01 |
|-----------------------------------|----------------|----------------------------|
| 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 282: 5MMUSB.2048-01, 5MMUSB.4096-01 - Technical data

1) Indicates data being transferred (sending and receiving).

7.2.4 Temperature humidity diagram

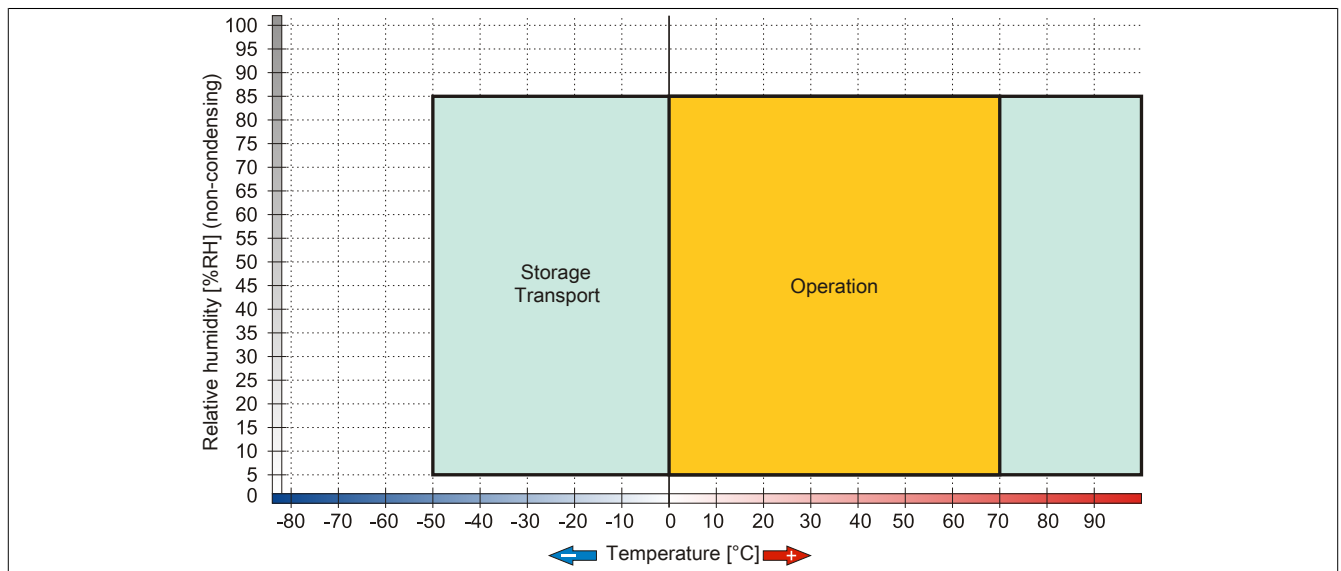


Figure 191: 5MMUSB.xxxx-01 - Temperature humidity diagram

8 HMI Drivers & Utilities DVD

8.1 5SWHMI.0000-00

8.1.1 General information

This DVD contains drivers, utilities, software upgrades and user's manuals for B&R panel system products (see the "Industrial PCs" or "Visualization and operation" section of the B&R website at www.br-automation.com).

When the DVD is created, its contents are identical to the files found in the Downloads section of the B&R website (under Service - "Material related downloads").

8.1.2 Order data


| Model number | Short description | Figure |
|----------------|-----------------------------|---|
| | Other |  |
| 5SWHMI.0000-00 | HMI Drivers & Utilities DVD | |

Table 283: 5SWHMI.0000-00 - Order data

8.1.3 Contents (V2.10)

BIOS product upgrades

- Automation PC 620 / Panel PC 700 CPU board 815E and 855GME BIOS
- Automation PC 620 / Panel PC 700 CPU board X855GME BIOS
- Automation PC 620 / Panel PC 700 CPU board 945GME N270 BIOS
- Automation PC 680
- Automation PC 810 / Automation PC 820 / Panel PC 800 B945GME BIOS
- Automation PC 810 / Panel PC 800 945GME N270 CPU board BIOS
- Automation PC 810 / Panel PC 800 GM45 CPU board BIOS
- Provit 2000 product family - IPC2000/2001/2002
- Provit 5000 product family - IPC5000/5600/5000C/5600C
- Power Panel 100 BIOS devices
- Mobile Panel 100 BIOS devices
- Power Panel 100 / Mobile Panel 100 user boot logo
- Power Panel 100 / Mobile Panel 100 REMHOST utility
- Power Panel 300/400 BIOS devices
- Power Panel 300/400 BIOS user boot logo
- Panel PC 310

Device drivers

- Automation Device Interface (ADI)
- Audio
- Chipset
- CD-ROM
- LS120
- Graphics
- Network

- PCI / SATA RAID controller
- Touch screen
- Touchpad
- Interface board

Firmware upgrades

- Automation PC 620 / Panel PC 700 (MTCX, SDLR, SDLT)
- Automation PC 810 (MTCX, SDLR, SDLT)
- Automation PC 820 (MTCX, SDLR, SDLT)
- Mobile Panel 100 (SMCX)
- Panel PC 300 (MTCX)
- Power Panel 100 (aPCI)
- Power Panel 300/400 (aPCI)
- Power Panel 300/400 (MTCX)
- Panel PC 800 (MTCX, SDLR, SDLT)
- UPS firmware

Utilities/Tools

- B&R Embedded OS Installer
- Windows CE Tools
- User boot logo conversion program
- SATA RAID Installation Utility
- Automation Device Interface (ADI)
- CompactFlash service life calculator (Silicon Systems)
- Miscellaneous
- MTC utilities
- B&R Key Editor
- MTC & Mkey utilities
- Mkey utilities
- UPS configuration software
- ICU ISA configuration
- Intel PCI NIC boot ROM
- Diagnostic programs

Windows

- Windows CE 6.0
- Windows CE 5.0
- Windows CE 4.2
- Windows CE 4.1
- Windows CE Tools
- Windows Embedded Standard 2009
- Thin client
- Windows NT Embedded
- Windows XP Embedded
- VNC viewer

MCAD templates for

- Industrial PCs
- Visualization and operating devices
- Slide-in label 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)

9 Uninterruptible power supply

With an optionally integrated UPS, the B&R Industrial PC makes sure that the PC system completes write operations even when a power failure occurs. When the UPS detects a power failure, it switches to battery operation immediately without interruption. This means that all running programs are shut down properly by the UPS software to prevent the possibility of inconsistent data (only functions if the UPS is already configured and the driver is enabled).

Information:

- The monitor/panel is not buffered by the UPS and will shut off when the power fails.
- More detailed information about uninterruptible power supplies can be found in the user's manual for the external UPS. This can be downloaded from the B&R website.

Because the charging circuit is integrated in the housing of the B&R Industrial PC, installation has been simplified to merely attaching the connection cable to the battery unit mounted next to the PC.

Special emphasis was placed on ease of maintenance when the battery unit was designed. Batteries are easily accessible from the front and can be replaced in just a few moments when servicing.

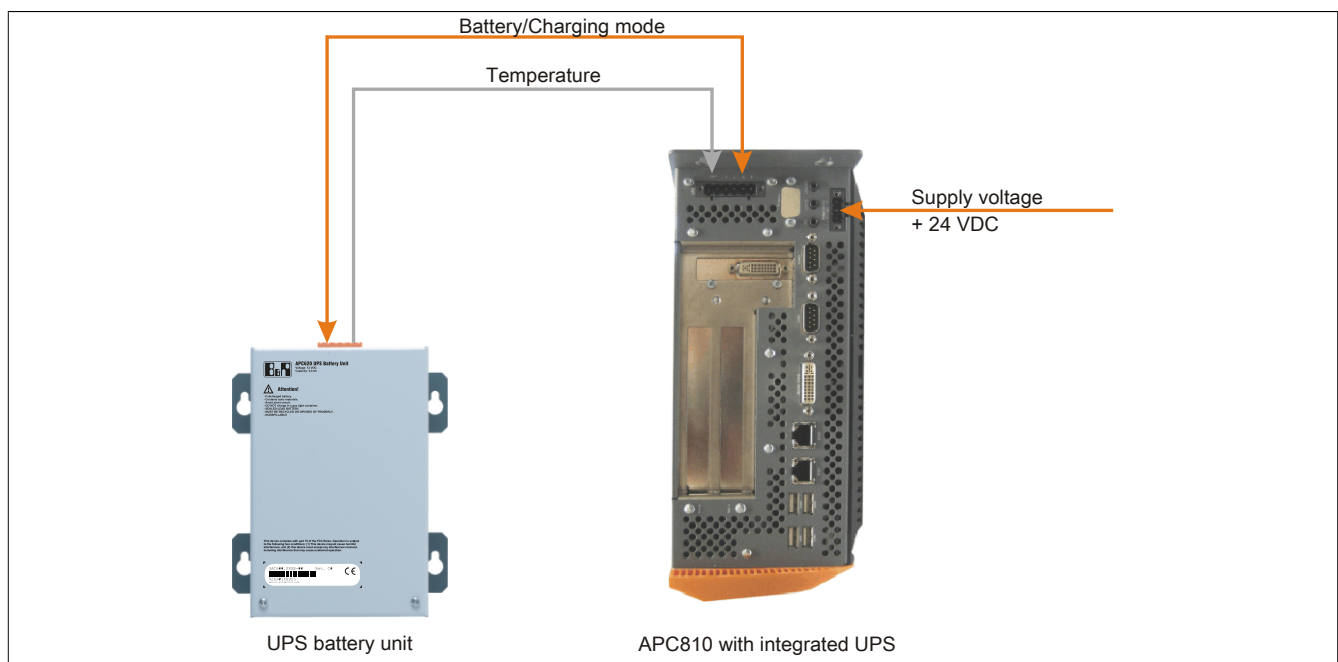


Figure 192: UPS principle

9.1 Features

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

9.2 Requirements

- A suitable 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)
- Configuration of the B&R UPS in the ADI Control Center

9.3 5AC600.UPSI-00

9.3.1 General information

This add-on UPS module can easily be installed in an appropriate system unit (for a list of required revisions, see section 9.2 "Requirements" on page 361).

9.3.2 Order data


| Model number | Short description | Figure |
|----------------|--|---|
| | Uninterruptible power supplies |  |
| 5AC600.UPSI-00 | UPS module for APC620, APC810, PPC800; for system units 5PC600.SX01-00 (beginning with rev. H0), 5PC600.SX02-00 (beginning with rev. G0), 5PC600.SX02-01 (beginning with rev. H0), 5PC600.SX05-00 (beginning with rev. F0), 5PC600.SX05-01 (beginning with rev. F0), 5PC600.SF03-00 (beginning with rev. A0), 5PC810.SX*, 5PC820.1505-00, 5PC820.1906-00. Order cable (5CAUPS.0005-00 or 5CAUPS.0030-00) and battery unit (5AC600.UPSB-00) separately. | |
| | Required accessories | |
| | Uninterruptible power supplies | |
| 5AC600.UPSB-00 | Battery unit 5 Ah; for APC620, APC810 or PPC800 UPS | |
| 5CAUPS.0005-00 | UPS cable 0.5 m; for UPS 5AC600.UPSI-00 | |
| 5CAUPS.0030-00 | UPS cable 3 m; for UPS 5AC600.UPSI-00 | |

Table 284: 5AC600.UPSI-00 - Order data

9.3.3 Technical data

Information:

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

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

Table 285: 5AC600.UPSI-00 - Technical data

9.3.4 Installation

This module is installed using the materials included in delivery. For more information regarding installation, see chapter 7 "Maintenance and service".

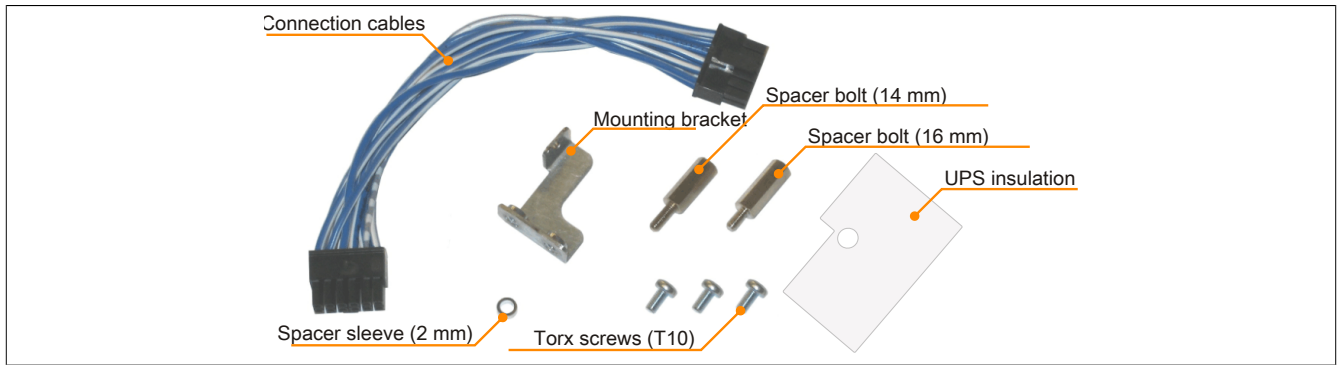


Figure 193: 5AC600.UPS1-00 Add-on UPS module - Installation materials

9.4 5AC600.UPSB-00

9.4.1 General information

The battery unit has a limited service life and should be replaced regularly (after the specified service life at the latest).

9.4.2 Order data


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

Table 286: 5AC600.UPSB-00 - Order data

9.4.3 Technical data

Information:

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

| Product ID | 5AC600.UPSB-00 | |
|-------------------------------------|---|-----|
| Revision | D0 | E0 |
| General information | | |
| Battery | Energys Cyclon 12 V 5 Ah (6 connected in series) 10 years ¹⁾ Single cell | |
| Type | | |
| Service life | | |
| Design | | |
| Temperature sensor | NTC resistance | |
| Maintenance interval during storage | 6 month interval between charges | |
| Certification | Yes Yes Yes | |
| CE | | |
| cULus | | |
| GL | | |
| Charge duration when battery low | Typ. 15 hours | |
| Electrical characteristics | | |
| Nominal voltage | 12 V | |
| Battery current | Max. 8 A | |
| Capacity | 5 Ah | |
| Fuse ²⁾ | No ³⁾ | Yes |
| Deep discharge voltage | 10 V | |
| Environmental conditions | | |
| Temperature | -30 to 60°C -40 to 80°C -65 to 80°C -65 to 80°C | |
| Charging mode | | |
| Operation | | |
| Storage | | |
| Transport | | |
| Relative humidity | 5 to 95%, non-condensing 5 to 95%, non-condensing 5 to 95%, non-condensing | |
| Operation | | |
| Storage | | |
| Transport | | |
| Altitude | Max. 3000 m | |
| Operation | | |

Table 287: 5AC600.UPSB-00, 5AC600.UPSB-00 - Technical data

| Product ID | 5AC600.UPSB-00 |
|----------------------------|----------------------|
| Mechanical characteristics | |
| Dimensions | |
| Width | 104 mm ⁴⁾ |
| Length | 170.5 mm |
| Height | 87.5 mm |
| Weight | Approx. 3200 g |

Table 287: 5AC600.UPSB-00, 5AC600.UPSB-00 - Technical data

- 1) At 25°C (up to 80% battery capacity).
- 2) 25 A fuse. Replacement fuses can be ordered separately whenever needed.
- 3) The fuse can be installed later in revisions up to and including D0. More information can be found in the "Maintenance and service" chapter of the APC810 and PPC800 user's manuals.
- 4) Dimensions without mounting clips.

9.4.4 Temperature/Service life diagram up to 20% battery capacity

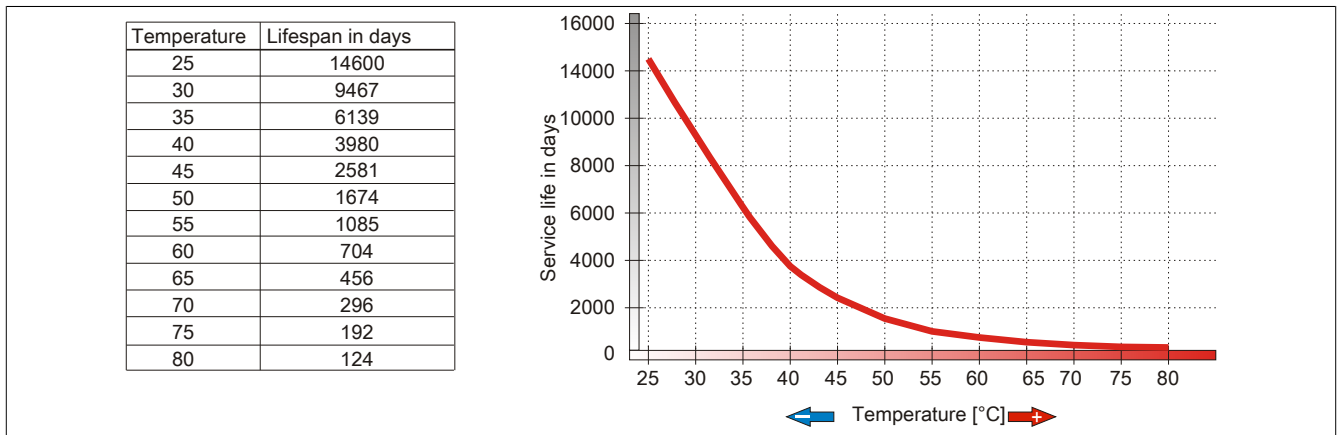


Figure 194: Temperature/Service life diagram

9.4.5 Deep discharge cycles

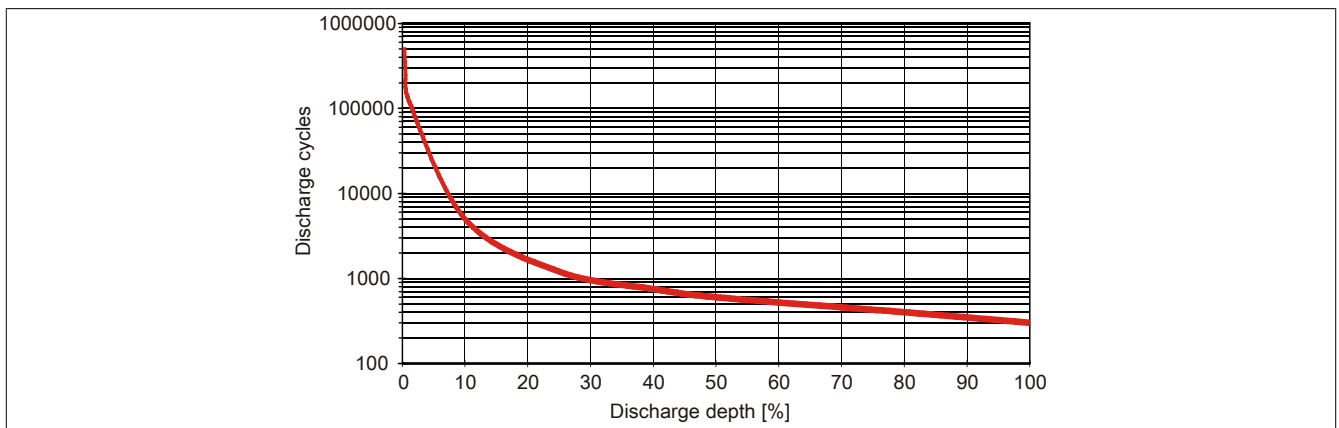


Figure 195: Deep discharge cycles

9.4.6 Dimensions

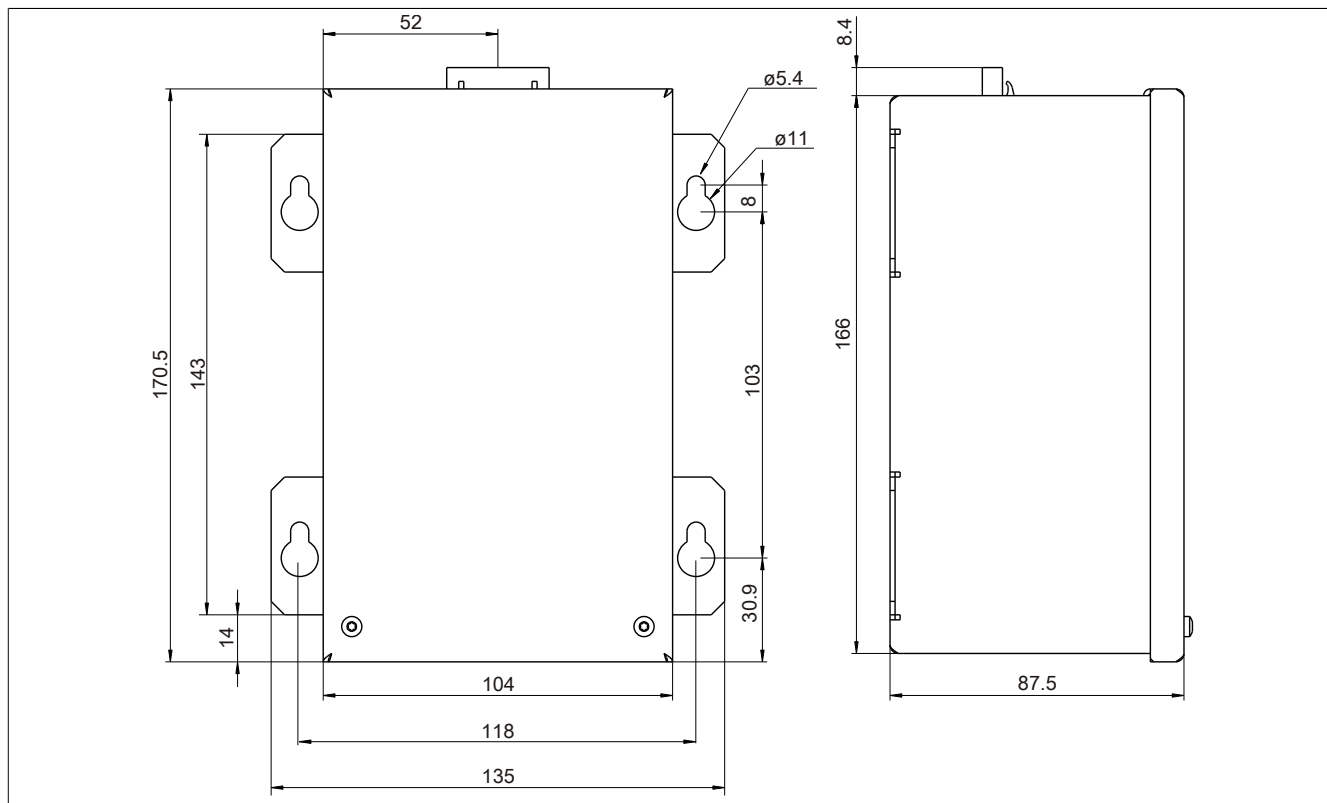


Figure 196: 5PC600.UPSB-00 - Dimensions

9.4.7 Drilling template

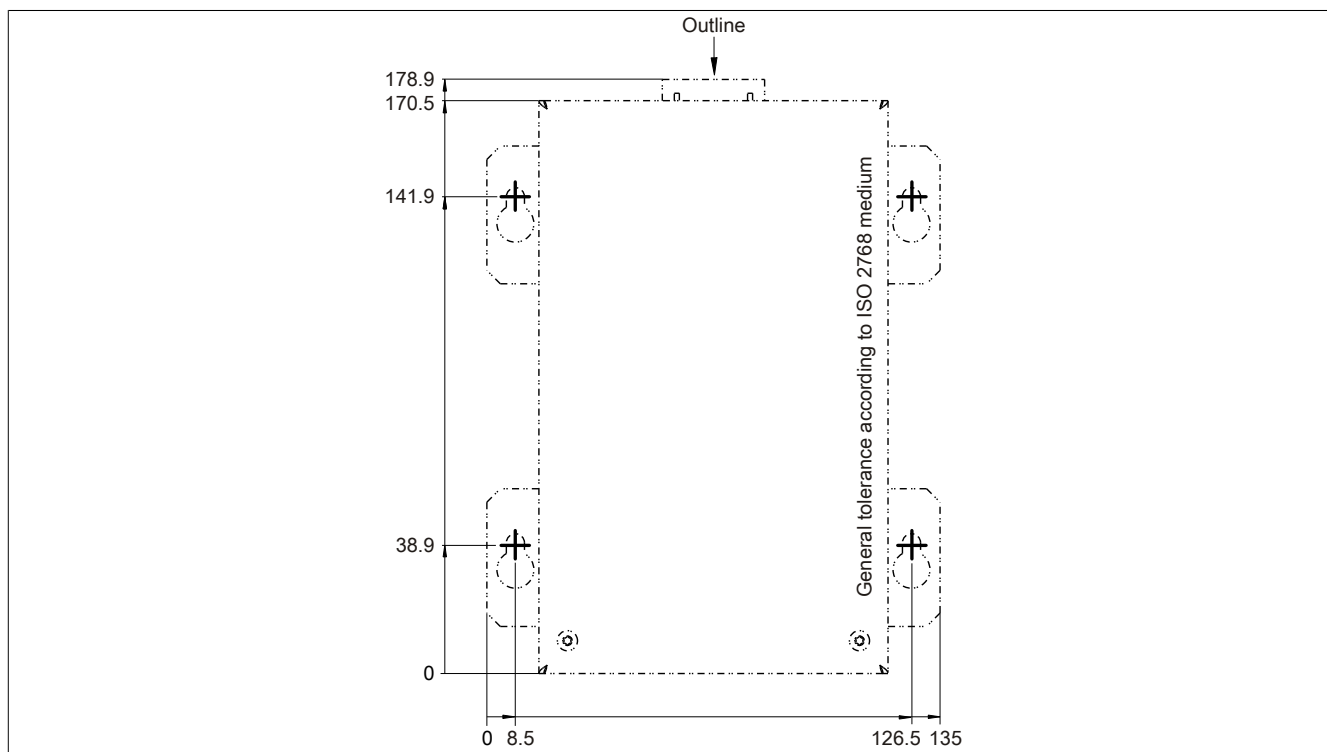


Figure 197: 5PC600.UPSB-00 - Drilling template

9.4.8 Installation instructions

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

9.5 5CAUPS.00xx-00

9.5.1 General information

The UPS connection cable establishes the connection between the add-on UPS module (5AC600.UPSI-00) and the battery unit (5AC600.UPSB-00). It is available in lengths of 0.5 m and 3 m.

9.5.2 Order data


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

Table 288: 5CAUPS.0005-00, 5CAUPS.0030-00 - Order data

9.5.3 Technical data

Information:

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

| Product ID | 5CAUPS.0005-00 | 5CAUPS.0030-00 |
|----------------------------|--|----------------|
| General information | | |
| Certification | | |
| CE | Yes | |
| cULus | Yes | |
| GL | Yes | |
| Cable structure | | |
| Wire cross section | 2x 0.5 mm ² (AWG 20) 4x 2.5 mm ² (AWG 13) | |
| Conductor resistance | At 0.5 mm ² max. 39 Ω/km At 2.5 mm ² max. 7.98 Ω/km | |
| Outer sheathing | | |
| Material | Thermoplastic PVC-based material | |
| Color | Window gray (similar to RAL 7040) | |
| Connector | | |
| Type | 6-pin connector with clamping yoke / 6-pin multipoint connector with clamping yoke | |
| Electrical characteristics | | |
| Operating voltage | Max. 300 V | |
| Peak operating voltage | Typically 12 VDC / max. 15 VDC | |
| Test voltage | | |
| Wire/Wire | 1500 V | |
| Current load | 10 A at 20°C | |
| Environmental conditions | | |
| Temperature | | |
| Moving | -5 to 80°C | |
| Static | -30 to 80°C | |
| Mechanical characteristics | | |
| Dimensions | | |
| Length | 0.5 m | 3 m |
| Diameter | 8.5 mm ±0.2 mm | |
| Flex radius | | |
| Moving | 10x wire cross section | |
| Fixed installation | 5x wire cross section | |
| Weight | Approx. 100 g | Approx. 470 g |

Table 289: 5CAUPS.0005-00, 5CAUPS.0030-00 - Technical data

9.6 5AC600.UPSF-00

9.6.1 General information

The UPS fuse kit can be used to add a fuse for the 5AC600.UPSB-00 battery unit.

Information about installing the 5AC600.UPSF-00 fuse kit can be found in the section "Installing the UPS fuse kit on the battery unit" on page 420.

Information:

The 5AC600.UPSF-00 UPS fuse kit is only needed for battery units up to and including revision D0. A 25 A fuse is integrated on the connector circuit board beginning with revision E0.

9.6.2 Order data


| Model number | Short description | Figure |
|----------------|---|---|
| | Uninterruptible power supplies | |
| 5AC600.UPSF-00 | UPS fuse kit for battery unit 5AC600.UPSB-00 up to revision D0. |  |

Table 290: 5AC600.UPSF-00 - Order data

9.7 5AC600.UPSF-01

9.7.1 General information

These 25 A fuses are replacement parts for the 5AC600.UPSB-00 battery unit (beginning with revision E0) as well as the 5AC600.UPSF-00 fuse kit.

9.7.2 Order data


| Model number | Short description | Figure |
|----------------|--------------------------------|---|
| | Uninterruptible power supplies | |
| 5AC600.UPSF-01 | UPS fuse, 5 pcs. |  |

Table 291: 5AC600.UPSF-01 - Order data

10 Line filter

10.1 5AC804.MFLT-00

10.1.1 General information

The 5AC804.MFLT-00 line filter may be necessary to satisfy requirements regarding conducted disturbances in supply lines in accordance with the 2003 edition of GL EMC1 (Germanischer Lloyd).

The line filter should be installed as close to the end device as possible; the supply line from the end device to the line filter should be kept as short as possible.

10.1.2 Order data


| Model number | Short description | Figure |
|----------------|----------------------------|---|
| 5AC804.MFLT-00 | Accessories Line filter |  |

Table 292: 5AC804.MFLT-00 - Order data

10.1.3 Technical data

Information:

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

| Product ID | 5AC804.MFLT-00 |
|-----------------------------------|----------------------------|
| General information | |
| Certification | |
| CE | Yes |
| cULus | Yes |
| GL | Yes |
| Terminal block | |
| Connection cross section | |
| With wire end sleeves | 1.5 mm ² |
| Flexible | 0.2 to 1.5 mm ² |
| Inflexible | 0.2 to 2.5 mm ² |
| Electrical characteristics | |
| Nominal voltage | 24 VDC -25% / +30% |
| Nominal current | 8 A |
| Environmental conditions | |
| Temperature | |
| Operation | -25 to 65°C |
| Storage | -25 to 65°C |
| Transport | -25 to 65°C |
| Mechanical characteristics | |
| Housing | |
| Material | Galvanized steel plate |
| Dimensions | |
| Width | 54 mm |
| Length | 94 mm |
| Depth | 32.15 mm |
| Weight | 205 g |

Table 293: 5AC804.MFLT-00 - Technical data

10.1.4 Dimensions

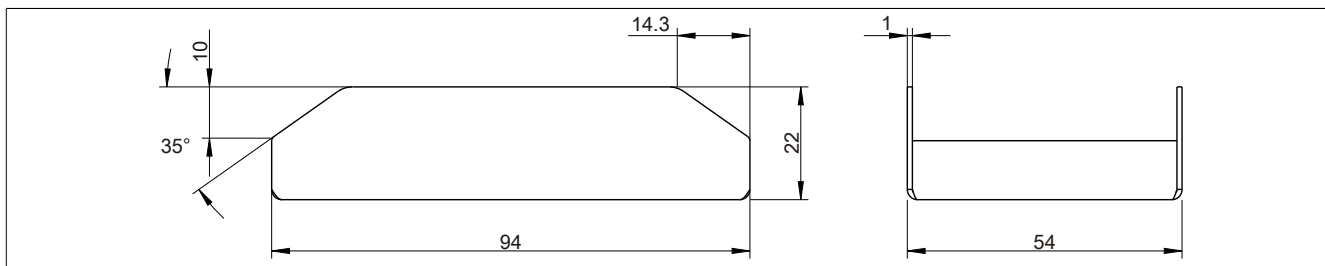


Figure 198: 5AC804.MFLT-00 - Dimensions

10.1.5 Drilling template

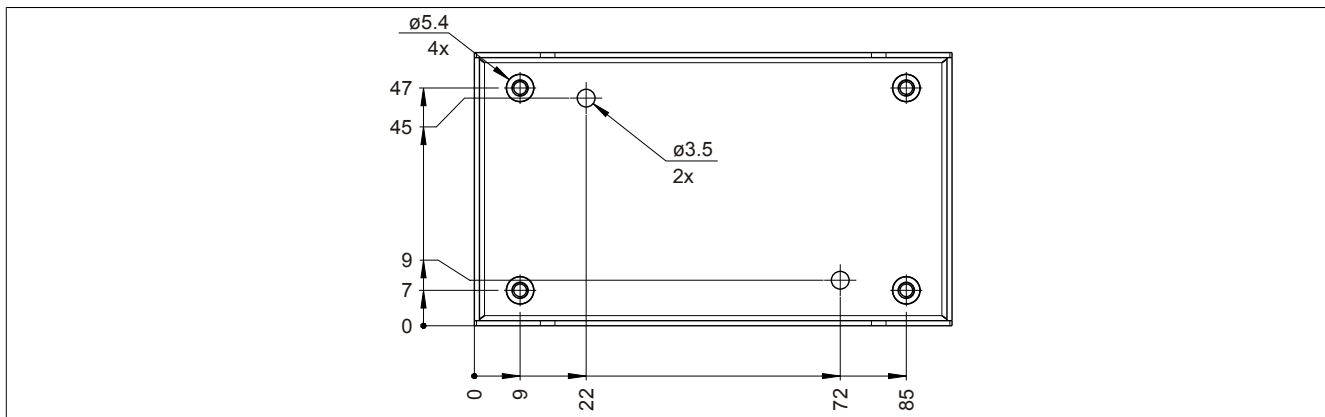


Figure 199: 5AC804.MFLT-00 - Drilling template

10.1.6 Connecting to the end device

The line filter must be connected between the supply voltage and the end device.

The following points must be observed:

- Use shielded, twisted wires.
- Keep the lines as short as possible (supply voltage - line filter - end device).
- The line filter must be installed on an unpainted, oil-free metallic surface.

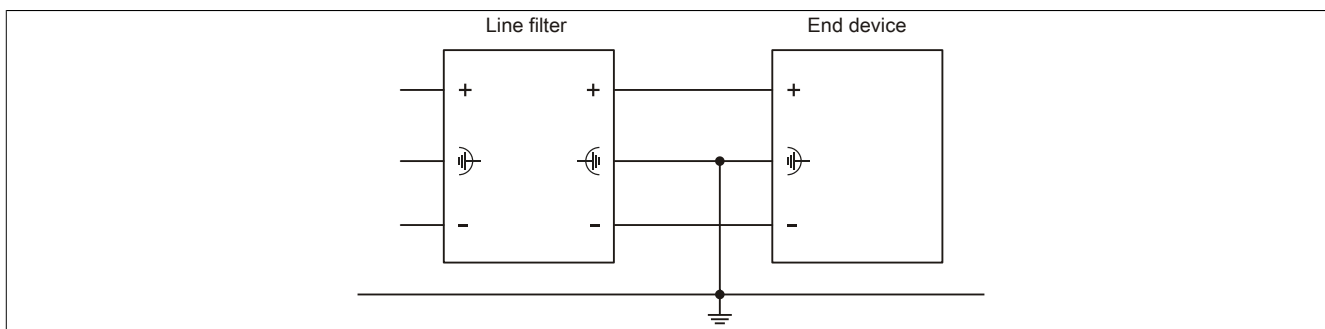


Figure 200: Connection example

11 PCI plug-in cards

11.1 5ACPCI.ETH1-01

11.1.1 General information

These universal (3.3 V and 5 V) half-size PCI Ethernet card have a 10/100 Mbit/s network connection and can be inserted and operated in a standard 16-bit PCI slot as an additional network interface.

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

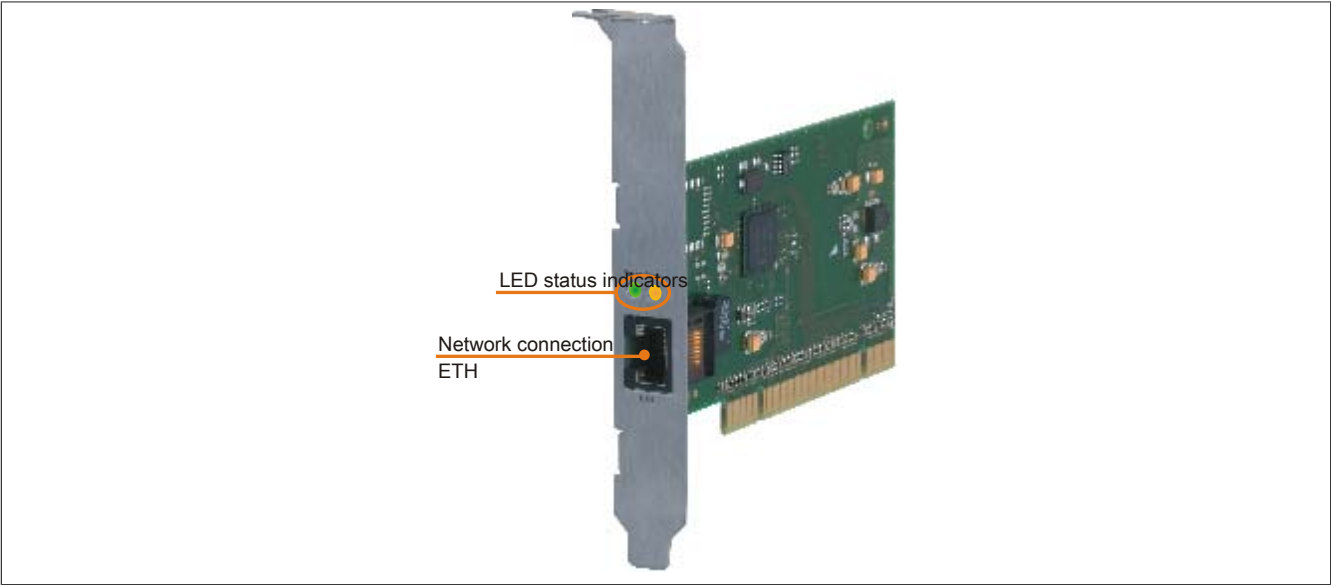


Figure 201: 5ACPCI.ETH1-01 - PCI 10/100 Ethernet card

11.1.2 Order data


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

Table 294: 5ACPCI.ETH1-01 - Order data

11.1.3 Technical data

| Product ID | 5ACPCI.ETH1-01 |
|---------------------|-----------------------|
| General information | |
| B&R ID code | \$A58A |
| Diagnostics | |
| Data transfer | Yes, using status LED |
| Certification | |
| CE | Yes |
| cULus | Yes |
| GL | Yes |

Table 295: 5ACPCI.ETH1-01 - Technical data

| Product ID | 5ACPCI.ETH1-01 |
|---------------|--|
| Interfaces | |
| Ethernet | |
| Quantity | 1 |
| Controller | Intel 82551ER |
| Design | Shielded RJ45 port |
| Transfer rate | 10/100 Mbit/s |
| Cable length | Max. 100 m between two stations (segment length) |

Table 295: 5ACPCI.ETH1-01 - Technical data



11.1.3.1 Ethernet interface


Information:

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

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

Speed Act/Link



ETH

Table 296: 5ACPCI.ETH1-01 - Technical data

11.1.4 Driver support

A special driver is required in order to operate the Intel 82551ER Ethernet controller. Drivers for approved operating systems (Windows XP Professional, Windows XP Embedded and MS-DOS) are available in the Downloads section of the B&R website (www.br-automation.com).

Information:

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

11.1.5 Dimensions

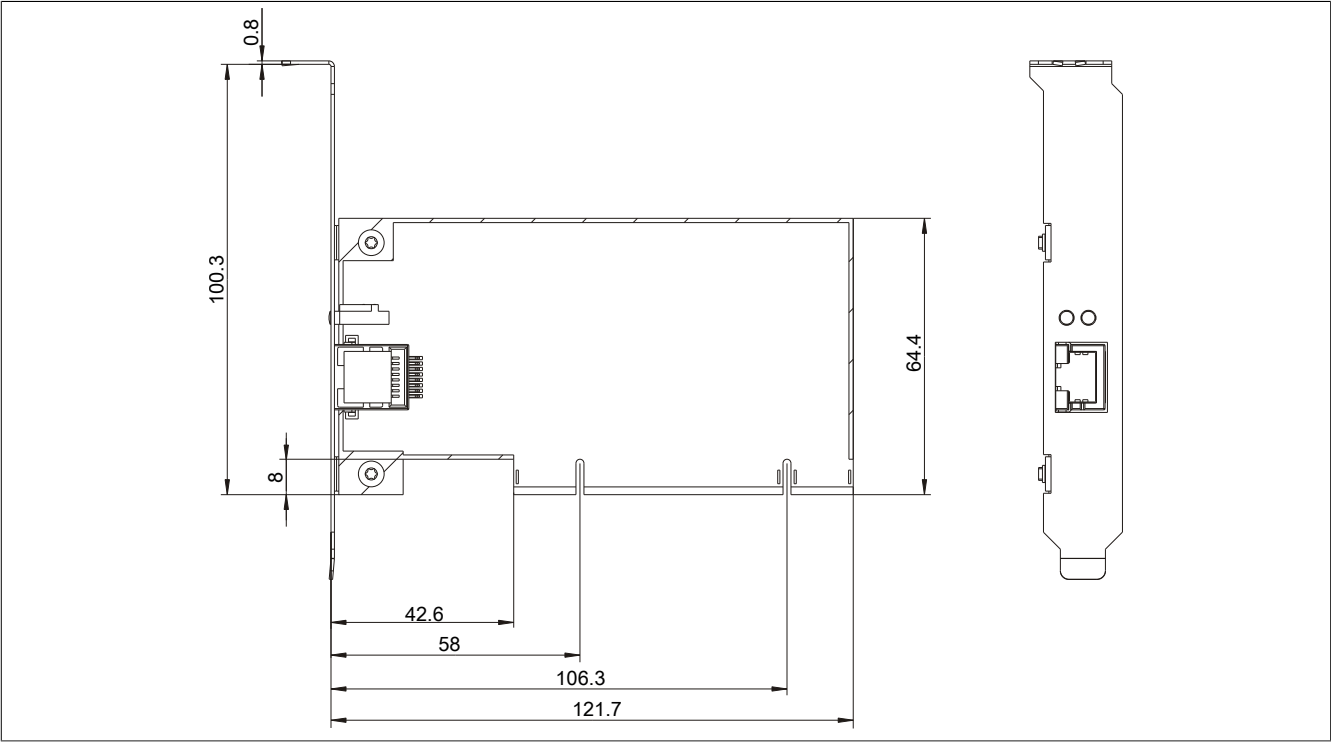


Figure 202: 5ACPCI.ETH1-01 - Dimensions

11.2 5ACPCI.ETH3-01

11.2.1 General information

These universal (3.3 V and 5 V) half-size PCI Ethernet card have three 10/100 Mbit/s network connections and can be inserted and operated in a standard 16-bit PCI slot as an additional network interface.

- PCI Ethernet card
- 3 network connections (10/100 Mbit/s)

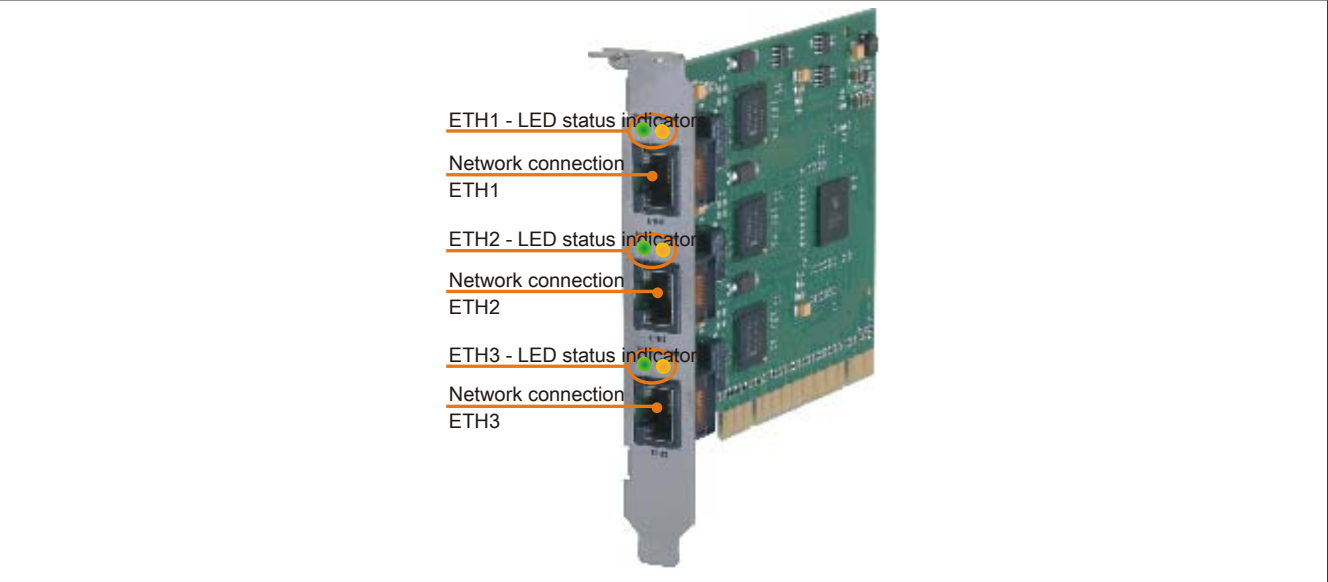


Figure 203: 5ACPCI.ETH3-01 - PCI 10/100 Ethernet card

11.2.2 Order data


| Model number | Short description | Figure |
|--------------------|-----------------------------|---|
| Accessories | |  |
| 5ACPCI.ETH3-01 | PCI Ethernet card 3x 10/100 | |

Table 297: 5ACPCI.ETH3-01 - Order data

11.2.3 Technical data

| Product ID | 5ACPCI.ETH3-01 |
|------------------------------------|-----------------------|
| General information | |
| B&R ID code | \$A58B |
| Diagnostics Data transfer | Yes, using status LED |
| Certification CE cULus GL | Yes Yes Yes |

Table 298: 5ACPCI.ETH3-01 - Technical data

| Product ID | 5ACPCI.ETH3-01 |
|---------------|--|
| Interfaces | |
| Ethernet | |
| Quantity | 3 |
| Controller | Intel 82551ER |
| Design | Shielded RJ45 port |
| Transfer rate | 10/100 Mbit/s |
| Cable length | Max. 100 m between two stations (segment length) |

Table 298: 5ACPCI.ETH3-01 - Technical data

11.2.3.1 Ethernet interface



Information:


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

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

Speed

Act/Link








ETH1

Speed

Act/Link








ETH2

Speed

Act/Link





ETH3

Table 299: 5ACPCI.ETH3-01 - Technical data

11.2.4 Driver support

A special driver is required in order to operate the Intel 82551ER Ethernet controller. Drivers for approved operating systems (Windows XP Professional, Windows XP Embedded and MS-DOS) are available in the Downloads section of the B&R website (www.br-automation.com).

Information:

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

11.2.5 Dimensions

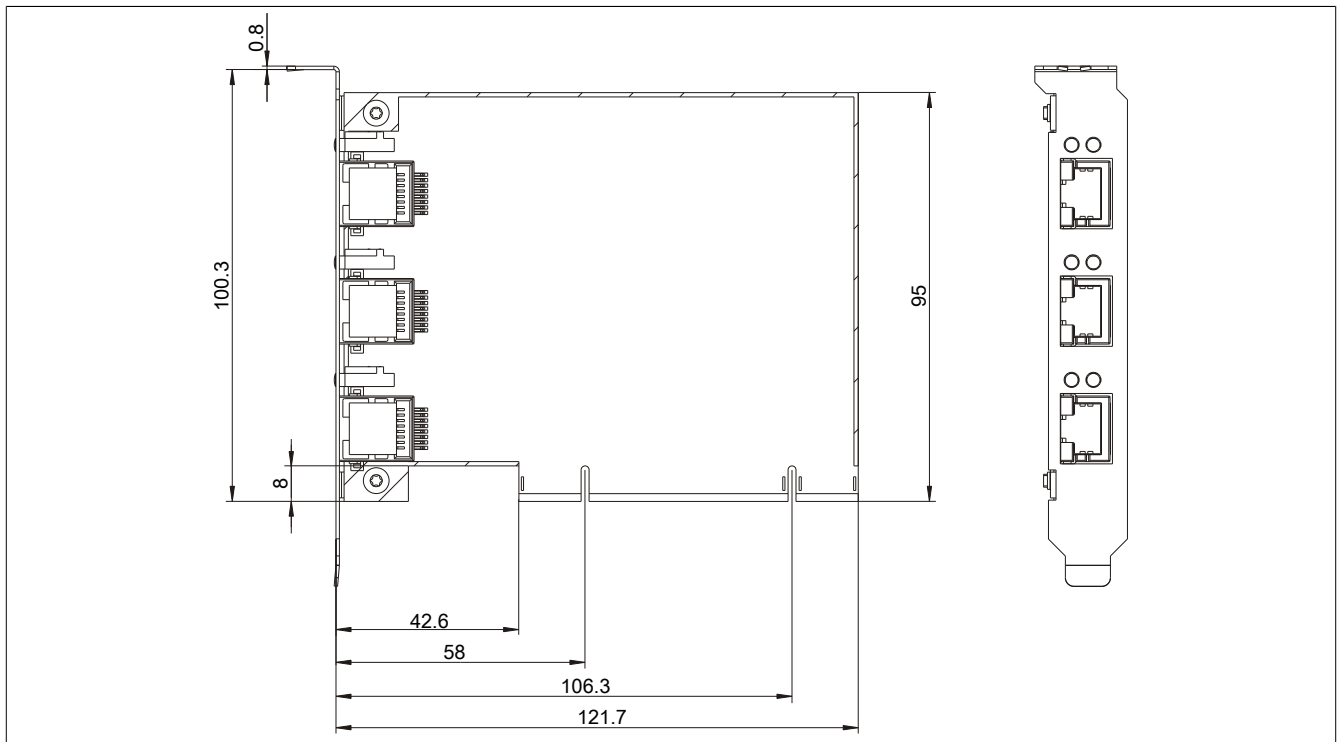


Figure 204: 5ACPCI.ETH3-01 - Dimensions

12 Cables

12.1 DVI cables

12.1.1 5CADVI.0xxx-00

12.1.1.1 General information

5CADVI.0xxx-00 DVI cables are designed for use in inflexible applications.

Caution!

Power must be turned off before plugging in and unplugging cables.

12.1.1.2 Order data


| Model number | Short description | Figure |
|----------------|--------------------|---|
| | DVI cable |  |
| 5CADVI.0018-00 | DVI-D cable, 1.8 m | |
| 5CADVI.0050-00 | DVI-D cable, 5 m | |
| 5CADVI.0100-00 | DVI-D cable, 10 m | |

Table 300: 5CADVI.0018-00, 5CADVI.0050-00, 5CADVI.0100-00 - Order data

12.1.1.3 Technical data

| Product ID | 5CADVI.0018-00 | 5CADVI.0050-00 | 5CADVI.0100-00 |
|----------------------------------|---|----------------|----------------|
| General information | | | |
| Certification | | | |
| CE | Yes | | |
| cULus | Yes | | |
| GL | Yes | | |
| Cable structure | | | |
| Wire cross section | AWG 28 | | |
| Shield | Individual cable pairs and entire cable | | |
| Cable shielding | Tinned copper mesh, optical coverage >86% | | |
| Outer sheathing | | | |
| Material | PVC | | |
| Color | Beige | | |
| Labeling | AWM STYLE 20276 80°C 30V VW1 DVI DIGITAL SINGLE LINK DER AN | | |
| Connector | | | |
| Type | 2x DVI-D (18+1), male | | |
| Connection cycles | 100 | | |
| Locating screw tightening torque | Max. 0.5 Nm | | |
| Electrical characteristics | | | |
| Conductor resistance | Max. 237 Ω/km | | |
| Insulation resistance | Min. 100 MΩ/km | | |
| Mechanical characteristics | | | |
| Dimensions | | | |
| Length | 1.8 m ±50 mm | 5 m ±80 mm | 10 m ±100 mm |
| Diameter | Max. 8.5 mm | | |
| Flex radius | ≥5x cable diameter (connector - ferrite bead and ferrite bead - ferrite bead) | | |
| Weight | Approx. 260 g | Approx. 460 g | Approx. 790 g |

Table 301: 5CADVI.0018-00, 5CADVI.0050-00, 5CADVI.0100-00 - Technical data

12.1.1.4 Flex radius specifications

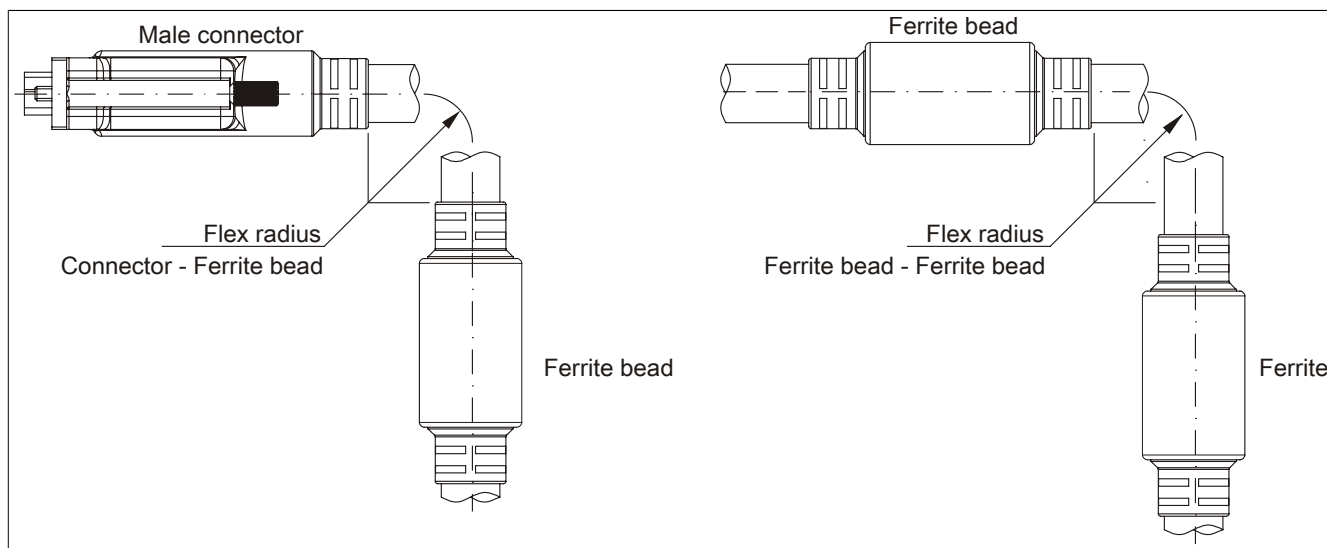


Figure 205: Flex radius specifications

12.1.1.5 Dimensions

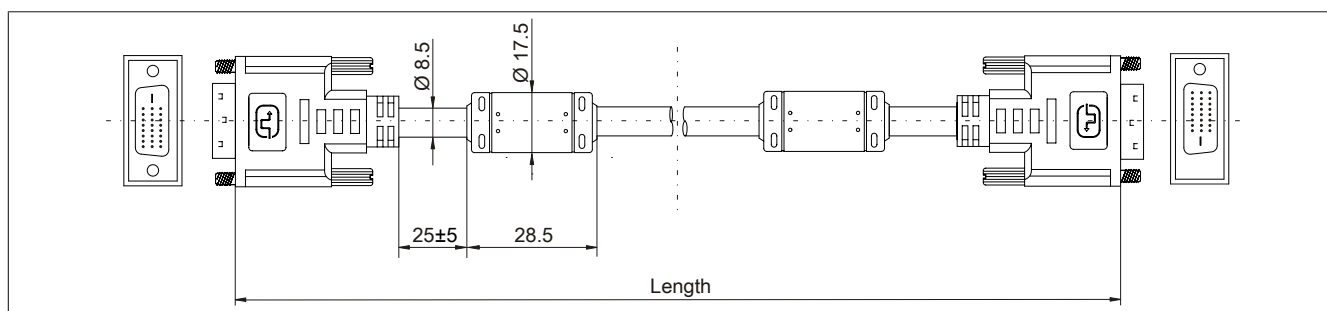


Figure 206: 5CADVI.0xxx-00 - Dimensions

12.1.1.6 Cable pinout

Warning!

If you choose to make a suitable cable yourself, it should be wired according to these specifications. If a self-made cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly.

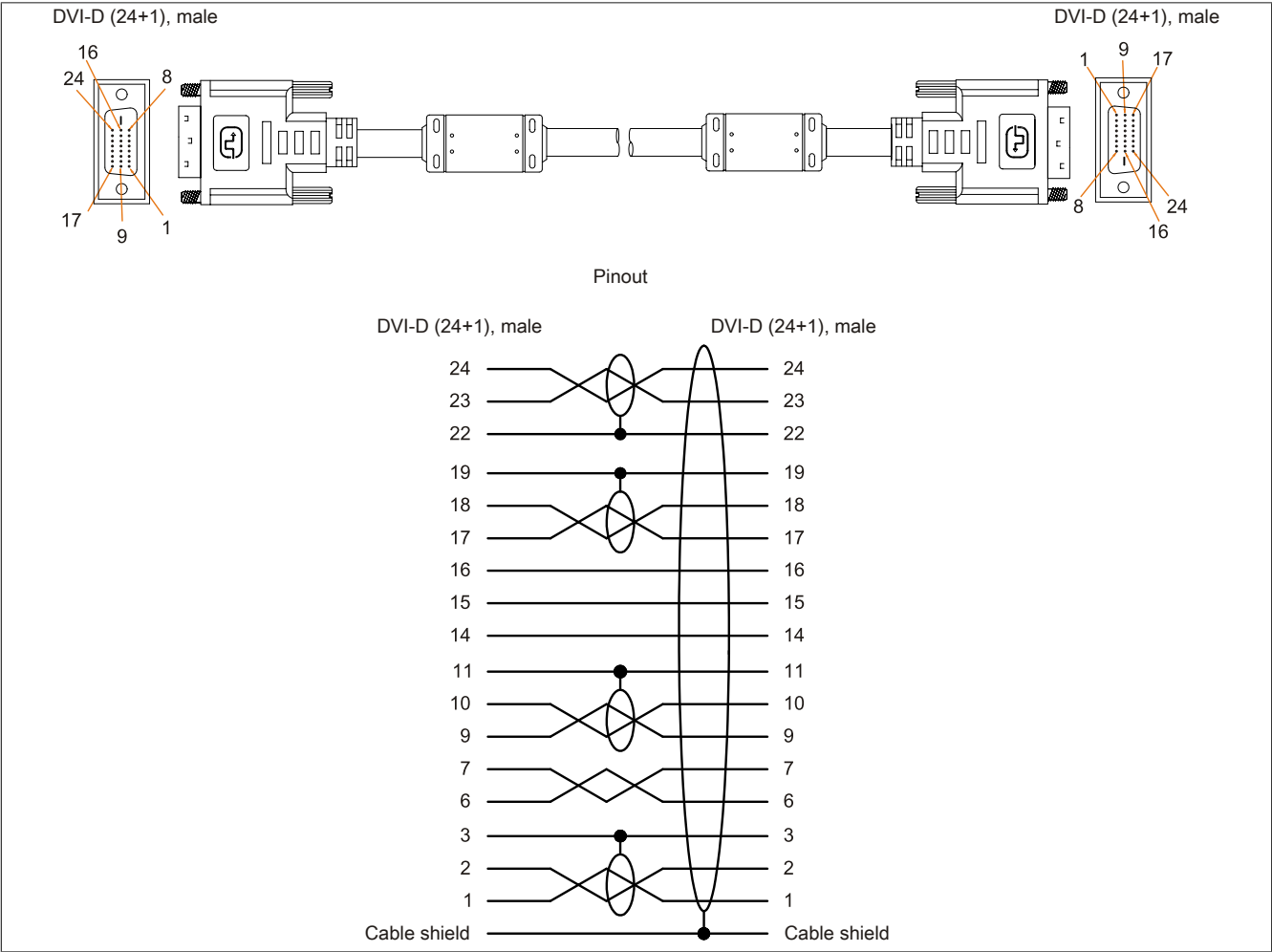


Figure 207: 5CADVI.0xxx-00 - Pinout

12.2 SDL cables

12.2.1 5CASDL.0xxx-00

12.2.1.1 General information

5CASDL.0xxx-00 SDL cables are designed for use in inflexible applications. SDL flex cables 5CASDL.0xxx-03 are required for flexible applications (e.g. swing arm systems).

Caution!

Power must be turned off before plugging in and unplugging cables.

12.2.1.2 Order data


| Model number | Short description | Figure |
|----------------|-------------------|---|
| | SDL cables |  |
| 5CASDL.0018-00 | SDL cable, 1.8 m | |
| 5CASDL.0050-00 | SDL cable, 5 m | |
| 5CASDL.0100-00 | SDL cable, 10 m | |
| 5CASDL.0150-00 | SDL cable, 15 m | |
| 5CASDL.0200-00 | SDL cable, 20 m | |
| 5CASDL.0250-00 | SDL cable, 25 m | |
| 5CASDL.0300-00 | SDL cable, 30 m | |

Table 302: 5CASDL.0018-00, 5CASDL.0050-00, 5CASDL.0100-00, 5CASDL.0150-00, 5CASDL.0200-00, 5CASDL.0250-00, 5CASDL.0300-00 - Order data

12.2.1.3 Technical data

| Product ID | 5CASDL. 0018-00 | 5CASDL. 0050-00 | 5CASDL. 0100-00 | 5CASDL. 0150-00 | 5CASDL. 0200-00 | 5CASDL. 0250-00 | 5CASDL. 0300-00 |
|----------------------------------|---|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| General information | | | | | | | |
| Certification | Yes | | | | | | |
| CE | | | | | | | |
| cULus | | | | | | | |
| GL | | | | | | | |
| Cable structure | | | | | | | |
| Wire cross section | AWG 28 | | AWG 24 | | | | |
| Shield | Individual cable pairs and entire cable | | | | | | |
| Cable shielding | Tinned copper 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 | | | | | | |
| Locating screw tightening torque | Max. 0.5 Nm | | | | | | |
| Electrical characteristics | | | | | | | |
| 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 ±30 mm 10 m ±50 mm 15 m ±100 mm 20 m ±100 mm 25 m ±100 mm 30 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 (connector - ferrite bead and ferrite bead - ferrite bead) | | | | | | |
| Flexibility | Limited flexibility; valid for ferrite bead - ferrite bead (tested 100 cycles with 5x cable diameter, 20 cycles / minute) | | | | | | |
| Weight | Approx. 300 g | Approx. 580 g | Approx. 1500 g | Approx. 2250 g | Approx. 2880 g | Approx. 4800 g | Approx. 5520 g |

Table 303: 5CASDL.0018-00, 5CASDL.0050-00, 5CASDL.0100-00, 5CASDL.0150-00, 5CASDL.0200-00, 5CASDL.0250-00, 5CASDL.0300-00 - Technical data

12.2.1.4 Flex radius specifications

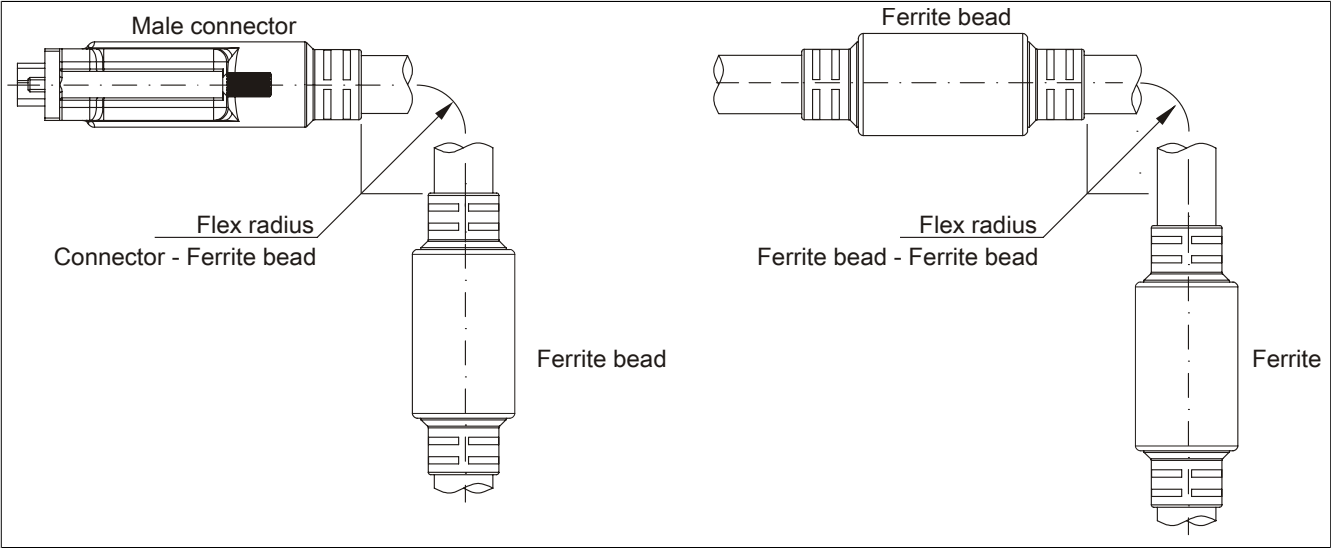


Figure 208: Flex radius specifications

12.2.1.5 Dimensions

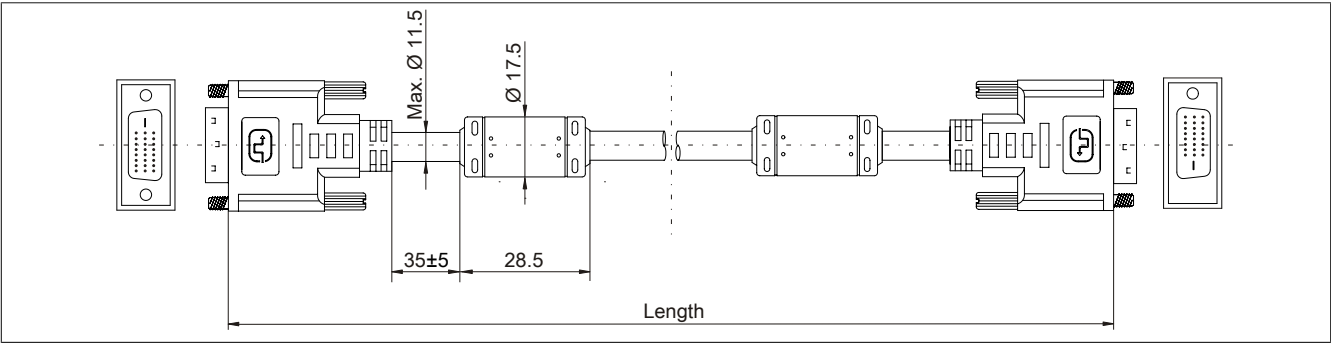


Figure 209: 5CASDL.0xxx-00- Dimensions

12.2.1.6 Cable pinout

Warning!

If you choose to make a suitable cable yourself, it should be wired according to these specifications.

If a self-made cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly.

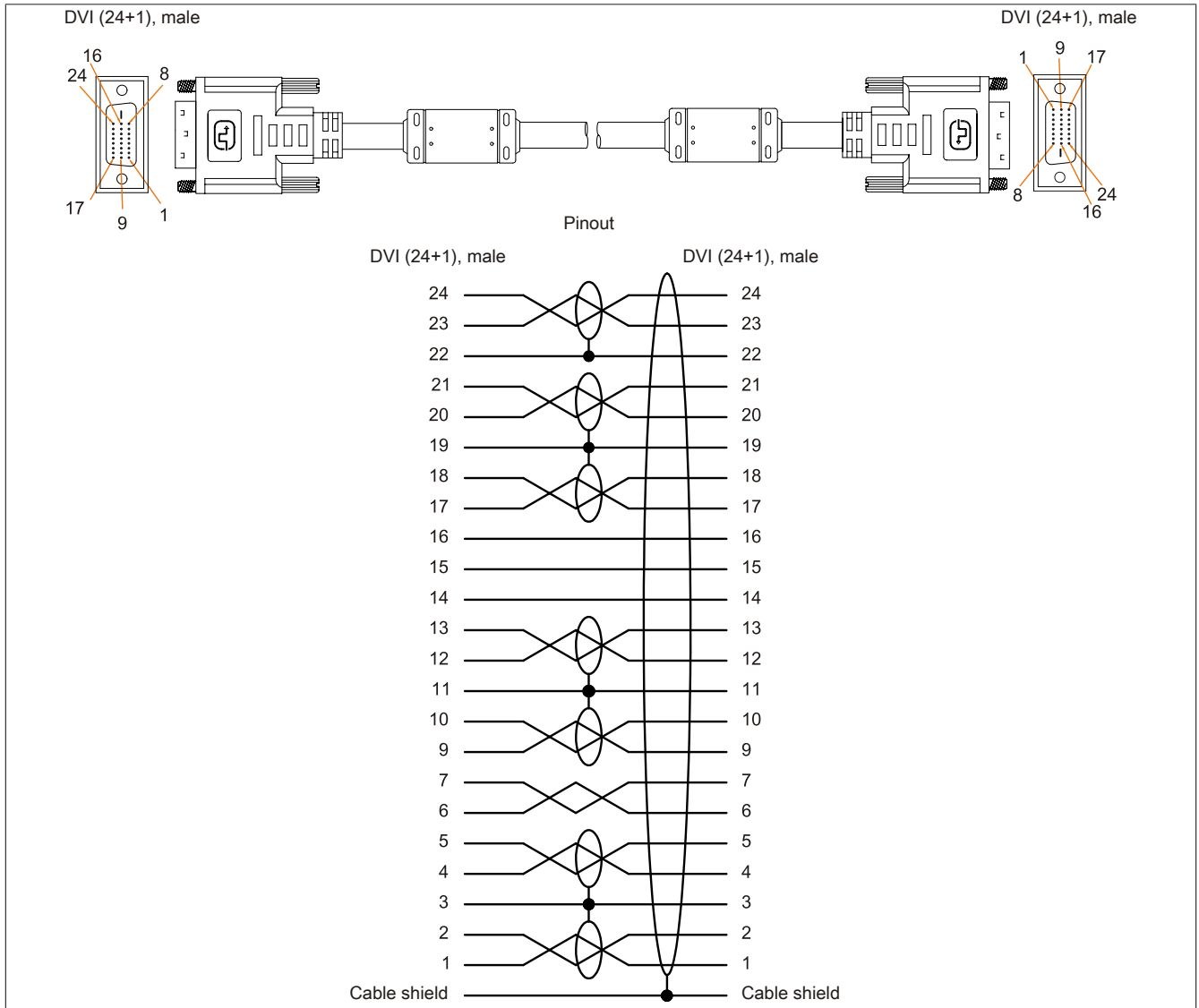


Figure 210: 5CASDL.0xxx-00 - Pinout

12.3 SDL cables with 45° male connector

12.3.1 5CASDL.0xxx-01

12.3.1.1 General information

5CASDL.0xxx-01 SDL cables with a 45° connector are designed for use in inflexible applications.

Caution!

Power must be turned off before plugging in and unplugging cables.

12.3.1.2 Order data


| Model number | Short description | Figure |
|----------------|--|---|
| | SDL cable - 45° connector |  |
| 5CASDL.0018-01 | SDL cable with 45° male connector, 1.8 m | |
| 5CASDL.0050-01 | SDL cable with 45° male connector, 5 m | |
| 5CASDL.0100-01 | SDL cable with 45° male connector, 10 m | |
| 5CASDL.0150-01 | SDL cable with 45° male connector, 15 m | |

Table 304: 5CASDL.0018-01, 5CASDL.0050-01, 5CASDL.0100-01, 5CASDL.0150-01 - Order data

12.3.1.3 Technical data

| Product ID | 5CASDL.0018-01 | 5CASDL.0050-01 | 5CASDL.0100-01 | 5CASDL.0150-01 |
|----------------------------------|---|----------------|----------------|----------------|
| General information | | | | |
| Certification | Yes Yes Yes | | | |
| CE | | | | |
| cULus | | | | |
| GL | | | | |
| Cable structure | | | | |
| Wire cross section | AWG 28 | | AWG 24 | |
| Shield | Individual cable pairs and entire cable | | | |
| Cable shielding | Tinned copper 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 | | | |
| Locating screw tightening torque | Max. 0.5 Nm | | | |
| Electrical characteristics | | | | |
| 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 (connector - ferrite bead and ferrite bead - ferrite bead) | | | |
| Fixed installation | | | | |
| Flexibility | Limited flexibility; valid for ferrite bead - ferrite bead (tested 100 cycles with 5x cable diameter, 20 cycles / minute) | | | |
| Weight | Approx. 300 g | Approx. 590 g | Approx. 2800 g | Approx. 2860 g |

Table 305: 5CASDL.0018-01, 5CASDL.0050-01, 5CASDL.0100-01, 5CASDL.0150-01 - Technical data

12.3.1.4 Flex radius specifications

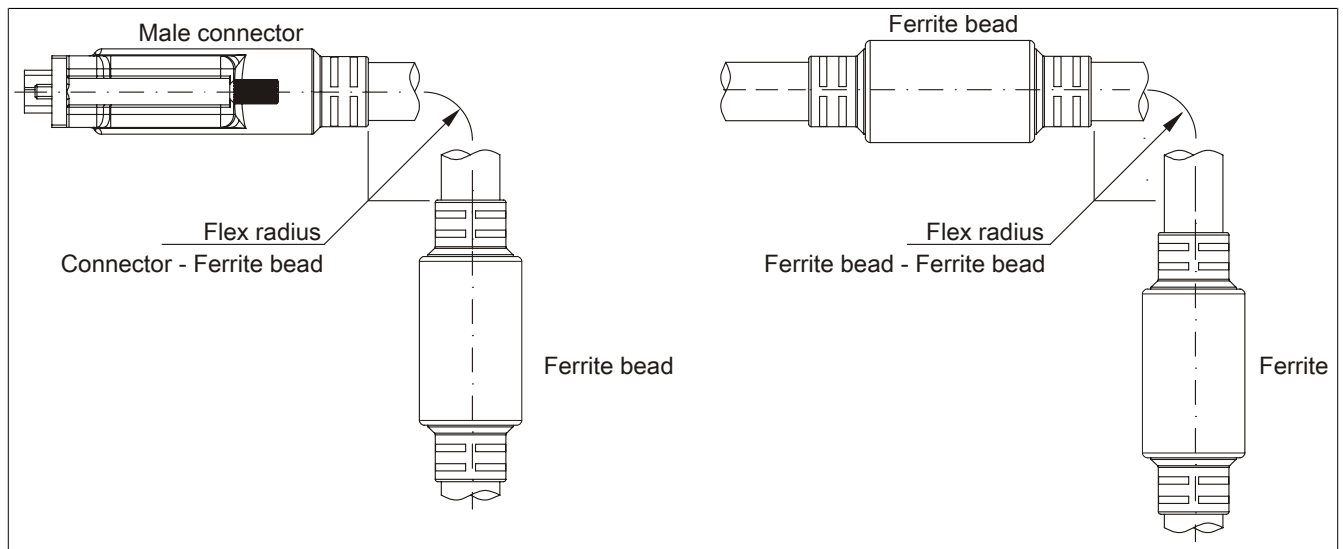


Figure 211: Flex radius specifications

12.3.1.5 Dimensions

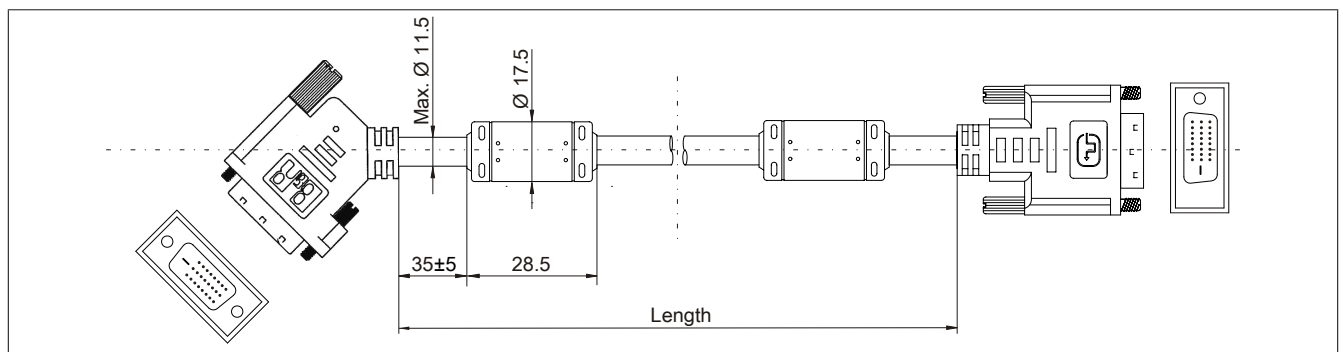


Figure 212: 5CASDL.0xxx-01 - Dimensions

12.3.1.6 Cable pinout

Warning!

If you choose to make a suitable cable yourself, it should be wired according to these specifications. If a self-made cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly.

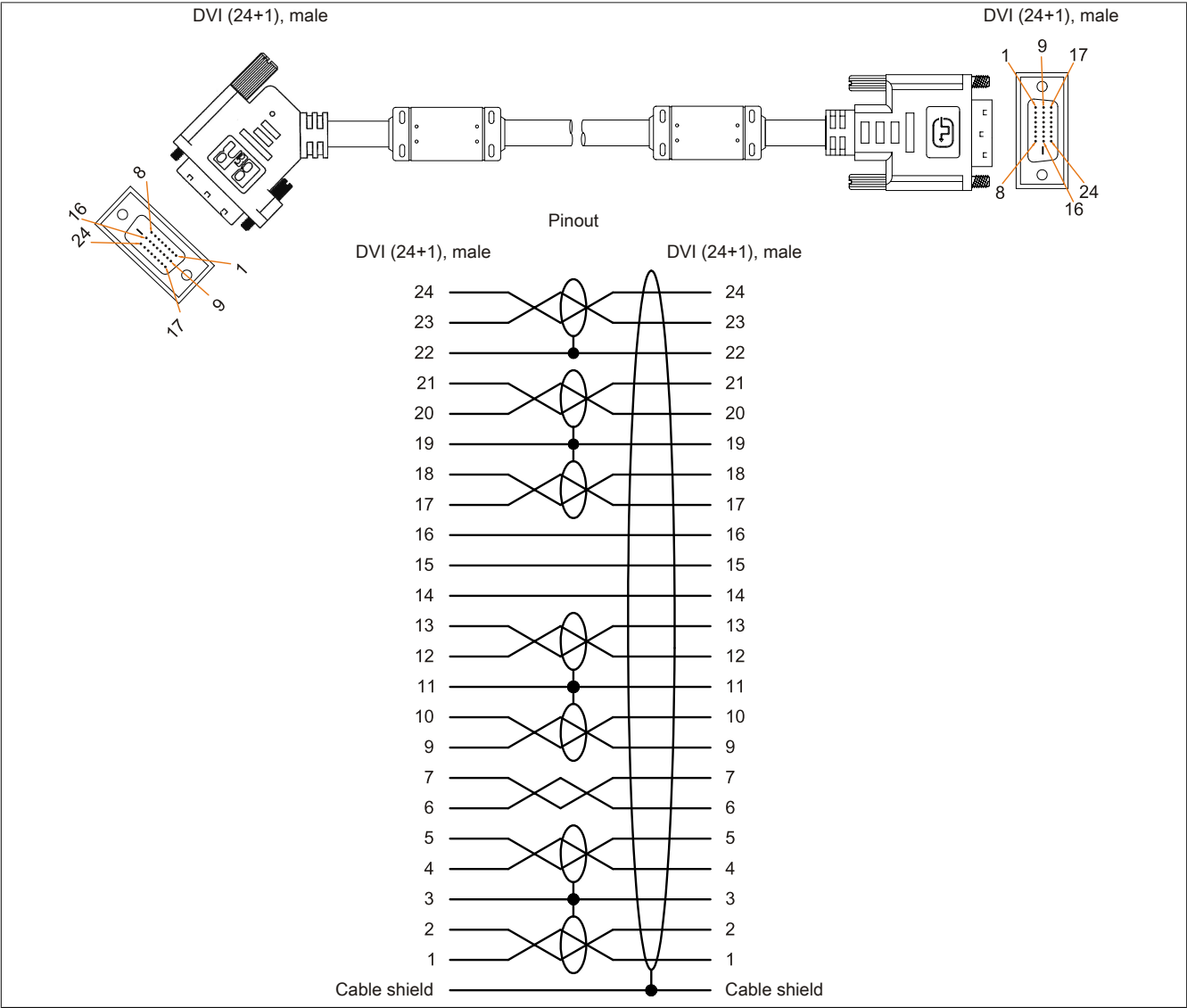


Figure 213: 5CASDL.0xxx-01 - Pinout

12.4 SDL flex cables

12.4.1 5CASDL.0xxx-03

12.4.1.1 General information

5CASDL.0xxx-03 SDL flex cables are designed for use in both inflexible and flexible applications (e.g. support arm systems).

Caution!

Power must be turned off before plugging in and unplugging cables.

12.4.1.2 Order data


| Model number | Short description | Figure |
|----------------|-----------------------|---|
| | SDL flex cable |  |
| 5CASDL.0018-03 | SDL flex cable, 1.8 m | |
| 5CASDL.0050-03 | SDL flex cable, 5 m | |
| 5CASDL.0100-03 | SDL flex cable, 10 m | |
| 5CASDL.0150-03 | SDL flex cable, 15 m | |
| 5CASDL.0200-03 | SDL flex cable, 20 m | |
| 5CASDL.0250-03 | SDL flex cable, 25 m | |
| 5CASDL.0300-03 | SDL flex cable, 30 m | |

Table 306: 5CASDL.0018-03, 5CASDL.0050-03, 5CASDL.0100-03, 5CASDL.0150-03, 5CASDL.0200-03, 5CASDL.0250-03, 5CASDL.0300-03 - Order data

12.4.1.3 Technical data

| Product ID | 5CASDL. 0018-03 | 5CASDL. 0050-03 | 5CASDL. 0100-03 | 5CASDL. 0150-03 | 5CASDL. 0200-03 | 5CASDL. 0250-03 | 5CASDL. 0300-03 |
|----------------------------------|--|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| General information | | | | | | | |
| Certification | | | | | | | |
| CE | | | | | | | |
| cULus | | | | | | | |
| GL | | | | | | | |
| Cable structure | | | | | | | |
| Wire cross section | AWG 24 (control wires) AWG 26 (DVI, USB, data) | | | | | | |
| Properties | Silicone- and halogen-free | | | | | | |
| Shield | Individual cable pairs and entire cable | | | | | | |
| Cable shielding | Aluminum-clad foil + tinned copper mesh | | | | | | |
| Outer sheathing | Special semi-glossy TMPU 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 | | | | | | |
| Locating screw tightening torque | Max. 0.5 Nm | | | | | | |
| Electrical characteristics | | | | | | | |
| Operating voltage | ≤30 V | | | | | | |
| Test voltage | 1 kV 0.5 kV | | | | | | |
| Wire/Wire | | | | | | | |
| Wire/Shield | | | | | | | |
| Wave impedance | 100 ±10 Ω | | | | | | |
| Conductor resistance | ≤95 Ω/km ≤145 Ω/km >200 MΩ/km | | | | | | |
| AWG 24 | | | | | | | |
| AWG 26 | | | | | | | |
| Insulation resistance | | | | | | | |
| Operating conditions | | | | | | | |
| Approbation | UL AWM 20236 80°C 30 V | | | | | | |
| Flame resistant | In accordance with UL758 (cable vertical flame test) | | | | | | |
| Oil and hydrolysis resistance | According to VDE 0282-10 | | | | | | |

Table 307: 5CASDL.0018-03, 5CASDL.0050-03, 5CASDL.0100-03, 5CASDL.0150-03, 5CASDL.0200-03, 5CASDL.0250-03, 5CASDL.0300-03 - Technical data

| Product ID | 5CASDL. 0018-03 | 5CASDL. 0050-03 | 5CASDL. 0100-03 | 5CASDL. 0150-03 | 5CASDL. 0200-03 | 5CASDL. 0250-03 | 5CASDL. 0300-03 |
|----------------------------|---|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Environmental conditions | | | | | | | |
| Temperature | -20 to 80°C | | | | | | |
| Storage | | | | | | | |
| Moving | | | | | | | |
| Fixed installation | -20 to 80°C | | | | | | |
| Mechanical characteristics | | | | | | | |
| Dimensions | 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 Max. 12 mm | | | | | | |
| Length | | | | | | | |
| Diameter | | | | | | | |
| Flex radius | ≥6x cable diameter (connector - ferrite bead) ≥10x cable diameter (from ferrite bead - ferrite bead) ≥15x cable diameter (from ferrite bead - ferrite bead) | | | | | | |
| Fixed installation | | | | | | | |
| Flexible installation | | | | | | | |
| Flexibility | Flexible; valid for ferrite bead - ferrite bead (tested 300,000 cycles with 15x cable diameter, 4800 cycles/hour) | | | | | | |
| Drag chain data | 300,000 4800 cycles/hour 180 mm; 15x cable diameter 460 mm | | | | | | |
| Flex cycles | | | | | | | |
| Velocity | | | | | | | |
| Flex radius | | | | | | | |
| Hub | | | | | | | |
| Weight | Approx. 460 g | Approx. 1020 g | Approx. 1940 g | Approx. 2840 g | Approx. 3740 g | Approx. 4560 g | Approx. 5590 g |
| Tension | ≤50 N ≤400 N | | | | | | |
| During operation | | | | | | | |
| During installation | | | | | | | |

Table 307: 5CASDL.0018-03, 5CASDL.0050-03, 5CASDL.0100-03, 5CASDL.0150-03, 5CASDL.0200-03, 5CASDL.0250-03, 5CASDL.0300-03 - Technical data

12.4.1.4 Flex radius specifications

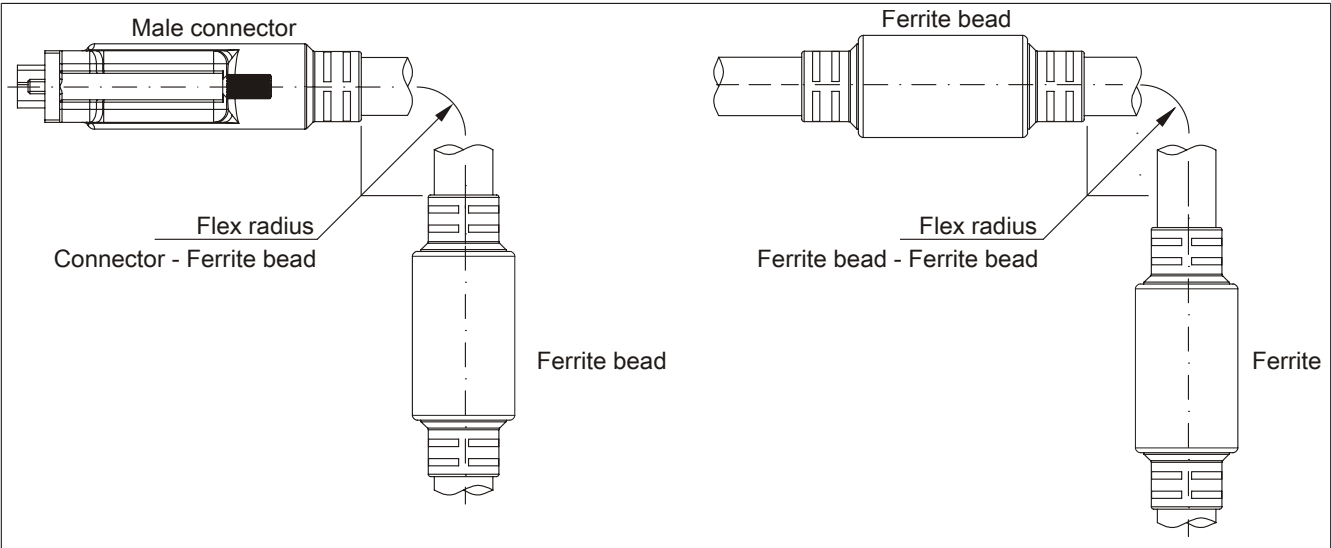


Figure 214: Flex radius specifications

12.4.1.5 Dimensions

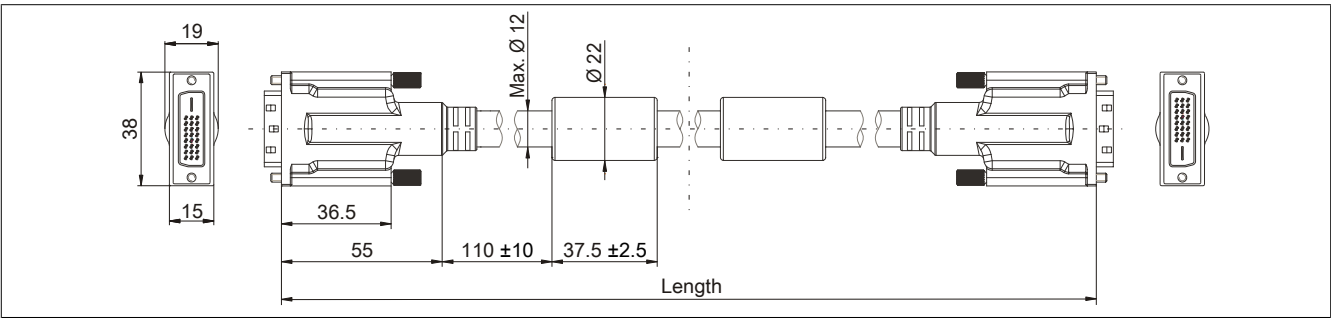


Figure 215: 5CASDL.0xxx-03 - Dimensions

12.4.1.6 Structure

| Element | Assignment | Cross section | |
|---------|-----------------|---------------|--|
| DVI | TMDS data 0 | 26 AWG | |
| | TMDS data 1 | 26 AWG | |
| | TMDS data 2 | 26 AWG | |
| | TMDS cycle | 26 AWG | |
| USB | XUSB0 | 26 AWG | |
| | XUSB1 | 26 AWG | |
| Data | SDL | 26 AWG | |
| | DDC cycle | 24 AWG | |
| | DDC data | 24 AWG | |
| | +5 V | 24 AWG | |
| | Mass | 24 AWG | |
| | Hot plug detect | 24 AWG | |

Table 308: 5CASDL.0xxx-03 SDL flex cables - Structure

12.4.1.7 Cable pinout

Warning!

If you choose to make a suitable cable yourself, it should be wired according to these specifications.

If a self-made cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly.

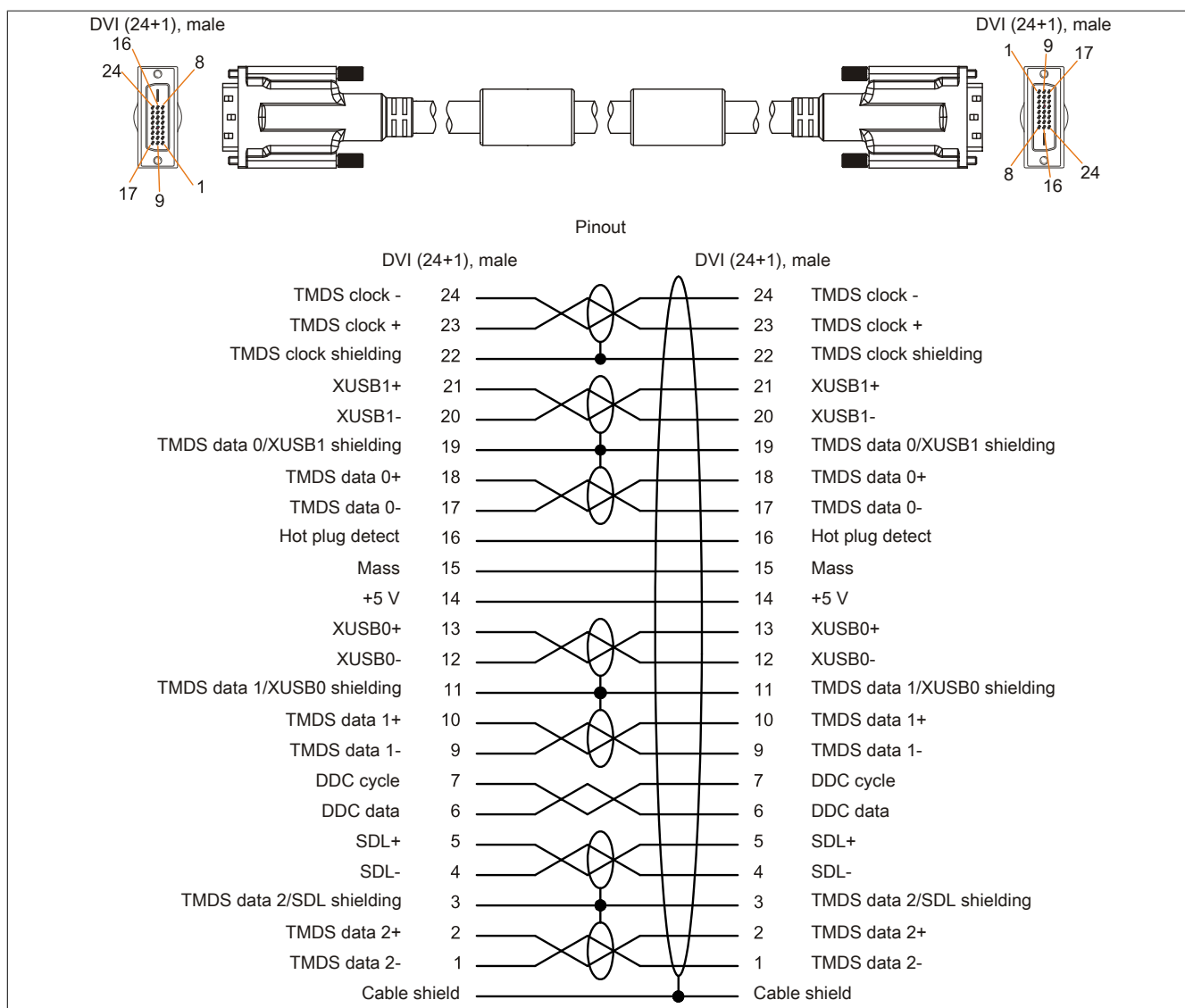


Figure 216: 5CASDL.0xxx-03 - Pinout

12.5 SDL flex cables with extender

12.5.1 5CASDL.0xx0-13

12.5.1.1 General information

5CASDL.0xx0-13 SDL flex cables with an extender are designed for use in both inflexible and flexible applications (e.g. support arm systems).

Caution!

Power must be turned off before plugging in and unplugging cables.

12.5.1.2 Order data

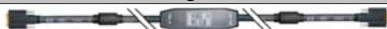
| Model number | Short description | Figure |
|----------------|------------------------------------|---|
| | SDL flex cable |  |
| 5CASDL.0300-13 | SDL flex cable with extender, 30 m | |
| 5CASDL.0400-13 | SDL flex cable with extender, 40 m | |
| 5CASDL.0430-13 | SDL flex cable with extender, 43 m | |

Table 309: 5CASDL.0300-13, 5CASDL.0400-13, 5CASDL.0430-13 - Order data

12.5.1.3 Technical data

| Product ID | 5CASDL.0300-13 | 5CASDL.0400-13 | 5CASDL.0430-13 |
|----------------------------------|--|----------------|----------------|
| General information | | | |
| Certification | | | |
| CE | Yes | | |
| cULus | Yes | | |
| GL | Yes | | |
| Cable structure | | | |
| Wire cross section | AWG 24 (control wires) AWG 26 (DVI, USB, data) | | |
| Properties | Silicone- and halogen-free | | |
| Shield | Individual cable pairs and entire cable | | |
| Cable shielding | Aluminum-clad foil + tinned copper mesh | | |
| Outer sheathing | | | |
| Material | Special semi-glossy TMPU | | |
| 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 | | |
| Locating screw tightening torque | Max. 0.5 Nm | | |
| Electrical characteristics | | | |
| Operating voltage | ≤30 V | | |
| Test voltage | | | |
| Wire/Wire | 1 kV | | |
| Wire/Shield | 0.5 kV | | |
| Wave impedance | 100 ±10 Ω | | |
| Conductor resistance | | | |
| AWG 24 | ≤95 Ω/km | | |
| AWG 26 | ≤145 Ω/km | | |
| Insulation resistance | >200 MΩ/km | | |
| Operating conditions | | | |
| Approbation | UL AWM 20236 80°C 30 V | | |
| Flame resistant | In accordance with UL758 (cable vertical flame test) | | |
| Oil and hydrolysis resistance | According to VDE 0282-10 | | |
| Environmental conditions | | | |
| Temperature | | | |
| Storage | -20 to 60°C | | |
| Moving | -5 to 60°C | | |
| Fixed installation | -20 to 60°C | | |

Table 310: 5CASDL.0300-13, 5CASDL.0400-13, 5CASDL.0430-13 - Technical data

| Product ID | 5CASDL.0300-13 | 5CASDL.0400-13 | 5CASDL.0430-13 |
|-----------------------------------|----------------|---|----------------|
| Mechanical characteristics | | | |
| Dimensions | | | |
| Length | 30 m ±280 mm | 40 m ±380 mm | 43 m ±410 mm |
| Diameter | | Max. 12 mm | |
| Extender box | | | |
| Width | | 35 mm | |
| Length | | 125 mm | |
| Height | | 18.5 mm | |
| Flex radius | | | |
| Fixed installation | | $\geq 6 \times$ cable diameter (connector - ferrite bead) $\geq 10 \times$ cable diameter (from ferrite bead - ferrite bead) $\geq 15 \times$ cable diameter (from ferrite bead - ferrite bead) | |
| Flexible installation | | | |
| Flexibility | | Flexible; valid for ferrite bead - ferrite bead (tested 300,000 cycles with 15x cable diameter, 4800 cycles/hour) | |
| Drag chain data | | | |
| Flex cycles | | 300,000 | |
| Velocity | | 4800 cycles/hour | |
| Flex radius | | 180 mm; 15x cable diameter | |
| Hub | | 460 mm | |
| Weight | Approx. 5430 g | Approx. 7200 g | Approx. 7790 g |
| Tension | | | |
| During operation | | ≤ 50 N | |
| During installation | | ≤ 400 N | |

Table 310: 5CASDL.0300-13, 5CASDL.0400-13, 5CASDL.0430-13 - Technical data

12.5.1.4 Flex radius specifications

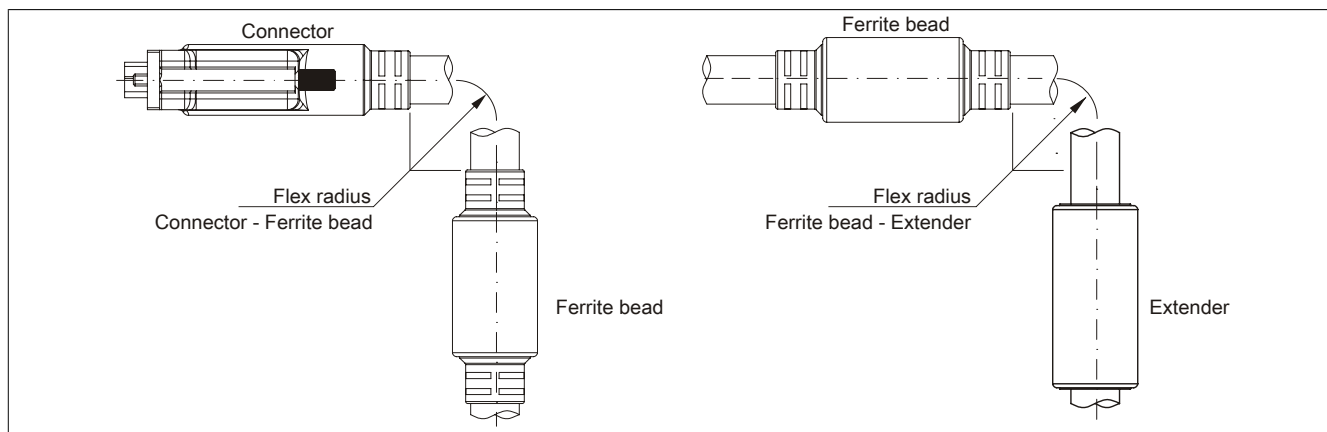


Figure 217: Flex radius specification with extender

12.5.1.5 Dimensions

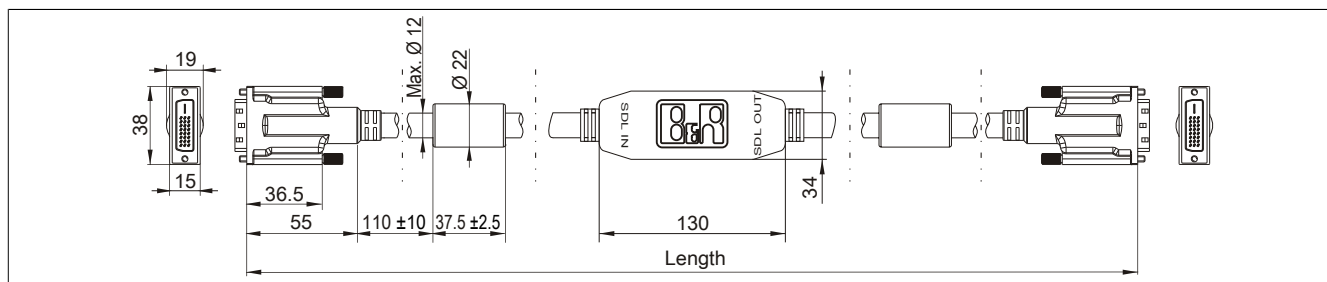


Figure 218: 5CASDL.0xx0-13 - Dimensions

12.5.1.6 Cable pinout

Warning!

If you choose to make a suitable cable yourself, it should be wired according to these specifications. If a self-made cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly.

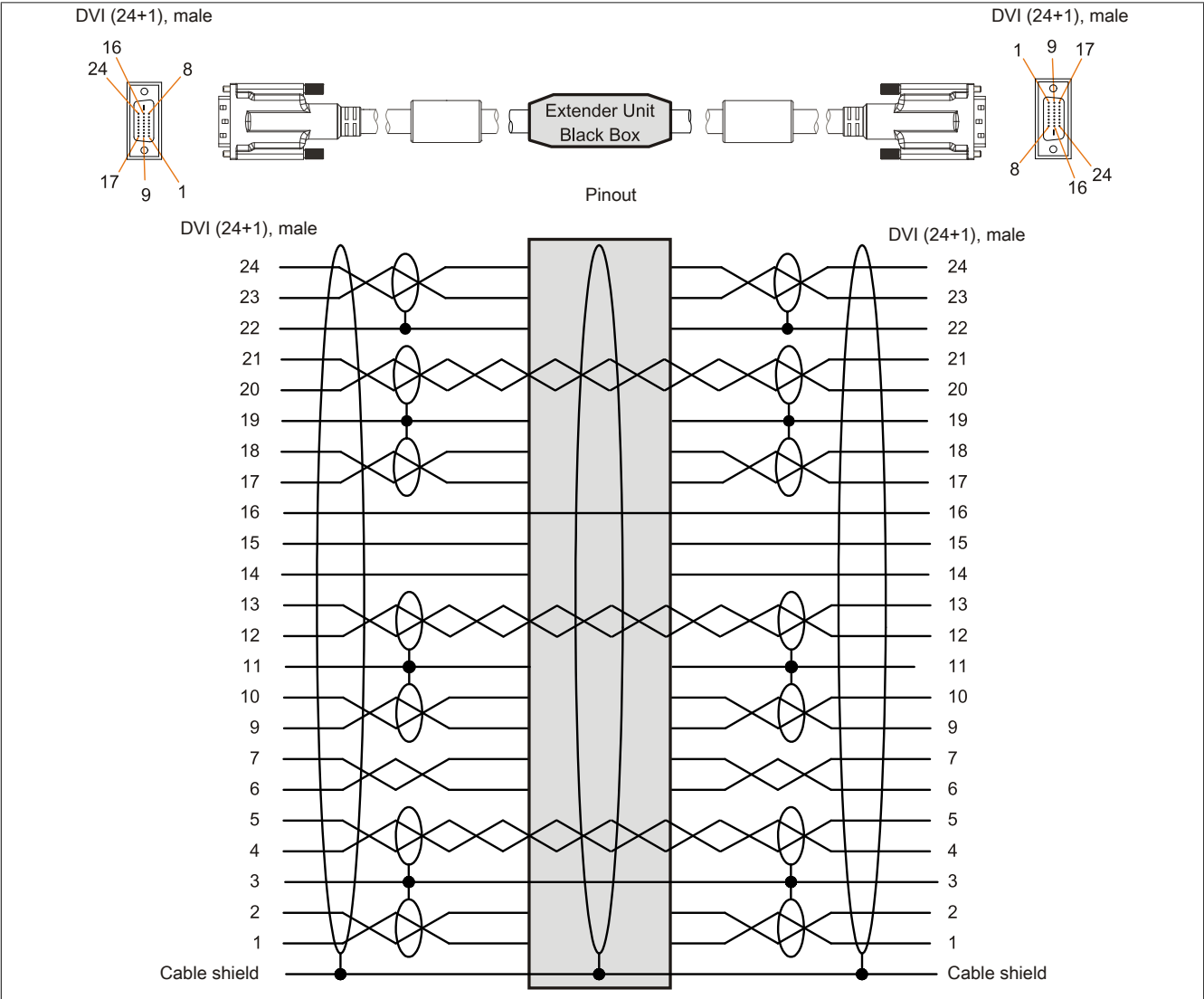


Figure 219: 5CASDL.0xx0-13 - Pinout

12.5.1.7 Cable connection

SDL flex cables with an extender must be connected between the B&R Industrial PC and the Automation Panel display unit in the correct direction. The proper signal direction is indicated on the extender.

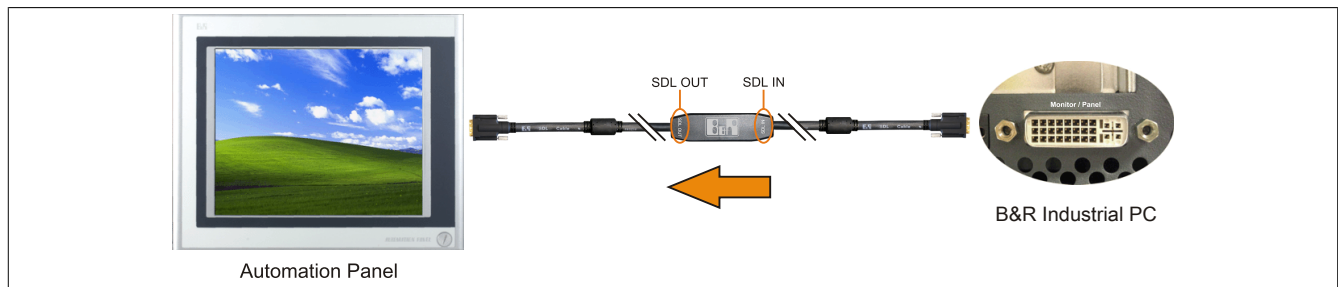


Figure 220: Example of the signal direction for an SDL flex cable with extender

12.6 USB cables

12.6.1 5CAUSB.00xx-00

12.6.1.1 General information

USB cables are designed to achieve USB 2.0 transfer speeds.

12.6.1.2 Order data


| Model number | Short description | Figure |
|----------------|---|---|
| | USB cable |  |
| 5CAUSB.0018-00 | USB 2.0 connection cable type A - type B, 1.8 m | |
| 5CAUSB.0050-00 | USB 2.0 connection cable type A - type B, 5 m | |

Table 311: 5CAUSB.0018-00, 5CAUSB.0050-00 - Order data

12.6.1.3 Technical data

| Product ID | 5CAUSB.0018-00 | 5CAUSB.0050-00 |
|----------------------------|-------------------------------------|----------------|
| General information | | |
| Certification | | |
| CE | Yes | |
| cULus | Yes | |
| Cable structure | | |
| Wire cross section | AWG 24, 28 | |
| Shield | Entire cable | |
| Outer sheathing | | |
| Color | Beige | |
| Connector | | |
| Type | USB type A male and USB type B male | |
| Mechanical characteristics | | |
| Dimensions | | |
| Length | 1.8 m ±30 mm | 5 m ±50 mm |
| Diameter | Max. 5 mm | |
| Flex radius | Min. 100 mm | |

Table 312: 5CAUSB.0018-00, 5CAUSB.0050-00 - Technical data

12.6.1.4 Cable pinout

Warning!

If you choose to make a suitable cable yourself, it should be wired according to these specifications.

If a self-made cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly.

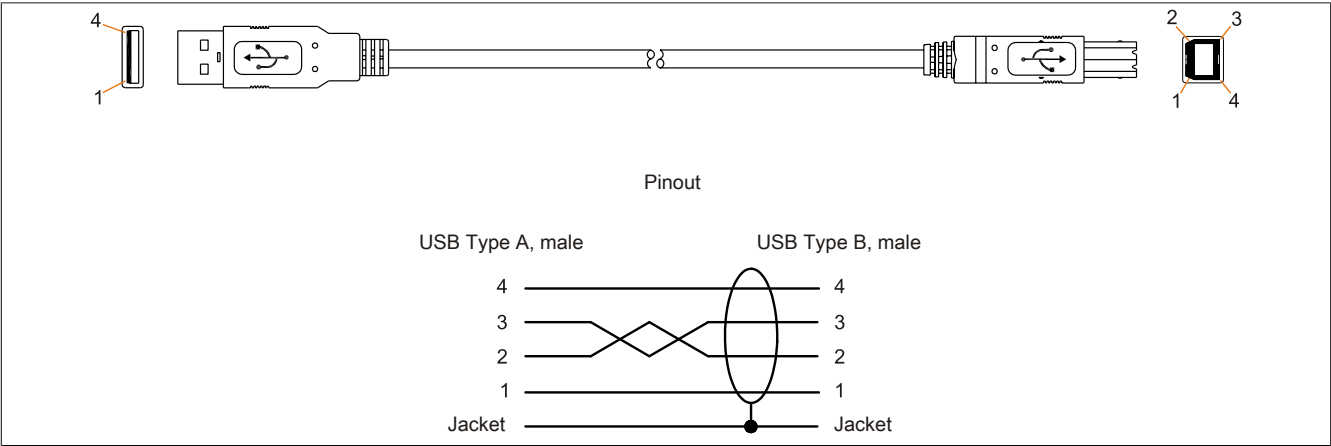


Figure 221: 5CAUSB.00xx-00 USB cables - Pinout

12.7 RS232 cables

12.7.1 9A0014.xx

12.7.1.1 General information

RS232 cables are used as extension cables between two RS232 interfaces.

12.7.1.2 Order data


| Model number | Short description | Figure |
|--------------|---|---|
| | RS232 cable |  |
| 9A0014.02 | RS232 extension cable for remote operation of a display unit with touch screen, 1.8 m | |
| 9A0014.05 | RS232 extension cable for remote operation of a display unit with touch screen, 5 m | |
| 9A0014.10 | RS232 extension cable for remote operation of a display unit with touch screen, 10 m | |

Table 313: 9A0014.02, 9A0014.05, 9A0014.10 - Order data

12.7.1.3 Technical data

| Product ID | 9A0014.02 | 9A0014.05 | 9A0014.10 |
|----------------------------------|----------------------------------|-------------------------|--------------|
| General information | | | |
| Certification CE | Yes | | |
| Cable structure | | | |
| Wire cross section | AWG 26 | | |
| Shield | Entire cable | | |
| Outer sheathing Color | Beige | | |
| Connector | | | |
| Type | 9-pin male/female DSUB connector | | |
| Locating screw tightening torque | Max. 0.5 Nm | | |
| 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 314: 9A0014.02, 9A0014.05, 9A0014.10 - Technical data

12.7.1.4 Cable pinout

Warning!

If you choose to make a suitable cable yourself, it should be wired according to these specifications. If a self-made cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly.

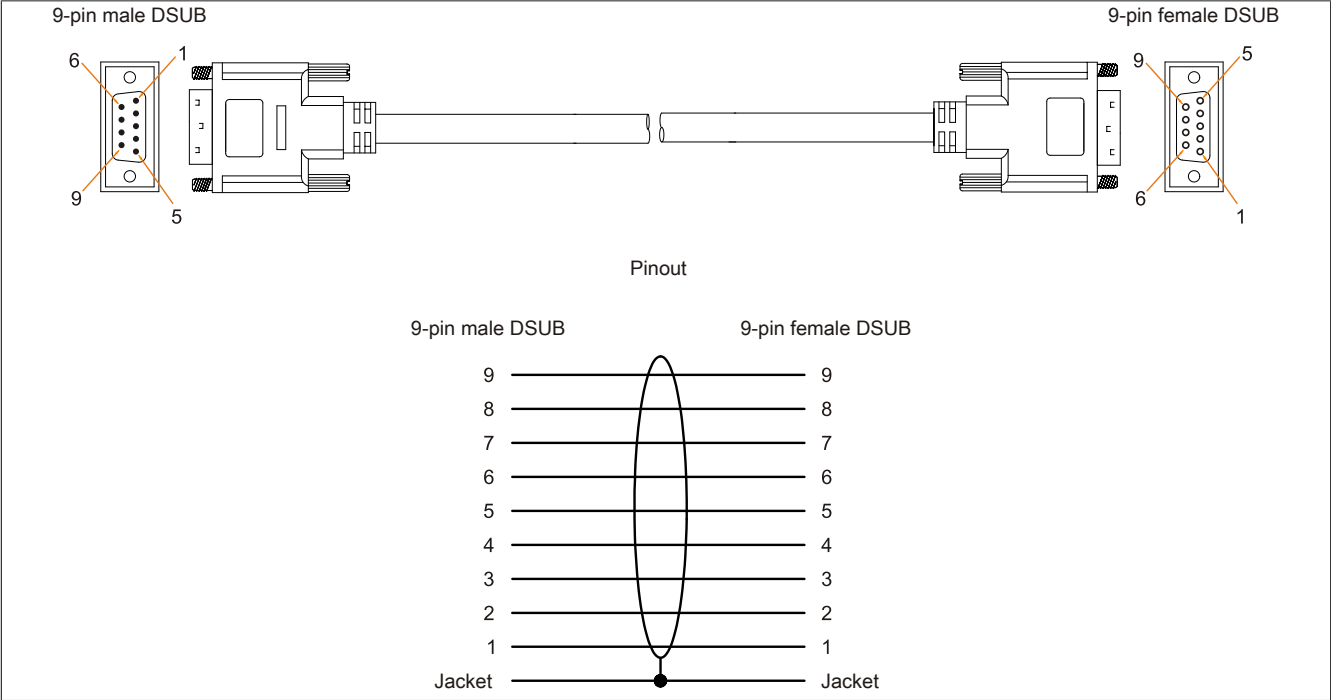


Figure 222: 9A0014.xx RS232 cables - Pinout

12.8 Internal supply cable

12.8.1 5CAMSC.0001-00

12.8.1.1 General information

This supply cable is used internally, for example to provide power to special PCI cards. It is connected to the mainboard.

For requirements and procedures, see "Connecting an external device to the mainboard" on page 432.

Caution!

Power must be turned off before plugging in and unplugging cables.

12.8.1.2 Order data


| Model number | Short description | Figure |
|--------------------|-----------------------|---|
| Accessories | |  |
| 5CAMSC.0001-00 | Internal supply cable | |

Table 315: 5CAMSC.0001-00 - Order data

12.8.1.3 Technical data

| | |
|-----------------------------------|---|
| Product ID | 5CAMSC.0001-00 |
| General information | |
| Certification CE | Yes |
| Cable structure | |
| Wire cross section | AWG 22 |
| Connector | |
| Type | 1x 4-pin male disk drive power connector, 1x 4-pin female connector housing |
| Mechanical characteristics | |
| Dimensions | |
| Length | 100 mm ±5 mm |
| Flexibility | Flexible |

Table 316: 5CAMSC.0001-00 - Technical data

13 HDD replacement disk tray

13.1 5AC801.FRAM-00

13.1.1 General information

To ensure that a hard disk can be replaced as quickly as possible, it is possible to install a compartment on the APC810 for storing a replacement HDD.

For more information about installing the HDD replacement disk tray, see chapter "Maintenance and service".

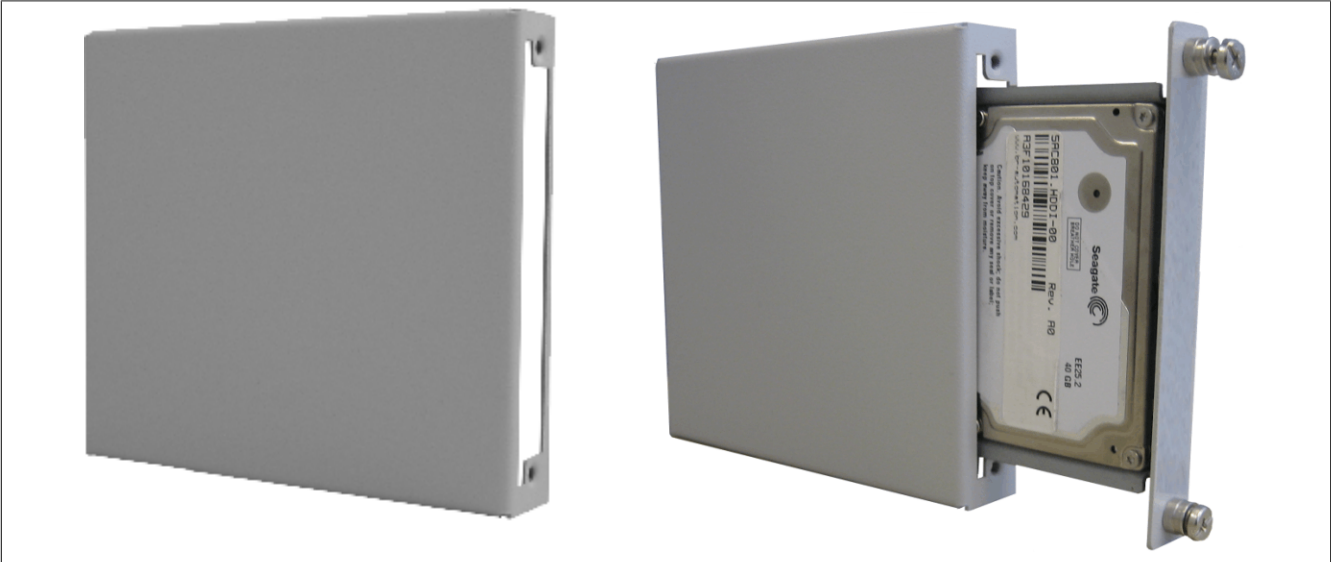


Figure 223: 5AC801.FRAM-00 - HDD replacement disk tray

13.1.2 Order data

| Model number | Short description | Figure |
|--------------------|--|--------|
| Accessories | | |
| 5AC801.FRAM-00 | APC810 SATA hard disk replacement tray | |

Table 317: 5AC801.FRAM-00 - Order data

13.1.3 Technical data

| | | | |
|----------------------------|----------------|--|--|
| Product ID | 5AC801.FRAM-00 | | |
| General information | | | |
| Certification CE | Yes | | |
| Mechanical characteristics | | | |
| Dimensions | | | |
| Width | 106 mm | | |
| Height | 101 mm | | |
| Depth | 18 mm | | |

Table 318: 5AC801.FRAM-00 - Technical data

13.1.4 Dimensions

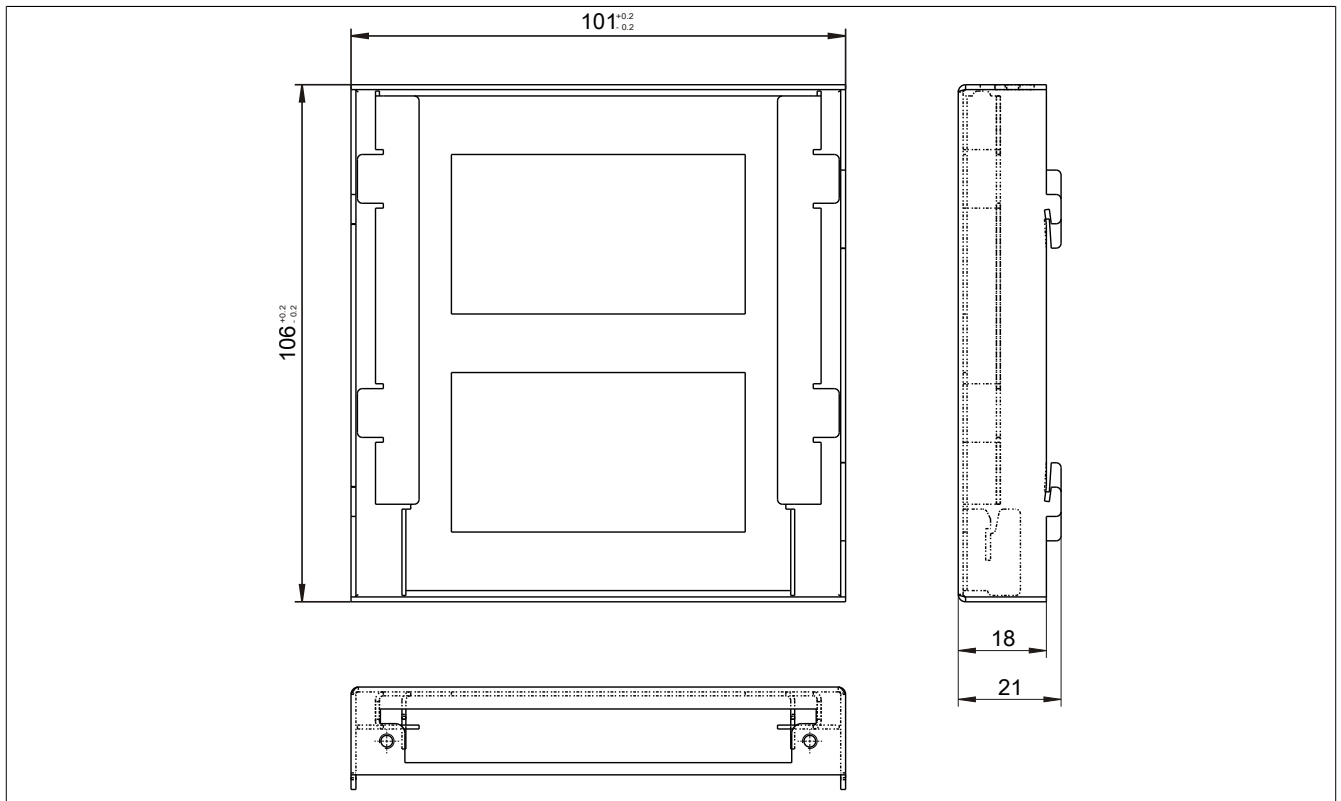


Figure 224: 5AC801.FRAM-00 - Dimensions

Chapter 7 • Maintenance and service

This chapter describes service/maintenance work that can be carried out by a qualified end user.

1 Changing the battery

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

Information:

- The product design allows the battery to be changed with the B&R device switched either on or off. In some countries, safety regulations do not allow batteries to be changed while the module is switched on.
- Any BIOS settings that have been made will remain when the battery is changed with the power turned off (stored in non-volatile EEPROM). The date and time must be reset later since this data is lost when the battery is changed.
- The battery should only be changed by qualified personnel.

Warning!

The battery must be replaced by a Type CR2477N Renata battery only. The use of another battery may present a risk of fire or explosion.

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

The following replacement lithium batteries are available: 4A0006.00-000 (1 pc.) and 0AC201.91 (4 pcs.).

1.1 Battery status evaluation

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

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

Table 319: Battery status

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

1.2 Procedure

- Disconnect the power supply to the B&R Industrial PC.
- Touch the housing or ground connection in order to discharge any electrostatic charge from your body.
- Remove the cover from the battery compartment and carefully pull out the battery using the removal strip.

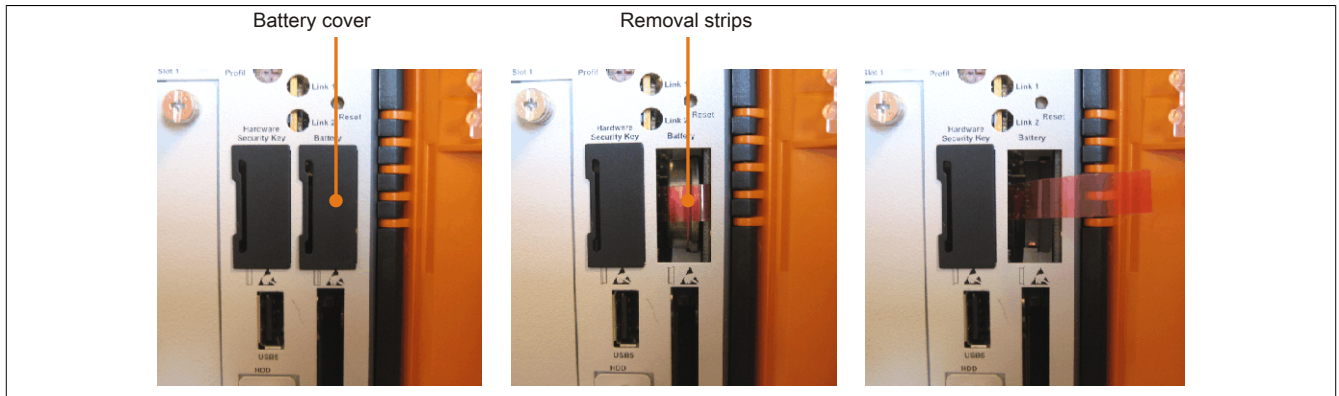


Figure 225: Removing the battery

- The battery should not be held by its edges. Insulated tweezers may also be used to insert the battery.

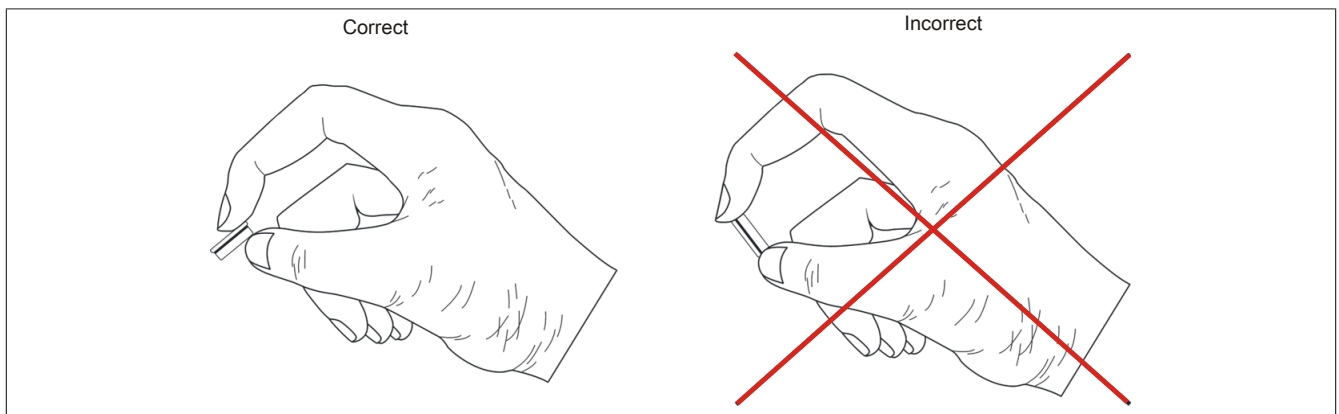


Figure 226: Battery handling

- Insert the new battery with the correct polarity.

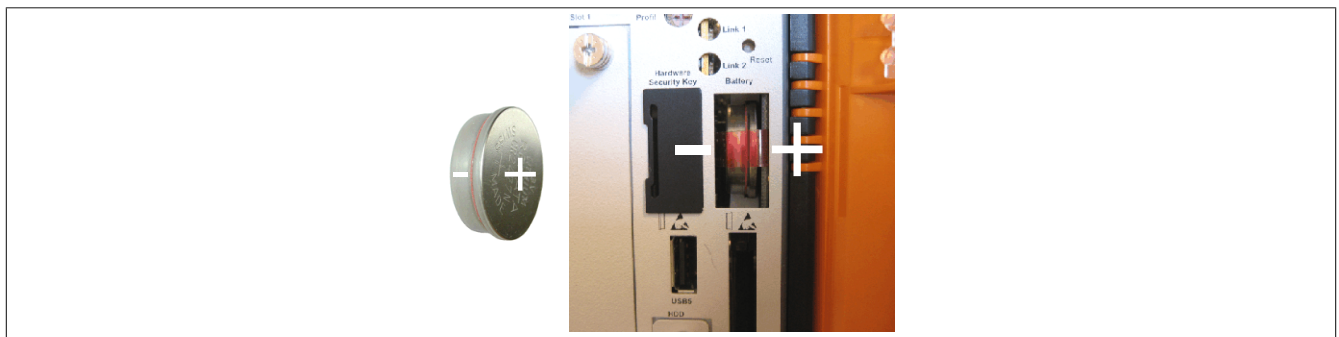


Figure 227: Battery polarity

- To make the next battery replacement easier, be sure the removal strip is in place when inserting the battery.
- Reconnect the power supply to the B&R Industrial PC (plug in the power cable).
- Reset the date and time in BIOS.

Warning!

Lithium batteries are considered hazardous waste. Used batteries should be disposed of in accordance with applicable local regulations.

2 Replacing a CompactFlash card

Caution!

Power must be turned off before replacing CompactFlash cards.

The CompactFlash card can be replaced quickly and easily by pressing the ejector (see image) with a pointed object such as a pen.

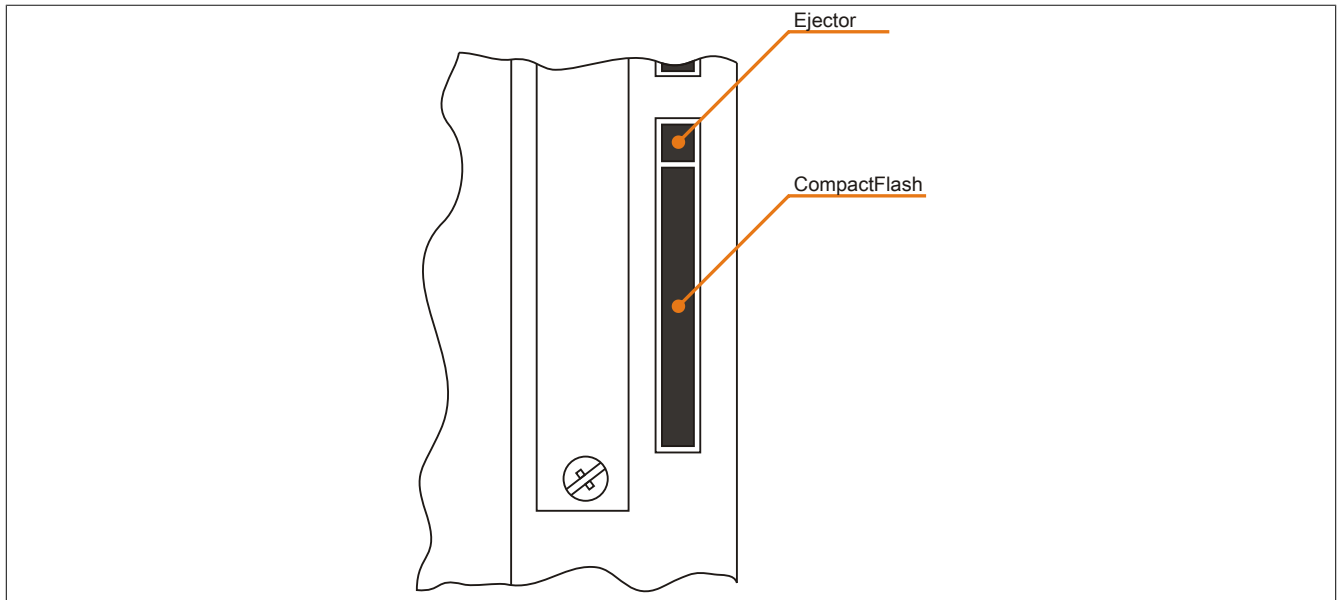


Figure 228: CompactFlash + ejector

3 Installing and replacing slide-in compact drives

Information:

The SATA I interface allows disks to be replaced during operation (hot plugging). In order to take advantage of this capability, this feature must be supported by the operating system.

3.1 Procedure

1. Loosen and remove the two quick release screws on the protective cover / slide-in compact drive.



Figure 229: Loosening the quick release screws

2. Insert the compact SATA drive and tighten the quick release screws.



Figure 230: Inserting the compact SATA drive

4 Installing and replacing slide-in drives

Slide-in drives can be installed and replaced in system units with 2, 3 or 5 card slots.

4.1 Procedure

1. Disconnect the power supply to the B&R Industrial PC.
2. Touch the housing or ground connection in order to discharge any electrostatic charge from your body.
3. Remove the dummy slide-in module or slide-in drive by unscrewing the two quick release screws.



Figure 231: Loosening the quick release screws

4. Insert the slide-in drive and tighten with the two $\frac{1}{4}$ turn screws.

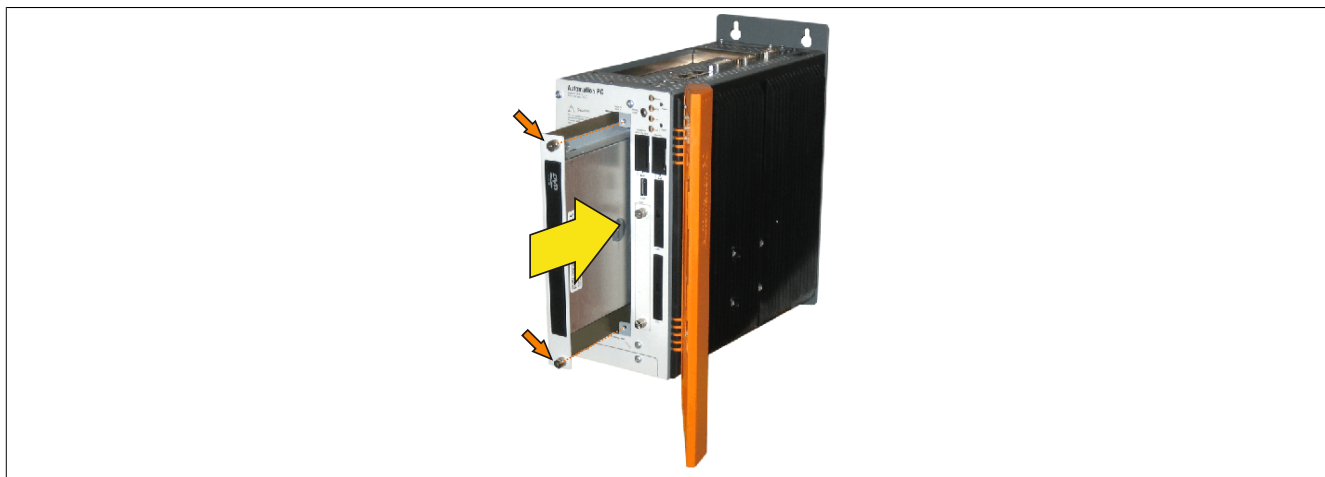


Figure 232: Installing the slide-in drive

5 Installing a slide-in compact adapter

Slide-in compact adapters can be installed and replaced in system units with 2, 3 or 5 card slots. 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.

5.1 Procedure

1. Disconnect the power supply to the B&R Industrial PC.
2. Touch the housing or ground connection in order to discharge any electrostatic charge from your body.
3. Remove the dummy slide-in module or slide-in drive by unscrewing the two quick release screws.



Figure 233: Loosening the quick release screws

4. Insert the slide-in compact adapter and tighten the two quick release screws.

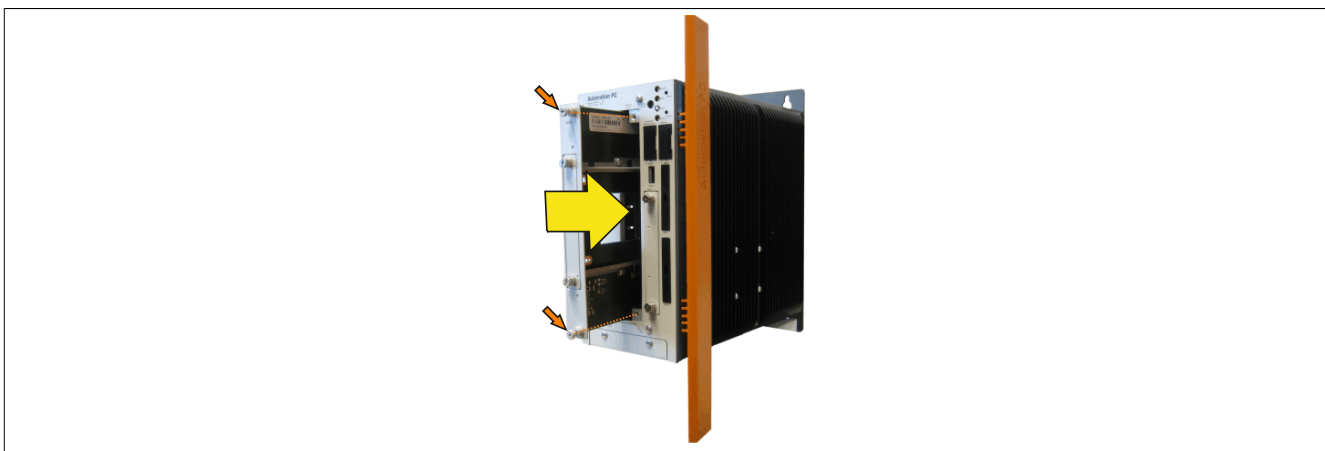


Figure 234: Installing the slide-in compact adapter

5. Once the adapter has been installed, the slide-in compact drive can be inserted.

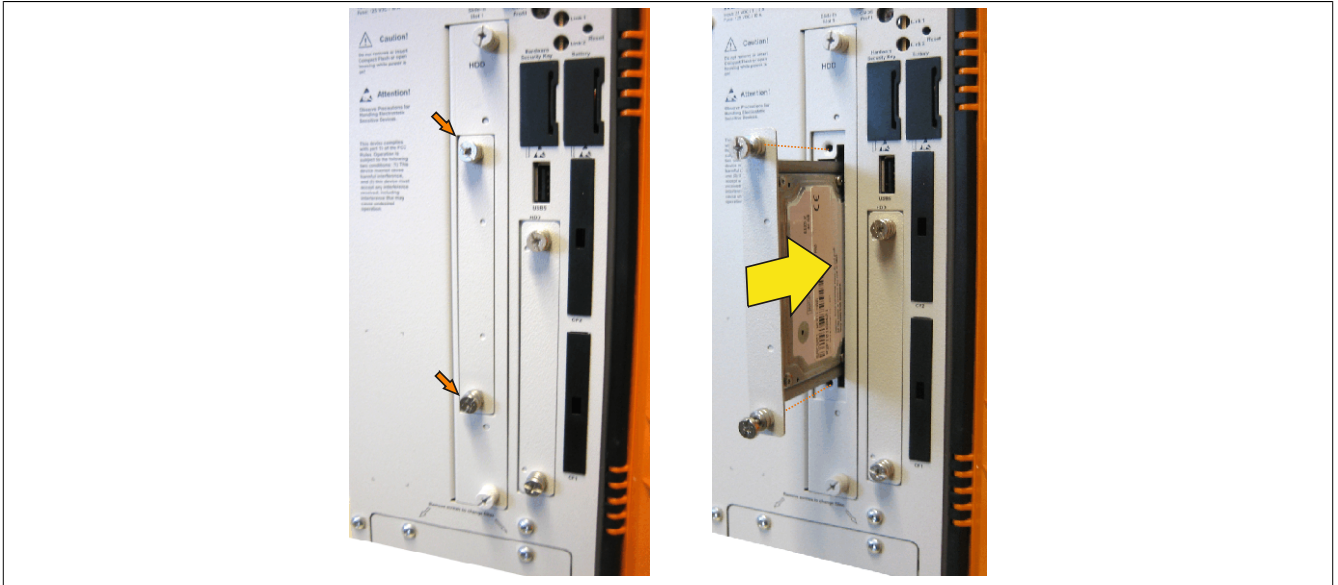


Figure 235: Inserting the slide-in compact drive

6 Installing and replacing fan kits

6.1 Procedure

1. Remove the fan kit cover. Loosen the Torx (T10) screws and slide the cover forward.

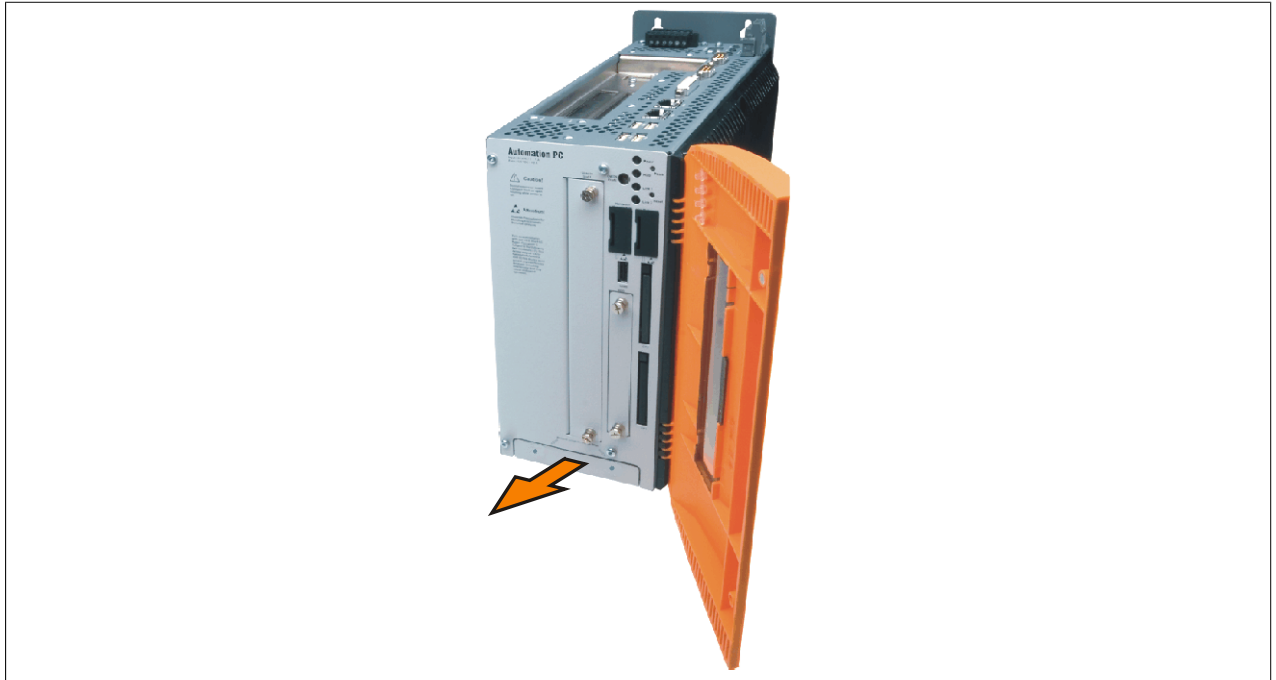


Figure 236: Removing the fan kit insert

2. Insert the frame by mounting the contact board side to the sliding contacts on the system unit and fasten using the quick release screws.

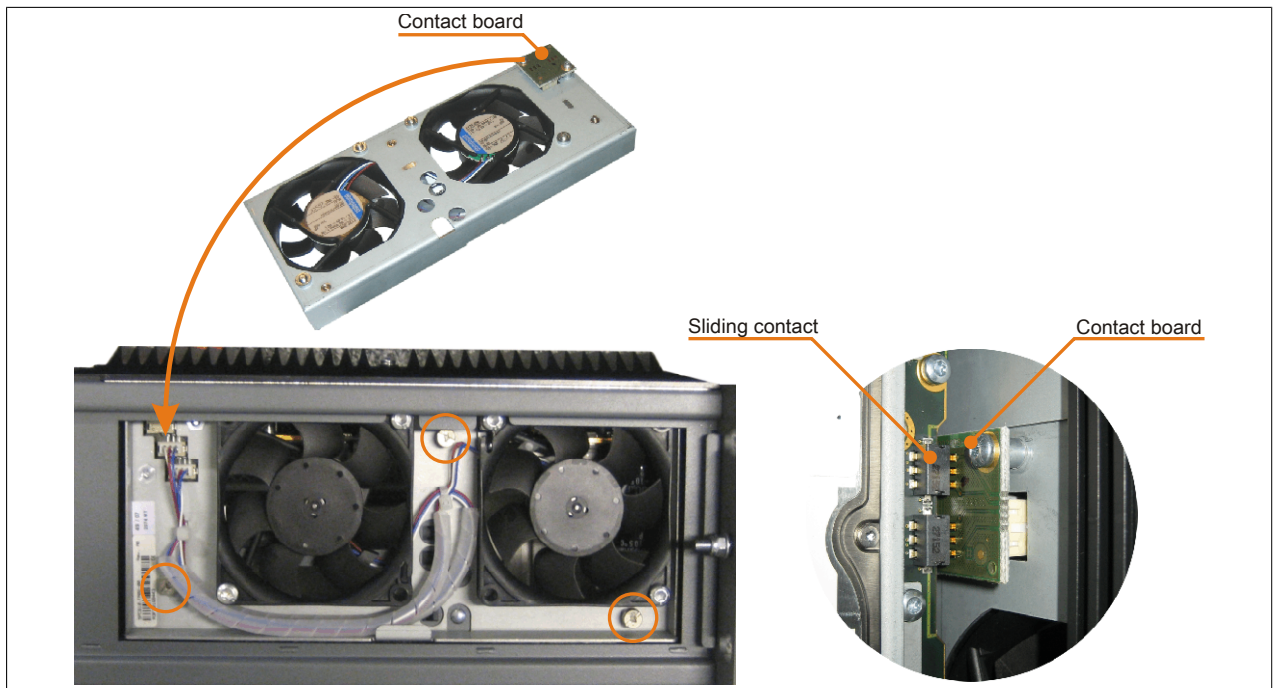


Figure 237: Inserting and fastening the fan kit

3. Place the dust filter in the fan kit cover and secure it with the filter clasp.

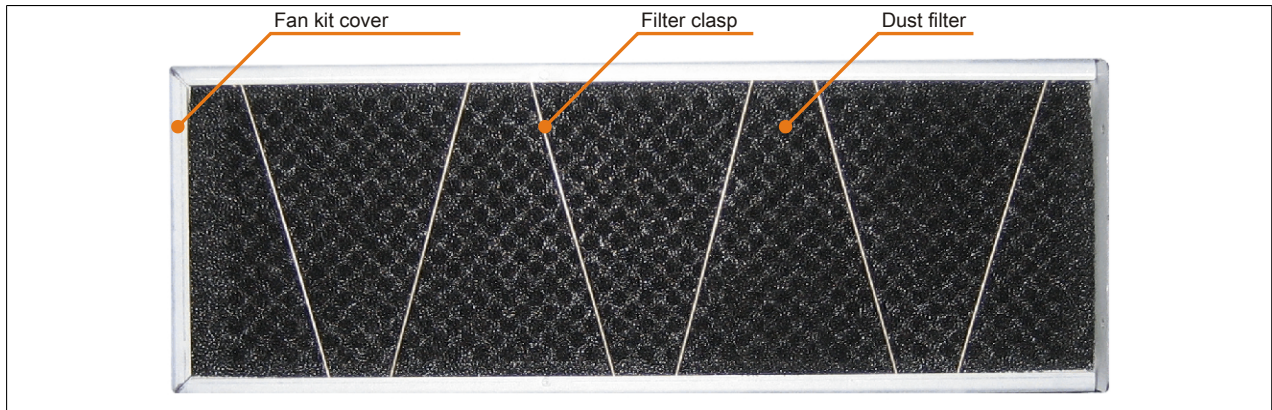


Figure 238: Securing the dust filter with the filter clasp

4. Place the fan kit cover in the housing and fasten using the Torx screws removed earlier.

Information:

The dust filter should be checked regularly depending on the area of use and degree of contamination.

Installation is the same as for all APC810 devices.

7 Installing the UPS module

This module is installed using the materials included in delivery.

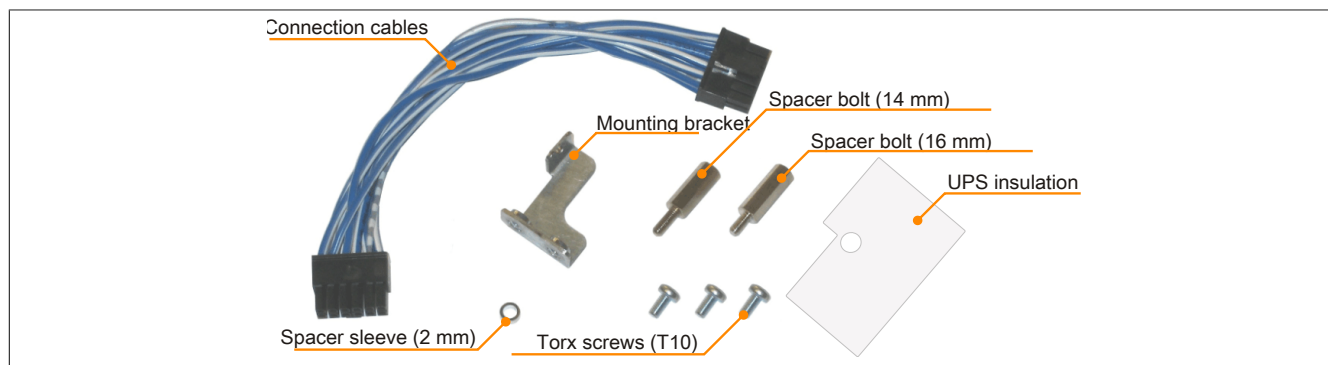


Figure 239: 5AC600.UPS1-00 Add-on UPS module - Installation materials

Installation may vary depending on the system unit variant (1, 2, 3 or 5 card slots) or whether an add-on interface module (IF option) is installed in the APC810.

7.1 Installation without installed add-on interface module

Different parts are used depending on the system unit and whether the add-on interface module is installed or not installed.

7.1.1 1-slot APC810

1. Remove the side cover (see "Installing the side cover" on page 422).
2. Remove the UPS module cover by removing the 2 marked Torx screws (T10).

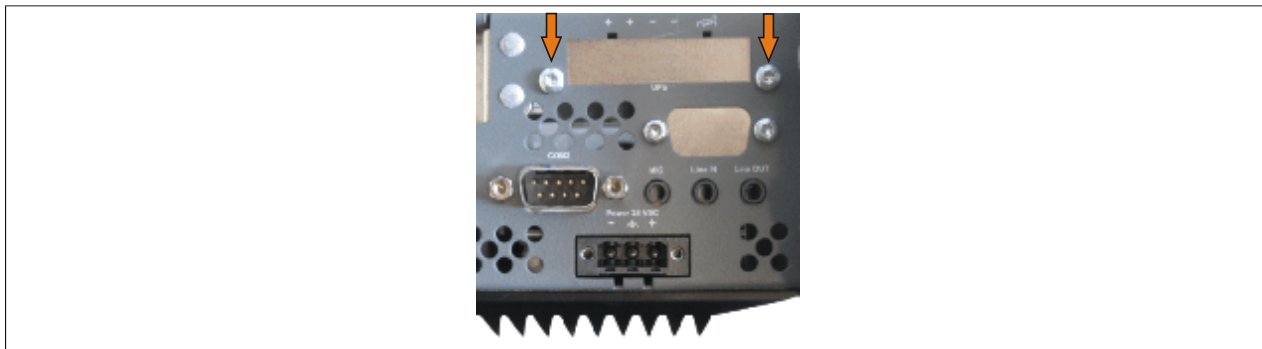


Figure 240: Removing the UPS module cover

3. Screw in the spacing bolt and spacing ring on the mainboard (using the M5 hex socket screwdriver).

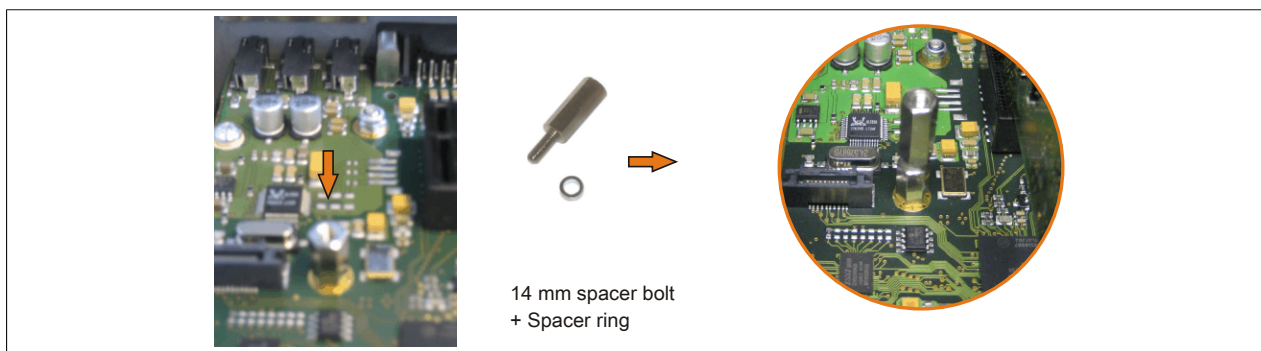


Figure 241: Screwing in the spacing bolt and spacing ring

4. Install the UPS module using 2 Torx screws (T10) on the housing and 1 Torx screw (T10) on the mainboard (spacing bolt). Use the previously removed Torx screws from the mounting materials.

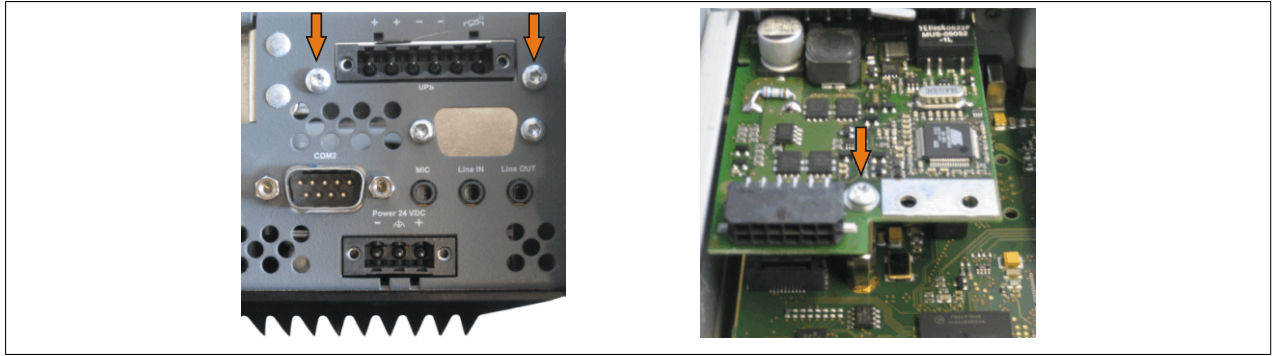


Figure 242: Installing the UPS module

5. Attach the connection cable (see marked female connector).

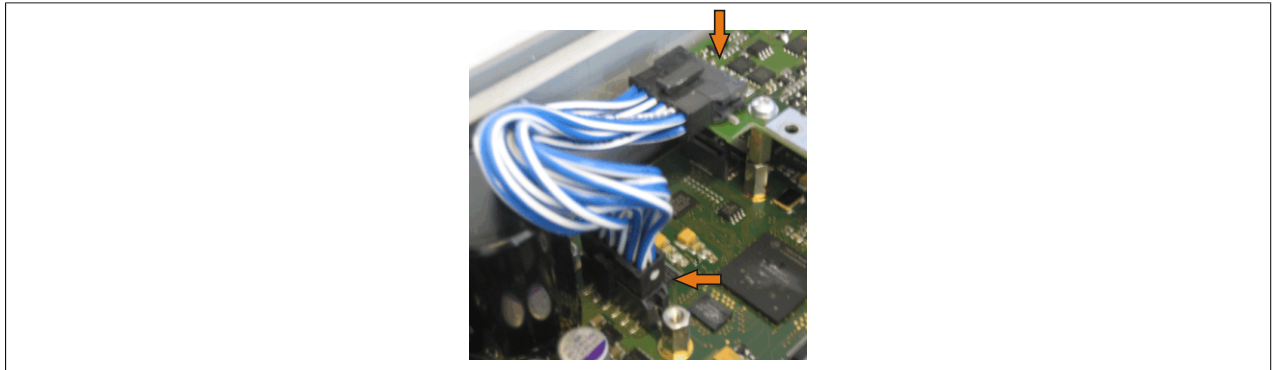


Figure 243: Attaching the connection cable

Information:

When connecting the cable, make sure that the connector locks into place.

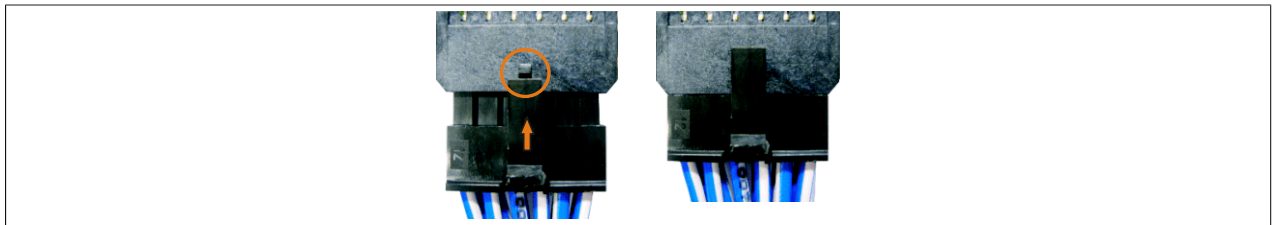


Figure 244: Connector locking mechanism

6. Attach the side cover.

7.1.2 2- and 3-slot APC810

1. Remove the side cover (see "Installing the side cover" on page 422).
2. Remove the UPS module cover by removing the 2 marked Torx screws (T10).

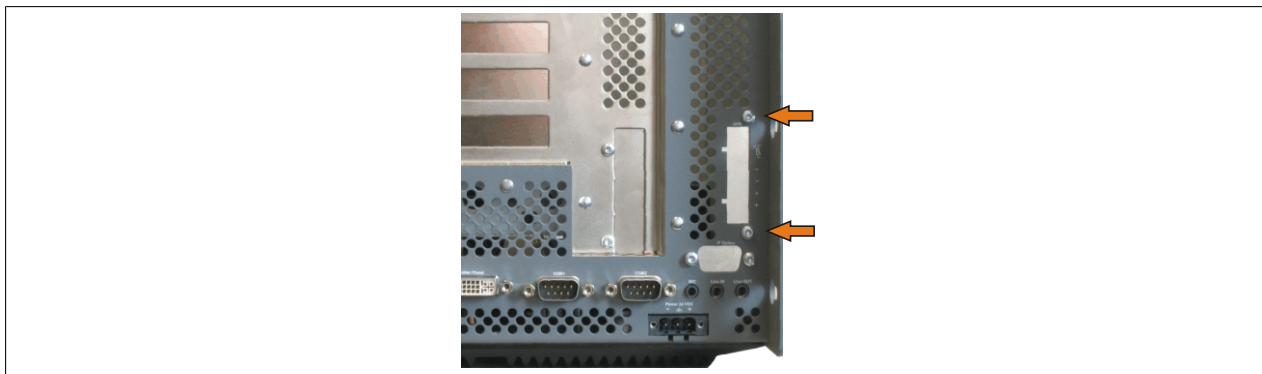


Figure 245: Removing the UPS module cover

3. Screw in the spacing bolt and spacing ring on the mainboard (using the M5 hex socket screwdriver).

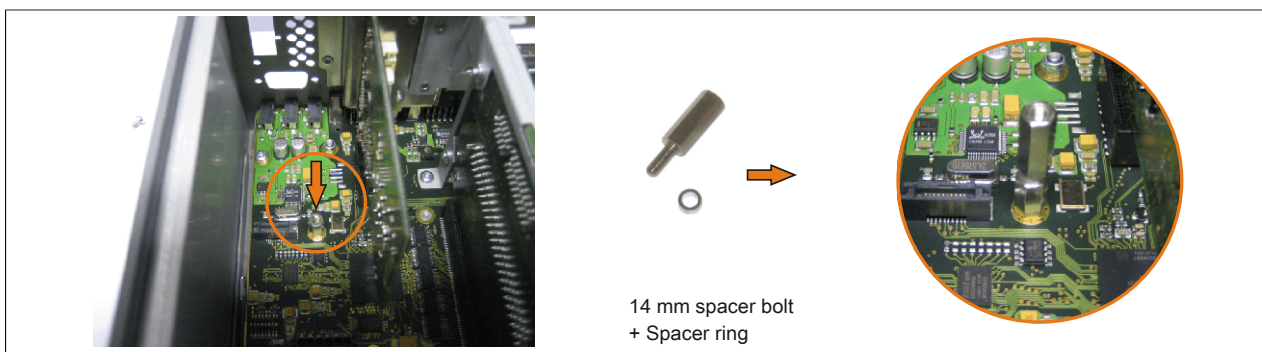


Figure 246: Screwing in the spacing bolt and spacing ring

4. Install the mounting bracket on the UPS module using 2 Torx screws (T10).

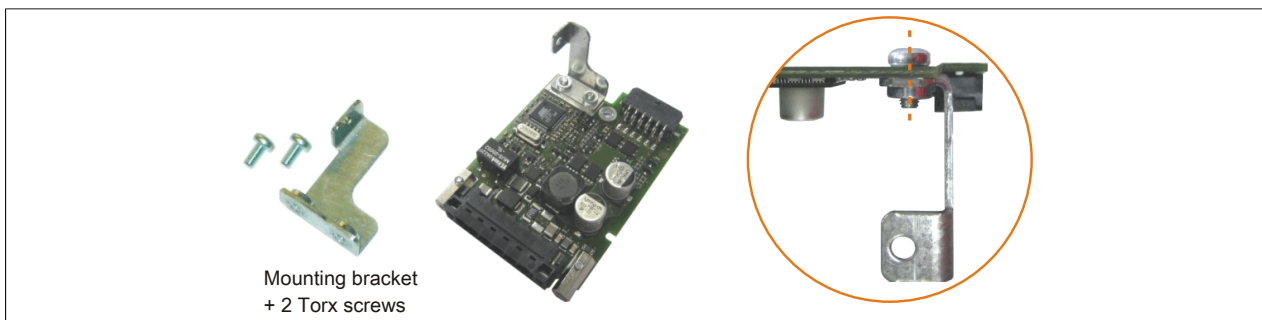


Figure 247: Installing the mounting bracket

5. Install the UPS module using 2 Torx screws (T10) on the housing and 1 Torx screw (T10) on the mainboard (spacing bolt). Use the previously removed Torx screws from the mounting materials.

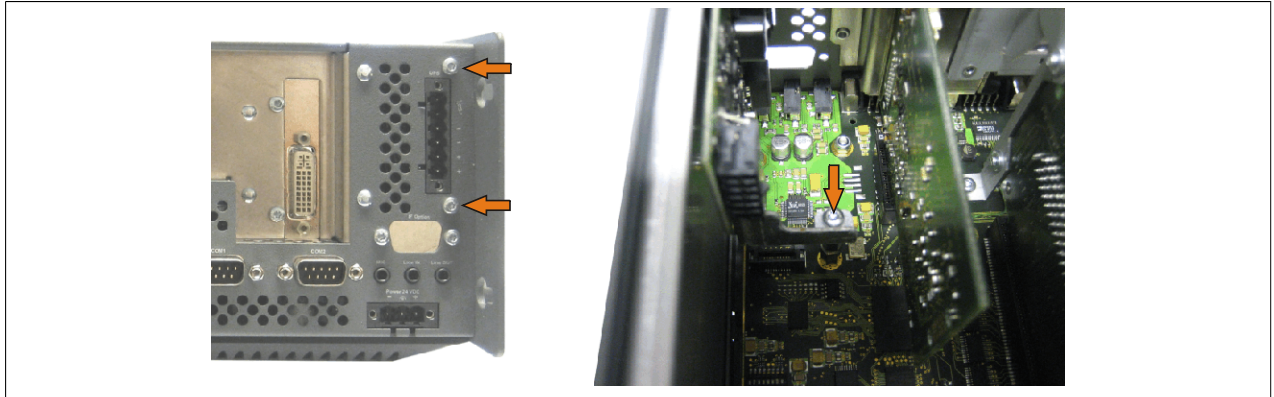


Figure 248: Installing the UPS module

6. Attach the connection cable (see marked female connector).

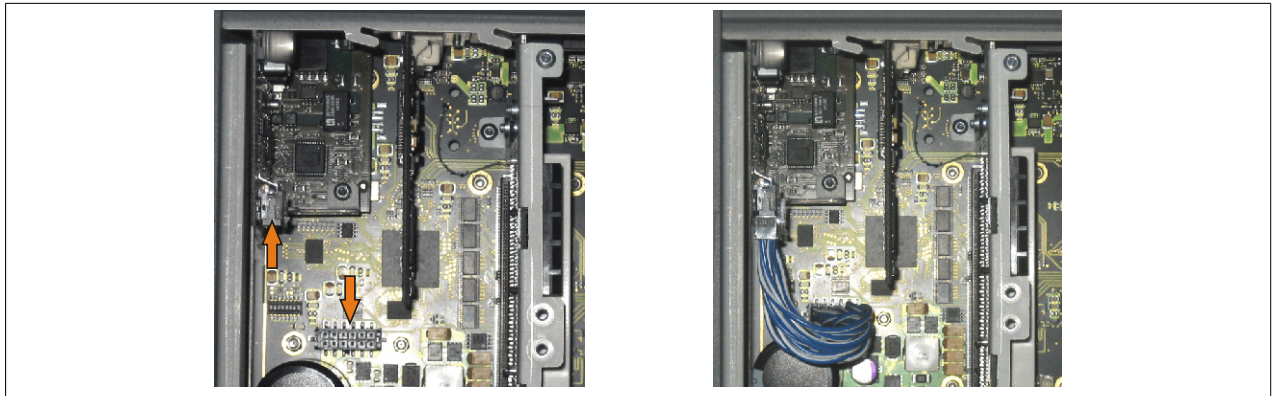


Figure 249: Attaching the connection cable

Information:

When connecting the cable, make sure that the connector locks into place.

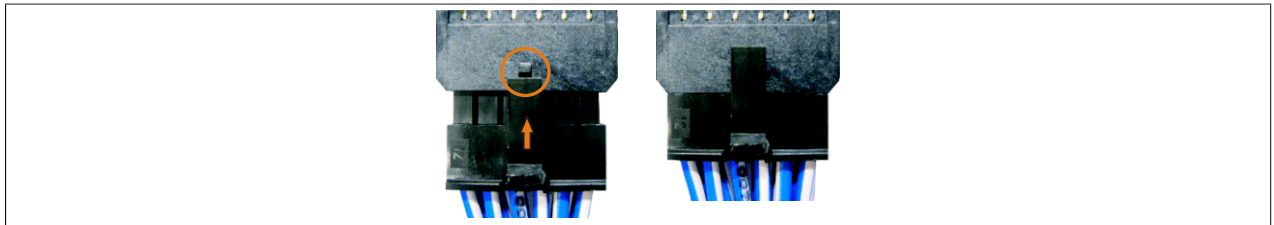


Figure 250: Connector locking mechanism

7. Attach the side cover.

7.1.3 5-slot APC810

1. Remove the side cover (see "Installing the side cover" on page 422).
2. Remove the UPS module cover by removing the 2 marked Torx screws (T10).

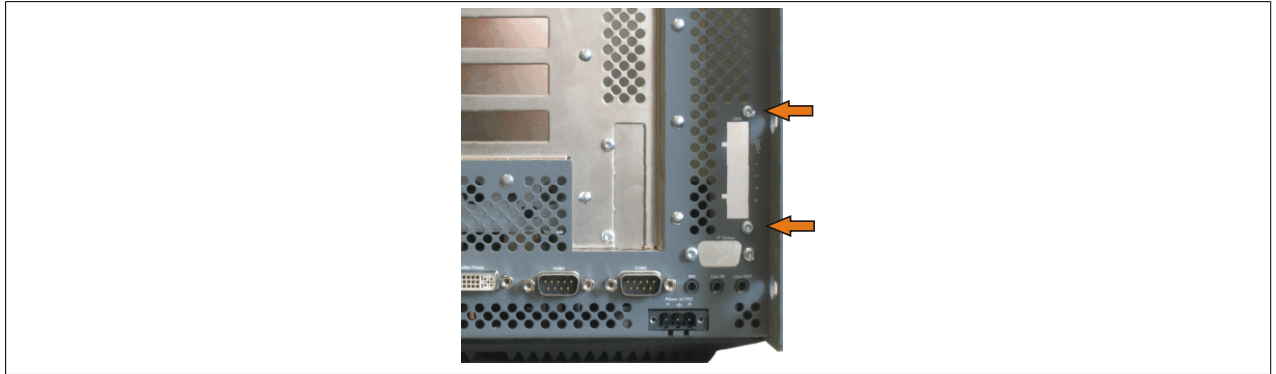


Figure 251: Removing the UPS module cover

3. Screw in spacing bolt and spacing ring (using M5 hex socket screwdriver).

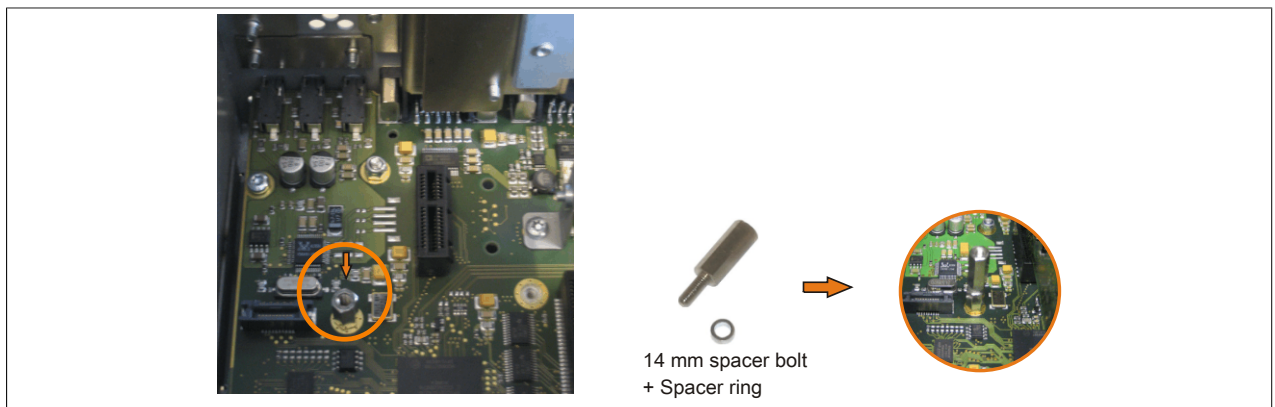


Figure 252: Screwing in the spacing bolt and spacing ring

4. Install the mounting bracket on the UPS module using 2 Torx screws (T10).

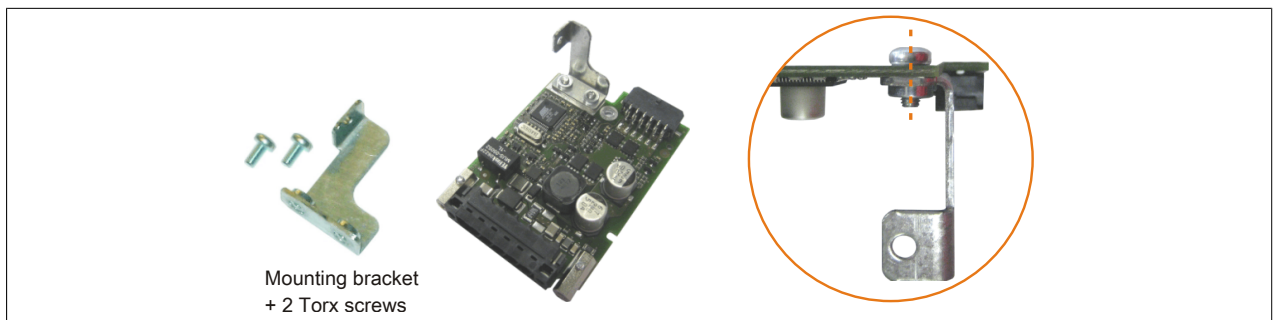


Figure 253: Installing the mounting bracket

5. Install the UPS module using 2 Torx screws (T10) on the housing and 1 Torx screw (T10) on the mainboard (spacing bolt). Use the previously removed Torx screws from the mounting materials.

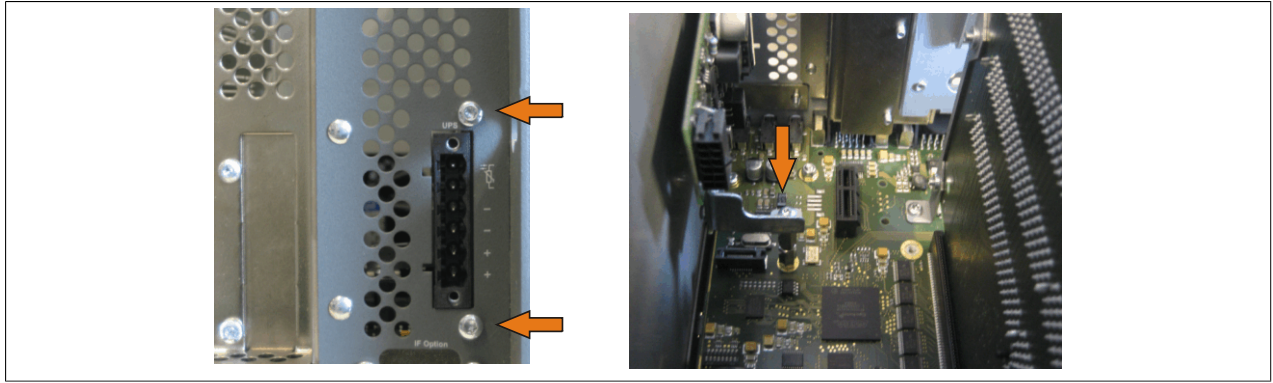


Figure 254: Installing the UPS module

6. Attach the connection cable (see the marked female connector).

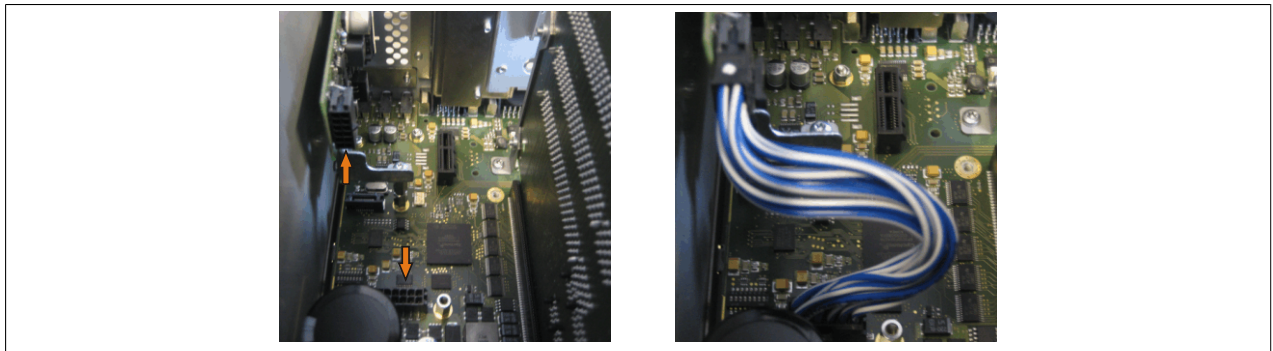


Figure 255: Attaching the connection cable

Information:

When connecting the cable, make sure that the connector locks into place.

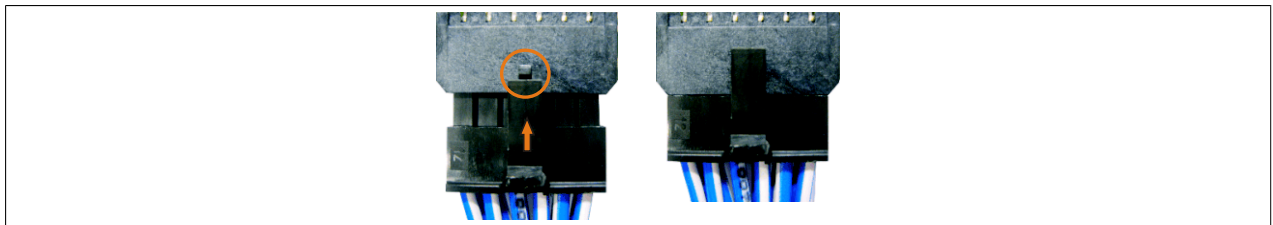


Figure 256: Connector locking mechanism

7. Attach the side cover.

7.2 Installation with installed add-on interface module

7.2.1 1-slot APC810

1. Remove the side cover (see "Installing the side cover" on page 422).
2. Remove the UPS module cover by removing the 2 marked Torx screws (T10).

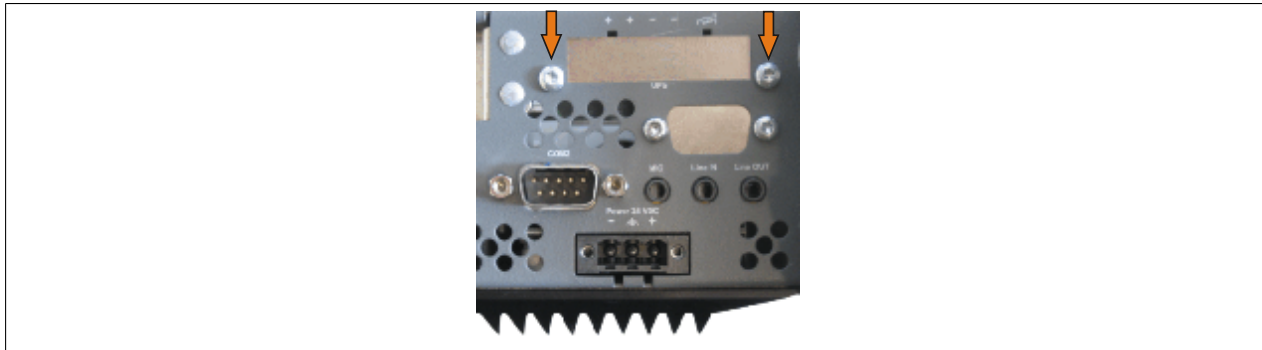


Figure 257: Removing the UPS module cover

3. Screw in the spacing bolt (using the M5 hex socket screwdriver).

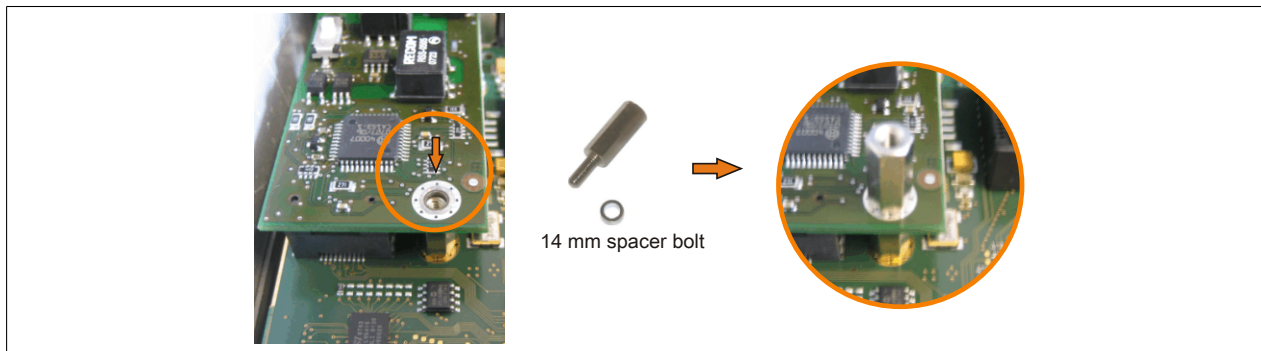


Figure 258: Screwing in the spacing bolt

4. Install the UPS module using 3 Torx screws (T10). Use the previously removed Torx screws and one Torx screw from the installation material.

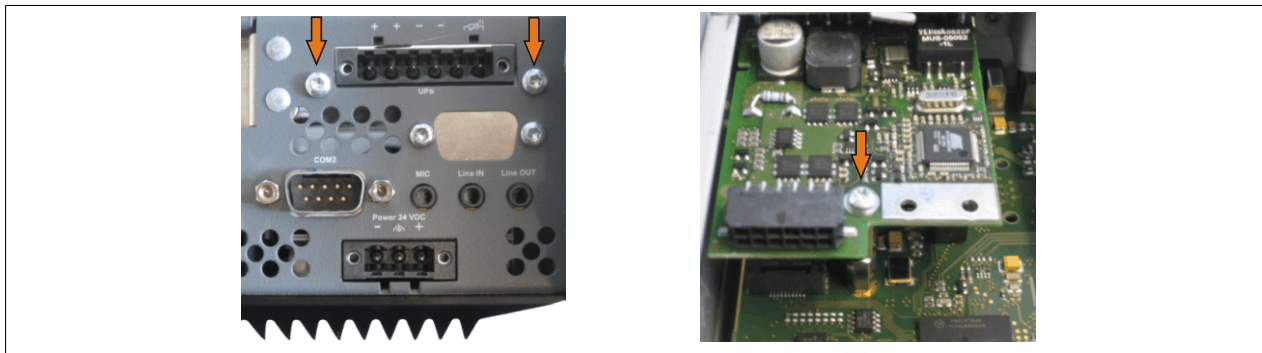


Figure 259: Installing the UPS module

5. Attach the connection cable (see marked female connector).

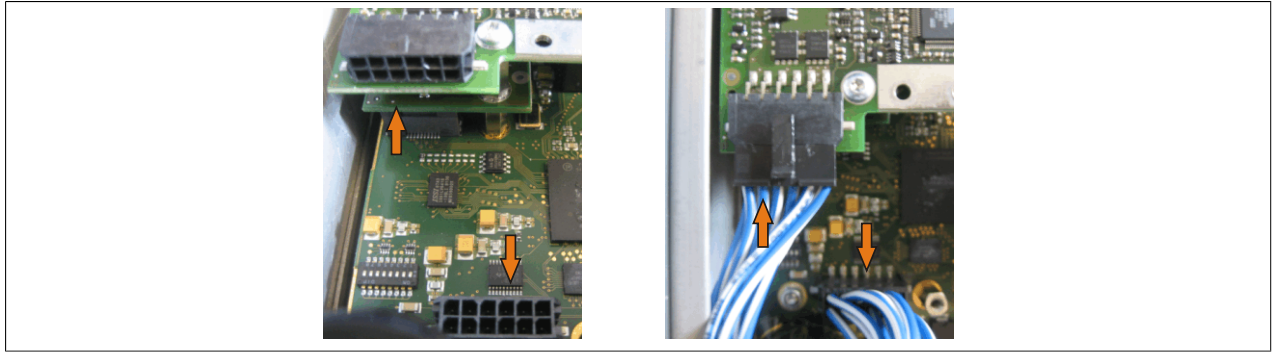


Figure 260: Attaching the connection cable

Information:

When connecting the cable, make sure that the connector locks into place.

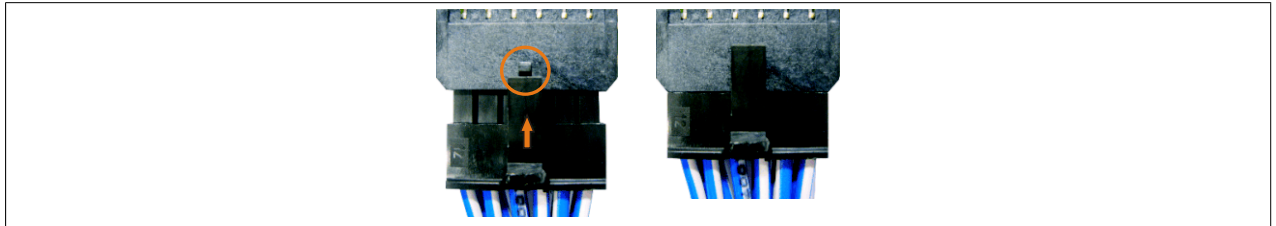


Figure 261: Connector locking mechanism

6. Attach the cover plate and side cover.

7.2.2 2- and 3-slot APC810

1. Remove the side cover (see "Installing the side cover" on page 422).
2. Remove the UPS module cover by removing the 2 marked Torx screws (T10).

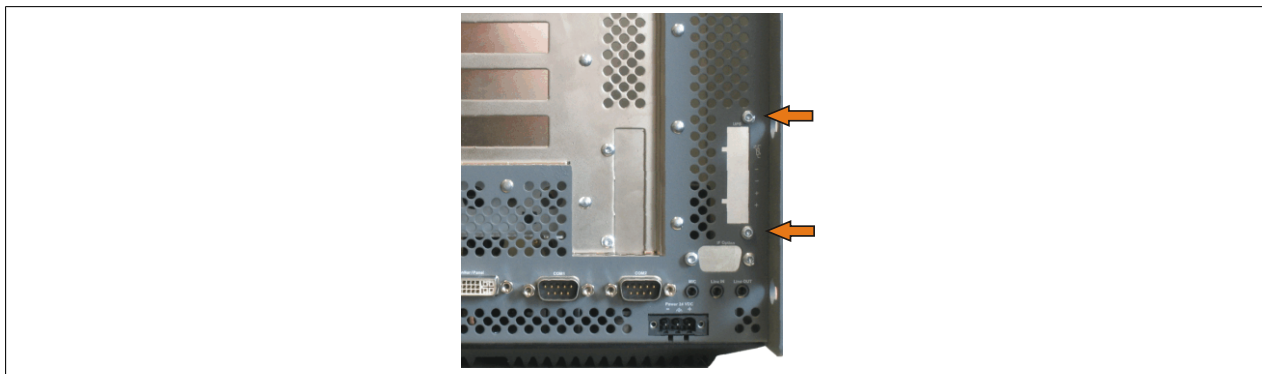


Figure 262: Removing the UPS module cover

3. Screw in the spacing bolt (using the M5 hex socket screwdriver).

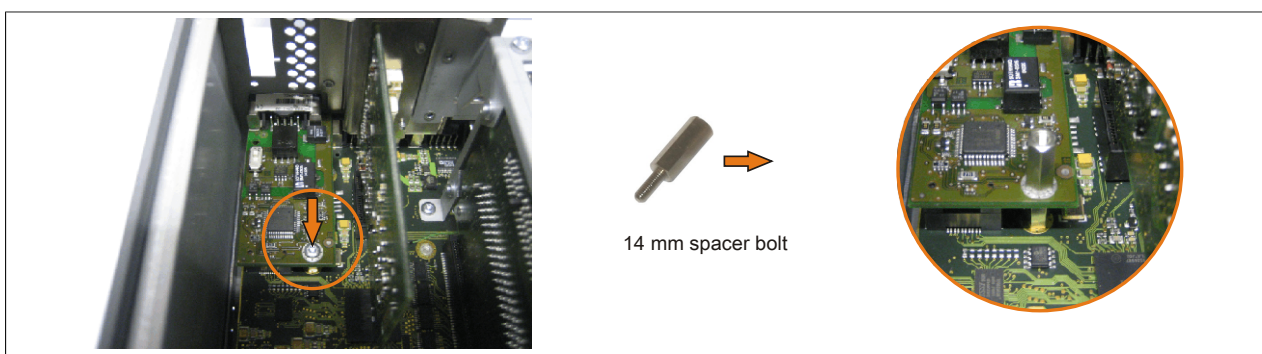


Figure 263: Screwing in the spacing bolt

4. Install the mounting bracket on the UPS module using 2 Torx screws (T10).

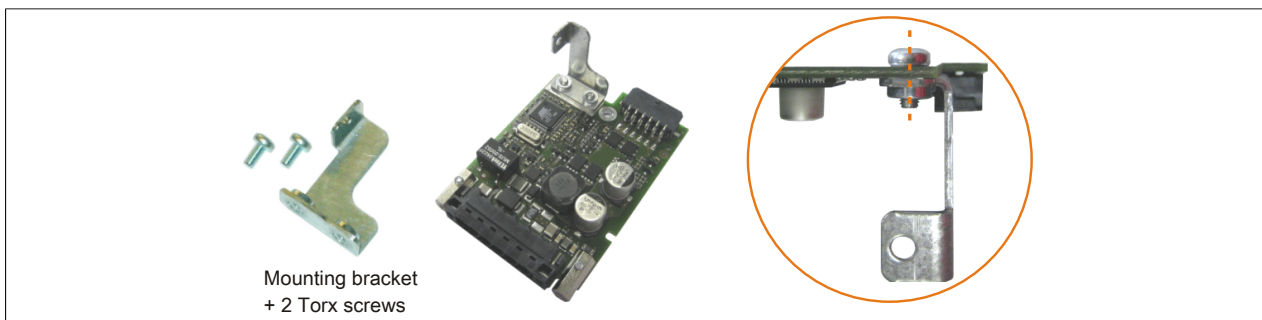


Figure 264: Installing the mounting bracket

5. Install the UPS module using 3 Torx screws (T10). Use the previously removed Torx screws and one Torx screw from the installation material.

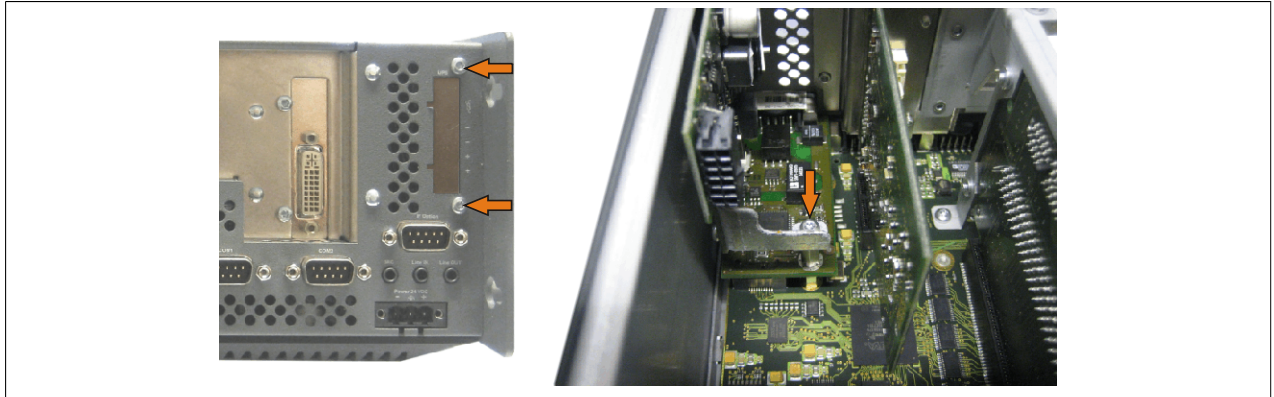


Figure 265: Installing the UPS module

6. Attach the connection cable (see marked female connector).

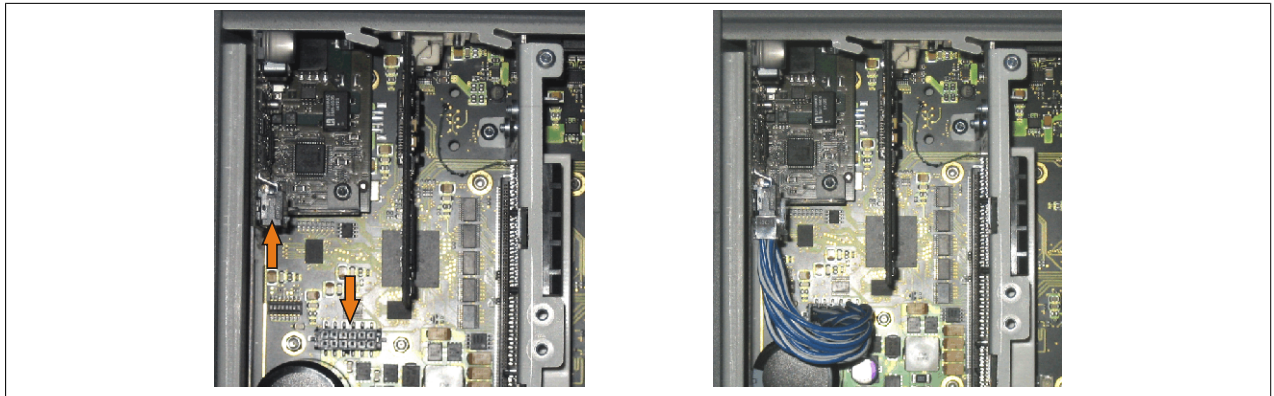


Figure 266: Attaching the connection cable

Information:

When connecting the cable, make sure that the connector locks into place.

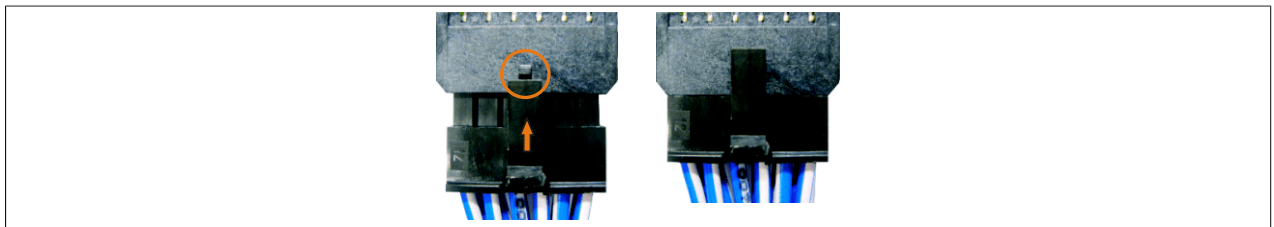


Figure 267: Connector locking mechanism

7. Attach the cover plate and side cover.

7.2.3 5-slot APC810

1. Remove the side cover (see "Installing the side cover" on page 422).
2. Remove the UPS module cover by removing the 2 marked Torx screws (T10).

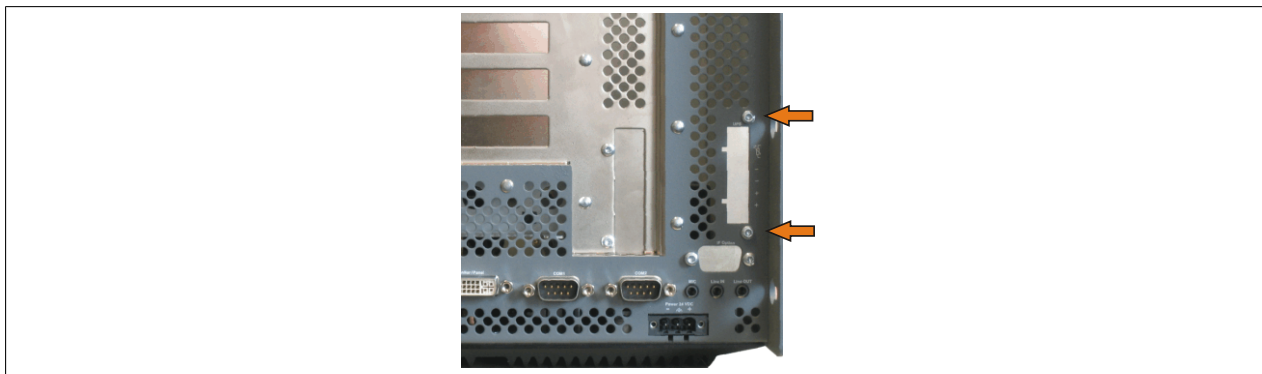


Figure 268: Removing the UPS module cover

3. Screw in the spacing bolt (using the M5 hex socket screwdriver).

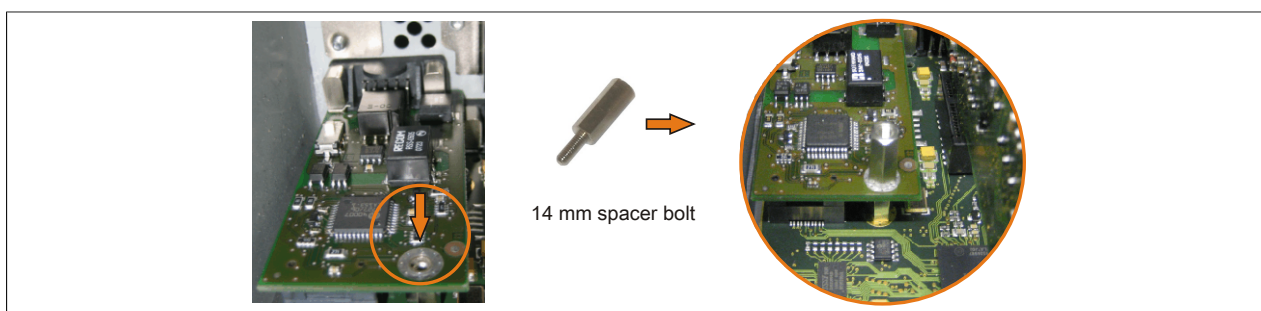


Figure 269: Screwing in the spacing bolt

4. Install the mounting bracket on the UPS module using 2 Torx screws (T10).

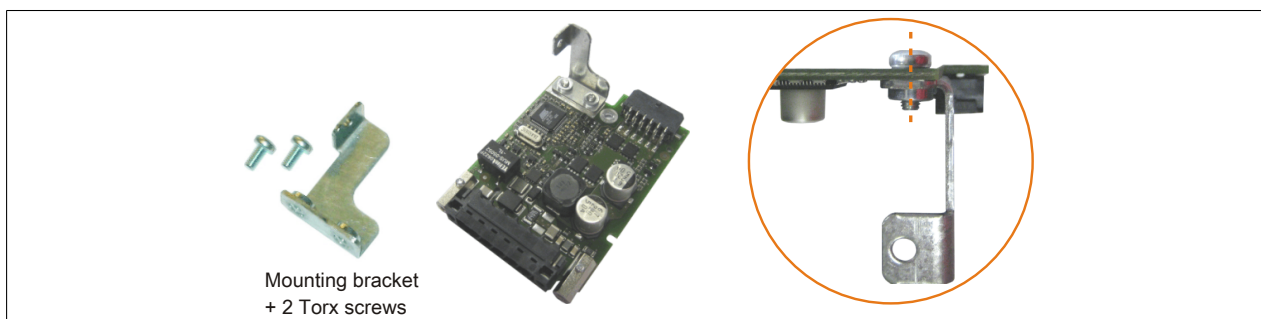


Figure 270: Installing the mounting bracket

5. Install the UPS module using 3 Torx screws (T10). Use the previously removed Torx screws and one Torx screw from the installation material.

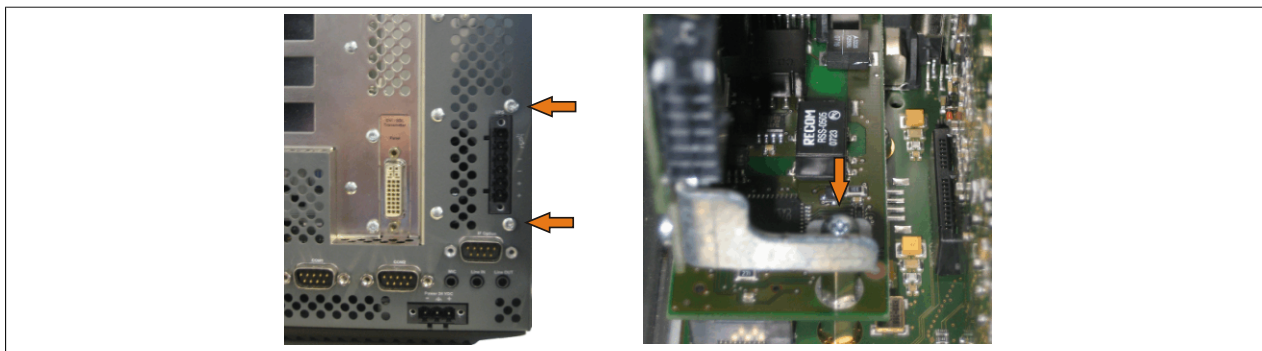


Figure 271: Installing the UPS module

6. Attach the connection cable (see marked female connector).

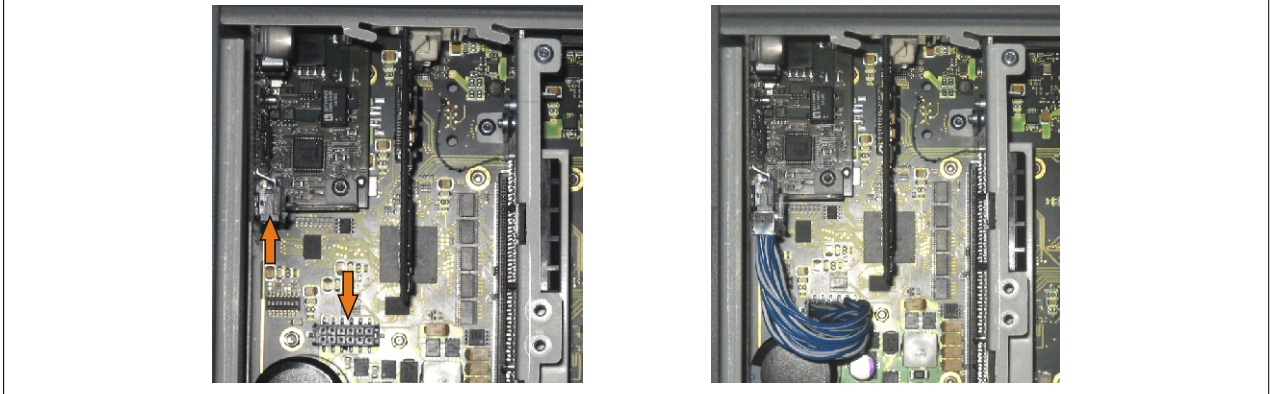


Figure 272: Attaching the connection cable

Information:

When connecting the cable, make sure that the connector locks into place.

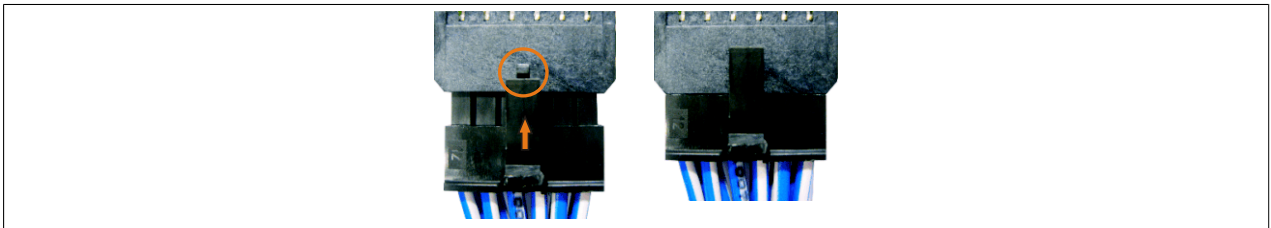


Figure 273: Connector locking mechanism

7. Attach the cover plate and side cover.

8 Installing the UPS fuse kit on the battery unit

Information:

The 5AC600.UPSF-00 UPS fuse kit is only needed for battery units up to and including revision D0. A 25 A fuse is integrated on the connector circuit board beginning with revision E0.

8.1 Procedure

1. Power to the 5AC600.UPSB-00 battery unit must be disconnected by unplugging the UPS connection cable from the B&R Industrial PC.
2. Remove the cover on the battery unit. This is done by unscrewing the two Torx screws (T10) so that the cover can be removed by sliding it towards the orange connector.



Figure 274: Removing the cover for the battery unit

3. To install the fuse, the red cable must be disconnected from the battery circuit board.



Figure 275: Disconnecting the cable

4. The male fuse kit connector must be connected to the female connector on the red cable (1). The female fuse kit connector must be connected to the male connector on the battery circuit board (2).

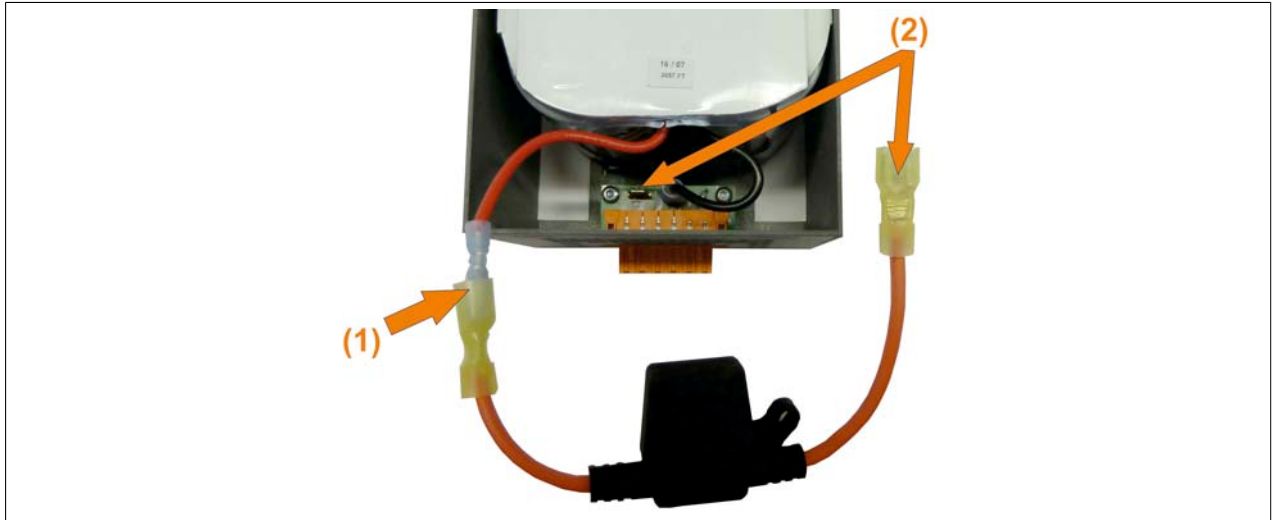


Figure 276: Connecting the fuse

5. The fuse can then be secured in the battery unit.



Figure 277: Securing the fuse

6. The cover for the battery unit can now be reattached. Insert the clips on the cover into the notch on the battery unit and tighten down the cover with the Torx screws removed previously.
7. Reconnect the 5AC600.UPSB-00 battery unit to the B&R Industrial PC.

9 Installing 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.

9.1 1-slot APC810

1. Disconnect the power supply to the Automation PC 810.
2. Touch the housing or ground connection in order to discharge any electrostatic charge from your body.
3. Open the orange front cover. The Combi-Torx screws (T10) behind the cover that are marked in the image must then be removed.
4. After the screws have been removed, the side cover can be removed by sliding it toward the front.



Figure 278: 1-slot APC810 - Installing the side cover

9.2 2- and 3-slot APC810

1. Disconnect the power supply to the Automation PC 810.
2. Touch the housing or ground connection in order to discharge any electrostatic charge from your body.
3. Open the orange front cover. The Combi-Torx screws (T10) behind the cover that are marked in the image must then be removed.
4. After the screws have been removed, the side cover can be removed by sliding it toward the front.

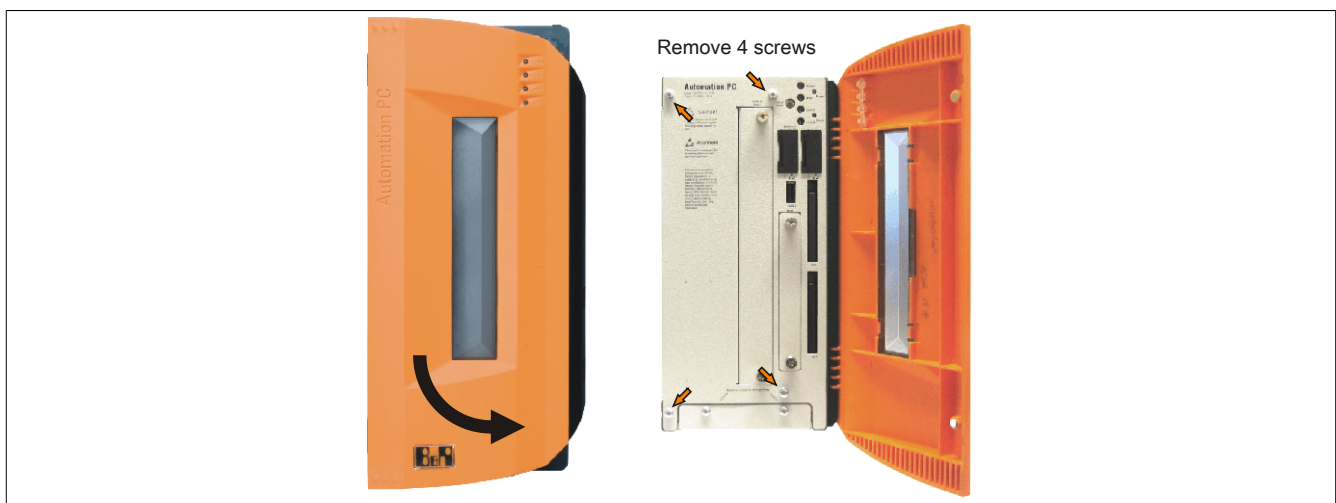


Figure 279: 2-slot APC810 - Installing the side cover

9.3 5-slot APC810

1. Disconnect the power supply to the Automation PC 810.
2. Touch the housing or ground connection in order to discharge any electrostatic charge from your body.
3. Open the orange front cover. The Combi-Torx screws (T10) behind the cover that are marked in the image must then be removed.
4. After the screws have been removed, the side cover can be removed by sliding it toward the front.

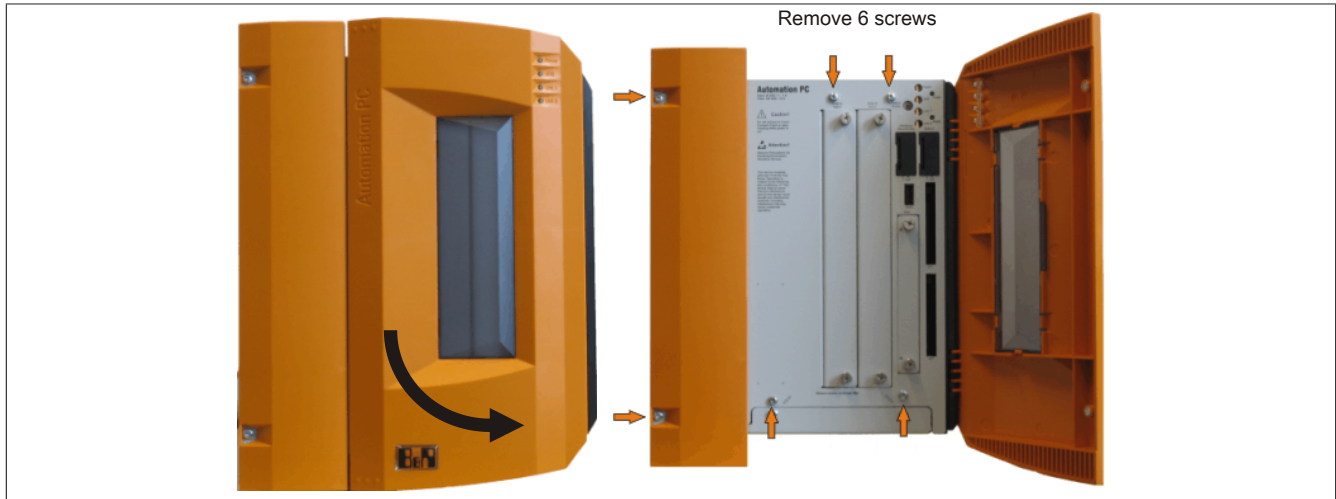


Figure 280: 5-slot APC810 - Installing the side cover

10 AP Link installation

10.1 Procedure

1. Remove the side cover (see "Installing the side cover" on page 422).
2. Remove the AP Link module cover by removing the 2 marked Torx screws (T10).

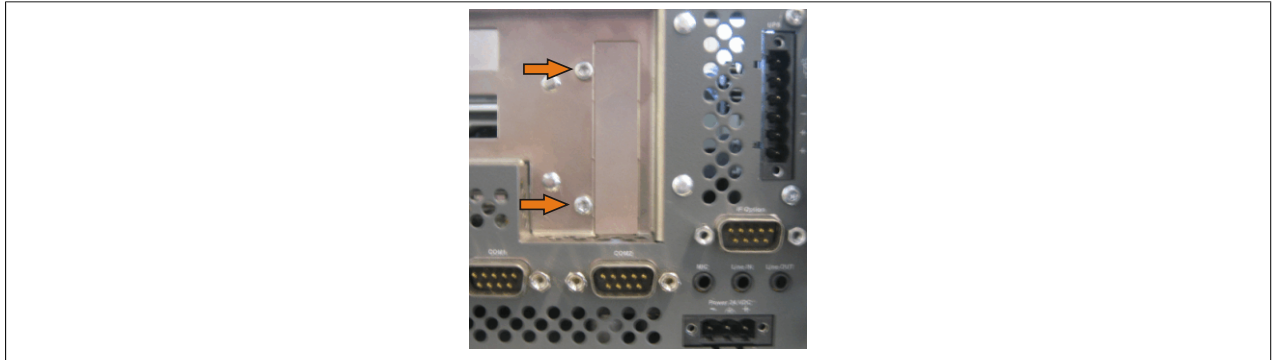


Figure 281: Removing the AP Link module cover

3. Insert the AP Link card in the appropriate slot.

Warning!

When inserting the AP Link card, be sure to push it all the way into the AP Link slot.

Do not force the card into the slot.

4. Install the AP Link module using 3 Torx screws (T10). Use the previously removed Torx screws and an additional Torx screw from the installation material.

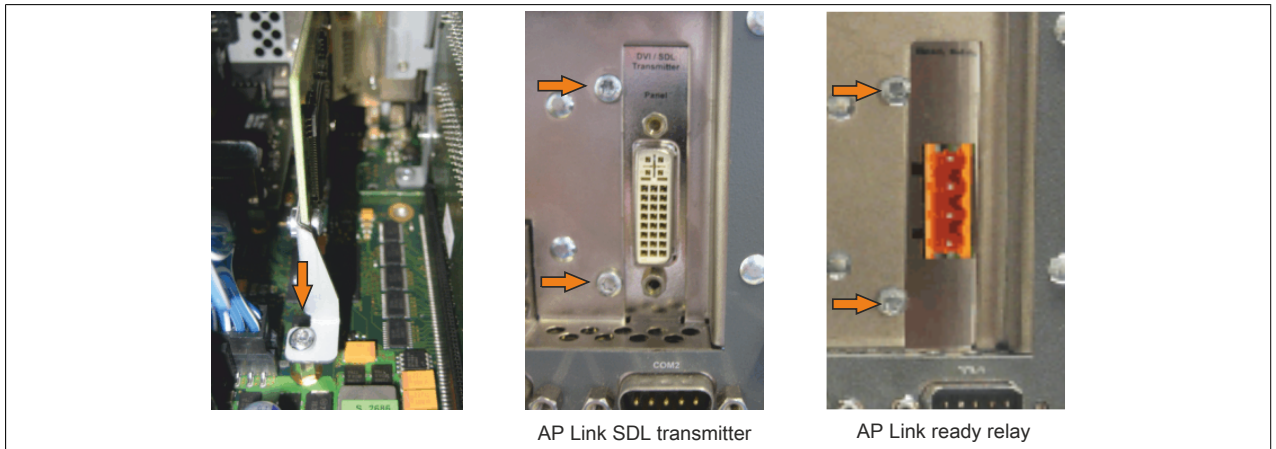


Figure 282: Installing the AP Link module

5. Attach the cover plate and side cover.

11 Replacing a PCI SATA RAID hard disk in a RAID 1 set

This example assumes 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 of PCI SATA RAID controller | Model number of required replacement SATA HDD | Note |
|--|---|------------------|
| 5ACPCI.RAIC-01 | 5ACPCI.RAIC-02 | 60 GB hard disk |
| 5ACPCI.RAIC-03 | 5ACPCI.RAIC-04 | 160 GB hard disk |
| 5ACPCI.RAIC-05 | 5MMHDD.0250-00 | 250 GB hard disk |
| 5ACPCI.RAIC-06 | 5MMHDD.0500-00 | 500 GB hard disk |

Table 320: Overview of required replacement SATA HDD for PCI SATA HDD RAID controller

A size 10 Torx screwdriver is needed to replace the hard disk.

11.1 Procedure

1. Disconnect the power supply.
2. Touch the housing or ground connection in order to discharge any electrostatic charge from your body.
3. Remove the side cover.
4. Remove the SATA RAID insert.
5. Loosen the 4 appropriate fastening screws (M3x5).

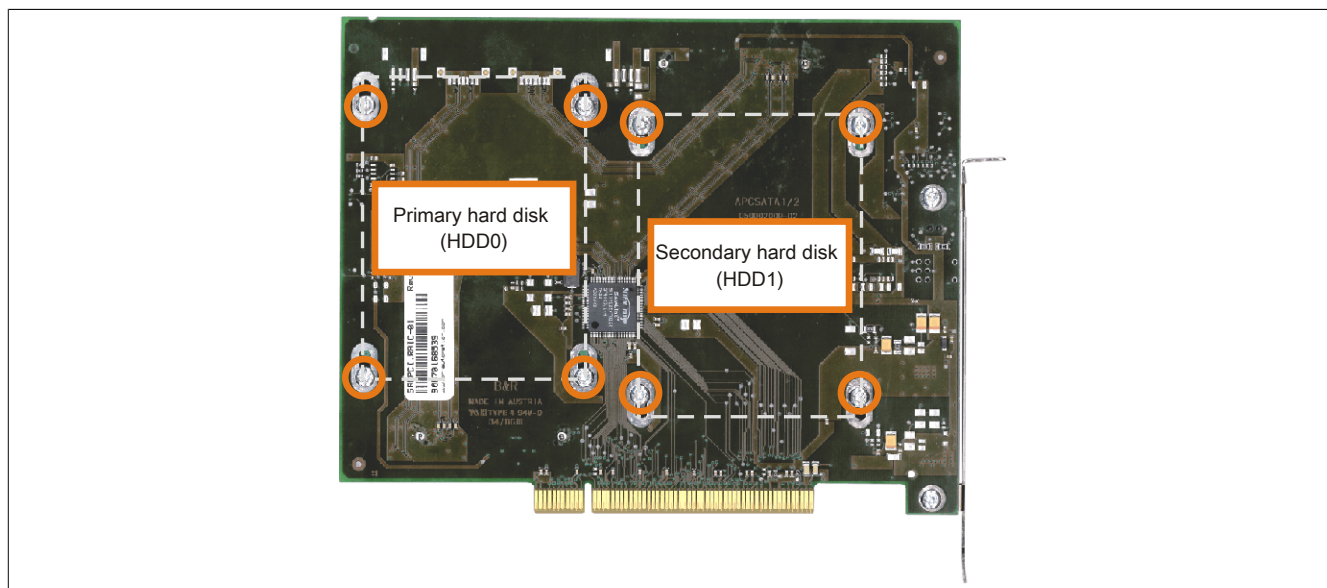


Figure 283: Screw layout on the back side of the 5ACPCI.RAIC-03 SATA RAID controller

6. On the front side, slide the hard disk down and away (Replacing the hard disk - left image).
7. Insert the new hard disk carefully into the connector (Replacing the hard disk - right image), being careful to only touch it on the front, not on the top.

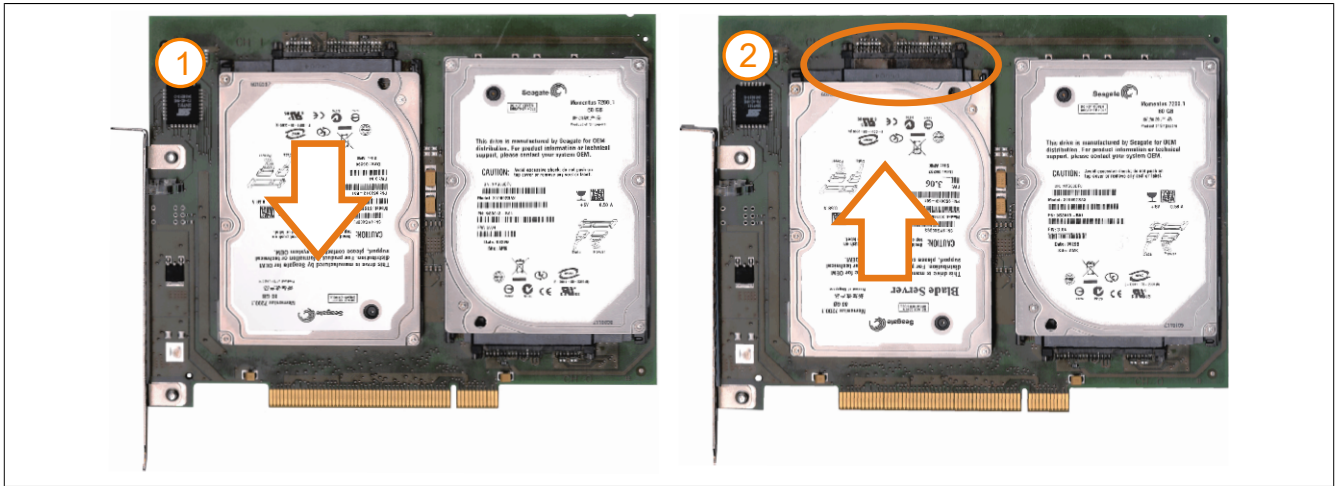


Figure 284: Replacing the hard disk

8. Re-secure the hard disk using the 4 fastening screws (M3x5) used earlier.
9. Reassemble the device in the reverse order.
10. An error message is output by the RAID BIOS after starting the system "RAID1 set is in Rebuild status. The rebuild will continue after boot sequence is complete".
11. A rebuild can be performed immediately in SATA RAID BIOS or once the PC has booted - see "Rebuild mirrored set" on page 225.

12 Installing the HDD replacement disk tray

12.1 Procedure

1. Remove the side cover (see "Installing the side cover" on page 422).
2. Insert the replacement HDD in the replacement disk tray and fasten using the quick release screws.

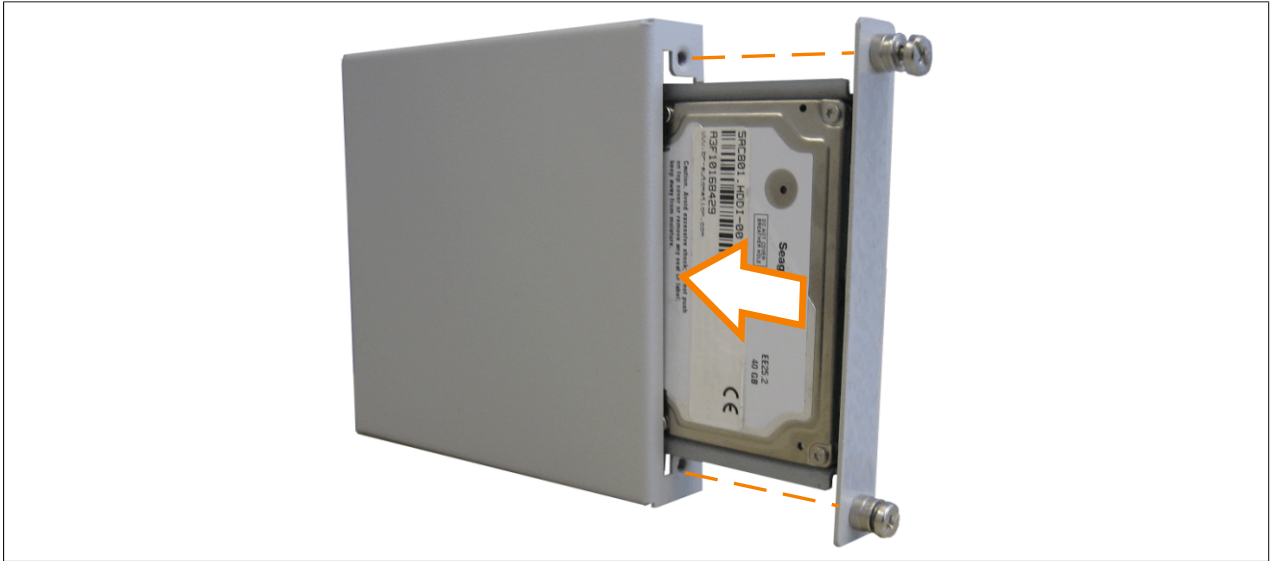


Figure 285: Inserting the replacement hard disk in the replacement disk tray

3. Attach the HDD replacement disk tray to the ventilation slots on the side of the APC810 housing using the hooks provided.
4. Affix to the inside of the side cover by lightly bending the hooks with a suitable tool (e.g. universal pliers).

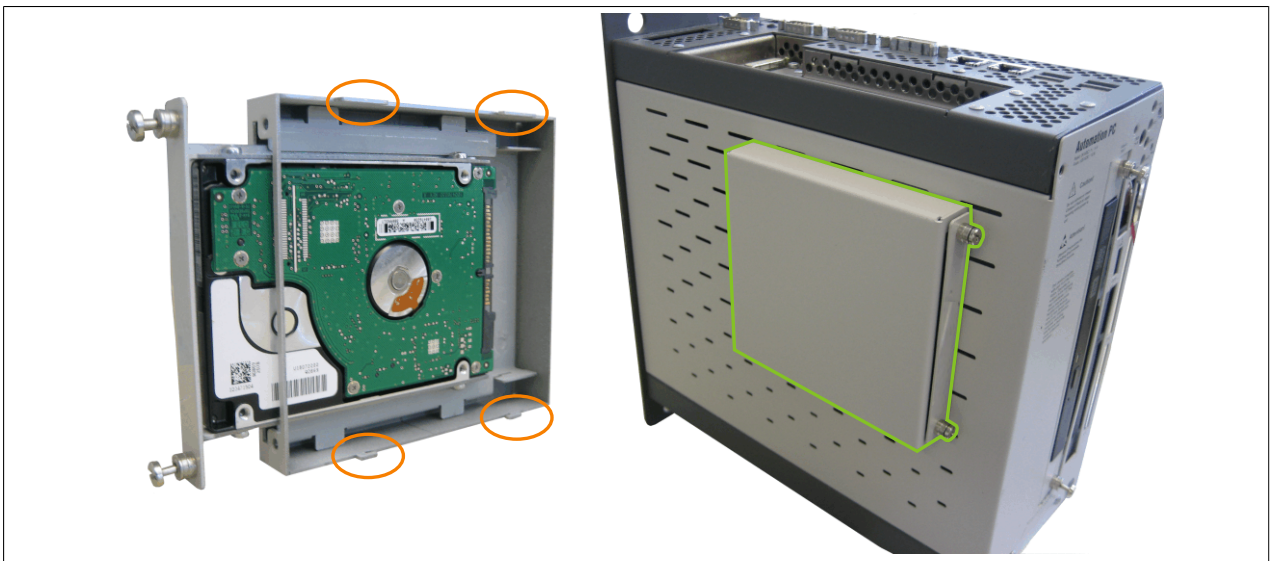


Figure 286: Installing the replacement disk tray in the APC810

5. Attach the side cover.

13 Installing the ready relay /2 in the add-on UPS slot

13.1 Procedure

1. Remove the side cover (see section 9 "Installing the side cover" on page 422).
2. Remove the UPS module cover or mounted UPS by loosening the 2 marked Torx screws (T10).

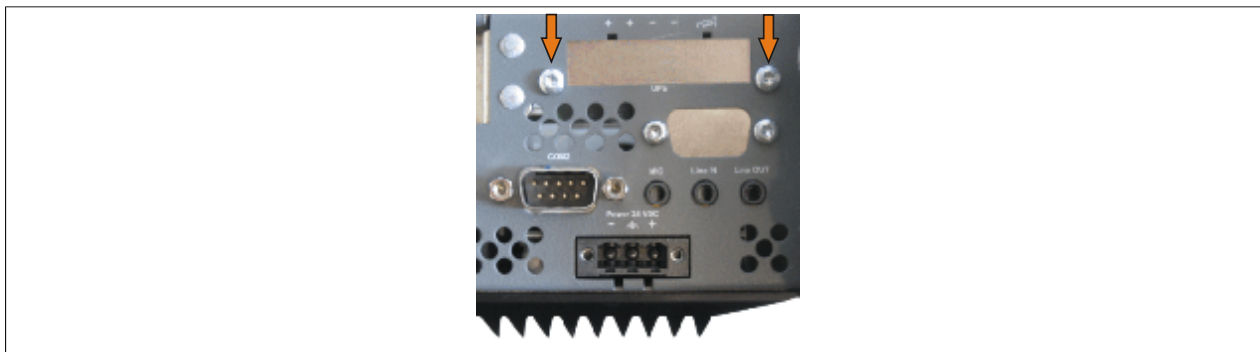


Figure 287: Removing the UPS module cover

3. Attach the spacing bolt and spacing ring (if not already mounted from the UPS) on the mainboard (using the size 5 hex screwdriver). The 14 mm spacing bolt must be used for APC810 system units 5PC810.SX01-00, 5PC810.SX02-00 and 5PC810.SX03-00. The 16 mm spacing bolt must be used for the 5PC810.SX05-00 system unit.

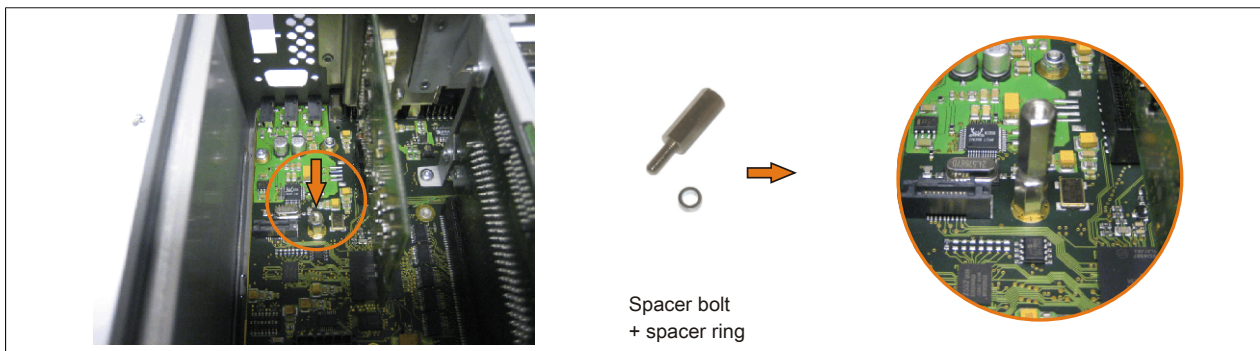


Figure 288: Screwing in the spacing bolt and spacing ring

4. Install the ready relay with 2 Torx screws (T6) and the mounting bracket on the housing with 1 Torx screw (T6) on the mainboard (spacing bolt).

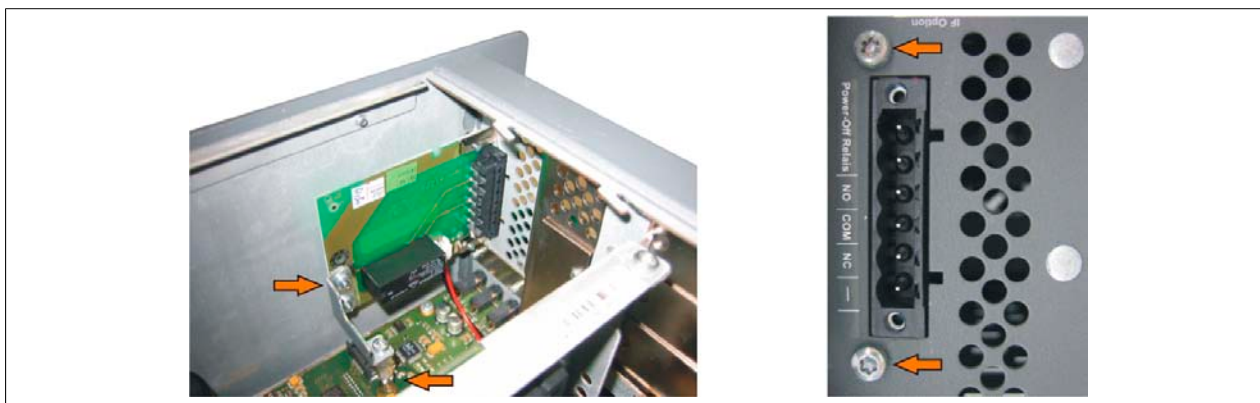


Figure 289: Installing the ready relay

5. Attach the connection cable.

Information:

When connecting the internal supply voltage cable, make sure that the connector locks into place.

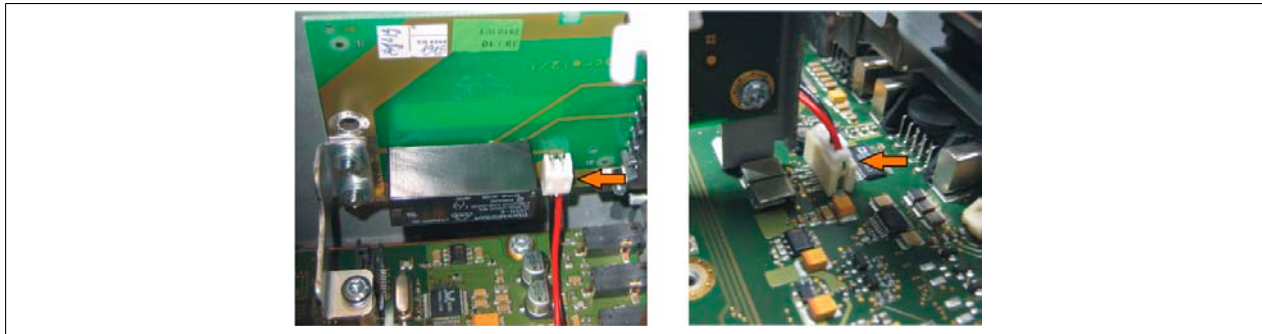


Figure 290: Attaching the connection cable

6. Attach the side cover.

Appendix A

1 Maintenance Controller Extended (MTCX)

The MTCX controller (FPGA processor) is located on the mainboard (part of every system unit) of the APC810 device.

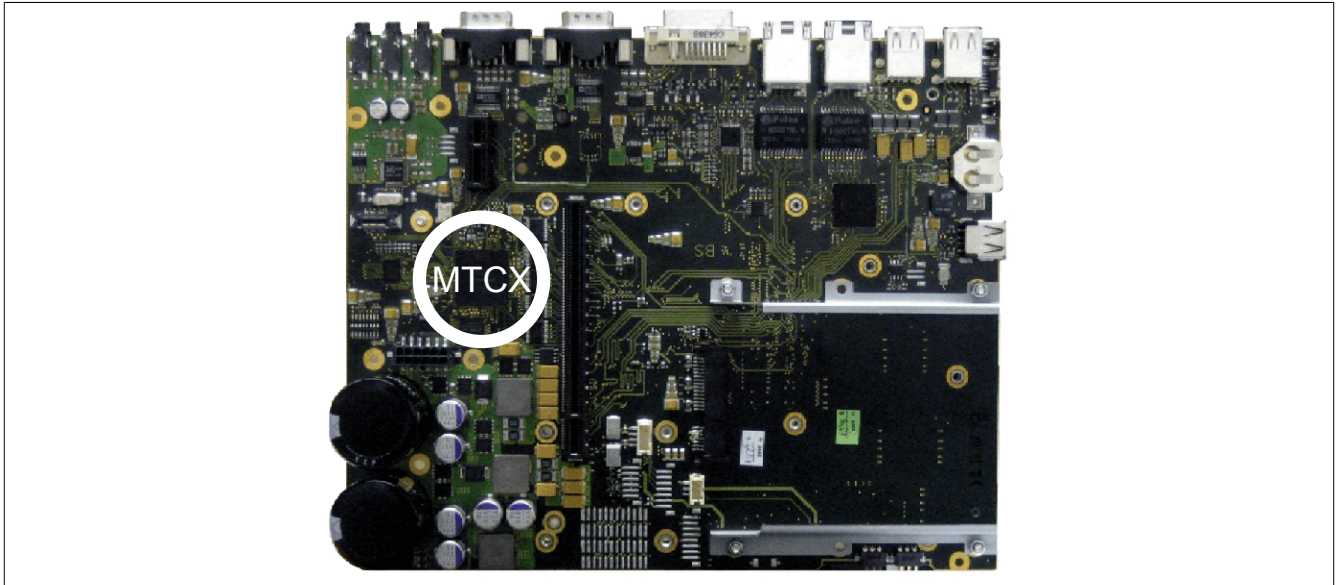


Figure 291: MTCX controller location

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

- Power on (power OK sequencing) and power failure logic
- Watchdog handling (NMI and reset handling)
- Temperature monitoring (I/O area, power supply, slide-in drive 1/2)
- Fan control
- Key and LED handling/coordination (matrix keyboard on B&R display units)
- Advanced desktop operation (keys, 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 connected B&R displays
- Statistical data recording (power cycles - records every switch-on, power on and fan hour; each full hour is counted, i.e. not increased at 50 minutes)
- SDL data transfer (display, matrix keyboard, touch screen, service data, USB)
- LED status indicators (Power, HDD, Link 1, Link 2)

Extended MTCX functions are available by upgrading firmware ⁷⁾. The version can be read in BIOS ("Advanced" - Baseboard/Panel Features) or in approved Microsoft Windows operating systems with the B&R Control Center.

1.1 Temperature monitoring - Fan control

The MTCX constantly monitors the temperature using temperature sensors (see "Temperature sensor locations" on page 38), which directly determines how the fans are controlled. The speed depends on the measured temperature. Limit values may depend on the MTCX firmware version being used.

⁷⁾ Available in the Downloads section of the B&R website (www.br-automation.com).

| Sensor range | Startup temperature | Max fan speed at: |
|-----------------|---------------------|-------------------|
| CPU | 65°C | 81°C |
| Board CPU | 65°C | 81°C |
| 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 |
| ETH2 controller | 70°C | 86°C |
| Slide-in 1/2 | 44°C | 60°C |

Table 321: Temperature limits of the fan (MTCX PX32 ≥ V0.06)

Once the startup temperature is reached, the device is started at the minimum fan speed. The maximum fan speed is reached at a startup temperature of 16°C. The fan speed in this area is controlled depending on the temperature.

For example, slide-in 1/2: 44°C + 16°C = 60°C --> Maximum fan speed

The fans will only be shut off again if the evaluation temperature is more than 6°C below the switch-on temperature for a period of 4 hours (=overshoot time).

2 Connecting an external device to the mainboard

A male connector on the mainboard allows +5 VDC and +12 VDC to be branched off in order to provide power to special PCI cards, for example.

This voltage can be accessed using the "5CAMSC.0001-00" on page 396. The connector is located close to the bus unit(s) and can be attached with a cable tie (see arrow in image). In order to reach the connector, the side cover (see "Installing the side cover" on page 422) of the APC810 as well as any slide-in drives and PCI insert cards must be removed.



Figure 292: Connector location for external devices

| Connector for 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 | | |

1

2

3

4

Table 322: Connector on the mainboard - Pinout

Connections are protected with a 1 A multi-fuse.

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