

# Automation PC 810

## User's Manual

Version: **1.48 (May 2013)**  
Model no.: **MAAPC800-ENG**

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# Chapter 1 • General information

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Version	Date	Change
0.10 preliminary	20-Nov-07	<ul style="list-style-type: none"> <li>First version</li> </ul>
0.20 Preliminary	11-Jan-08	<ul style="list-style-type: none"> <li>Changed wording in the brief description of system units.</li> <li>Changed wording to 945GME (instead of 945GM).</li> <li>Removed 256 MB main memory.</li> <li>Updated 5AC801.ADAS-00 and 5AC801.HDDS-00.</li> <li>Updated accessories.</li> <li>Updated 5AC801.RDYR-00 ready relay, SATA RAID controller, fan kit, IF options and replacement fan filter.</li> <li>Updated BIOS description.</li> </ul>
0.30 Preliminary	31-Jan-08	<ul style="list-style-type: none"> <li>Correct mistake regarding configuration.</li> <li>Updated BIOS default profiles.</li> <li>Changed model number and name from APC810 to APC800.</li> <li>Updated technical data for the fully assembled device.</li> <li>Updated connection examples.</li> <li>Updated problems and properties of the first production batch.</li> </ul>
0.40 Preliminary	11-Apr-08	<ul style="list-style-type: none"> <li>Revised problems and properties of the first production batch.</li> <li>Updated section "Temperature sensor locations" in "Appendix A".</li> <li>Updated section "Temperature specifications" on page 31.</li> <li>Updated system unit with 1 card slot.</li> <li>Updated content (especially in "Maintenance / Servicing" chapter).</li> <li>Revised BIOS description for Version 1.10.</li> </ul>
0.41 Preliminary	09-May-08	<ul style="list-style-type: none"> <li>Corrected images for "Ambient temperatures with and without a fan kit".</li> <li>Updated measurement specifications of fully assembled devices with 1 and 2 card slots to include heat sink 5AC801.HS00-01.</li> <li>Added "Power management" section.</li> <li>Updated serial number sticker information.</li> <li>Updated "Automation PC 810 with Windows XP Professional and Windows XP embedded" section.</li> <li>Updated "Automation Device Interface (ADI)" section.</li> <li>Updated 5-card slot variant.</li> <li>Updated drilling templates 5-card variant.</li> <li>Updated section "Connecting peripheral USB devices" on page 224.</li> <li>Updated index.</li> </ul>
0.42 Preliminary	29-May-08	<ul style="list-style-type: none"> <li>Added information about mounting orientation (vertical, horizontal) in Chapter 3 "Commissioning".</li> <li>Updated ambient temperature specifications with and without a fan kit for each mounting orientation (vertical, horizontal).</li> <li>Corrected error (fan kit model numbers) in "Figure 2: Configuration - Optional components" on page 30.</li> <li>Corrected error (pinout) in "Table 18: Supply voltage connection 24 VDC" on page 57.</li> <li>Revised slide-in slot 2 description.</li> <li>Updated 5AC801.DVDS-00 slide-in DVD burner.</li> <li>Updated fan kit for the 5-card slot variant (5PC810.FA05-00).</li> <li>Updated real-time clock (RTC) specifications.</li> </ul>
1.00	10-Jul-08	<ul style="list-style-type: none"> <li>Corrected spelling and sentence structure errors.</li> <li>Added block diagram of all system units depending on the bus unit ("Block diagrams" on page 49).</li> <li>Updated description of the 5AC600.485I-00 add-on interface module.</li> </ul>

Table 1: Manual history

Version	Date	Change
1.10	12-Sep-08	<ul style="list-style-type: none"> <li>• Corrected spelling and sentence structure errors.</li> <li>• Updated starting current values (due to new power supply).</li> <li>• Updated 5ACPCI.ETH1-01 and 5ACPCI.ETH3-01 PCI Ethernet cards.</li> <li>• Updated power consumption from 1..5 A to 1..6 A.</li> <li>• Updated manual to the maximum value of 130 W.</li> <li>• Added new "Standards and certifications" chapter.</li> <li>• Updated humidity specifications in "Humidity specifications" on page 39.</li> <li>• Explained user ID in further detail.</li> <li>• Updated model number for Windows XP with SP3 (5SWWXP.0600-ENG, 5SWWXP.0600-GER, 5SWWXP.0600-MUL).</li> <li>• Added minimum ambient temperature specifications.</li> <li>• Added 5CAMSC.0001-00 internal supply cable (for external consumers on the PCI slot).</li> <li>• Moved SATA RAID controller configuration from "Software" to "Commissioning".</li> <li>• Error correction for 5PC810.FA05-00 (see "5PC810.FA05-00" on page 177).</li> <li>• Modified BIOS settings (new BIOS version).</li> <li>• Updated information about creating a bootable MS-DOS diskette.</li> <li>• Updated information about creating a bootable USB flash drive.</li> <li>• Updated B&amp;R Key Editor description.</li> <li>• Updated HMI Drivers &amp; Utilities DVD.</li> <li>• Revised description for operating the RS232/422/485 add-on interface module as an RS485 interface.</li> <li>• Updated ADI Control Center.</li> <li>• Updated glossary.</li> <li>• Updated information about removing the 5PC810.SX01-00 and 5PC810.SX05-00 side cover.</li> <li>• Updated information about installing the UPS module (with and without add-on interface module).</li> <li>• Corrected model number errors for 3-phase 40 A power supply (0PS340.1).</li> <li>• Updated bus unit with 5-card slot.</li> <li>• Corrected temperature humidity diagrams.</li> <li>• Updated add-on interface slot.</li> <li>• Updated description "Connecting an external device to the mainboard" on page 439.</li> <li>• Updated description "AP Link installation" on page 431.</li> <li>• Corrected power supply fuse from 10 A to 15 A in "+24 VDC supply voltage" on page 57.</li> <li>• Updated CMOS profile switch position 2 on page "CMOS profile switch" on page 68.</li> <li>• Corrected service life and revolution speed of the 5PC810.FA01-00 fan kit.</li> <li>• Updated temperature monitoring and fan control, see "Temperature monitoring - Fan control" on page 437.</li> </ul>

Table 1: Manual history

Version	Date	Change
1.20	14-Oct-09	<ul style="list-style-type: none"> <li>Updated topology graphic.</li> <li>Corrected maximum ambient temperature for the 5AC800.B945-02 system unit in the figure .</li> <li>Changed the description of the CMOS battery status in "Table 207: 945GME Baseboard Monitor (Setting options)" on page 260.</li> <li>Added HDD replacement tray to accessories on page "5AC801.FRAME-00" on page 404 and corresponding installation in Chapter 7 "Maintenance / Service".</li> <li>Corrected error in figure and table index.</li> <li>Corrected error in temperature humidity diagram for the 5ACPCI.RAIC-03 and 5ACPCI.RAIC-04 SATA RAID hard disks.</li> <li>Modified ADI Development Kit.</li> <li>Added table for the maximum ambient temperature of heat sinks 5AC801.HS00-00 &gt; Rev. D0 and 5AC801.HS00-01 &gt; Rev. D0.</li> <li>Updated PCIE port (ETH2) and PCIE port (ETH1) BIOS description.</li> <li>Discontinued 9S0000.08-010, 9S0000.08-020 and 9S0000.09-090.</li> <li>Updated information about firmware upgrades.</li> <li>Added CMOS profile 3 (5PC820.SX01-00). Additional information about this CMOS profile can be found in the APC820 user's manual.</li> <li>Updated section "Environmentally friendly disposal" in Chapter 1 "General information".</li> <li>Added new 5PC810.FA02-01 for 2-slot APC810 variants.</li> <li>Added PCI bus type for bus units.</li> <li>Updated BIOS default settings for FDC/LPT/COM ports.</li> <li>Removed content of delivery for USB flash drives.</li> <li>Updated image for Silicon Systems CompactFlash.</li> <li>Corrected L2 cache of 5PC800.B945-00 CPU board to 2 MB.</li> <li>Updated B&amp;R CompactFlash cards.</li> <li>Revised technical data for Silicon Systems CF cards.</li> <li>Updated section 1.11 "Distribution of resources" on page 275.</li> <li>Updated section 4.3.1 "Installation on a PCI SATA RAID controller - 5ACPCI.RAIC-03, 5ACPCI.RAIC-05, 5ACPCI.RAIC-06" on page 291.</li> <li>Updated new "5AC801.SSDI-00" on page 126.</li> <li>Updated BIOS settings to V1.14.</li> <li>Removed "CPU board software versions" and "Automation Panel Link software versions" tables from section "BIOS upgrade".</li> <li>Modified dimensions for slide-in and slide-in compact devices. The new dimensions are based on all of the mechanical features of the devices.</li> <li>Updated mechanical properties for products 5AC801.DVDS-00 and 5AC801.DVRS-00.</li> <li>Updated operating systems 5SWWXP.0500-GER, 5SWWXP.0500-ENG and 5SWWXP.0500-MUL.</li> <li>Removed section 9.4 "Creating a bootable USB flash drive".</li> <li>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".</li> <li>In Chapter 4 "Software", updated section "Creating a bootable USB flash drive for B&amp;R upgrade files" on page 287.</li> <li>In Chapter 4 "Software", updated section 2.5 "Creating a bootable CompactFlash card for B&amp;R upgrade files" on page 288.</li> <li>Added specifications for possible resolutions to the technical data of the CPU boards.</li> <li>Updated section 1.10 "BIOS error signals (Beep Codes)" on page 274 in Chapter 4 "Software".</li> <li>Reworded Windows XP Professional installation text.</li> <li>Changed section "Temperature sensor locations".</li> <li>Updated information about B&amp;R Key Editor.</li> <li>Updated section 3 "Microsoft DOS" on page 289.</li> <li>Corrected chipset for technical data of the CPU board in section "CPU boards 945GME" on page 108.</li> <li>Corrected "Table 88: 5AC801.ADAS-00 - Technical data" on page 144.</li> <li>Updated information in "RS422 - Bus length and cable type" on page 188.</li> <li>Corrected "Table 179: Link modules" on page 222.</li> <li>Updated hex range in "Table 235: RAM address assignment" on page 275.</li> <li>Replaced 0AC201.9 replacement CMOS batteries with 0AC201.91.</li> <li>Updated 5PC800.B945-05 CPU board.</li> <li>Revised section 2.2 "Humidity specifications" on page 39.</li> </ul>
1.30	12-Jul-10	<ul style="list-style-type: none"> <li>Updated system unit 5PC810.SX03-00, bus unit 5PC810.BX03-00, fan kit 5PC810.FA03-00 and replacement fan 5AC801.FA03-00.</li> <li>Updated section 7 "Windows Embedded Standard 2009" on page 296.</li> <li>Updated section 11 "B&amp;R Automation Device Interface (ADI) - Control Center" on page 304.</li> <li>Chapter 5 "Standards and certifications" on page 320 revised.</li> <li>Added B&amp;R 16 GB CompactFlash card 5CFCRD.016G-04.</li> <li>Updated section "Known problems / issues" on page 231 to include additional information.</li> <li>Updated section "Cables" on page 382 in Chapter 6 "Accessories".</li> <li>Added B&amp;R ID codes for system units.</li> <li>Updated section 9 "Windows CE" on page 301.</li> <li>Updated B&amp;R USB flash drive in Chapter 6 "Accessories" on page 326.</li> <li>Added CPU boards 5PC800.B945-10, 5PC800.B945-11, 5PC800.B945-12, 5PC800.B945-13, and 5PC800.B945-14.</li> <li>Updated technical data "Remanent variables for AR (Automation Runtime) in power fail mode" for APC810 system units.</li> </ul>

Table 1: Manual history

Version	Date	Change
1.31	14-Nov-10	<ul style="list-style-type: none"> <li>Updated 5AC801.RDYR-01 ready relay in Chapter 6 "Accessories".</li> <li>Updated section 13 "Installing the ready relay /2 in the add-on UPS slot" on page 435 in Chapter 7 "Maintenance / Service".</li> </ul>
1.32	02-Nov-10	<ul style="list-style-type: none"> <li>"5AC801.HDDI-03" on page 121 added.</li> <li>"5ACPCI.RAIC-05" on page 164 added.</li> <li>"5MMHDD.0250-00" on page 170 added.</li> <li>Revised "Figure 2: Configuration - Optional components" on page 30.</li> <li>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.</li> </ul>
1.33	20-May-11	<ul style="list-style-type: none"> <li>Updated sections "Windows Embedded Standard 7" on page 298, "B&amp;R Automation Device Interface (ADI) .NET SDK" on page 316, "Automation Runtime" on page 303 and "B&amp;R Automation Runtime dongle".</li> <li>Updated BIOS version (1.14 -&gt; 1.17).</li> <li>Revised sections "B&amp;R Automation Device Interface (ADI) - Control Center" on page 304, "B&amp;R Key Editor" on page 318, "HMI Drivers &amp; Utilities DVD" on page 363 and "B&amp;R Automation Device Interface (ADI) Development Kit" on page 314.</li> <li>Updated bus unit 5PC810.BX05-02.</li> <li>Corrected chipset information "CPU boards 945GME" on page 108.</li> <li>Revised "Figure 2: Configuration - Optional components" on page 30.</li> </ul>
1.34	11-Jul-11	<ul style="list-style-type: none"> <li>Updated USB5 in heading ("USB interfaces (USB1, 2, 3, 4, 5)" on page 63).</li> <li>5AC801.HDDI-03 added in table "Table 44: Slide-in compact slot" on page 74.</li> <li>Table entry "Charge duration when battery low" added in table "Table 283: 5AC600.UPSB-00, 5AC600.UPSB-00 - Technical data" on page 369.</li> <li>Sections "B&amp;R Automation Device Interface (ADI) - Control Center" on page 304, "B&amp;R Automation Device Interface (ADI) Development Kit" on page 314 and "B&amp;R Automation Device Interface (ADI) .NET SDK" on page 316 revised.</li> <li>Updated information regarding "Special considerations for the 5PCI slot variant" in "Windows XP Professional" on page 290 and "Windows 7" on page 292.</li> <li>Corrected information on "Windows XP mode" in section "Features with WES7 (Windows Embedded Standard 7)" on page 299.</li> <li>Reference to external UPS 24 VDC in section "Uninterruptible power supply" on page 366 revised.</li> </ul>
1.40	23-Jan-12	<ul style="list-style-type: none"> <li>Revised section "CompactFlash cards".</li> <li>Moved section "B&amp;R Automation Device Interface (ADI) Development Kit" to Chapter 4 "Software".</li> <li>Moved section "Temperature sensor locations" to Chapter 2 "Technical data".</li> <li>Removed drilling templates section from the "Installation" chapter and updated drilling templates for the system units in chapter Chapter 2 "Technical data", section 2 "Fully assembled device" on page 31.</li> <li>Revised section "Connection examples" on page 199.</li> <li>Removed "Cable lengths and resolutions for SDL transmission" in section "AP Link cards" on page 179.</li> <li>Added new CompactFlash cards 5CFCRD.xxxx-06 in Chapter 6 "Accessories". Discontinued CompactFlash cards 5CFCRD.xxxx-04.</li> <li>Removed section "B&amp;R Automation Runtime dongle" and updated the order data in section "Automation Runtime" on page 303.</li> <li>Updated BIOS version (1.17 -&gt; 1.18).</li> <li>Revised entire manual according to current formatting standards.</li> </ul>
1.41	25-Jun-12	<ul style="list-style-type: none"> <li>Updated information about the Automation Device Interface and B&amp;R Key Editor.</li> <li>Updated section "Card slots (PCI / PCIe)" on page 66 to include information regarding using 64-bit PCI cards.</li> <li>Section "Cable lengths and resolutions for SDL transmission" on page 59 updated</li> <li>Updated information regarding "PCI to PCI bridge" in 3.2.3 "Technical data" for the bus units.</li> <li>Updated information regarding "PCIe to SATA bridge" in section "Slide-in slot 2" on page 73.</li> <li>Moved ready relay 5AC801.RDYR-01 to section "Ready relay".</li> </ul>
1.45	01-Oct-12	<ul style="list-style-type: none"> <li>Section "Organization of safety notices" on page 22 revised, descriptions for cautions and warnings updated</li> <li>SSD drives "5AC801.SSDI-01" on page 130 and "5AC801.SSDI-02" on page 133 added.</li> <li>Section "General instructions for performing Temperature tests" on page 195 updated</li> <li>Windows 7 Service Pack 1 updated (see "Windows 7" on page 292).</li> <li>Windows Embedded Standard 7 Service Pack 1 updated (see "Windows Embedded Standard 7" on page 298).</li> <li>"B&amp;R Automation Device Interface (ADI) - Control Center" on page 304 updated.</li> <li>Updated "B&amp;R Automation Device Interface (ADI) Development Kit" on page 314 to version 3.40.</li> <li>Updated "B&amp;R Automation Device Interface (ADI) .NET SDK" on page 316 to version 1.80.</li> <li>Updated "B&amp;R Key Editor" on page 318 to version 3.30.</li> <li>Updated technical data for CPU boards, see "CPU boards 945GME" on page 108.</li> </ul>
1.46	21-Nov-12	<ul style="list-style-type: none"> <li>Updated B&amp;R CompactFlash card 5CFCRD.032G-06, see "5CFCRD.xxxx-06" on page 333.</li> <li>Revised technical data for UPS cables, see "5CAUPS.00xx-00" on page 372.</li> </ul>
1.47	14-Mar-13	<ul style="list-style-type: none"> <li>Updated the following drives: "5AC801.HDDI-04" on page 124, "5ACPCI.RAIC-06" on page 167, "5MMHDD.0500-00" on page 172.</li> <li>Revised order data for system units "5PC810.SX01-00" on page 75, "5PC810.SX02-00" on page 82, "5PC810.SX03-00" on page 90 and "5PC810.SX05-00" on page 97.</li> <li>Revised general information regarding drives "5ACPCI.RAIC-01" on page 154, "5ACPCI.RAIC-05" on page 164 and "5MMHDD.0250-00" on page 170.</li> <li>Corrected spelling and sentence structure errors.</li> </ul>

Table 1: Manual history

Version	Date	Change
1.48	15-May-13	<ul style="list-style-type: none"><li>• Chapter 5 "Standards and certifications" on page 320 revised.</li><li>• Revised information regarding certifications in the technical data of individual components.</li><li>• Updated the line filter "5AC804.MFLT-00" on page 374.</li><li>• Updated add-on fuse kit "5AC600.UPSF-00" on page 373 and replacement fuses "5AC600.UPSF-01" on page 373 for the UPS battery unit.</li><li>• Updated slide-in compact drive "5AC801.SSDI-03" on page 136.</li><li>• Updated replacement SSDs "5MMSSD.0060-00" on page 138, "5MMSSD.0060-01" on page 140 and "5MMSSD.0180-00" on page 142.</li></ul>

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), the safety precautions applying to industrial control systems (e.g. the provision of safety devices such as emergency stop circuits, etc.) must be observed in accordance with applicable national and international regulations. The same applies for all other devices connected to the system, such as drives.

All tasks such as 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.

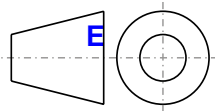
### 3 Organization of safety notices

Safety notices in this manual are organized as follows:

Safety notice	Description
<b>Danger!</b>	Disregarding these safety guidelines and notices can be life-threatening.
<b>Warning!</b>	Disregarding these safety guidelines and notices can result in severe injury or substantial damage to equipment.
<b>Caution!</b>	Disregarding these safety guidelines and notices can result in injury or damage to equipment.
<b>Information:</b>	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	$\pm 0.1$ mm
For 6 to 30 mm	$\pm 0.2$ mm
For 30 to 120 mm	$\pm 0.3$ mm
For 120 to 400 mm	$\pm 0.5$ mm
For 400 to 1000 mm	$\pm 0.8$ mm

Table 4: Range of nominal sizes

## 5 Overview

Product ID	Short description	on page
<b>Accessories</b>		
5AC801.FA01-00	Fan filter for APC810 5 pcs. (spare part), for 5PC810.SX01-00.	329
5AC801.FA02-00	Fan filter for APC810 5 pcs. (spare part), for 5PC810.SX02-00.	329
5AC801.FA03-00	Fan filter for APC810 5 pcs. (spare part), for 5PC810.SX03-00.	329
5AC801.FA05-00	Fan filter for APC810 5 pcs. (spare part), for 5PC810.SX05-00.	329
5AC801.FRAME-00	APC810 SATA Hard Disk Replacement Tray	404
5AC801.RDYR-01		182
5AC804.MFLT-00	Mains filter	374
5ACPCI.ETH1-01	PCI Ethernet card 1x 10/100	376
5ACPCI.ETH3-01	PCI Ethernet card 3x 10/100	379
5CAMSC.0001-00	Internal power supply cable	403
<b>Automation PC / Panel PC</b>		
1A4601.06	B&R Automation Runtime AREmb, incl. License Label and Security Key	303
<b>Automation Panel Link interfaces</b>		
5AC801.RDYR-00	Ready relay for APC810	181
5AC801.SDL0-00	Smart Display Link/DVI-D Transmitter	179
<b>Automation Runtime</b>		
1A4600.10-2	B&R Automation Runtime ARwin, ARNC0	303
1A4600.10-3	B&R Automation Runtime ARwin+PVIControls incl. License Label and Security Key	303
1A4600.10-4	B&R Automation Runtime ARwin+ARNC0+PVIControls	303
<b>Batteries</b>		
0AC201.91	Lithium batteries 4 pieces, 3 V / 950 mAh button cell Hereby we declare that the Lithium cells contained in this shipment qualify as „partly regulated“. Handle with care. If the package is damaged, inspect cells, repack intact cells and protect cells against short circuits. For emergency information, call RENATA SA at + 41 61 319 28 27	326
4A0006.00-000	Lithium battery, 3 V / 950 mAh, button cell	326
<b>Bus units</b>		
5PC810.BX01-00	APC810 bus, 1 PCI	106
5PC810.BX01-01	APC810 bus, 1 PCI Express (x4)	106
5PC810.BX02-00	APC810 bus, 2 PCI	106
5PC810.BX02-01	APC810 bus, 1 PCI, 1 PCI Express (x4)	106
5PC810.BX03-00	APC810 bus, 2 PCI, 1 PCI Express (x4)	106
5PC810.BX05-00	APC810 bus, 4 PCI, 1 PCI Express (x1)	106
5PC810.BX05-01	APC810 bus, 2 PCI, 3 PCI Express (x1)	106
5PC810.BX05-02	APC810 bus, 5 PCI	106
<b>CPU boards</b>		
5PC800.B945-00	Intel Core Duo L2400 CPU board, 1.66 GHz, dual-core, 667 MHz FSB, 2 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111B.	108
5PC800.B945-01	Intel Core2 Duo L7400 CPU board, 1.5 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111B.	108
5PC800.B945-02	Intel Core2 Duo U7500 CPU board, 1.06 GHz, dual-core, 533 MHz FSB, 2 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111B.	108
5PC800.B945-03	Intel Celeron M 423 CPU board, 1.06 GHz, single-core, 533 MHz FSB, 1 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111B.	108
5PC800.B945-04	Intel Core2 Duo T7400 CPU board, 2.16 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111B.	108
5PC800.B945-05	Intel Atom N270 CPU board, 1.6 GHz, single-core, 533 MHz FSB, 512 kB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111C.	108
5PC800.B945-10	Intel Core Duo L2400 CPU board, 1.66 GHz, dual-core, 667 MHz FSB, 2 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111C.	108
5PC800.B945-11	Intel Core2 Duo L7400 CPU board, 1.5 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111C.	108
5PC800.B945-12	Intel Core2 Duo U7500 CPU board, 1.06 GHz, dual-core, 533 MHz FSB, 2 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111C.	108
5PC800.B945-13	Intel Celeron M 423 CPU board, 1.06 GHz, single-core, 533 MHz FSB, 1 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111C.	108
5PC800.B945-14	Intel Core2 Duo T7400 CPU board, 2.16 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111C.	108
<b>CompactFlash</b>		
5CFCRD.0064-03	CompactFlash 64 MB Western Digital (SLC)	343
5CFCRD.0128-03	CompactFlash 128 MB Western Digital (SLC)	343
5CFCRD.016G-04	CompactFlash 16 GB B&R (SLC)	338
5CFCRD.016G-06	CompactFlash 16 GB B&R (SLC)	333
5CFCRD.0256-03	CompactFlash 256 MB Western Digital (SLC)	343
5CFCRD.032G-06	CompactFlash 32 GB B&R (SLC)	333
5CFCRD.0512-03	CompactFlash 512 MB Western Digital (SLC)	343
5CFCRD.0512-04	CompactFlash 512 MB B&R (SLC)	338
5CFCRD.0512-06	CompactFlash 512 MB B&R (SLC)	333
5CFCRD.1024-03	CompactFlash 1 GB Western Digital (SLC)	343
5CFCRD.1024-04	CompactFlash 1 GB B&R (SLC)	338
5CFCRD.1024-06	CompactFlash 1 GB B&R (SLC)	333
5CFCRD.2048-03	CompactFlash 2 GB Western Digital (SLC)	343
5CFCRD.2048-04	CompactFlash 2 GB B&R (SLC)	338
5CFCRD.2048-06	CompactFlash 2 GB B&R (SLC)	333
5CFCRD.4096-03	CompactFlash 4 GB Western Digital (SLC)	343

Product ID	Short description	on page
5CFCRD.4096-04	CompactFlash 4 GB B&R (SLC)	338
5CFCRD.4096-06	CompactFlash 4 GB B&R (SLC)	333
5CFCRD.8192-03	CompactFlash 8 GB Western Digital (SLC)	343
5CFCRD.8192-04	CompactFlash 8 GB B&R (SLC)	338
5CFCRD.8192-06	CompactFlash 8 GB B&R (SLC)	333
<b>DVI cable</b>		
5CADVI.0018-00	DVI-D cable, 1.8 m.	382
5CADVI.0050-00	DVI-D cable, 5 m.	382
5CADVI.0100-00	DVI-D cable, 10 m.	382
<b>Drives</b>		
5AC801.ADAS-00	SATA hard disk adapter to operate a slide-in compact hard disk in a slide-in slot.	144
5AC801.DVDS-00	DVD-ROM SATA drive, slide-in.	148
5AC801.DVRS-00	DVD-R/RW DVD+R/RW SATA drive, slide-in.	151
5AC801.HDDI-00	40 GB SATA hard disk, slide-in compact; 24/7 hard disk with extended temperature range. Remark: Please see manual for proper use of the hard disk.	114
5AC801.HDDI-02	160 GB SATA hard disk, slide-in compact; 24/7 hard disk with extended temperature range. Remark: Please see manual for proper use of the hard disk.	119
5AC801.HDDI-03	250 GB SATA hard disk, slide-in compact; 24/7 hard disk. Remark: Please see manual for proper use of the hard disk.	121
5AC801.HDDI-04	500 GByte SATA Hard Disk, Slide-in compact, 24/7 Hard Disk Hinweis: Beachten Sie das Manual zum Einsatz der Harddisk.	124
5AC801.HDDS-00	40 GB SATA hard disk, slide-in; 24/7 hard disk with extended temperature range. Remark: Please see manual for proper use of the hard disk.	145
5AC801.SSDI-00	32 GB SATA SSD (SLC), Slide-in compact	126
5AC801.SSDI-01	60 GB SATA SSD (MLC), Slide-in compact	130
5AC801.SSDI-02	180 GB SATA SSD (MLC), Slide-in compact	133
5AC801.SSDI-03	60 GB SATA SSD (MLC), Slide-in compact.	136
5ACPCI.RAIC-03	PCI RAID System SATA 2x 160 GB; Remark: Please see manual for proper use of the hard disk.	159
5ACPCI.RAIC-04	160 GB SATA Hard Disk Spare part for 5ACPCI.RAIC-03; Remark: Please see manual for proper use of the hard disk.	162
5ACPCI.RAIC-05	PCI RAID System SATA 2x 250 GB; Remark: Please see manual for proper use of the hard disk.	164
5ACPCI.RAIC-06	PCI RAID System SATA 2x 500 GByte; Hinweis: Beachten Sie das Manual zum Einsatz der Harddisk.	167
5MMHDD.0250-00	250 GB SATA hard disk replacement for 5AC801.HDDI-03 and 5ACPCI.RAIC-05; Remark: Please see manual for proper use of the hard disk.	170
5MMHDD.0500-00	500 GB SATA hard disk replacement for 5AC801.HDDI-04, 5AC901.CHDD-01 and 5ACPCI.RAIC-06; Remark: Please see manual for proper use of the hard disk.	172
5MMSSD.0060-00	60 GB SATA SSD (MLC); Spare part for 5AC801.SSDI-01; SSD for 5PP5IO.GMAC-00; Remark: Please see manual for proper use of the SSD.	138
5MMSSD.0060-01	60 GByte SATA SSD (MLC); Ersatzteil für 5AC801.SSDI-03 und 5AC901.CSSD-03; SSD für 5PP5IO.GMAC-00; Hinweis: Beachten Sie das Manual zum Einsatz der SSD.	140
5MMSSD.0180-00	180 GB SATA SSD (MLC); Spare part for 5AC801.SSDI-02; SSD for 5PP5IO.GMAC-00; Remark: Please see manual for proper use of the SSD.	142
<b>Fan kits</b>		
5PC810.FA01-00	APC810 fan kit for system unit 5PC810.SX01-00.	174
5PC810.FA02-01	APC810 fan kit for system unit 5PC810.SX02-00 from revision D0.	175
5PC810.FA03-00	APC810 fan kit for system unit 5PC810.SX03-00.	177
5PC810.FA05-00	APC810 fan kit for system unit 5PC810.SX05-00.	178
<b>Kühlkörper</b>		
5AC801.HS00-00	APC810 Kühlkörper für CPU Boards mit Dual Core Prozessoren L2400, L7400, U7500 und Celeron M 423.	111
5AC801.HS00-01	APC810 Kühlkörper für CPU Boards mit Dual Core Prozessor T7400, T9400 und P8400.	111
5AC801.HS00-02	APC810 Kühlkörper für CPU Board mit Atom Prozessor N270.	111
<b>MS-DOS</b>		
9S0000.01-010	OEM Microsoft MS-DOS 6.22, German Floppy disks, only available with a new PC.	289
9S0000.01-020	OEM Microsoft MS-DOS 6.22, English Floppy disks, only available with a new PC.	289
<b>Main memory</b>		
5MMDDR.0512-01	SO-DIMM DDR2 RAM 512 MB PC2-5300	113
5MMDDR.1024-01	SO-DIMM DDR2 RAM 1024 MB PC2-5300	113
5MMDDR.2048-01	SO-DIMM DDR2 RAM 2048 MB PC2-5300	113
<b>Miscellaneous</b>		
5AC900.1000-00	Adapter DVI (male) to CRT (female). For connecting a standard monitor to a DVI-I interface.	330
<b>Other</b>		
5SWHMI.0000-00	HMI Drivers & Utilities DVD	363
<b>RS232 cable</b>		
9A0014.02	RS232 extension cable for remote operating of a display unit with touch screen, 1.8 m.	401
9A0014.05	RS232 extension cable for remote operating of a display unit with touch screen, 5 m.	401
9A0014.10	RS232 extension cable for remote operating of a display unit with touch screen, 10 m.	401
<b>SDL cable - 45° connector</b>		
5CASDL.0018-01	SDL cable; 45° connector, 1.8 m.	388
5CASDL.0050-01	SDL cable; 45° connector, 5 m.	388
5CASDL.0100-01	SDL cable; 45° connector, 10 m.	388
5CASDL.0150-01	SDL cable; 45° connector, 15 m.	388
<b>SDL cables</b>		
5CASDL.0018-00	SDL cable, 1.8 m.	385
5CASDL.0050-00	SDL cable, 5 m.	385
5CASDL.0100-00	SDL cable, 10 m.	385
5CASDL.0150-00	SDL cable, 15 m.	385

Product ID	Short description	on page
5CASDL.0200-00	SDL cable, 20 m.	385
5CASDL.0250-00	SDL cable, 25 m.	385
5CASDL.0300-00	SDL cable, 30 m.	385
<b>SDL flex cable</b>		
5CASDL.0018-03	SDL Cable flex, 1.8 m.	391
5CASDL.0050-03	SDL cable flex, 5 m.	391
5CASDL.0100-03	SDL cable flex, 10 m.	391
5CASDL.0150-03	SDL cable flex, 15 m.	391
5CASDL.0200-03	SDL cable flex, 20 m.	391
5CASDL.0250-03	SDL cable flex, 25 m.	391
5CASDL.0300-03	SDL cable flex, 30 m.	391
5CASDL.0300-13	SDL cable flex with extender, 30 m.	395
5CASDL.0400-13	SDL cable flex with extender, 40 m.	395
5CASDL.0430-13	SDL Cable flex with extender, 43 m.	395
<b>Serial adapters</b>		
5AC600.485I-00	RS232/422/485 Interface; for APC620, APC810 and PPC700.	187
5AC600.CANI-00	CAN Interface; For APC620, APC810 or PPC700.	184
<b>Systemeinheiten</b>		
5PC810.SX01-00	APC810 Systemeinheit 1 Slot (PCI Express, PCI, abhängig vom Bus); 1 Slide-in compact Steckplatz; Smart Display Link/DVI/Monitor, 2x RS232, 5x USB 2.0, 2x ETH 10/100/1000, 24 VDC (Schraubklemme 0TB103.9 oder Federzug- klemme 0TB103.91 gesondert bestellen)	75
5PC810.SX02-00	APC810 Systemeinheit 2 Slots (PCI Ex- press, PCI, abhängig vom Bus); 1 Slot für Automation Panel Link Transmitter; 1 Slide-in compact und 1 Slide-in Steckplatz; Smart Display Link/ DVI/Monitor, 2x RS232, 5x USB 2.0, 2x ETH 10/100/1000, 24 VDC (Schraubklemme 0TB103.9 oder Feder- zugklemme 0TB103.91 gesondert bestellen)	82
5PC810.SX03-00	APC810 Systemeinheit 3 Slots (PCI Ex- press, PCI, abhängig vom Bus); 1 Slot für Automation Panel Link Transmitter; 1 Slide-in compact und 1 Slide-in Steckplatz; Smart Display Link/DVI/Monitor, 2x RS232, 5x USB 2.0, 2x ETH 10/100/1000, AC97 Sound, 24 VDC (Schraubklemme 0TB103.9 oder Federzugklemme 0TB103.91 gesondert bestellen)	90
5PC810.SX05-00	APC810 Systemeinheit 5 Slots (PCI Ex- press, PCI, abhängig vom Bus); 1 Slot für Automation Panel Link Transmitter; 1 Slide-in compact und 2 Slide-in Steckplätze; Smart Display Link/DVI/ Monitor, 2x RS232, 5x USB 2.0, 2x ETH 10/100/1000, 24 VDC Schraubklemme 0TB103.9 oder Federzug- klemme 0TB103.91 gesondert bestellen)	97
<b>Terminal blocks</b>		
0TB103.9	Connector, 24 VDC, 3-pin female, screw clamps 3.31 mm <sup>2</sup> , protected against vibration by the screw flange	328
0TB103.91	Connector, 24 VDC, 3-pin female, cage clamps 3.31 mm <sup>2</sup> , protected against vibration by the screw flange	328
<b>USB accessories</b>		
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.	357
5MD900.USB2-01	USB 2.0 Drives DVD-R/RW DVD+R/RW, FDD, CompactFlash slot (type II), USB connector (type A on front side, type B on back side); 24 VDC; (0TB103.9 screw clamp or 0TB103.91 cage clamp must be ordered separately).	347
5MD900.USB2-02	USB 2.0 DVD-R/RW DVD+R/RW drive, CompactFlash slot (Type II), USB connector (Type A on front, Type B on back), 24 VDC, please order 0TB103.9 screw clamp or 0TB103.91 cage clamp separately	352
5MMUSB.2048-00	USB 2.0 Memory Stick, 2048 MB	359
5MMUSB.2048-01	USB 2.0 flash drive, 2048 MB, B&R	361
<b>USB cable</b>		
5CAUSB.0018-00	USB 2.0 connecting cable type A - type B, 1.8 m.	399
5CAUSB.0050-00	USB 2.0 connecting cable type A - type B, 5 m.	399
<b>Undefined</b>		
1A4601.06-2	B&R Automation Runtime AREmb, ARNC0	303
5AC801.HDDI-01	80 GB SATA hard disk, slide-in compact; 24/7 hard disk with extended temperature range. Remark: Please see manual for proper use of the hard disk.	117
5ACPCI.RAIC-01	PCI RAID System SATA 2x 60 GB Remark: Please see manual for proper use of the hard disk.	154
5ACPCI.RAIC-02	60 GByte SATA Hard Disk Spare part for 5ACPCI.RAIC-01 Remark: Please see manual for proper use of the hard disk.	157
5PC810.FA02-00	APC810 fan kit for system unit 5PC810.SX02-00	175
<b>Uninterruptible power supplies</b>		
5AC600.UPSB-00	Battery unit 5Ah; for APC620, APC800 or PPC800 UPS.	369
5AC600.UPSF-00	USV Sicherungs Kit für Batterieeinheit 5AC600.UPSB-00 bis Revision D0.	373
5AC600.UPSF-01	USV Sicherung, 5 Stück	373
5AC600.UPSI-00	UPS module for APC620, APC810, PPC800; for system units 5PC600.SX01-00 (from Rev. H0), 5PC600.SX02-00 (from Rev. G0), 5PC600.SX02-01 (from Rev. H0), 5PC600.SX05-00 (from Rev. F0), 5PC600.SX05-01 (from Rev. F0), 5PC600.SF03-00 (from Rev. A0), 5PC810.SX*. 5PC820.1505-00, 5PC820.1906-00. Cable (5CAUPS.0005-00 or 5CAUPS.0030-00) and battery unit (5AC600.UPSB-00) have to be ordered separately.	367
5CAUPS.0005-00	UPS cable 0.5 m; for UPS 5AC600.UPSI-00.	372
5CAUPS.0030-00	UPS cable 3 m; for UPS 5AC600.UPSI-00.	372
<b>Windows 7 Professional/Ultimate</b>		
5SWWI7.1100-ENG	Microsoft OEM Windows 7 Professional 32-bit, Service Pack 1, DVD, English. Only available with a new device.	292
5SWWI7.1100-GER	Microsoft OEM Windows 7 Professional 32-bit, Service Pack 1, DVD, German. Only available with a new device.	292
5SWWI7.1200-ENG	Microsoft OEM Windows 7 Professional 64-bit, Service Pack 1, DVD, English. Only available with a new device.	292
5SWWI7.1200-GER	Microsoft OEM Windows 7 Professional 64-bit, Service Pack 1, DVD, German. Only available with a new device.	292
5SWWI7.1300-MUL	Microsoft OEM Windows 7 Ultimate 32-bit, Service Pack 1, DVD, multilanguage. Only available with a new device.	292
5SWWI7.1400-MUL	Microsoft OEM Windows 7 Ultimate 64-bit, Service Pack 1, DVD, multilanguage. Only available with a new device.	292

Product ID	Short description	on page
	<b>Windows CE 6.0</b>	
5SWWCE.0826-ENG	Microsoft OEM Windows CE 6.0 Professional, English; for APC810 with 945GME chipset; please order CompactFlash separately (minimum 128 MB).	301
	<b>Windows Embedded Standard 2009</b>	
5SWWXP.0726-ENG	Microsoft OEM Windows Embedded Standard 2009, English; for APC810 with 945GME chipset; please order CompactFlash separately (minimum 1 GB).	296
	<b>Windows Embedded Standard 7</b>	
5SWWI7.1526-ENG	Microsoft OEM Windows Embedded Standard 7 32-bit, Service Pack 1, English; for APC810 with 945GME chipset; please order CompactFlash separately (minimum 16 GB).	298
5SWWI7.1626-ENG	Microsoft OEM Windows Embedded Standard 7 64-bit, Service Pack 1, English; for APC810 with 945GME chipset; please order CompactFlash separately (minimum 16 GB).	298
5SWWI7.1726-MUL	Microsoft OEM Windows Embedded Standard 7 Premium 32-bit, Service Pack 1, Multilanguage; for APC810 with 945GME chipset; please order CompactFlash separately (minimum 16 GB).	298
5SWWI7.1826-MUL	Microsoft OEM Windows Embedded Standard 7 Premium 64-bit, Service Pack 1, multilanguage; for APC810 with 945GME chipset; please order CompactFlash separately (minimum 16 GB).	298
	<b>Windows XP Embedded</b>	
5SWWXP.0426-ENG	Microsoft OEM Windows XP Embedded Feature Pack 2007, English; for APC810 with 945GME chipset; please order CompactFlash separately (minimum 512 MB).	294
	<b>Windows XP Professional</b>	
5SWWXP.0500-ENG	Microsoft OEM Windows XP Professional Service Pack 2c, CD, English. Only available with a B&R device.	290
5SWWXP.0500-GER	Microsoft OEM Windows XP Professional Service Pack 2c, CD, German. Only available with a B&R device.	290
5SWWXP.0500-MUL	Microsoft OEM Windows XP Professional Service Pack 2c, CD, multilanguage. Only available with a B&R device.	290
5SWWXP.0600-ENG	Microsoft OEM Windows XP Professional Service Pack 3, CD, English. Only available with a B&R device.	290
5SWWXP.0600-GER	Microsoft OEM Windows XP Professional Service Pack 3, CD, German. Only available with a device.	290
5SWWXP.0600-MUL	Microsoft OEM Windows XP Professional Service Pack 3, CD, multilanguage. Only available with a B&R device.	290
	<b>Windows-based Runtime</b>	
1A4600.10	B&R Automation Runtime ARwin, incl. License Label and Security Key	303

## 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. Drive bays (DVD, HDD) and two CompactFlash slots are 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 side of the housing. The installation depth is not increased by protruding connectors. The different APC810 sizes with one, two, three or five card slots (for PCI / PCI Express cards) provide the optimum design for every type of installation – a perfect fit without wasting valuable space in the control cabinet.



## 1.1 Features

- Latest processor technologies – Core Duo, Core 2 Duo, Celeron M and Atom N270
- Up to 3 GB main memory (dual-channel memory support)
- 2 CompactFlash slots (type I)
- 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 operation<sup>1)</sup>
- BIOS (AMI)
- Real-time clock (RTC, battery-backed)
- 512 kB SRAM (battery-backed)
- Connection of various display devices to the "Monitor/Panel" video output (supports RGB, DVI, and SDL - Smart Display Link - signals)
- 2nd graphics line with installation of the optional AP Link card
- Easy slide-in drive exchange (SATA hot plug capable)
- 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

<sup>1)</sup> Depends on the device configuration and ambient temperature.



### 1.3 Configuration - Base system





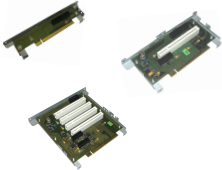



Configuration - Base system				
System unit	Select one			
A system unit consists of a housing and mainboard. <u>Variants:</u> Card slots (1, 2, 3 or 5) Slide-in slots (0, 1 or 2) AP Link slot (0 or 1) <u>Example:</u> (2 / 1 / 1) = 2 card slots, 1 slide-in slot, 1 AP Link slot				
	5PC810.SX01-00 (1 / 0 / 0)	5PC810.SX02-00 (2 / 1 / 1)	5PC810.SX03-00 (3 / 1 / 1)	5PC810.SX05-00 (5 / 2 / 1)
Bus unit	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			
	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		
	5AC801.HS00-00	5AC801.HS00-01	5AC801.HS00-02	
	Main memory	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: Configuration - Base system

## 1.4 Configuration - Optional components





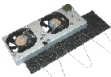


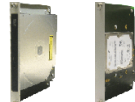














Configuration - Drives, software, accessories				
System unit	Select one			
A system unit consists of a housing and mainboard. <u>Variants:</u> Card slots (1, 2, 3 or 5) Slide-in slots (0, 1 or 2) AP Link slot (0 or 1) <u>Example:</u> (2 / 1 / 1) = 2 card slots, 1 slide-in slot, 1 AP Link slot				
	5PC810.SX01-00 (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	<b>Windows XP</b> 5SWWXP.0500-ENG 5SWWXP.0500-GER 5SWWXP.0500-MUL 5SWWXP.0600-ENG 5SWWXP.0600-GER 5SWWXP.0600-MUL	<b>Windows Embedded Standard 2009</b> 5SWWXP.0726-ENG <b>Windows Embedded Standard 7</b> 5SWWI7.1526-ENG 5SWWI7.1626-ENG 5SWWI7.1726-MUL 5SWWI7.1826-MUL	<b>Automation Runtime</b> 1A4601.06 1A4601.06-2 1A4600.10 1A4600.10-2 1A4600.10-3 1A4600.10-4	
	<b>Windows CE</b> 5SWWCE.0826-ENG	<b>Windows XP Embedded</b> 5SWWXP.0426-ENG		
	<b>Windows 7</b> 5SWWI7.1200-ENG 5SWWI7.1200-GER 5SWWI7.1400-MUL	5SWWI7.1100-ENG 5SWWI7.1100-GER 5SWWI7.1300-MUL		

Figure 2: Configuration - Optional components

## 2 Fully assembled device

### 2.1 Temperature specifications

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

#### Information:

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

#### Information regarding worst-case conditions

- Thermal Analysis Tool (TAT 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 fully assembled device 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:

- 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 191).
- 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).													
<b>Maximum ambient temperature</b>		<b>35</b>	<b>35</b>	<b>35</b>	<b>45</b>	<b>-</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>40</b>	<b>-</b>		
What else can also be operated at the max. ambient temperature, or are there any limits?													
<b>Slide-in compact drives</b>	Onboard CompactFlash <sup>1)</sup>	✓	✓	✓	✓		✓	✓	✓	✓		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	
<b>Slide-in drives</b>	5AC801.HDDS-00	✓	✓	✓	✓		✓	✓	✓	✓		80	Slide-in drive
	5AC801.DVDS-00	✓	✓	✓	40		✓	✓	✓	✓		50	
	5AC801.DVRS-00	✓	✓	✓	40		✓	✓	✓	✓		50	
<b>Main memory</b>	5MMDDR.0512-01	✓	✓	✓	✓		✓	✓	✓	✓		-	-
	5MMDDR.1024-01	✓	✓	✓	✓		✓	✓	✓	✓		-	
	5MMDDR.2048-01	✓	✓	✓	✓		✓	✓	✓	✓		-	
<b>System units</b>	5PC810.SX01-00	✓	✓	✓	✓		✓	✓	✓	✓		80	Power supply
	5PC810.SX02-00	✓	✓	✓	✓		✓	✓	✓	✓		80	
	5PC810.SX03-00	✓	✓	✓	✓		✓	✓	✓	✓		80	
	5PC810.SX05-00	✓	✓	✓	✓		✓	✓	✓	✓		80	
<b>Additional insert cards Interfaces / AP Link</b>	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:

- 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 191).
- 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 <sup>1)</sup>	✓	✓	✓	✓		✓	✓	✓	✓		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	
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 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/ ✓	30/ ✓	30/ ✓	30/ 40		✓	✓	✓	✓		-	
	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:

- 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 191).
- 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 <sup>1)</sup>	✓	✓	✓	✓		✓	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	
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	✓	✓	✓	✓		✓	-	-
	5AC600.485I-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:**

- 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 191).

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	L7400	U7500	M 423	T7400	L2400	L7400	U7500	M 423	T7400			
		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			
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		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 <sup>1)</sup>	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	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		
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 insert 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:

- 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 191).
- 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		55	55	55	55	55	60	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 <sup>1)</sup>	✓	✓	✓	✓	✓	✓	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	
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	✓	✓	✓	✓	✓	✓	-	-
	5AC600.485I-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	-	
	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 fully assembled device, including the respective CPU board.

#### Information:

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

3. Incorporating additional drives (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 fully assembled device without problems.

If there is a specific temperature, for example "35", next to the component, then the ambient temperature of the fully assembled 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 temperature<sup>2)</sup> 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).

<sup>2)</sup> 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 temperatures<sup>3)</sup> can be read in BIOS (Advanced - CPU monitor) or in Microsoft Windows operating systems via the B&R Control Center<sup>4)</sup>.

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.

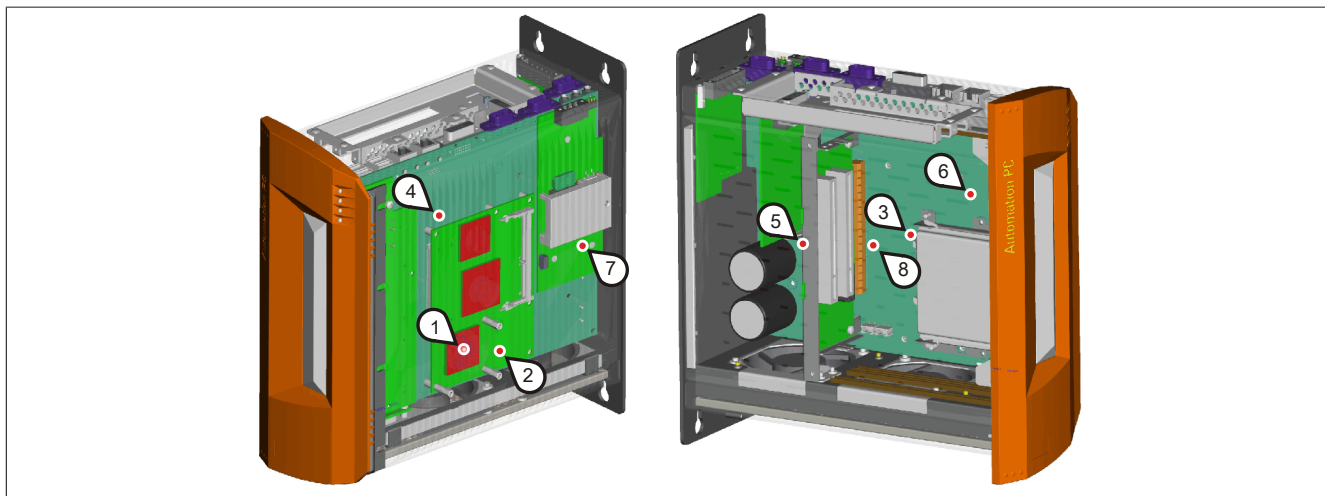


Figure 3: Temperature sensor locations

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).	Drive-dependent
8	Slide-in drive 2	Slide-in drive 2 temperature (sensor integrated in the slide-in slot).	Drive-dependent

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](http://www.br-automation.com)).

## 2.2 Humidity specifications

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

Component		Operation	Storage / Transport
CPU boards 945GME COM Express		10 to 90%	5 to 95%
System units (all models)		5 to 90%	5 to 95%
Main memory for CPU boards		10 to 90%	5 to 95%
Slide-in compact drive	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%
Slide-in drives	5AC801.SSDI-03	8 to 95%	8 to 95%
	5AC801.HDDS-00	5 to 90%	5 to 90%
	5AC801.DVDS-00	8 to 90%	5 to 95%
Additional insert cards	5AC801.DVRS-00	8 to 90%	5 to 95%
	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%
Accessories	5MMHDD.0500-00 (24 hours / standard)	5 to 95%	5 to 95%
	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%
	Flash drive 5MMUSB.2048-xx	10 to 90%	5 to 90%
	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.

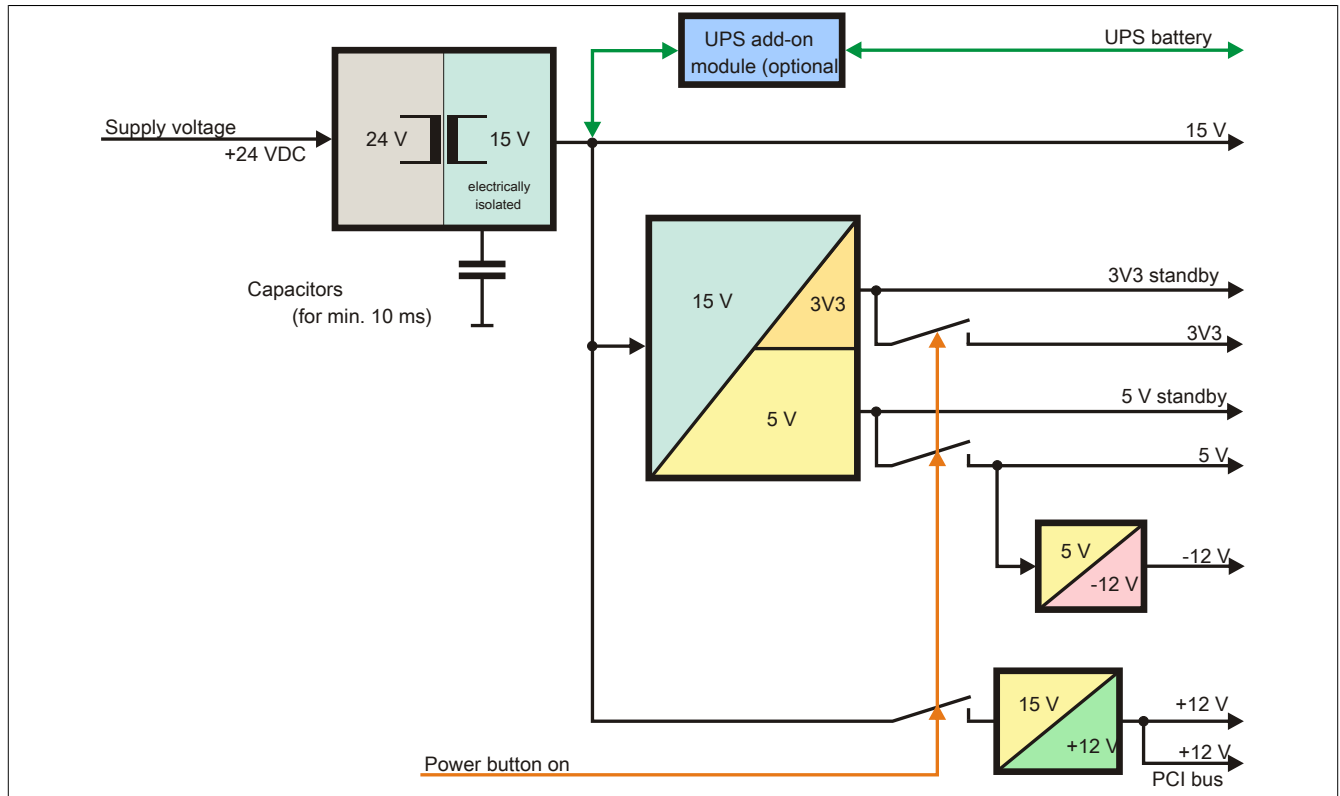


Figure 4: Supply voltage for system units

#### Description

15 V is generated from the supply voltage using a DC-to-DC converter. This electrically isolated 15 V supplies further DC/DC converters, which 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/DC converter generates +12 V.

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

## 2.3.2 Power calculation with 5PC810.SX01-00 revision &gt;= 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 <b>watts</b> The values for the <b>suppliers</b> are maximum values. The values for the <b>con-</b> <b>sumers</b> are average maximum values, but not peak values.		Total power supply power (maximum)							130	
Total power supply	+12 V	Add-on UPS module, optional	7.5	7.5	7.5	7.5	7.5	7.5		
		Maximum possible at +12 V							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 base board)	10	10	10	10	10	10		
		PCI card limit, optional (max. 3 W without fan kit, max. 6 W with fan kit) <sup>1)</sup>								
		PCIe x1 card limit, optional (max. 3 W without fan kit, max. 20 W with fan kit) <sup>1)</sup>								
		Consumers +12 V ∑								
		Maximum possible at +5 V							65	
	+5 V	System unit, permanent consumers	4	4	4	4	4	4		
		Hard disk (slide-in compact)	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		
		External consumers, optional (via base board)	5	5	5	5	5	5		
		PCI card limit, optional (max. 3 W without fan kit, max. 20 W with fan kit) <sup>1)</sup>								
		Maximum possible at -12 V							1.2	
		-12 V	PCI card limit, optional (max. 1.2 W with or without fan kit) <sup>1)</sup>							
			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			
PCI card limit, optional (max. 3 W without fan kit, max. 15 W with fan kit) <sup>1)</sup>										
PCIe x1 card limit, optional (max. 3 W without fan kit, max. 10 W with fan kit) <sup>1)</sup>										
Consumers 3V3 ∑										
Consumers ∑										

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

Table 12: Power calculation APC 1 slot

### 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 <b>watts</b> The values for the <b>suppliers</b> are maximum values. The values for the <b>consumers</b> 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	7.5	7.5	7.5	7.5	7.5	
		Maximum possible at +12 V						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 base board)	10	10	10	10	10	10
		PCI card limit, optional (max. 3 W without fan kit, max. 6 W with fan kit) <sup>1)</sup>						
		PCIe x1 card limit, optional (max. 3 W without fan kit, max. 20 W with fan kit) <sup>1)</sup>						
		Consumers +12 V ∑						
	+5 V	Maximum possible at +5 V						65
		System unit, permanent consumers	4	4	4	4	4	4
		Hard disk (slide-in compact)	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
		External consumers, optional (via base board)	5	5	5	5	5	5
		PCI card limit, optional (max. 3 W without fan kit, max. 20 W with fan kit) <sup>1)</sup>						
	-12 V	Maximum possible at -12 V						1.2
		PCI card limit, optional (max. 1.2 W with or without fan kit) <sup>1)</sup>						
		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
		PCI card limit, optional (max. 3 W without fan kit, max. 15 W with fan kit) <sup>1)</sup>						
		PCIe x1 card limit, optional (max. 3 W without fan kit, max. 10 W with fan kit) <sup>1)</sup>						
		Consumers 3V3 ∑						
		Consumers ∑						

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

Table 13: Power calculation APC 1 slot

## 2.3.4 Power calculation with 5PC810.SX02-00 revision &gt;= 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 <b>watts</b> The values for the <b>suppliers</b> are maximum values. The values for the <b>con-</b> <b>sumers</b> 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 +12 V							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 base board)	10	10	10	10	10	10	
	PCI card limit, optional (max. 3 W without fan kit, max. 6 W with fan kit) <sup>1)</sup>							
	PCIe x1 card limit, optional (max. 3 W without fan kit, max. 20 W with fan kit) <sup>1)</sup>							
	Consumers +12 V ∑							
	Maximum possible at +5 V							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 base board)	5	5	5	5	5	5	
	PCI card limit, optional (max. 3 W without fan kit, max. 20 W with fan kit) <sup>1)</sup>							
	Maximum possible at -12 V							1.2
	PCI card limit, optional (max. 1.2 W with or without fan kit) <sup>1)</sup>							
	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) <sup>1)</sup>							
	PCIe x1 card limit, optional (max. 3 W without fan kit, max. 10 W with fan kit) <sup>1)</sup>							
Consumers 3V3 ∑								
Consumers ∑								

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

Table 14: Power calculation APC 2 slot

### 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 <b>watts</b> The values for the <b>suppliers</b> are maximum values. The values for the <b>con-</b> <b>sumers</b> are average maximum values, but not peak values.		Total power supply power (maximum)						85		
Total power supply	Add-on UPS module, optional		7.5	7.5	7.5	7.5	7.5	7.5		
	Maximum possible at +12 V								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 base board)	10	10	10	10	10	10		
		PCI card limit, optional (max. 3 W without fan kit, max. 6 W with fan kit) <sup>1)</sup>								
		PCIe x1 card limit, optional (max. 3 W without fan kit, max. 20 W with fan kit) <sup>1)</sup>								
	Consumers +12 V ∑									
	+5 V	Maximum possible at +5 V								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 base board)	5	5	5	5	5	5		
PCI card limit, optional (max. 3 W without fan kit, max. 20 W with fan kit) <sup>1)</sup>										
Maximum possible at -12 V								1.2		
-12 V		PCI card limit, optional (max. 1.2 W with or without fan kit) <sup>1)</sup>								
	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) <sup>1)</sup>									
	PCIe x1 card limit, optional (max. 3 W without fan kit, max. 10 W with fan kit) <sup>1)</sup>									
	Consumers 3V3 ∑									
Consumers ∑										

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

Table 15: Power calculation APC 2 slot



### 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 <b>watts</b> The values for the <b>suppliers</b> are maximum values. The values for the <b>con-</b> <b>sumers</b> 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 +12 V							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 base board)	10	10	10	10	10	10	
		PCI card limit, optional (max. 3 W without fan kit, max. 6 W with fan kit) <sup>1)</sup>							
		PCIe x1 card limit, optional (max. 3 W without fan kit, max. 20 W with fan kit) <sup>1)</sup>							
		Consumers +12 V ∑							
		Maximum possible at +5 V							65
	+5 V	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 base board)	5	5	5	5	5	5	
		PCI card limit, optional (max. 3 W without fan kit, max. 20 W with fan kit) <sup>1)</sup>							
		Maximum possible at -12 V							1.2
	-12 V	PCI card limit, optional (max. 1.2 W with or without fan kit) <sup>1)</sup>							
		Consumers -12 V ∑							
		Consumers +5 V ∑							
		Maximum possible at 3V3							40
	3V3	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) <sup>1)</sup>							
		PCIe x1 card limit, optional (max. 3 W without fan kit, max. 10 W with fan kit) <sup>1)</sup>							
		Consumers 3V3 ∑							
		Consumers ∑							

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

Table 16: Power calculation APC 3 slot

### 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	Enter values in this column	
All values in <b>watts</b> The values for the <b>suppliers</b> are maximum values. The values for the <b>con-</b> <b>sumers</b> are average maximum values, but not peak values.		Total power supply power (maximum)							130
Total power supply	+12 V	Add-on UPS module, optional	7.5	7.5	7.5	7.5	7.5	7.5	
		Maximum possible at +12 V							75
		CPU board, permanent consumers	26	30	18	14	43	11	
		512 MB RAM, max. 2 with 1.5 W each							
		1024 MB RAM, max. 2 with 2.5 W each							
		2048 MB RAM, max. 2 with 3 W each							
		Fan kit, optional	2.8	2.8	2.8	2.8	2.8	2.8	
		External consumers, optional (via base board)	10	10	10	10	10	10	
		PCI card limit, optional (max. 3 W without fan kit, max. 6 W with fan kit) <sup>1)</sup>							
		PCIe x1 card limit, optional (max. 3 W without fan kit, max. 20 W with fan kit) <sup>1)</sup>							
	Consumers +12 V ∑								
	+5 V	Maximum possible at +5 V							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 base board)	5	5	5	5	5	5	
PCI card limit, optional (max. 3 W without fan kit, max. 20 W with fan kit) <sup>1)</sup>									
-12 V	Maximum possible at -12 V							1.2	
	PCI card limit, optional (max. 1.2 W with or without fan kit) <sup>1)</sup>								
	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) <sup>1)</sup>								
	PCIe x1 card limit, optional (max. 3 W without fan kit, max. 10 W with fan kit) <sup>1)</sup>								
	Consumers 3V3 ∑								
Consumers ∑									

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

Table 17: Power calculation APC 5 slot

## 2.4 Serial number sticker

A unique serial number sticker with a bar code (type 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).

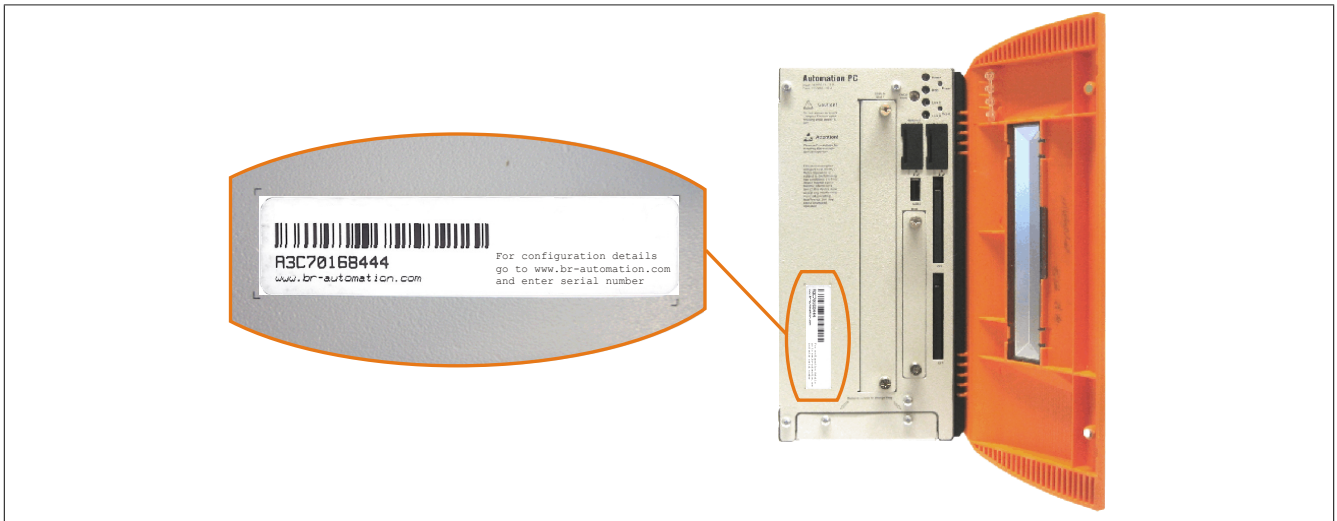


Figure 5: Serial number sticker (front)

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

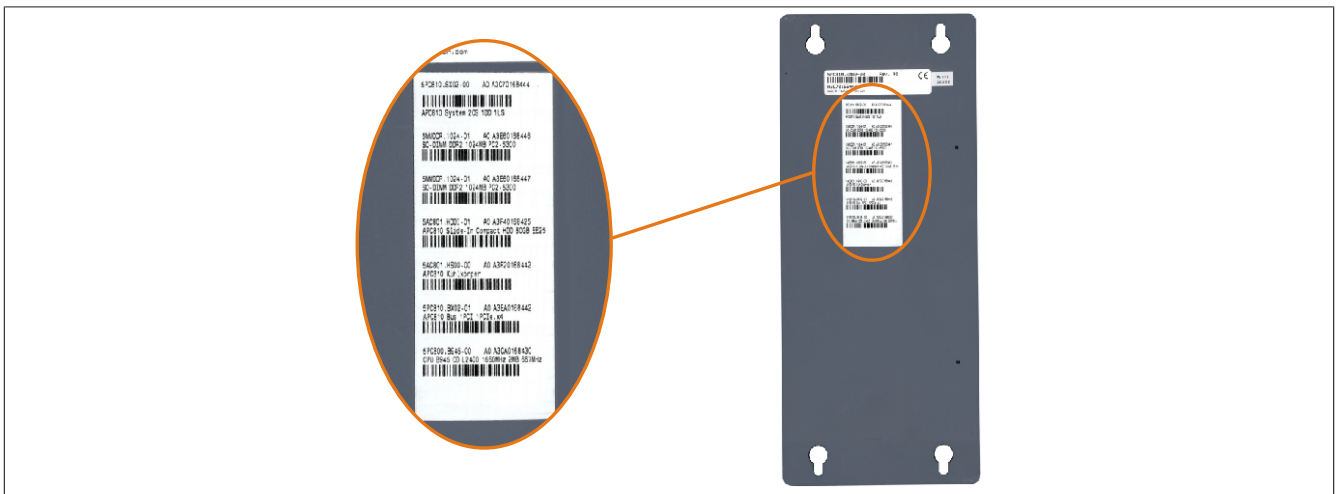
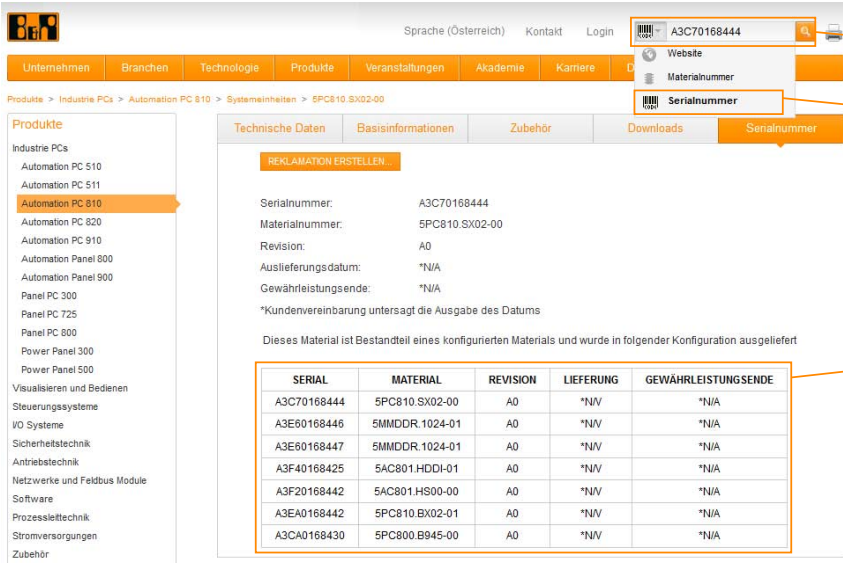


Figure 6: Serial number sticker (back)

This information can also be found on the B&R website by entering the serial number of the fully assembled device in the search field (after selecting the "Serial number" option) tab at the top of the homepage [www.br-automation.com](http://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 "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 shows the material number "5PC810.SX02-00" and a list of 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	GEWÄHRLEISTUNGSSENDE
A3C70168444	5PC810.SX02-00	A0	*N/A	*N/A
A3E60168446	5MMDDR.1024-01	A0	*N/A	*N/A
A3E60168447	5MMDDR.1024-01	A0	*N/A	*N/A
A3F40168425	5AC801.HDDI-01	A0	*N/A	*N/A
A3F20168442	5AC801.HS00-00	A0	*N/A	*N/A
A3EA0168442	5PC810.BX02-01	A0	*N/A	*N/A
A3CA0168430	5PC800.B945-00	A0	*N/A	*N/A

Figure 7: Example of serial number search - A3C70168444

## 2.5 Block diagrams

The following block diagrams show the simplified structure of system units with a CPU board in relation to the various bus units.

### 2.5.1 5PC810.SX01-00 system unit + 5PC810.BX01-00 bus unit

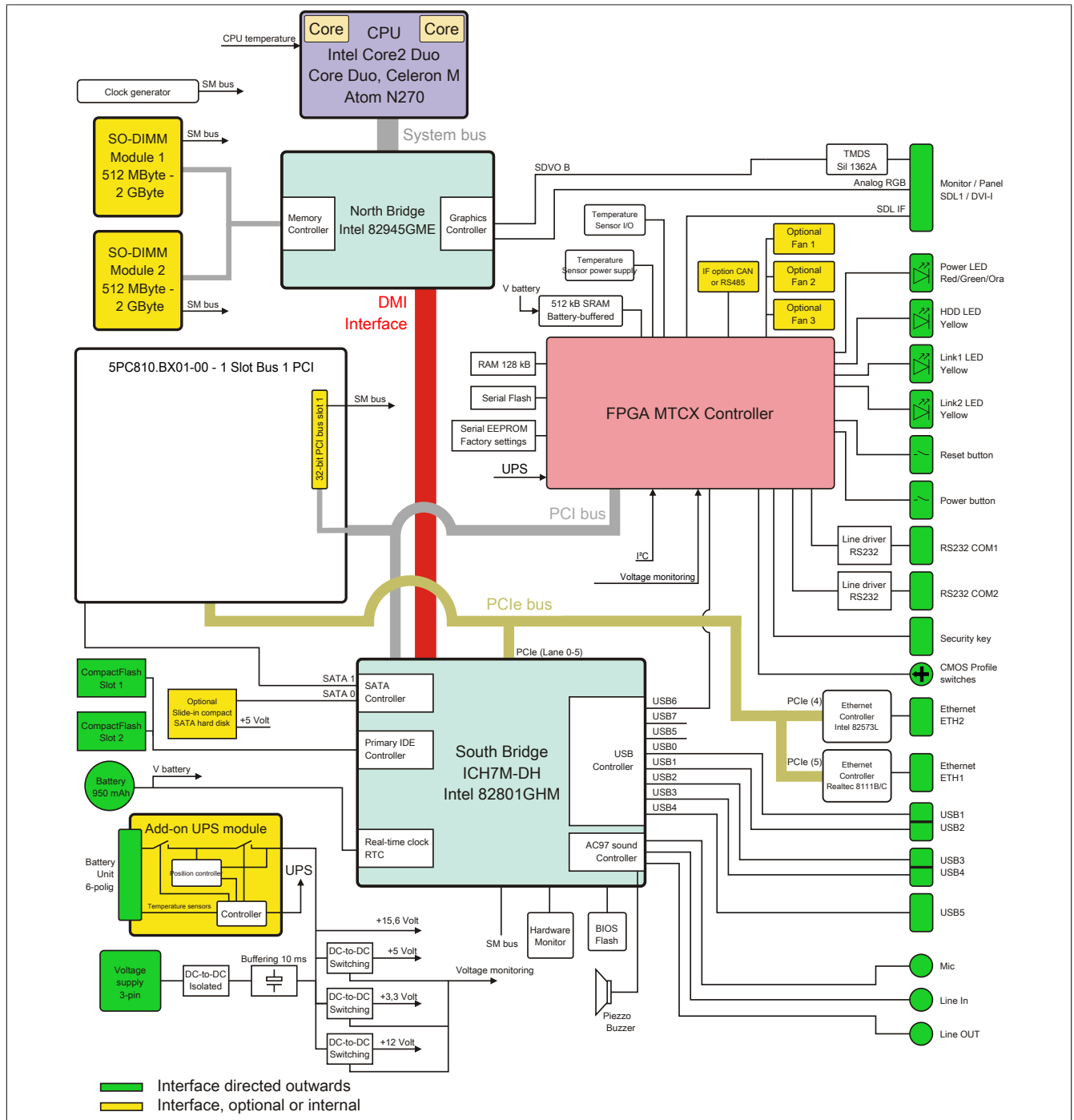


Figure 8: 5PC810.SX01-00 + 5PC810.BX01-00 - Block diagram

## 2.5.2 5PC810.SX01-00 system unit + 5PC810.BX01-01 bus unit

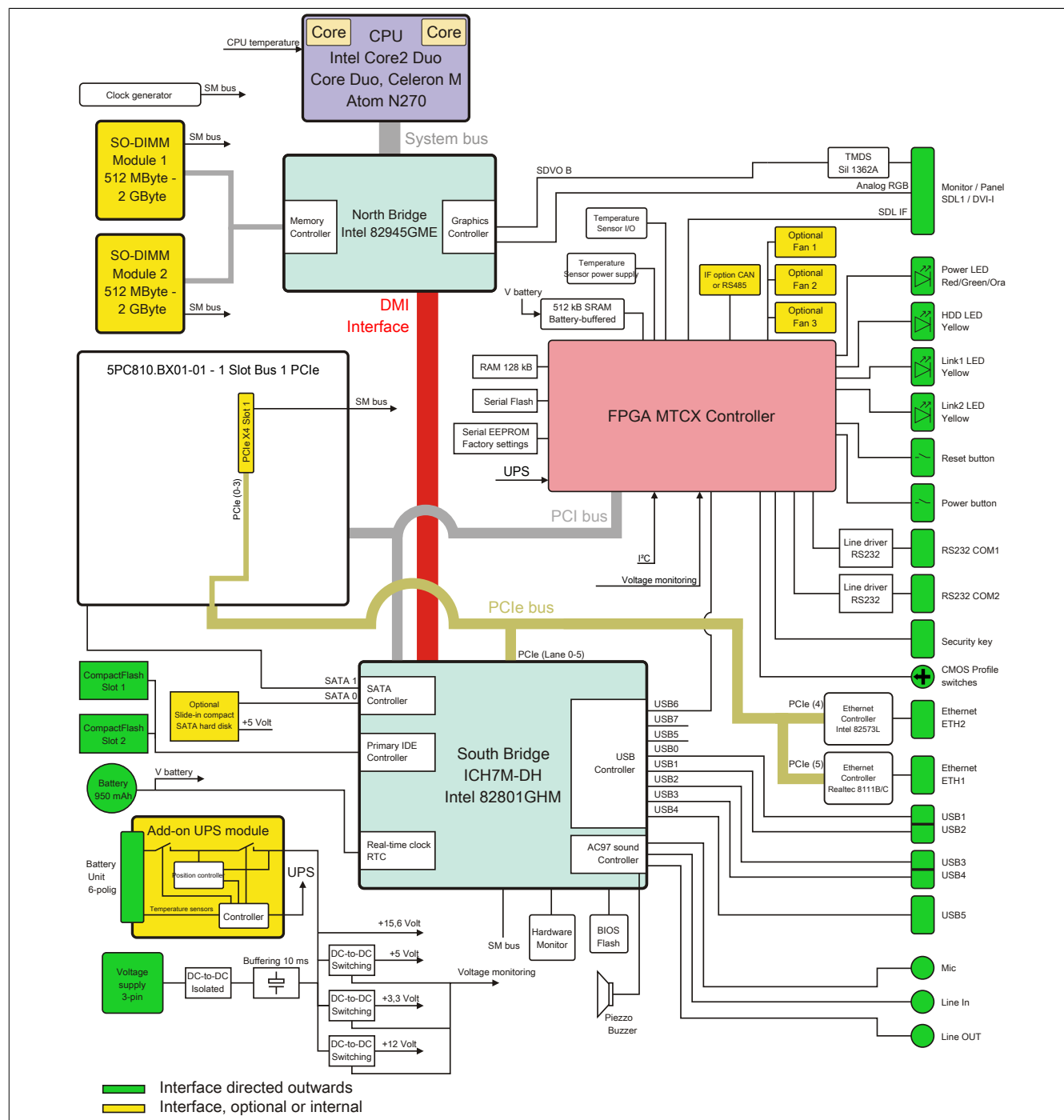


Figure 9: 5PC810.SX01-00 + 5PC810.BX01-01 - Block diagram

### 2.5.3 5PC810.SX02-00 system unit + 5PC810.BX02-00 bus unit

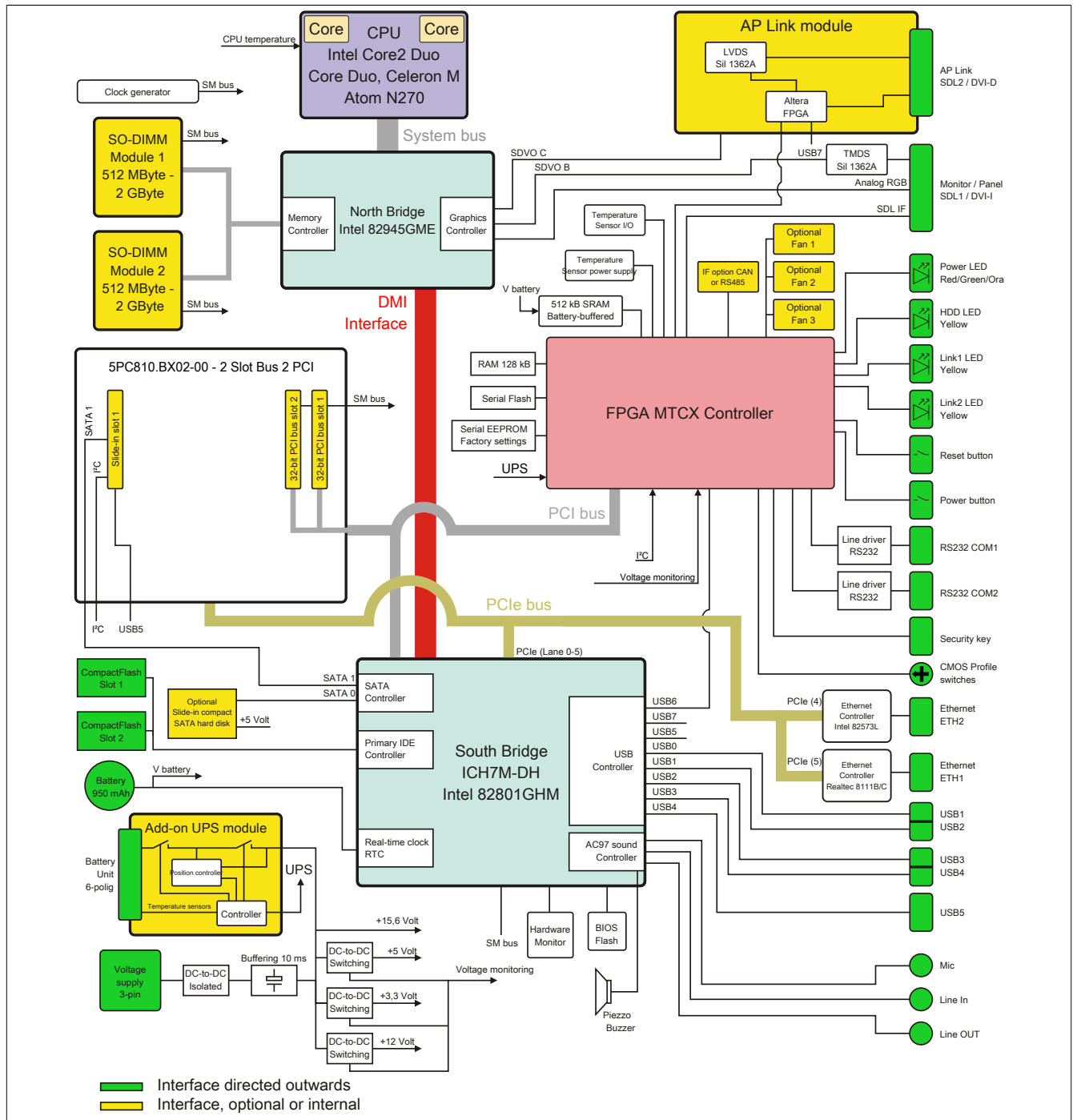


Figure 10: 5PC810.SX02-00 + 5PC810.BX02-00 - Block diagram

## 2.5.4 5PC810.SX02-00 system unit + 5PC810.BX02-01 bus unit

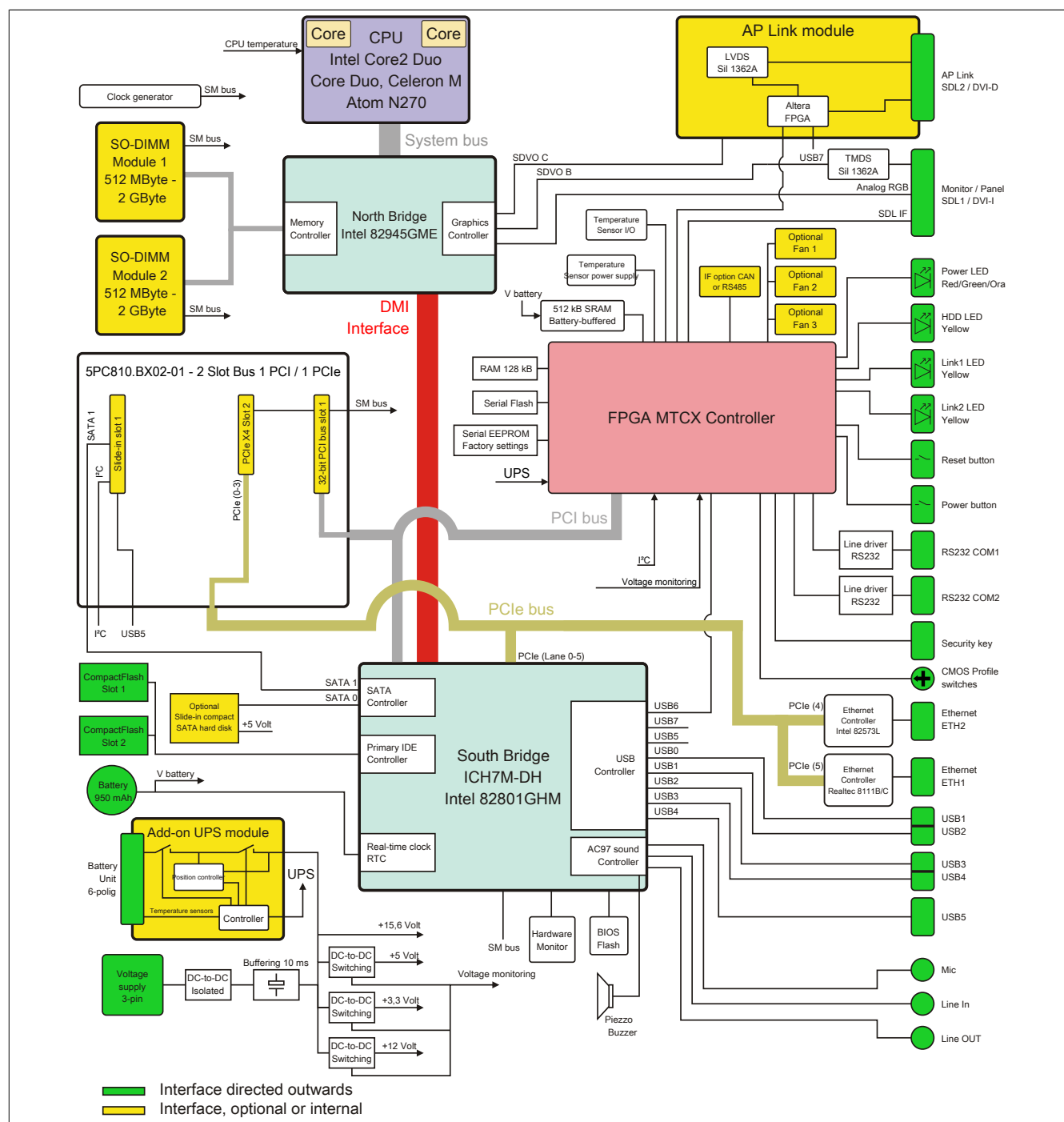


Figure 11: 5PC810.SX02-00 + 5PC810.BX02-01 - Block diagram



## 2.5.5 5PC810.SX03-00 system unit + 5PC810.BX03-00 bus unit

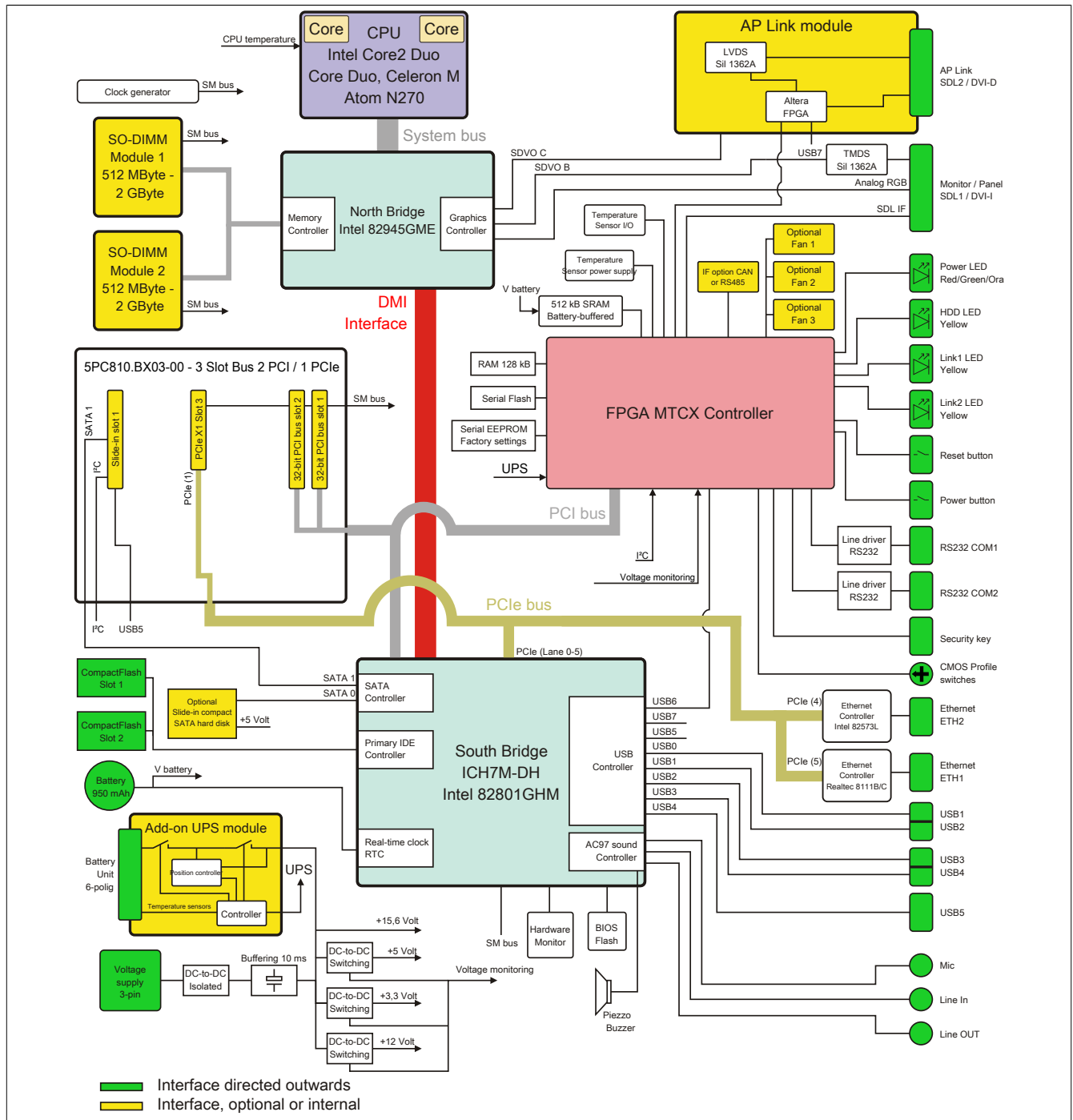


Figure 12: 5PC810.SX03-00 + 5PC810.BX03-00 - Block diagram

## 2.5.6 5PC810.SX05-00 system unit + 5PC810.BX05-00 bus unit

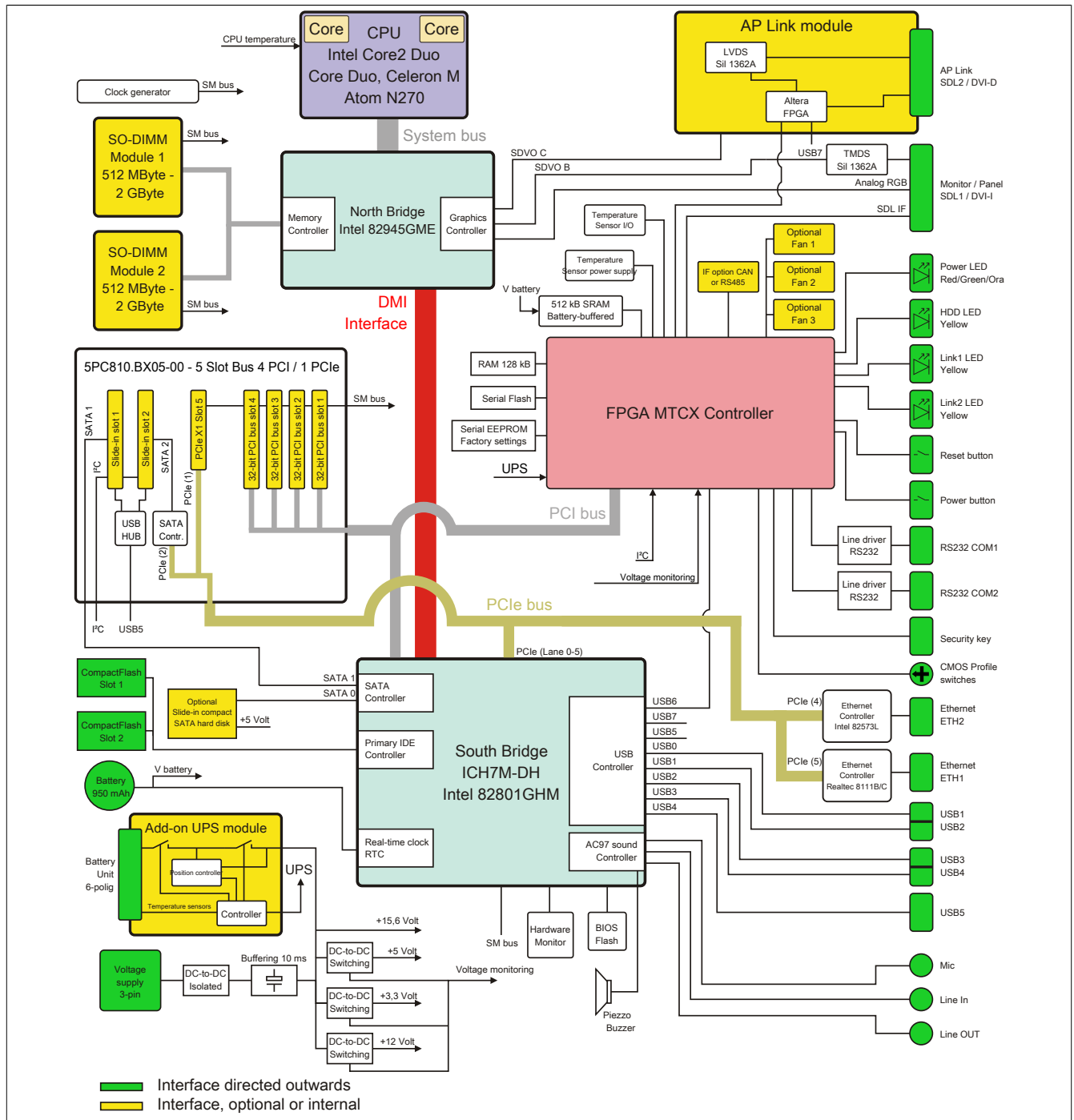


Figure 13: 5PC810.SX05-00 + 5PC810.BX05-00 - Block diagram

## 2.5.7 5PC810.SX05-00 system unit + 5PC810.BX05-01 bus unit

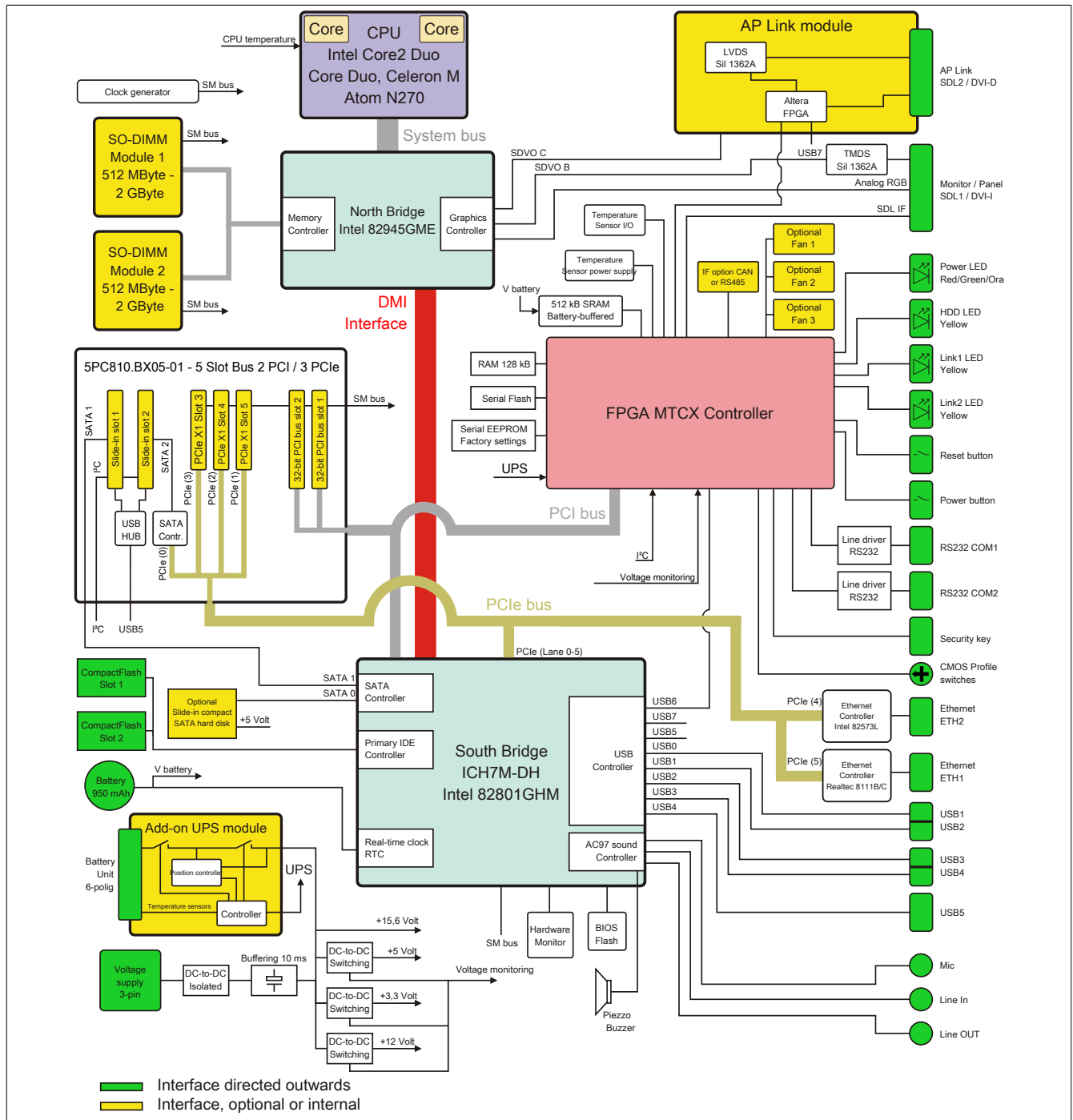


Figure 14: 5PC810.SX05-00 + 5PC810.BX05-01 - Block diagram

## 2.5.8 5PC810.SX05-00 system unit + 5PC810.BX05-02 bus unit

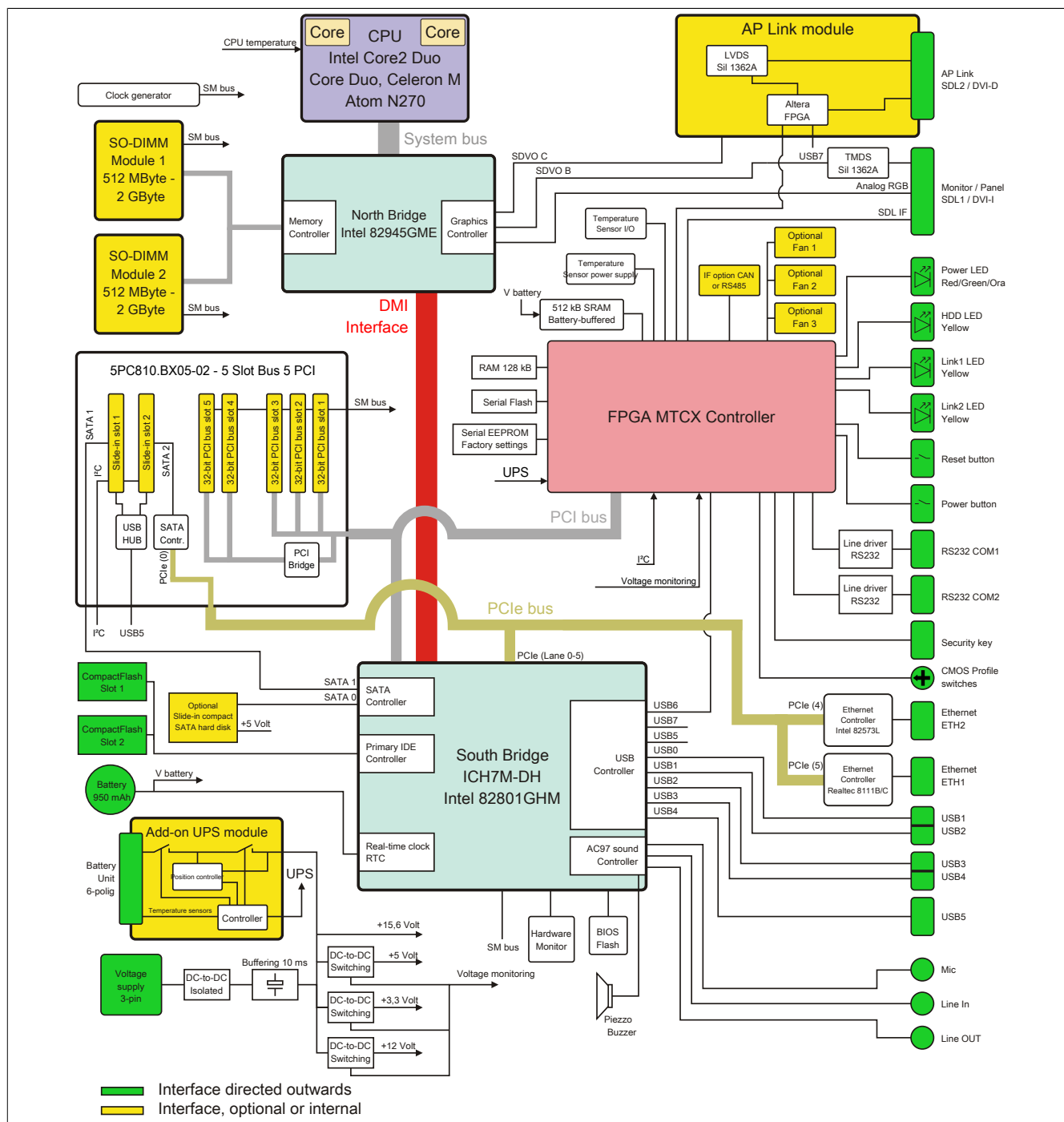


Figure 15: 5PC810.SX05-00 + 5PC810.BX05-02 - Block diagram

## 2.6 Device interfaces

### 2.6.1 +24 VDC supply voltage

The 3-pin socket 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 can be found either in the following table or 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.

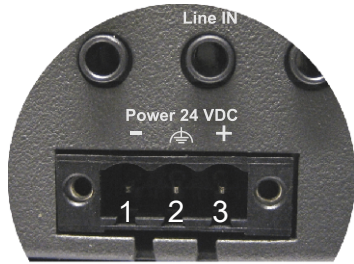
Supply voltage		3-pin, male
Protected against reverse polarity		
Pin	Description	
1	-	
2	Functional ground	
3	+	
Model number	Short description	
Terminal blocks		
0TB103.9	Connector 24 V 5.08 3-pin screw clamp	
0TB103.91	Connector 24 V 5.08 3-pin cage clamp	

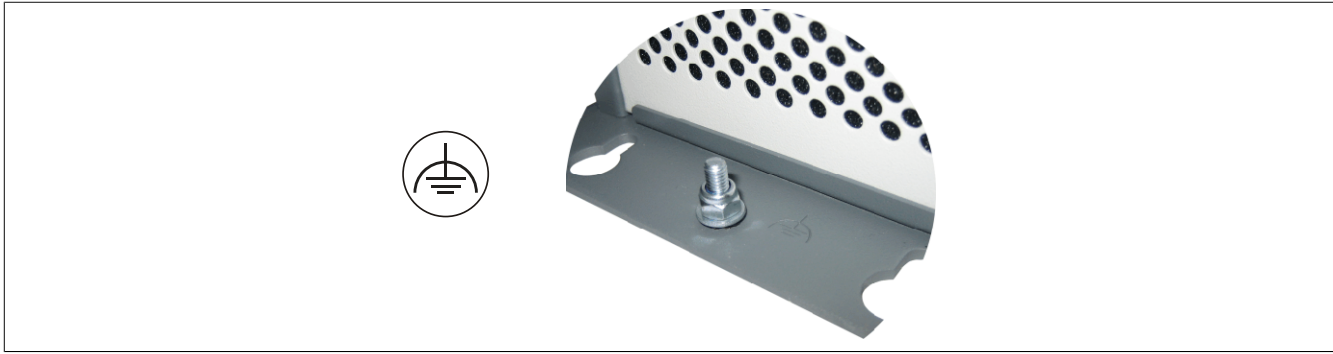
Table 18: Supply voltage connection 24 VDC

#### 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 plug 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 Serial interface COM1

Serial interface COM1<sup>1)</sup>

	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 DSUB connector

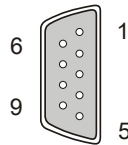


Table 19: Pinout - COM1

- 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 Serial interface COM2

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

9-pin DSUB connector

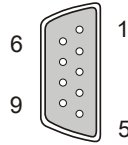


Table 20: Pinout - COM2

- 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 connection - SDL (Smart Display Link / DVI)

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



Table 21: Monitor/Panel connection - 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 USB0	C2	ANALOG GREEN	Analog green
12	XUSB0-	USB lane 0 (negative)	C3	ANALOG BLUE	Analog blue
13	XUSB0+	USB lane 0 (positive)	C4	ANALOG HORZ SYNC	Analog horizontal synchronization
14	+5 V power <sup>1)</sup>	+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			

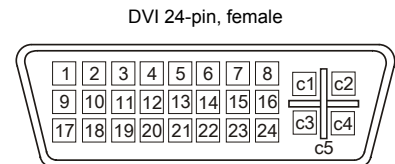


Table 22: Pinout - DVI connection

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

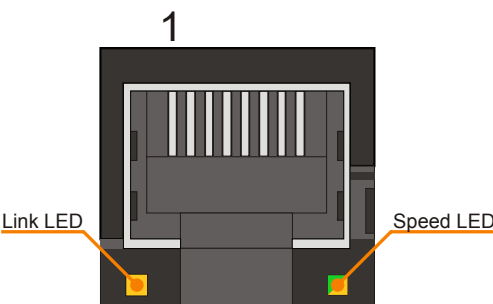
Table 24: Cable lengths and resolutions for DVI transmission



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



The diagram shows a top-down view of the Ethernet port. A large number '1' is positioned above the port. Two small square LEDs are located at the bottom of the port: an orange one on the left labeled 'Link LED' and a green one on the right labeled 'Speed LED'.

Table 25: Ethernet connection (ETH1)

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

### 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, -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, -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](http://www.br-automation.com)).

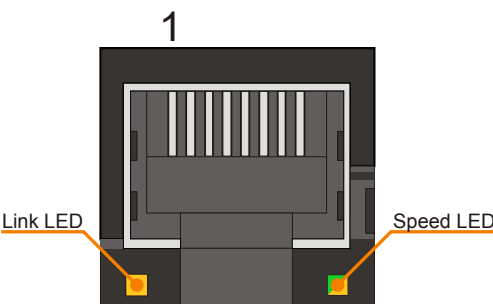
### Information:

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



The diagram shows a top-down view of the Ethernet port. A large number '1' is positioned above the port. Two small square LEDs are located at the bottom of the port. The left LED is labeled 'Link LED' and the right LED is labeled 'Speed LED'. Both LEDs are shown with a yellow glow, indicating they are active.

Table 26: Ethernet connection (ETH2)

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

### Driver support

A special driver is required in order to operate the Intel 82573L Ethernet controller. Drivers for approved operating systems are available in the Downloads section of the B&R website ([www.br-automation.com](http://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 these USB ports. Due to the vast number of USB devices available on the market, B&R cannot guarantee their performance. B&R does ensure the performance of all USB devices that they provide.

### Information:

For more information see Chapter 3 "Commissioning", section "Connecting peripheral USB devices" on page 224.

### 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

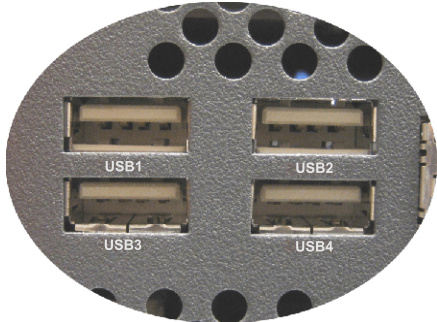
Universal Serial Bus (USB1, USB2, USB3, USB4 <sup>1)</sup> )	
Type	USB 2.0
Design	Type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s)
Current load <sup>2)</sup> USB1, USB3 USB2, USB4	Max. 1 A Max. 500 mA
Cable length	Max. 5 m (without hub)
	

Table 27: USB1, USB2, USB3 and USB4 connections

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

## USB5


Universal Serial Bus (USB5 <sup>1)</sup> )	
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 <sup>2)</sup> USB5	Max. 1 A
Cable length	Max. 5 m (without hub)
	

Table 28: USB5 connection

- 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.

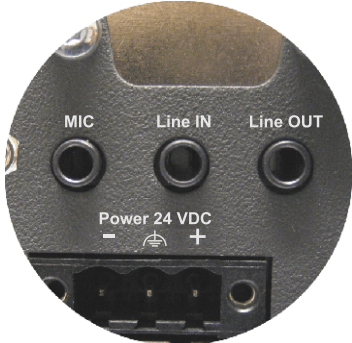
MIC, Line IN, Line OUT		
Controller	Realtek AC97, Rev. 2.2	<div>3.5 mm jack, female</div> 
MIC	Connection of a mono microphone with a 3.5 mm jack	
Line IN	Stereo Line IN signals supplied via a 3.5 mm jack.	
Line OUT	Connection of a stereo playback device (e.g. amplifier) via a 3.5 mm jack	

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](http://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 184.

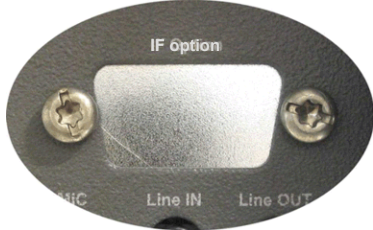
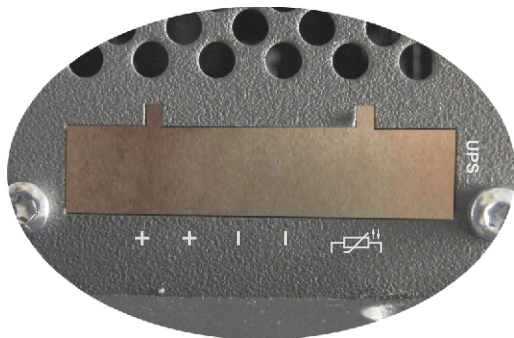
Add-on interface slot		
Model number	Short description	<div>IF Option</div> 
	Serial port adapter	
5AC600.CANI-00	Add-on CAN interface	
5AC600.458I-00	Add-on RS232/422/458 interface	

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 366.

### 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 for 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.

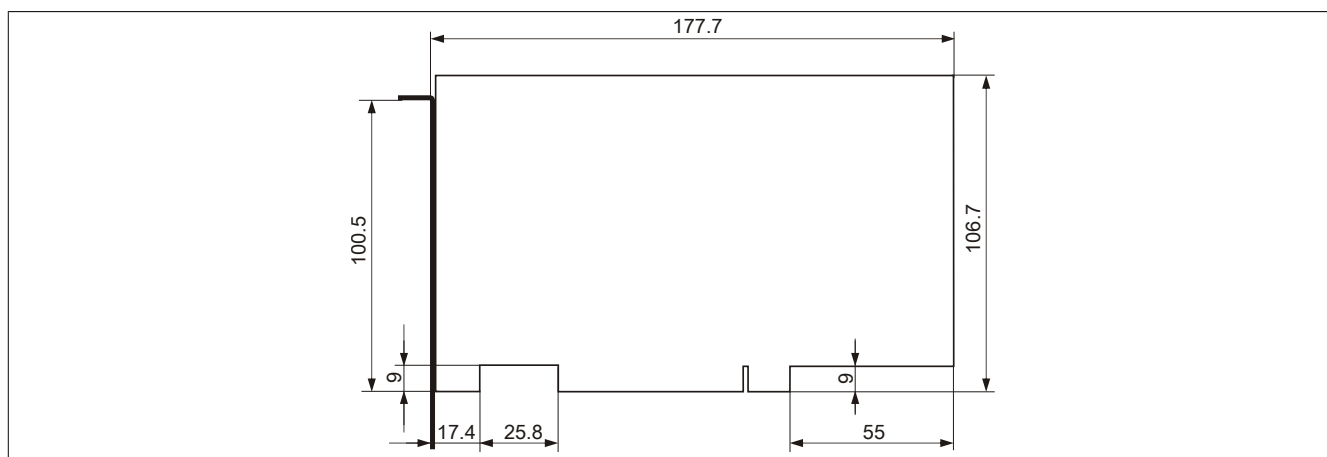


Figure 16: Dimensions - Standard half-size 32-bit PCI card

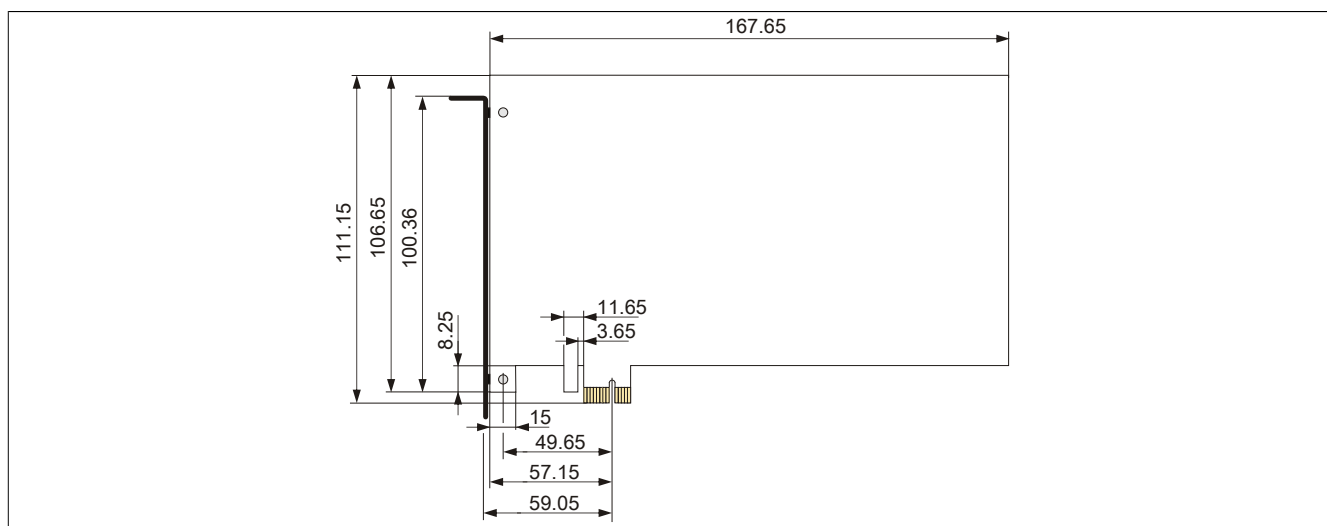


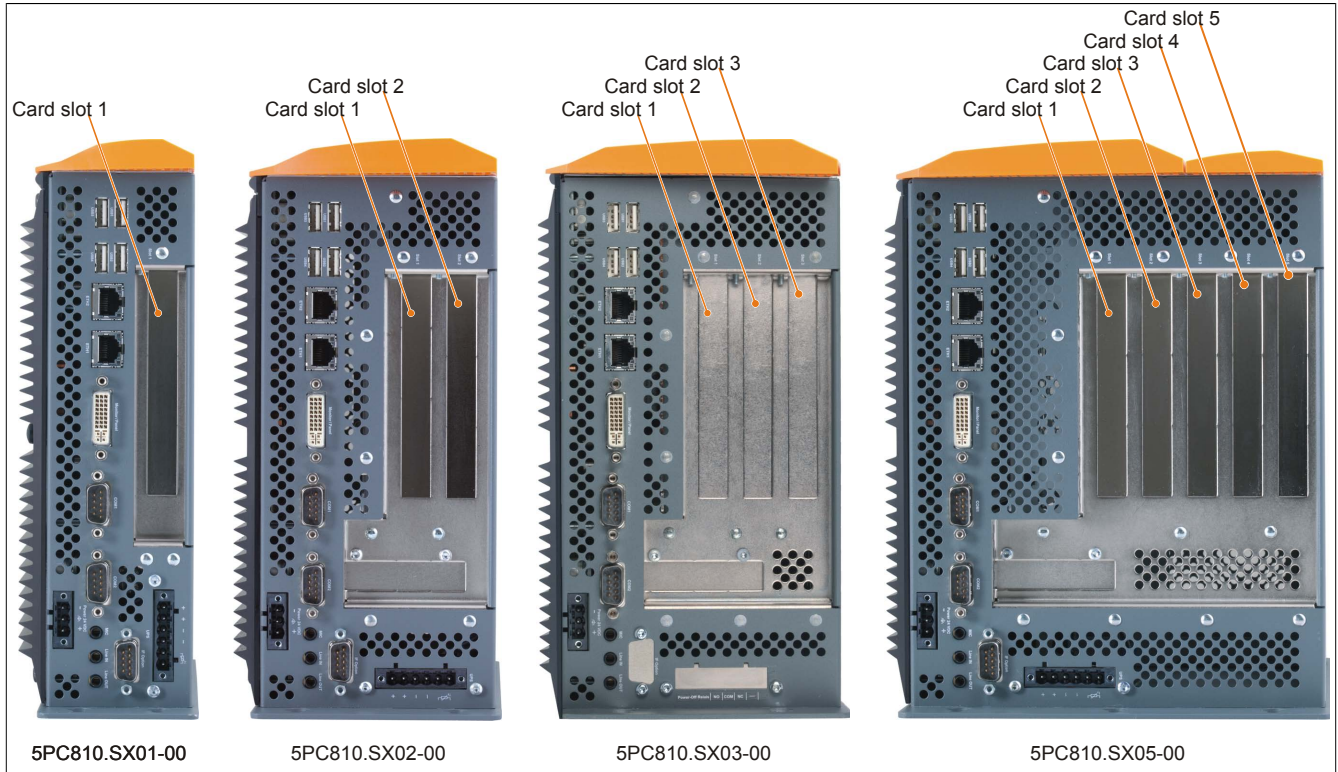
Figure 17: Dimensions - Standard half-size PCIe card

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 and 64-bit PCI	32 and 64-bit PCI	32-bit PCI	PCIe
	5PC810.BX05-01	32-bit and 64-bit PCI	32 and 64-bit PCI	PCIe	PCIe	PCIe
	5PC810.BX05-02	32-bit and 64-bit PCI	32 and 64-bit PCI	32 and 64-bit PCI	32 and 64-bit PCI	32 and 64-bit PCI

Table 32: Overview of 64-bit cards





## 2.6.13 Status LEDs

Status LEDs are integrated in the system unit behind the orange front cover.

Status LEDs			
LED	Color	Status	Description
Power	Green	On	Supply voltage OK
	Red	On	System in standby mode (S5: Soft-off mode, S4: Hibernation mode or S3: Suspend-to-RAM)
	Orange <sup>1)</sup>	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 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: Status LEDs - Data

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

The light for the Status LEDs is fed to the front cover via fiber optic lines.



Figure 18: Status LEDs on the 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: Default profile reserved.
1	<b>Profile 1: Optimized for system units 5PC810.SX01-00, 5PC810.SX02-00 and 5PC810.SX03-00</b>
2	<b>Profile 2: Optimized for 5PC810.SX05-00 system unit</b>
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 switch position that is set upon delivery represents the optimum BIOS default values for this system and should therefore not be changed.

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



### 2.6.15 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><b>Press and release</b> ... Switches on the APC810 or shuts down the operating system and switches off the APC810</p> <p><b>Press and hold</b> ... ATX power supply switches off 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:

From 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. In MTCX PX32 firmware  $<$  V00.11, the system does not start after holding down (~ 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 <sup>1)</sup>
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 (previously 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 is internally connected with the chipset via IDE PATA. Type I CompactFlash cards are supported.

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




Table 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 is internally connected with the chipset via IDE PATA. Type I CompactFlash cards are supported.

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

Table 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 hard disk (slide-in); 24/7 hard disk 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 drive (slide-in).
5AC801.DVDS-00	DVD-ROM SATA drive (slide-in).

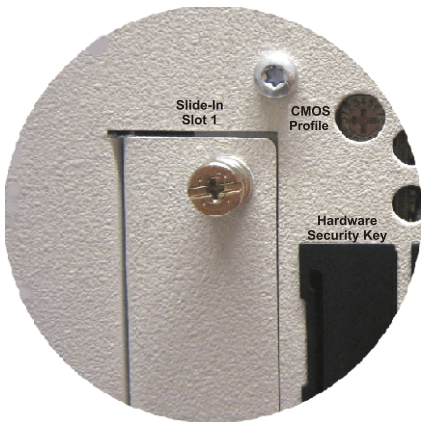


Table 42: Slide-in slot 1

#### Information:

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

### 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 hard disk (slide-in); 24/7 hard disk 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 drive (slide-in).
5AC801.DVDS-00	DVD-ROM SATA drive (slide-in).

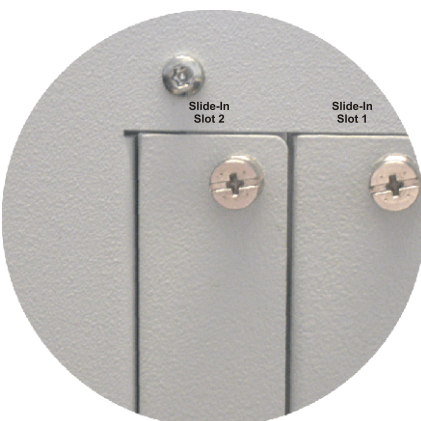


Table 43: Slide-in slot 2

#### Information:

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

#### Information:

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

#### Information:

The required drivers, depending on the operating system used, 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 hard disk 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 hard disk. Note: Please see the manual for information about using this hard disk.
5AC801.HDDI-04	500 GB SATA hard disk (slide-in compact); 24/7 hard disk. Note: Please see the manual for information about using this hard disk.
5AC801.SSDI-00	32 GB SATA SSD (SLC), slide-in compact drive
5AC801.SSDI-01	60 GB SATA SSD (MLC), slide-in compact drive
5AC801.SSDI-02	180 GB SATA SSD (MLC), slide-in compact drive
5AC801.SSDI-03	60 GB SATA SSD (MLC), slide-in compact drive




Table 44: Slide-in compact slot

#### Information:

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

For information about installing / replacing a slide-in compact drive, see see "Procedure" on page 409.

## 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. The system units are available in sizes with 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
	<b>System units</b>	
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)	
	<b>Required accessories</b>	
	<b>Bus units</b>	
5PC810.BX01-00	APC810 bus, 1 PCI	
5PC810.BX01-01	APC810 bus: 1 PCI Express (x4)	
	<b>CPU boards</b>	
5PC800.B945-05	Intel Atom N270 CPU board, 1.6 GHz, single-core, 533 MHz FSB, 512 kB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	
5PC800.B945-10	Intel Core Duo L2400 CPU board, 1.66 GHz, dual-core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-11	Intel Core2 Duo L7400 CPU board, 1.5 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-12	Intel Core2 Duo U7400 CPU board, 1.06 GHz, dual-core, 533 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-13	Intel Celeron M 423 CPU board, 1.06 GHz, single-core, 533 MHz FSB, 1 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-14	Intel Core2 Duo T7400 CPU board, 2.16 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
	<b>Terminal blocks</b>	
0TB103.9	24 VDC supply voltage plug, 3-pin female, 3.31 mm <sup>2</sup> screw clamp, protected against vibration by the screw flange	
0TB103.91	24 VDC supply voltage plug, 3-pin female, 3.31 mm <sup>2</sup> cage clamp, protected against vibration by the screw flange	
	<b>Main memory</b>	
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	
	<b>Heat sinks</b>	
5AC801.HS00-00	APC810 heat sink for CPU boards with dual-core processors L2400, L7400, U7500 and Celeron M 423.	
5AC801.HS00-01	APC810 heat sink for CPU boards with dual-core processors T7400, T9400 and P8400.	
5AC801.HS00-02	APC810 heat sink for CPU board with Atom processor N270.	
	<b>Optional accessories</b>	
	<b>Drives</b>	

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 drive.	
5AC801.SSDI-01	60 GB slide-in compact SATA SSD (MLC).	
5AC801.SSDI-02	180 GB slide-in compact SATA SSD (MLC).	
5AC801.SSDI-03	60 GB slide-in compact SATA SSD (MLC).	
5ACPCI.RAIC-06	PCI RAID system SATA 2x 500 GB; Note: Please see the manual for information about using this hard disk.	
	<b>Fan kit</b>	
5PC810.FA01-00	APC810 fan kit for system unit 5PC810.SX01-00	
	<b>Serial port adapter</b>	
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.	
	<b>Uninterruptible power supply</b>	
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.	
	<b>Accessories</b>	
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

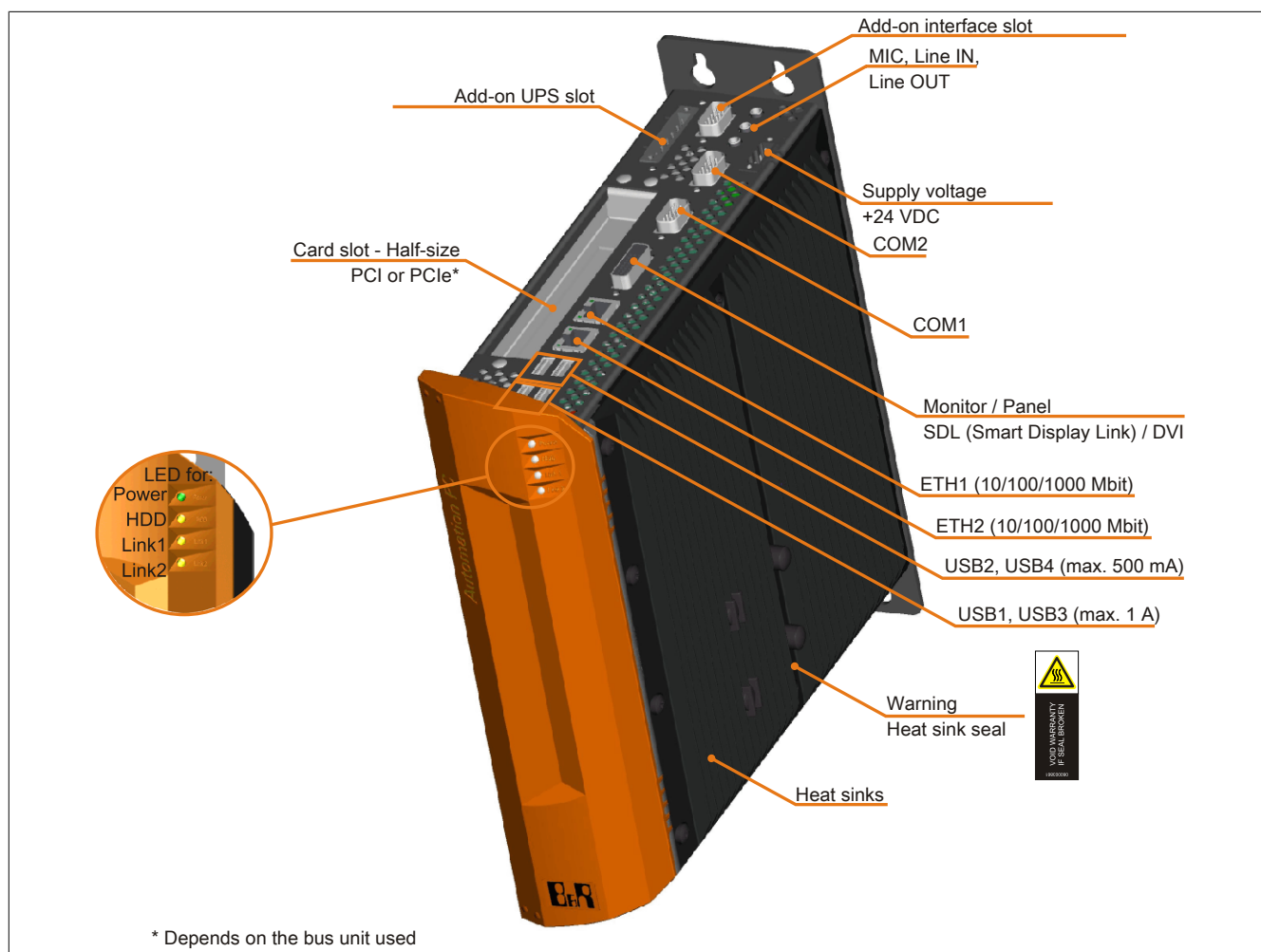


Figure 19: 5PC810.SX01-00 - Interfaces on top



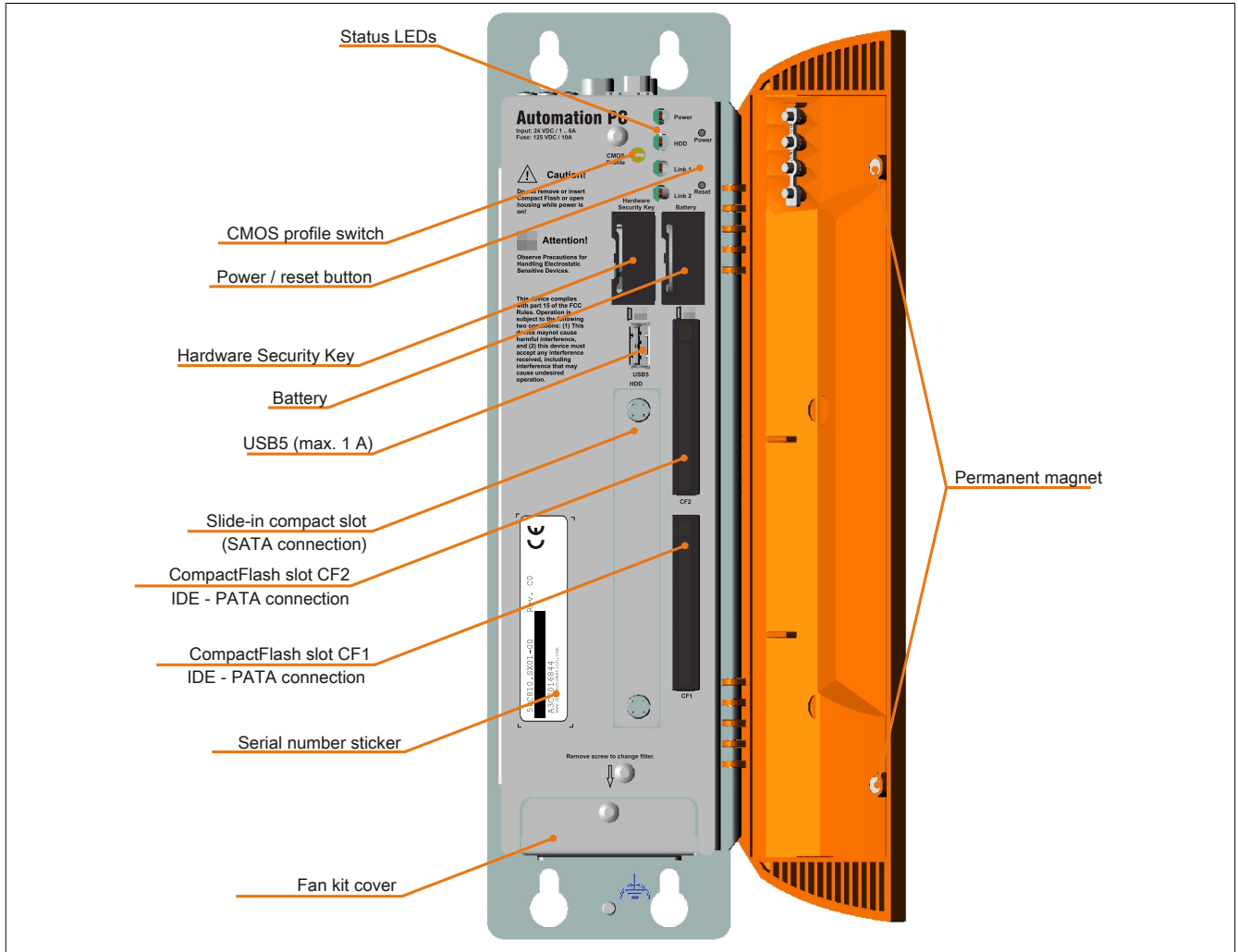


Figure 20: 5PC810.SX01-00 - Interfaces on front

### 3.1.1.4 Technical data

Product ID	5PC810.SX01-00
<b>General information</b>	
Dongle port	Yes
Cooling	Passive via heat sink and optionally supported with an active fan kit <sup>1)</sup>
LEDs	Power, HDD, Link 1, Link 2
B&R ID code	\$A3ED
Battery	
Type	Renata 950 mAh
Service life	2½ years <sup>2)</sup>
Removable	Yes, accessible behind the orange front doors
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
<b>Controller</b>	
Boot loader	BIOS
Real-time clock	
Battery-buffered	Yes
Power failure logic	
Controller	MTCX <sup>3)</sup>
Buffer time	10 ms
Graphics	
Controller	Depending on the CPU board used

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

Product ID	5PC810.SX01-00
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	Depending on the CPU board used
Size	Depending on the CPU board used
Interfaces	
COM1	
Type	RS232, modem-capable, not electrically isolated
Design	9-pin DSUB plug
UART	16550-compatible, 16-byte FIFO
Max. baud rate	115 kbit/s
COM2	
Type	RS232, modem-capable, not electrically isolated
Design	9-pin DSUB plug
UART	16550-compatible, 16-byte FIFO
Max. baud rate	115 kbit/s
CompactFlash slot 1	
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
Panel/Monitor interface	
Design	DVI-I socket
Type	SDL/DVI/Monitor
CAN	
Note	Optional
Audio	
Type	AC97 sound <sup>4)</sup>
Inputs	Microphone, Line in
Outputs	Line OUT
Add-on interface slot	
Quantity	1
Inserts	
PCI / PCIe slots	
Quantity	1 PCI slot or 1 PCIe slot <sup>5)</sup>
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	Component-dependent
Storage	-20 to 60°C
Transport	-20 to 60°C
Relative humidity	
Operation	Component-dependent
Storage	Component-dependent
Transport	Component-dependent
Vibration <sup>6)</sup>	
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 46: 5PC810.SX01-00 - Technical data

Product ID	5PC810.SX01-00
Shock <sup>6)</sup>	
Operation	15 g, 11 ms
Storage	30 g, 15 ms
Transport	30 g, 15 ms
Altitude	
Operation	Max. 3000 m (component-dependent) <sup>7)</sup>
Mechanical characteristics	
Housing <sup>8)</sup>	
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. 2200 g (component-dependent)
Recommendations	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
UL HazLoc Cl I Div 2 (cULus)	LISTED 2P61 ABCD BR
ATEX Zone 22 (EX)	II 3D tc IIIA T85 0-55°C BR
GL (GL)	Cat. C EMC 1
Recommendations	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
UL HazLoc Cl I Div 2 (cULus)	LISTED 2P61 ABCD BR
ATEX Zone 22 (EX)	II 3D tc IIIA T85 0-55°C BR
GL (GL)	Cat. C EMC 1

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, as long as no other individual component specifies any other.
- 7) Derating the max. ambient temperature – typically 1°C per 1000 meters (from 500 meters above sea level).
- 8) Depending on the process or batch, there may be visible deviations in the color and surface structure.

3.1.1.5 Dimensions

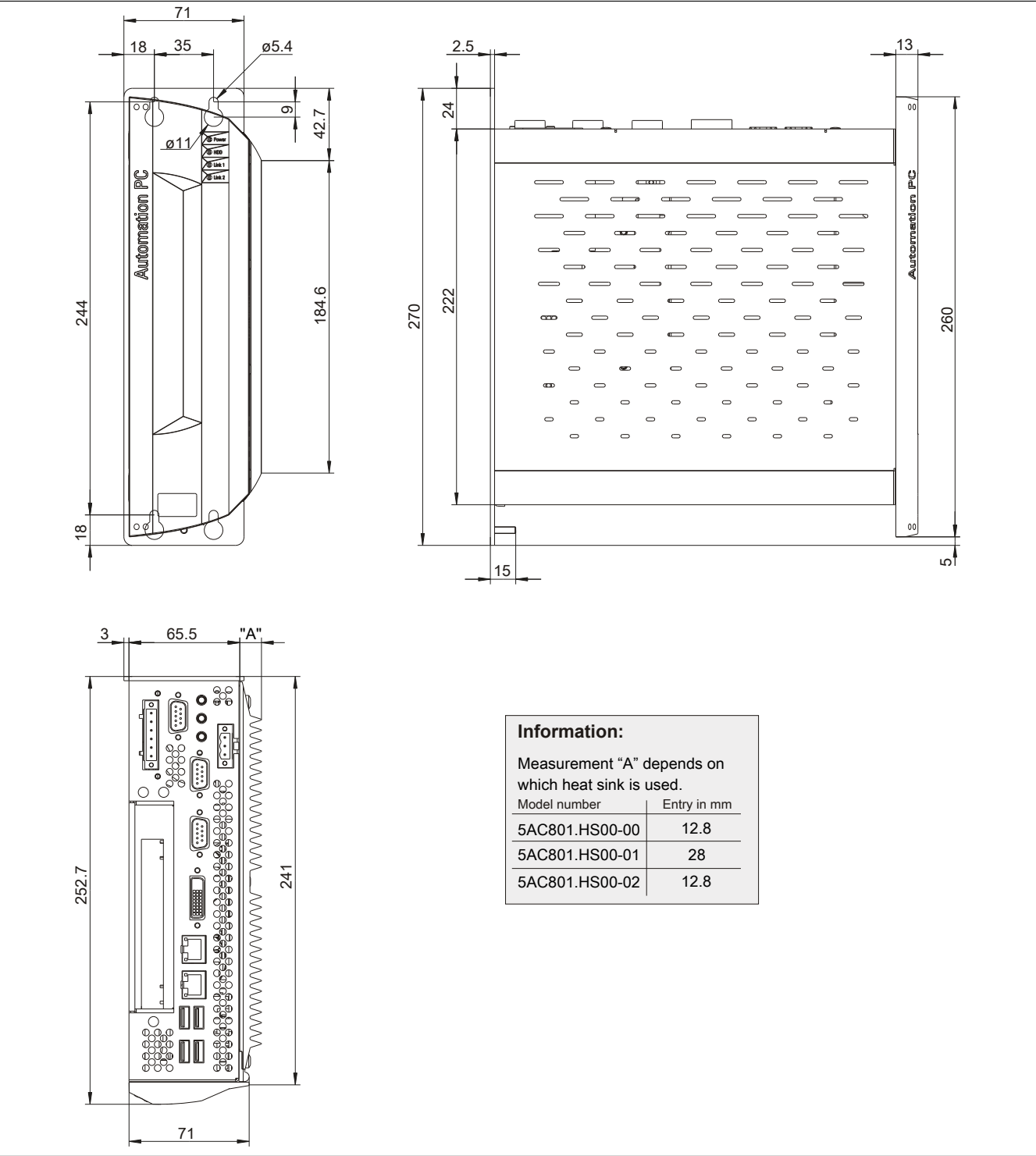


Figure 21: 5PC810.SX01-00 - Dimensions

### 3.1.1.6 Drilling template

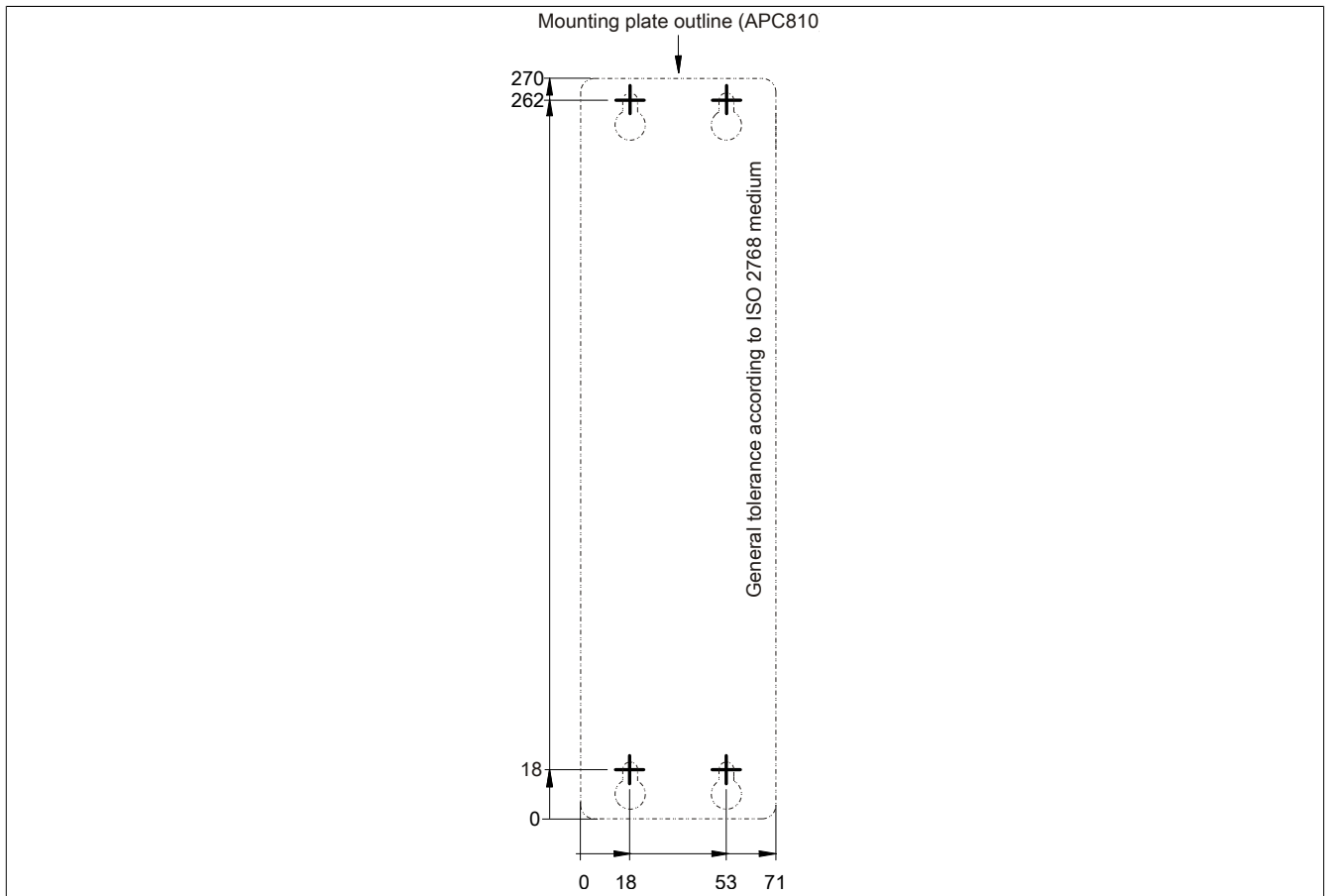


Figure 22: 5PC810.SX01-00 - Drilling template

### 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
	<b>System units</b>	
5PC810.SX02-00	APC810 system unit, 2 slots (PCI or PCI Express depending on the 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)	
	<b>Required accessories</b>	
	<b>Bus units</b>	
5PC810.BX02-00	APC810 bus, 2 PCI	
5PC810.BX02-01	APC810 bus: 1 PCI, 1 PCI Express (x4)	
	<b>CPU boards</b>	
5PC800.B945-05	Intel Atom N270 CPU board, 1.6 GHz, single-core, 533 MHz FSB, 512 kB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	
5PC800.B945-10	Intel Core Duo L2400 CPU board, 1.66 GHz, dual-core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-11	Intel Core2 Duo L7400 CPU board, 1.5 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-12	Intel Core2 Duo U7400 CPU board, 1.06 GHz, dual-core, 533 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-13	Intel Celeron M 423 CPU board, 1.06 GHz, single-core, 533 MHz FSB, 1 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-14	Intel Core2 Duo T7400 CPU board, 2.16 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
	<b>Terminal blocks</b>	
0TB103.9	24 VDC supply voltage plug, 3-pin female, 3.31 mm² screw clamp, protected against vibration by the screw flange	
0TB103.91	24 VDC supply voltage plug, 3-pin female, 3.31 mm² cage clamp, protected against vibration by the screw flange	
	<b>Main memory</b>	
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	
	<b>Heat sinks</b>	
5AC801.HS00-00	APC810 heat sink for CPU boards with dual-core processors L2400, L7400, U7500 and Celeron M 423.	
5AC801.HS00-01	APC810 heat sink for CPU boards with dual-core processors T7400, T9400 and P8400.	
5AC801.HS00-02	APC810 heat sink for CPU board with Atom processor N270.	
	<b>Optional accessories</b>	
	<b>Automation Panel Link insert cards</b>	
5AC801.RDYR-00	APC810 Ready relay	
5AC801.SDL0-00	Smart Display Link/DVI-D transmitter	
	<b>Drives</b>	
5AC801.ADAS-00	SATA hard disk adapter for operating a slide-in compact hard disk in a slide-in slot	
5AC801.DVDS-00	DVD-ROM slide-in SATA drive.	
5AC801.DVRS-00	DVD-R/RW DVD+R/RW slide-in SATA drive.	
5AC801.HDDI-00	40 GB slide-in compact SATA hard disk, 24/7 operation with extended temperature range. Note: Please see the manual for information about using this hard disk.	

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 drive.	
5AC801.SSDI-01	60 GB slide-in compact SATA SSD (MLC).	
5AC801.SSDI-02	180 GB slide-in compact SATA SSD (MLC).	
5AC801.SSDI-03	60 GB slide-in compact SATA SSD (MLC).	
5ACPCI.RAIC-06	PCI RAID system SATA 2x 500 GB; Note: Please see the manual for information about using this hard disk.	
	<b>Fan kit</b>	
5PC810.FA02-01	APC810 fan kit for system unit 5PC810.SX02-00 starting with revision D0	
	<b>Serial port adapter</b>	
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.	
	<b>Uninterruptible power supply</b>	
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.	
	<b>Accessories</b>	
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

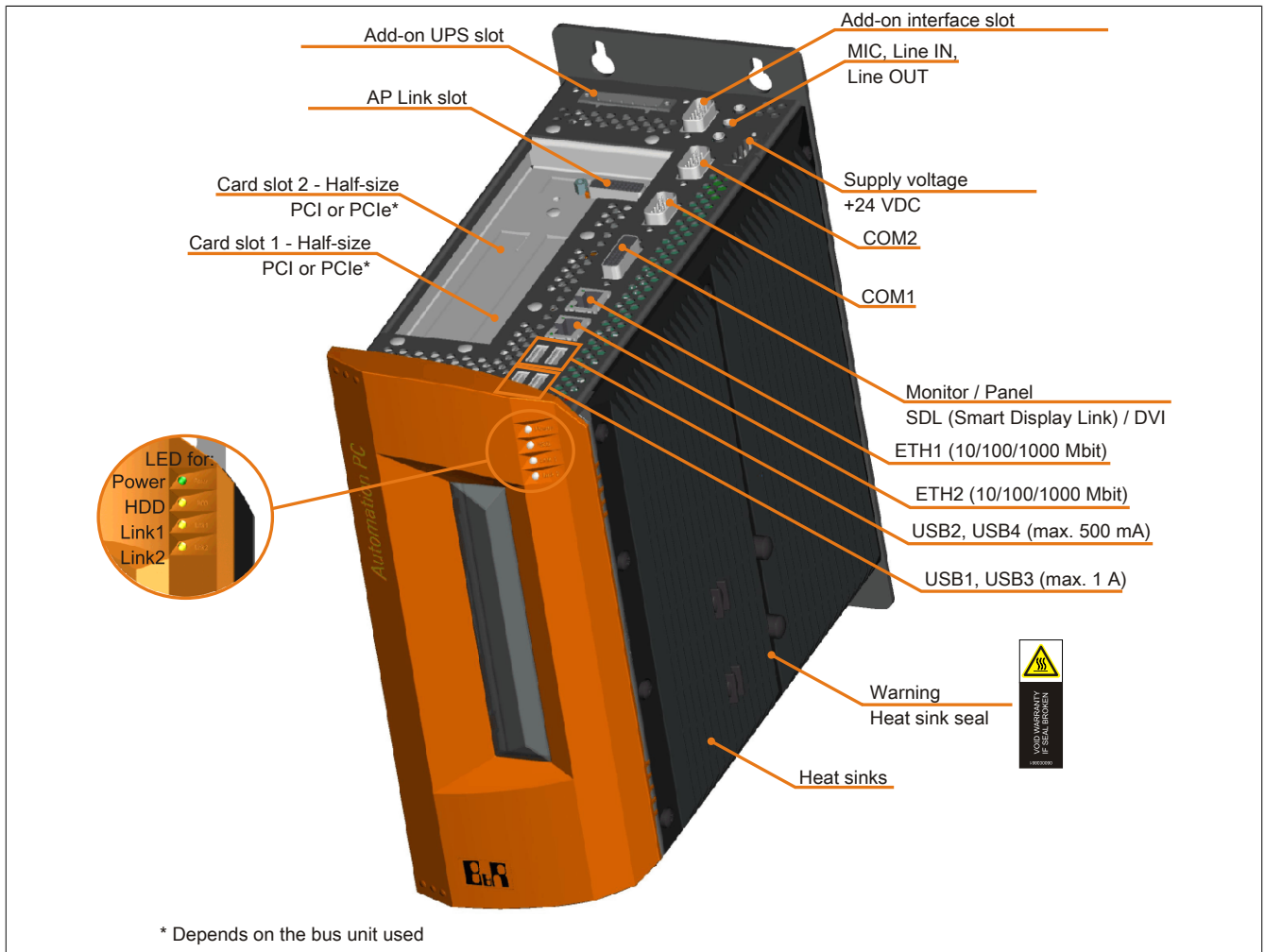


Figure 23: 5PC810.SX02-00 - Interfaces on top



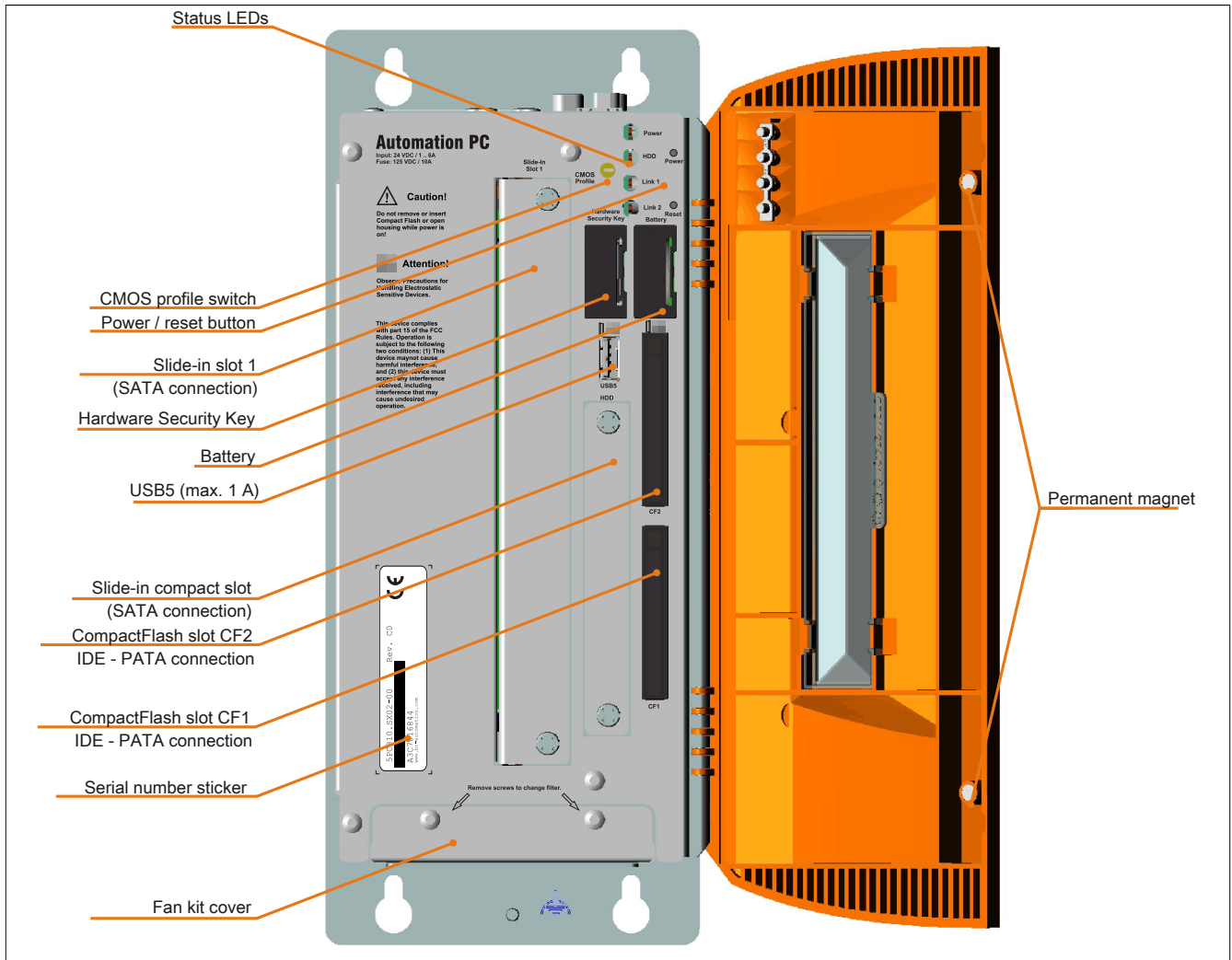


Figure 24: 5PC810.SX02-00 - Interfaces on front

### 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 <sup>1)</sup>
LEDs	Power, HDD, Link 1, Link 2
B&R ID code	\$A3C7
Battery	
Type	Renata 950 mAh
Service life	2½ years <sup>2)</sup>
Removable	Yes, accessible behind the orange front doors
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 <sup>3)</sup>
Buffer time	10 ms
Graphics	
Controller	Depending on the CPU board used

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

Product ID	5PC810.SX02-00
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	Depending on the CPU board used Depending on the CPU board used
Interfaces	
COM1 Type Design UART Max. baud rate	RS232, modem-capable, not electrically isolated 9-pin DSUB plug 16550-compatible, 16-byte FIFO 115 kbit/s
COM2 Type Design UART Max. baud rate	RS232, modem-capable, not electrically isolated 9-pin DSUB plug 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
Panel/Monitor interface Design Type	DVI-I socket SDL/DVI/Monitor
CAN Note	Optional
Audio Type Inputs Outputs	AC97 sound <sup>4)</sup> 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 <sup>5)</sup>
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
Vibration <sup>6)</sup> Operation (continuous) Operation (occasional) Storage Transport	2 to 9 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g 2 to 9 Hz: 3.5 mm amplitude / 9 to 200 Hz: 1 g 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g

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

Product ID	5PC810.SX02-00
Shock <sup>6)</sup>	
Operation	15 g, 11 ms
Storage	30 g, 15 ms
Transport	30 g, 15 ms
Altitude	
Operation	Max. 3000 m (component-dependent) <sup>7)</sup>
<b>Mechanical characteristics</b>	
Housing <sup>8)</sup>	
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. 2800 g (component-dependent)
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
UL HazLoc Cl I Div 2 (cULus)	LISTED 2P61 ABCD BR
ATEX Zone 22 (EX)	II 3D tc IIIA T85 0-55°C BR
GL (GL)	Cat. C EMC 1
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
UL HazLoc Cl I Div 2 (cULus)	LISTED 2P61 ABCD BR
ATEX Zone 22 (EX)	II 3D tc IIIA T85 0-55°C BR
GL (GL)	Cat. C EMC 1

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, as long as no other individual component specifies any other.
- 7) Derating the max. ambient temperature – typically 1°C per 1000 meters (from 500 meters above sea level).
- 8) Depending on the process or batch, there may be visible deviations in the color and surface structure.

3.1.2.5 Dimensions

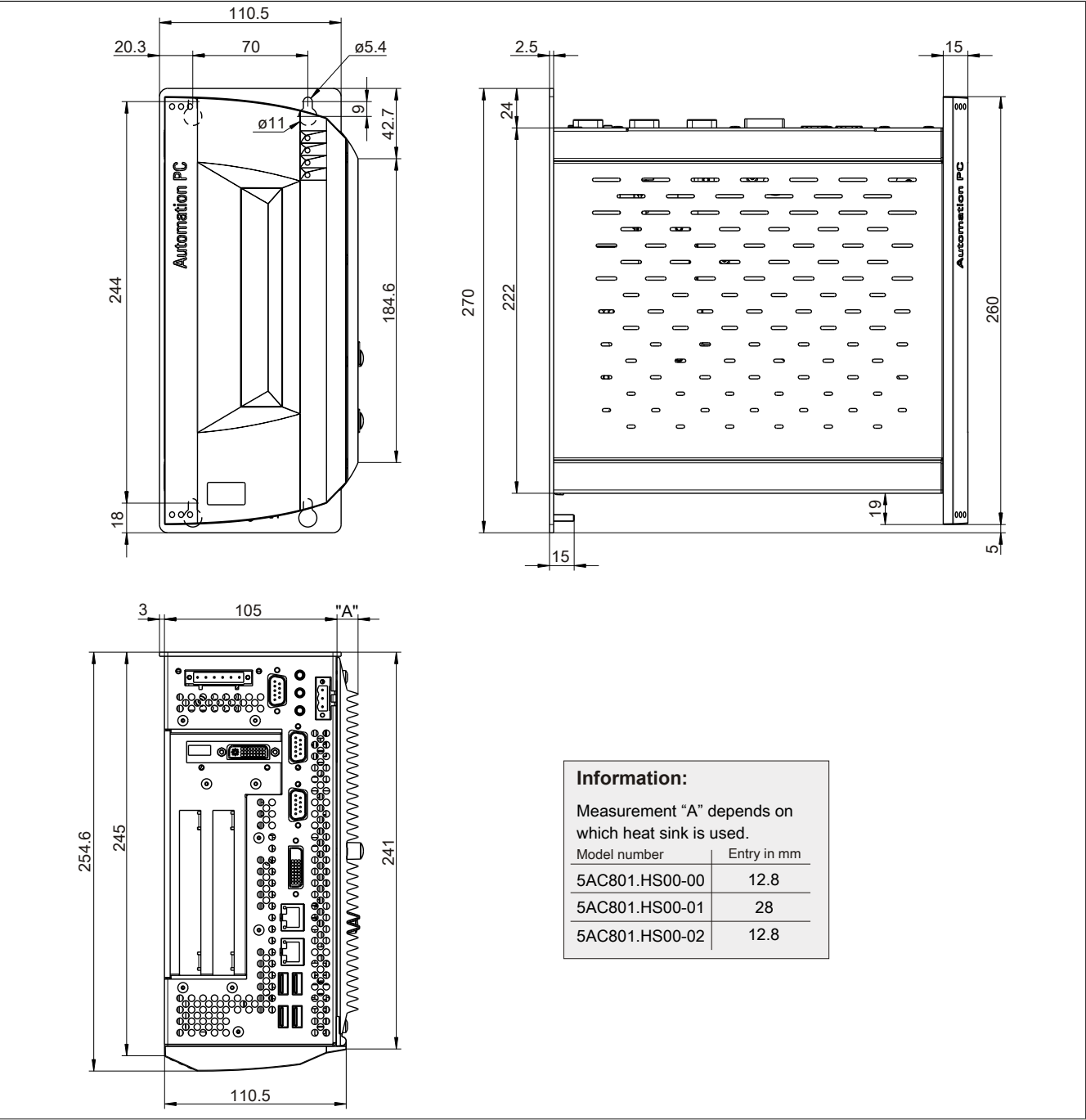


Figure 25: 5PC810.SX02-00 - Dimensions

### 3.1.2.6 Drilling template

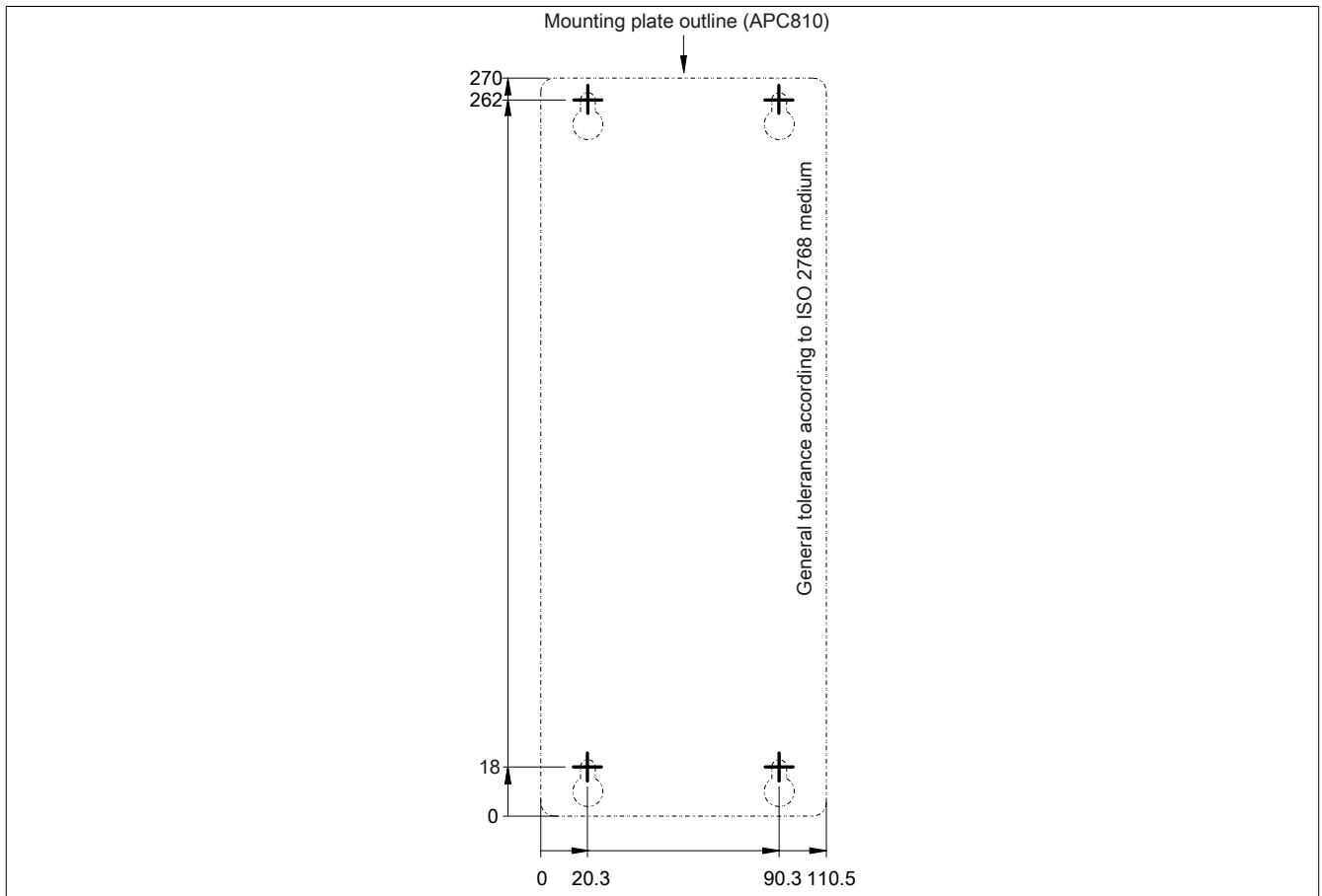


Figure 26: 5PC810.SX02-00 - Drilling template

### 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
	<b>System units</b>	
5PC810.SX03-00	APC810 system unit, 3 slots (PCI or PCI Express depending on the 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)	
	<b>Required accessories</b>	
	<b>Bus units</b>	
5PC810.BX03-00	APC810 bus: 2 PCI, 1 PCI Express (x4)	
	<b>CPU boards</b>	
5PC800.B945-05	Intel Atom N270 CPU board, 1.6 GHz, single-core, 533 MHz FSB, 512 kB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	
5PC800.B945-10	Intel Core Duo L2400 CPU board, 1.66 GHz, dual-core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-11	Intel Core2 Duo L7400 CPU board, 1.5 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-12	Intel Core2 Duo U7400 CPU board, 1.06 GHz, dual-core, 533 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-13	Intel Celeron M 423 CPU board, 1.06 GHz, single-core, 533 MHz FSB, 1 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-14	Intel Core2 Duo T7400 CPU board, 2.16 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
	<b>Terminal blocks</b>	
0TB103.9	24 VDC supply voltage plug, 3-pin female, 3.31 mm <sup>2</sup> screw clamp, protected against vibration by the screw flange	
0TB103.91	24 VDC supply voltage plug, 3-pin female, 3.31 mm <sup>2</sup> cage clamp, protected against vibration by the screw flange	
	<b>Main memory</b>	
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	
	<b>Heat sinks</b>	
5AC801.HS00-00	APC810 heat sink for CPU boards with dual-core processors L2400, L7400, U7500 and Celeron M 423.	
5AC801.HS00-01	APC810 heat sink for CPU boards with dual-core processors T7400, T9400 and P8400.	
5AC801.HS00-02	APC810 heat sink for CPU board with Atom processor N270.	
	<b>Optional accessories</b>	
	<b>Automation Panel Link insert cards</b>	
5AC801.RDYR-00	APC810 Ready relay	
5AC801.SDL0-00	Smart Display Link/DVI-D transmitter	
	<b>Drives</b>	
5AC801.ADAS-00	SATA hard disk adapter for operating a slide-in compact hard disk in a slide-in slot	
5AC801.DVDS-00	DVD-ROM slide-in SATA drive.	
5AC801.DVRS-00	DVD-R/RW DVD+R/RW slide-in SATA drive.	
5AC801.HDDI-00	40 GB slide-in compact SATA hard disk, 24/7 operation with extended temperature range. Note: Please see the manual for information about using this hard disk.	

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 drive.	
5AC801.SSDI-01	60 GB slide-in compact SATA SSD (MLC).	
5AC801.SSDI-02	180 GB slide-in compact SATA SSD (MLC).	
5AC801.SSDI-03	60 GB slide-in compact SATA SSD (MLC).	
5ACPCI.RAIC-06	PCI RAID system SATA 2x 500 GB; Note: Please see the manual for information about using this hard disk.	
	<b>Fan kit</b>	
5PC810.FA03-00	APC810 fan kit for system unit 5PC810.SX03-00	
	<b>Serial port adapter</b>	
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.	
	<b>Uninterruptible power supply</b>	
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.	
	<b>Accessories</b>	
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

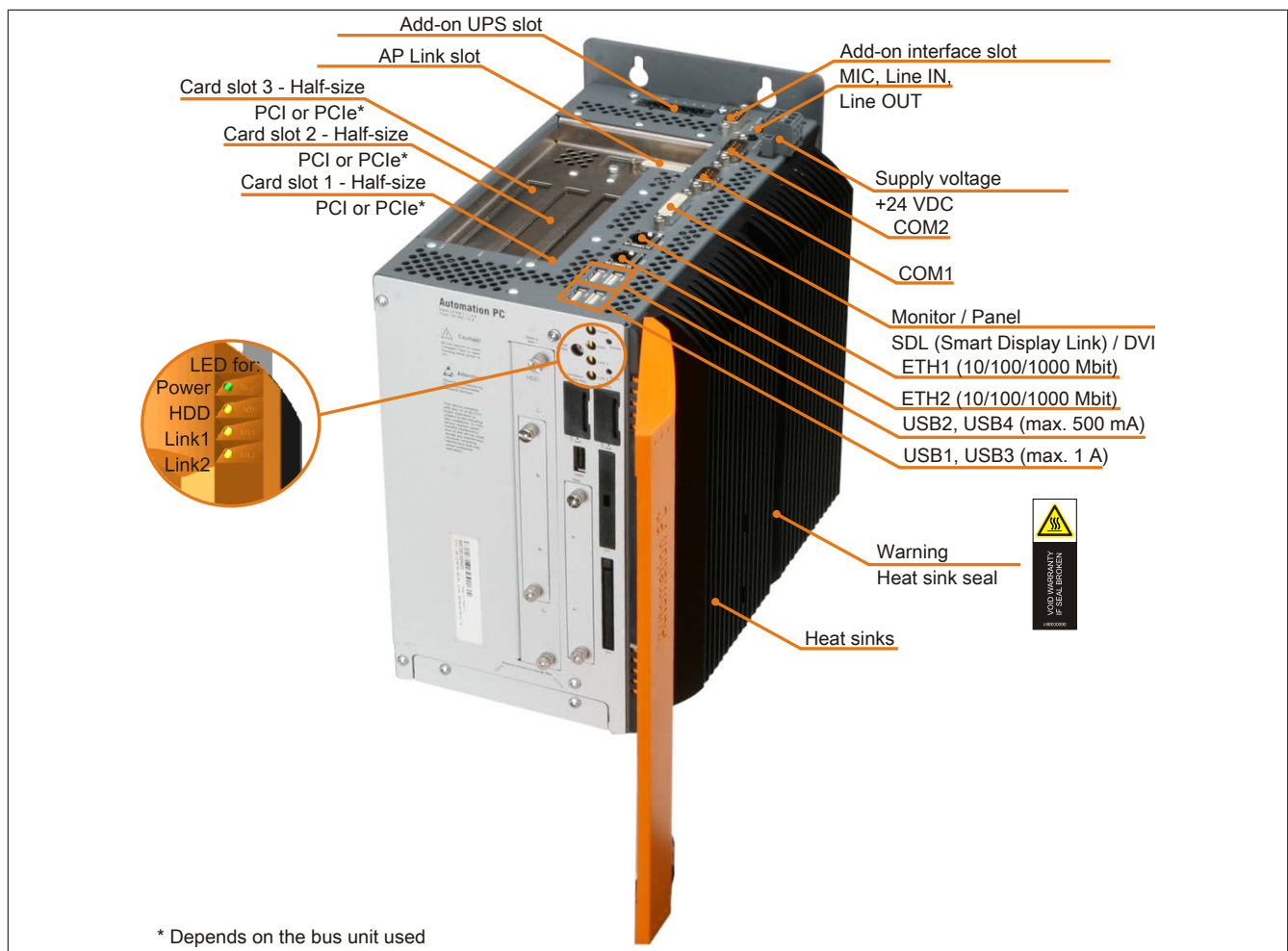


Figure 27: 5PC810.SX03-00 - Interfaces on top

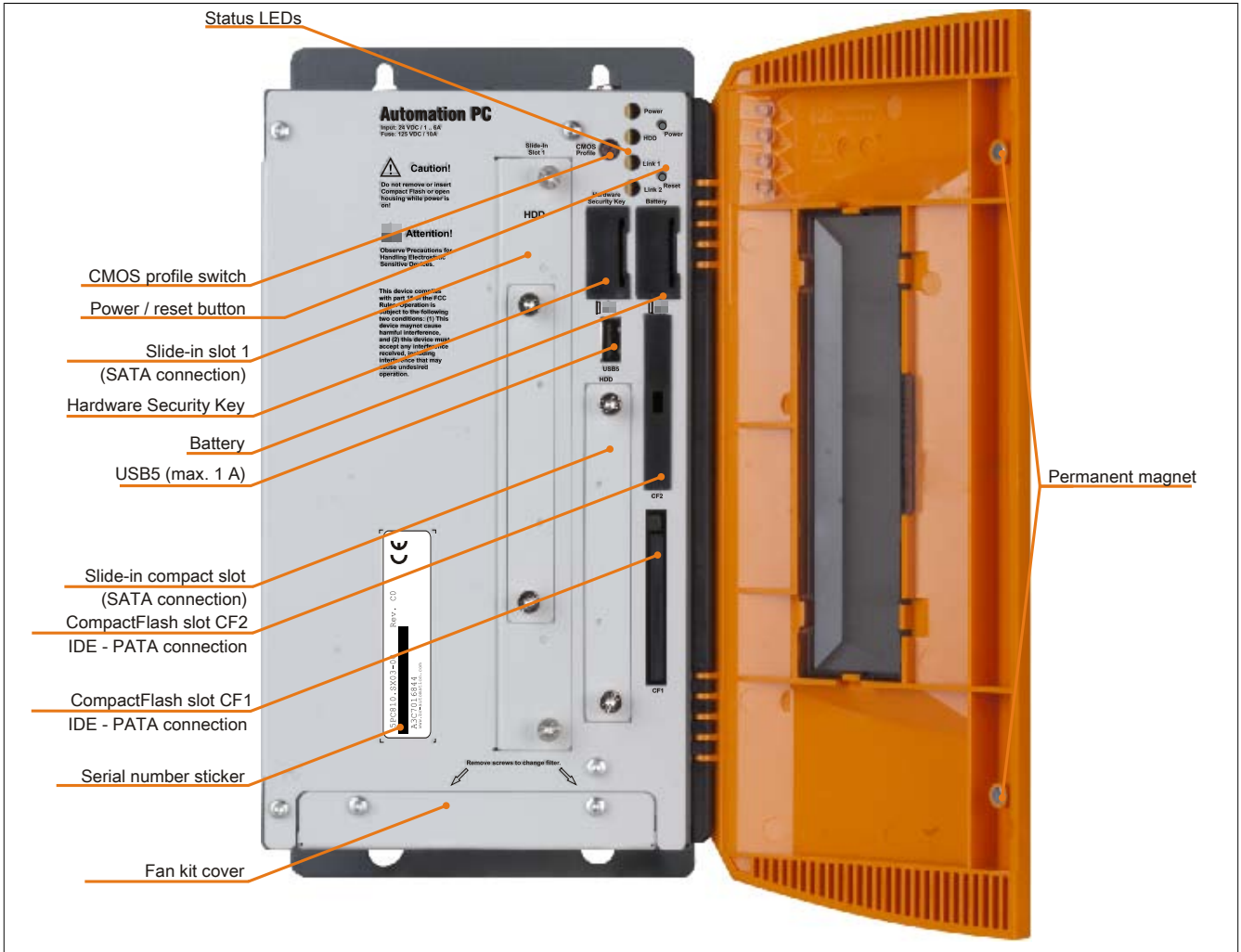


Figure 28: 5PC810.SX03-00 - Interfaces on front

### 3.1.3.4 Technical data

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

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



Product ID	5PC810.SX03-00
Memory Type Size	Depending on the CPU board used Depending on the CPU board used
<b>Interfaces</b>	
COM1 Type Design UART Max. baud rate	RS232, modem-capable, not electrically isolated 9-pin DSUB plug 16550-compatible, 16-byte FIFO 115 kbit/s
COM2 Type Design UART Max. baud rate	RS232, modem-capable, not electrically isolated 9-pin DSUB plug 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
Panel/Monitor interface Design Type	DVI-I socket SDL/DVI/Monitor
CAN Note	Optional
Audio Type Inputs Outputs	AC97 sound <sup>4)</sup> Microphone, Line in Line OUT
Add-on interface slot Quantity	1
<b>Inserts</b>	
PCI / PCIe slots Quantity	2 PCI and 1 PCIe slot <sup>5)</sup>
Slide-in drives	1
Slide-in compact drives	1
Automation Panel Link slot	Yes
Add-on UPS slot	Yes
Insert for fan kit	Yes
<b>Electrical characteristics</b>	
Nominal voltage	24 VDC ±25%
Nominal current	6 A
Starting current	Typ. 7 A, max. 50 A for < 300 µs
Electrical isolation	Yes
<b>Operating conditions</b>	
Protection in accordance with EN 60529	IP20
<b>Environmental conditions</b>	
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
Vibration <sup>6)</sup> Operation (continuous) Operation (occasional) Storage Transport	2 to 9 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g 2 to 9 Hz: 3.5 mm amplitude / 9 to 200 Hz: 1 g 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g 2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g
Shock <sup>6)</sup> Operation Storage Transport	15 g, 11 ms 30 g, 15 ms 30 g, 15 ms

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

Product ID	5PC810.SX03-00
Altitude Operation	Max. 3000 m (component-dependent) <sup>7)</sup>
<b>Mechanical characteristics</b>	
Housing <sup>8)</sup> 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	140.8 mm with heat sink 5AC801.HS00-00 and 5AC801.HS00-02 156.5 mm with heat sink 5AC801.HS00-01 270 mm 254.6 mm
Weight	Approx. 3200 g (component-dependent)
<b>Recommendations</b>	
Specified standard CE (CE) UL 508 (cULus)	Yes LISTED 14F2 BR
<b>Recommendations</b>	
Specified standard CE (CE) UL 508 (cULus)	Yes LISTED 14F2 BR

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, as long as no other individual component specifies any other.
- 7) Derating the max. ambient temperature – typically 1°C per 1000 meters (from 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

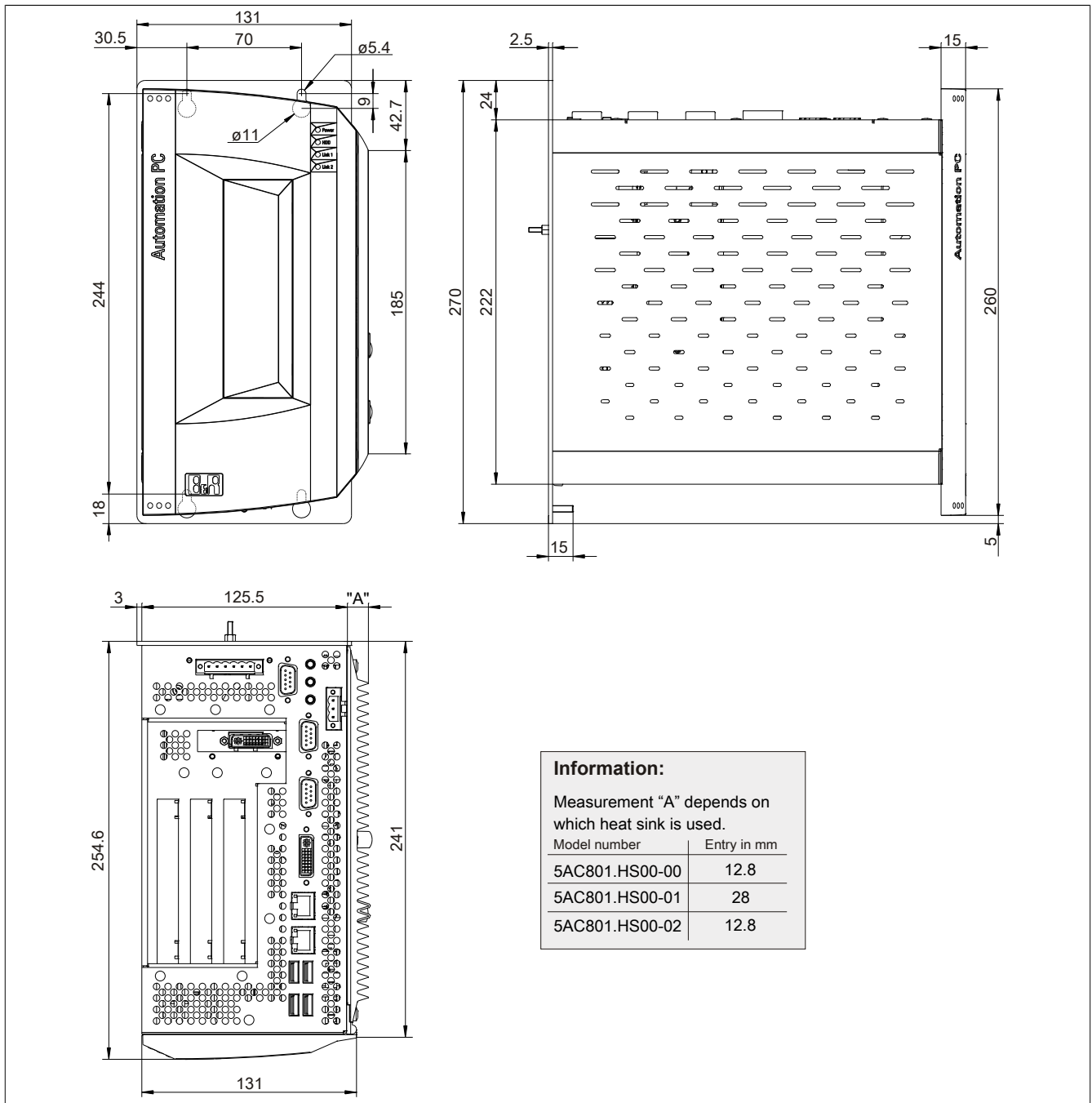


Figure 29: 5PC810.SX03-00 - Dimensions

### 3.1.3.6 Drilling template

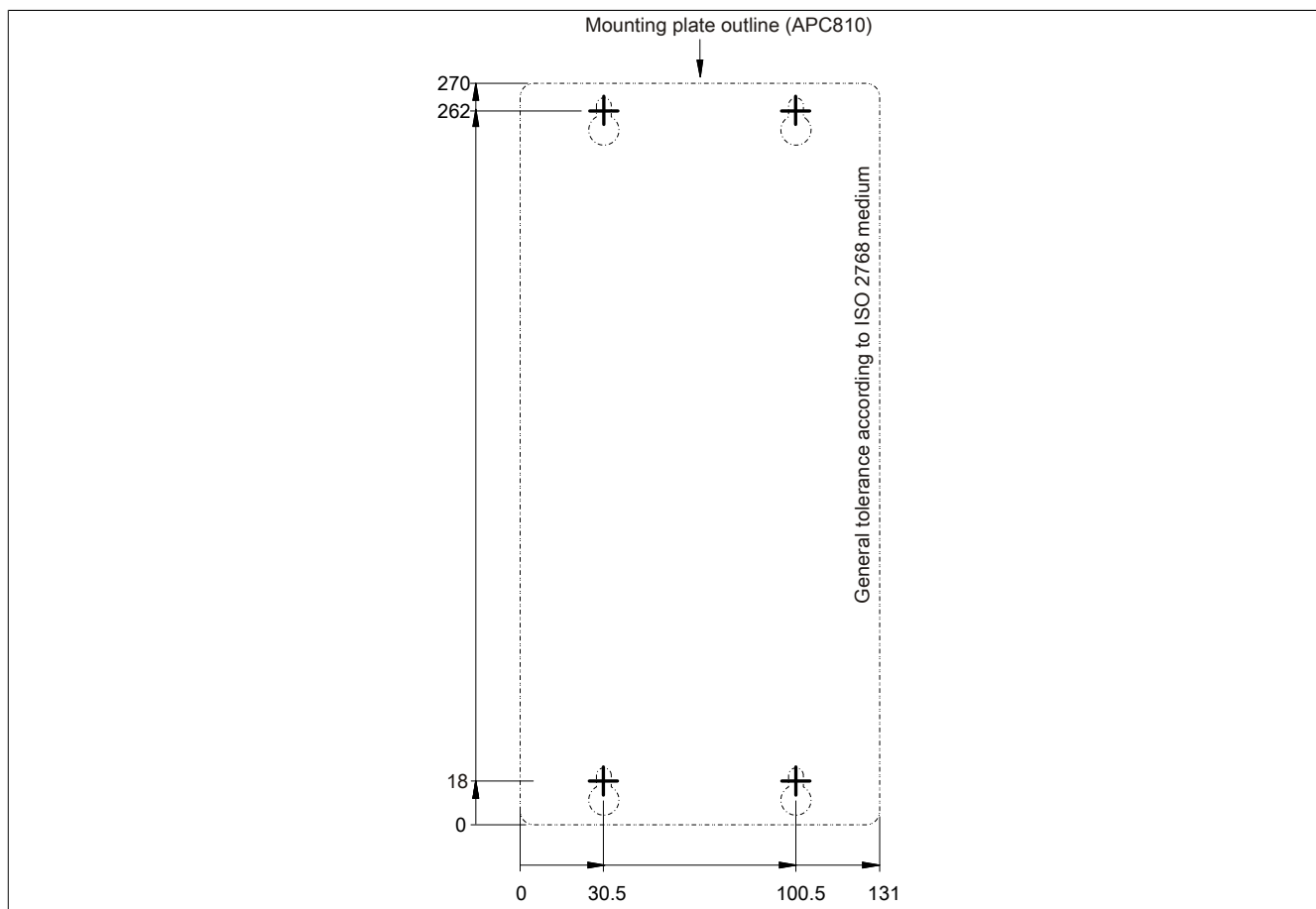


Figure 30: 5PC810.SX03-00 - Drilling template

### 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

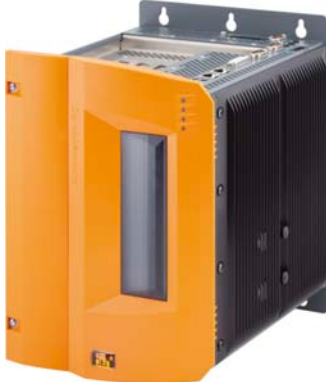
Model number	Short description	Figure
System units		
5PC810.SX05-00	APC810 system unit, 5 slots (PCI or PCI Express depending on the bus); 1 slot for Automation Panel Link transmitter; 1 slide-in compact and 2 slide-in slots; Smart Display Link/DVI/monitor, 2x RS232, 5x USB 2.0, 2x ETH 10/100/1000, 24 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 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	
5PC800.B945-10	Intel Core Duo L2400 CPU board, 1.66 GHz, dual-core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-11	Intel Core2 Duo L7400 CPU board, 1.5 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-12	Intel Core2 Duo U7400 CPU board, 1.06 GHz, dual-core, 533 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-13	Intel Celeron M 423 CPU board, 1.06 GHz, single-core, 533 MHz FSB, 1 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-14	Intel Core2 Duo T7400 CPU board, 2.16 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
Terminal blocks		
0TB103.9	24 VDC supply voltage plug, 3-pin female, 3.31 mm² screw clamp, protected against vibration by the screw flange	
0TB103.91	24 VDC supply voltage plug, 3-pin female, 3.31 mm² cage clamp, protected against vibration by the screw flange	
Main memory		
5MMDDR.0512-01	SO-DIMM DDR2 RAM 512 MB PC2-5300	
5MMDDR.1024-01	SO-DIMM DDR2 RAM 1024 MB PC2-5300	
5MMDDR.2048-01	SO-DIMM DDR2 RAM 2048 MB PC2-5300	
Heat sinks		
5AC801.HS00-00	APC810 heat sink for CPU boards with dual-core processors L2400, L7400, U7500 and Celeron M 423.	
5AC801.HS00-01	APC810 heat sink for CPU boards with dual-core processors T7400, T9400 and P8400.	
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 slide-in SATA drive.	
5AC801.DVRS-00	DVD-R/RW DVD+R/RW slide-in SATA drive.	

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 drive.	
5AC801.SSDI-01	60 GB slide-in compact SATA SSD (MLC).	
5AC801.SSDI-02	180 GB slide-in compact SATA SSD (MLC).	
5AC801.SSDI-03	60 GB slide-in compact SATA SSD (MLC).	
5ACPCI.RAIC-06	PCI RAID system SATA 2x 500 GB; Note: Please see the manual for information about using this hard disk.	
	<b>Fan kit</b>	
5PC810.FA05-00	APC810 fan kit for system unit 5PC810.SX05-00	
	<b>Serial port adapter</b>	
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.	
	<b>Uninterruptible power supply</b>	
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.	
	<b>Accessories</b>	
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

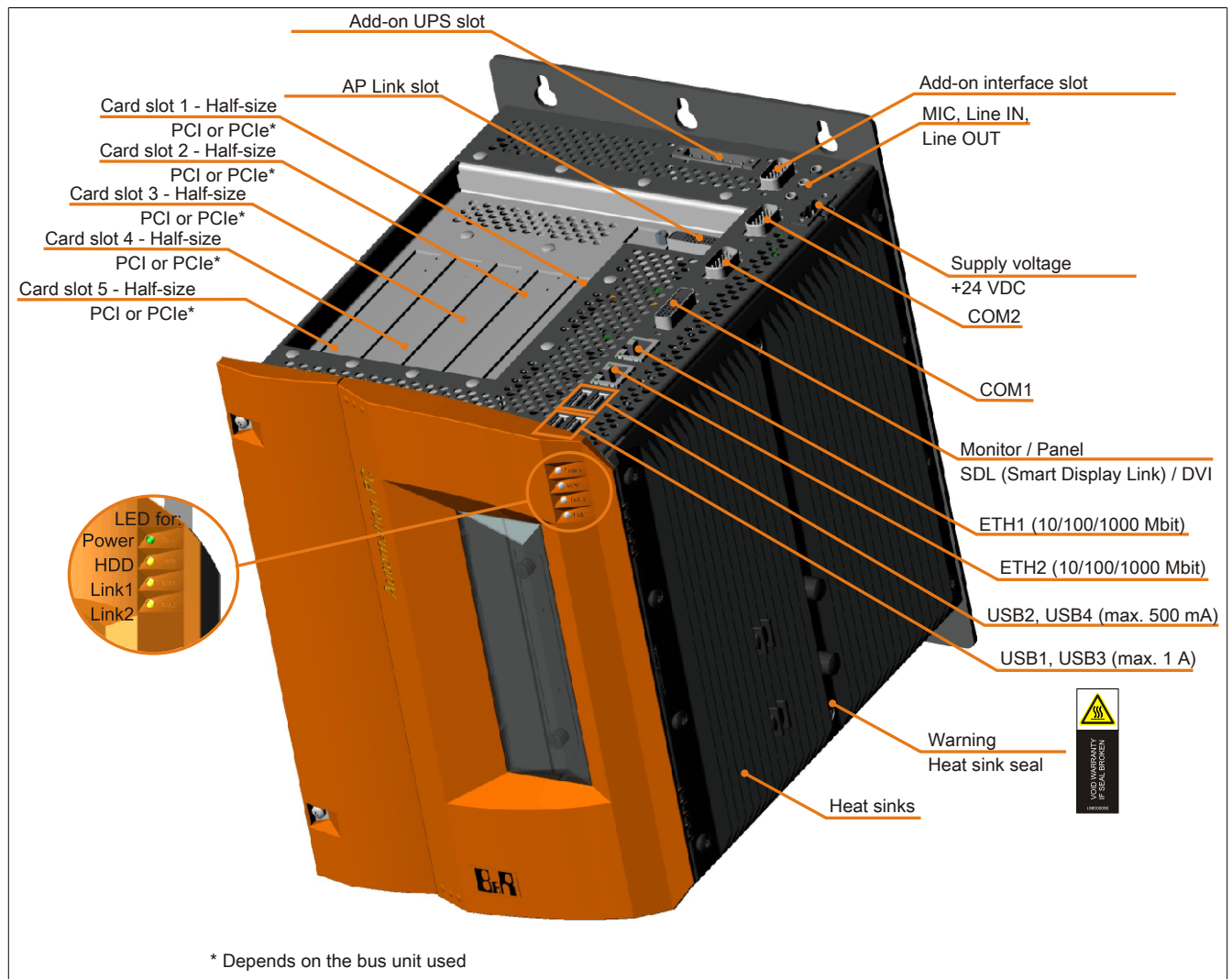


Figure 31: 5PC810.SX05-00 - Interfaces on top

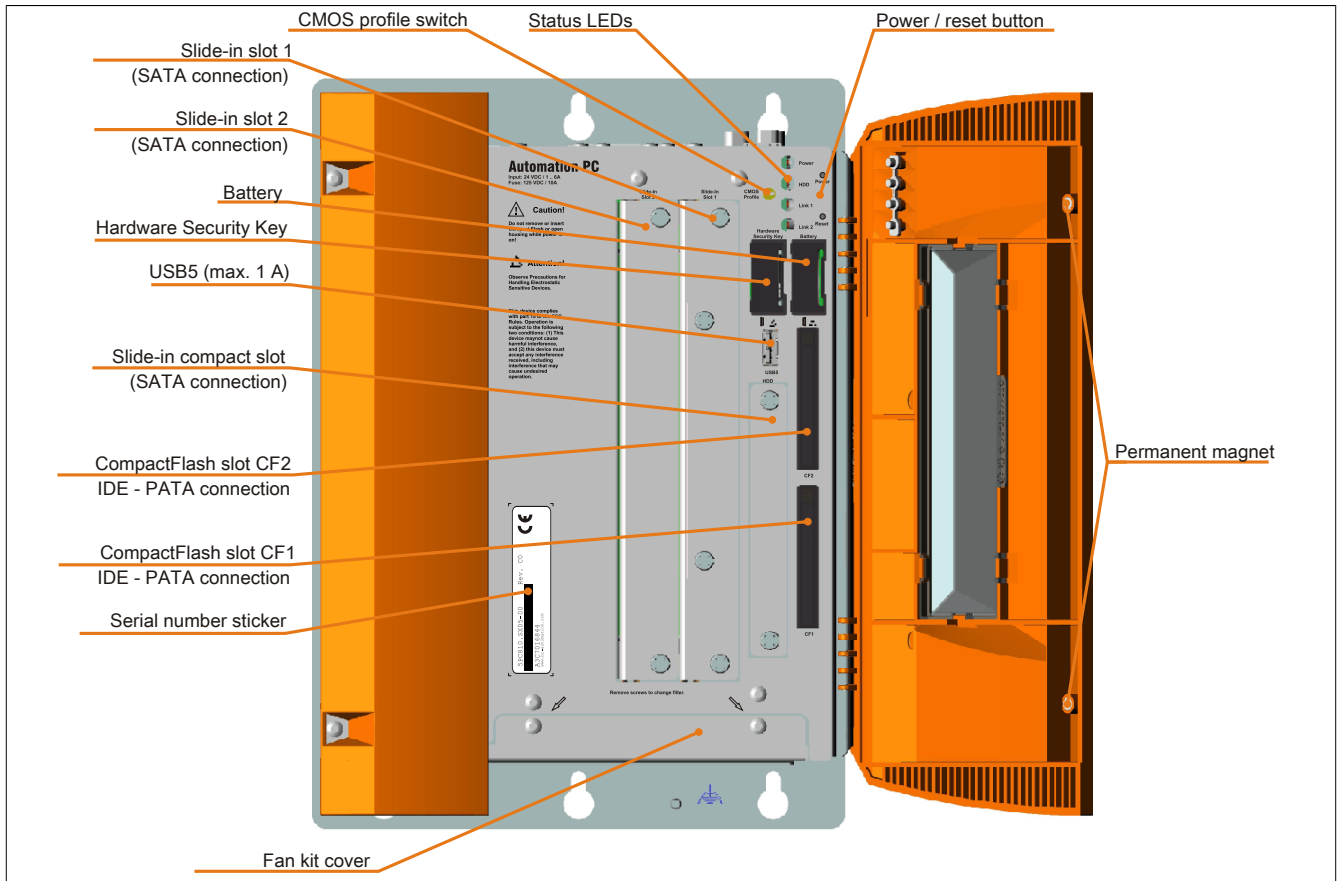


Figure 32: 5PC810.SX05-00 - Interfaces on front

### 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 <sup>1)</sup>
LEDs	Power, HDD, Link 1, Link 2
B&R ID code	\$A3EE
Battery	
Type	Renata 950 mAh
Service life	2½ years <sup>2)</sup>
Removable	Yes, accessible behind the orange front doors
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 <sup>3)</sup>
Buffer time	10 ms
Graphics	
Controller	Depending on the CPU board 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	Depending on the CPU board used
Size	Depending on the CPU board used

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



Product ID	5PC810.SX05-00
<b>Interfaces</b>	
COM1	
Type	RS232, modem-capable, not electrically isolated
Design	9-pin DSUB plug
UART	16550-compatible, 16-byte FIFO
Max. baud rate	115 kbit/s
COM2	
Type	RS232, modem-capable, not electrically isolated
Design	9-pin DSUB plug
UART	16550-compatible, 16-byte FIFO
Max. baud rate	115 kbit/s
CompactFlash slot 1	
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
Panel/Monitor interface	
Design	DVI-I socket
Type	SDL/DVI/Monitor
CAN	
Note	Optional
Audio	
Type	AC97 sound <sup>4)</sup>
Inputs	Microphone, Line in
Outputs	Line OUT
Add-on interface slot	
Quantity	1
<b>Inserts</b>	
PCI / PCIe slots	
Quantity	4 PCI and 1 PCIe slots or 2 PCI and 3 PCIe slots or 5 PCI slots <sup>5)</sup>
Slide-in drives	2
Slide-in compact drives	1
Automation Panel Link slot	Yes
Add-on UPS slot	Yes
Insert for fan kit	Yes
<b>Electrical characteristics</b>	
Nominal voltage	24 VDC ±25%
Nominal current	6 A
Starting current	Typ. 7 A, max. 50 A for < 300 µs
Electrical isolation	Yes
<b>Operating conditions</b>	
Protection in accordance with EN 60529	IP20
<b>Environmental conditions</b>	
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 <sup>6)</sup>	
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 <sup>6)</sup>	
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) <sup>7)</sup>
<b>Mechanical characteristics</b>	
Housing <sup>8)</sup> 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. 3900 g (component-dependent)
<b>Recommendations</b>	
Specified standard CE (CE) UL 508 (cULus)	Yes LISTED 14F2 BR
<b>Recommendations</b>	
Specified standard CE (CE) UL 508 (cULus)	Yes LISTED 14F2 BR

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, as long as no other individual component specifies any other.
- 7) Derating the max. ambient temperature – typically 1°C per 1000 meters (from 500 meters above sea level).
- 8) Depending on the process or batch, there may be visible deviations in the color and surface structure.

### 3.1.4.5 Dimensions

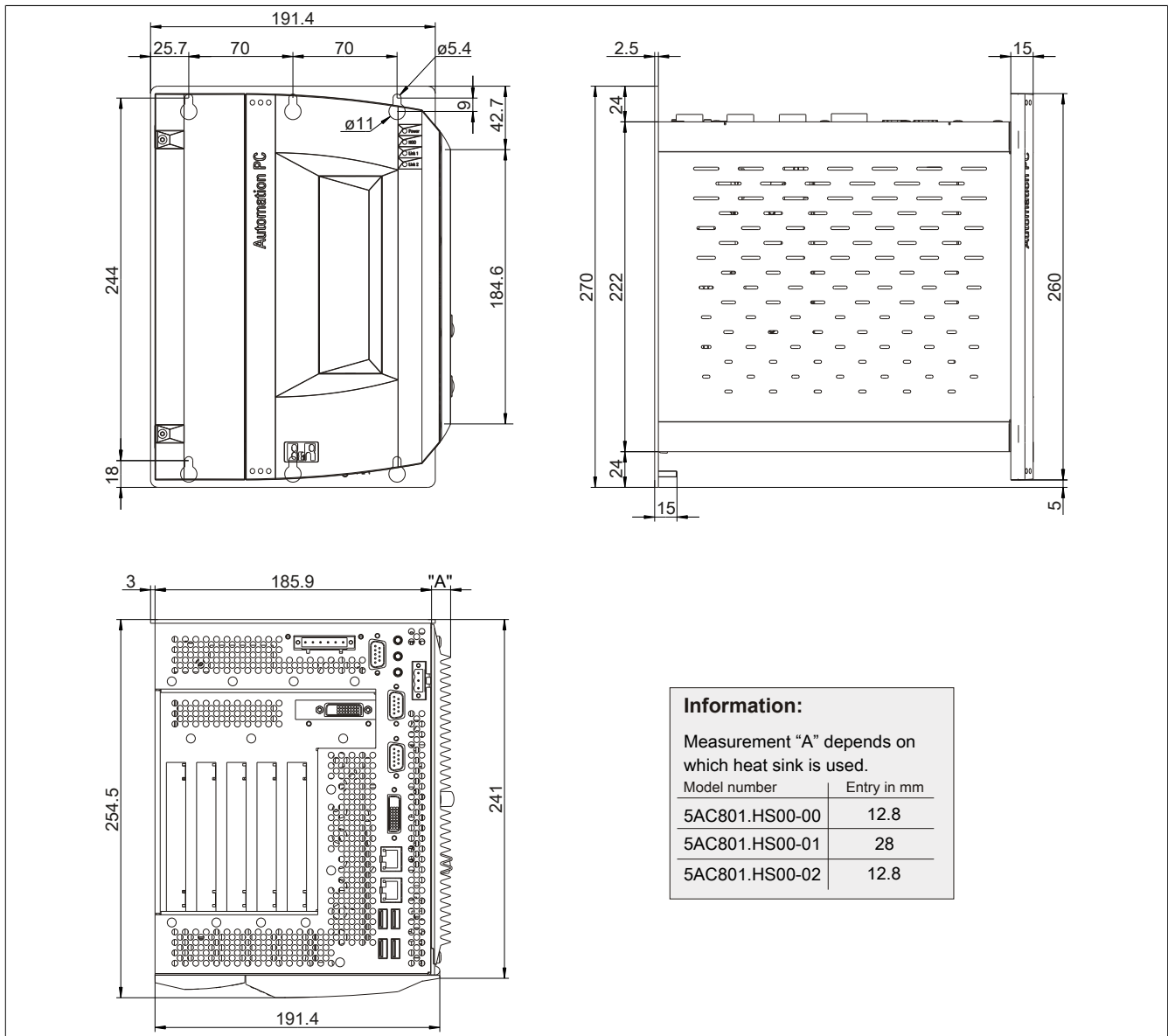


Figure 33: 5PC810.SX05-00 - Dimensions

### 3.1.4.6 Drilling template

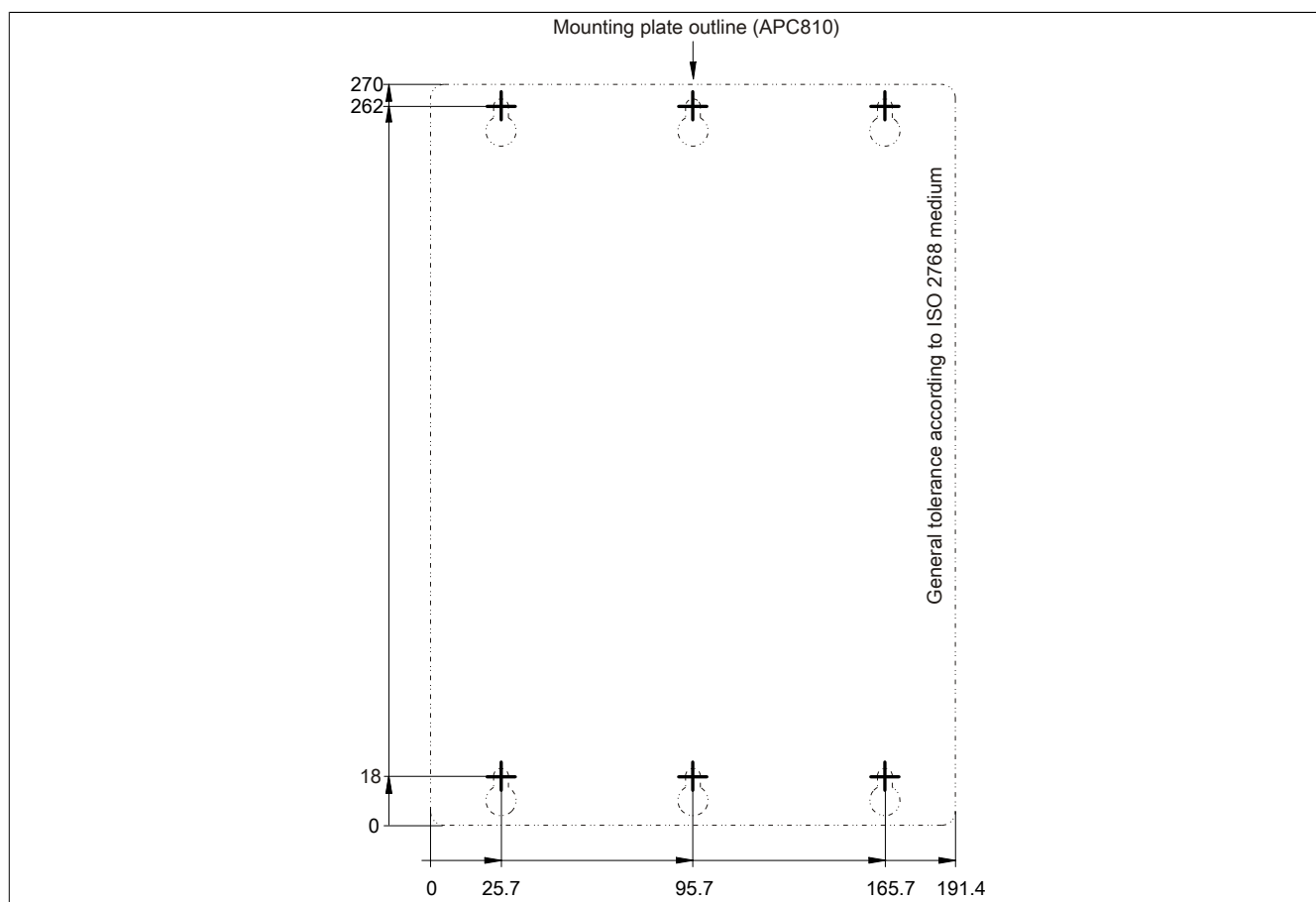


Figure 34: 5PC810.SX05-00 - Drilling template

## 3.2 Bus units

### 3.2.1 General information

The bus units are compatible with the system units in 1, 2, 3 or 5 card slot sizes, available with PCI and/or PCI Express support.

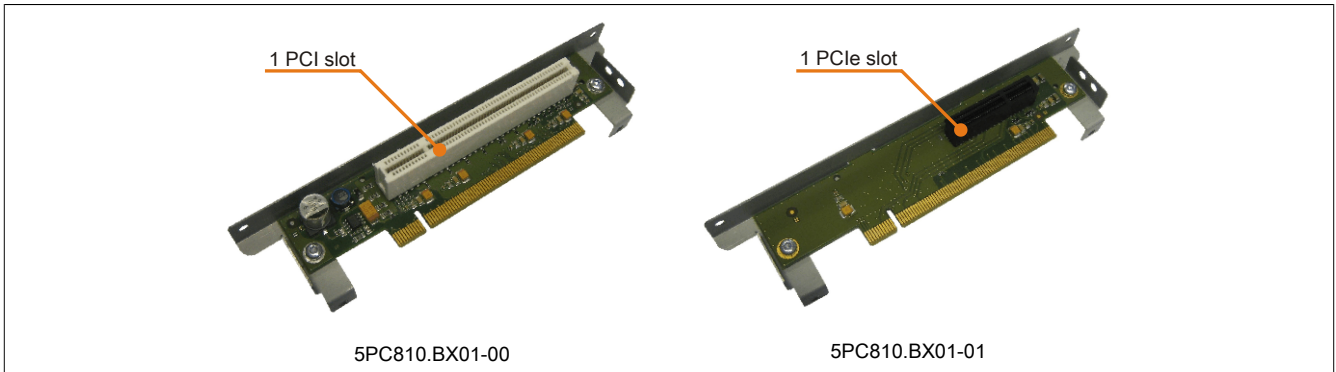


Figure 35: 1 slot bus units

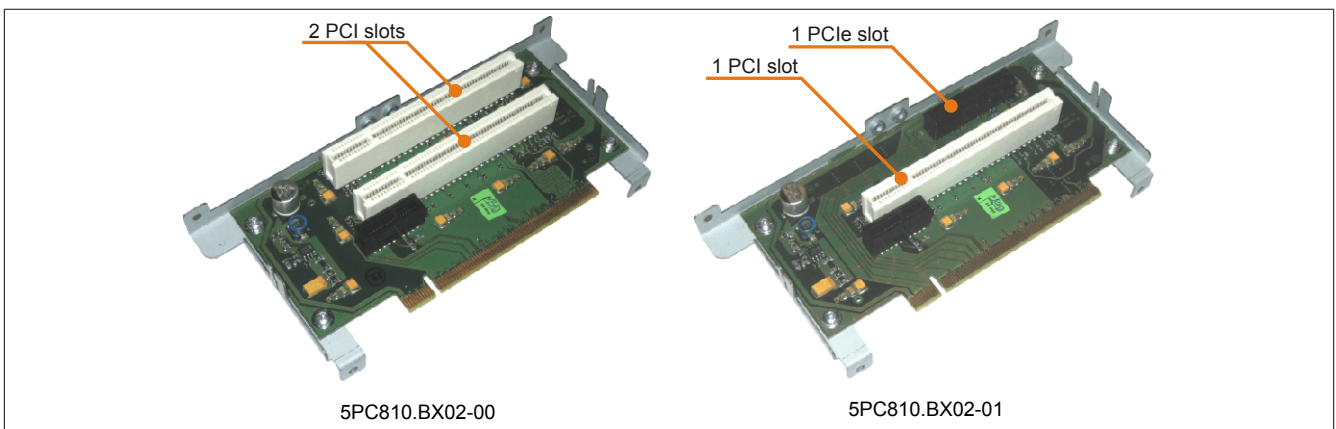


Figure 36: 2 slot bus units

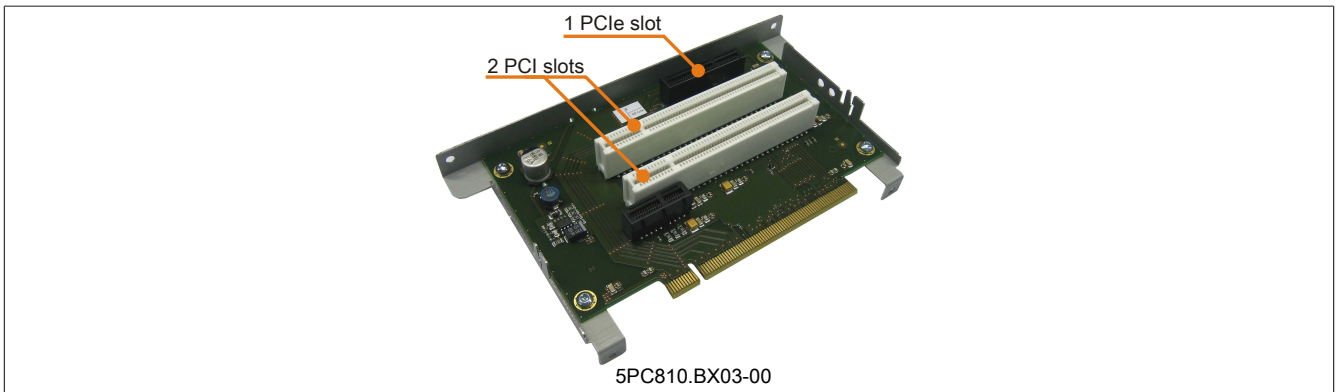


Figure 37: 3 slot bus units

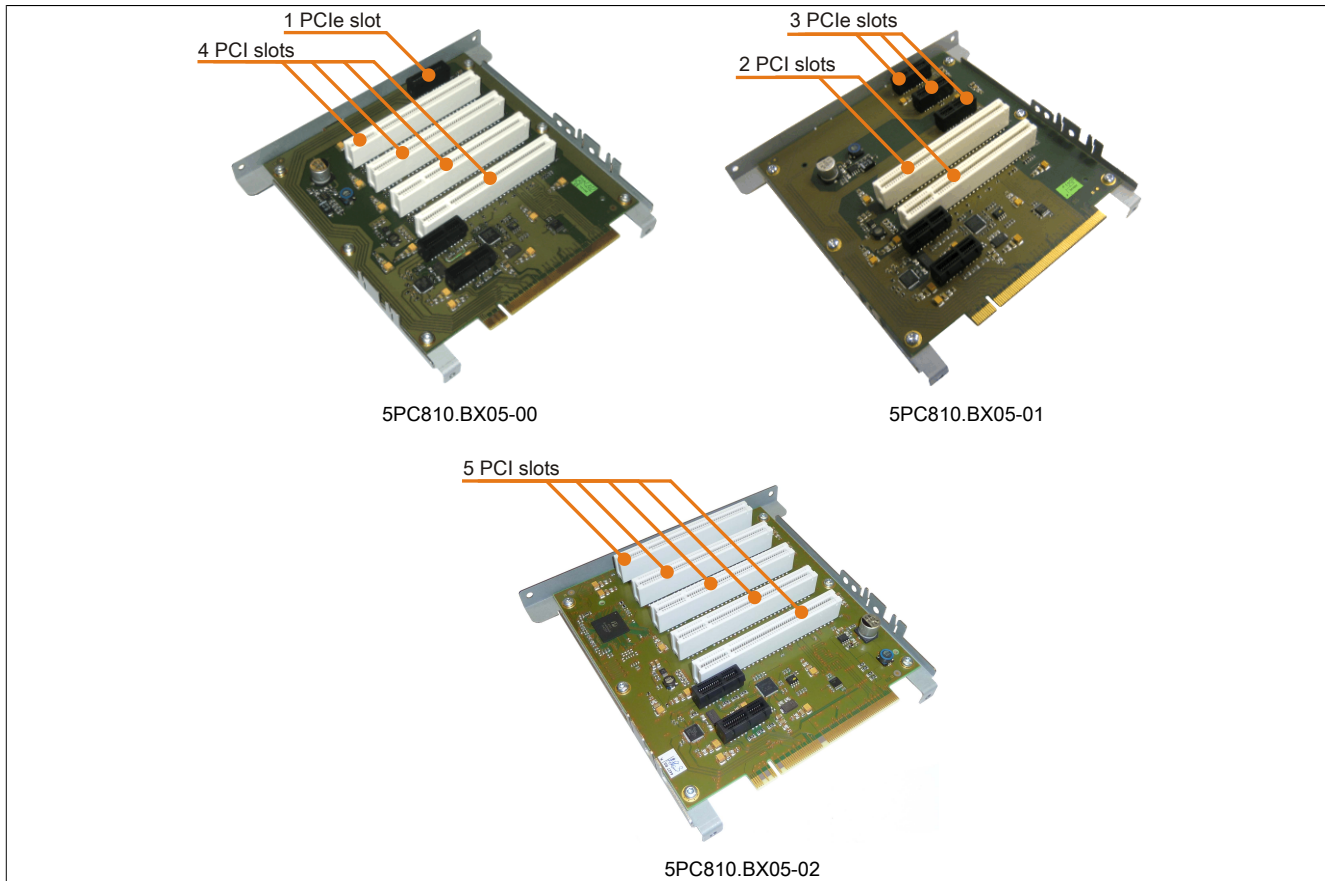


Figure 38: 5 slot bus units

### 3.2.2 Order data


Model number	Short description	Figure
<b>Bus units</b>		
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
<b>General information</b>								
Certification	Yes							
CE	Yes	-	Yes	-	-	-	-	-
cULus HazLoc Class 1 Division 2	Yes	-	Yes	-	-	-	-	-
ATEX Zone 22	Yes	-	Yes	-	-	-	-	-
GL	Yes	Yes	Yes	Yes	-	-	-	-
<b>Inserts</b>								
PCIe slots	-	1	-	1	1	1	3	-
Quantity	-	PCIe	-	PCIe	PCIe	PCIe	PCIe	-
Design	-	half-size	-	half-size	half-size	half-size	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

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
PCI slots								
Quantity	1	-	2	1	2	4	2	5
Type	32-bit	-	32-bit	32-bit	32-bit	32-bit	32-bit	32-bit
Design	PCI half-size	-	PCI half-size	PCI half-size	PCI half-size	PCI half-size	PCI half-size	PCI half-size
Standard	2.2 <sup>1)</sup>	-	2.2 <sup>1)</sup>	2.2 <sup>1)</sup>	2.2 <sup>1)</sup>	2.2 <sup>1)</sup>	2.2 <sup>1)</sup>	2.2 <sup>1)</sup>
Bus speed	33 MHz	-	33 MHz	33 MHz	33 MHz	33 MHz	33 MHz	33 MHz
PCI to PCI bridge	-	-	-	-	-	-	-	Yes, slots 4 and 5
<b>Recommendations</b>								
Specified standard								
CE (CE)	Yes							
UL HazLoc Cl I Div 2 (cULus)	LISTED 2P61 ABCD BR	-	LISTED 2P61 ABCD BR	-	-	-	-	-
ATEX Zone 22 (EX)	II 3D tc IIIA T85 0-55°C BR	-	II 3D tc IIIA T85 0-55°C BR	-	-	-	-	-
GL (GL)	Cat. C EMC 1	Cat. C EMC 1	Cat. C EMC 1	Cat. C EMC 1	-	-	-	-
<b>Recommendations</b>								
Specified standard								
CE (CE)	Yes							
UL HazLoc Cl I Div 2 (cULus)	LISTED 2P61 ABCD BR	-	LISTED 2P61 ABCD BR	-	-	-	-	-
ATEX Zone 22 (EX)	II 3D tc IIIA T85 0-55°C BR	-	II 3D tc IIIA T85 0-55°C BR	-	-	-	-	-
GL (GL)	Cat. C EMC 1	Cat. C EMC 1	Cat. C EMC 1	Cat. C EMC 1	-	-	-	-

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

### 3.3 CPU boards 945GME

#### 3.3.1 General information

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

#### 3.3.2 Order data

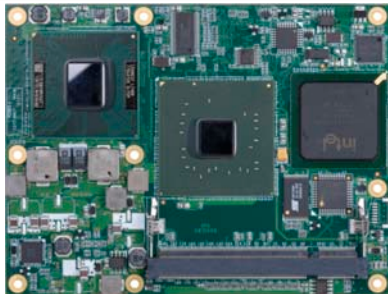

Model number	Short description	Figure
	<b>CPU boards</b>	
5PC800.B945-00	Intel Core Duo L2400 CPU board, 1.66 GHz, dual-core, 667 MHz FSB, 2 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111B.	
5PC800.B945-01	Intel Core2 Duo L7400 CPU board, 1.5 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111B.	
5PC800.B945-02	Intel Core2 Duo U7500 CPU board, 1.06 GHz, dual-core, 533 MHz FSB, 2 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111B.	
5PC800.B945-03	Intel Celeron M 423 CPU board, 1.06 GHz, single-core, 533 MHz FSB, 1 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111B.	
5PC800.B945-04	Intel Core2 Duo T7400 CPU board, 2.16 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111B.	
5PC800.B945-05	Intel Atom N270 CPU board, 1.6 GHz, single-core, 533 MHz FSB, 512 kB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111C.	
	<b>Required accessories</b>	
	<b>Main memory</b>	
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 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
	<b>CPU boards</b>	
5PC800.B945-10	Intel Core Duo L2400 CPU board, 1.66 GHz, dual-core, 667 MHz FSB, 2 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111C.	
5PC800.B945-11	Intel Core2 Duo L7400 CPU board, 1.5 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111C.	
5PC800.B945-12	Intel Core2 Duo U7500 CPU board, 1.06 GHz, dual-core, 533 MHz FSB, 2 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111C.	
5PC800.B945-13	Intel Celeron M 423 CPU board, 1.06 GHz, single-core, 533 MHz FSB, 1 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111C.	
5PC800.B945-14	Intel Core2 Duo T7400 CPU board, 2.16 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; chipset 945GME; 2 sockets for SO-DIMM DDR2 modules (total memory max. 3 GB), Realtek Ethernet controller RTL8111C.	
	<b>Required accessories</b>	
	<b>Main memory</b>	
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 Technical data - 5PC800.B945-0x

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	512 kB
L2 cache	2 MB	4 MB	2 MB	1 MB	4 MB	512 kB
External bus	667 MHz	667 MHz	533 MHz	533 MHz	667 MHz	533 MHz
Intel® 64 Architecture	No	Yes	Yes	No	Yes	No
Intel® Virtualization Technology (VT-x)	Yes	Yes	Yes	No	Yes	No
Enhanced Intel SpeedStep® Technology	Yes	Yes	Yes	No	Yes	Yes
Chipset	Intel® 945GME Intel® 82801 GHM (ICH7M-DH)					
Real-time clock	At 25°C: typ. 12 ppm (1 seconds) per day					
Accuracy	Yes					
Battery-buffered						
Memory socket	DDR2					
Type	Max. 3 GB					
Size						
Graphics	Intel® Graphics Media Accelerator 950					
Controller	Up to 224 MB <sup>1)</sup>					
Memory	Max. 32-bit					
Color depth						
Resolution	2x Intel compliant SDVO ports, 1920 x 1080					
DVI	400 MHz RAMDAC, resolutions up to 2048 x 1536 @ 75 Hz (QXGA) and 1920 x 1080 @ 85 Hz (HDTV)					
RGB						
Mass memory management	2x SATA, 1x IDE					
Power management	ACPI 2.0, S3 Support (suspend to RAM)					
Recommendations						
Specified standard	Yes					
CE (CE)	-	-	-	-	-	LISTED 14F2 BR
UL 508 (cULus)	-	-	-	-	-	Cat. C EMC 1
GL (GL)	-	-	-	-	-	
Recommendations						
Specified standard	Yes					
CE (CE)	-	-	-	-	-	LISTED 14F2 BR
UL 508 (cULus)	-	-	-	-	-	Cat. C EMC 1
GL (GL)	-	-	-	-	-	

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 Technical data - 5PC800.B945-1x

Product ID	5PC800.B945-10	5PC800.B945-11	5PC800.B945-12	5PC800.B945-13	5PC800.B945-14
General information					
Certification	Yes				
CE					
cULus					
Controller					
Boot loader	embedded AMI BIOS				

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
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				
Memory socket					
Type	DDR2				
Size	Max. 3 GB				
Graphics					
Controller	Intel® Graphics Media Accelerator 950				
Memory	Up to 224 MB <sup>1)</sup>				
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)				
Recommendations					
Specified standard					
CE (CE)	Yes				
UL 508 (cULus)	LISTED 14F2 BR				
Recommendations					
Specified standard					
CE (CE)	Yes				
UL 508 (cULus)	LISTED 14F2 BR				

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 sink

#### 3.4.1 Order data


Model number	Short description	Figure
	<b>Heat sinks</b>	
5AC801.HS00-00	APC810 heat sink for CPU boards with dual-core processors L2400, L7400, U7500 and Celeron M 423.	
5AC801.HS00-01	APC810 heat sink for CPU boards with dual-core processors T7400, T9400 and P8400.	
5AC801.HS00-02	APC810 heat sink for CPU board with Atom processor N270.	
	<b>Required accessories</b>	
	<b>CPU boards</b>	
5PC800.B945-00	Intel Core Duo L2400 CPU board, 1.66 GHz, dual-core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	
5PC800.B945-01	Intel Core2 Duo L7400 CPU board, 1.5 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	
5PC800.B945-02	Intel Core2 Duo U7400 CPU board, 1.06 GHz, dual-core, 533 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	
5PC800.B945-03	Intel Celeron M 423 CPU board, 1.06 GHz, single-core, 533 MHz FSB, 1 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	
5PC800.B945-04	Intel Core2 Duo T7400 CPU board, 2.16 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	
5PC800.B945-05	Intel Atom N270 CPU board, 1.6 GHz, single-core, 533 MHz FSB, 512 kB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	
5PC800.B945-10	Intel Core Duo L2400 CPU board, 1.66 GHz, dual-core, 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-11	Intel Core2 Duo L7400 CPU board, 1.5 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-12	Intel Core2 Duo U7400 CPU board, 1.06 GHz, dual-core, 533 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-13	Intel Celeron M 423 CPU board, 1.06 GHz, single-core, 533 MHz FSB, 1 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	
5PC800.B945-14	Intel Core2 Duo T7400 CPU board, 2.16 GHz, dual-core, 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111C.	

Table 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
<b>General information</b>			
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	-
<b>Mechanical characteristics</b>			
Material	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.

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

#### 3.5.2 Order data


Model number	Short description	Figure
	<b>Main memory</b>	
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		
Recommendations			
Specified standard			
CE (CE)	Yes		
UL 508 (cULus)	LISTED 14F2 BR		
GL (GL)	Cat. C EMC 1		
Recommendations			
Specified standard			
CE (CE)	Yes		
UL 508 (cULus)	LISTED 14F2 BR		
GL (GL)	Cat. C EMC 1		

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 and also provides an extended temperature specification. The slide-in compact drive 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 referred to internally as SATA.

#### 3.6.1.2 Order data


Model number	Short description	Figure
	<b>Drives</b>	
5AC801.HDDI-00	40 GB SATA hard disk, slide-in compact; 24/7 hard disk with extended temperature range. Remark: Please see manual for proper use of the hard disk.	

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 entire device. For the entire device in which this individual component is used, refer to the data given specifically for the entire device.

Product ID	5AC801.HDDI-00
<b>General information</b>	
Certification	
CE	Yes
cULus	Yes
GL	Yes
<b>Hard disk drive</b>	
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 <sup>1)</sup>
S.M.A.R.T. support	Yes
Interface	SATA
Access time	5.6 ms
Data transfer rate	
Internal	Max. 450 Mbits/s
To/From host	Max. 150 MB/s (Ultra DMA mode 5)
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 <sup>2)</sup>	
Operation <sup>3)</sup>	-30 to 85°C
24-hour operation <sup>4)</sup>	-30 to 85°C
Storage	-40 to 95°C
Transport	-40 to 95°C
Relative humidity <sup>5)</sup>	
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 <sup>6)</sup>
Dimensions	
Width	13 mm
Height	98 mm
Depth	105 mm
Weight	134 g
Manufacturer information	
Manufacturer	Seagate
Manufacturer product ID	ST940817SM
Recommendations	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
GL (GL)	Cat. C EMC 1
Recommendations	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
GL (GL)	Cat. C EMC 1

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

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

### 3.6.1.4 Temperature humidity diagram

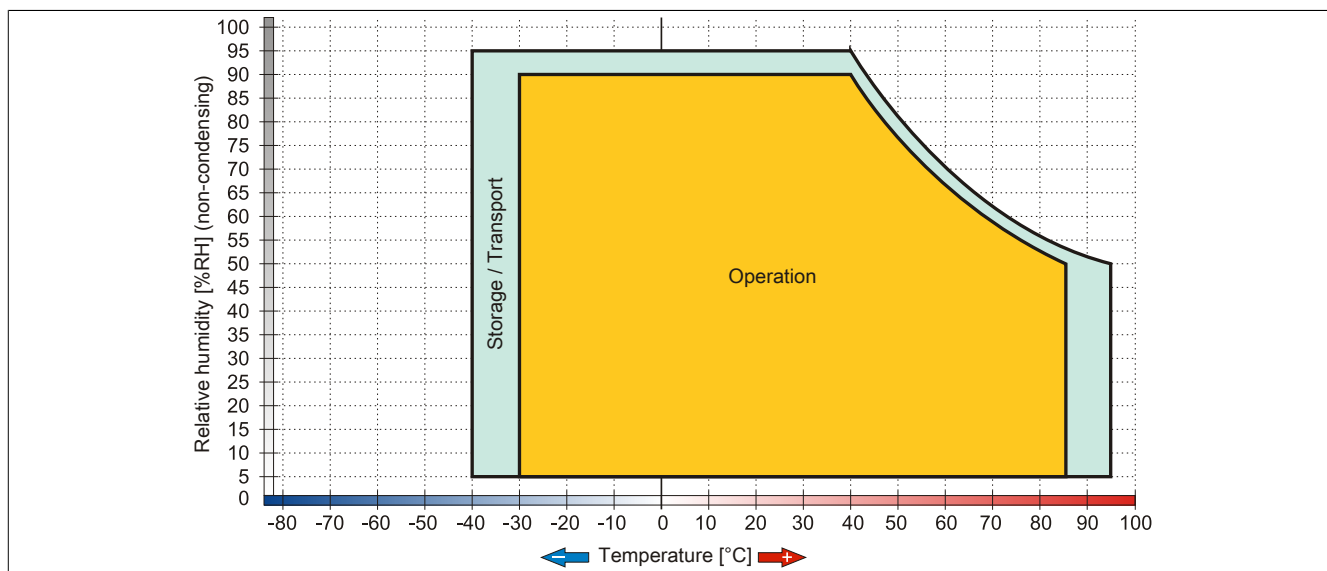


Figure 39: 5AC801.HDDI-00 - Temperature humidity diagram



### 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 and also provides an extended temperature specification. The slide-in compact drive 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 referred to internally as SATA.

#### 3.6.2.2 Order data


Model number	Short description	Figure
	<b>Undefined</b>	
5AC801.HDDI-01	80 GB SATA hard disk, slide-in compact; 24/7 hard disk with extended temperature range. Remark: Please see manual for proper use of the hard disk.	

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

#### 3.6.2.3 Technical data

Product ID	5AC801.HDDI-01
<b>General information</b>	
Certification	
CE	Yes
cULus	Yes
<b>Hard disk drive</b>	
Capacity	80 GB
Number of heads	2
Number of sectors	156,301,488
Bytes per sector	512
Cache	8 MB
Speed	5400 rpm ±1%
Startup time	Typ. 3 s (from 0 rpm to read access)
MTBF	750,000 POH <sup>1)</sup>
S.M.A.R.T. support	Yes
Interface	SATA
Access time	5.6 ms
Data transfer rate	
Internal	Max. 450 Mbits/s
To/From host	Max. 150 MB/s (Ultra DMA mode 5)
Positioning time	
Minimum (track to track)	1 ms
Nominal (read only)	12.5 ms
Maximum (read only)	23 ms
<b>Environmental conditions</b>	
Temperature <sup>2)</sup>	
Operation <sup>3)</sup>	-30 to 85°C
24-hour operation <sup>4)</sup>	-30 to 85°C
Storage	-40 to 95°C
Transport	-40 to 95°C
Relative humidity <sup>5)</sup>	
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
Storage	150 g and 11 ms duration; no unrecoverable errors
Transport	300 g and 2 ms duration; no unrecoverable errors
Altitude	
Operation	-300 to 5000 m
Storage	-300 to 12192 m
<b>Mechanical characteristics</b>	
Installation	Fixed <sup>6)</sup>
Dimensions	
Width	13 mm
Height	98 mm
Depth	105 mm
Weight	133 g
<b>Manufacturer information</b>	
Manufacturer	Seagate
Manufacturer product ID	ST980817SM
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR

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

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

### 3.6.2.4 Temperature humidity diagram

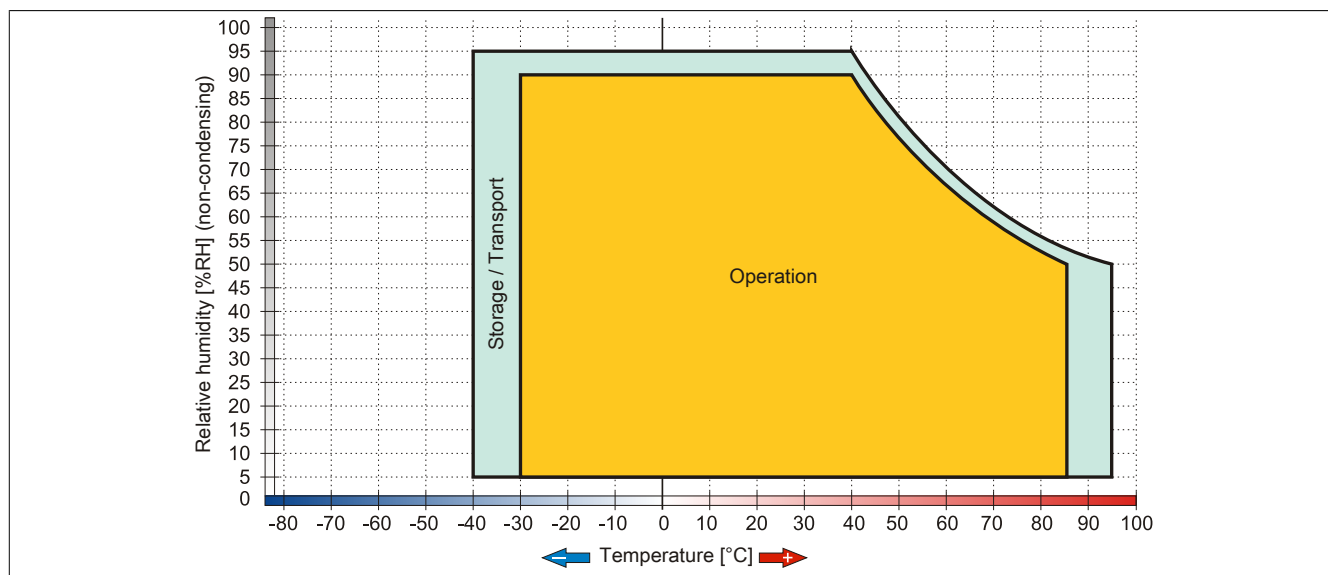


Figure 40: 5AC801.HDDI-01 - Temperature humidity diagram

### 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 (24x7) and also provides an extended temperature specification. The slide-in compact drive can be used in APC810 and PPC800 system units.

#### When used in an APC810

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

#### 3.6.3.2 Order data


Model number	Short description	Figure
	<b>Drives</b>	
5AC801.HDDI-02	160 GB SATA hard disk, slide-in compact; 24/7 hard disk with extended temperature range. Remark: Please see manual for proper use of the hard disk.	

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 entire device. For the entire device in which this individual component is used, refer to the data given specifically for the entire device.

Product ID	5AC801.HDDI-02
<b>General information</b>	
Certification	
CE	Yes
GL	Yes
<b>Hard disk drive</b>	
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 <sup>1)</sup>
S.M.A.R.T. support	Yes
Interface	SATA
Access time	12 ms
Data transfer rate	
Internal	Max. 84.6 Mb/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
<b>Environmental conditions</b>	
Temperature <sup>2)</sup>	
Operation	-15 to 80°C
24-hour operation <sup>3)</sup>	-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 <sup>4)</sup>	
Operation	8 to 90%, non-condensing <sup>5)</sup>
Storage	5 to 95%, non-condensing <sup>6)</sup>
Transport	5 to 95%, non-condensing <sup>6)</sup>
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
<b>Mechanical characteristics</b>	
Installation	Fixed <sup>7)</sup>
Dimensions	
Width	13 mm
Height	98 mm
Depth	105 mm
Weight	135 g
<b>Manufacturer information</b>	
Manufacturer	Fujitsu
Manufacturer product ID	MHY2160BH-ESW
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
GL (GL)	Cat. C EMC 1
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
GL (GL)	Cat. C EMC 1

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

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

### 3.6.3.4 Temperature humidity diagram

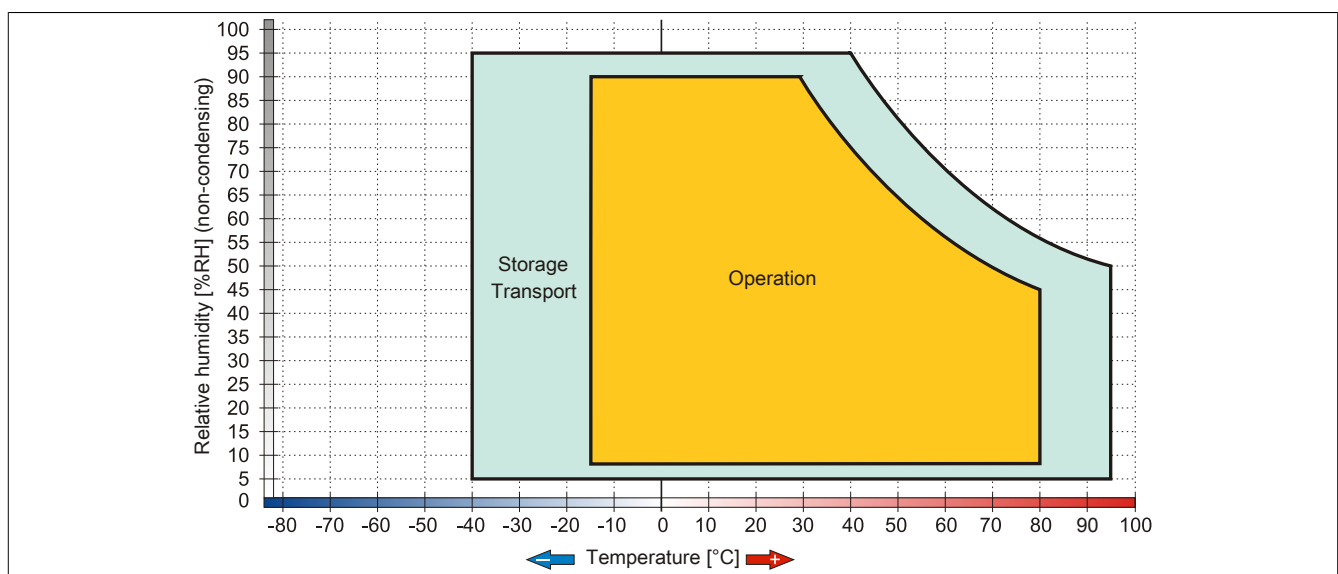


Figure 41: 5AC801.HDDI-02 - Temperature humidity diagram

### 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 The slide-in compact drive 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 referred to internally as SATA.

#### 3.6.4.2 Order data


Model number	Short description	Figure
	<b>Drives</b>	
5AC801.HDDI-03	250 GB SATA hard disk, slide-in compact; 24/7 hard disk. Remark: Please see manual for proper use of the hard disk.	
	<b>Optional accessories</b>	
	<b>Drives</b>	
5MMHDD.0250-00	250 GB SATA hard disk replacement for 5AC801.HDDI-03 and 5ACPCI.RAIC-05; Remark: Please see manual for proper use of the 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 entire device. For the entire device in which this individual component is used, refer to the data given specifically for the entire device.

Product ID	5AC801.HDDI-03
<b>General information</b>	
Certification	
CE	Yes
cULus	Yes
cULus HazLoc Class 1 Division 2	Yes
ATEX Zone 22	Yes
GL	Yes
<b>Hard disk drive</b>	
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 <sup>1)</sup>
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 <sup>2)</sup>	
Operation <sup>3)</sup>	0 to 60°C
24-hour operation <sup>4)</sup>	0 to 60°C
Storage	-40 to 70°C
Transport	-40 to 70°C
Relative humidity <sup>5)</sup>	
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 <sup>6)</sup>
Dimensions	
Width	13 mm
Height	98 mm
Depth	105 mm
Weight	134 g
Manufacturer information	
Manufacturer	Seagate
Manufacturer product ID	ST9250315AS
Recommendations	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
UL HazLoc Cl I Div 2 (cULus)	LISTED 2P61 ABCD BR
ATEX Zone 22 (EX)	II 3D tc IIIA T85 0-55°C BR
GL (GL)	Cat. C EMC 1
Recommendations	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
UL HazLoc Cl I Div 2 (cULus)	LISTED 2P61 ABCD BR
ATEX Zone 22 (EX)	II 3D tc IIIA T85 0-55°C BR
GL (GL)	Cat. C EMC 1

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

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

### 3.6.4.4 Temperature humidity diagram

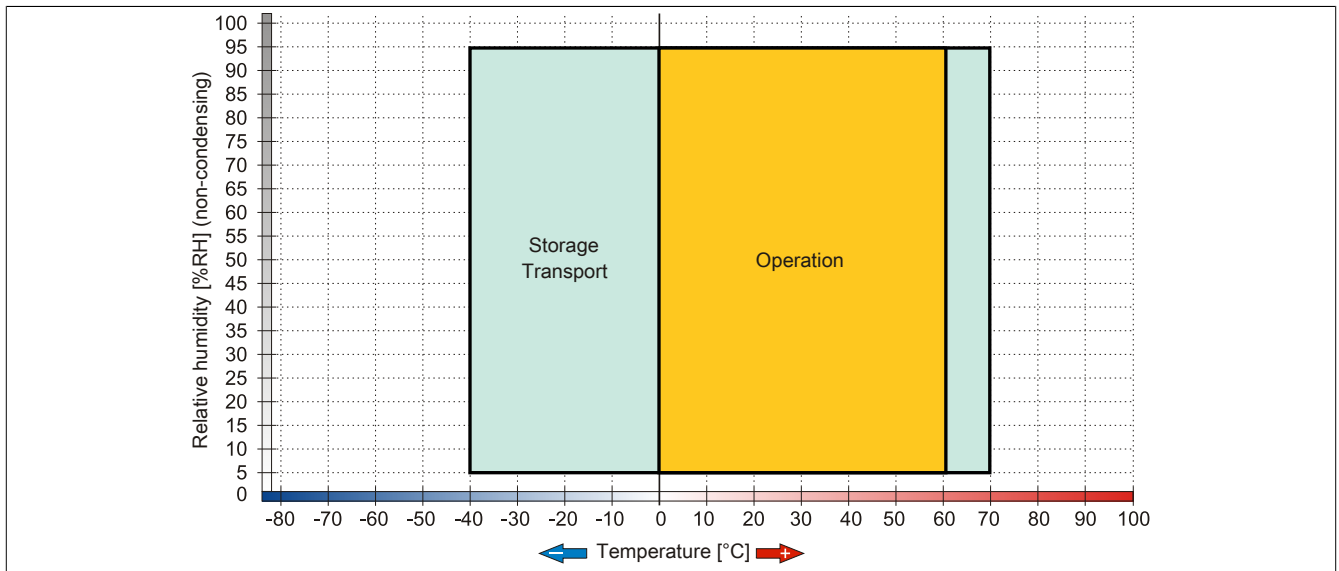


Figure 42: 5AC801.HDDI-03 - Temperature humidity diagram

### 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. The slide-in compact drive can be used in APC810 and PPC800 system units.

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

#### When used in an APC810

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

#### 3.6.5.2 Order data


Model number	Short description	Figure
	<b>Drives</b>	
5AC801.HDDI-04	500 GByte SATA Hard Disk, Slide-in compact, 24/7 Hard Disk Hinweis: Beachten Sie das Manual zum Einsatz der Harddisk.	
	<b>Optional accessories</b>	
	<b>Drives</b>	
5MMHDD.0500-00	500 GB SATA hard disk replacement for 5AC801.HDDI-04, 5AC901.CHDD-01 and 5ACPCI.RAIC-06; Remark: Please see manual for proper use of the 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 fully assembled device. The data specifications for the fully assembled device take precedence over those of individual components.

Product ID	5AC801.HDDI-04
<b>General information</b>	
Certification	
CE	Yes
cULus	Yes
<b>Hard disk drive</b>	
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 <sup>1)</sup>
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
<b>Environmental conditions</b>	
Temperature <sup>2)</sup>	
Operation <sup>3)</sup>	0 to 60°C
24-hour operation <sup>4)</sup>	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 <sup>5)</sup>	
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
<b>Mechanical characteristics</b>	
Installation	Fixed <sup>6)</sup>
Dimensions	
Width	13 mm
Height	98 mm
Depth	105 mm
Weight	134 g
<b>Manufacturer information</b>	
Manufacturer	Western Digital
Manufacturer product ID	WD5000LUCT
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR

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

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

### 3.6.5.4 Temperature humidity diagram

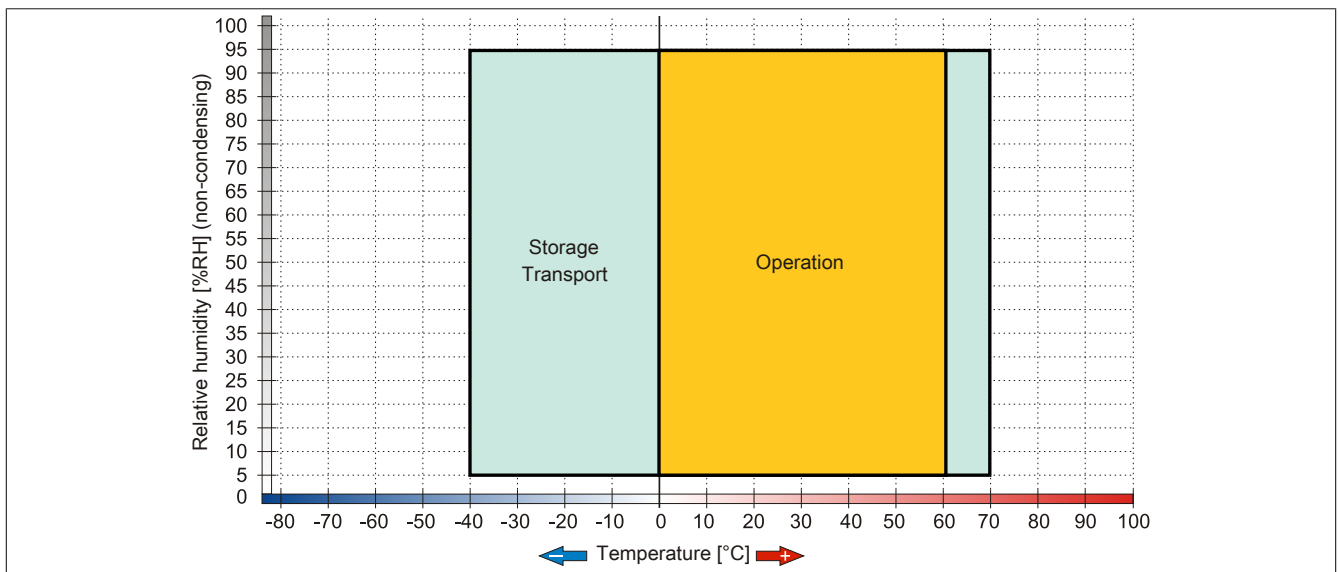


Figure 43: 5AC801.HDDI-04 - Temperature humidity diagram

### 3.6.6 5AC801.SSDI-00

#### 3.6.6.1 General information

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

#### When used in an APC810

##### Information:

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

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

#### 3.6.6.2 Order data


Model number	Short description	Figure
	<b>Drives</b>	
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, mass memory may also be damaged. To prevent damage and loss of data, the use of a UPS device is recommended.

##### Information:

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

Product ID	5AC801.SSDI-00
<b>General information</b>	
Certification	
CE	Yes
cULus	Yes
GL	Yes
<b>Solid state drive</b>	
Capacity	32 GB
Data reliability	< 1 unrecoverable error in 10 <sup>15</sup> bit read accesses
MTBF	2,000,000 hours
Power on/off cycles	50000
S.M.A.R.T. support	Yes
Interface	SATA
Maintenance	None
Continuous reading	Max. 250 MB/s
Continuous writing	Max. 170 MB/s
IOPS <sup>1)</sup>	
4k read	35,000
4k write	3,300

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

Product ID	5AC801.SSDI-00
<b>Endurance</b>	
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) command
<b>Environmental conditions</b>	
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 12,192 m
Storage	-300 to 12,192 m
Transport	-300 to 12,192 m
<b>Mechanical characteristics</b>	
Installation	Fixed <sup>2)</sup>
Dimensions	
Width	13 mm
Height	98 mm
Depth	105 mm
Weight	118 g
<b>Manufacturer information</b>	
Manufacturer	Intel
Manufacturer product ID	SSDSA2SH032G1
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
GL (GL)	Cat. C EMC 1
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
GL (GL)	Cat. C EMC 1

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

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

### 3.6.6.4 Temperature humidity diagram

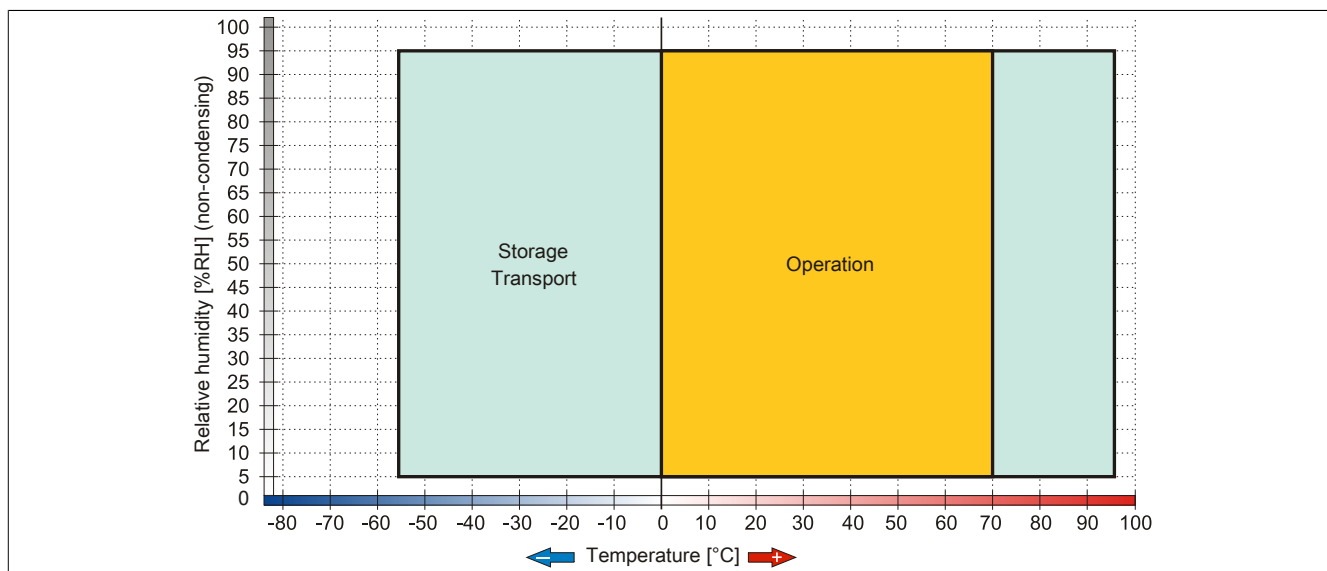


Figure 44: 5AC801.SSDI-00 - Temperature humidity diagram

### 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.

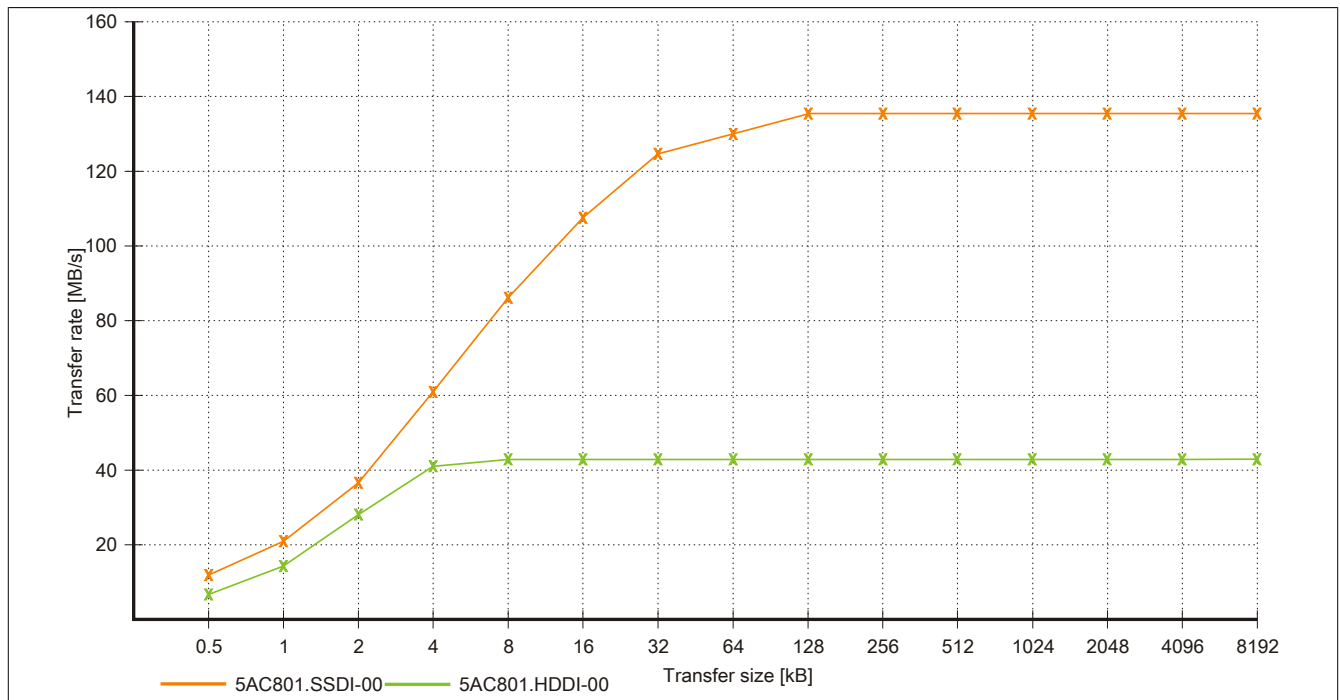


Figure 45: 5AC801.SSDI-00 - ATTO disk benchmark v2.34 - Cyclic read

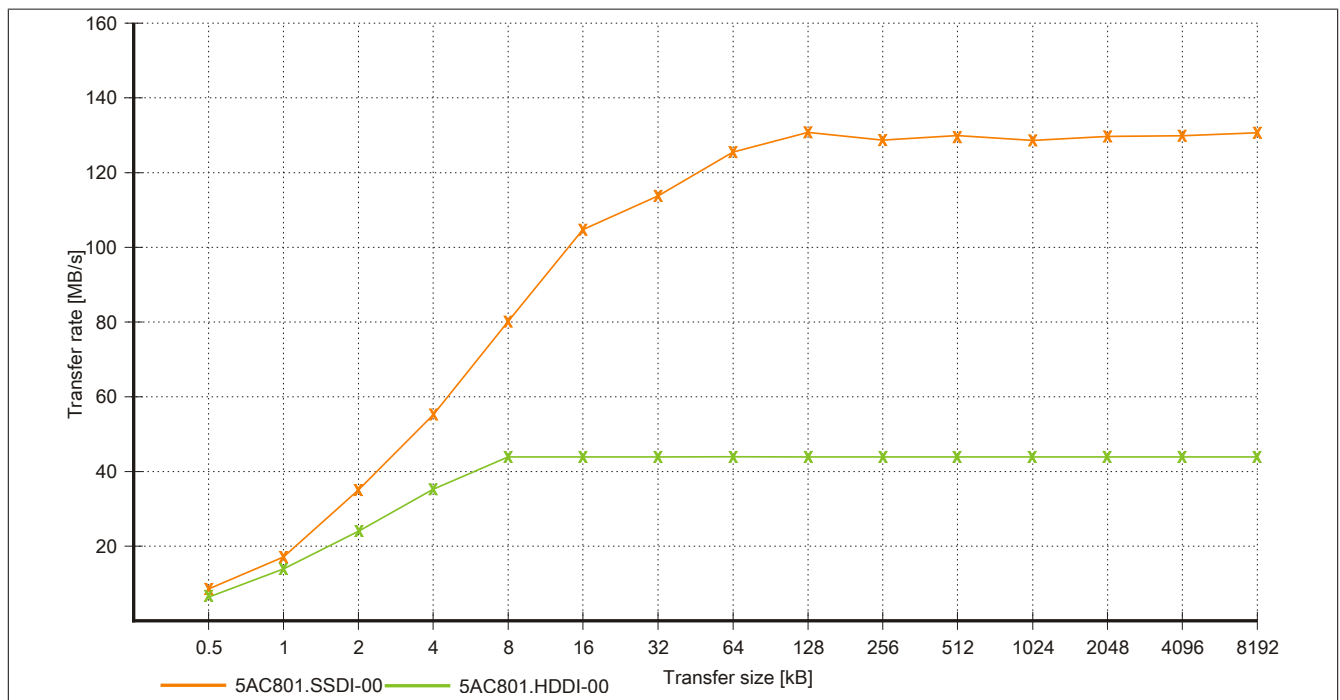


Figure 46: 5AC801.SSDI-00 - ATTO disk benchmark v2.34 - Cyclic write

### 3.6.7 5AC801.SSDI-01

#### 3.6.7.1 General information

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

#### When used in an APC810

##### Information:

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

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

#### 3.6.7.2 Order data


Model number	Short description	Figure
	<b>Drives</b>	
5AC801.SSDI-01	60 GB SATA SSD (MLC), Slide-in compact	
	<b>Optional accessories</b>	
	<b>Drives</b>	
5MMSSD.0060-00	60 GB SATA SSD (MLC); Spare part for 5AC801.SSDI-01; SSD for 5PP5IO.GMAC-00; Remark: Please see manual for proper use of the 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, mass memory may also be damaged. To prevent damage and loss of data, the use of a UPS device is recommended.

##### Information:

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

Product ID	5AC801.SSDI-01
<b>General information</b>	
Certification	
CE	Yes
cULus	Yes
GL	Yes
<b>Solid state drive</b>	
Capacity	60 GB
Data reliability	< 1 unrecoverable errors in 10 <sup>16</sup> 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 <sup>1)</sup>	
4k read	15000
4k write	
Typical	23000
Maximum	80000
Endurance	
MLC flash	Yes
Compatibility	SATA Revision 3.0 compliant ACS-2 SSD Enhanced SMART ATA feature set Native Command Queuing (NCQ) command
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 12,192 m
Storage	-300 to 12,192 m
Transport	-300 to 12,192 m
Mechanical characteristics	
Installation	Fixed <sup>2)</sup>
Dimensions	
Width	13 mm
Height	98 mm
Depth	105 mm
Weight	118 g
Manufacturer information	
Manufacturer	Intel
Manufacturer product ID	SSDSC2CW060A3
Recommendations	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
GL (GL)	Cat. C EMC 1
Recommendations	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
GL (GL)	Cat. C EMC 1

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

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

2) Slide-in compact mounting

### 3.6.7.4 Temperature humidity diagram

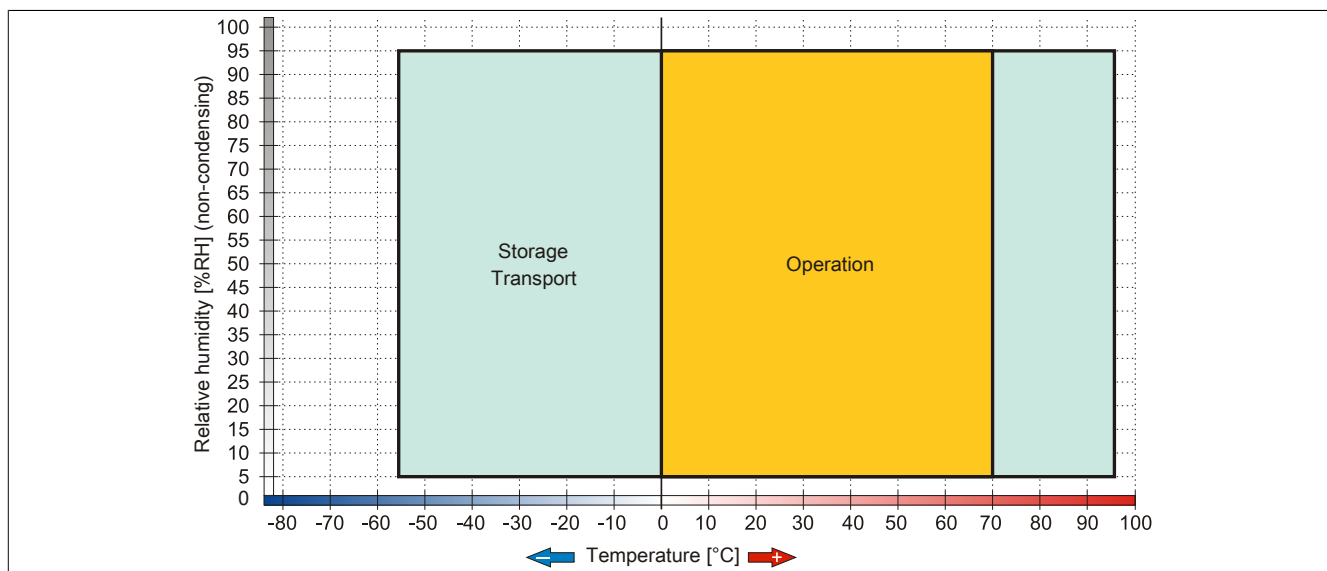


Figure 47: 5AC801.SSDI-01 - Temperature humidity diagram



### 3.6.8 5AC801.SSDI-02

#### 3.6.8.1 General information

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

#### When used in an APC810

##### Information:

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

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

#### 3.6.8.2 Order data


Model number	Short description	Figure
	<b>Drives</b>	
5AC801.SSDI-02	180 GB SATA SSD (MLC), Slide-in compact	
	<b>Optional accessories</b>	
	<b>Drives</b>	
5MMSSD.0180-00	180 GB SATA SSD (MLC); Spare part for 5AC801.SSDI-02; SSD for 5PP5IO.GMAC-00; Remark: Please see manual for proper use of the 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, mass memory may also be damaged.

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

##### Information:

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

Product ID	5AC801.SSDI-02
<b>General information</b>	
Certification	
CE	Yes
cULus	Yes
GL	Yes
<b>Solid state drive</b>	
Capacity	180 GB
Data reliability	< 1 unrecoverable errors in 10 <sup>16</sup> 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 <sup>1)</sup>	
4k read	50000
4k write	
Typical	60000
Maximum	80000
Endurance	
MLC flash	Yes
Compatibility	SATA Revision 3.0 compliant ACS-2 SSD Enhanced SMART ATA feature set Native Command Queuing (NCQ) command
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 12,192 m
Storage	-300 to 12,192 m
Transport	-300 to 12,192 m
Mechanical characteristics	
Installation	Fixed <sup>2)</sup>
Dimensions	
Width	13 mm
Height	98 mm
Depth	105 mm
Weight	118 g
Manufacturer information	
Manufacturer	Intel
Manufacturer product ID	SSDSC2CW180A3
Recommendations	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
GL (GL)	Cat. C EMC 1
Recommendations	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
GL (GL)	Cat. C EMC 1

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

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

2) Slide-in compact mounting

### 3.6.8.4 Temperature humidity diagram

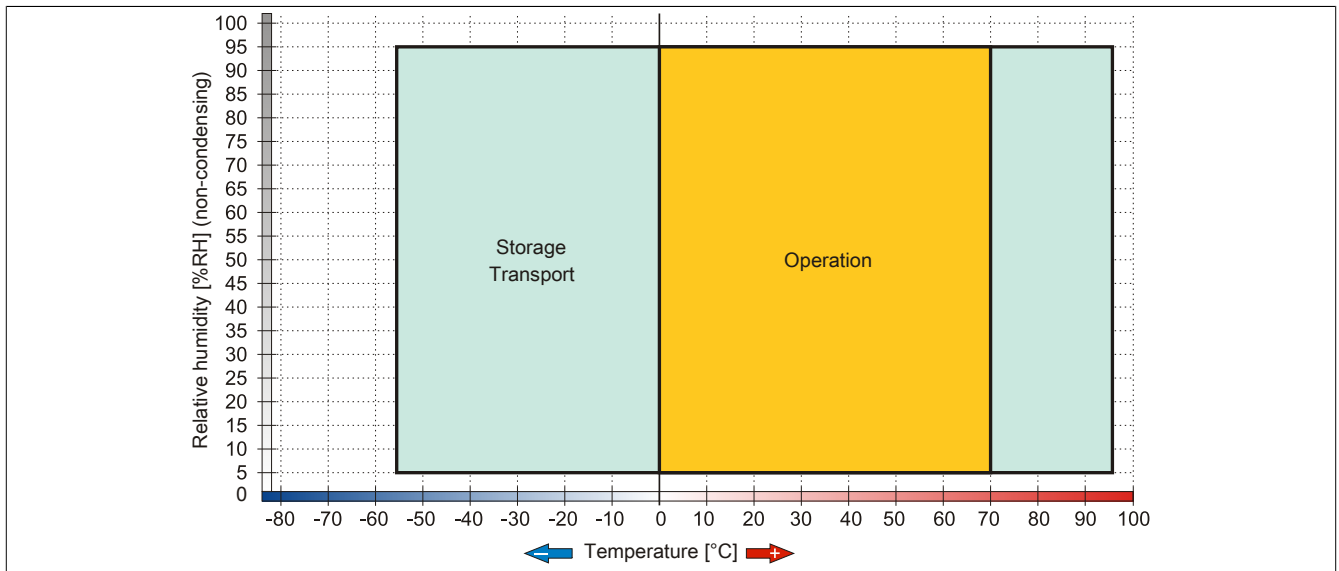


Figure 48: 5AC801.SSDI-02 - Temperature humidity diagram

### 3.6.9 5AC801.SSDI-03

#### 3.6.9.1 General information

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

#### When used in an APC810

##### Information:

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

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

#### 3.6.9.2 Order data


Model number	Short description	Figure
	<b>Drives</b>	
5AC801.SSDI-03	60 GB SATA SSD (MLC), Slide-in compact.	
	<b>Optional accessories</b>	
	<b>Drives</b>	
5MMSSD.0060-01	60 GByte SATA SSD (MLC); Ersatzteil für 5AC801.SSDI-03 und 5AC901.CSSD-03; SSD für 5PP5IO.GMAC-00; Hinweis: Beachten Sie das Manual zum Einsatz der 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, mass memory may also be damaged. To prevent damage and loss of data, the use of a UPS device is recommended.

##### Information:

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

Product ID	5AC801.SSDI-03
<b>General information</b>	
Certification	
cULus	Yes
GL	Yes
<b>Solid state drive</b>	
Capacity	60 GB
Data reliability	< 1 unrecoverable error in 10 <sup>15</sup> 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 <sup>1)</sup>	
4k read	Max. 60,000 (random)
4k write	Max. 25,000 (random)
<b>Endurance</b>	
MLC flash	Yes

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

Product ID	5AC801.SSDI-03
Compatibility	SATA Revision 3.0 compliant ACS-2 SSD Enhanced SMART ATA feature set Native Command Queuing (NCQ) command
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 12,192 m
Storage	-300 to 12,192 m
Transport	-300 to 12,192 m
Mechanical characteristics	
Installation	Fixed <sup>2)</sup>
Dimensions	
Width	13 mm
Height	98 mm
Depth	105 mm
Weight	118 g
Manufacturer information	
Manufacturer	Toshiba
Manufacturer product ID	THNSNH060GBST
Recommendations	
Specified standard	
UL 508 (cULus)	LISTED 14F2 BR
GL (GL)	Cat. C EMC 1
Recommendations	
Specified standard	
UL 508 (cULus)	LISTED 14F2 BR
GL (GL)	Cat. C EMC 1

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

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

### 3.6.9.4 Temperature humidity diagram

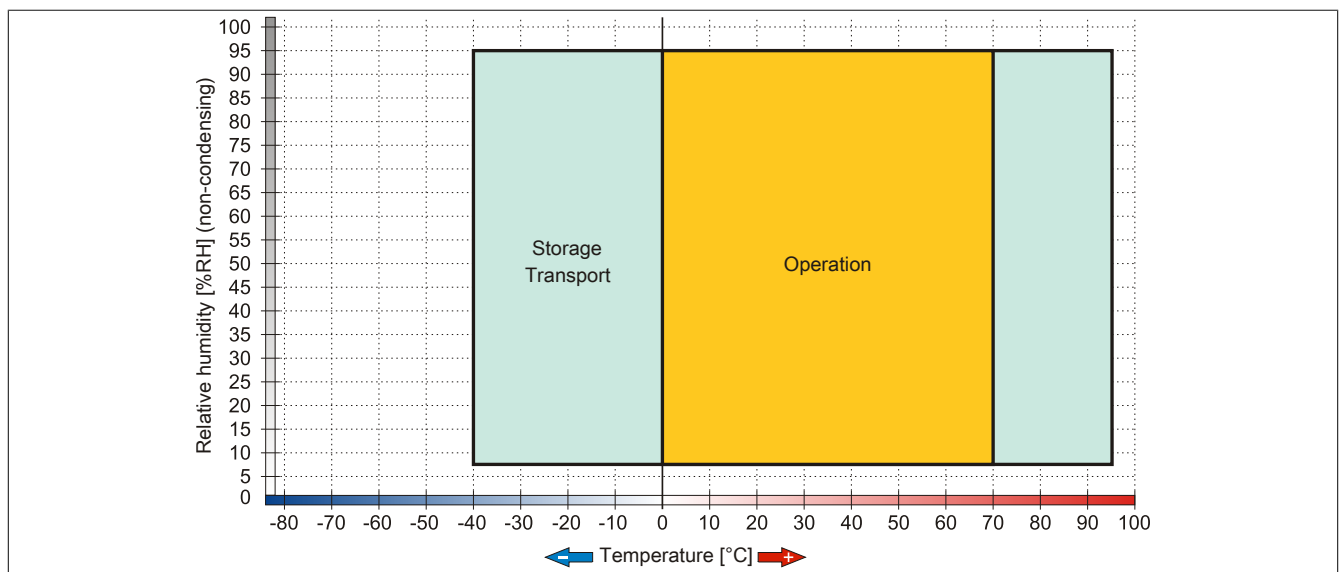


Figure 49: 5AC801.SSDI-03 - Temperature humidity diagram

### 3.6.10 5MMSSD.0060-00

#### 3.6.10.1 General information

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

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

#### 3.6.10.2 Order data


Model number	Short description	Figure
	<b>Drives</b>	
5MMSSD.0060-00	60 GB SATA SSD (MLC); Spare part for 5AC801.SSDI-01; SSD for 5PP5IO.GMAC-00; Remark: Please see manual for proper use of the SSD.	

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

#### 3.6.10.3 Technical data

##### Caution!

A sudden loss of power may result in data loss! In very rare cases, mass memory may also be damaged.  
To prevent damage and loss of data, the use of a UPS device is recommended.

##### Information:

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

Product ID	5MMSSD.0060-00
<b>General information</b>	
Certification	
CE	Yes
cULus	Yes
<b>Solid state drive</b>	
Capacity	60 GB
Data reliability	< 1 unrecoverable errors in 10 <sup>16</sup> 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 <sup>1)</sup>	
4k read	15000
4k write	
Typical	23000
Maximum	80000
<b>Endurance</b>	
MLC flash	Yes
Compatibility	SATA Revision 3.0 compliant ACS-2 SSD Enhanced SMART ATA feature set Native Command Queuing (NCQ) command

Table 82: 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 12,192 m
Storage	-300 to 12,192 m
Transport	-300 to 12,192 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
Recommendations	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
Recommendations	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR

Table 82: 5MMSSD.0060-00 - Technical data

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

### 3.6.10.4 Temperature humidity diagram

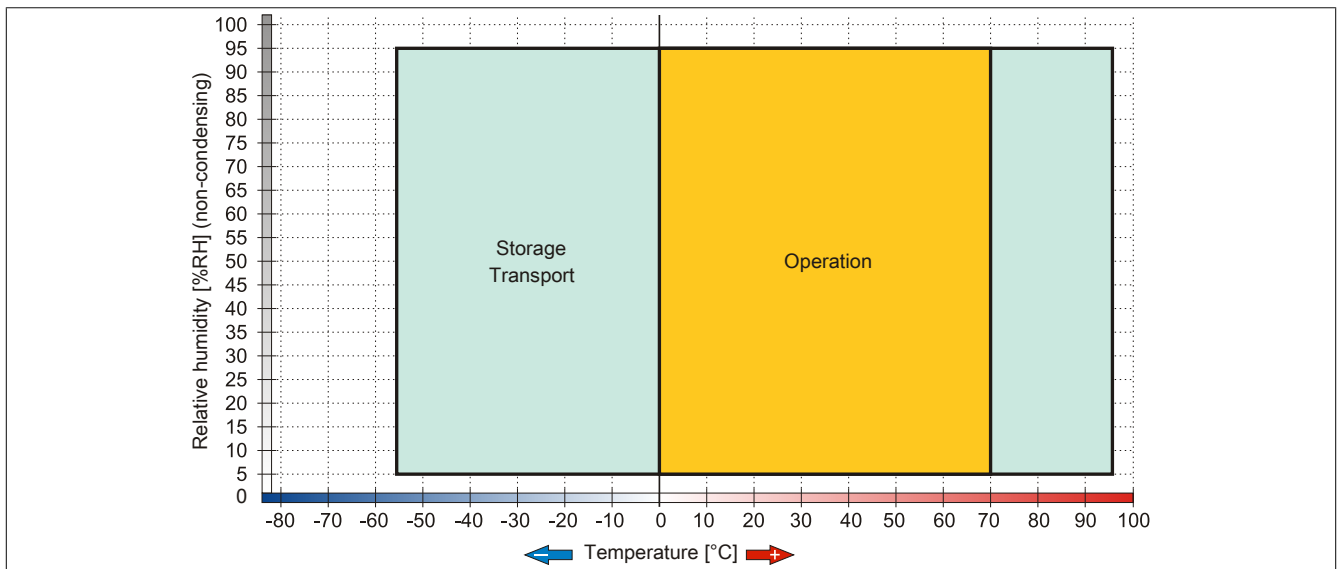


Figure 50: 5AC801.SSDI-01 - Temperature humidity diagram

### 3.6.11 5MMSSD.0060-01

#### 3.6.11.1 General information

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

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

#### 3.6.11.2 Order data

Model number	Short description	Figure
	<b>Drives</b>	Image not found for 5MMSSD.0060-01!
5MMSSD.0060-01	60 GByte SATA SSD (MLC); Ersatzteil für 5AC801.SSDI-03 und 5AC901.CSSD-03; SSD für 5PP5IO.GMAC-00; Hinweis: Beachten Sie das Manual zum Einsatz der SSD.	

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

#### 3.6.11.3 Technical data

##### Caution!

A sudden loss of power may result in data loss! In very rare cases, mass memory may also be damaged. To prevent damage and loss of data, the use of a UPS device is recommended.

##### Information:

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

Product ID	5MMSSD.0060-01
<b>General information</b>	
Certification cULus	Yes
<b>Solid state drive</b>	
Capacity	60 GB
Data reliability	< 1 unrecoverable error in 10 <sup>15</sup> 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 <sup>1)</sup>	
4k read	Max. 60,000 (random)
4k write	Max. 25,000 (random)
<b>Endurance</b>	
MLC flash	Yes
Compatibility	SATA Revision 3.0 compliant ACS-2 SSD Enhanced SMART ATA feature set Native Command Queuing (NCQ) command
<b>Environmental conditions</b>	
Temperature	
Operation	0 to 70°C
Storage	-40 to 95°C
Transport	-40 to 95°C
Relative humidity	
Operation	8 to 95%, non-condensing
Storage	8 to 95%, non-condensing
Transport	8 to 95%, non-condensing
Vibration	
Operation	10 to 2000 Hz: 20 g
Storage	10 to 2000 Hz: 20 g
Transport	10 to 2000 Hz: 20 g

Table 84: 5MMSSD.0060-01 - Technical data



Product ID	5MMSSD.0060-01
Shock	
Operation	1500 g, 0.5 ms
Storage	1500 g, 0.5 ms
Transport	1500 g, 0.5 ms
Altitude	
Operation	-300 to 12,192 m
Storage	-300 to 12,192 m
Transport	-300 to 12,192 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
Recommendations	
Specified standard UL 508 (cULus)	LISTED 14F2 BR
Recommendations	
Specified standard UL 508 (cULus)	LISTED 14F2 BR

Table 84: 5MMSSD.0060-01 - Technical data

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

### 3.6.11.4 Temperature humidity diagram

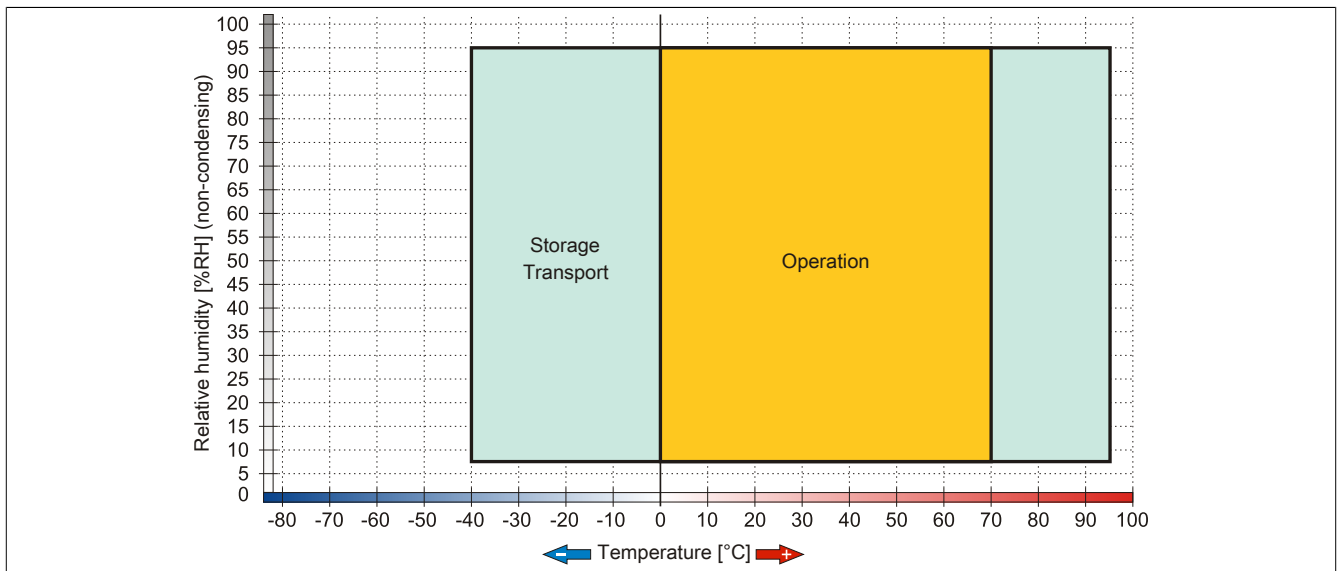


Figure 51: 5MMSSD.0060-01 - Temperature humidity diagram

### 3.6.12 5MMSSD.0180-00

#### 3.6.12.1 General information

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

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

#### 3.6.12.2 Order data


Model number	Short description	Figure
	<b>Drives</b>	
5MMSSD.0180-00	180 GB SATA SSD (MLC); Spare part for 5AC801.SSDI-02; SSD for 5PP5IO.GMAC-00; Remark: Please see manual for proper use of the SSD.	

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

#### 3.6.12.3 Technical data

##### Caution!

A sudden loss of power may result in data loss! In very rare cases, mass memory may also be damaged.  
To prevent damage and loss of data, the use of a UPS device is recommended.

##### Information:

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

Product ID	5MMSSD.0180-00
<b>General information</b>	
Certification	
CE	Yes
cULus	Yes
<b>Solid state drive</b>	
Capacity	180 GB
Data reliability	< 1 unrecoverable errors in 10 <sup>16</sup> 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 <sup>1)</sup>	
4k read	50000
4k write	
Typical	60000
Maximum	80000
<b>Endurance</b>	
MLC flash	Yes
Compatibility	SATA Revision 3.0 compliant ACS-2 SSD Enhanced SMART ATA feature set Native Command Queuing (NCQ) command

Table 86: 5MMSSD.0180-00 - Technical data

<b>Product ID</b>	<b>5MMSSD.0180-00</b>
<b>Environmental conditions</b>	
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 12,192 m
Storage	-300 to 12,192 m
Transport	-300 to 12,192 m
<b>Mechanical characteristics</b>	
Dimensions	
Width	9.5 mm
Height	69 mm
Depth	100 mm
Weight	78 g
<b>Manufacturer information</b>	
Manufacturer	Intel
Manufacturer product ID	SSDSC2CW180A3
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR

Table 86: 5MMSSD.0180-00 - Technical data

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

### 3.6.12.4 Temperature humidity diagram

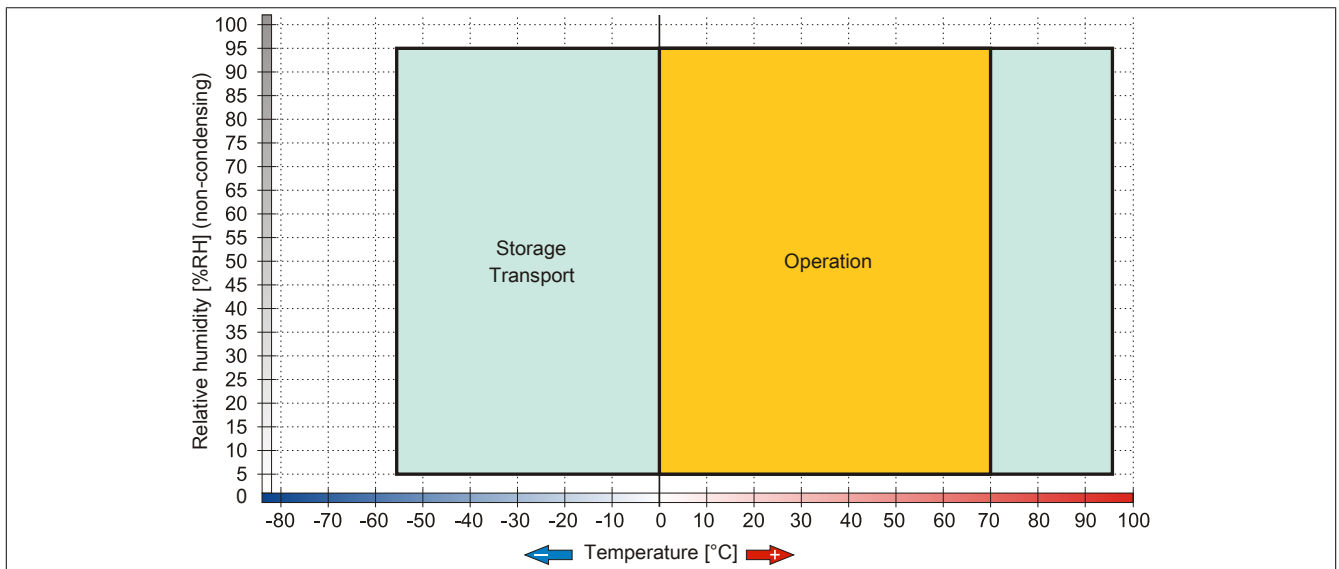


Figure 52: 5AC801.SSDI-02 - Temperature humidity diagram

### 3.6.13 5AC801.ADAS-00

#### 3.6.13.1 General information

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

#### When used in an APC810

##### Information:

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

#### 3.6.13.2 Order data


Model number	Short description	Figure
	<b>Drives</b>	
5AC801.ADAS-00	SATA hard disk adapter to operate a slide-in compact hard disk in a slide-in slot.	

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

#### 3.6.13.3 Technical data

Product ID	5AC801.ADAS-00
<b>General information</b>	
Certification	
CE	Yes
cULus	Yes
GL	Yes
<b>Mechanical characteristics</b>	
Dimensions	
Width	22 mm
Height	172.5 mm
Depth	150 mm
Weight	328 g
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
GL (GL)	Cat. C EMC 1
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
GL (GL)	Cat. C EMC 1

Table 88: 5AC801.ADAS-00 - Technical data

### 3.6.14 5AC801.HDDS-00

#### 3.6.14.1 General information

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

#### Information:

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

#### When used in 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.

#### 3.6.14.2 Order data


Model number	Short description	Figure
5AC801.HDDS-00	<b>Drives</b> 40 GB SATA hard disk, slide-in; 24/7 hard disk with extended temperature range. Remark: Please see manual for proper use of the hard disk.	

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

#### 3.6.14.3 Technical data

#### Information:

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

Product ID	5AC801.HDDS-00
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 <sup>1)</sup>
S.M.A.R.T. support	Yes
Interface	SATA
Access time	5.6 ms
Data transfer rate	
Internal	Max. 450 Mbits/s
To/From host	Max. 150 MB/s (Ultra DMA mode 5)
Positioning time	
Minimum (track to track)	1 ms
Nominal (read only)	12.5 ms
Maximum (read only)	23 ms

Table 90: 5AC801.HDDS-00 - Technical data

Product ID	5AC801.HDDS-00
Environmental conditions	
Temperature <sup>2)</sup>	
Operation <sup>3)</sup>	-30 to 85°C
24-hour operation <sup>4)</sup>	-30 to 85°C
Storage	-40 to 95°C
Transport	-40 to 95°C
Relative humidity <sup>5)</sup>	
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 <sup>6)</sup>
Dimensions	
Width	22 mm
Height	172.5 mm
Depth	150 mm
Weight	387 g
Manufacturer information	
Manufacturer	Seagate
Manufacturer product ID	ST940817SM
Recommendations	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
GL (GL)	Cat. C EMC 1
Recommendations	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
GL (GL)	Cat. C EMC 1

Table 90: 5AC801.HDDS-00 - Technical data

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

### 3.6.14.4 Temperature humidity diagram

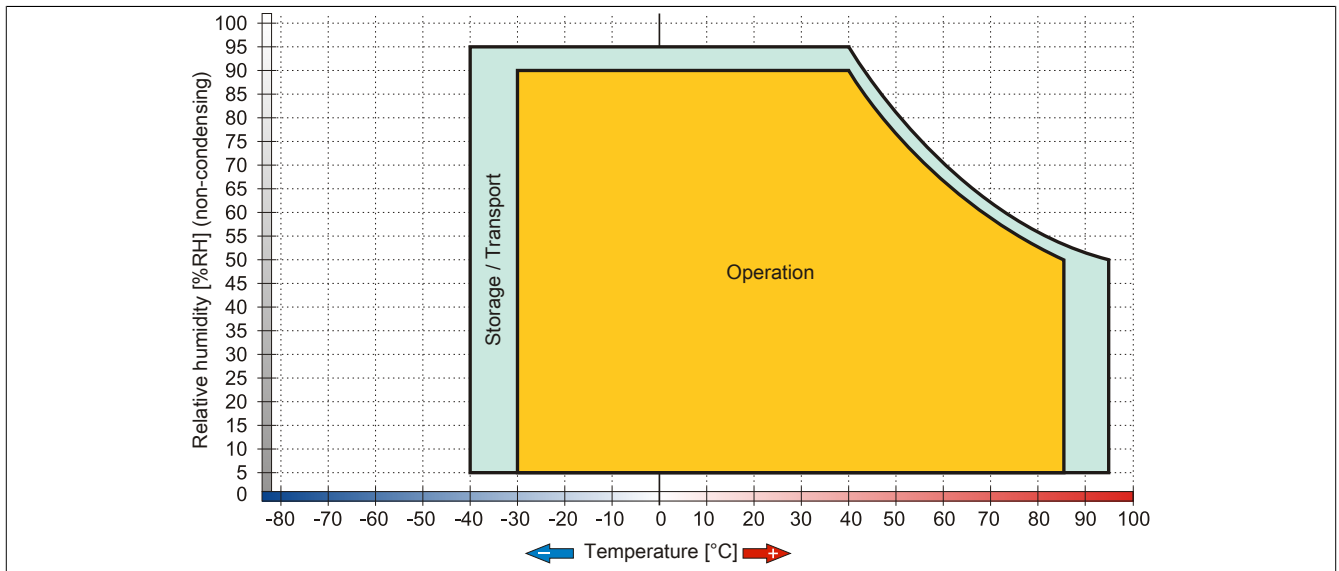


Figure 53: 5AC801.HDDS-00 - Temperature humidity diagram

### 3.6.15 5AC801.DVDS-00

#### 3.6.15.1 General information

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

#### Information:

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

#### When used in 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.

#### 3.6.15.2 Order data


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

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

#### 3.6.15.3 Technical data

#### Information:

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

Product ID	5AC801.DVDS-00
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 (Double Layer), DVD-R (Single/Multi-border), DVD-R DL (Single/Multi-border), DVD-RW (Single/Multi-border), DVD+R (Single/Multi session), DVD+R DL (Single/Multi session), DVD+RW (Single/Multi session), DVD-RAM (4.7 GB, 2.6 GB)
Laser class	Class 1 laser
Service life	60000 POH (Power-On Hours)
Interface	SATA
Startup time	
CD	Max. 19 seconds (0 rpm to read access)
DVD	Max. 19 seconds (0 rpm to read access)
Access time	
CD	Average of 130 ms
DVD	Average of 140 ms

Table 92: 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 <sup>1)</sup> Operation Storage Transport	5 to 55°C <sup>2)</sup> -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: 0.2g 5 to 500 Hz: 2g 5 to 500 Hz: 2g
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
Recommendations	
Specified standard CE (CE) UL 508 (cULus) GL (GL)	Yes LISTED 14F2 BR Cat. C EMC 1
Recommendations	
Specified standard CE (CE) UL 508 (cULus) GL (GL)	Yes LISTED 14F2 BR Cat. C EMC 1

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

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

### 3.6.15.4 Temperature humidity diagram

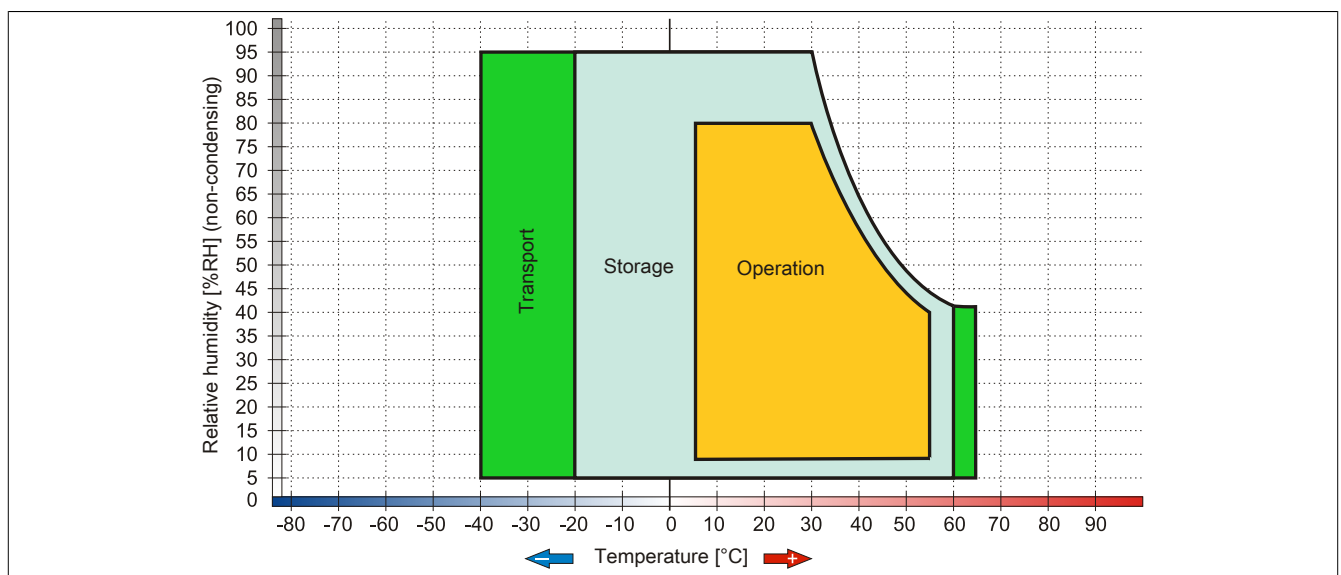


Figure 54: 5AC801.DVDS-00 - Temperature humidity diagram

### **3.6.15.5 Hot plug capable**

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

### 3.6.16 5AC801.DVRS-00

#### 3.6.16.1 General information

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

#### Information:

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

#### When used in 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.

#### 3.6.16.2 Order data


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

Table 93: 5AC801.DVRS-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 entire device. For the entire device in which this individual component is used, refer to the data given specifically for the entire device.

Product ID	5AC801.DVRS-00
<b>General information</b>	
Certification	
CE	Yes
cULus	Yes
GL	Yes
<b>CD / DVD drive</b>	
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 (double layer), DVD-RW, DVD-Video DVD-RAM (4.7GB, 2.6GB) DVD+R, DVD+R (double layer), DVD+RW
Laser class	Class 1 laser
Service life	60000 POH (Power-On Hours)
Interface	SATA
Startup time	
CD	Max. 14 seconds (0 rpm to read access)
DVD	Max. 15 seconds (0 rpm to read access)
Access time	
CD	On average 140 ms (24x)
DVD	On average 150 ms (8x)

Table 94: 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 (double layer), DVD-RW, DVD-RAM, DVD+R, DVD+R (double layer), DVD+RW, DVD-RAM
Writable media CD DVD	CD-R, CD-RW DVD-R/RW, DVD-R (double layer), DVD-RAM (4.7 GB), DVD+R/RW, DVD+R (double 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 <sup>1)</sup> 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, over-write, sequential, multi-session
Environmental conditions	
Temperature <sup>2)</sup> Operation Storage Transport	5 to 55°C <sup>3)</sup> -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: 0.2g 5 to 500 Hz: 2g 5 to 500 Hz: 2g
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
Recommendations	
Specified standard CE (CE) UL 508 (cULus) GL (GL)	Yes LISTED 14F2 BR Cat. C EMC 1
Recommendations	
Specified standard CE (CE) UL 508 (cULus) GL (GL)	Yes LISTED 14F2 BR Cat. C EMC 1

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

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

### 3.6.16.4 Temperature humidity diagram

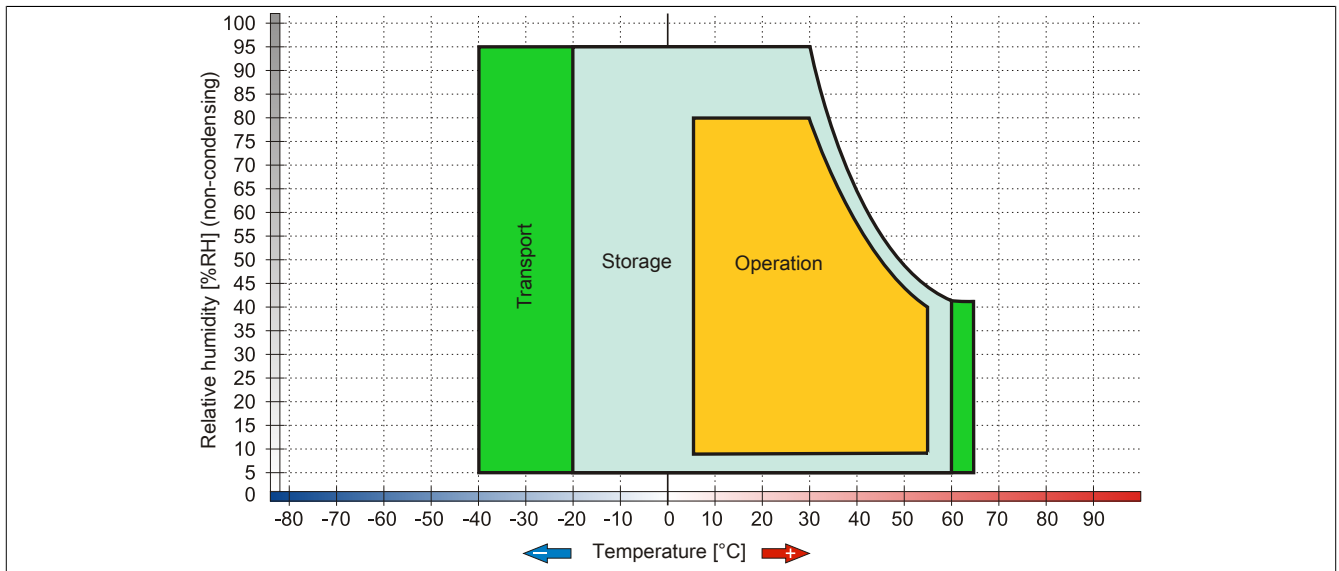


Figure 55: 5AC801.DVRS-00 - Temperature humidity diagram

3.6.17 5ACPCI.RAIC-01

3.6.17.1 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

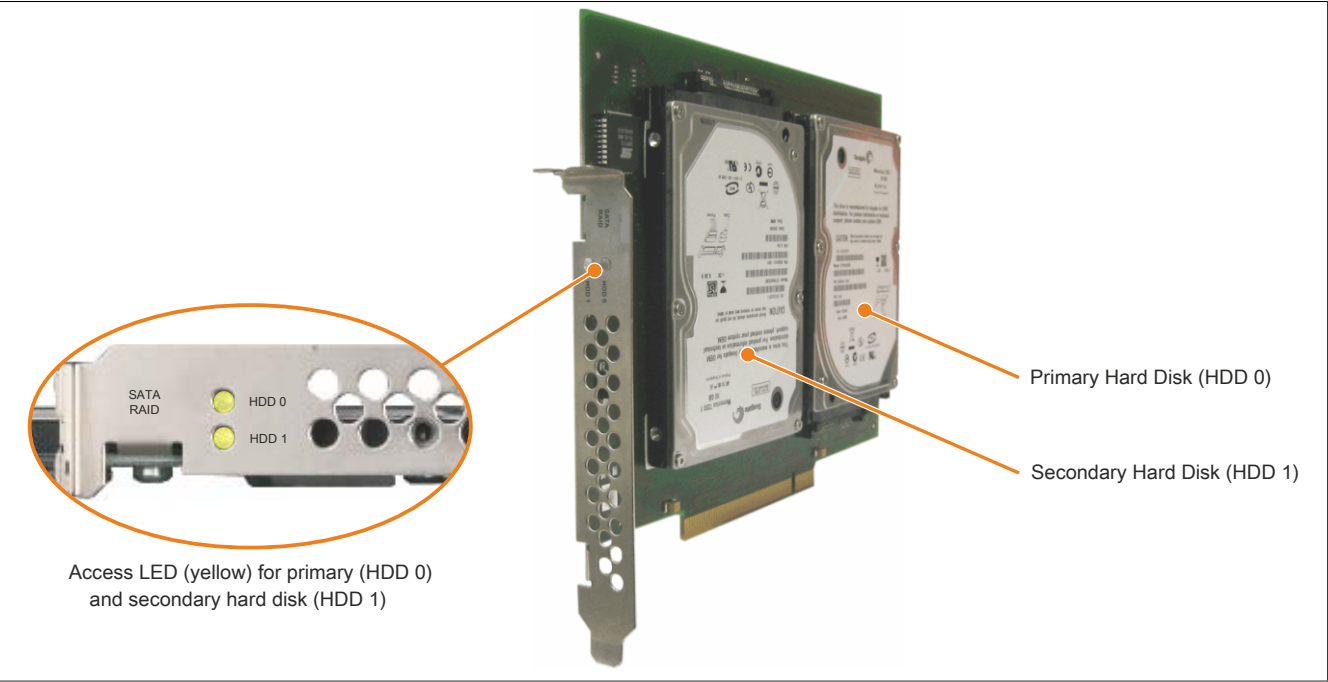


Figure 56: PCI SATA RAID controller

**Information:**

The PCI SATA RAID controller cannot be used in place of a Universal Power Supply (UPS). If the operating system is shut down improperly, the next time it is started it is detected as an error by the RAID 1, and a complete rebuild is executed. This generally takes at least 50 minutes (configurable) to complete.

3.6.17.2 Order data

Model number	Short description	Figure
5ACPCI.RAIC-01	PCI RAID System SATA 2x 60 GB Remark: Please see manual for proper use of the hard disk.	
	Optional accessories	
	Undefined	
5ACPCI.RAIC-02	60 GByte SATA Hard Disk Spare part for 5ACPCI.RAIC-01 Remark: Please see manual for proper use of the hard disk.	

Table 95: 5ACPCI.RAIC-01 - 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 entire device. For the entire device in which this individual component is used, refer to the data given specifically for the entire device.

<b>Product ID</b>	<b>5ACPCI.RAIC-01</b>
<b>General information</b>	
Number of hard disks	2
Certification CE cULus	Yes Yes
<b>Controller</b>	
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
<b>Hard disk drive</b>	
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 To/From host	Max. 539 Mbits/s Max. 150 MB/s
Positioning time Minimum (track to track) Nominal (read only) Maximum (read only)	1.5 ms 10.5 ms 22 ms
<b>Electrical characteristics</b>	
Power consumption	0.3A at 3.3V (PCI bus) 1A at 5V (PCI bus)
<b>Environmental conditions</b>	
Temperature <sup>1)</sup> Operation <sup>2)</sup> 24-hour operation <sup>3)</sup> Storage Transport	5 to 55°C 5 to 40°C -40 to 70°C -40 to 70°C
Relative humidity Operation Storage Transport	5 to 90%, non-condensing 5 to 95%, non-condensing 5 to 95%, non-condensing
Vibration <sup>4)</sup> Operation (continuous) Operation (occasional) Storage Transport	5 to 500 Hz: 0.125 g (1.225 m/s <sup>2</sup> 0-peak) duration 1 octave per minute; no damage 5 to 500 Hz: 0.25 g (2.45 m/s <sup>2</sup> 0-peak) duration 1 octave per minute; no damage At max. 5 to 500 Hz and 5 g (49 m/s <sup>2</sup> 0-peak) duration 0.5 octave per minute; no damage At max. 5 to 500 Hz and 5 g (49 m/s <sup>2</sup> 0-peak) duration 0.5 octave per minute; no damage
Shock Operation Storage  Transport	At max. 125 g (1226 m/s <sup>2</sup> 0-peak) and 2 ms duration; no unrecoverable errors At max. 400 g (3924 m/s <sup>2</sup> 0-peak) and 2 ms duration; no damage At max. 450 g (4424 m/s <sup>2</sup> 0-peak) and 1 ms duration; no damage At max. 200 g (1962 m/s <sup>2</sup> 0-peak) and 0.5 ms duration; no damage At max. 400 g (3924 m/s <sup>2</sup> 0-peak) and 2 ms duration; no damage At max. 450 g (4424 m/s <sup>2</sup> 0-peak) and 1 ms duration; no damage At max. 200 g (1962 m/s <sup>2</sup> 0-peak) and 0.5 ms duration; no damage
Altitude Operation Storage	-300 to 3048 m -300 to 12192 m
<b>Mechanical characteristics</b>	
Installation <sup>5)</sup>	Fixed
Dimensions Width Length Height	70 mm 100 mm 9.5 mm
Weight	350 g

Table 96: 5ACPCI.RAIC-01 - Technical data

<b>Product ID</b>	<b>5ACPCI.RAIC-01</b>
<b>Manufacturer information</b>	
Manufacturer	Seagate
Manufacturer product ID	Momentum 7200.1 ST96023AS
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR

Table 96: 5ACPCI.RAIC-01 - Technical data

- 1) Temperature values for 305 meter altitude. The temperature specification must be reduced linearly by 1 °C every 305 meters. The temperature increase and decrease can be a maximum of 3°C per minute.
- 2) Standard operation means 333 POH (power-on hours) per month.
- 3) 24-hour operation means 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) Mounted on PCI insert.

### 3.6.17.4 Temperature humidity diagram

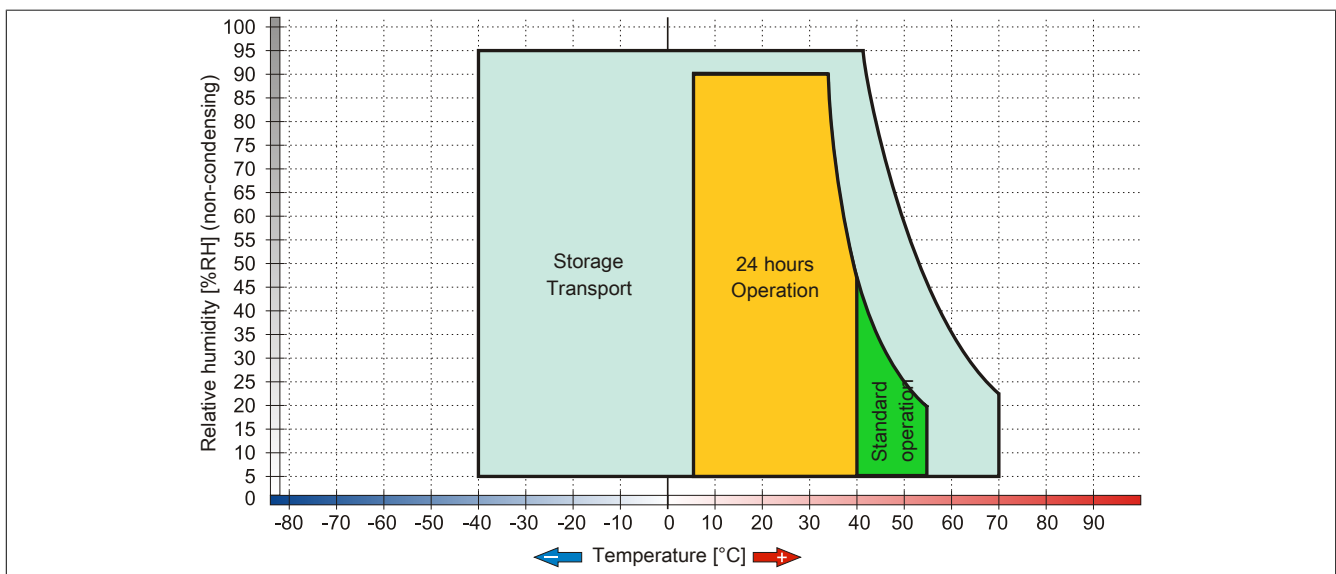


Figure 57: 5ACPCI.RAIC-01 - Temperature humidity diagram

### 3.6.17.5 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](http://www.br-automation.com)).

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

#### Information:

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

### 3.6.17.6 Configuration

Configuring a SATA RAID network: see Chapter 3 "Commissioning", section 7 "Configuration of a SATA RAID array" on page 226.

### 3.6.17.7 Exchanging a HDD

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

For instructions on exchanging the drive, see chapter Chapter 7 "Maintenance / Service", section 11 "Exchanging a PCI SATA RAID hard disk in a RAID 1 system" on page 432.



### 3.6.18 5ACPCI.RAIC-02

#### 3.6.18.1 General information

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

#### 3.6.18.2 Order data


Model number	Short description	Figure
5ACPCI.RAIC-02	60 GByte SATA Hard Disk Spare part for 5ACPCI.RAIC-01 Remark: Please see manual for proper use of the hard disk.	

Table 97: 5ACPCI.RAIC-02 - 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 entire device. For the entire device in which this individual component is used, refer to the data given specifically for the entire device.

Product ID	5ACPCI.RAIC-02
<b>General information</b>	
Certification	
CE	Yes
cULus	Yes
<b>Hard disk drive</b>	
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 Mbits/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
<b>Environmental conditions</b>	
Temperature <sup>1)</sup>	
Operation <sup>2)</sup>	5 to 55°C
24-hour operation <sup>3)</sup>	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 <sup>4)</sup>	
Operation (continuous)	5 to 500 Hz: 0.125 g (1.225 m/s <sup>2</sup> 0-peak) duration 1 octave per minute; no damage
Operation (occasional)	5 to 500 Hz: 0.25 g (2.45 m/s <sup>2</sup> 0-peak) duration 1 octave per minute; no damage
Storage	At max. 5 to 500 Hz and 5 g (49 m/s <sup>2</sup> 0-peak) duration 0.5 octave per minute; no damage
Transport	At max. 5 to 500 Hz and 5 g (49 m/s <sup>2</sup> 0-peak) duration 0.5 octave per minute; no damage

Table 98: 5ACPCI.RAIC-02 - Technical data

Product ID	5ACPCI.RAIC-02
Shock	At max. 125 g (1226 m/s <sup>2</sup> 0-peak) and 2 ms duration; no unrecoverable errors
Operation	At max. 400 g (3924 m/s <sup>2</sup> 0-peak) and 2 ms duration; no damage
Storage	At max. 450 g (4424 m/s <sup>2</sup> 0-peak) and 1 ms duration; no damage
Transport	At max. 200 g (1962 m/s <sup>2</sup> 0-peak) and 0.5 ms duration; no damage
	At max. 400 g (3924 m/s <sup>2</sup> 0-peak) and 2 ms duration; no damage
	At max. 450 g (4424 m/s <sup>2</sup> 0-peak) and 1 ms duration; no damage
	At max. 200 g (1962 m/s <sup>2</sup> 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
Recommendations	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
Recommendations	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR

Table 98: 5ACPCI.RAIC-02 - Technical data

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

### 3.6.18.4 Temperature humidity diagram

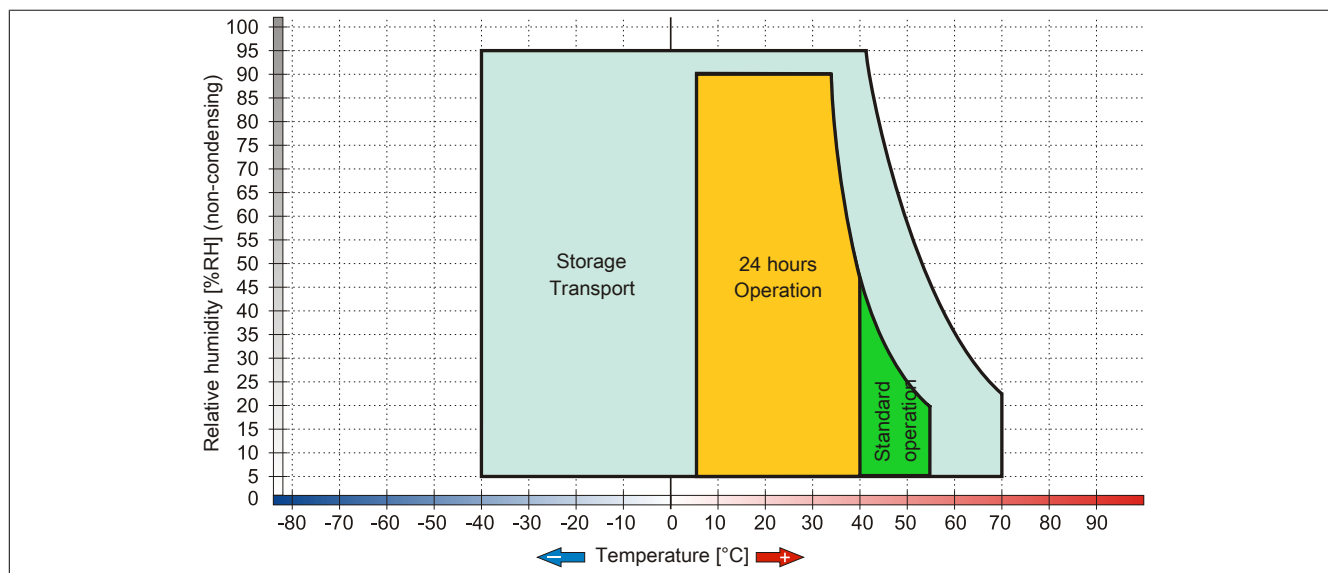


Figure 58: 5ACPCI.RAIC-02 - Temperature humidity diagram

### 3.6.19 5ACPCI.RAIC-03

#### 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 being used are specified for 24-hour operation (24x7) and also provides an extended temperature specification (ET).

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

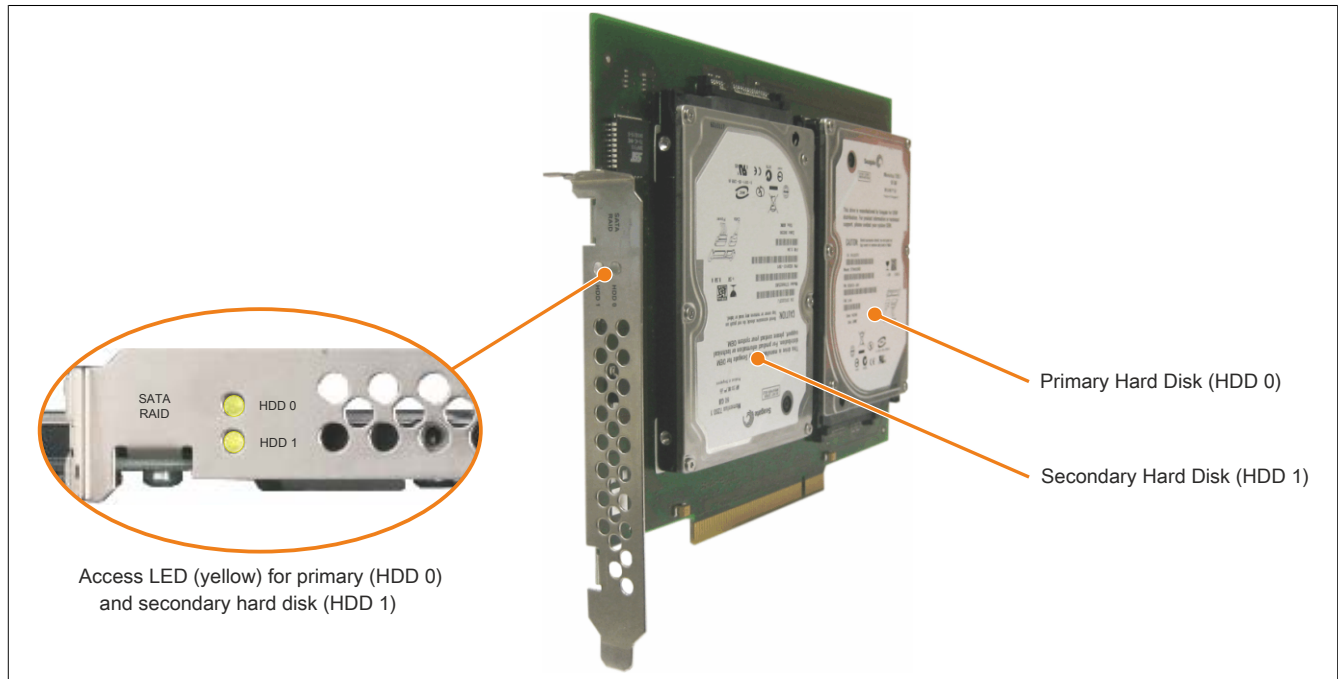


Figure 59: PCI SATA RAID controller

#### Information:

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

#### 3.6.19.2 Order data

Model number	Short description	Figure
5ACPCI.RAIC-03	<b>Drives</b>	
	PCI RAID System SATA 2x 160 GB; Remark: Please see manual for proper use of the hard disk.	
	<b>Optional accessories</b>	
5ACPCI.RAIC-04	<b>Drives</b>	
	160 GB SATA Hard Disk Spare part for 5ACPCI.RAIC-03; Remark: Please see manual for proper use of the hard disk.	

Table 99: 5ACPCI.RAIC-03 - 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 entire device. For the entire device in which this individual component is used, refer to the data given specifically for the entire device.

<b>Product ID</b>	<b>5ACPCI.RAIC-03</b>
<b>General information</b>	
Number of hard disks	2
Certification CE	Yes
<b>Controller</b>	
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
<b>Hard disk drive</b>	
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 Mbits/s
To/From host	Max. 150 MB/s
Positioning time	
Minimum (track to track)	1.5 ms
Nominal (read only)	12 ms
Maximum (read only)	22 ms
<b>Electrical characteristics</b>	
Power consumption	0.3A at 3.3V (PCI bus) 1A at 5V (PCI bus)
<b>Environmental conditions</b>	
Temperature <sup>1)</sup>	
Operation <sup>2)</sup>	-15 to 80°C
24-hour operation <sup>3)</sup>	-15 to 80°C
Storage	-40 to 95°C
Transport	-40 to 95°C
Relative humidity	
Operation	8 to 90%, non-condensing <sup>4)</sup>
Storage	5 to 95%, non-condensing <sup>5)</sup>
Transport	5 to 95%, non-condensing <sup>5)</sup>
Vibration <sup>6)</sup>	
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
<b>Mechanical characteristics</b>	
Installation <sup>7)</sup>	Fixed
Dimensions	
Width	70 mm
Length	100 mm
Height	9.5 mm
Weight	350 g

Table 100: 5ACPCI.RAIC-03 - Technical data

<b>Product ID</b>	<b>5ACPCI.RAIC-03</b>
<b>Manufacturer information</b>	
Manufacturer	Fujitsu
Manufacturer product ID	M120-ESW MHY2160BH-ESW
<b>Recommendations</b>	
Specified standard CE (CE)	Yes
<b>Recommendations</b>	
Specified standard CE (CE)	Yes

Table 100: 5ACPCI.RAIC-03 - Technical data

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

### 3.6.19.4 Temperature humidity diagram

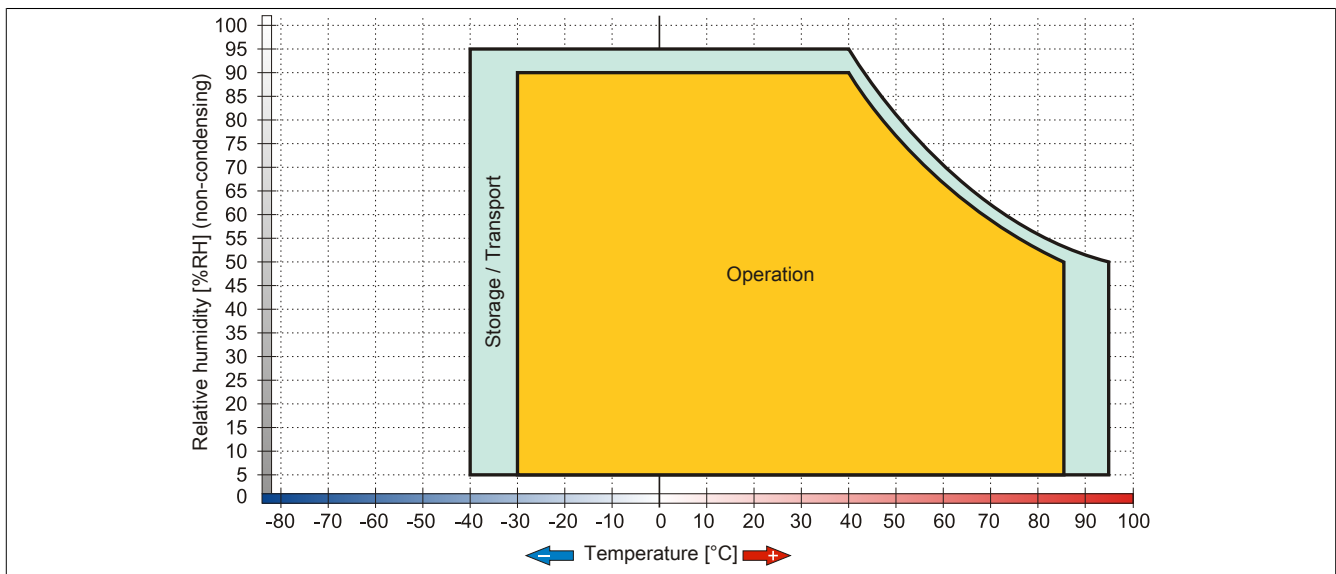


Figure 60: 5ACPCI.RAIC-03 - Temperature humidity diagram

### 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](http://www.br-automation.com)).

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

#### Information:

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

### 3.6.19.6 Configuration

Configuring a SATA RAID network: see Chapter 3 "Commissioning", section 7 "Configuration of a SATA RAID array" on page 226.

### 3.6.19.7 Exchanging a HDD

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

For instructions on exchanging the drive, see chapter Chapter 7 "Maintenance / Service", section 11 "Exchanging a PCI SATA RAID hard disk in a RAID 1 system" on page 432.

### 3.6.20 5ACPCI.RAIC-04

#### 3.6.20.1 General information

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

#### 3.6.20.2 Order data


Model number	Short description	Figure
5ACPCI.RAIC-04	<b>Drives</b> 160 GB SATA Hard Disk Spare part for 5ACPCI.RAIC-03; Remark: Please see manual for proper use of the hard disk.	

Table 101: 5ACPCI.RAIC-04 - 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 entire device. For the entire device in which this individual component is used, refer to the data given specifically for the entire device.

Product ID	5ACPCI.RAIC-04
<b>General information</b>	
Certification CE	Yes
<b>Hard disk drive</b>	
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 Mbits/s
To/From host	Max. 150 MB/s
Positioning time	
Minimum (track to track)	1.5 ms
Nominal (read only)	12 ms
Maximum (read only)	22 ms
<b>Electrical characteristics</b>	
Power consumption	0.3A at 3.3V (PCI bus) 1A at 5V (PCI bus)
<b>Environmental conditions</b>	
Temperature <sup>1)</sup>	
Operation <sup>2)</sup>	-15 to 80°C
24-hour operation <sup>3)</sup>	-15 to 80°C
Storage	-40 to 95°C
Transport	-40 to 95°C
Relative humidity	
Operation	8 to 90%, non-condensing <sup>4)</sup>
Storage	5 to 95%, non-condensing <sup>5)</sup>
Transport	5 to 95%, non-condensing <sup>5)</sup>
Vibration <sup>6)</sup>	
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 102: 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
Recommendations	
Specified standard	
CE (CE)	Yes
Recommendations	
Specified standard	
CE (CE)	Yes

Table 102: 5ACPCI.RAIC-04 - Technical data

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

### 3.6.20.4 Temperature humidity diagram

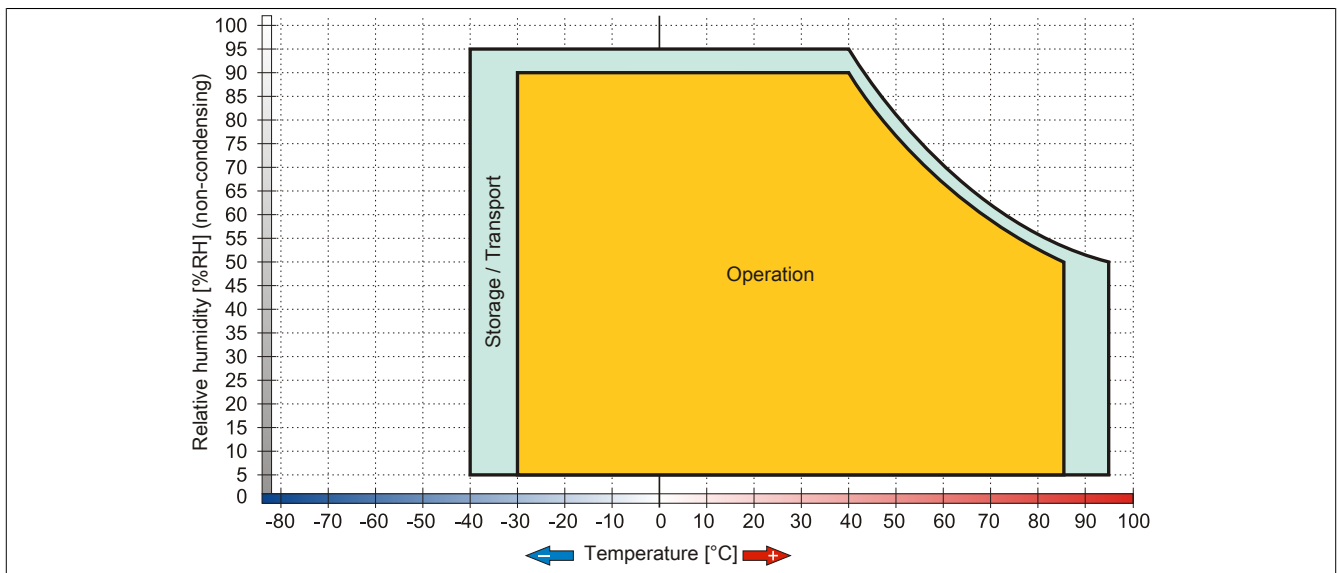


Figure 61: 5ACPCI.RAIC-04 - Temperature humidity diagram

3.6.21 5ACPCI.RAIC-05

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 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

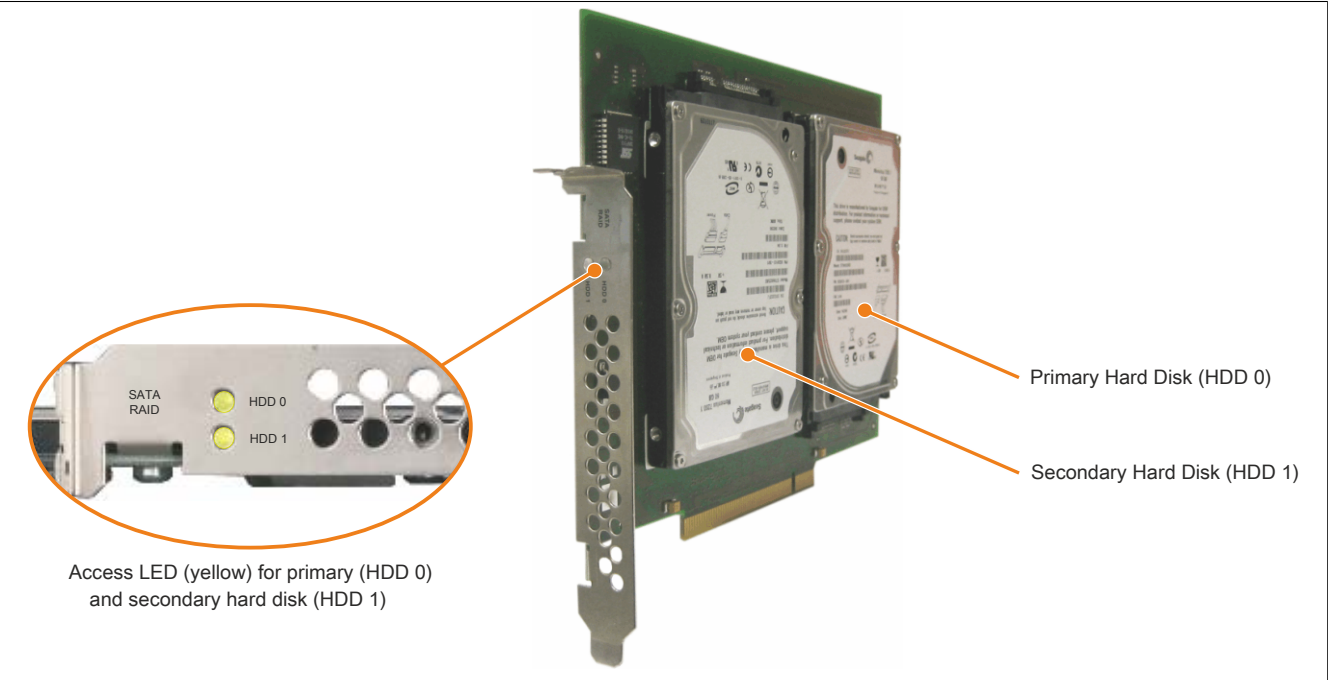


Figure 62: PCI SATA RAID controller

**Information:**

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

3.6.21.2 Order data

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

Table 103: 5ACPCI.RAIC-05 - Order data



### 3.6.21.3 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 ±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 <sup>1)</sup>	
Operation <sup>2)</sup>	0 to 60°C
24-hour operation <sup>3)</sup>	0 to 60°C
Storage	-40 to 70°C
Transport	-40 to 70°C
Relative humidity <sup>4)</sup>	
Operation	5 to 95%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Vibration <sup>5)</sup>	
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 <sup>5)</sup>	
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 <sup>6)</sup>
Weight	350 g
Manufacturer information	
Manufacturer	Seagate
Manufacturer product ID	ST9250315AS
Recommendations	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR

Table 104: 5ACPCI.RAIC-05 - Technical data

Product ID	5ACPCI.RAIC-05
Recommendations	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR

Table 104: 5ACPCI.RAIC-05 - Technical data

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

### 3.6.21.4 Temperature humidity diagram

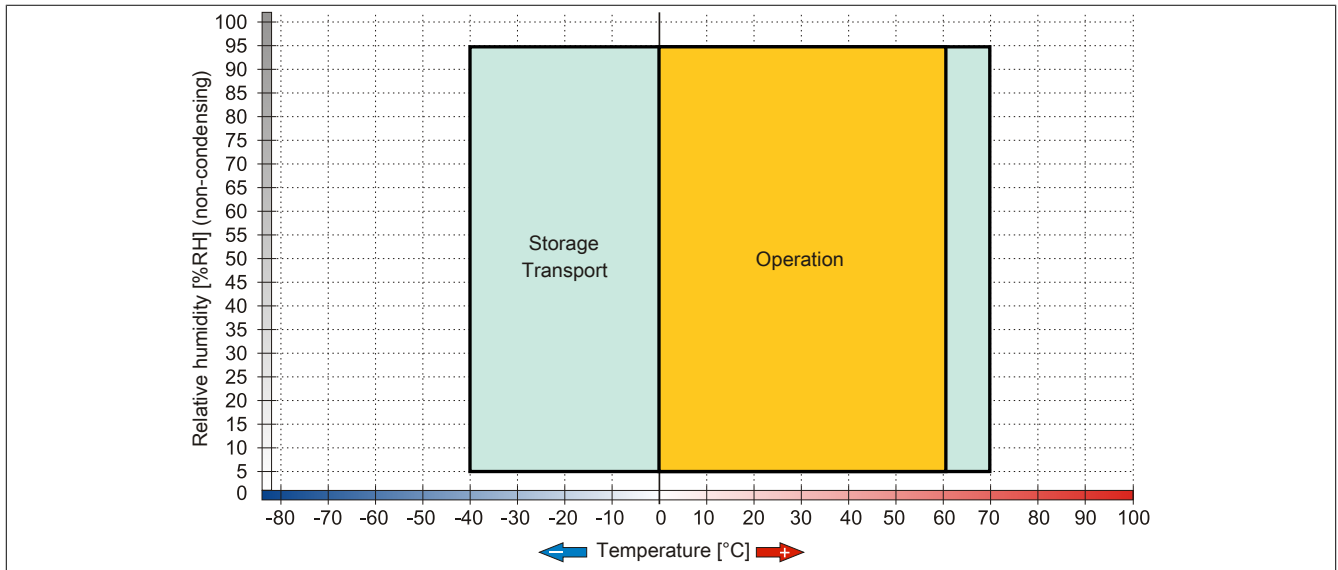


Figure 63: 5ACPCI.RAIC-05 - Temperature humidity diagram

### 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](http://www.br-automation.com)).

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

#### Information:

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

### 3.6.21.6 Configuration

Configuring a SATA RAID network: see Chapter 3 "Commissioning", section 7 "Configuration of a SATA RAID array" on page 226.

### 3.6.21.7 Exchanging a HDD

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

Instructions for exchanging see "Exchanging a PCI SATA RAID hard disk in a RAID 1 system" on page 432.

### 3.6.22 5ACPCI.RAIC-06

#### 3.6.22.1 General information

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

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

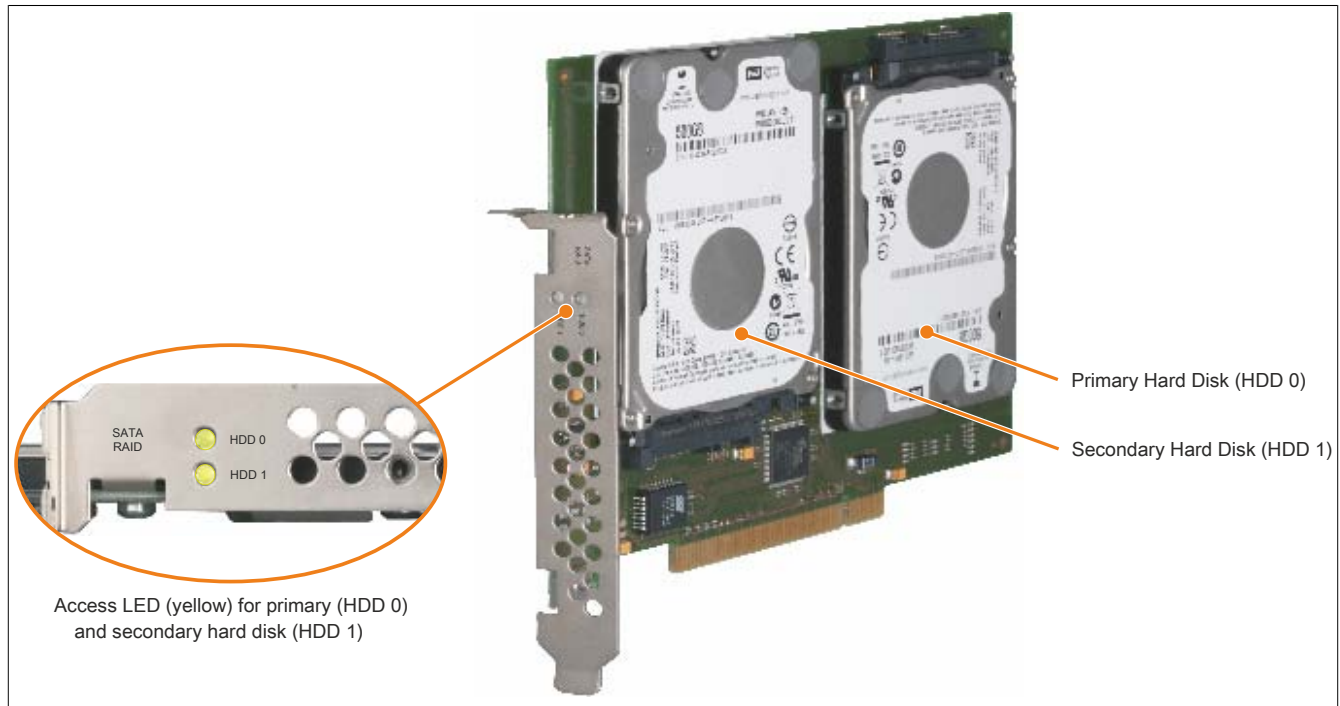


Figure 64: PCI SATA RAID controller

#### Information:

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

#### 3.6.22.2 Order data

Model number	Short description	Figure
	<b>Drives</b>	
5ACPCI.RAIC-06	PCI RAID System SATA 2x 500 GByte; Hinweis: Beachten Sie das Manual zum Einsatz der Harddisk.	
	<b>Optional accessories</b>	
	<b>Drives</b>	
5MMHDD.0500-00	500 GB SATA hard disk replacement for 5AC801.HDDI-04, 5AC901.CHDD-01 and 5ACPCI.RAIC-06; Remark: Please see manual for proper use of the hard disk.	

Table 105: 5ACPCI.RAIC-06 - Order data

## 3.6.22.3 Technical data

**Information:**

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

<b>Product ID</b>	<b>5ACPCI.RAIC-06</b>
<b>General information</b>	
Capacity	2x 500 GB
Number of hard disks	2
Certification	
CE	Yes
cULus	Yes
<b>Controller</b>	
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
<b>Hard disk drive <sup>1)</sup></b>	
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 <sup>2)</sup>
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
<b>Environmental conditions</b>	
Temperature <sup>3)</sup>	
Operation <sup>4)</sup>	0 to 60°C
24-hour operation <sup>5)</sup>	0 to 60°C
Storage	-40 to 70°C
Transport	-40 to 70°C
Relative humidity <sup>6)</sup>	
Operation	5 to 95%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Vibration <sup>7)</sup>	
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
<b>Mechanical characteristics</b>	
Installation	Fixed <sup>8)</sup>
Weight	350 g
<b>Manufacturer information</b>	
Manufacturer	Western Digital
Manufacturer product ID	WD5000LUCT
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR

Table 106: 5ACPCI.RAIC-06 - Technical data

Product ID	5ACPCI.RAIC-06
Recommendations	
Specified standard CE (CE) UL 508 (cULus)	Yes LISTED 14F2 BR

Table 106: 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 for 305 meter altitude. The temperature specification must be reduced linearly by 1 °C every 305 meters. The temperature increase and decrease can be a maximum of 20 °C per hour.
- 4) Standard operation means 333 POH (power-on hours) per month.
- 5) 24-hour operation means 732 POH (power-on hours) per month.
- 6) Humidity gradient: Maximum 20% per hour.
- 7) Operation in areas prone to vibration and shock can affect performance negatively (reduction of transfer rate).
- 8) Mounted on PCI insert.

### 3.6.22.4 Temperature humidity diagram

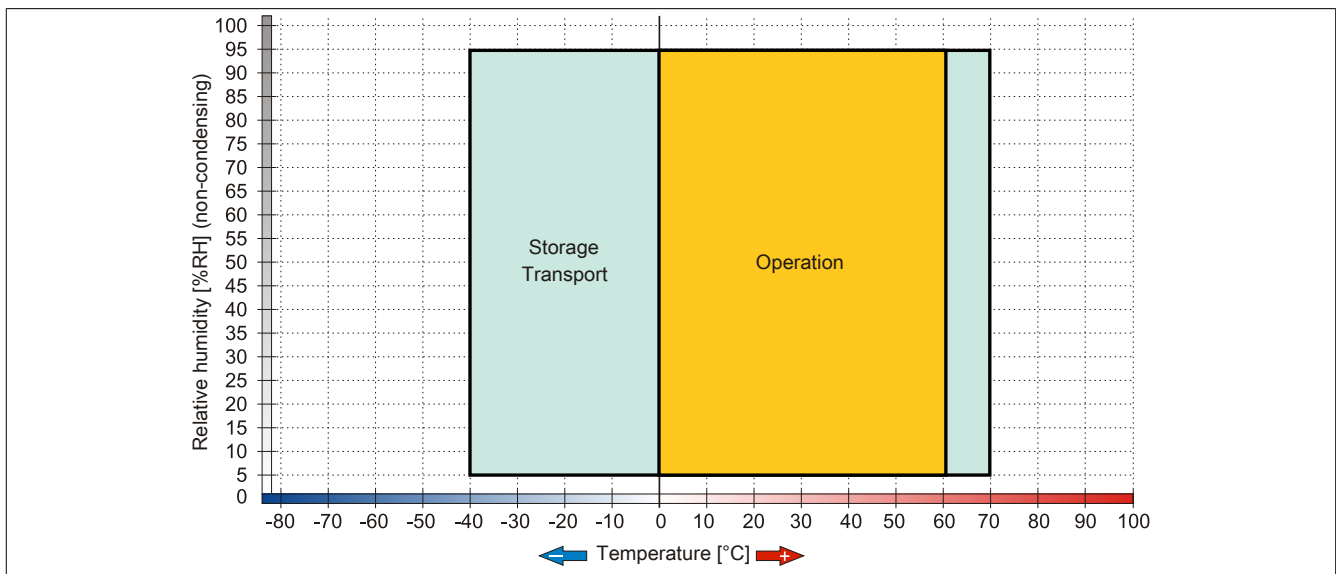


Figure 65: 5ACPCI.RAIC-06 - Temperature humidity diagram

### 3.6.22.5 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](http://www.br-automation.com)).

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

#### Information:

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

### 3.6.22.6 Configuration

Configuring a SATA RAID network: see Chapter 3 "Commissioning", section 7 "Configuration of a SATA RAID array" on page 226.

### 3.6.22.7 Exchanging a HDD

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

Instructions for exchanging see "Exchanging a PCI SATA RAID hard disk in a RAID 1 system" on page 432.

### 3.6.23 5MMHDD.0250-00

#### 3.6.23.1 General information

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

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

#### 3.6.23.2 Order data


Model number	Short description	Figure
	<b>Drives</b>	
5MMHDD.0250-00	250 GB SATA hard disk replacement for 5AC801.HDDI-03 and 5ACPCI.RAIC-05; Remark: Please see manual for proper use of the hard disk.	

Table 107: 5MMHDD.0250-00 - Order data

#### 3.6.23.3 Technical data

##### Information:

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

Product ID	5MMHDD.0250-00
<b>General information</b>	
Certification	
CE	Yes
cULus	Yes
<b>Hard disk drive</b>	
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 <sup>1)</sup>
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
<b>Environmental conditions</b>	
Temperature <sup>2)</sup>	
Operation <sup>3)</sup>	0 to 60°C
24-hour operation <sup>4)</sup>	0 to 60°C
Storage	-40 to 70°C
Transport	-40 to 70°C

Table 108: 5MMHDD.0250-00 - Technical data

Product ID	5MMHDD.0250-00
Relative humidity <sup>5)</sup>	
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
<b>Mechanical characteristics</b>	
Dimensions	
Width	9.5 mm
Height	69 mm
Depth	100 mm
Weight	100 g
<b>Manufacturer information</b>	
Manufacturer	Seagate
Manufacturer product ID	ST9250315AS
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR

Table 108: 5MMHDD.0250-00 - Technical data

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

### 3.6.23.4 Temperature humidity diagram

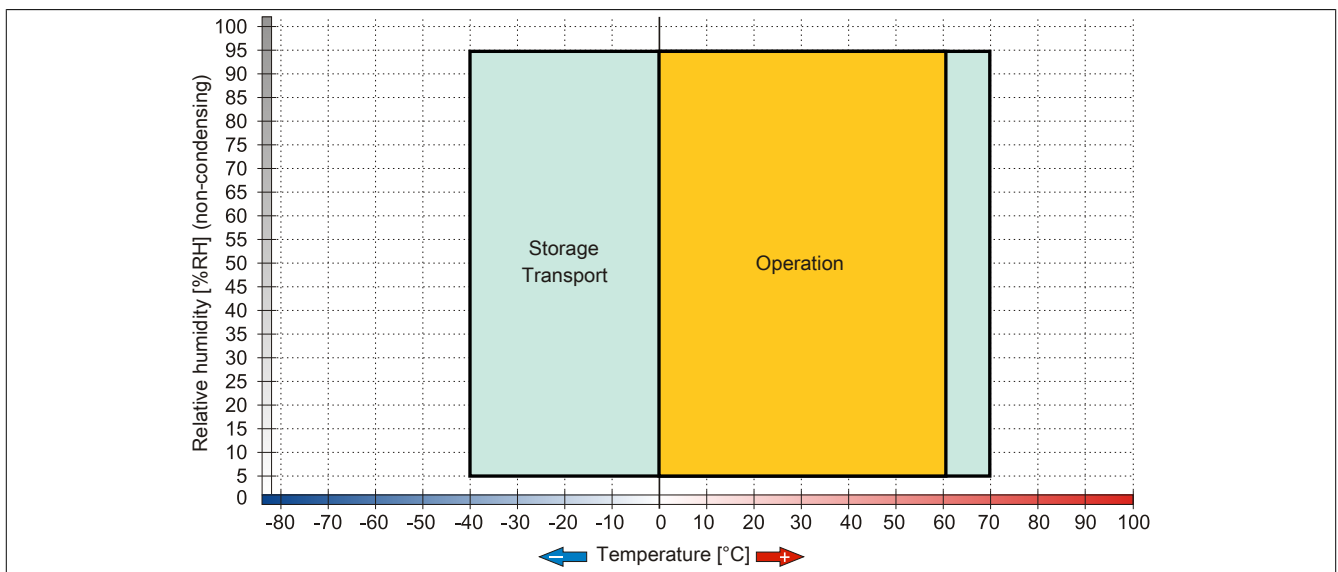


Figure 66: 5MMHDD.0250-00 - Temperature humidity diagram

### 3.6.24 5MMHDD.0500-00

#### 3.6.24.1 General information

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

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

#### 3.6.24.2 Order data


Model number	Short description	Figure
5MMHDD.0500-00	<b>Drives</b> 500 GB SATA hard disk replacement for 5AC801.HDDI-04, 5AC901.CHDD-01 and 5ACPCI.RAIC-06; Remark: Please see manual for proper use of the hard disk.	

Table 109: 5MMHDD.0500-00 - 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 fully assembled device. The data specifications for the fully assembled device take precedence over those of individual components.

Product ID	5MMHDD.0500-00
<b>General information</b>	
Certification	
CE	Yes
cULus	Yes
<b>Hard disk drive</b>	
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 <sup>1)</sup>
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 110: 5MMHDD.0500-00 - Technical data



Product ID	5MMHDD.0500-00
<b>Environmental conditions</b>	
Temperature <sup>2)</sup>	
Operation <sup>3)</sup>	0 to 60°C
24-hour operation <sup>4)</sup>	0 to 60°C
Storage	-40 to 70°C
Transport	-40 to 70°C
Relative humidity <sup>5)</sup>	
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
<b>Mechanical characteristics</b>	
Dimensions	
Width	7 mm
Height	69 mm
Depth	100 mm
Weight	100 g
<b>Manufacturer information</b>	
Manufacturer	Western Digital
Manufacturer product ID	WD5000LUCT
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR

Table 110: 5MMHDD.0500-00 - Technical data

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

### 3.6.24.4 Temperature humidity diagram

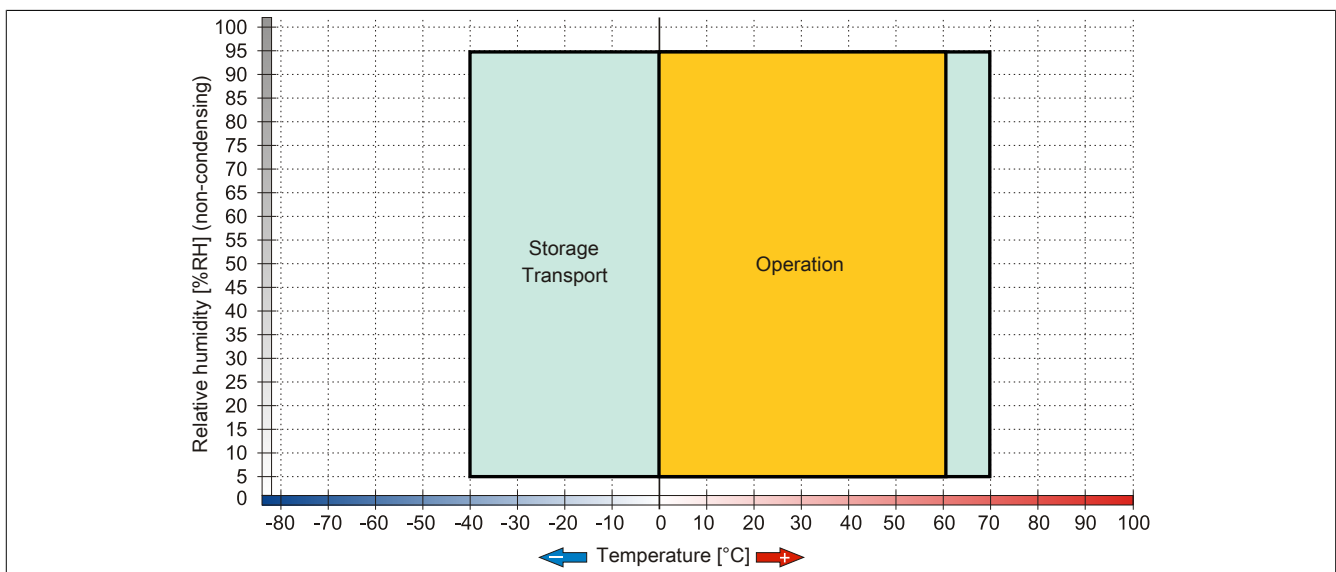


Figure 67: 5MMHDD.0500-00 - Temperature humidity diagram

### 3.7 Fan kit

#### Information:

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

The fan and dust filter are subject to wear and must be checked with appropriate frequency and cleaned or replaced when not functioning properly (e.g. due to dirt and grime).

For additional information about fan switching limits, see Appendix A.

#### 3.7.1 5PC810.FA01-00

##### 3.7.1.1 General information

This fan kit is an optional addition for system units with 1 card slots.

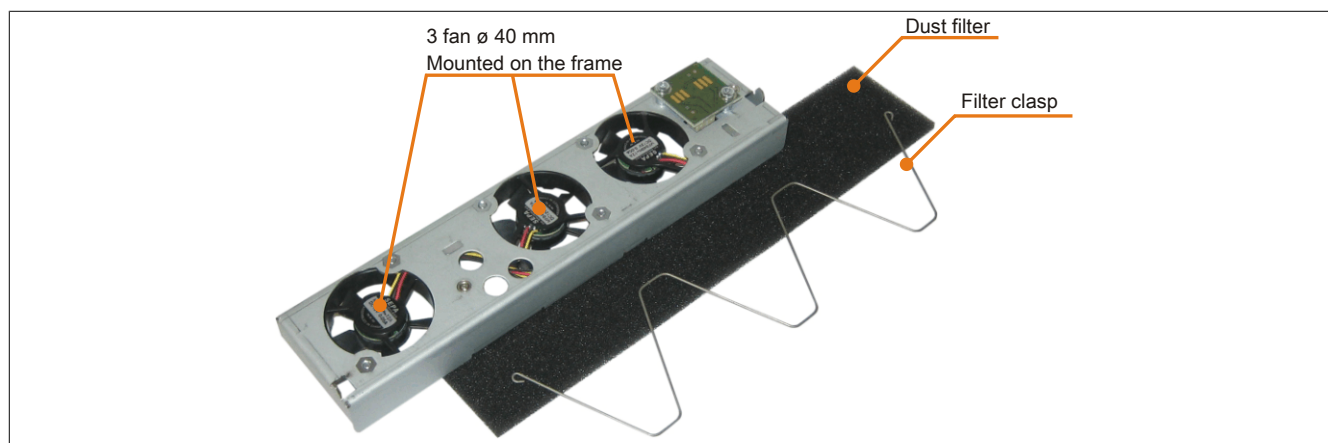


Figure 68: 5PC810.FA01-00 - Fan kit

##### 3.7.1.2 Order data

Model number	Short description	Figure
	<b>Fan kits</b>	
5PC810.FA01-00	APC810 fan kit for system unit 5PC810.SX01-00.	
	<b>Optional accessories</b>	
	<b>Accessories</b>	
5AC801.FA01-00	Fan filter for APC810 5 pcs. (spare part), for 5PC810.SX01-00.	

Table 111: 5PC810.FA01-00 - Order data

##### 3.7.1.3 Technical data

Product ID	5PC810.FA01-00
<b>General information</b>	
Number of fans	3
Speed	Max. 6100 rpm
Noise level	21 dB
Service life	29000 hours at 70 °C 95000 hours at 20 °C
Type	Double ball bearings
Certification	
CE	Yes
cULus HazLoc Class 1 Division 2	Yes
ATEX Zone 22	Yes
GL	Yes

Table 112: 5PC810.FA01-00 - Technical data

Product ID	5PC810.FA01-00
<b>Mechanical characteristics</b>	
Dimensions	
Fan	
Width	40 mm
Height	40 mm
Depth	10 mm
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL HazLoc Cl I Div 2 (cULus)	LISTED 2P61 ABCD BR
ATEX Zone 22 (EX)	II 3D tc IIIA T85 0-55°C BR
GL (GL)	Cat. C EMC 1
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL HazLoc Cl I Div 2 (cULus)	LISTED 2P61 ABCD BR
ATEX Zone 22 (EX)	II 3D tc IIIA T85 0-55°C BR
GL (GL)	Cat. C EMC 1

Table 112: 5PC810.FA01-00 - Technical data

For information about installing/replacing fan kits, see chapter "Maintenance / Service", section 6 "Installing / exchanging the fan kit" on page 413.

### 3.7.2 5PC810.FA02-01

#### 3.7.2.1 General information

These fan kits are an optional addition for system units with 2 card slots.

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

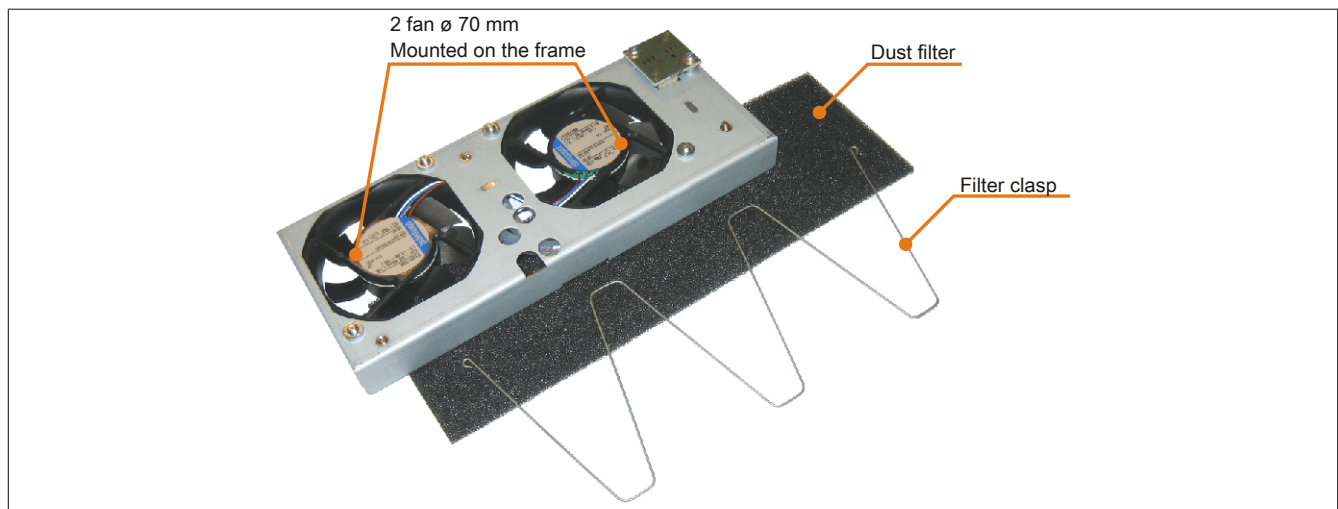


Figure 69: 5PC810.FA02-00 and 5PC810.FA02-01 - Fan kit

#### 3.7.2.2 Order data

Model number	Short description	Figure
	<b>Undefined</b>	
5PC810.FA02-00	APC810 fan kit for system unit 5PC810.SX02-00	
5PC810.FA02-01	APC810 fan kit for system unit 5PC810.SX02-00 from revision D0.	
	<b>Optional accessories</b>	
	<b>Accessories</b>	
5AC801.FA02-00	Fan filter for APC810 5 pcs. (spare part), for 5PC810.SX02-00.	

Table 113: 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 ±12.5%			
Noise level	32 dB			
Service life	60000 hours at 40 °C			
Type	Double ball bearings			
Certification				
CE		Yes		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			
Recommendations				
Specified standard				
CE (CE)		Yes		
UL HazLoc Cl I Div 2 (cULus)	-			LISTED 2P61 ABCD BR
ATEX Zone 22 (EX)	-			II 3D tc IIIA T85 0-55°C BR
GL (GL)	-			Cat. C EMC 1
Recommendations				
Specified standard				
CE (CE)		Yes		
UL HazLoc Cl I Div 2 (cULus)	-			LISTED 2P61 ABCD BR
ATEX Zone 22 (EX)	-			II 3D tc IIIA T85 0-55°C BR
GL (GL)	-			Cat. C EMC 1

Table 114: 5PC810.FA02-00, 5PC810.FA02-01 - Technical data

For information about installing/replacing fan kits, see chapter "Maintenance / Service", section 6 "Installing / exchanging the fan kit" on page 413.

### 3.7.3 5PC810.FA03-00

#### 3.7.3.1 General information

This fan kit is an optional addition for system units with 3 card slots.

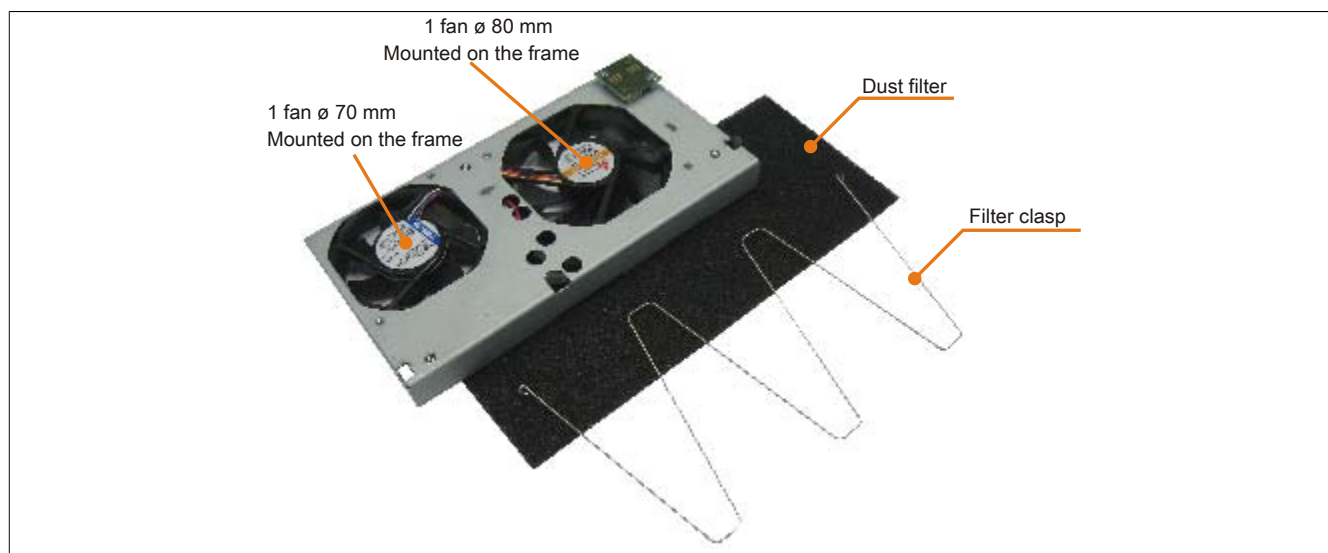


Figure 70: 5PC810.FA03-00 - Fan kit

### 3.7.3.2 Order data


Model number	Short description	Figure
	<b>Fan kits</b>	
5PC810.FA03-00	APC810 fan kit for system unit 5PC810.SX03-00.	
	<b>Optional accessories</b>	
	<b>Accessories</b>	
5AC801.FA03-00	Fan filter for APC810 5 pcs. (spare part), for 5PC810.SX03-00.	

Table 115: 5PC810.FA03-00 - Order data

### 3.7.3.3 Technical data

Product ID	5PC810.FA03-00
<b>General information</b>	
Number of fans	2
Speed	Fan 1: Max. 4300 rpm $\pm 12.5\%$ Fan 2: Max. 3200 rpm $\pm 10\%$
Noise level	Fan 1: 32 dB Fan 2: 33 dB
Service life	Fan 1: 60000 hours at 40 °C Fan 2: 75,000 hours at 40 °C
Type	Double ball bearings
Certification CE	Yes
<b>Mechanical characteristics</b>	
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
<b>Recommendations</b>	
Specified standard CE (CE)	Yes
<b>Recommendations</b>	
Specified standard CE (CE)	Yes

Table 116: 5PC810.FA03-00 - Technical data

For information about installing/replacing fan kits, see chapter "Maintenance / Service", section 6 "Installing / exchanging the fan kit" on page 413.

### 3.7.4 5PC810.FA05-00

#### 3.7.4.1 General information

This fan kit is an optional addition for system units with 5 card slots.

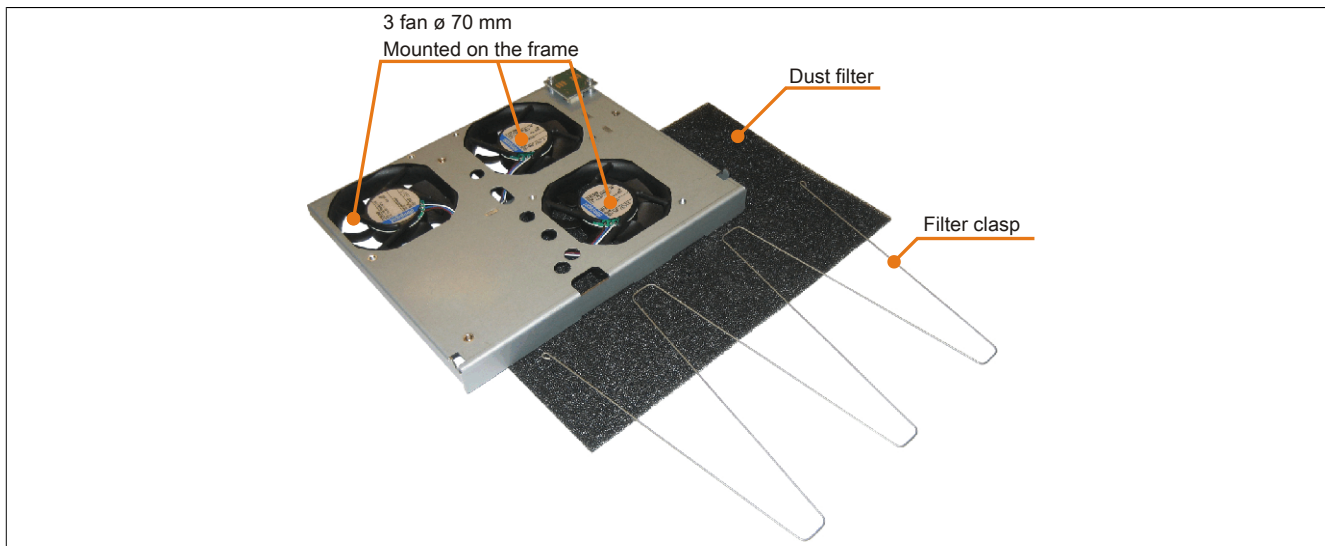


Figure 71: 5PC810.FA05-00 - Fan kit

### 3.7.4.2 Order data

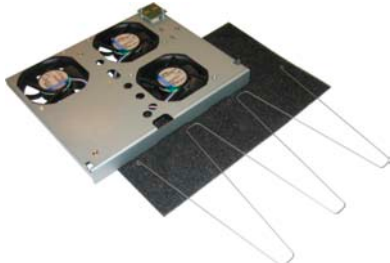
Model number	Short description	Figure
	<b>Fan kits</b>	
5PC810.FA05-00	APC810 fan kit for system unit 5PC810.SX05-00.	
	<b>Optional accessories</b>	
	<b>Accessories</b>	
5AC801.FA05-00	Fan filter for APC810 5 pcs. (spare part), for 5PC810.SX05-00.	

Table 117: 5PC810.FA05-00 - Order data

### 3.7.4.3 Technical data

Product ID	5PC810.FA05-00
<b>General information</b>	
Number of fans	3
Speed	Max. 4300 rpm $\pm 10\%$
Noise level	32 dB
Service life	60000 hours at 40 °C
Type	Double ball bearings
Certification CE	Yes
<b>Mechanical characteristics</b>	
Dimensions	
Fan	
Width	70 mm
Height	70 mm
Depth	15 mm
<b>Recommendations</b>	
Specified standard CE (CE)	Yes
<b>Recommendations</b>	
Specified standard CE (CE)	Yes

Table 118: 5PC810.FA05-00 - Technical data

For information about installing/replacing fan kits, see chapter "Maintenance / Service", section 6 "Installing / exchanging the fan kit" on page 413.

### 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. DVI and SDL signals are available with this. RGB signals are not supported. Details can be found in the technical data for the CPU board being used.

#### Information:

**Installation of AP Link SDL transmitters is only possible in connection with the system units 5PC810.SX02-00, 5PC810.SX03-00 and 5PC810.SX05-00.**

**You can find information on installing the AP Link SDL transmitter under "AP Link installation" on page 431.**

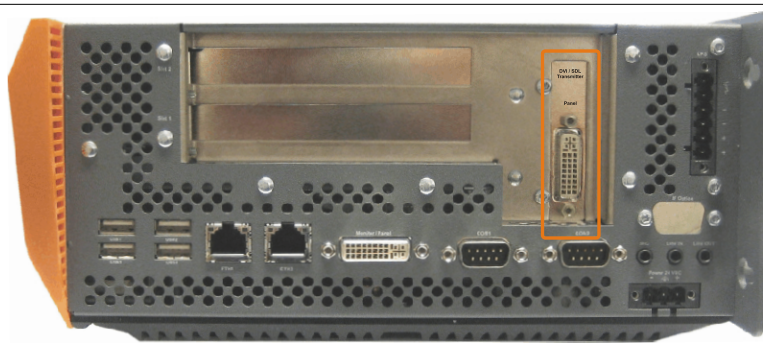


Figure 72: 5PC810.SX02-00 - Mounting example with the system unit

##### 3.8.1.2 Order data


Model number	Short description	Figure
	<b>Automation Panel Link interfaces</b>	
5AC801.SDL0-00	Smart Display Link/DVI-D Transmitter	

Table 119: 5AC801.SDL0-00 - Order data

##### 3.8.1.3 Technical data

Product ID	5AC801.SDL0-00
<b>General information</b>	
Certification	
CE	Yes
GL	Yes
<b>Interfaces</b>	
Panel/Monitor interface	
Design	DVI-D socket
Type	SDL/DVI

Table 120: 5AC801.SDL0-00 - Technical data



Product ID	5AC801.SDL0-00
Recommendations	
Specified standard CE (CE) GL (GL)	Yes Cat. C EMC 1
Recommendations	
Specified standard CE (CE) GL (GL)	Yes Cat. C EMC 1

Table 120: 5AC801.SDL0-00 - Technical data

### 3.8.1.4 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	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 <sup>1)</sup>	+5 V power supply	C5	NC	Not connected
15	Ground (return for +5 V, HSync and VSync)	Ground			

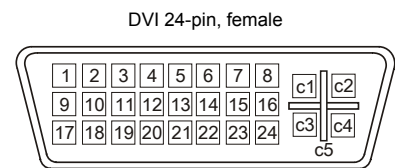


Table 121: Pinout - DVI connection

- 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.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03
5	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03
10	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03
15	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	- - -	- - 5CASDL.0150-03
20	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	- -	- 5CASDL.0200-03
25	5CASDL.0250-00 5CASDL.0250-03	5CASDL.0250-00 5CASDL.0250-03	5CASDL.0250-00 5CASDL.0250-03	- -	- -	- -
30	5CASDL.0300-00 5CASDL.0300-03	5CASDL.0300-00 5CASDL.0300-03	- 5CASDL.0300-13	- 5CASDL.0300-13	- -	- 5CASDL.0300-13
40	5CASDL.0400-13	5CASDL.0400-13	5CASDL.0400-13	5CASDL.0400-13	-	5CASDL.0400-13

Table 122: Cable lengths and resolutions for SDL transmission



### 3.8.2 5AC801.RDYR-00

#### 3.8.2.1 General information

##### Information:

Installation of the ready relay is only possible in connection with the system units 5PC810.SX02-00, 5PC810.SX03-00 and 5PC810.SX05-00.



Figure 73: Mounting example with the system unit 5PC810.SX02-00

The relay contacts are closed when the APC810 is turned on.

#### 3.8.2.2 Order data

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

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

#### 3.8.2.3 Pinout

Ready relay - Pinout	
Pinout - 4-pin multipoint plug 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

Diagram illustrating the pinout of the 4-pin multipoint plug. The pins are labeled 1, 2, 3, and 4. Pin 1 is the top contact, Pin 2 is the second contact, Pin 3 is the third contact, and Pin 4 is the bottom contact. A switch symbol is shown next to Pin 2, indicating it is the common or root contact.

Table 124: Pinout - Ready relay 5AC801.RDYR-00

3.9 Ready relay

3.9.1 5AC801.RDYR-01

3.9.2 General information

The ready relay 5AC801.RDYR-01 can be connected to the APC810 add-on UPS slot (this slot must be available). For more information about installing the ready relay, see chapter Chapter 7 "Maintenance / Service", section 13 "Installing the ready relay /2 in the add-on UPS slot" on page 435.

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

3.9.3 Order data


Model number	Short description	Figure
5AC801.RDYR-01	Accessories	

Table 125: 5AC801.RDYR-01 - Order data

3.9.4 Pinout

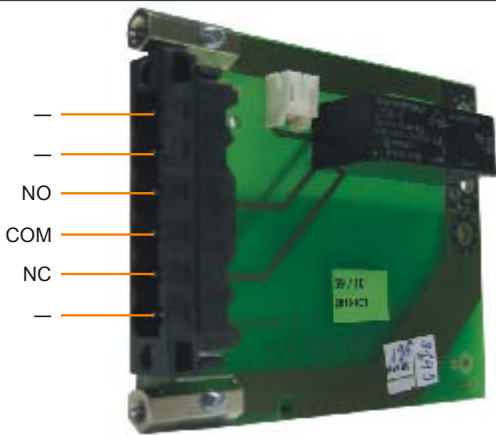
Pin	Assignment	Description	Figure
1	-	Not connected	
2	-	Not connected	
3	NO	Normally open	
4	COM	Change-over contact	
5	NC	Normally closed	
6	-	Not connected	

Table 126: 5AC801.RDYR-01 - Pinout

### 3.9.5 Contents of delivery

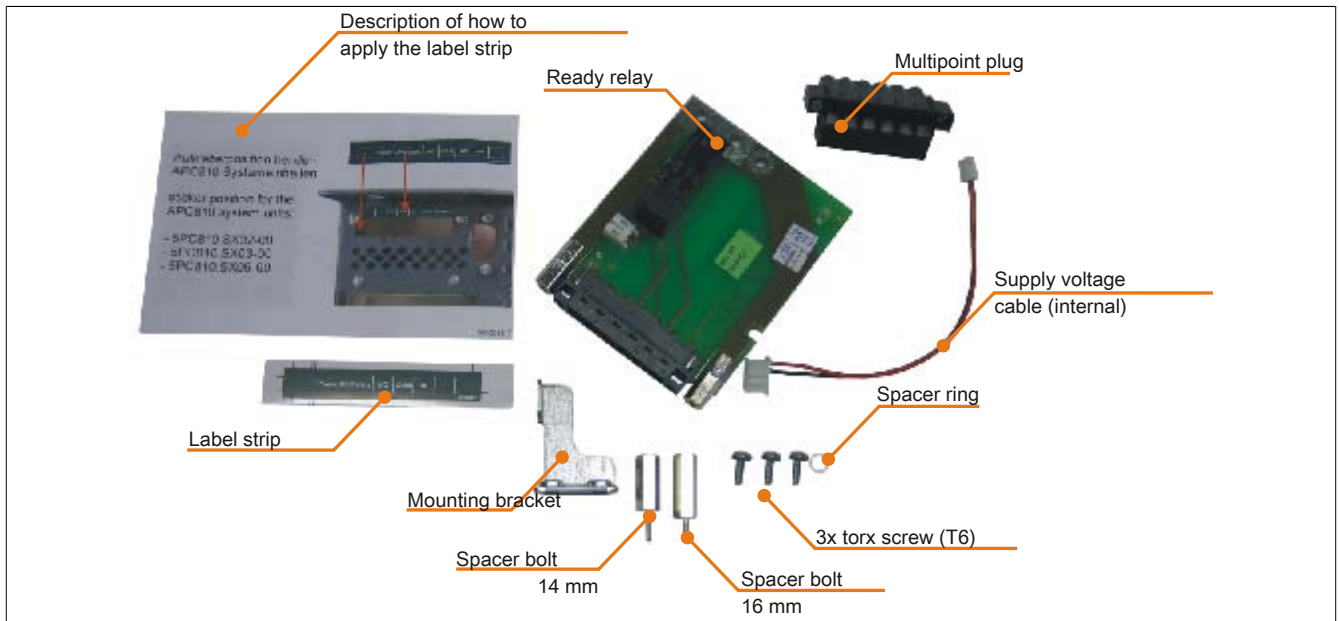


Figure 74: 5AC801.RDYR-01 - Contents of delivery

### 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.

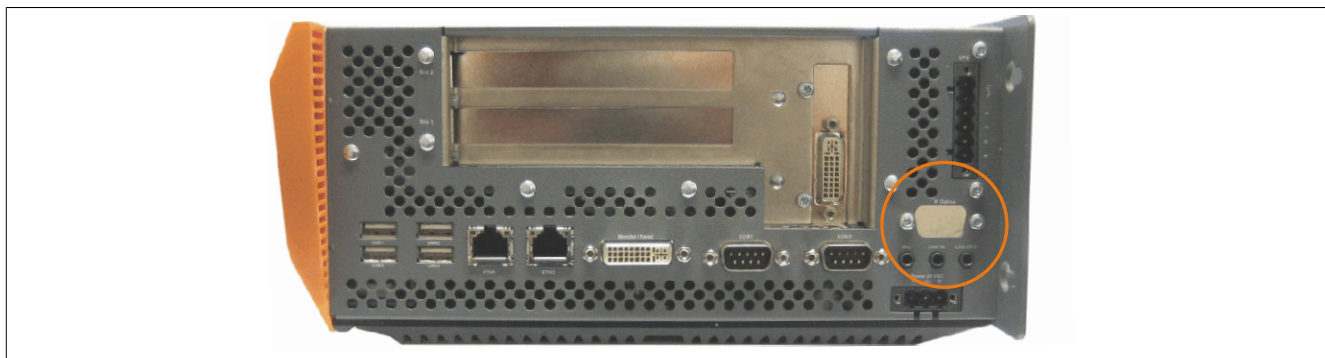


Figure 75: Add-on interfaces (IF option)

#### Information:

An add-on interface drive can be added, removed or exchanged at any time.

#### Information:

Turn off power before adding 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, which conforms to CAN specifications 2.0 part A/B. The CAN controller can trigger an NMI (non-maskable interrupt).

##### 3.10.2.2 Order data


Model number	Short description	Figure
	<b>Serial adapters</b>	
5AC600.CANI-00	CAN Interface; For APC620, APC810 or PPC700.	

Table 127: 5AC600.CANI-00 - Order data

##### 3.10.2.3 Technical data

Product ID	5AC600.CANI-00
<b>General information</b>	
Certification	
CE	Yes
cULus	Yes
<b>Interfaces</b>	
CAN	
Quantity	1
Controller	Bosch CC770 (compatible with Intel 82527 CAN controller)
Design	9-pin DSUB plug
Terminating resistor	
Type	Can be activated and deactivated using a sliding switch
Default setting	Disabled
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR

Table 128: 5AC600.CANI-00 - Technical data

### 3.10.2.4 Pinout

Add-on CAN	
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

9-pin DSUB plug

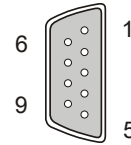


Table 129: Pinout - CAN

### 3.10.2.5 I/O address and IRQ

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

Table 130: Add-on CAN - I/O address and IRQ

<sup>1</sup> NMI = Non Maskable Interrupt.

The IRQ setting can be changed in the BIOS setup. Please note any potential conflicts with other resources 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 131: 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 reach an optimal transfer rate.

CAN cables	Property
Signal lines	
Cable cross section	2x 0.25 mm <sup>2</sup> (24AWG/19), tinned Cu 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 <sup>2</sup> (22AWG/19), tinned Cu wire
Wire insulation	PE
Conductor resistance	≤ 59 Ω / km
Outer sheathing	
Material	PUR mixture
Features	Halogen-free
Cable shielding	From tinned copper wires

Table 132: 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 (delivery state: disabled with the setting "Off").

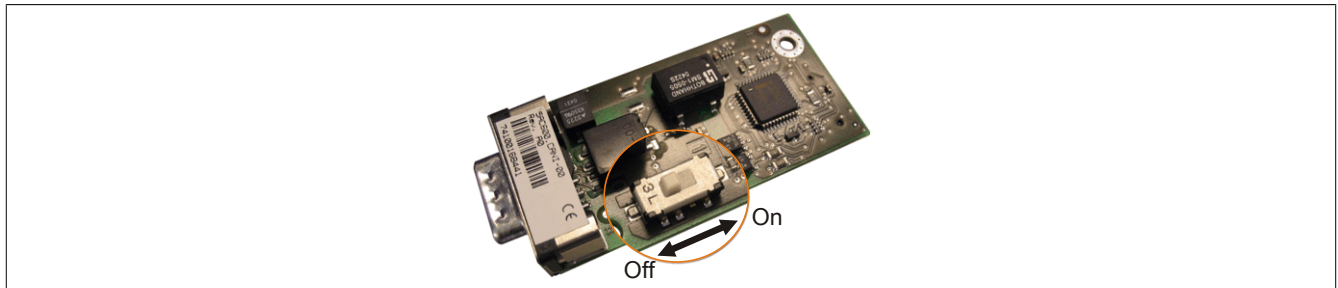


Figure 76: 5AC600.CANI-00 - Terminating resistor for add-on CAN interface

### 3.10.2.8 Contents of delivery

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

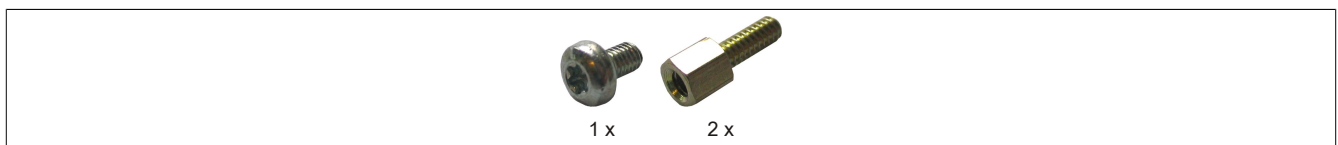


Figure 77: 5AC600.CANI-00 - Contents of the delivery / mounting material

### 3.10.2.9 Driver support

Because of the Dual Core processors, the INACAN.SYS driver version 2.36, contained in the PVI setup 2.6.0.3105, is required for the 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

The 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	<b>Serial adapters</b> RS232/422/485 Interface; for APC620, APC810 and PPC700.	

Table 133: 5AC600.485I-00 - Order data

#### 3.10.3.3 Technical data

Product ID	5AC600.485I-00
<b>General information</b>	
Certification	
CE	Yes
cULus	Yes
GL	Yes
<b>Interfaces</b>	
COM1	
Type	RS232, not modem-capable, electrically isolated
Design	9-pin DSUB plug
Max. baud rate	115 kbit/s
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
GL (GL)	Cat. C EMC 1
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
GL (GL)	Cat. C EMC 1

Table 134: 5AC600.485I-00 - Technical data

#### 3.10.3.4 Pinout

Add-on RS232/422/485		
	RS232	RS422/485
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

9-pin DSUB plug

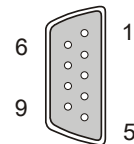


Table 135: Pinout - RS232/RS422

#### 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 136: Add-on RS232/422/485 - I/O address and IRQ

The setting for the I/O address and the IRQ can be changed in the BIOS setup (under "Advanced" - submenu "Main board/Panel Features" - submenu "Legacy Devices", setting "COM E"). Please note any potential conflicts with other resources 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 137: 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 reach an optimal transfer rate.

RS232 cables	
Signal lines	
Cable cross section	4x 0.16 mm <sup>2</sup> (26AWG), tinned Cu 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 <sup>2</sup> (22AWG/19), tinned Cu wire
Wire insulation	PE
Conductor resistance	≤ 59 Ω / km
Outer sheathing	
Material	PUR mixture
Features	Halogen-free
Cable shielding	From tinned copper wires

Table 138: 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 139: 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 reach an optimal transfer rate.

RS422 cables		Property
Signal lines		
Cable cross section	4x 0.25 mm <sup>2</sup> (24AWG/19), tinned Cu wire	
Wire insulation	PE	
Conductor resistance	≤ 82 Ω / km wires	
Stranding	stranded in pairs	
Shield	Paired shield with aluminum foil	
Grounding line		
Cable cross section	1x 0,34 mm <sup>2</sup> (22AWG/19), tinned Cu wire	
Wire insulation	PE	
Conductor resistance	≤ 59 Ω / km	
Outer sheathing		
Material	PUR mixture	
Features	Halogen-free	
Cable shielding	From tinned copper wires	

Table 140: 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.



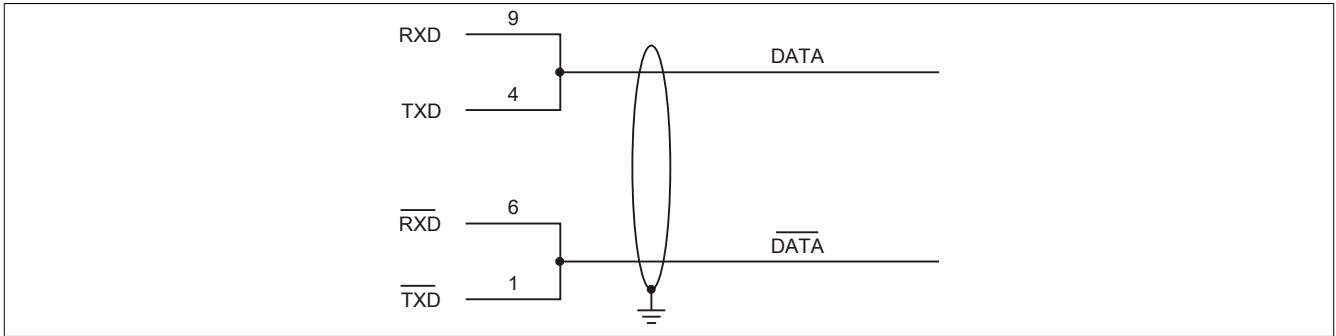


Figure 78: Add-on RS232/422/485 interface - Operated in RS485 mode

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  $\Omega$  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 141: 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 reach an optimal transfer rate.

RS485 cables	Property
Signal lines	
Cable cross section	4x 0.25 mm <sup>2</sup> (24AWG/19), tinned Cu 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 <sup>2</sup> (22AWG/19), tinned Cu wire
Wire insulation	PE
Conductor resistance	$\leq 59 \Omega / \text{km}$
Outer sheathing	
Material	PUR mixture
Features	Halogen-free
Cable shielding	From tinned copper wires

Table 142: RS422 - Cable requirements

### 3.10.3.10 Contents of delivery

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

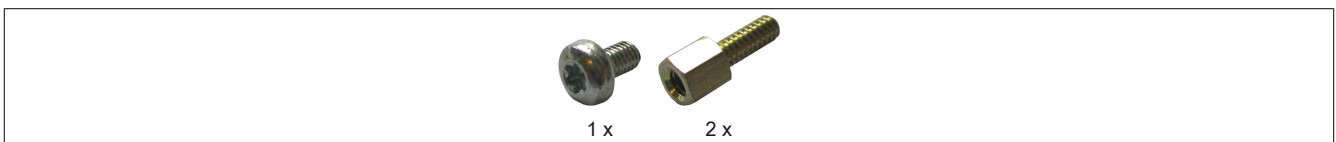


Figure 79: 5AC600.485I-00 - Contents of the delivery / mounting material

## Chapter 3 • Commissioning

### 1 Installation

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

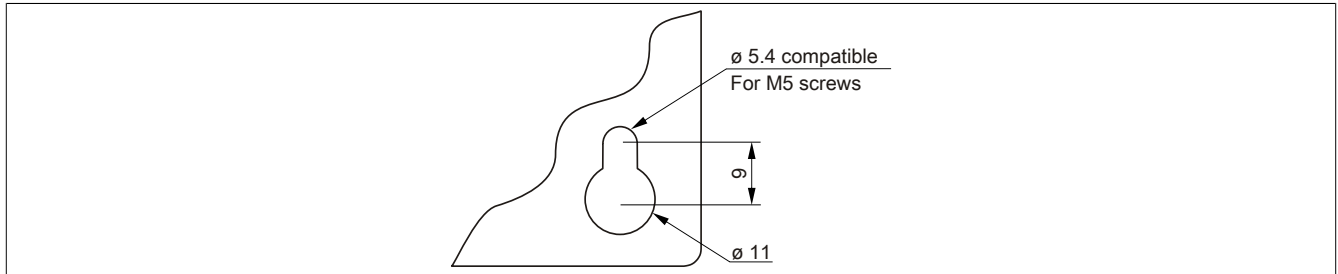


Figure 80: Mounting plates

The exact positioning of the mounting holes can be seen in the drilling templates in Chapter 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 mounting information

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

### 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.

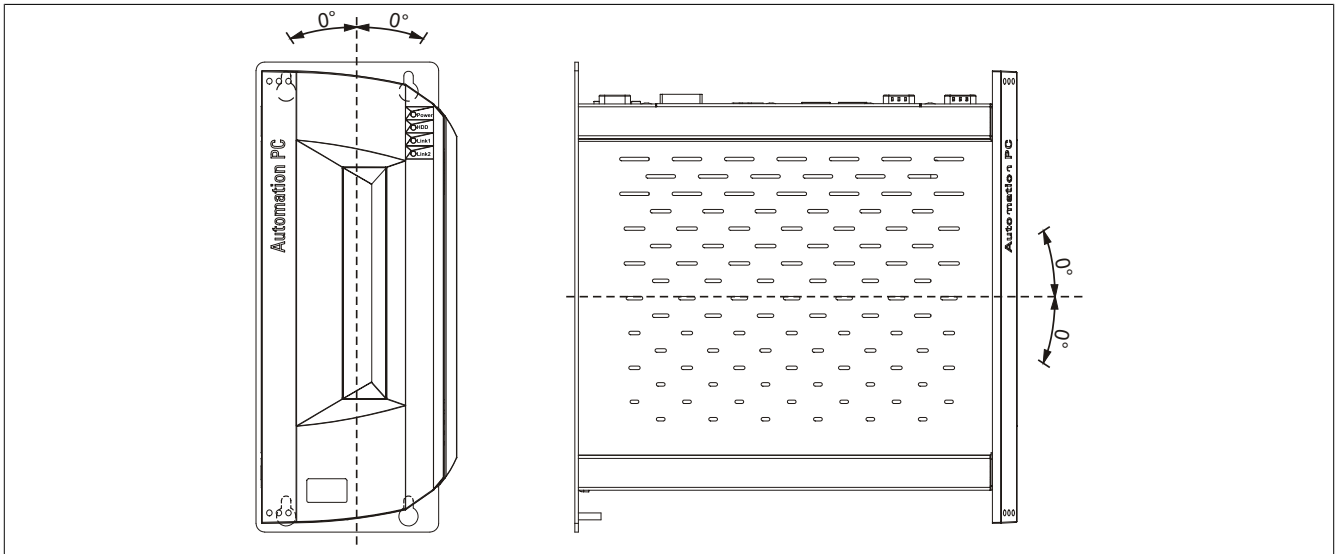


Figure 81: Vertical mounting orientation

In order to facilitate natural air circulation, devices must be mounted according to the spacing indicated in the section "Air circulation spacing" on page 192.

#### 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.

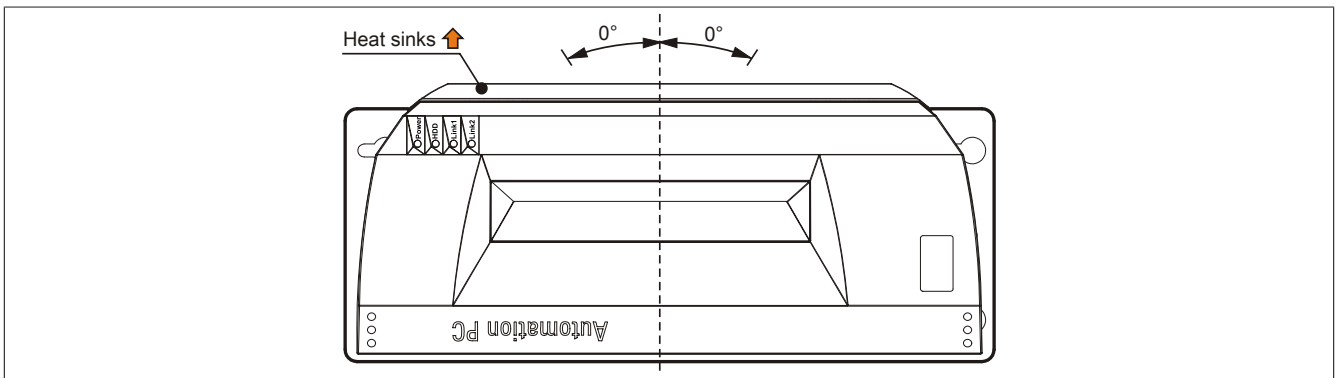


Figure 82: Horizontal mounting orientation

In order to facilitate natural air circulation, devices must be mounted according to the spacing indicated in the section "Air circulation spacing" on page 192.

## 1.4 Air circulation spacing

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

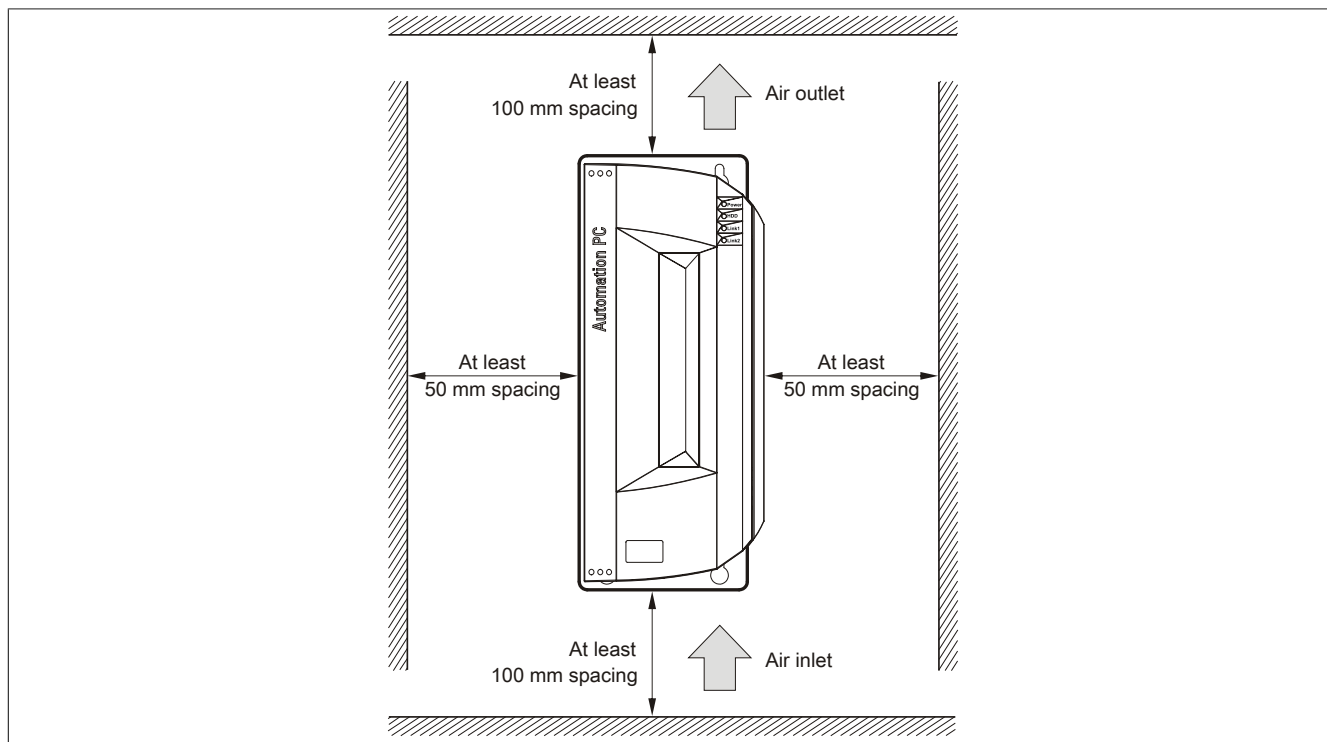


Figure 83: Standard mounting - Spacing

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 "Temperature specifications" in the chapter "Technical data").

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

## 2 Cable connections

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

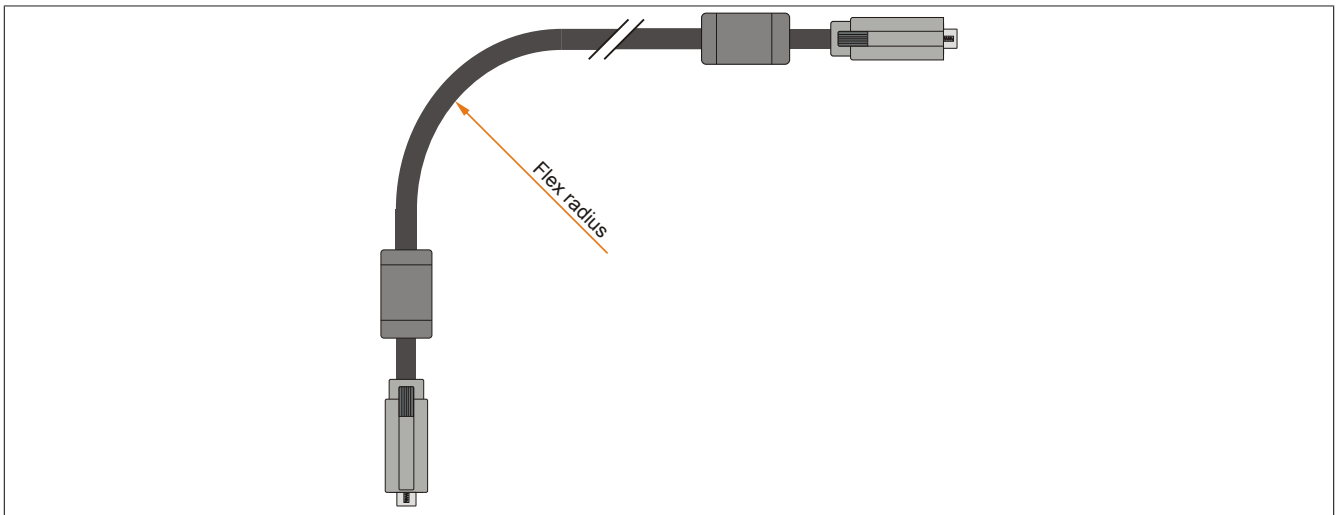


Figure 84: Flex radius - Cable connection

### 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](http://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  $2.5 \text{ mm}^2$  per connection should be used. If a cable with wire tip sleeves is connected to the 0TB103.9 or 0TB103.91 terminal block, then a cable with maximum  $1.5 \text{ mm}^2$  per connection is possible.
- Note the line shielding concept; all connected data cables are used as shielded lines.

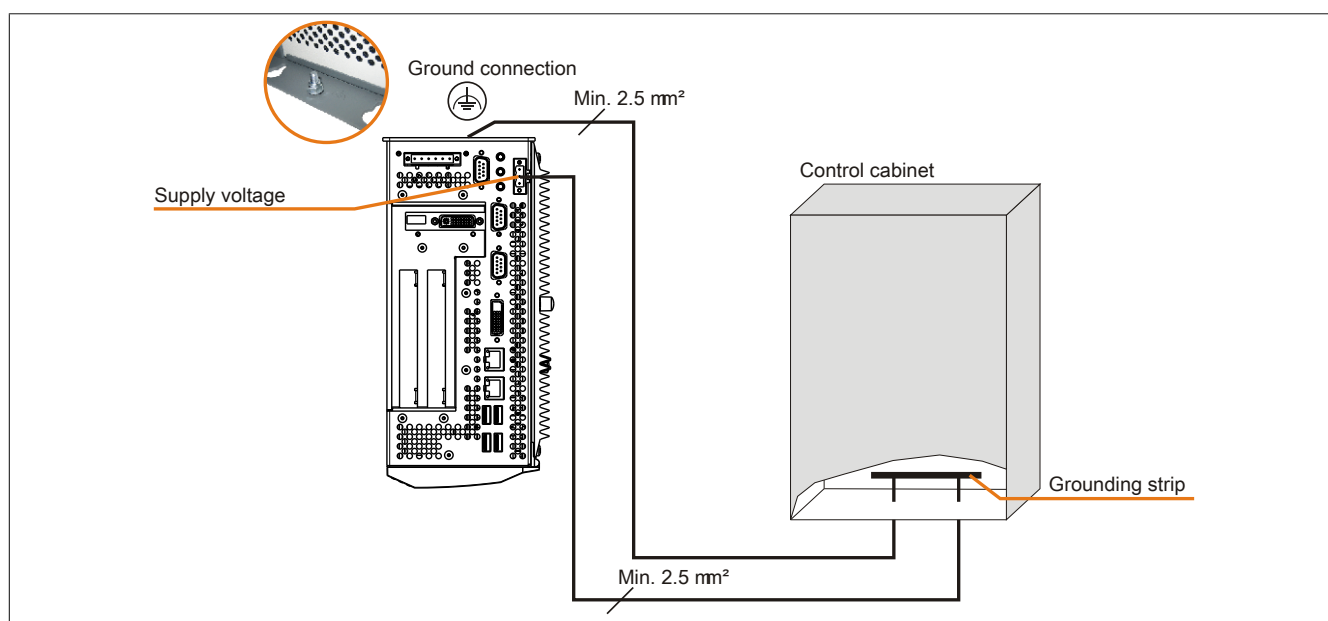


Figure 85: Grounding concept

## 4 General instructions for performing Temperature tests

The purpose of these instructions is to explain general procedures for performing application-specific temperature tests with B&R industrial PCs or Power Panels. However, 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..

Additionally, 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 mounted 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.

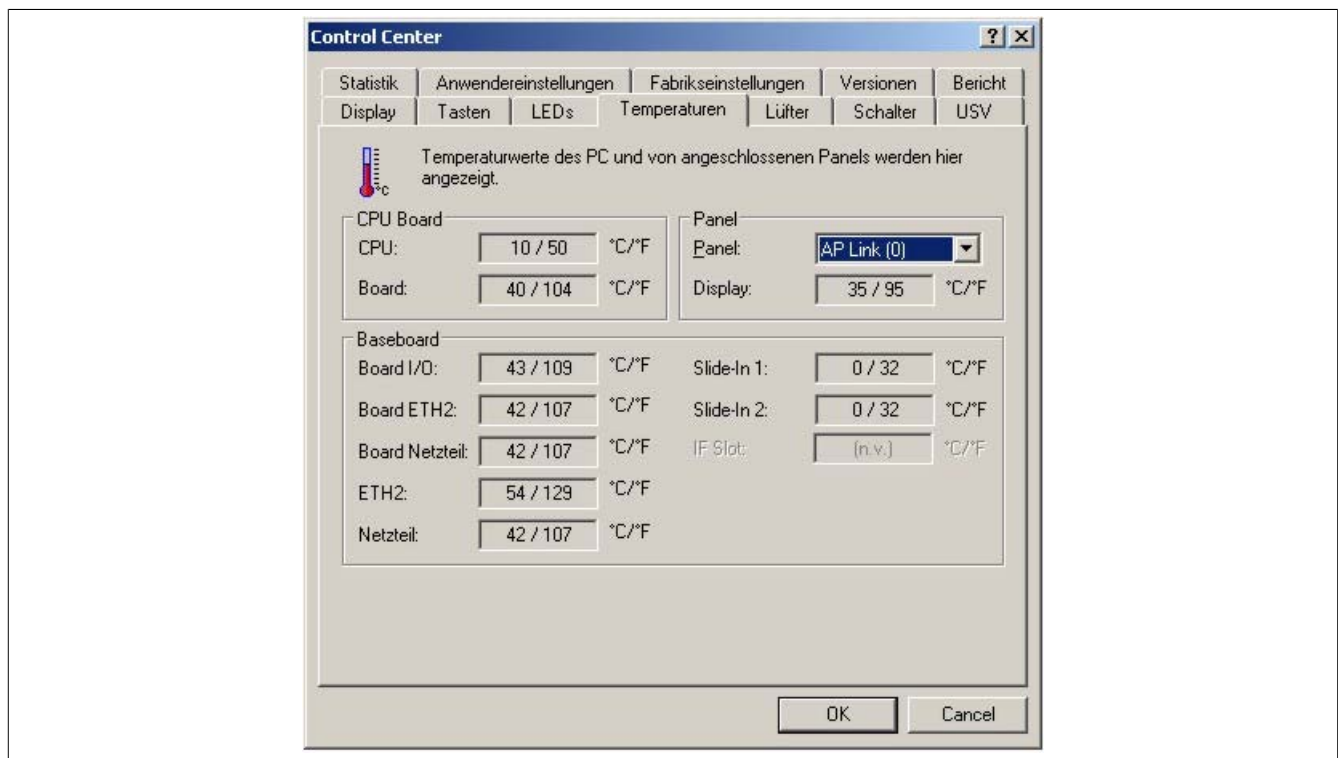
For information about the locations of temperature sensors and the maximum specified values, please see section "Temperature sensor locations" in Chapter 2 "Technical data".

To ensure a reliable evaluation of the temperature situation, a minimum of 8 hours are recommended for testing.

### 4.2 Evaluation of temperatures in Windows operating systems

#### 4.2.1 Evaluation using B&R Control Center

The B&R Control Center can be used to evaluate the temperatures. The temperatures can be viewed on the "Temperatures" tab. The B&R Control Center can be downloaded at no cost from the Downloads section of the B&R website ([www.br-automation.com](http://www.br-automation.com)). The B&R Control Center uses the B&R Automation Device Interface (ADI).



A new application can be created if a historic recording of the data is required.

#### Information:

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

#### 4.2.2 Evaluation using the BurnIn tool from Passmark

If a new application is not created for evaluating the temperatures, B&R recommends using the BurnIn Test software tool from the company Passmark.

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

### Information:

Loopback adapters are also available from Passmark. More information is available at [www.passmark.com](http://www.passmark.com).

The following screenshots are based on Passmark BurnIn Pro Version V4 and an APC810 2-slot with DVD.

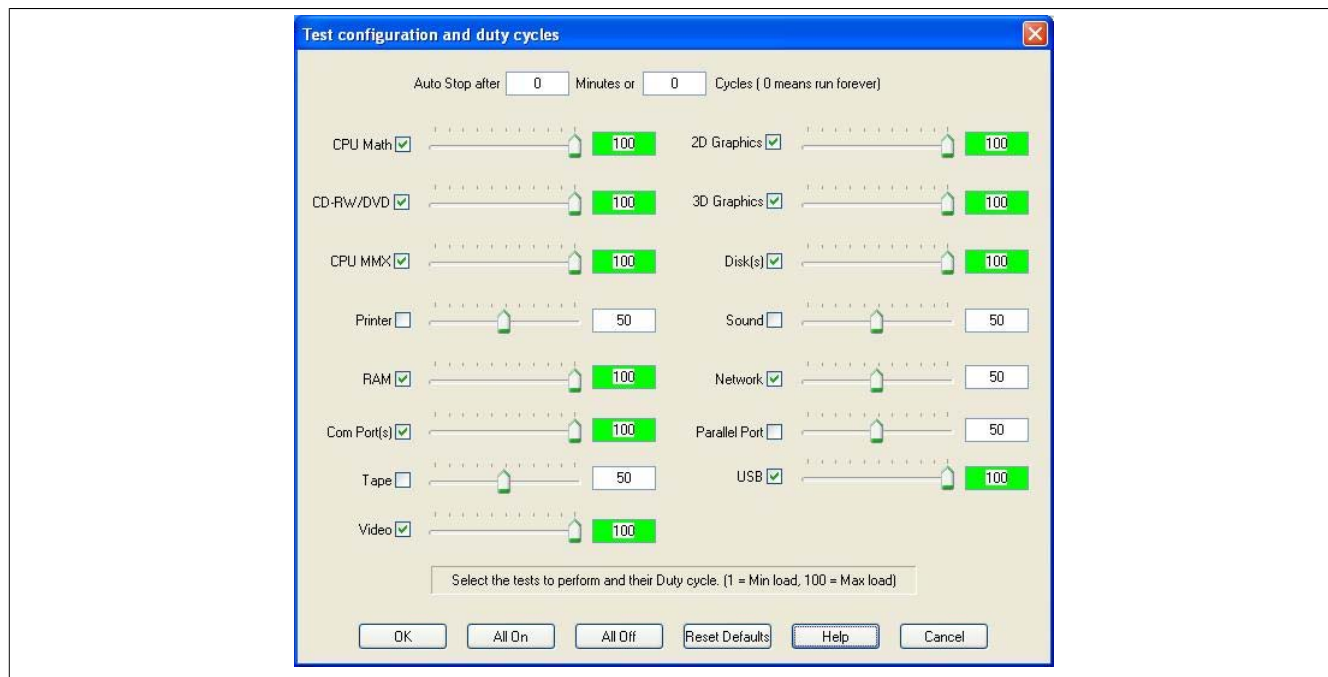


Figure 86: Settings for Passmark BurnIn Pro V4 with an APC810 2-slot with DVD



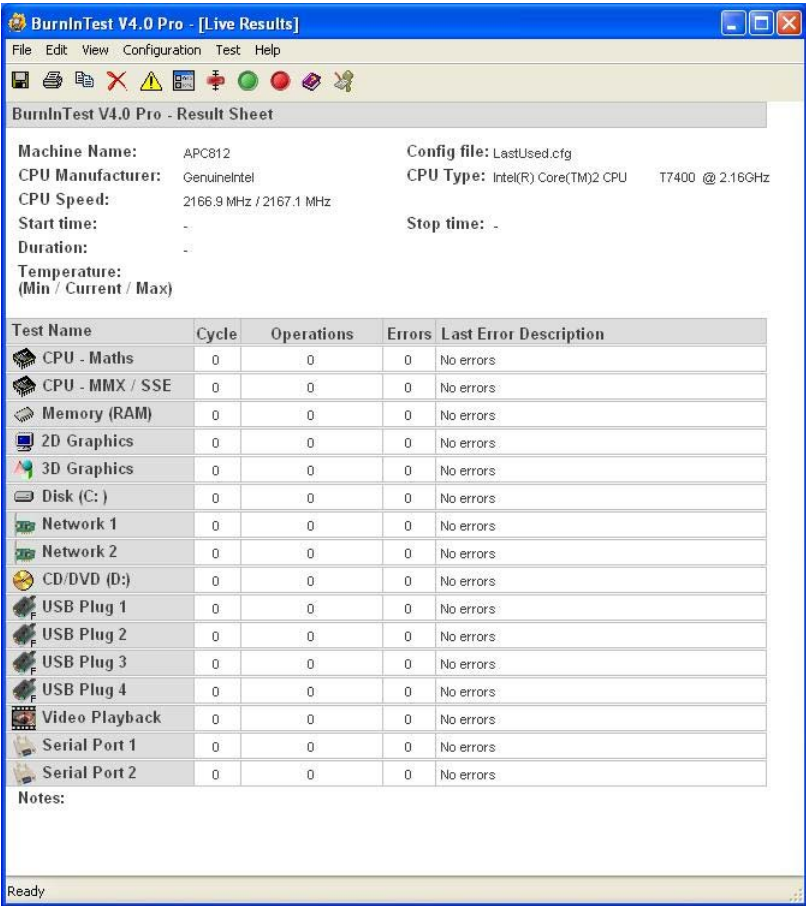


Figure 87: Test overview of an APC810 2-slot with DVD

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

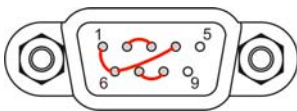
**Information:**

If there is no USB loopback adapter available, USB flash drives can also be used. The USB flash drives must be available in Windows as formatted drives. The test USB must then be deselected and the USB flash drives must be configured in the disk properties.



**Information:**

Serial loopback adapters are relatively easy to create yourself. Simple connect several pins with wires to the serial interface.



### 4.3 Evaluating the temperatures in an operating system other than Windows

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.

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

If code from the sample programs is used, please observe the notes in the implementation guide regarding the TODO statements, I/O access functions, etc.

#### Information:

Sample programs and implementation guides for all B&R Industrial PCs and Power Panel can be downloaded at no cost from the B&R website ([www.br-automation.com](http://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 also 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 consider the speed, etc..

If the temperature tests are performed in a climate controlled chamber with fans, the devices will be cooled by these fans, and the results will be skewed. The measurement results for passive devices would therefore be unusable. In order to obtain accurate results in climate controlled chambers with fans, the chamber 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 an APC810 2-slot

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

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 143: Evaluation example using an APC810 2-slot

## 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, and what needs to be considered?
- How are Automation Panel 800 devices connected to the monitor / panel output of the APC810, and what needs to be considered?
- How are Automation Panel 900 devices connected simultaneously to the Monitor / Panel output on the optional SDL AP Link of the APC810 and what needs to be considered?
- What are "Display Clone" and "Extended Desktop" modes?
- How many Automation Panel 900 devices can be connected per line?
- How many Automation Panel 900 devices can be connected to an Automation Panel 800 device per line?
- How are the connected devices internally numbered?
- Are there limitations to the segment length and if so, what are they?
- What cables and link modules are needed?
- Do BIOS settings have to be changed for a specific configuration?

### 5.1 Selecting the display units

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

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

Table 144: Selecting the display units

## 5.2 One Automation Panel 900 via onboard DVI

An Automation Panel 900 with max. SXGA resolution is connected to the integrated DVI interface (onboard). As an alternative, an office TFT with DVI interface or an analog monitor (using adapter with model no. 5AC900.1000-00) can also be used. A separate cable is used for touch screen and USB. If USB devices are to be operated on the Automation Panel 900, the maximum distance is 5 meters. USB devices can only be connected directly to the Automation Panel (without a hub).

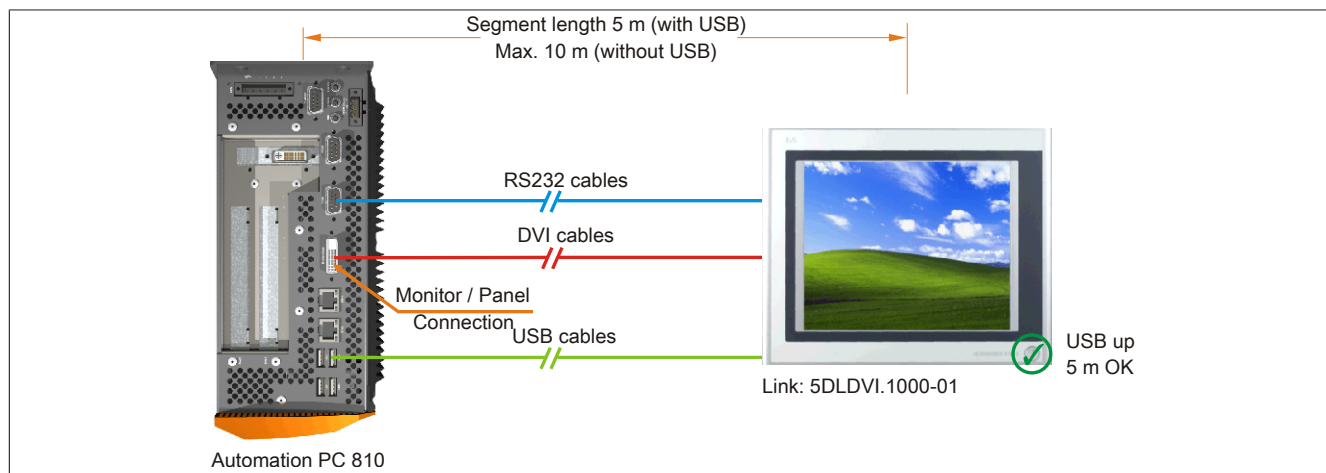


Figure 88: One Automation Panel 900 via onboard DVI (sample photo)

### 5.2.1 Basic system requirements

The following table shows the possible combinations of APC810 system unit and CPU board to implement the configuration shown in the figure above. If a combination results in a limitation of the maximum resolution, this is also indicated (e.g. when connecting a non-B&R Automation Panel 900 device).

CPU board	with system unit				Limitation Resolution
	5PC810.SX01-00	5PC810.SX02-00	5PC810.SX03-00	5PC810.SX05-00	
5PC800.B945-00 5PC800.B945-10	✓	✓	✓	✓	Max. SXGA
5PC800.B945-01 5PC800.B945-11	✓	✓	✓	✓	Max. SXGA
5PC800.B945-02 5PC800.B945-12	✓	✓	✓	✓	Max. SXGA
5PC800.B945-03 5PC800.B945-13	✓	✓	✓	✓	Max. SXGA
5PC800.B945-04 5PC800.B945-14	✓	✓	✓	✓	Max. SXGA
5PC800.B945-05	✓	✓	✓	✓	Max. SXGA

Table 145: Possible combinations of system unit and CPU board

### 5.2.2 Link modules

#### Information:

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

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

Table 146: 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 147: 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 147: Cables for DVI configurations

## Information:

Detailed technical data about the cables can be found in the Automation Panel 900 User's Manual. This can be downloaded as a PDF file from the B&R website at [www.br-automation.com](http://www.br-automation.com).

### 5.2.4 Possible Automation Panel units, resolutions and segment lengths

The following Automation Panel 900 units can be used. In rare cases, the segment length is limited according to the resolution.

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

Table 148: Possible Automation Panel units, resolutions and segment lengths

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

## Information:

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

### 5.2.5 BIOS settings

No special BIOS settings are necessary for operation.

### 5.3 One Automation Panel 900 via onboard SDL

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

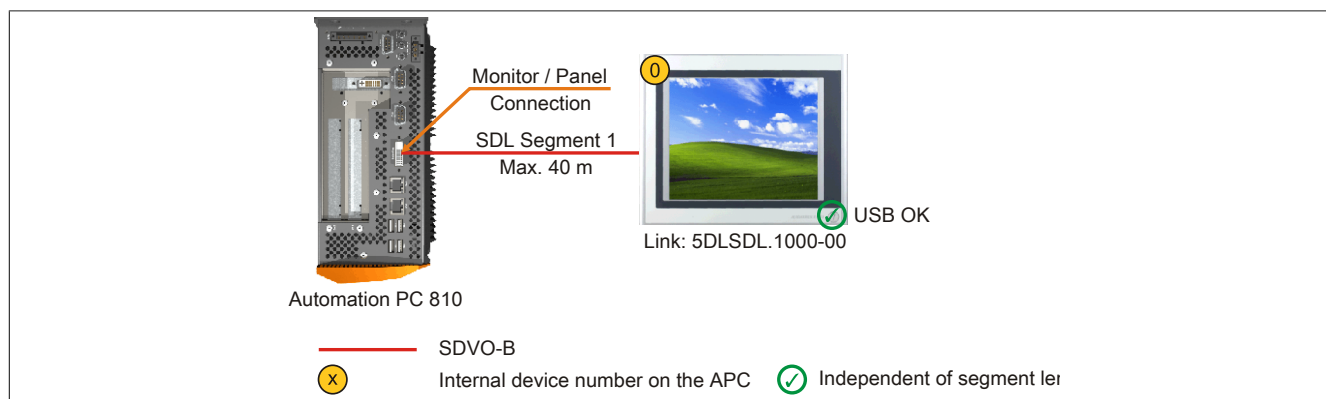


Figure 89: One Automation Panel 900 via onboard SDL (sample photo)

#### 5.3.1 Basic system requirements

The following table shows the possible combinations of APC810 system unit and CPU board to implement the configuration shown in the figure above. If a combination results in a limitation of the maximum resolution, this is also indicated (e.g. when connecting a non-B&R Automation Panel 900 device).

CPU board	with system unit				Limitation Resolution
	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 149: Possible combinations of system unit and CPU board

#### 5.3.2 Link modules

##### Information:

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

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

Table 150: 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 151: 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, 45° connector, 1.8 m	1.8 m ±30 mm
5CASDL.0050-01	SDL cable, 45° connector, 5 m	5 m ±50 mm
5CASDL.0100-01	SDL cable, 45° connector, 10 m	10 m ±100 mm
5CASDL.0150-01	SDL cable, 45° connector, 15 m	15 m ±100 mm

Table 151: Cables for SDL configurations

## Information:

Detailed technical data about the cables can be found in the Automation Panel 900 User's Manual. This can be downloaded as a PDF file from the B&R website at [www.br-automation.com](http://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	-	-	-	-
40	5CASDL.0400-13	5CASDL.0400-13	5CASDL.0400-13	5CASDL.0400-13	-	5CASDL.0400-13

Table 152: Cable lengths and resolutions for SDL transmission

### 5.3.4 BIOS settings

No special BIOS settings are necessary for operation.

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

### Touch screen functionality

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

## 5.4 One Automation Panel 800 via onboard SDL

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

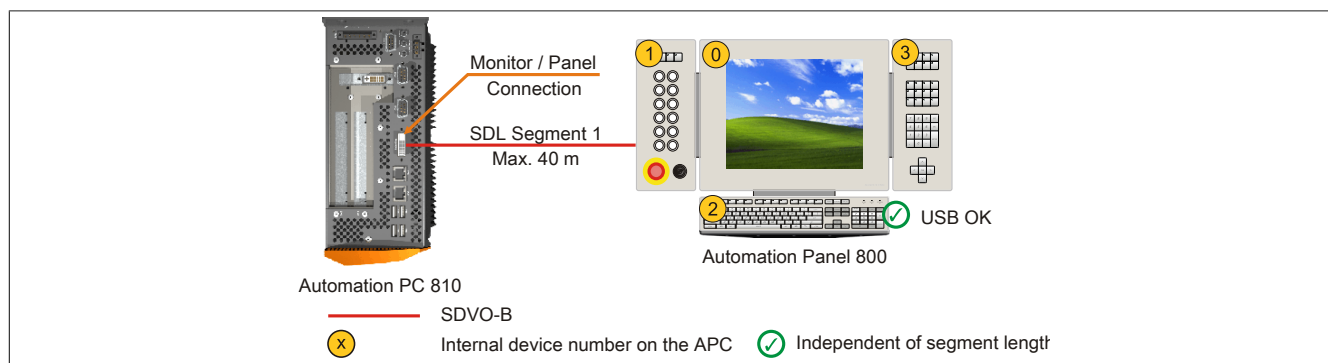


Figure 90: One Automation Panel 800 via onboard SDL (sample photo)

### 5.4.1 Basic system requirements

The following table shows the possible combinations of APC810 system unit and CPU board to implement the configuration shown in the figure above. If a combination results in a limitation of the maximum resolution, this is also indicated (e.g. when connecting a non-B&R Automation Panel 900 device).

CPU board	with system unit				Limitation Resolution
	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 combinations of system unit and CPU board

### 5.4.2 Cables

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

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

Table 154: Cables for SDL configurations

### Information:

Detailed technical data about the cables can be found in the Automation Panel 800 User's Manual. This can be downloaded as a PDF file from the B&R website at [www.br-automation.com](http://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 155: Cable lengths and resolutions for SDL transmission

### 5.4.3 BIOS settings

No special BIOS settings are necessary for operation.

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

### Touch screen functionality

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

### 5.5 One AP900 and one AP800 via onboard SDL

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

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

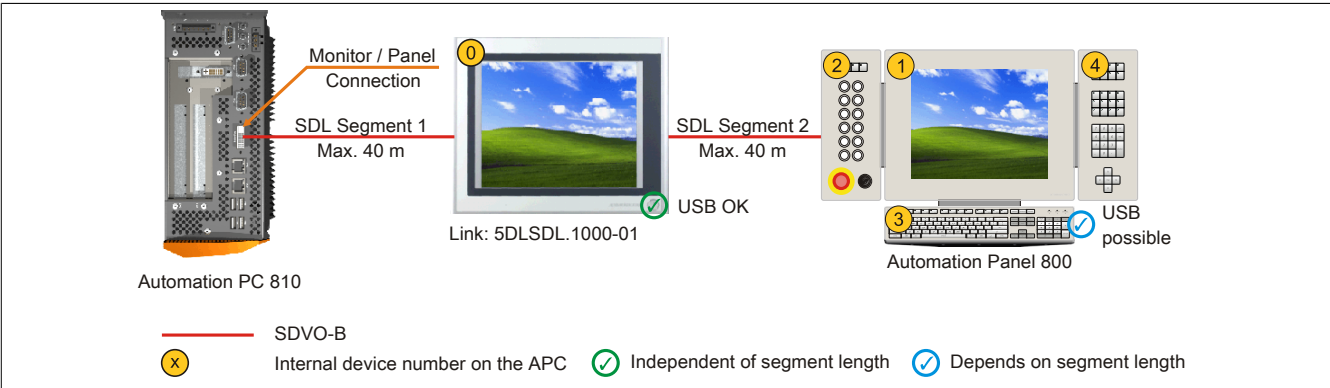


Figure 91: One AP900 and one AP800 via onboard SDL (sample photo)

#### 5.5.1 Basic system requirements

The following table shows the possible combinations of APC810 system unit and CPU board to implement the configuration shown in the figure above. If a combination results in a limitation of the maximum resolution, this is also indicated (e.g. when connecting a non-B&R Automation Panel 900 device).

CPU board	with system unit				Limitation Resolution
	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 156: Possible combinations of system unit and CPU board

#### 5.5.2 Link modules

##### Information:

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

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

Table 157: Link modules

#### 5.5.3 Cables

For a selection of SDL cables for connecting the AP900 display to the AP900 display, see see "Cables" on page 202.

For a selection of SDL cables for connecting the AP800 display to the AP900 display, see see "Cables" on page 204.

##### Information:

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

#### 5.5.4 BIOS settings

No special BIOS settings are necessary for operation.

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

#### Touch screen functionality

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

## 5.6 Four Automation Panel 900 units via onboard SDL

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

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

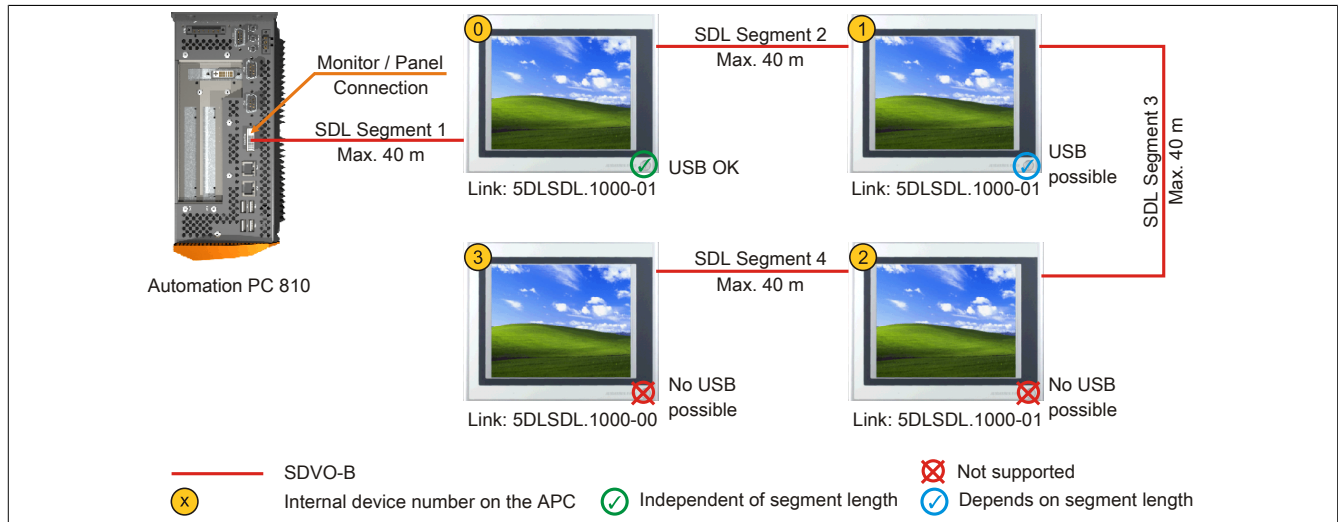


Figure 92: Four Automation Panel 900 units via onboard SDL (sample photo)

### 5.6.1 Basic system requirements

The following table shows the possible combinations of APC810 system unit and CPU board to implement the configuration shown in the figure above. If a combination results in a limitation of the maximum resolution, this is also indicated (e.g. when connecting a non-B&R Automation Panel 900 device).

CPU board	with system unit				Limitation Resolution
	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 158: Possible combinations of system unit and CPU board

### 5.6.2 Link modules

#### Information:

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

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

Table 159: 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, 45° connector, 1.8 m	1.8 m ±30 mm
5CASDL.0050-01	SDL cable, 45° connector, 5 m	5 m ±50 mm
5CASDL.0100-01	SDL cable, 45° connector, 10 m	10 m ±100 mm
5CASDL.0150-01	SDL cable, 45° connector, 15 m	15 m ±100 mm

Table 160: Cables for SDL configurations

## Information:

Detailed technical data about the cables can be found in the Automation Panel 900 User's Manual. This can be downloaded as a PDF file from the B&R website at [www.br-automation.com](http://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 161: Cable lengths and resolutions for SDL transmission

### 5.6.4 BIOS settings

No special BIOS settings are necessary for operation.

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

### Touch screen functionality

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

## 5.7 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 (without a hub).

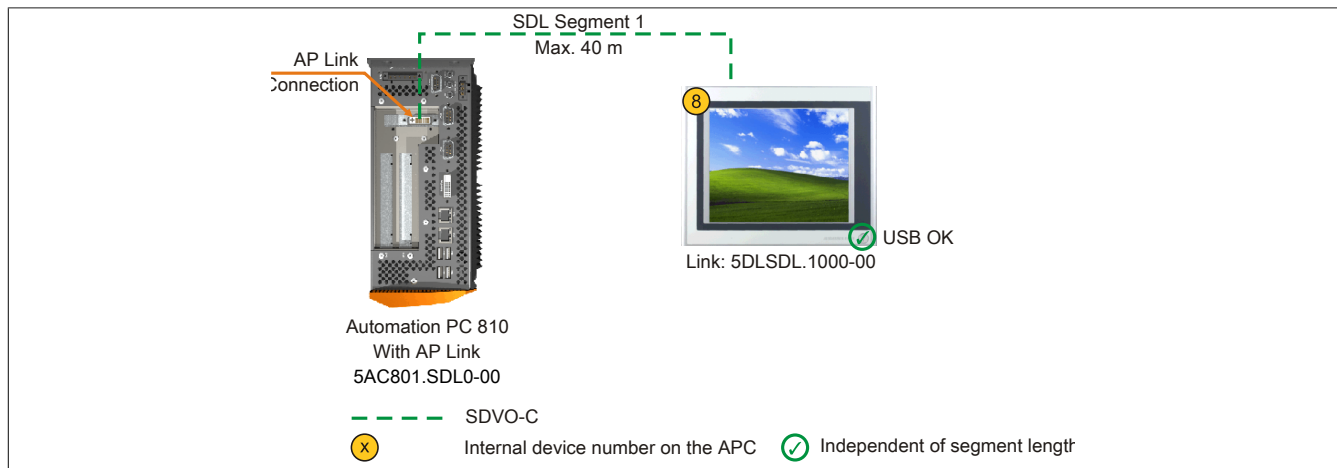


Figure 93: One Automation Panel 900 via SDL AP Link (sample photo)

### 5.7.1 Basic system requirements

The following table shows the possible combinations of APC810 system unit and CPU board to implement the configuration shown in the figure above. If a combination results in a limitation of the maximum resolution, this is also indicated (e.g. when connecting a non-B&R Automation Panel 900 device).

CPU board	with system unit				Limitation Resolution
	5PC810.SX01-00 <sup>1)</sup>	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 combinations of system unit and CPU board

1) AP Link cannot be installed.

### 5.7.2 Link modules

#### Information:

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

Model number	Description	Note
5DLSDL.1000-00	<b>Automation Panel Link SDL receiver</b> Connection for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900
5AC801.SDL0-00	<b>APC810 AP Link SDL transmitter</b> Automation Panel SDL link transmitter	For Automation PC 810

Table 163: 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

Table 164: Cables for SDL configurations

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

Table 164: Cables for SDL configurations

## Information:

Detailed technical data about the cables can be found in the Automation Panel 900 User's Manual. This can be downloaded as a PDF file from the B&R website at [www.br-automation.com](http://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
	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
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

### 5.7.4 BIOS settings

No special BIOS settings are necessary for operation.

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

### Touch screen functionality

The COM D must be enabled in BIOS in order to operate the connected panel touch screen on the AP Link connection (found in the BIOS menu under "Advanced - Main board / 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 panels show the same content (Display Clone).

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

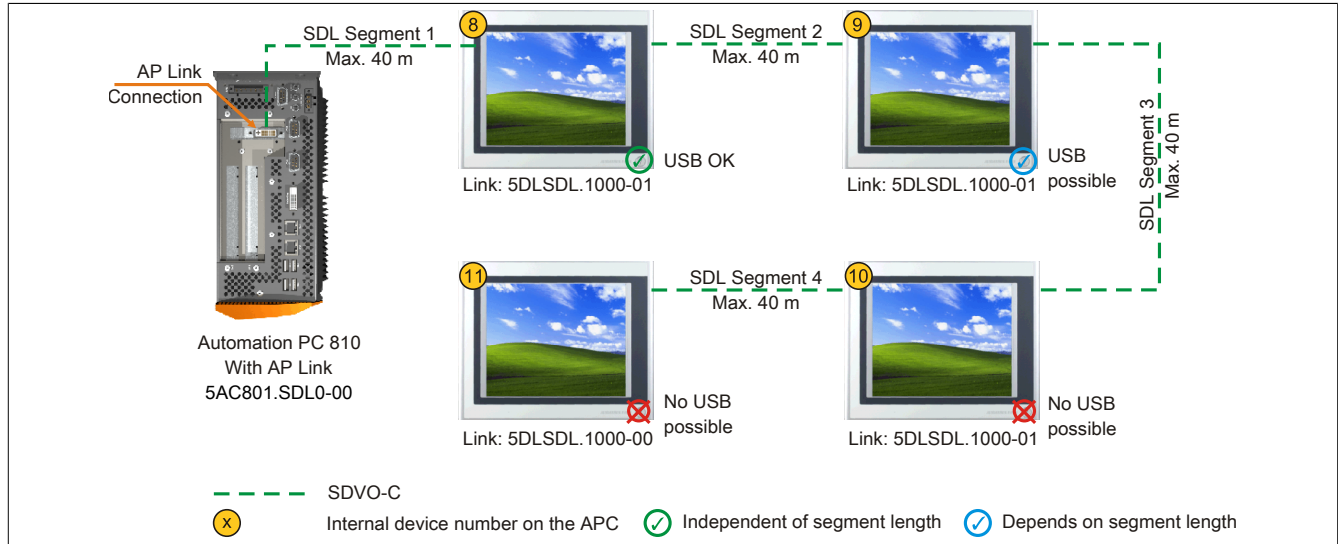


Figure 94: Four Automation Panel 900 units via SDL AP Link (sample photo)

### 5.8.1 Basic system requirements

The following table shows the possible combinations of APC810 system unit and CPU board to implement the configuration shown in the figure above. If a combination results in a limitation of the maximum resolution, this is also indicated (e.g. when connecting a non-B&R Automation Panel 900 device).

CPU board	with system unit				Limitation Resolution
	5PC810.SX01-00 <sup>1)</sup>	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 166: Possible combinations of system unit and CPU board

1) AP Link cannot be installed.

## 5.8.2 Link modules

### Information:

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

Model number	Description	Note
5DLSDL.1000-00	<b>Automation Panel Link SDL receiver</b> Connection for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900
5DLSDL.1000-01	<b>Automation Panel Link SDL transceiver</b> Connections for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900
5AC801.SDL0-00	<b>APC810 AP Link SDL transmitter</b> Automation Panel SDL link transmitter	For Automation PC 810

Table 167: 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, 45° connector, 1.8 m	1.8 m ±30 mm
5CASDL.0050-01	SDL cable, 45° connector, 5 m	5 m ±50 mm
5CASDL.0100-01	SDL cable, 45° connector, 10 m	10 m ±100 mm
5CASDL.0150-01	SDL cable, 45° connector, 15 m	15 m ±100 mm

Table 168: Cables for SDL configurations

### Information:

Detailed technical data about the cables can be found in the Automation Panel 900 User's Manual. This can be downloaded as a PDF file from the B&R website at [www.br-automation.com](http://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 169: 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 169: Cable lengths and resolutions for SDL transmission

### 5.8.4 BIOS settings

No special BIOS settings are necessary for operation.

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

### Touch screen functionality

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

## 5.9 Two Automation Panel 900 units 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.

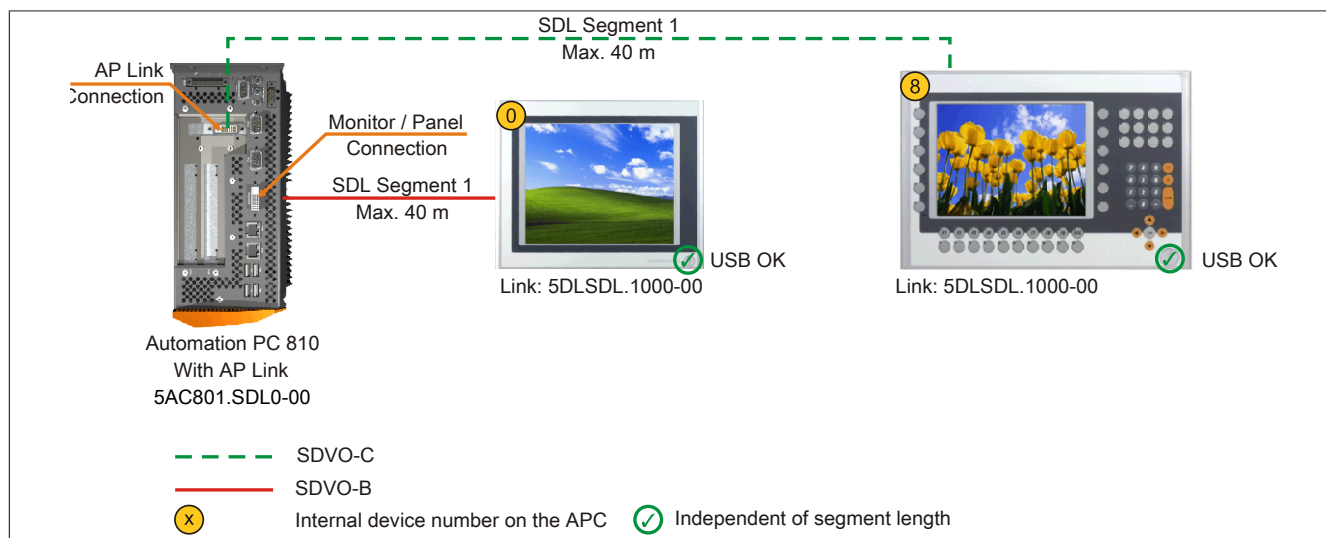


Figure 95: Two Automation Panel 900 units via onboard SDL and SDL AP Link (sample photo)

### 5.9.1 Basic system requirements

The following table shows the possible combinations of APC810 system unit and CPU board to implement the configuration shown in the figure above. If a combination results in a limitation of the maximum resolution, this is also indicated (e.g. when connecting a non-B&R Automation Panel 900 device).

CPU board	with system unit				Limitation Resolution
	5PC810.SX01-00 <sup>1)</sup>	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 combinations of system unit and CPU board

1) AP Link cannot be installed.

### 5.9.2 Link modules

#### Information:

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

Model number	Description	Note
5DLSDL.1000-00	<b>Automation Panel Link SDL receiver</b> Connection for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900
5AC801.SDL0-00	<b>APC810 AP Link SDL transmitter</b> Automation Panel SDL link transmitter	For Automation PC 810

Table 171: 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, 45° connector, 1.8 m	1.8 m ±30 mm
5CASDL.0050-01	SDL cable, 45° connector, 5 m	5 m ±50 mm
5CASDL.0100-01	SDL cable, 45° connector, 10 m	10 m ±100 mm
5CASDL.0150-01	SDL cable, 45° connector, 15 m	15 m ±100 mm

Table 172: Cables for SDL configurations

#### Information:

Detailed technical data about the cables can be found in the Automation Panel 900 User's Manual. This can be downloaded as a PDF file from the B&R website at [www.br-automation.com](http://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 173: Cable lengths and resolutions for SDL transmission

#### 5.9.4 BIOS settings

No special BIOS settings are necessary for operation.

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

#### Touch screen functionality

The COM C or COM D must be enabled in BIOS in order to operate the connected panel touch screen on the monitor / panel or AP Link connection (found in the BIOS menu under "Advanced - Main board / 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 30m on the first two panels (front and back side). From a distance of 30 m and longer, USB is only available for the first panel on each line. USB devices can only be connected directly to the Automation Panel (without hub).

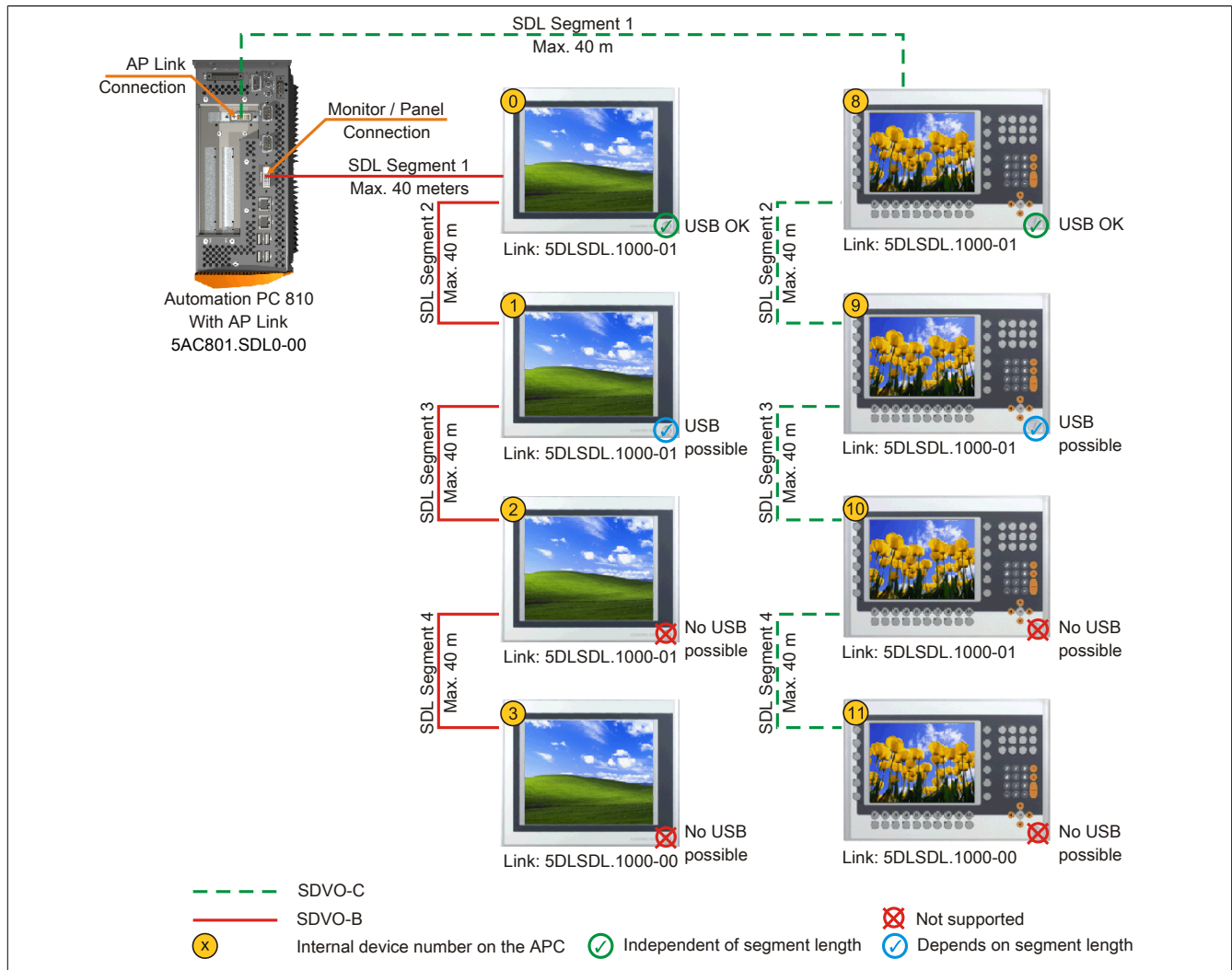


Figure 96: Eight Automation Panel 900 units via onboard SDL and SDL AP Link (sample photo)

### 5.10.1 Basic system requirements

The following table shows the possible combinations of APC810 system unit and CPU board to implement the configuration shown in the figure above. If a combination results in a limitation of the maximum resolution, this is also indicated (e.g. when connecting a non-B&R Automation Panel 900 device).

CPU board	with system unit				Limitation Resolution
	5PC810.SX01-00 <sup>1)</sup>	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

Table 174: Possible combinations of system unit and CPU board

CPU board	with system unit				Limitation Resolution
	5PC810.SX01-00 <sup>1)</sup>	5PC810.SX02-00	5PC810.SX03-00	5PC810.SX05-00	
5PC800.B945-03 5PC800.B945-13	-	✓	✓	✓	Max. UXGA
5PC800.B945-04 5PC800.B945-14	-	✓	✓	✓	Max. UXGA
5PC800.B945-05	-	✓	✓	✓	Max. UXGA

Table 174: Possible combinations of system unit and CPU board

1) AP Link cannot be installed.

### 5.10.2 Link modules

#### Information:

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

Model number	Description	Note
5DLSDL.1000-00	<b>Automation Panel Link SDL receiver</b> Connection for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900
5DLSDL.1000-01	<b>Automation Panel Link SDL transceiver</b> Connections for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900
5AC801.SDL0-00	<b>APC810 AP Link SDL transmitter</b> Automation Panel SDL link transmitter	For Automation PC 810

Table 175: 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, 45° connector, 1.8 m	1.8 m ±30 mm
5CASDL.0050-01	SDL cable, 45° connector, 5 m	5 m ±50 mm
5CASDL.0100-01	SDL cable, 45° connector, 10 m	10 m ±100 mm
5CASDL.0150-01	SDL cable, 45° connector, 15 m	15 m ±100 mm

Table 176: Cables for SDL configurations

#### Information:

Detailed technical data about the cables can be found in the Automation Panel 900 User's Manual. This can be downloaded as a PDF file from the B&R website at [www.br-automation.com](http://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 177: Cable lengths and resolutions for SDL transmission

### 5.10.4 BIOS settings

No special BIOS settings are necessary for operation.

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

### Touch screen functionality

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



Three Automation Panel 900 (max. UXGA) units and one Automation Panel 800 are connected to the integrated SDL interface (onboard) via SDL. Additionally, three Automation Panel 900 (max. UXGA) units and one Automation Panel 800 are operated on the optional SDL transmitters. The Automation Panels in each line must be the same type. The two lines show different content (Extended Desktop), but displays in the same line show the same content (Display Clone).

The diagram illustrates the connection of an Automation PC 810 to multiple Automation Panel 800 units via SDVO-C and SDVO-B links. The diagram shows the maximum segment length (40m) and the number of panels supported per segment. It also shows the internal device numbers on the APC and the USB connection status for each panel.

**Legend:**

- SDVO-C (Green dashed line)
- SDVO-B (Red solid line)
- Internal device number on the APC (Yellow circle with number)
- Independent of segment length (Green checkmark)
- Depends on segment length (Blue checkmark)
- Not supported (Red X)

**Automation PC 810:** With AP Link 5AC801.SDL0-00

**SD Segment 1 (Max. 40 m):**

- Panel 0: USB OK (Independent of segment length)
- Panel 1: USB possible (Depends on segment length)
- Panel 2: No USB possible (Not supported)

**SD Segment 2 (Max. 40 m):**

- Panel 8: USB OK (Independent of segment length)
- Panel 9: USB possible (Depends on segment length)
- Panel 10: No USB possible (Not supported)

**SD Segment 3 (Max. 40 m):**

- Panel 4: No USB possible (Not supported)
- Panel 5: No USB possible (Not supported)
- Panel 6: No USB possible (Not supported)

**SD Segment 4 (Max. 40 m):**

- Panel 11: No USB possible (Not supported)
- Panel 12: No USB possible (Not supported)
- Panel 13: No USB possible (Not supported)

**Automation Panel 800:**

### 5.11.1 Basic system requirements

If an Automation Panel 800 and an Automation Panel 900 should be connected on the same line, the devices must have the same display type.

CPU board	with system unit				Limitation Resolution
	5PC810.SX01-00 <sup>1)</sup>	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 178: Possible combinations of system unit and CPU board

1) AP Link cannot be installed.

### 5.11.2 Link modules

#### Information:

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

Model number	Description	Note
5DLSL.1000-01	<b>Automation Panel Link SDL transceiver</b> Connections for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900
5AC801.SDL0-00	<b>APC810 AP Link SDL transmitter</b> Automation Panel SDL link transmitter	For Automation PC 810

Table 179: Link modules

### 5.11.3 Cables

For a selection of SDL cables for connecting the AP900 display to the AP900 display, see see "Cables" on page 202.

For a selection of SDL cables for connecting the AP800 display to the AP900 display, see see "Cables" on page 204.

#### Information:

Detailed technical data about the cables can be found in 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 180: 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 180: Segment lengths, resolutions and SDL cables

#### 5.11.4 BIOS settings

No special BIOS settings are necessary for operation.

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

#### Touch screen functionality

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

## 6 Connecting peripheral USB devices

### Warning!

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

### 6.1 Locally on the APC810

Many different peripheral USB devices can be connected to the 5 USB ports. This means that the USB ports USB1, USB3, USB5 can each handle a load of 1A and USB ports USB2 and USB4 can each handle a load of 500mA. The maximum transfer rate is USB 2.0.



Figure 98: 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 (no hubs) can be connected to the Automation Panel 900.**



Figure 99: Remote connection of USB peripheral devices to the APC900 via DVI

## 6.3 Remote connection to Automation Panel 800 / 900 via SDL

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

### Information:

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



Figure 100: Remote connection of USB peripheral devices to the APC800/900 via SDL

## 7 Configuration of a SATA RAID array

### Information:

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

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

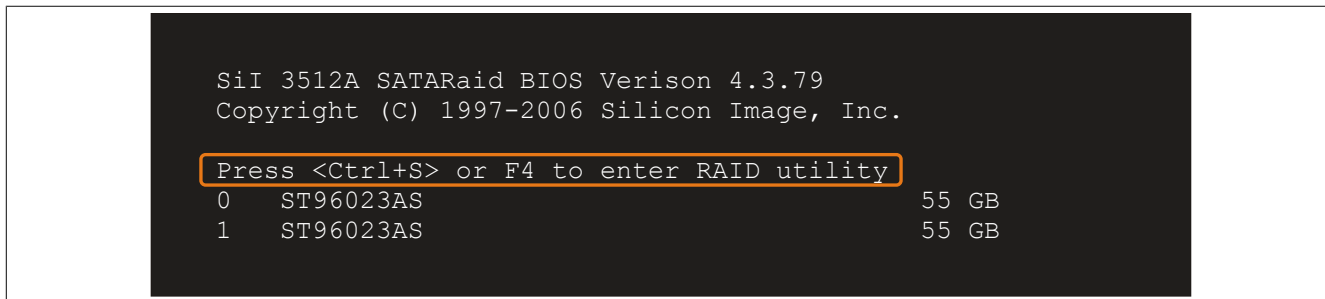


Figure 101: Open the RAID Configuration Utility

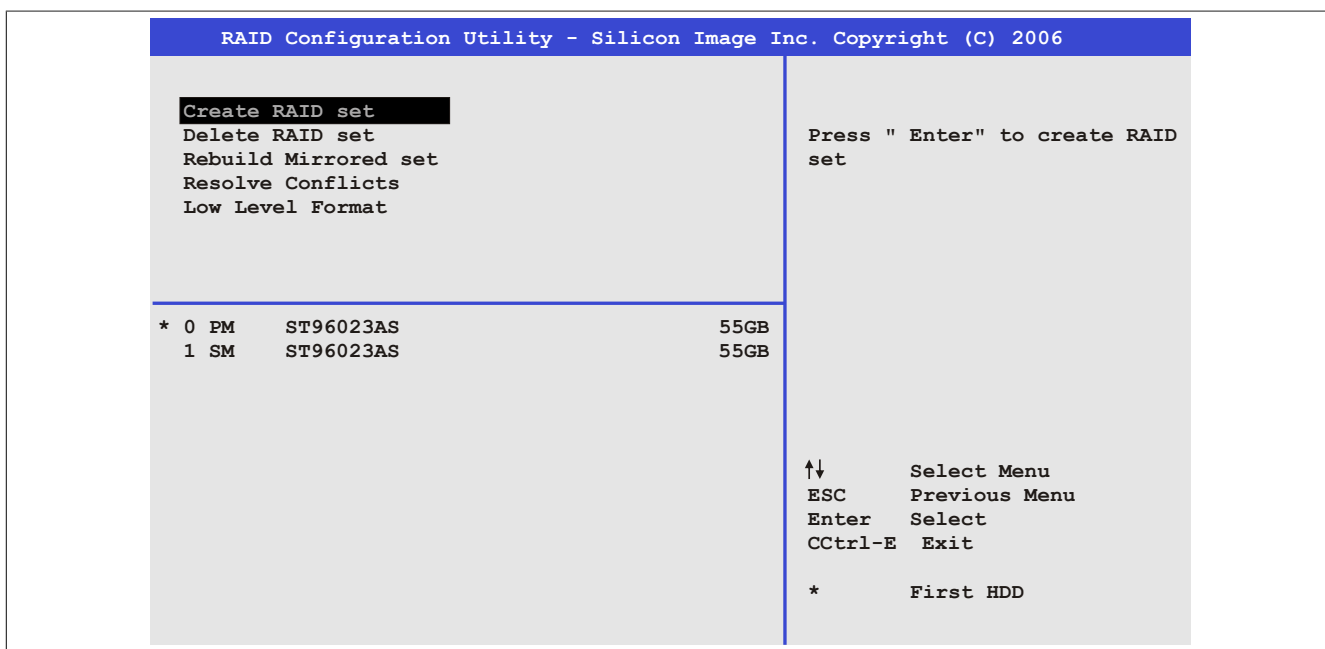


Figure 102: RAID Configuration Utility - Menu

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 181: BIOS-relevant keys in the RAID Configuration Utility

### 7.1 Create RAID set

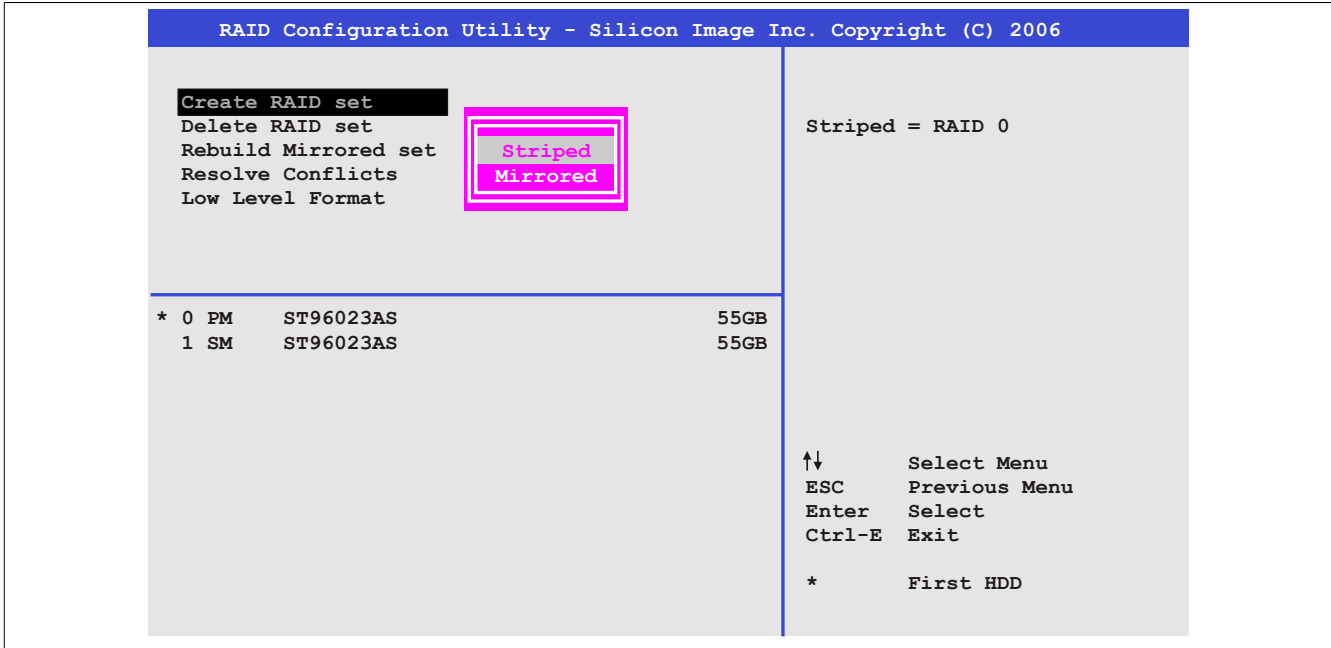


Figure 103: RAID Configuration Utility - Menu

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

### 7.2 Create RAID set - Striped

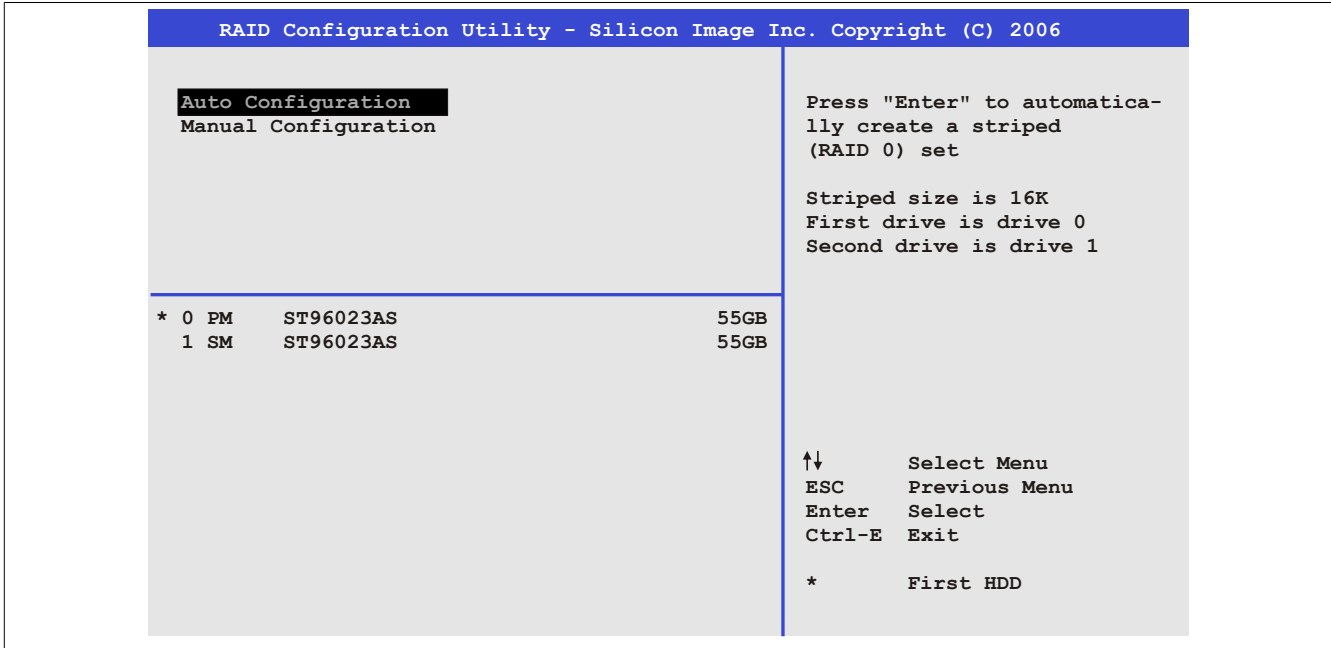


Figure 104: RAID Configuration Utility - Create RAID set - Striped

#### "Auto Configuration"

Auto configuration optimizes all settings.

#### "Manual Configuration"

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

7.3 Create RAID set - Mirrored

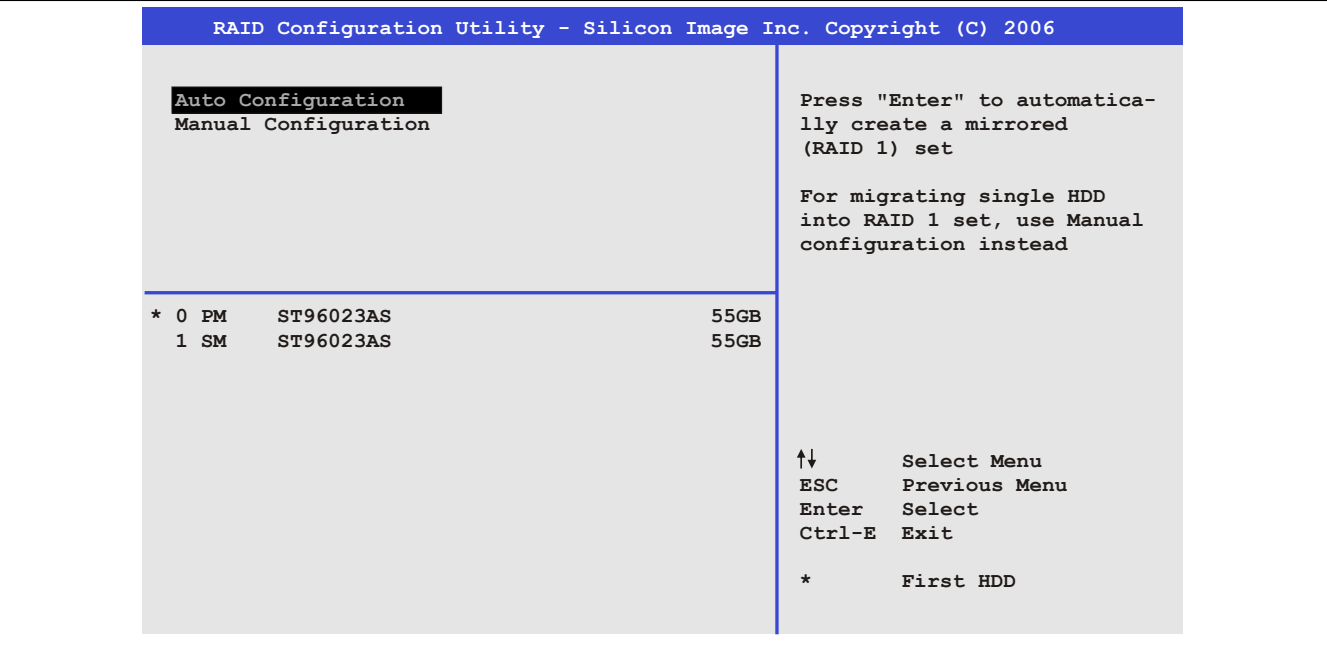


Figure 105: RAID Configuration Utility - Create RAID set - Mirrored

"Auto Configuration"

Auto configuration optimizes all settings.

"Manual Configuration"

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

7.4 Delete RAID set

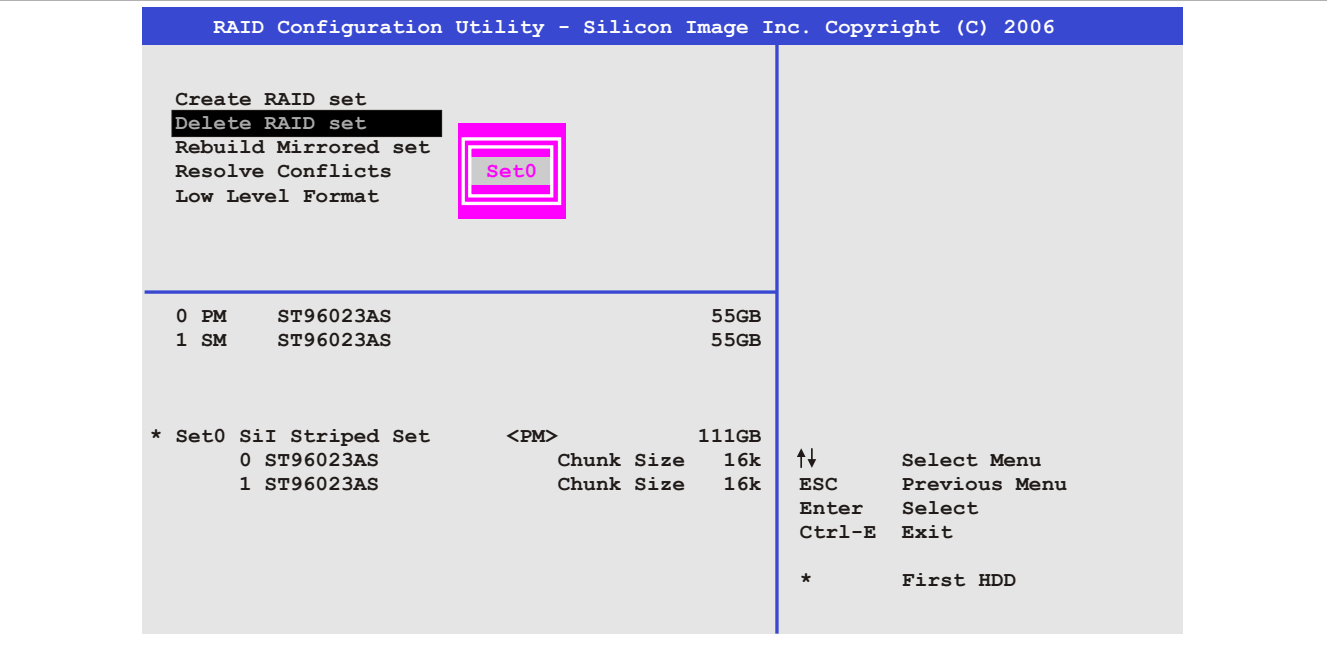


Figure 106: RAID Configuration Utility - Delete RAID set

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



## 7.5 Rebuild mirrored set

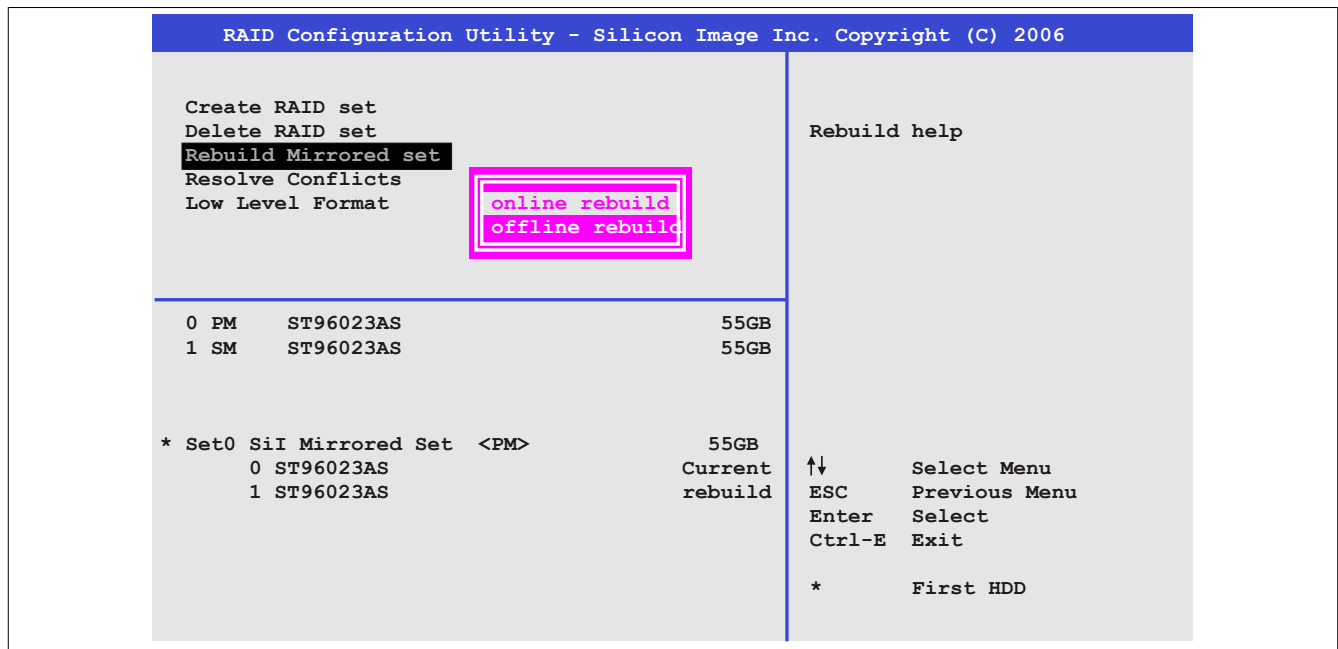


Figure 107: RAID Configuration Utility - Rebuild mirrored set

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

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

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

## 7.6 Resolve Conflicts

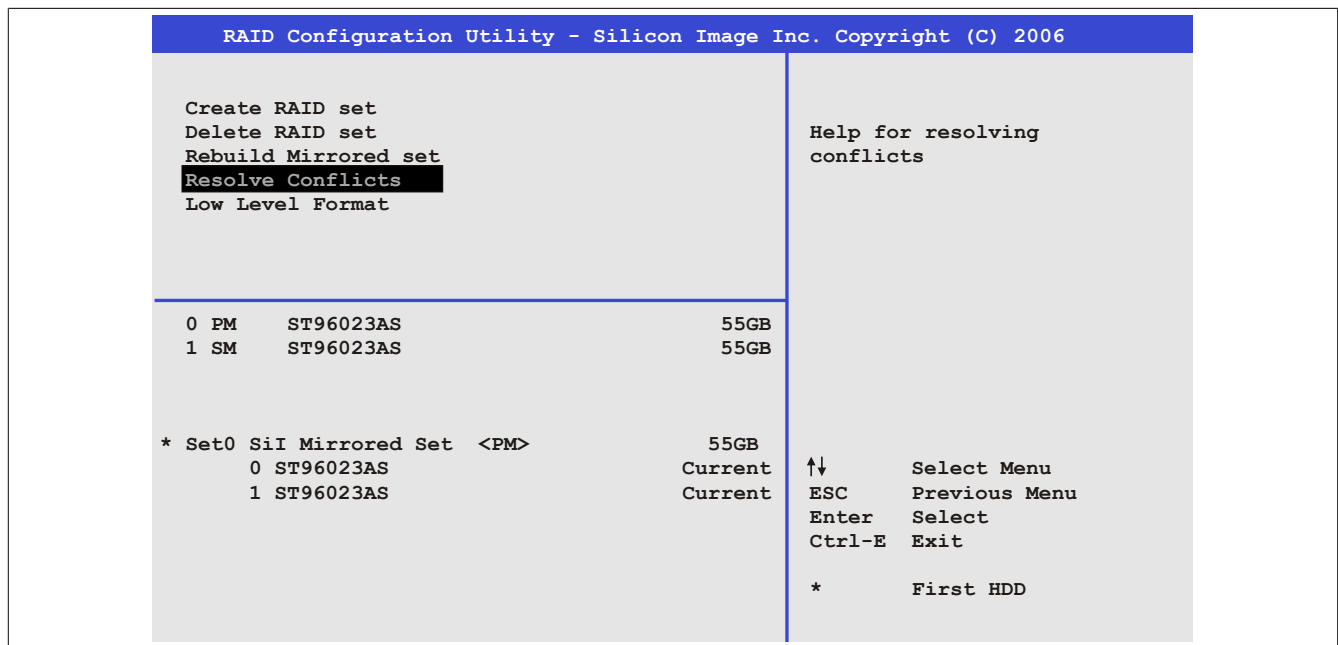


Figure 108: RAID Configuration Utility - Resolve conflicts

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

7.7 Low Level Format

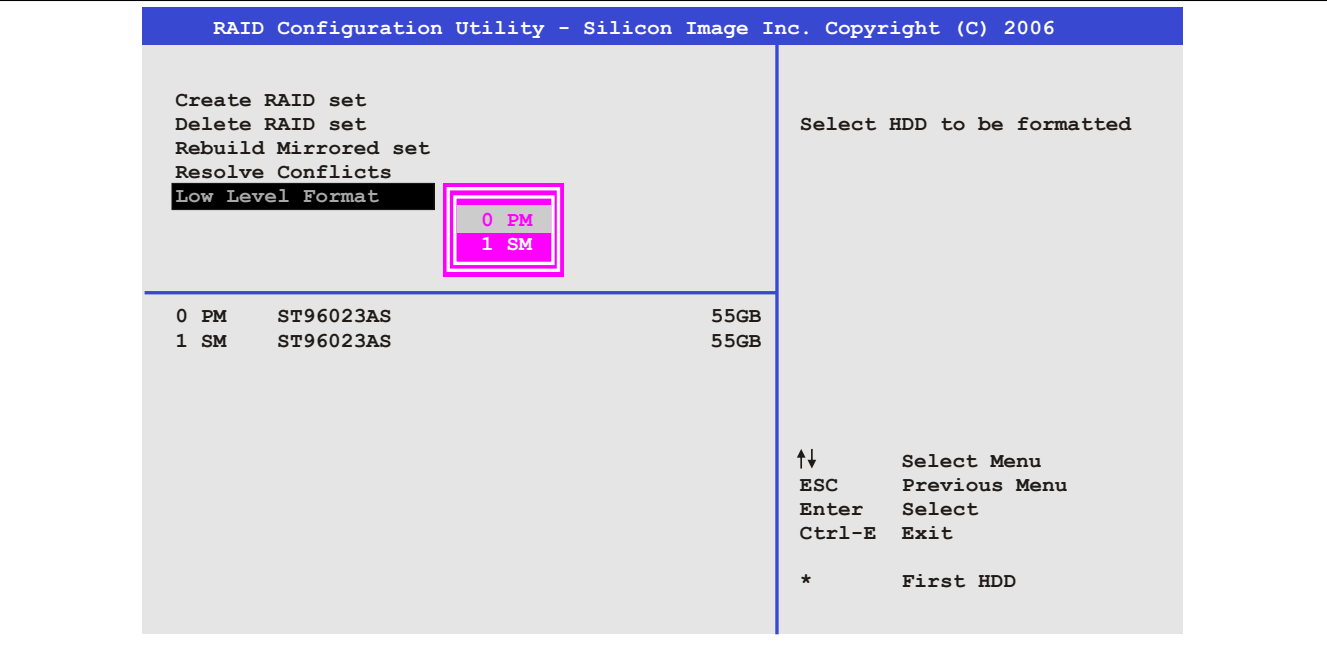


Figure 109: RAID Configuration Utility - Low level format

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

## 8 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).
- Sporadically, it was possible that the ETH2 interface was not initialized during a power-on and therefore it would 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 or the SATA drive can first be removed.
- When using two graphic lines, the Windows XP graphics driver assigns the labels "digital indicator" to the monitor / panel plug and "digital indicator 2" to the AP Link plug. In the "extended desktop" mode, the following behavior is observed: If the digital display device on the monitor / panel is removed (e.g. cable disconnected), digital display 2 is activated automatically, and the graphics driver settings also switch over accordingly. The next time the system is rebooted, the image content is diverted from the monitor / panel plug to the AP Link plug. If the BIOS option "SDVO/DVI Hot plugging support" is set to "enabled" (found under the BIOS menu point "Advanced - Graphics - Configuration"), then the image content is automatically diverted from the separate monitor / panel plug to the second graphics line on the AP Link plug.
- Special features of "Quick Switching" - if the APC810 is in Standby mode - Power LED is red (e.g. Windows XP shutdown), then buffering takes a little more time due to capacitors and low 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 turn-off time should be set to at least 10 seconds.
- From MTCX PX32 firmware ≥ 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. In 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 slide-in DVD-ROM - 5AC801.DVDS-00 does not offer SATA hot plug capability. Other hardware revisions are hot plug capable.
- Using two different types of CompactFlash cards can cause problems in Automation PCs and Panel PCs. This can result in one of the two cards not being detected during system startup. This is caused by varying startup speeds. CompactFlash cards with older technology require significantly more time during system startup than CompactFlash cards with newer technology. This behavior occurs near the limits of the time frame provided for startup. This can occur because the startup time for the CompactFlash cards fluctuates due to the variance of the components being used. Depending on the CompactFlash cards being used, this error may occur never, sometimes or always.
- During daisy chain operation of multiple AP800/AP900 devices via SDL, it's possible that the touch controller status shows a red "X" in the Control Center applet for the touch screen driver when the touch controller is detected. The functionality of the touch system is not affected by this. This can be avoided by setting a panel locking time of 50 ms. The panel locking time can be configured with the B&R Key Editor.

## Chapter 4 • Software

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### 1 BIOS options

#### Information:

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

#### 1.1 General information

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

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

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

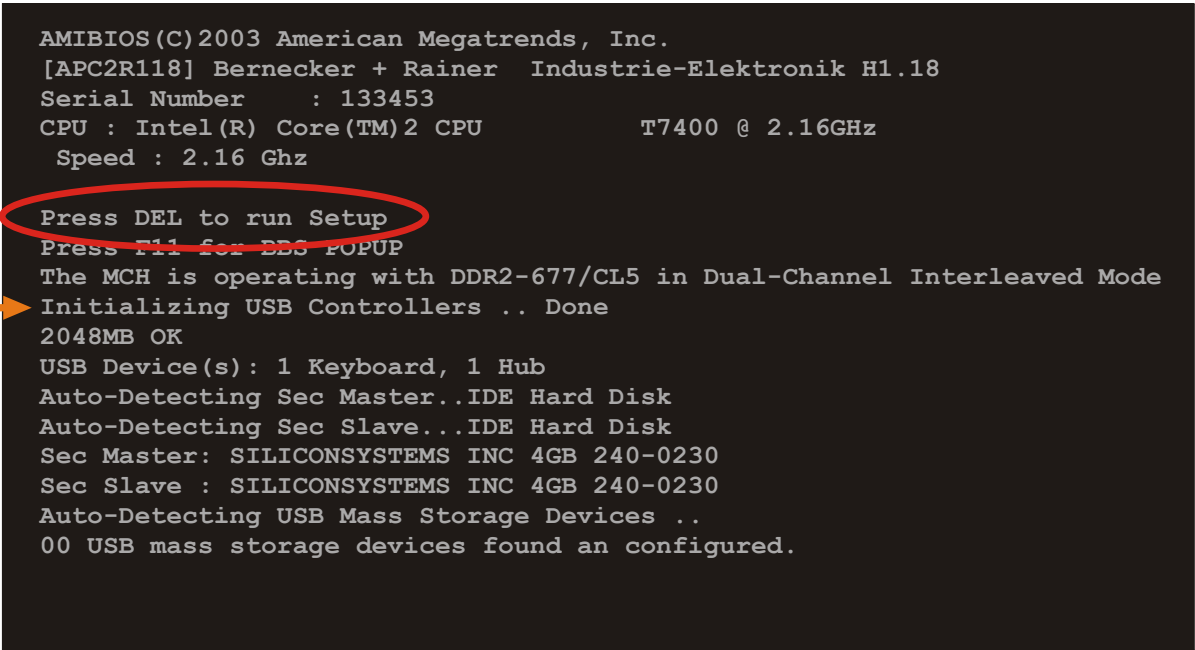
#### 1.2 BIOS setup and boot procedure

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

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

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

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

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 110: Boot screen

## 1.2.1 BIOS setup keys

The following keys are enabled during POST:

### Information:

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

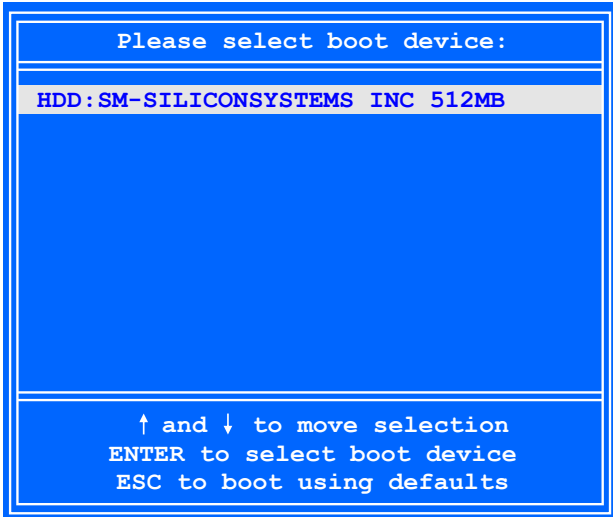
Keys	Function
Del	Opens the main BIOS Setup screen
F12	Network boot
F11	Opens the boot menu. This list all bootable devices that are connected to the system. Selecting a device with cursor ↑, cursor ↓ and the pressing <ENTER> will boot from that device.
	
<Pause>	Pauses POST. Pressing any other key resumes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

Table 182: 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 183: BIOS-relevant keys

### 1.3 Main

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

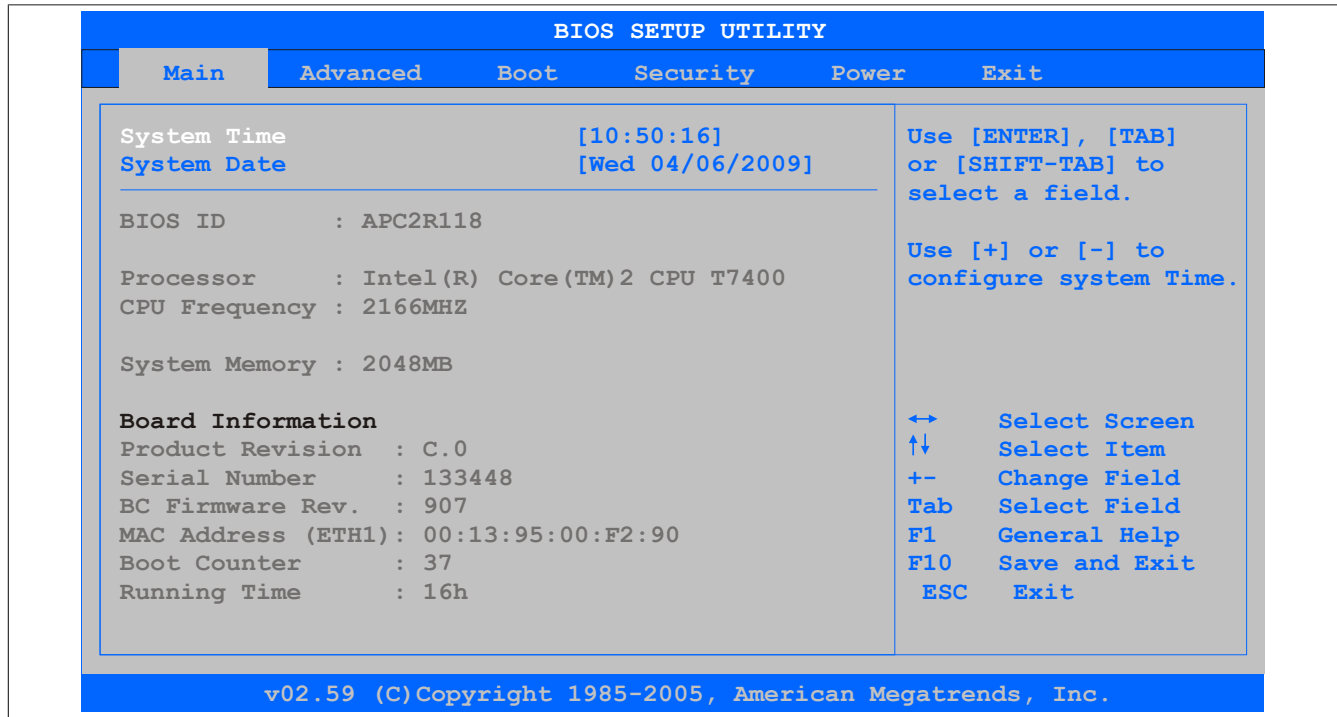


Figure 111: 945GME BIOS Main Menu

BIOS setting	Description	Configuration options	Effect
System time	The currently configured system time setting. This is buffered by the CMOS battery when the system is switched off.	Changes the system time	Sets the system time in the format Hour:Minute:Second (hh:mm:ss)
System date	The currently configured system date. This is buffered by the CMOS battery when the system is switched off.	Changes the system date	Sets the system date in the format Month:Day:Year (mm:dd:yyyy)
BIOS ID	Displays the BIOS version	None	-
Processor	Displays the processor type	None	-
CPU Frequency	Displays the processor frequency	None	-
System Memory	Displays the system memory size	None	-
Product revision	Displays the 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 184: 945GME - Main Menu - Setting options

## 1.4 Advanced

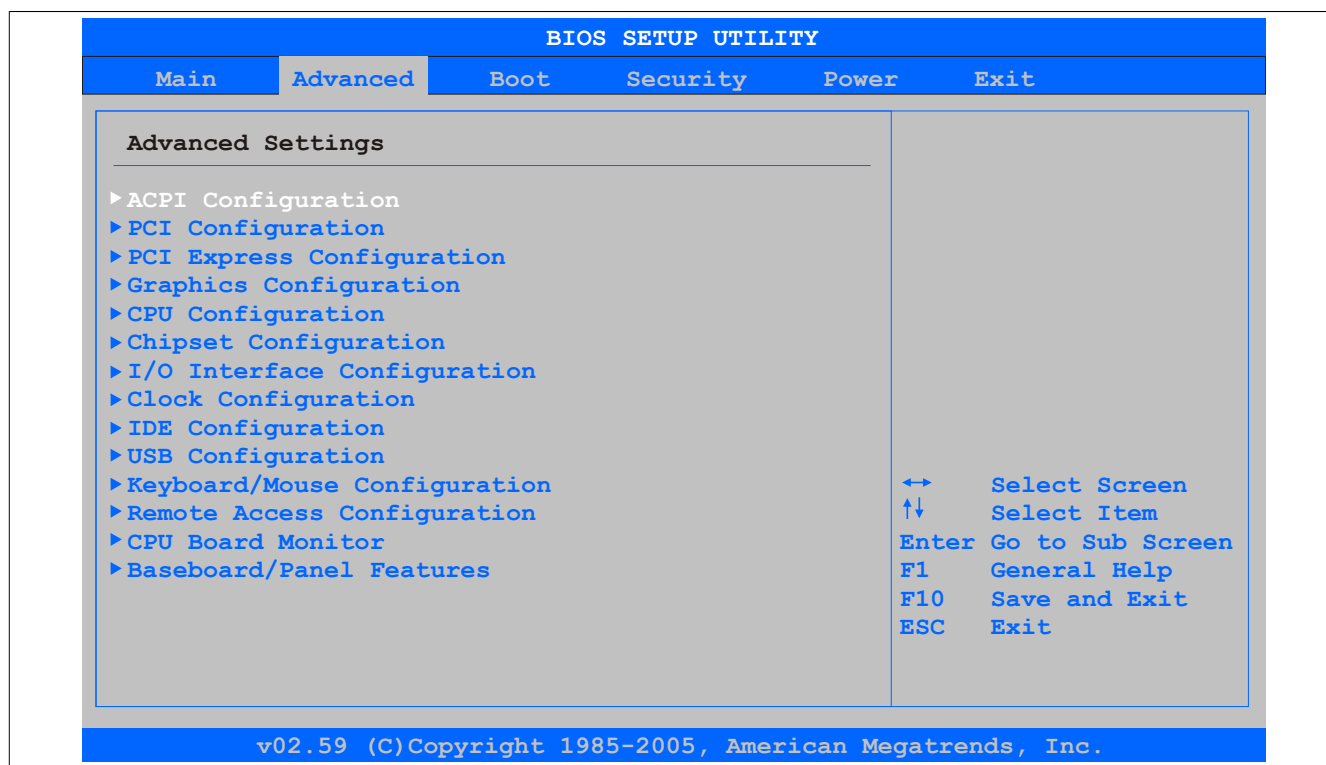


Figure 112: 945GME Advanced Menu

BIOS setting	Description	Configuration options	Effect
<b>ACPI configuration</b>	Configures the ACPI devices.	Enter	Opens the submenu See "ACPI Configuration" on page 237
<b>PCI configuration</b>	Configures PCI devices	Enter	Opens the submenu See "PCI Configuration" on page 238
<b>PCI Express configura- tion</b>	Configures PCI Express settings	Enter	Opens the submenu See "PCI Express Configuration" on page 241
<b>Graphics configuration</b>	Configures graphics settings	Enter	Opens the submenu See "Graphics Configuration" on page 243
<b>CPU configuration</b>	Configures CPU settings	Enter	Opens the submenu See "CPU Configuration" on page 245
<b>Chipset configuration</b>	Configuration of the chipset settings.	Enter	Opens the submenu See "Chipset Configuration" on page 246
<b>I/O interface configura- tion</b>	Configuration of the I/O device settings.	Enter	Opens the submenu See "I/O Interface Configuration" on page 247
<b>Clock configuration</b>	Configures the clock settings.	Enter	Opens the submenu See "Clock Configuration" on page 247
<b>IDE Configuration</b>	Configures IDE functions	Enter	Opens the submenu See "IDE Configuration" on page 248
<b>USB configuration</b>	Configures USB settings.	Enter	Opens the submenu See "USB Configuration" on page 253
<b>Keyboard/mouse configu- ration</b>	Configuration of the keyboard/mouse settings.	Enter	Opens the submenu See "Keyboard/Mouse Configuration" on page 255
<b>Remote access configu- ration</b>	Configures the remote access settings.	Enter	Opens the submenu See "Remote Access Configuration" on page 255
<b>CPU Board Monitor</b>	Displays the current voltages and temperature of the processor in use.	Enter	Opens the submenu See "CPU Board Monitor" on page 257
<b>Main Board/Panel Fea- tures</b>	Displays device specific information and setup of device specific values.	Enter	Opens the submenu See "Baseboard/Panel Features" on page 258

Table 185: 945GME Advanced Menu (Setting options)



### 1.4.1 ACPI Configuration

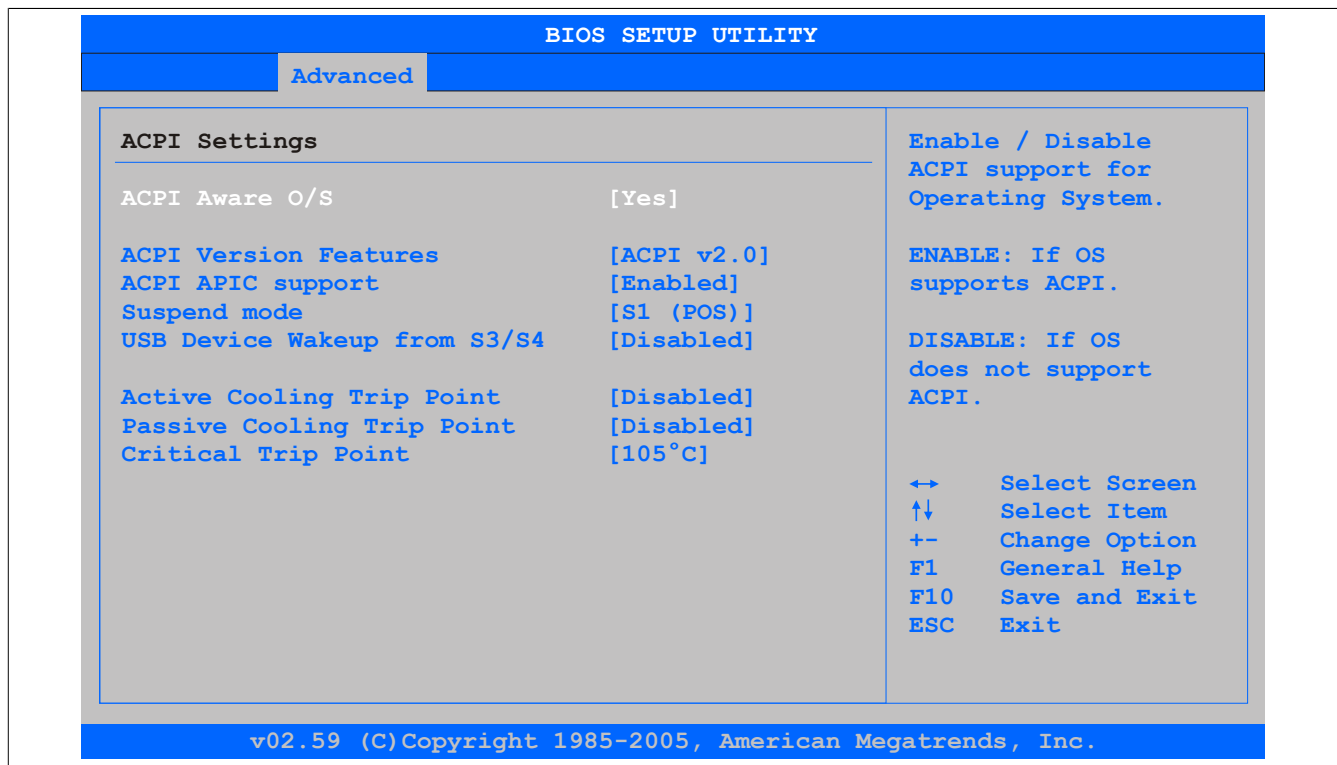


Figure 113: 945GME Advanced ACPI Configuration

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

Table 186: 945GME - Advanced ACPI configuration - Setting options

## 1.4.2 PCI Configuration

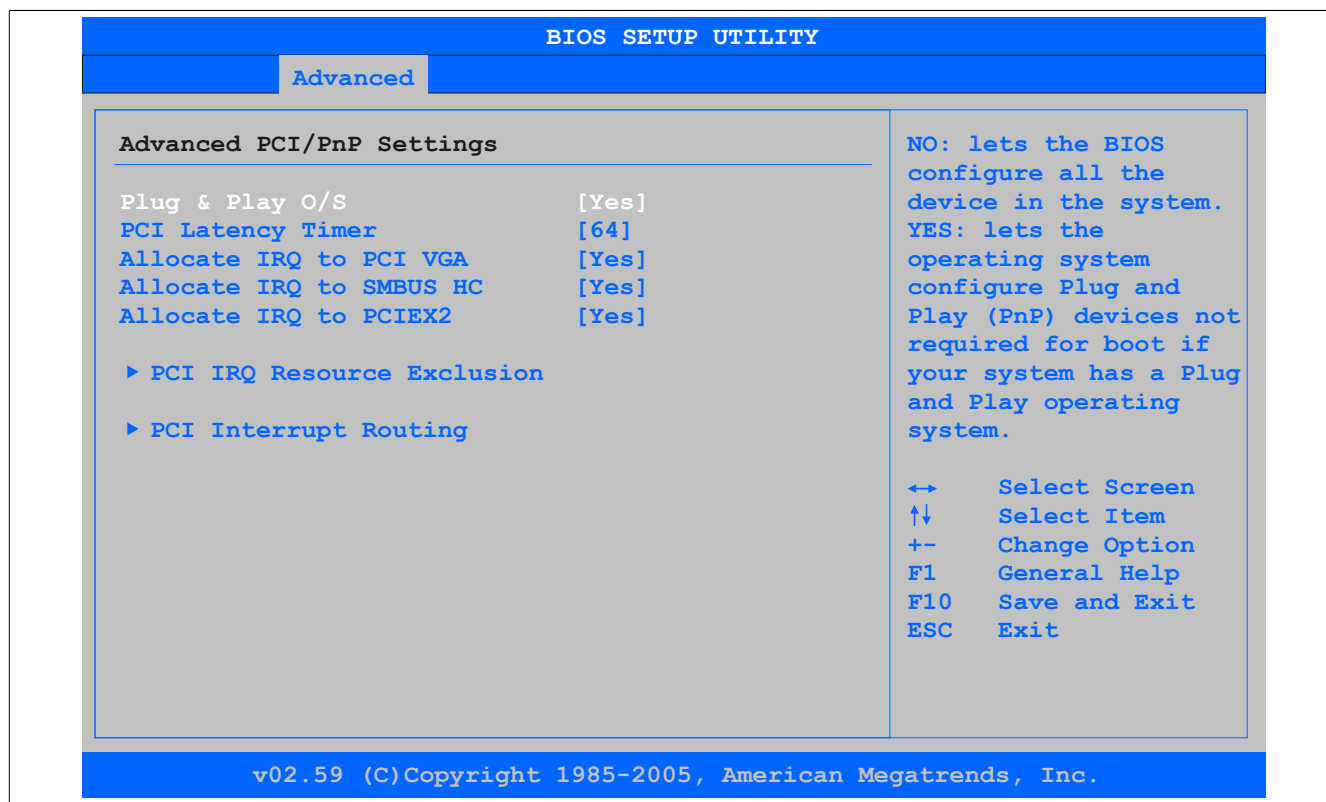


Figure 114: 945GME Advanced PCI Configuration

BIOS setting	Description	Configuration options	Effect
Plug & Play O/S	BIOS is informed if Plug & Play is capable on the operating system.	Yes	The operating system handles the distribution of resources.
		No	BIOS handles the distribution of resources.
PCI latency timer	Option for controlling how long (in PCI ticks) one PCI bus card can continue to use the master after another PCI card has requested access	32, 64, 96, 128, 160, 192, 224, 248	Manually sets the value in PCI ticks
Allocate IRQ to PCI VGA	This function is used to determine if an interrupt is assigned to the PCI VGA.	Yes	Automatic assignment of an interrupt.
		No	No assignment of an interrupt.
Allocate IRQ to SMBUS HC	Use this function to set whether or not the SM (System Management) bus controller is assigned a PCI interrupt.	Yes	Automatic assignment of a PCI interrupt.
		No	No assignment of an interrupt.
Allocate IRQ to PCIEX2	Use this function to set whether or not the PCIEX2 is assigned a PCI interrupt.	Yes	Automatic assignment of a PCI interrupt.
		No	No assignment of an interrupt.
<b>PCI IRQ Resource Exclusion</b>	Configures the PCI IRQ resource settings for ISA Legacy devices.	Enter	Opens the submenu See "PCI IRQ Resource Exclusion" on page 239
<b>PCI Interrupt Routing</b>	Configures PCI interrupt routing	Enter	Opens the submenu See "PCI Interrupt Routing" on page 240

Table 187: 945GME - Advanced PCI configuration - Setting options

## 1.4.2.1 PCI IRQ Resource Exclusion

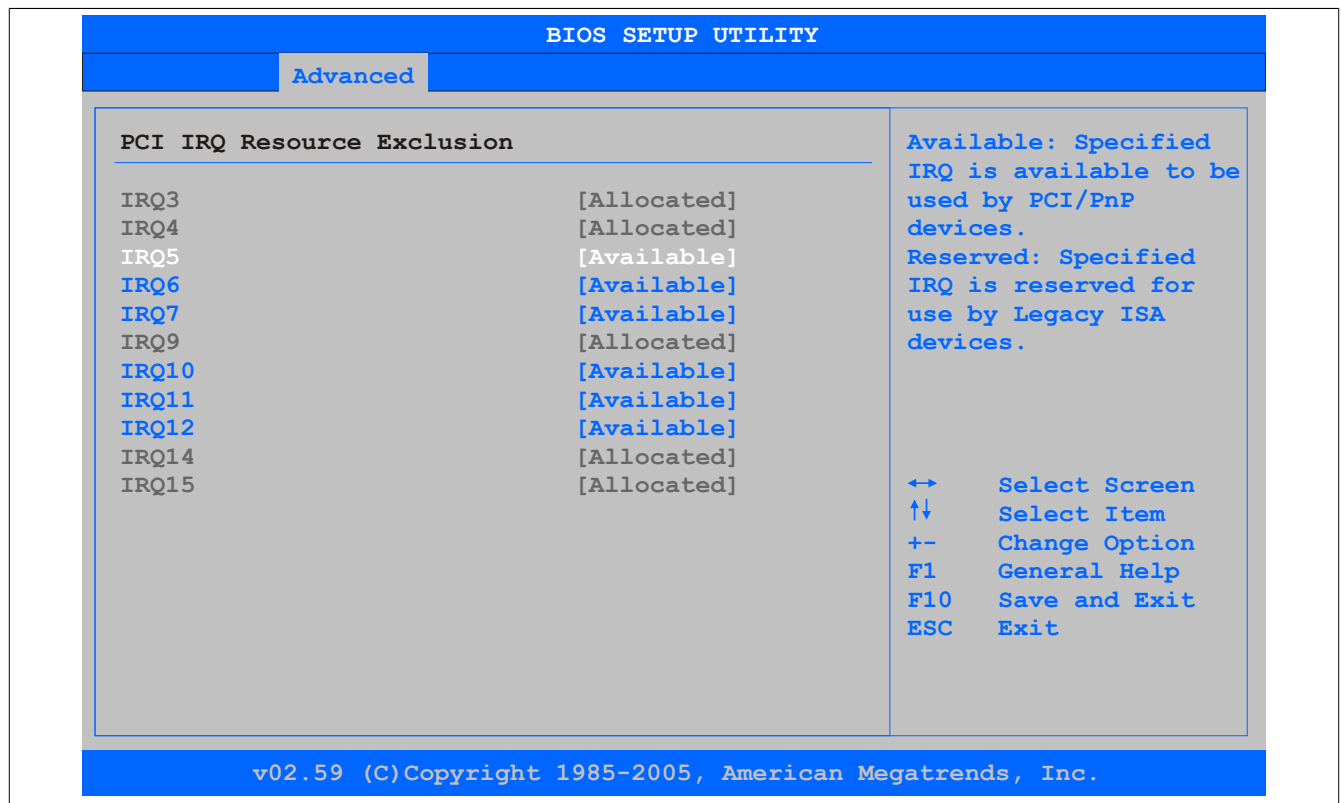


Figure 115: 945GME Advanced PCI IRQ Resource Exclusion

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

Table 188: 945GME - Advanced PCI IRQ Resource Exclusion - Setting options

## 1.4.2.2 PCI Interrupt Routing

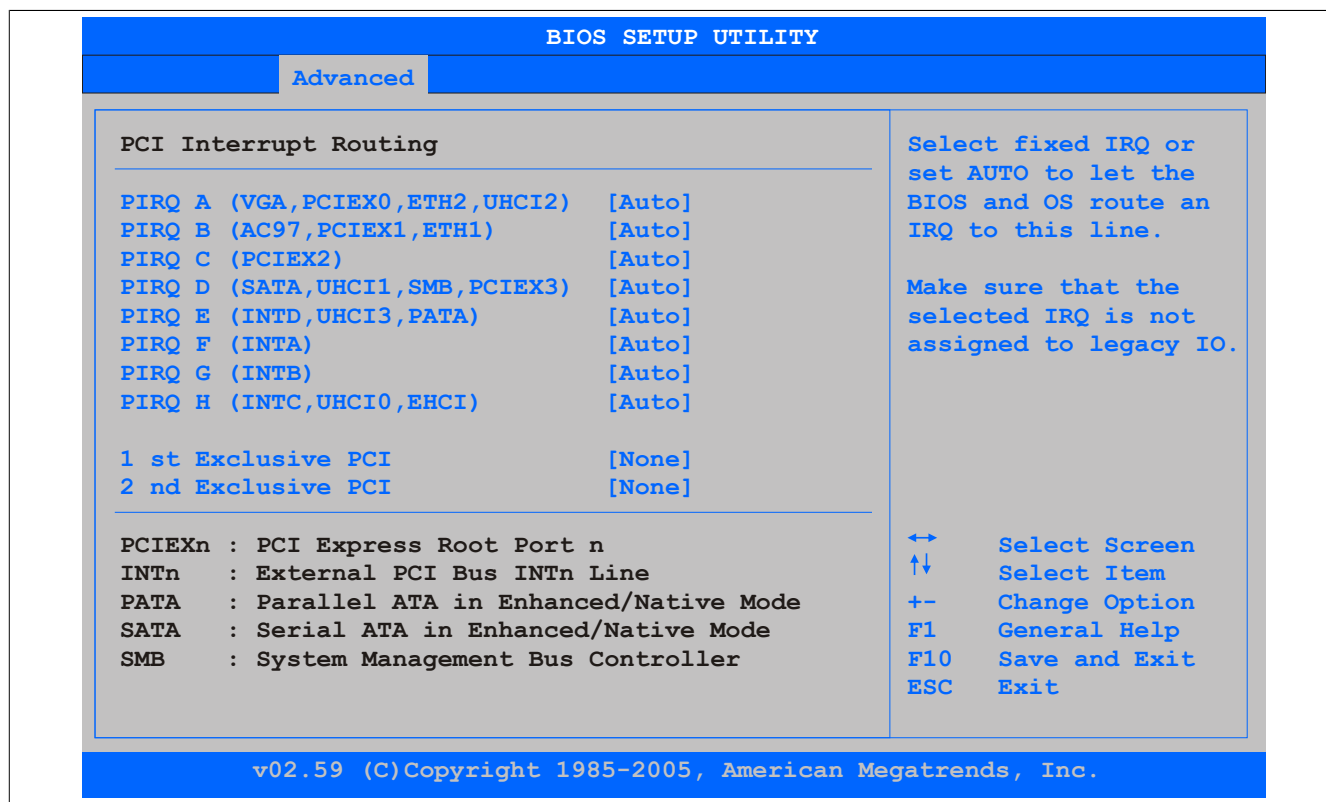


Figure 116: 945GME Advanced PCI Interrupt Routing

BIOS setting	Description	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	With this option you can determine if the IRQ assigned to the PIRQ x is handled exclusively (no IRQ sharing).	None	No interrupt assigned
		x	Assigns the PIRQ as 1st exclusive PCI IRQ.

**Information:**

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

Table 189: 945GME - Advanced PCI Interrupt Routing - Setting options

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

Table 189: 945GME - Advanced PCI Interrupt Routing - Setting options

### 1.4.3 PCI Express Configuration

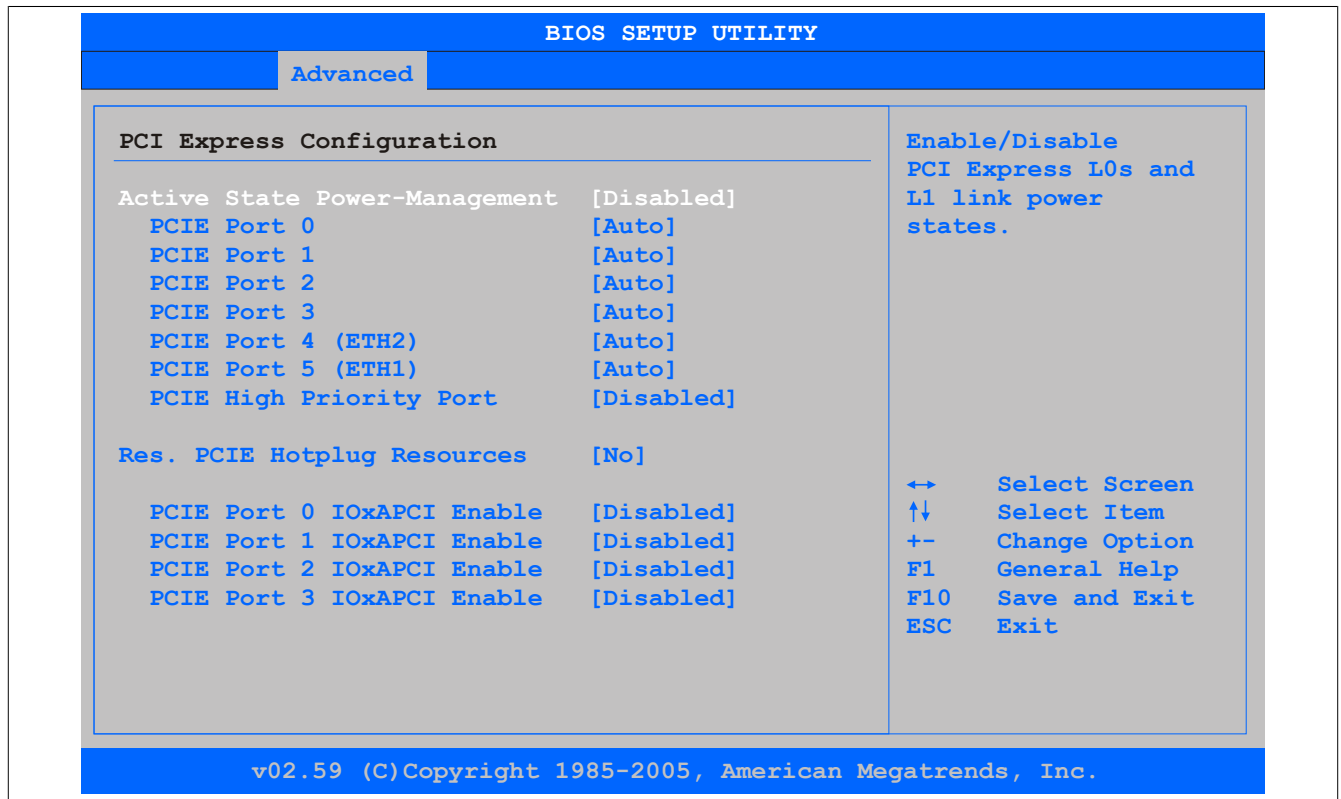


Figure 117: 945GME Advanced PCI Express Configuration

BIOS setting	Description	Configuration options	Effect
Active State Power Management	Option for setting a power saving function (L0s/L1) for PCIe slots if they do not require full power	Enabled	Enables this function
		Disabled	Disables this function
PCIE Port 0	This option activates or deactivates the PCI Express connection function.  <b>Information:</b>  If you are not using any PCI Express devices, this option should be deactivated.	Auto	Automatic assignment by BIOS and the operating system
		Enabled	Enables this function
PCIE Port 1	This option activates or deactivates the PCI Express connection function.  <b>Information:</b>  If you are not using any PCI Express devices, this option should be deactivated.	Auto	Automatic assignment by BIOS and the operating system
		Enabled	Enables this function
PCIE Port 2	This option activates or deactivates the PCI Express connection function.  <b>Information:</b>  If you are not using any PCI Express devices, this option should be deactivated.	Auto	Automatic assignment by BIOS and the operating system
		Enabled	Enables this function
PCIE Port 3	This option activates or deactivates the PCI Express connection function.	Auto	Automatic assignment by BIOS and the operating system
		Enabled	Enables this function

Table 190: 945GME Advanced PCI Express Configuration (Setting options)

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

Table 190: 945GME Advanced PCI Express Configuration (Setting options)

## 1.4.4 Graphics Configuration

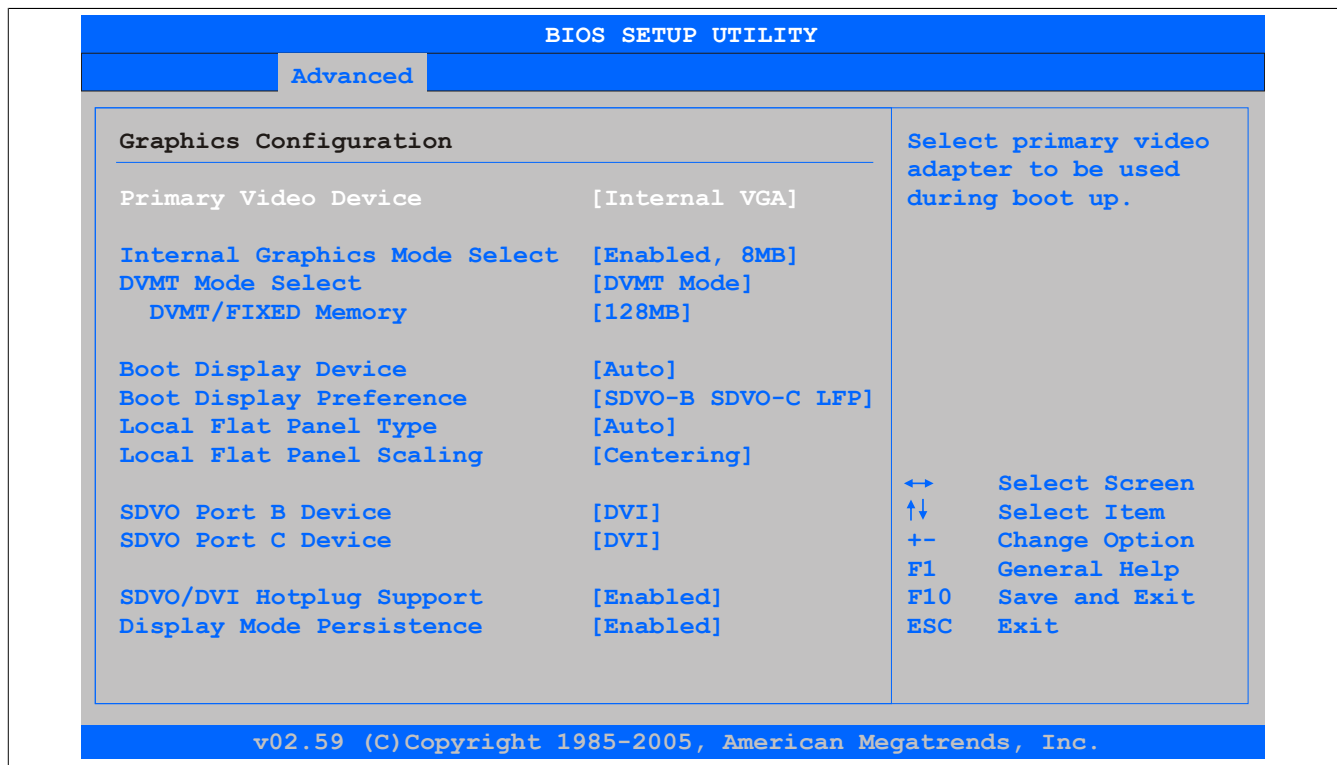


Figure 118: 945GME Advanced Graphics Configuration

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

Table 191: 945GME Advanced Graphics Configuration (Setting options)

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

Table 191: 945GME Advanced Graphics Configuration (Setting options)



## 1.4.5 CPU Configuration

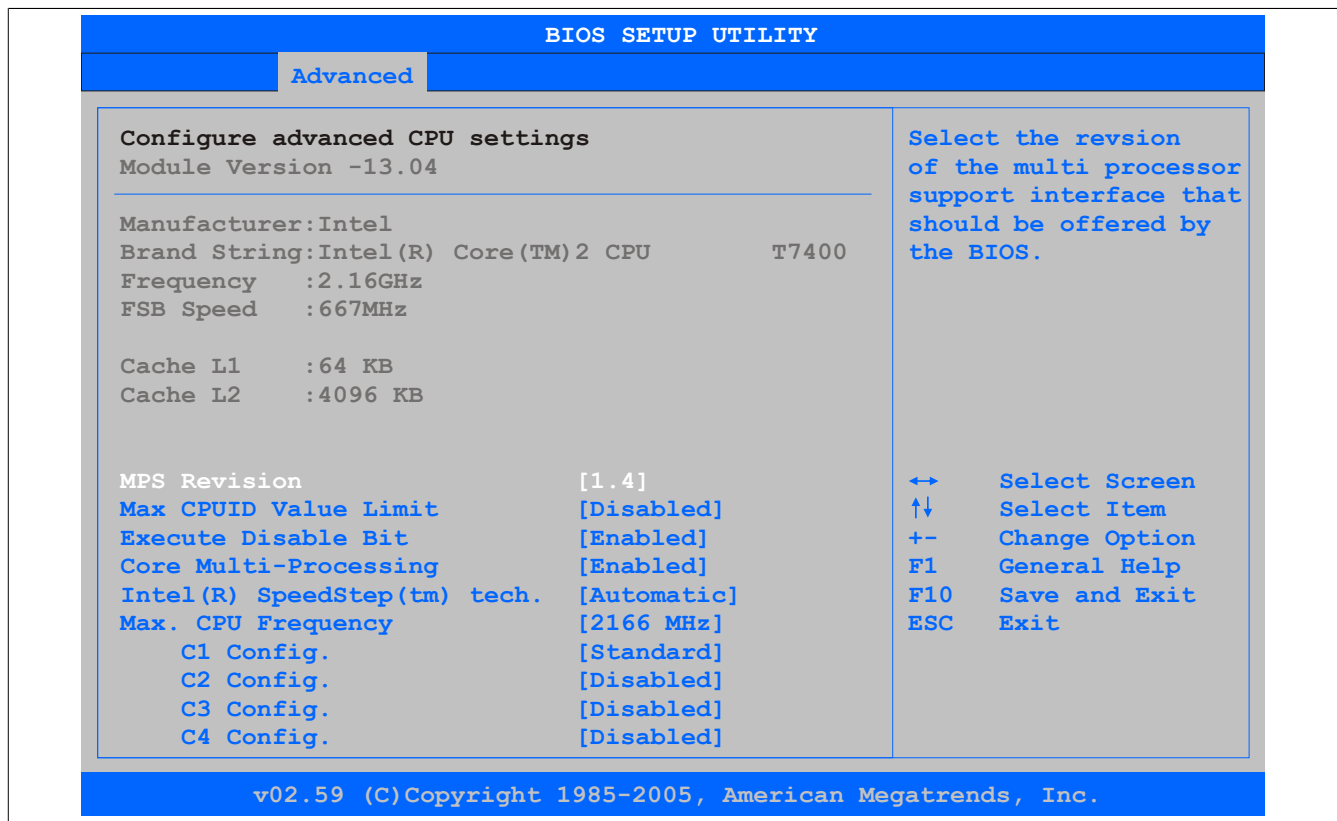


Figure 119: 945GME Advanced CPU Configuration

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

Table 192: 945GME Advanced CPU Configuration (Setting options)

## 1.4.6 Chipset Configuration

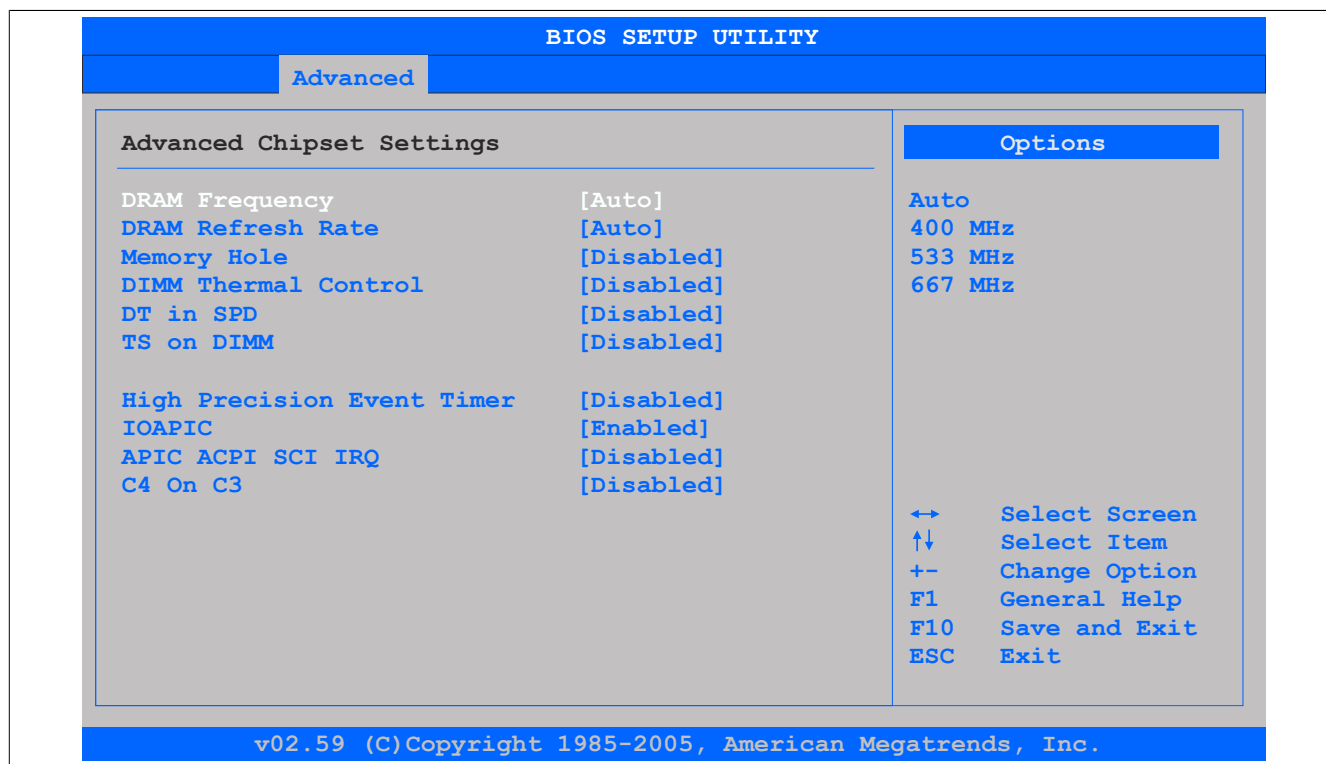


Figure 120: 945GME Advanced Chipset Configuration

BIOS setting	Description	Configuration options	Effect
DRAM Frequency	Option for setting the RAM frequency.	Auto	Frequency set automatically by the BIOS.
		400, 533, 667 MHz	Desired clock frequency set manually.
DRAM Refresh Rate	Option for setting the DRAM refresh rate.	Auto	DRAM Refresh is read from the SPD data of the DRAM module.
		7.8 $\mu$ s	Manual setting for the DRAM refresh rate.
		3.9 $\mu$ s	Manual setting for the DRAM refresh rate.
Memory Hole	Option for ISA cards with frame buffer. Not important for an APC810.	Disabled	Disables this function
		15MB-16MB	This address area is reserved.
DIMM Thermal Control	Option for setting the maximum surface temperature of the DIMM module. The module is cooled by limiting the memory bandwidth if the defined surface temperature is reached.	Disabled	Surface temperature not limited.
		40°C, 50°C, 60°C, 70°C, 80°C, 85°C, 90°C	Temperature limit value for the limitation.
DT in SPD	Option to determine whether the GMCH (Graphics and Memory Controller Hub) supports DT (Delta Temperature) in the SPD (Serial Presence Detect) Management Algorithm of the DIMM module.	Enabled	Enables this function
		Disabled	Disables this function
TS on DIMM	Option to determine whether the GMCH (Graphics and Memory Controller Hub) supports TS (Thermal Sensor) in the Thermal Management Algorithm of the DIMM module.	Enabled	Enables this function
		Disabled	Disables this function
High Precision Event Timer	The HPET is a timer inside the PC. It is able to trigger an interrupt with a high degree of accuracy, which allows other programs to better synchronize a variety of applications.	Enabled	Enables this function This function is recommended for multimedia applications.
		Disabled	Disables this function
IOAPIC	This option is used to activate or deactivate the APIC (Advanced Programmable Interrupt Controller).	Enabled	The IRQ resources available to the system are expanded when the APIC mode is enabled.
		Disabled	Disables this function
APIC ACPI SCI IRQ	This option is used to modify the SCI IRQ when in APIC (Advanced Programmable Interrupt Controller) mode.	Enabled	IRQ20 is used for SCI.
		Disabled	IRQ9 is used for SCI.
C4 On C3	Fine-tunes the power saving function on an ACPI operating system.	Enabled	Processor is needed in C4 if the operating system is initiated in a C3 state.
		Disabled	Disables this function

Table 193: 945GME Advanced Chipset (Setting options)

### 1.4.7 I/O Interface Configuration

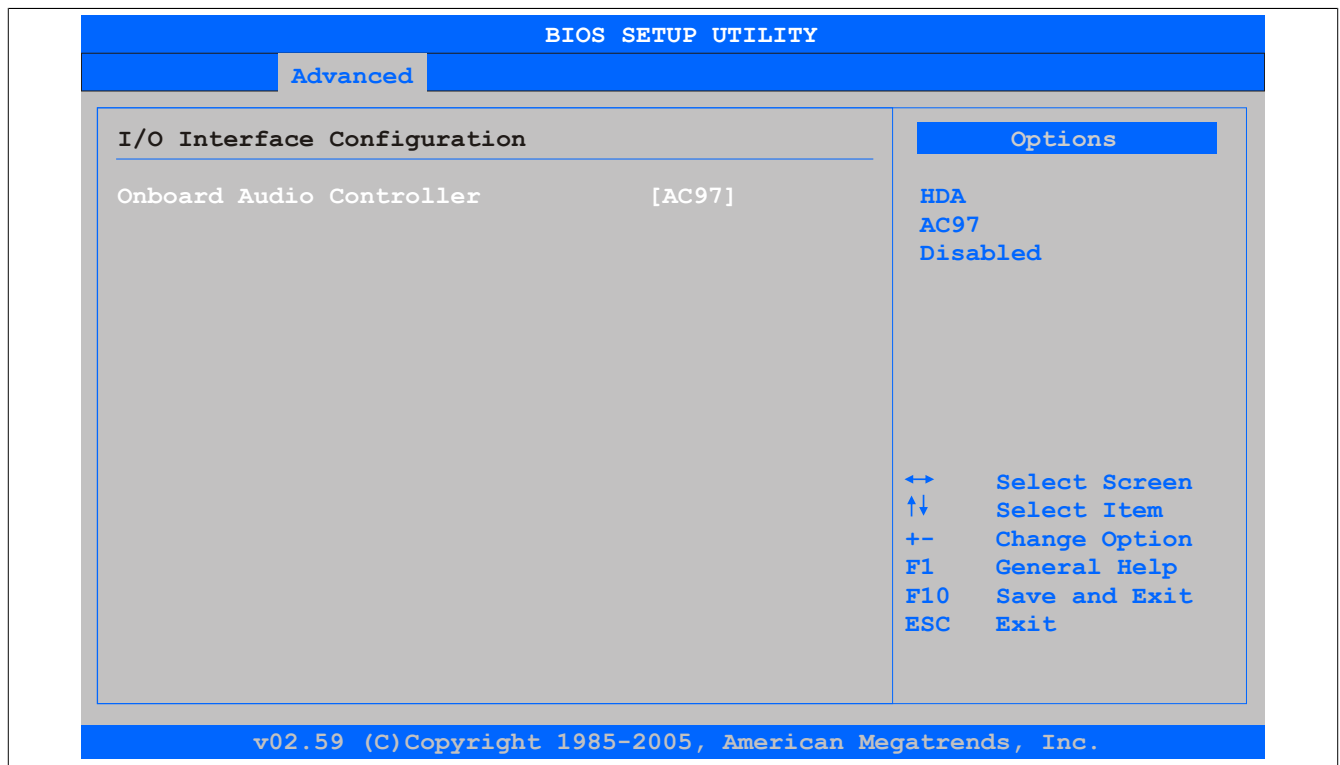


Figure 121: 945GME Advanced I/O Interface Configuration

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

Table 194: 945GME Advanced I/O Interface Configuration (Setting options)

### 1.4.8 Clock Configuration

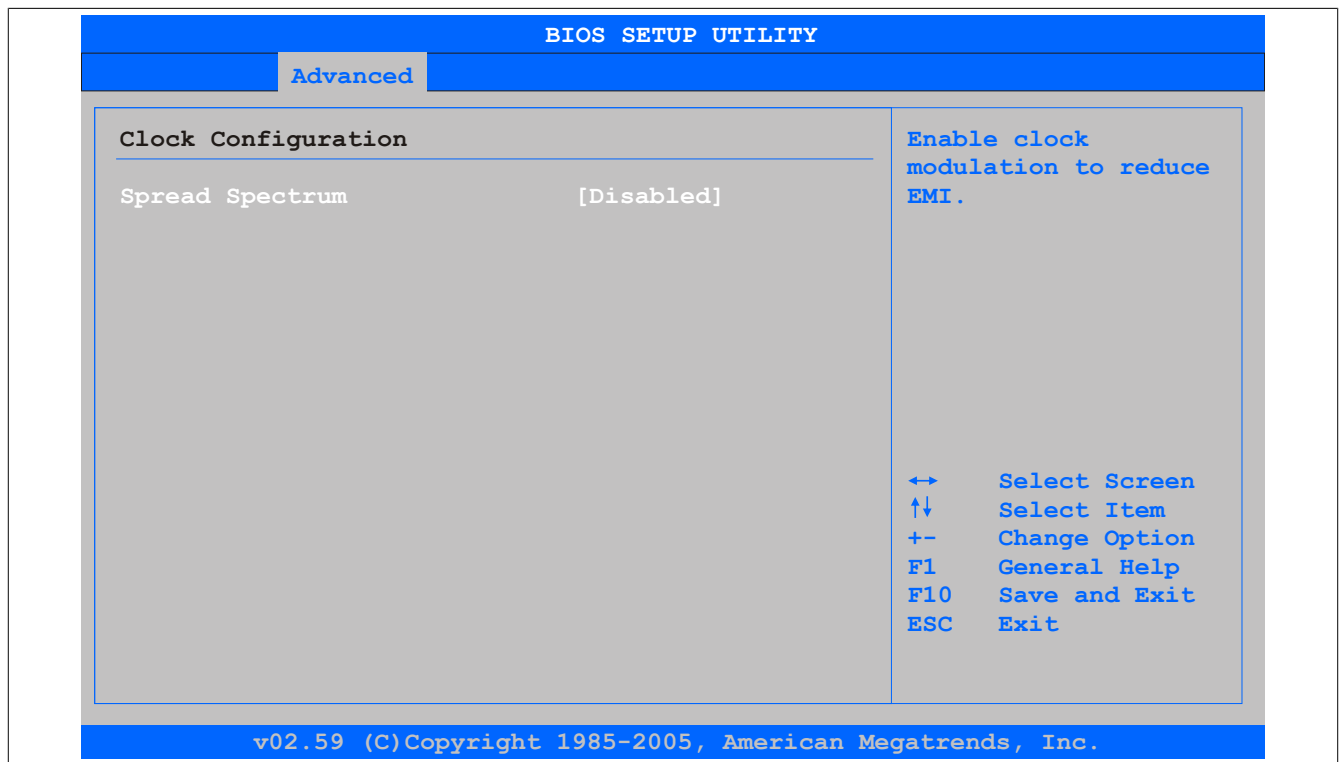


Figure 122: 945GME Advanced Clock Configuration

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

Table 195: 945GME Advanced Clock Configuration (Setting options)

### 1.4.9 IDE Configuration

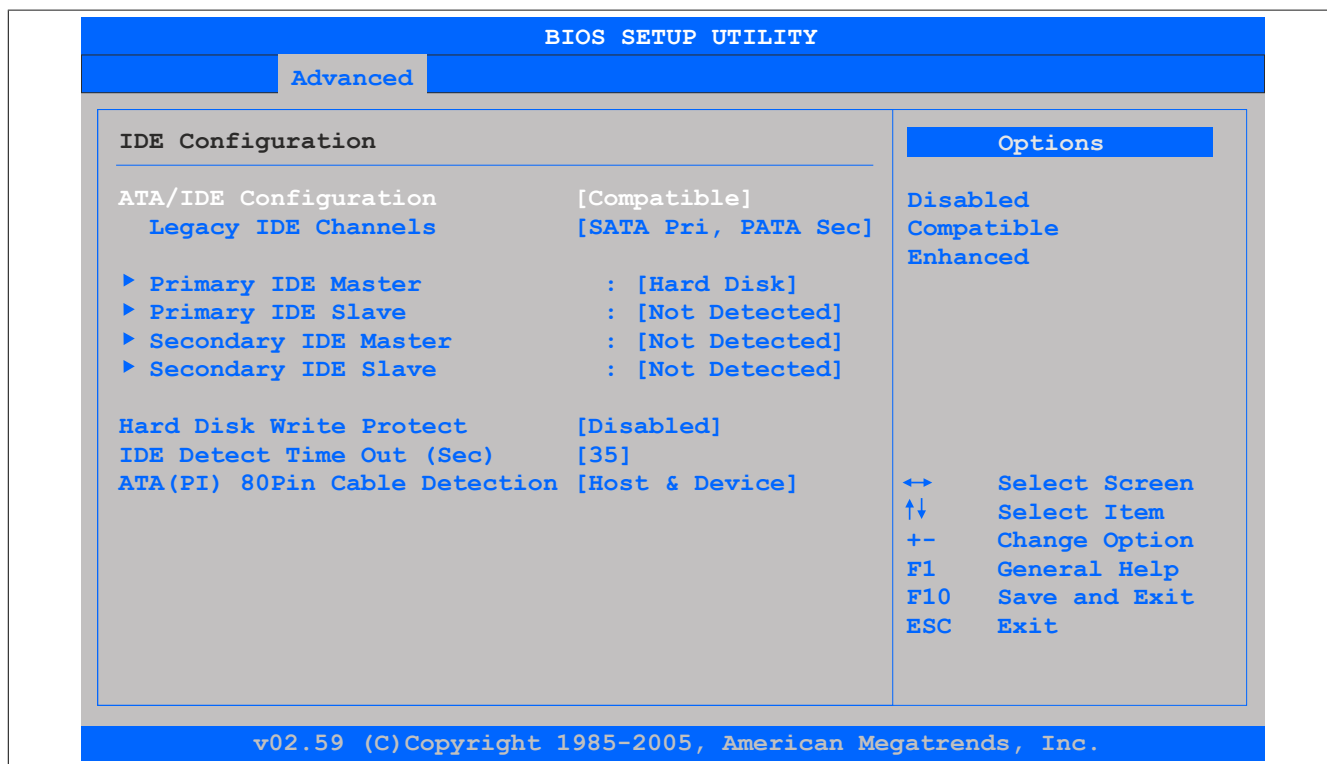


Figure 123: 945GME Advanced IDE Configuration

BIOS setting	Description	Configuration options	Effect
ATA/IDE Configuration	Option for configuring the integrated PATA and SATA controller.	Compatible	Both controllers run in Legacy or Compatible mode.
		Disabled	Both controllers disabled.
		Enhanced	Both controllers run in Enhanced or Native Mode.
Legacy IDE Channels <sup>1)</sup>	Option for configuring the Legacy IDE channels in Compatible mode.	SATA Pri, PATA Sec	SATA drives are address primarily and PATA drive secondarily.
		SATA only	Only use SATA drives.
		PATA only	Only use PATA drives.
Configure SATA as <sup>2)</sup>	The Serial ATA connections supported by the Southbridge can be defined here.	IDE	The serial ATA hard drive is used as a parallel ATA physical drive.
		RAID	RAID 0, 1, 5, 10 or Intel® Matrix Storage technology can be configured here with the serial ATA hard drive.
		AHCI	The AHCI setting enables the internal memory driver for SATA functions, which increases the storage performance for random read-write access by allowing the drive itself to determine the sequence of commands.
Configure SATA channels <sup>3)</sup>	SATA or PATA drives can be configured as primary or secondary devices.	Before PATA	The SATA drives are the Primary Devices, meaning PATA are Secondary.
		Behind PATA	The PATA drives are the Primary Devices, meaning SATA are Secondary.
AHCI/RAID SATA hot plug <sup>4)</sup>	Hot plugging support for AHCI/RAID systems can be set up here.	Enabled	Enables hot plug support.
		Disabled	Disables hot plug support.
Primary IDE Master	The drive in the system that is connected to the IDE primary master port is configured here.	Enter	Opens the submenu See "Primary IDE Master" on page 249
Primary IDE slave	The drive in the system that is connected to the IDE primary slave port is configured here.	Enter	Opens the submenu See "Primary IDE slave" on page 250
Secondary IDE Master	The drive in the system that is connected to the IDE secondary master port is configured here.	Enter	Opens the submenu See "Secondary IDE Master" on page 251
Secondary IDE slave	The drive in the system that is connected to the IDE secondary slave port is configured here.	Enter	Opens the submenu See "Secondary IDE slave" on page 252
Hard disk write protect	Write protection for the hard drive can be enabled/disabled here.	Enabled	Enables this function
		Disabled	Disables this function

Table 196: 945GME Advanced IDE Configuration (Setting options)

BIOS setting	Description	Configuration options	Effect
IDE Detect Time Out (Sec)	Configuring the time overrun limit value for the ATA/ATAPI device identification.	0, 5, 10, 15, 20, 25, 30, 35	Time setting in seconds.
ATA(PI) 80-Pin Cable De- tection	Setting that determines whether an 80 pin cable is connected to the drive, to the controller or to both.	Host & device	Using both IDE controllers (motherboard, disk drive).
		Host	IDE controller motherboard used.
		Device	IDE disk drive controller used.
		<div><div></div><div><div>Information:</div><div>This option is not available on the APC810 CPU board. Therefore this setting is not relevant.</div></div></div>	

Table 196: 945GME Advanced IDE Configuration (Setting 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 *Enhanced* and *Configure SATA as* is set to *RAID* or *AHCI*.

### 1.4.9.1 Primary IDE Master

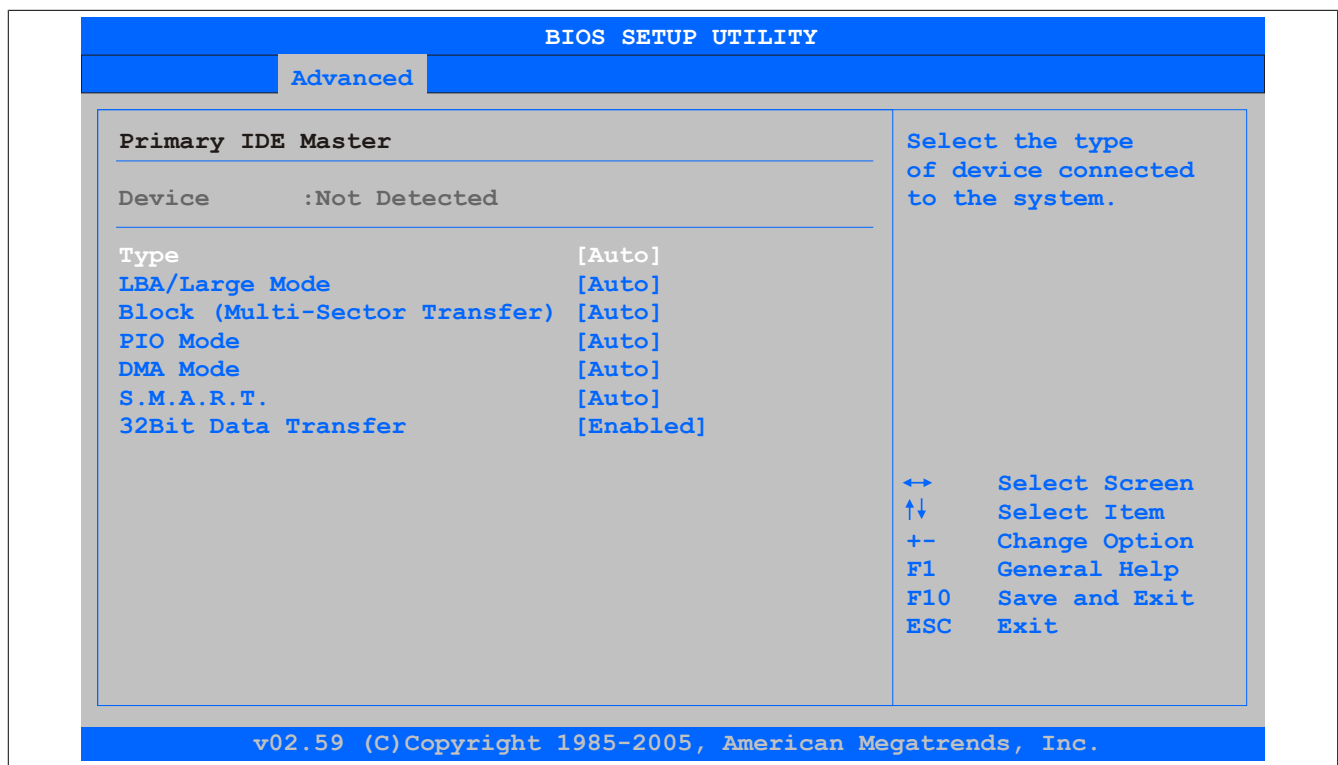


Figure 124: 945GME Primary IDE Master

BIOS setting	Description	Configuration options	Effect
Type	The type of drive connected to the primary master is configured here.	Not installed	No drive installed.
		Auto	Automatic recognition of the drive and setup of appropriate values.
		CD/DVD	CD -/ DVD drive.
		ARMD	ARMD - drive (zip drive)
LBA/Large Mode	This option activates the logical block addressing / large mode for IDE.	Disabled	Disables this function
		Auto	Automatic enabling of this function when supported by the system.
Block (Multi-Sector Transfer)	This option enables the block mode for IDE hard drives. When this option is enabled, the number of blocks per request from the configuration sector of the hard drive is read.	Disabled	Disables this function
		Auto	Automatic enabling of this function when supported by the system.

Table 197: 945GME - Primary IDE Master - Setting options

BIOS setting	Description	Configuration options	Effect
PIO Mode	The PIO mode determines the data rate of the hard drive.  <b>Information:</b>  This option is not available on the APC810. Therefore this setting is not relevant.	Auto	Automatic configuration of PIO mode.
		0, 1, 2, 3, 4	Manual configuration of PIO mode.
DMA Mode	The data transfer rate to and from the primary master drive is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Auto	Automatic definition of the transfer rate.
		Disabled	Manual definition of the transfer rate.
S.M.A.R.T.	Monitoring function of modern hard drives (self-monitoring, analysis and reporting technology).	Auto	Automatic detection and enabling.
		Enabled	Enables this function
		Disabled	Disables this function
32 Bit Data Transfer	This function enables 32-bit data transfer.	Enabled	Enables this function
		Disabled	Disables this function

Table 197: 945GME - Primary IDE Master - Setting options

### 1.4.9.2 Primary IDE slave

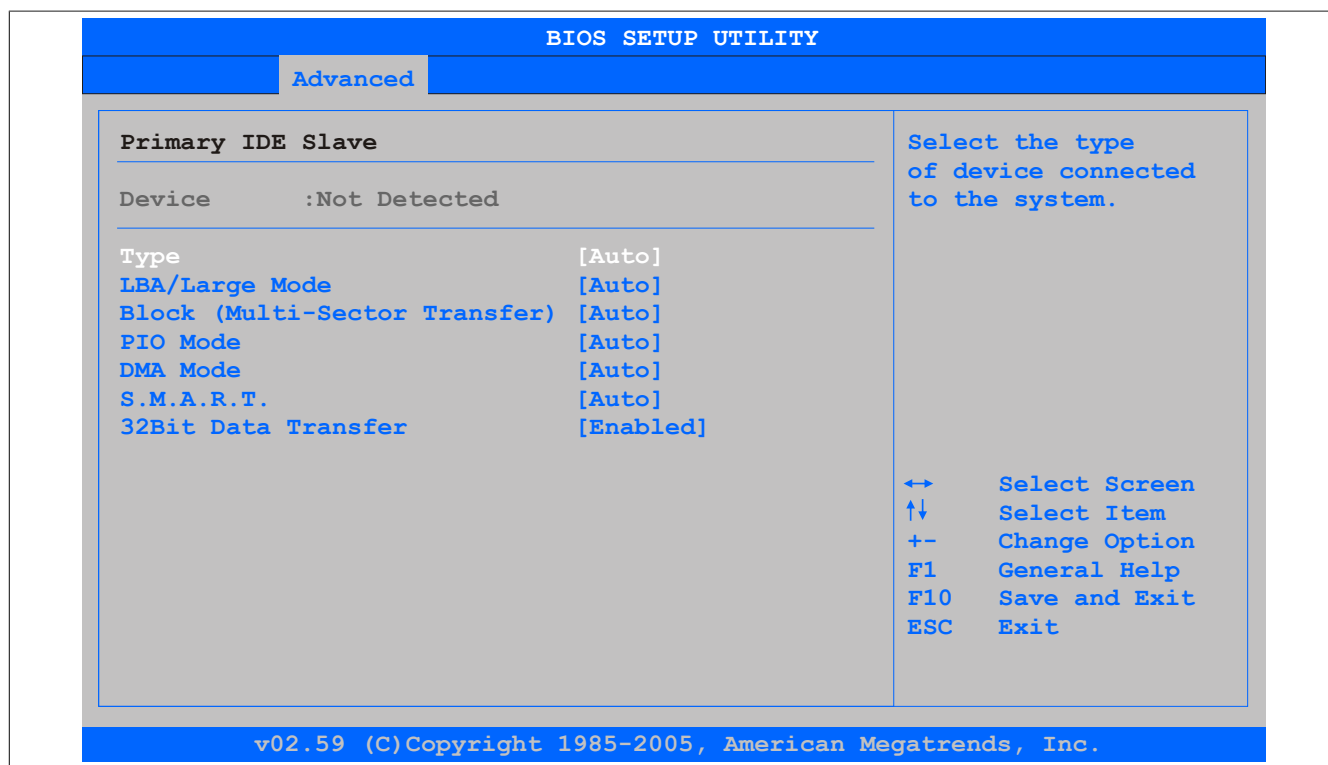


Figure 125: 945GME Primary IDE Slave

BIOS setting	Description	Configuration options	Effect
Type	The type of drive connected to the primary slave is configured here.	Not installed	No drive installed.
		Auto	Automatic recognition of the drive and setup of appropriate values.
		CD/DVD	CD -/ DVD drive.
		ARMD	ARMD - drive (zip drive)
LBA/Large Mode	This option activates the logical block addressing / large mode for IDE.	Disabled	Disables this function
		Auto	Automatic enabling of this function when supported by the system.
Block (Multi-Sector Transfer)	This option enables the block mode for IDE hard drives. When this option is enabled, the number of blocks per request from the configuration sector of the hard drive is read.	Disabled	Disables this function
		Auto	Automatic enabling of this function when supported by the system.

Table 198: 945GME - Primary IDE Slave - Setting options

BIOS setting	Description	Configuration options	Effect
PIO Mode	The PIO mode determines the data rate of the hard drive.  <b>Information:</b>  This option is not available on the APC810. Therefore this setting is not relevant.	Auto	Automatic configuration of PIO mode.
		0, 1, 2, 3, 4	Manual configuration of PIO mode.
DMA Mode	The data transfer rate to and from the primary slave drive is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Auto	Automatic definition of the transfer rate.
		Disabled	Manual definition of the transfer rate.
S.M.A.R.T.	Monitoring function of modern hard drives (self-monitoring, analysis and reporting technology).	Auto	Automatic detection and enabling.
		Enabled	Enables this function
		Disabled	Disables this function
32 Bit Data Transfer	This function enables 32-bit data transfer.	Enabled	Enables this function
		Disabled	Disables this function

Table 198: 945GME - Primary IDE Slave - Setting options

### 1.4.9.3 Secondary IDE Master

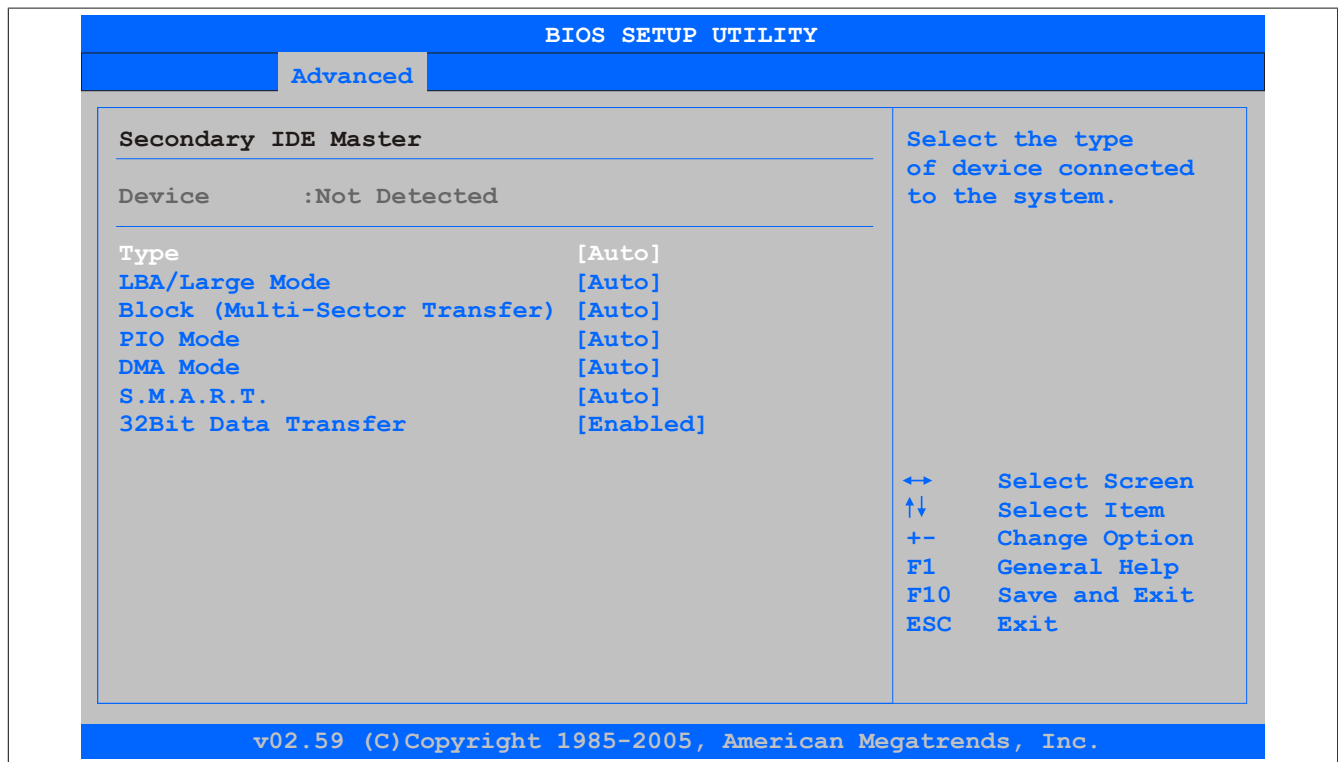


Figure 126: 945GME Secondary IDE Master

BIOS setting	Description	Configuration options	Effect
Type	The type of drive connected to the secondary master is configured here.	Not installed	No drive installed.
		Auto	Automatic recognition of the drive and setup of appropriate values.
		CD/DVD	CD -/ DVD drive.
		ARMD	ARMD - drive (zip drive)
LBA/Large Mode	This option activates the logical block addressing / large mode for IDE.	Disabled	Disables this function
		Auto	Automatic enabling of this function when supported by the system.
Block (Multi-Sector Transfer)	This option enables the block mode for IDE hard drives. When this option is enabled, the number of blocks per request from the configuration sector of the hard drive is read.	Disabled	Disables this function
		Auto	Automatic enabling of this function when supported by the system.

Table 199: 945GME - Secondary IDE Master - Setting options

BIOS setting	Description	Configuration options	Effect
PIO Mode	The PIO mode determines the data rate of the hard drive.  <b>Information:</b>  This option is not available on the APC810. Therefore this setting is not relevant.	Auto	Automatic configuration of PIO mode.
		0, 1, 2, 3, 4	Manual configuration of PIO mode.
DMA Mode	The data transfer rate to and from the secondary master drive is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Auto	Automatic definition of the transfer rate.
		Disabled	Manual definition of the transfer rate.
S.M.A.R.T.	Monitoring function of modern hard drives (self-monitoring, analysis and reporting technology).	Auto	Automatic detection and enabling.
		Enabled	Enables this function
		Disabled	Disables this function
32 Bit Data Transfer	This function enables 32-bit data transfer.	Enabled	Enables this function
		Disabled	Disables this function

Table 199: 945GME - Secondary IDE Master - Setting options

#### 1.4.9.4 Secondary IDE slave

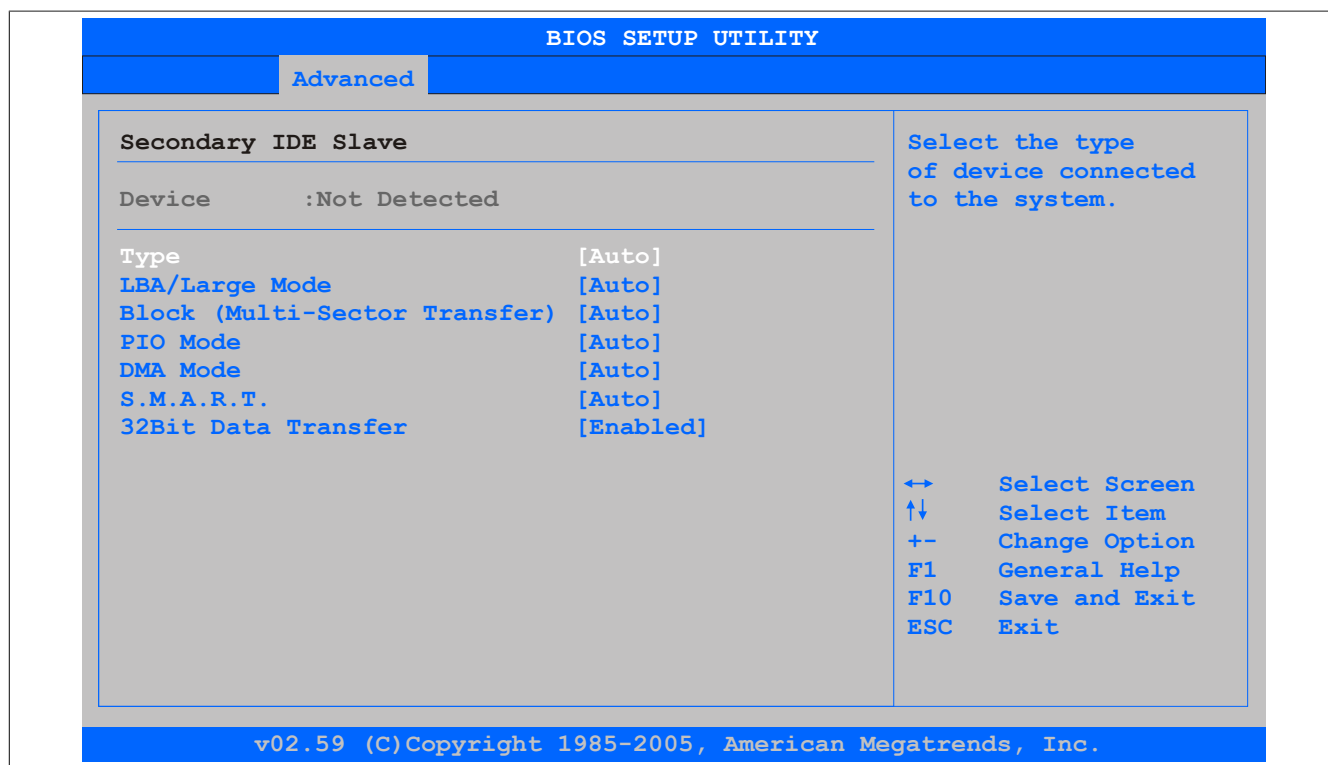


Figure 127: 945GME Secondary IDE Slave

BIOS setting	Description	Configuration options	Effect
Type	The type of drive connected to the secondary slave is configured here.	Not installed	No drive installed.
		Auto	Automatic recognition of the drive and setup of appropriate values.
		CD/DVD	CD -/ DVD drive.
		ARMD	ARMD - drive (zip drive)
LBA/Large Mode	This option activates the logical block addressing / large mode for IDE.	Disabled	Disables this function
		Auto	Automatic enabling of this function when supported by the system.
Block (Multi-Sector Transfer)	This option enables the block mode for IDE hard drives. When this option is enabled, the number of blocks per request from the configuration sector of the hard drive is read.	Disabled	Disables this function
		Auto	Automatic enabling of this function when supported by the system.

Table 200: 945GME - Secondary IDE Slave - Setting options



BIOS setting	Description	Configuration options	Effect
PIO Mode	The PIO mode determines the data rate of the hard drive.  <b>Information:</b>  This option is not available on the APC810. Therefore this setting is not relevant.	Auto	Automatic configuration of PIO mode.
		0, 1, 2, 3, 4	Manual configuration of PIO mode.
DMA Mode	The data transfer rate to and from the secondary slave is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Auto	Automatic definition of the transfer rate.
		Disabled	Manual definition of the transfer rate.
S.M.A.R.T.	Monitoring function of modern hard drives (self-monitoring, analysis and reporting technology).	Auto	Automatic detection and enabling.
		Enabled	Enables this function
		Disabled	Disables this function
32 Bit Data Transfer	This function enables 32-bit data transfer.	Enabled	Enables this function
		Disabled	Disables this function

Table 200: 945GME - Secondary IDE Slave - Setting options

### 1.4.10 USB Configuration

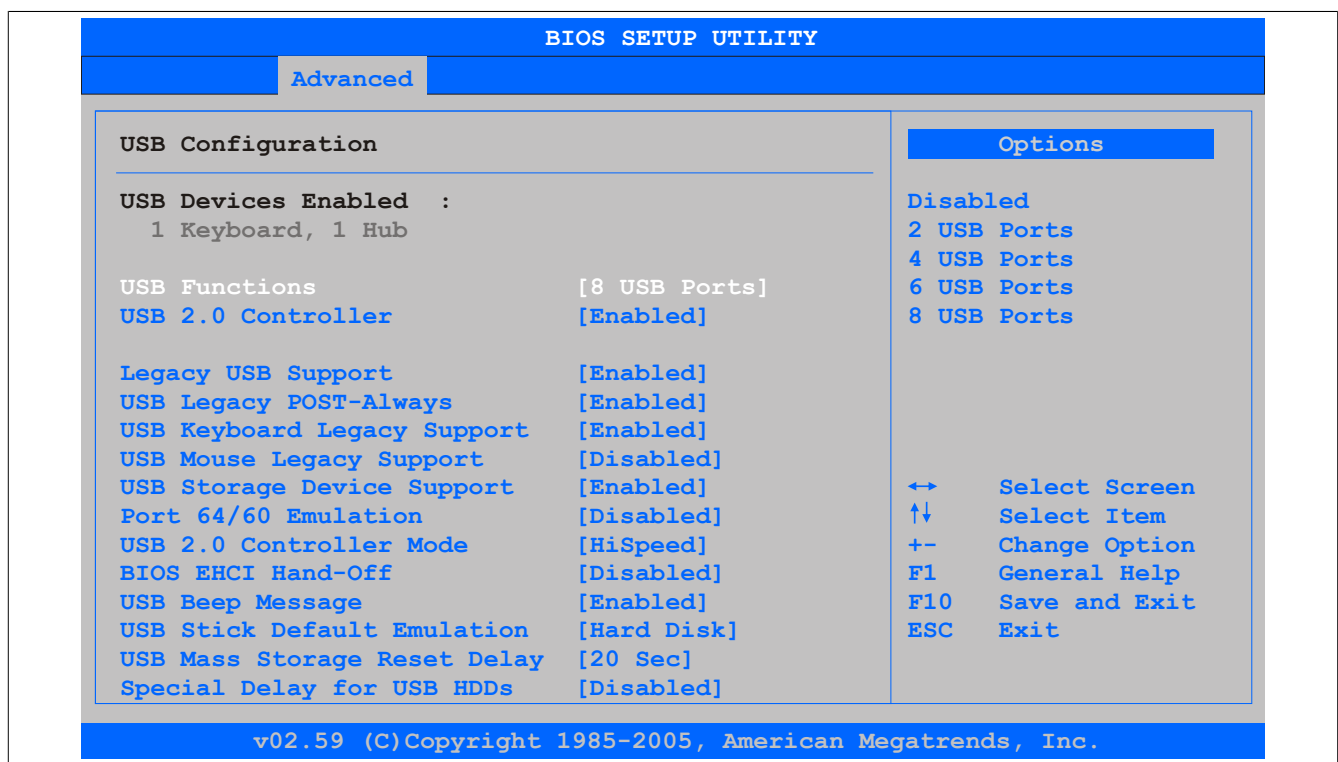


Figure 128: 945GME Advanced USB Configuration

BIOS setting	Description	Configuration options	Effect
USB Function	USB ports can be enabled/disabled here. The USB numbers (e.g. USB1, USB3, etc.) are printed on the APC810 housing).	Disabled	Disables the USB port.
		2 USB Ports	USB1, USB3 are enabled.
		4 USB Ports	USB1, USB2, USB3, USB4 are enabled.
		6 USB Ports	USB1, USB2, USB3, USB4, USB5 are enabled.
USB 2.0 Controller	Option for enabling or disabling USB 2.0 mode	8 USB Ports	USB1, USB2, USB3, USB4, USB5, USB are enabled on an AP via SDL.
		Enabled	All USB ports run in USB 2.0 mode.
Legacy USB support	Legacy USB support can be enabled/disabled here. USB ports do not function during startup. USB support is available again after the operating system has started. A USB keyboard is still recognized during POST.	Disabled	All USB ports run in USB 1.1 mode.
		Enabled	Enables this function
		Disabled	Disables this function
USB Legacy POST-Always	Option to enable Legacy USB Support during the POST (Power On Self Test) the same as the Legacy USB Support setting.	Auto	Automatic enabling
		Enabled	The BIOS Setup can be called up during the POST using a USB keyboard.
		Disabled	Disables this function

Table 201: 945GME - Advanced USB Configuration - Setting options

BIOS setting	Description	Configuration options	Effect
USB Keyboard Legacy Support	USB keyboard support can be enabled/disabled here.	Enabled	Enables this function
		Disabled	Disables this function
USB Mouse Legacy Support	USB mouse support can be enabled/disabled here.	Enabled	Enables this function
		Disabled	Disables this function
USB Storage Device Support	USB memory device support can be enabled/disabled here.	Enabled	Enables this function
		Disabled	Disables this function
Port 64/60 Emulation	Port 64/60 emulation can be enabled/disabled here.	Enabled	USB keyboard functions in Windows NT.
		Disabled	USB keyboard functions in all systems excluding Windows NT.
USB 2.0 Controller Mode	Settings can be made for the USB controller here.	FullSpeed	12 MBps
		HiSpeed	480 MBps
BIOS EHCI Hand-Off	The support for the operating system can be set up without the fully automatic EHCI function.	Enabled	Enables this function
		Disabled	Disables this function
USB Beep Message	Option for outputting a tone each time a USB device is detected by the BIOS during the POST.	Enabled	Enables this function
		Disabled	Disables this function
USB Stick Default Emulation	You can set how the USB device is to be used.	Auto	USB devices with fewer than 530MB of memory are simulated as floppy disk drives and devices with larger capacities are simulated as hard drives.
		Hard disk drive	An HDD-formatted drive can be used as an FDD (e.g. zip drive) for starting the system.
USB Mass Storage Reset Delay	<p>Option for configuring the time that POST waits for USB memory storage devices after the device start command is issued</p> <p><b>Information:</b></p> <p>The message "No USB mass storage device detected" is displayed if no USB memory device has been installed.</p>	10 Sec, 20 Sec, 30 Sec, 40 Sec	Value set manually.
Special Delay for USB HDDs	<p>Option for setting a boot delay prior to counting USB 2.0 devices, which allows slow-booting USB devices (e.g. USB hard disks) to boot.</p> <p><b>Information:</b></p> <p>This option should only be used when required, since it would otherwise unnecessarily extend the boot process by the configured time.</p>	Disabled	Disables this function No boot delay is added.
		1 Sec, 2 Sec, 3 Sec, 4 Sec, 5 Sec, 7 Sec, 10 Sec	A boot delay of 1, 2, 3, 4, 5, 7 or 10 seconds is added.

Table 201: 945GME - Advanced USB Configuration - Setting options

### 1.4.11 Keyboard/Mouse Configuration

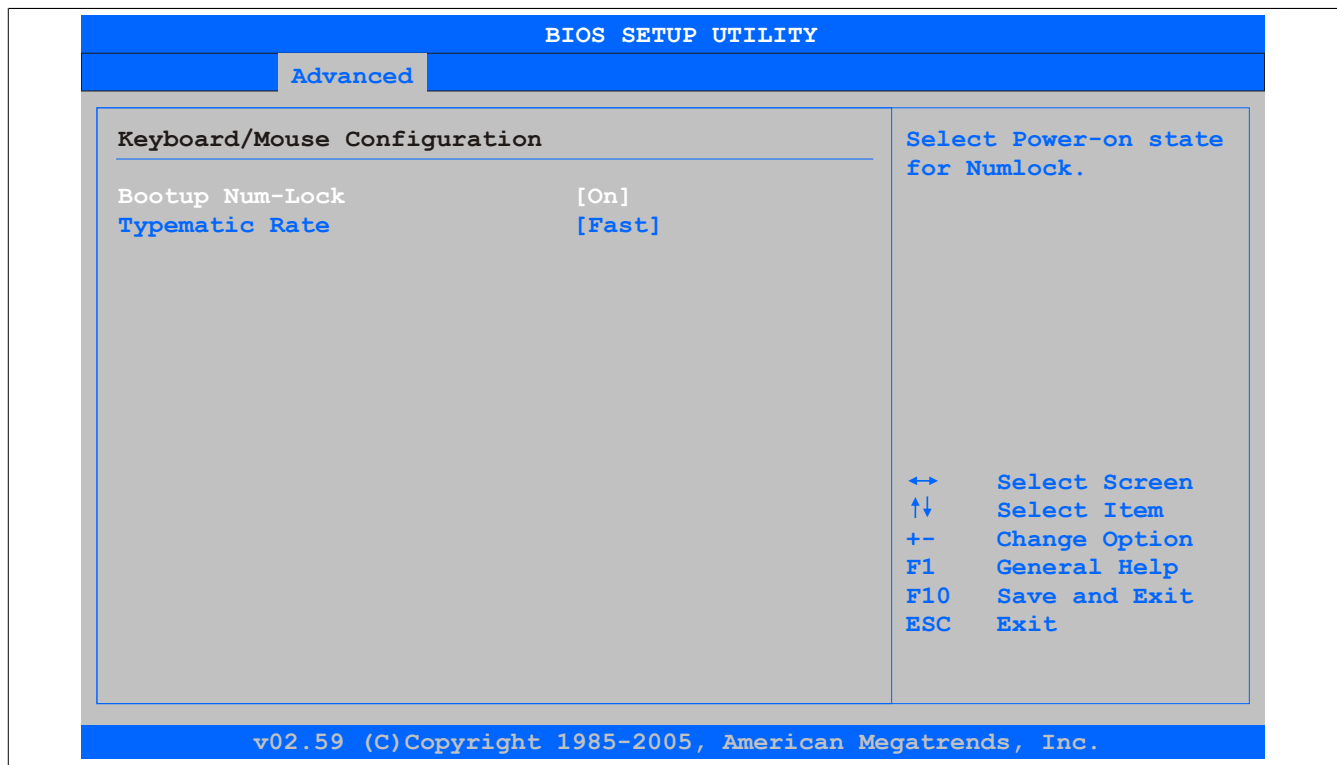


Figure 129: 945GME Advanced Keyboard/Mouse Configuration

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

Table 202: 945GME Advanced Keyboard/Mouse Configuration (Setting options)

### 1.4.12 Remote Access Configuration

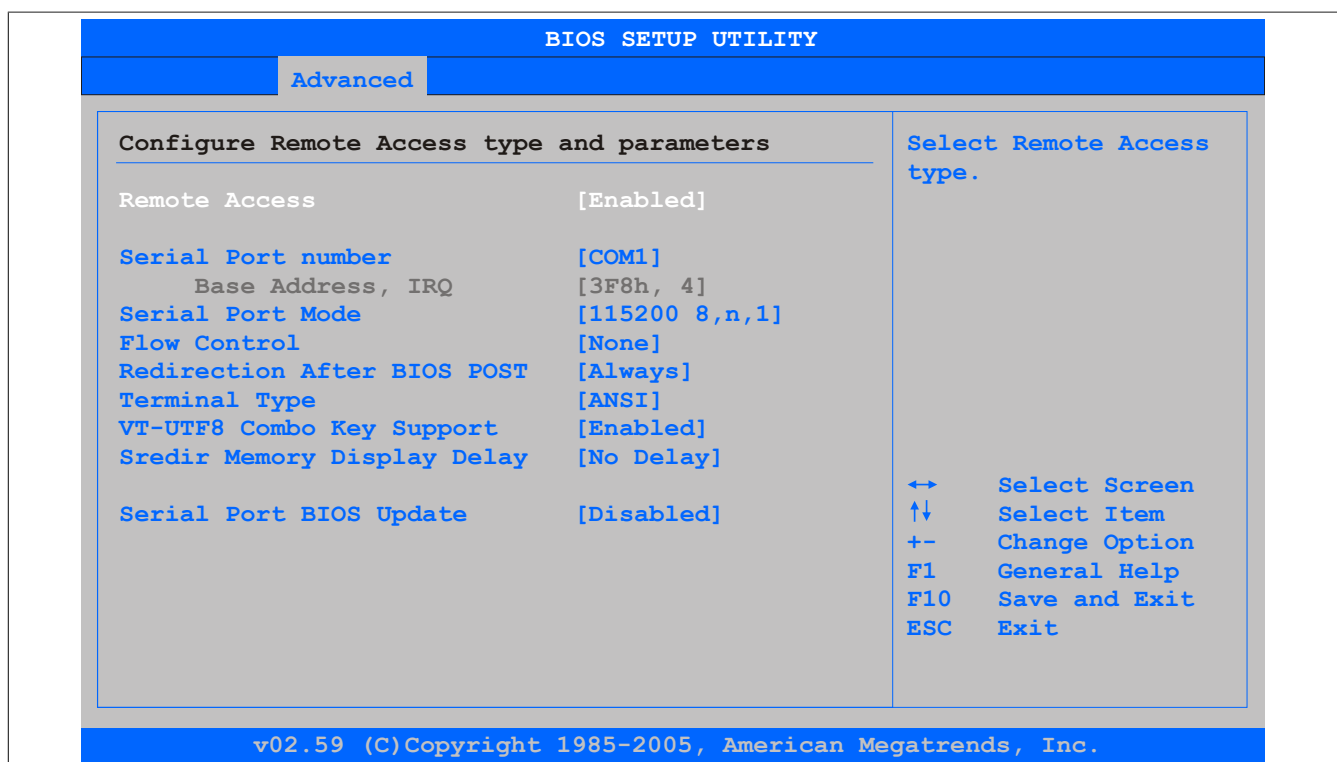


Figure 130: 945GME Advanced Remote Access Configuration

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

Table 203: 945GME Advanced Remote Access Configuration (Setting options)

## 1.4.13 CPU Board Monitor

**Information:**

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

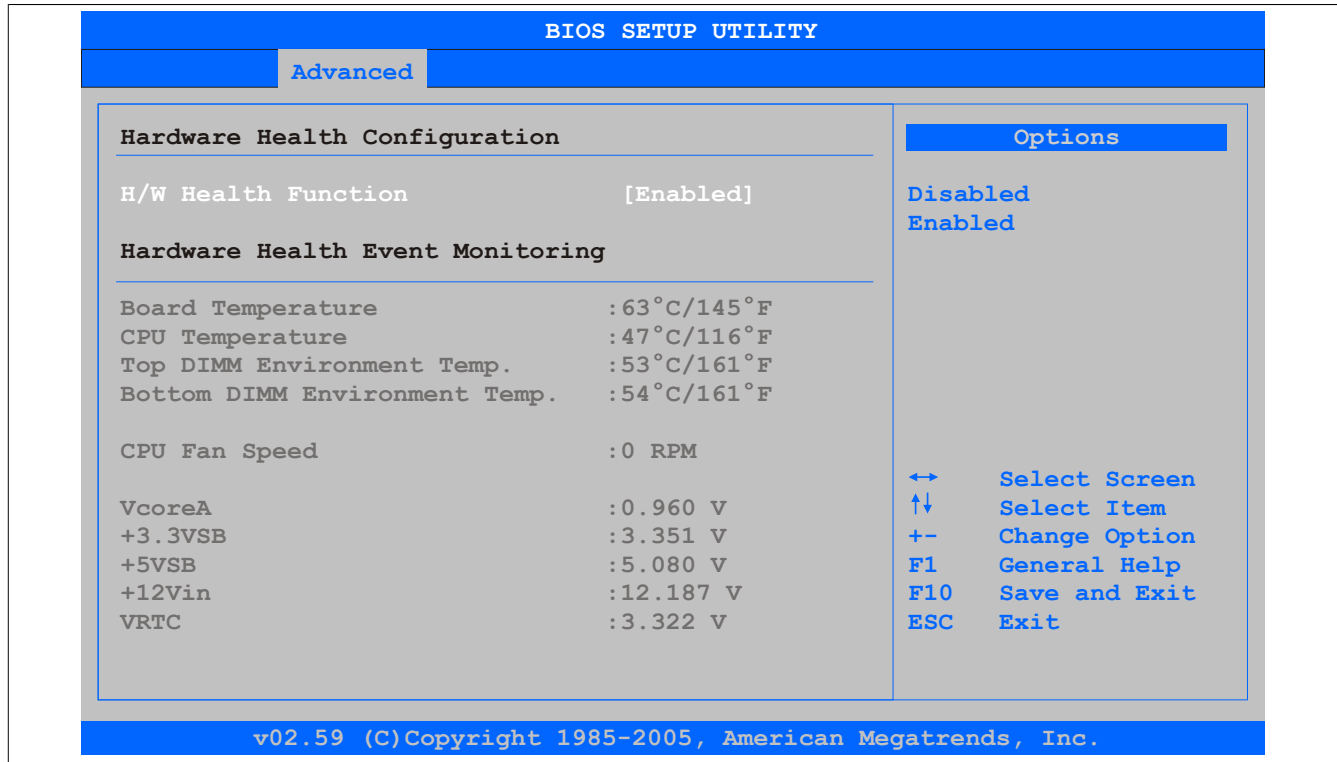


Figure 131: 945GME Advanced CPU Board Monitor

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

Table 204: 945GME Advanced CPU Board Monitor (Setting options)

## 1.4.14 Baseboard/Panel Features

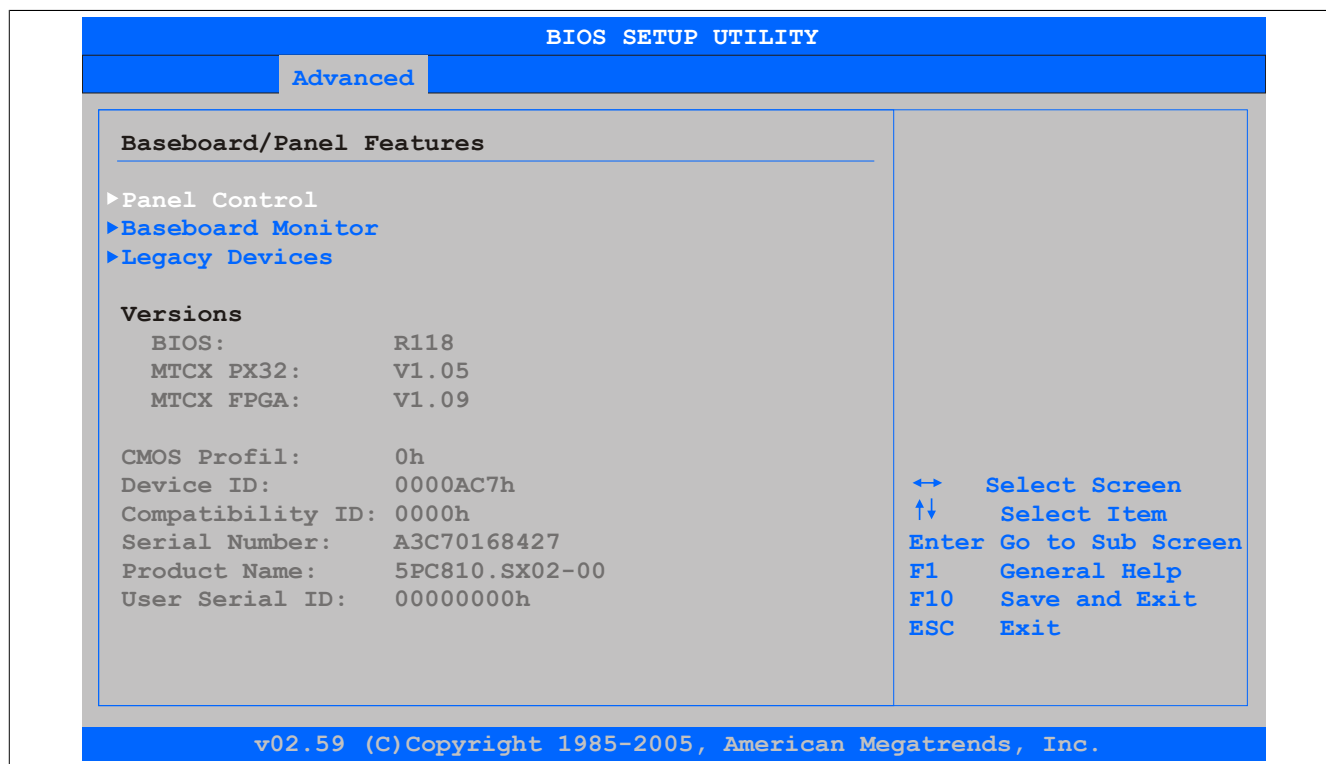


Figure 132: 945GME Advanced Baseboard/Panel Features

BIOS setting	Description	Configuration options	Effect
<b>Panel Control</b>	For special setup of connected panels (display units).	Enter	Opens the submenu See "Panel Control" on page 259
<b>Baseboard Monitor</b>	Display of various temperatures and fan speeds.	Enter	Opens the submenu See "Baseboard Monitor" on page 260
<b>Legacy Devices</b>	Special settings for the interface can be changed here.	Enter	Opens the submenu See "Legacy Devices" on page 261
BIOS	Displays the BIOS version.	None	-
MTCX PX32	Displays the MTCX PX32 firmware version.	None	-
MTCX FPGA	Displays the MTCX FPGA firmware version.	None	-
CMOS profile	Shows the CMOS profile number.	None	-
Device ID	Displays the hexadecimal value of the hardware device ID.	None	-
Compatibility ID	Displays the version of the device within the same B&R device code. This ID is needed for Automation Runtime.	None	-
Serial number	Displays the B&R serial number	None	-
Product name	Displays the B&R model number	None	-
User serial ID	Displays the user serial ID. This 8-digit hexadecimal value can be freely specified by the user (e.g. to give the device a unique ID) and can only be changed using the "B&R Control Center" included with the ADI driver.	None	-

Table 205: 945GME - Advanced Baseboard/Panel Features - Setting options

## 1.4.14.1 Panel Control

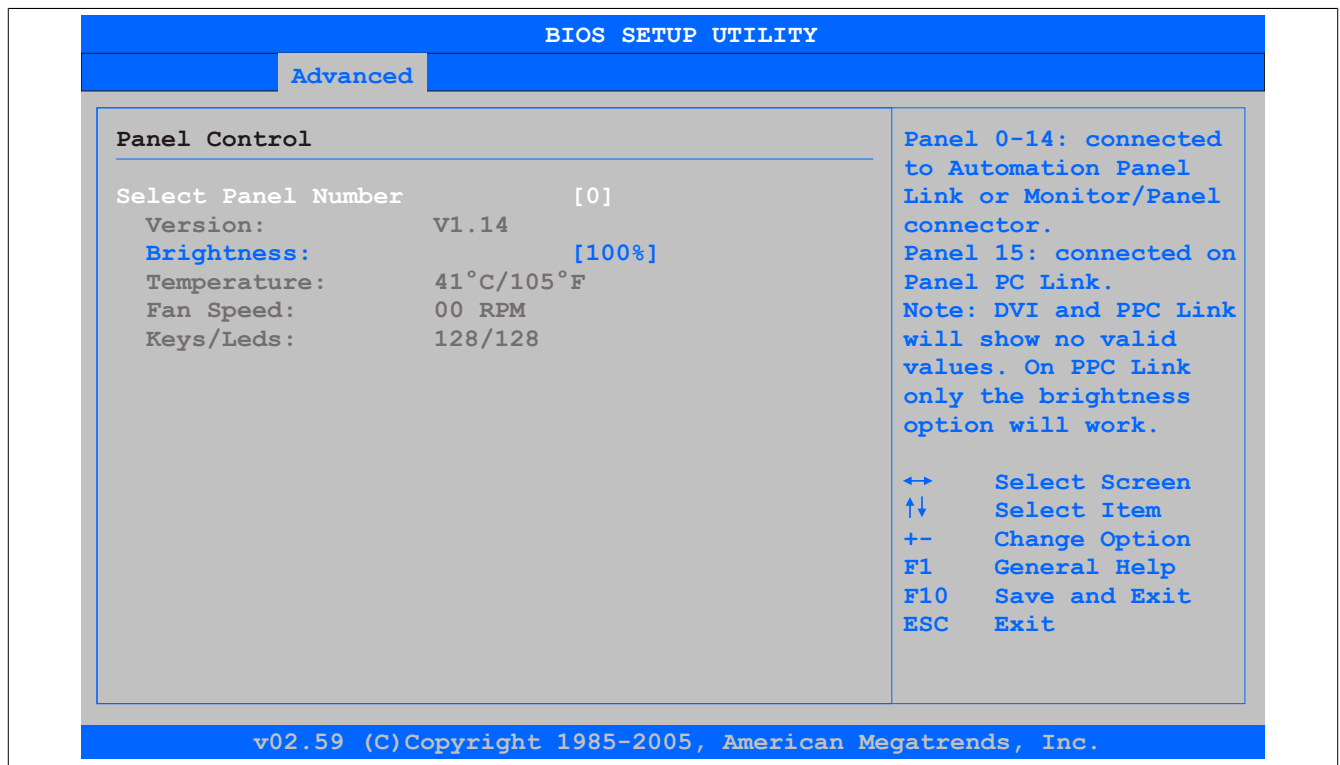


Figure 133: 945GME Panel Control

BIOS setting	Description	Configuration options	Effect
Select panel number	Selection of the panel number for which the values should be read out and/or changed.	0...15	Selection of panel 0 - 15. Panel 15 is specifically intended for panel PC 800 systems.
Version	Displays the firmware version of the SDLR controller	None	-
Brightness	For setting the brightness of the selected panel.	0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%	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 fan speed for the selected panel.	None	-
Keys/LEDs	Displays the available keys and LEDs on the selected panel.	None	-

Table 206: 945GME Panel Control (Setting options)

## 1.4.14.2 Baseboard Monitor

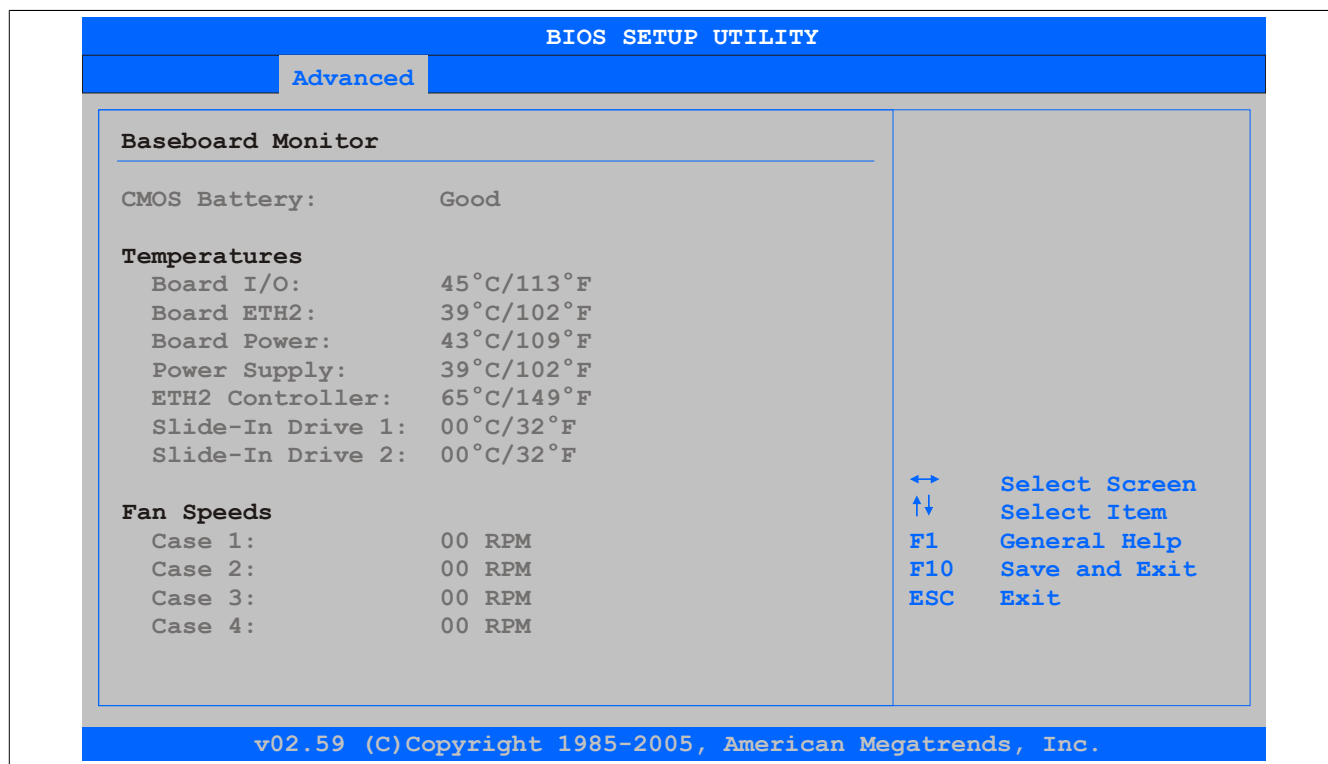


Figure 134: 945GME Baseboard Monitor

BIOS setting	Description	Configuration options	Effect
CMOS Battery	Displays the battery status. <b>n.a.</b> - not available <b>Good</b> - Battery OK. <b>Bad</b> - 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 the slide-in drive 1 in degrees Celsius and Fahrenheit.	None	-
Slide-In Drive 2	Displays the temperature of the slide-in drive 2 in degrees Celsius and Fahrenheit.	None	-
Case 1	Displays the fan speed of housing fan 1.	None	-
Case 2	Displays the fan speed of housing fan 2.	None	-
Case 3	Displays the fan speed of housing fan 3.	None	-
Case 4	Displays the fan speed of housing fan 4.	None	-

Table 207: 945GME Baseboard Monitor (Setting options)



## 1.4.14.3 Legacy Devices

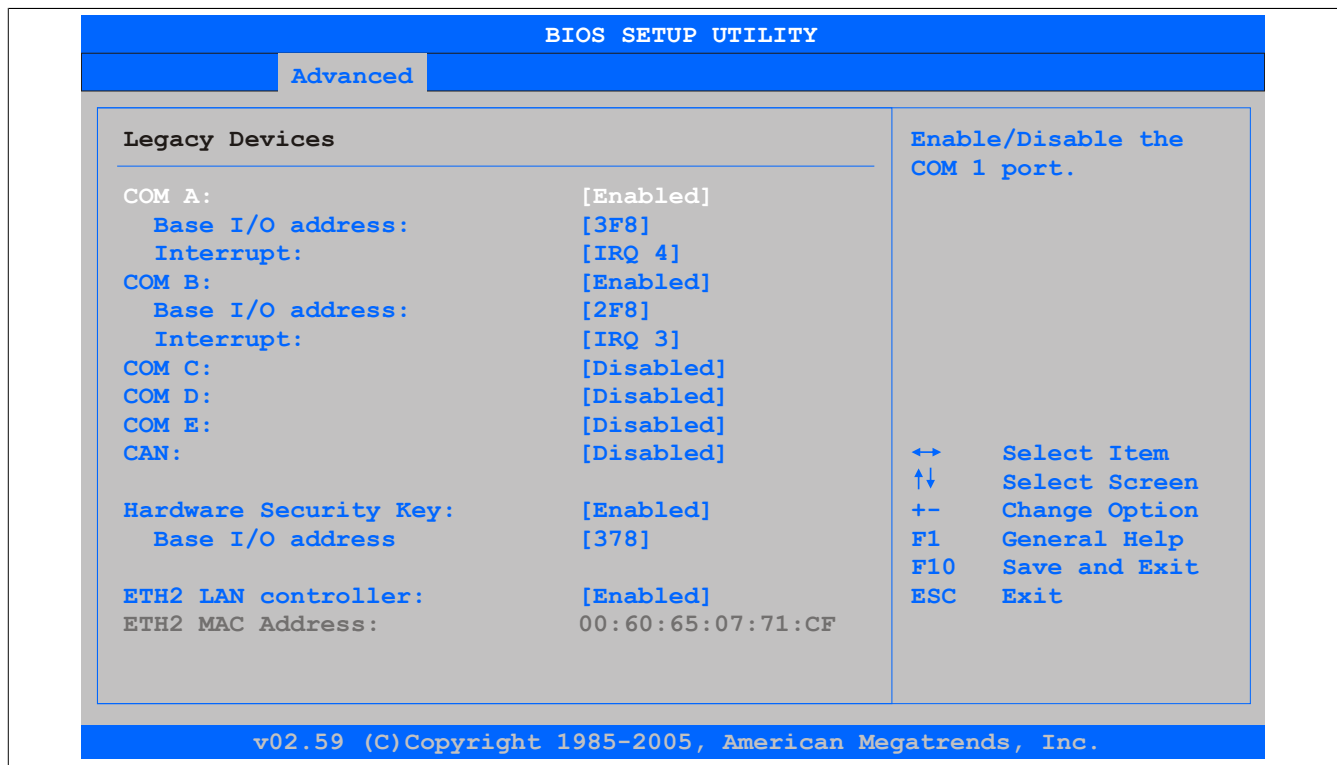


Figure 135: 945GME Legacy Devices

BIOS setting	Description	Configuration options	Effect
COM A	Settings for the serial <b>COM1</b> interface in the system.	Enabled Disabled	Enables the interface Disables the interface
Base I/O address	Selects the base I/O address for the COM port	238, 2E8, 2F8, 328, 338, 3E8, 3F8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM port.	IRQ 3, IRQ 4, IRQ 5, IRQ 6, IRQ 7, IRQ 10, IRQ 11, IRQ 12	Selected interrupt is assigned.
COM B	Setting for the <b>COM2</b> serial interface in the system.	Disabled Enabled	Disables the interface Enables the interface
Base I/O address	Selects the base I/O address for the COM port	238, 2E8, 2F8, 328, 338, 3E8, 3F8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM port.	IRQ 3, IRQ 4, IRQ 5, IRQ 6, IRQ 7, IRQ 10, IRQ 11, IRQ 12	Selected interrupt is assigned.
COM C	Setting the COM port for the <b>touch screen on the monitor/panel</b> connector.	Enabled Disabled	Enables the interface Disables the interface
Base I/O address	Selects the base I/O address for the COM port	238, 2E8, 2F8, 328, 338, 3E8, 3F8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM port.	IRQ 3, IRQ 4, IRQ 5, IRQ 6, IRQ 7, IRQ 10, IRQ 11, IRQ 12	Selected interrupt is assigned.
COM D	Sets the COM port for the <b>touch screen on the AP Link connector</b> .	Enabled Disabled	Enables the interface Disables the interface
Base I/O address	Selects the base I/O address for the COM port	238, 2E8, 2F8, 328, 338, 3E8, 3F8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM port.	IRQ 3, IRQ 4, IRQ 5, IRQ 6, IRQ 7, IRQ 10, IRQ 11, IRQ 12	Selected interrupt is assigned.
COM E	Configuration of the COM port on the <b>B&amp;R add-on interface 5AC600.485I-00</b> (IF option).	Enabled Disabled	Enables the interface Disables the interface
Base I/O address	Selects the base I/O address for the COM port	238, 2E8, 2F8, 328, 338, 3E8, 3F8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM port.	IRQ 3, IRQ 4, IRQ 5, IRQ 6, IRQ 7, IRQ 10, IRQ 11, IRQ 12	Selected interrupt is assigned.
CAN	Configuration of the CAN port of the <b>B&amp;R add-on CAN interface card 5AC600.CANI-00</b> (IF option).	Disabled Enabled	Disables the interface Enables the interface
Base I/O address	Selection of the base I/O address for the CAN port.	None	-
Interrupt	Selection of the interrupt for the CAN port.	IRQ 10, NMI	Selected interrupt is assigned.
Hardware Security Key	Settings for the hardware security key (Dongle) are made here.	Disabled Enabled	Disables the interface Enables the interface

Table 208: 945GME Legacy Devices (Setting options)

BIOS setting	Description	Configuration options	Effect
Base I/O address	Selection of the base I/O address for the hardware security interface.	278, 378, 3BC	Selection of the base I/O address for the parallel port.
ETH2 LAN controller	Option for turning the onboard LAN controller (ETH2) on and off	Enabled	Enables the controller
		Disabled	Disables the controller
ETH2 MAC address	Displays the Ethernet 2 controller MAC address.	None	-

Table 208: 945GME Legacy Devices (Setting options)

## 1.5 Boot

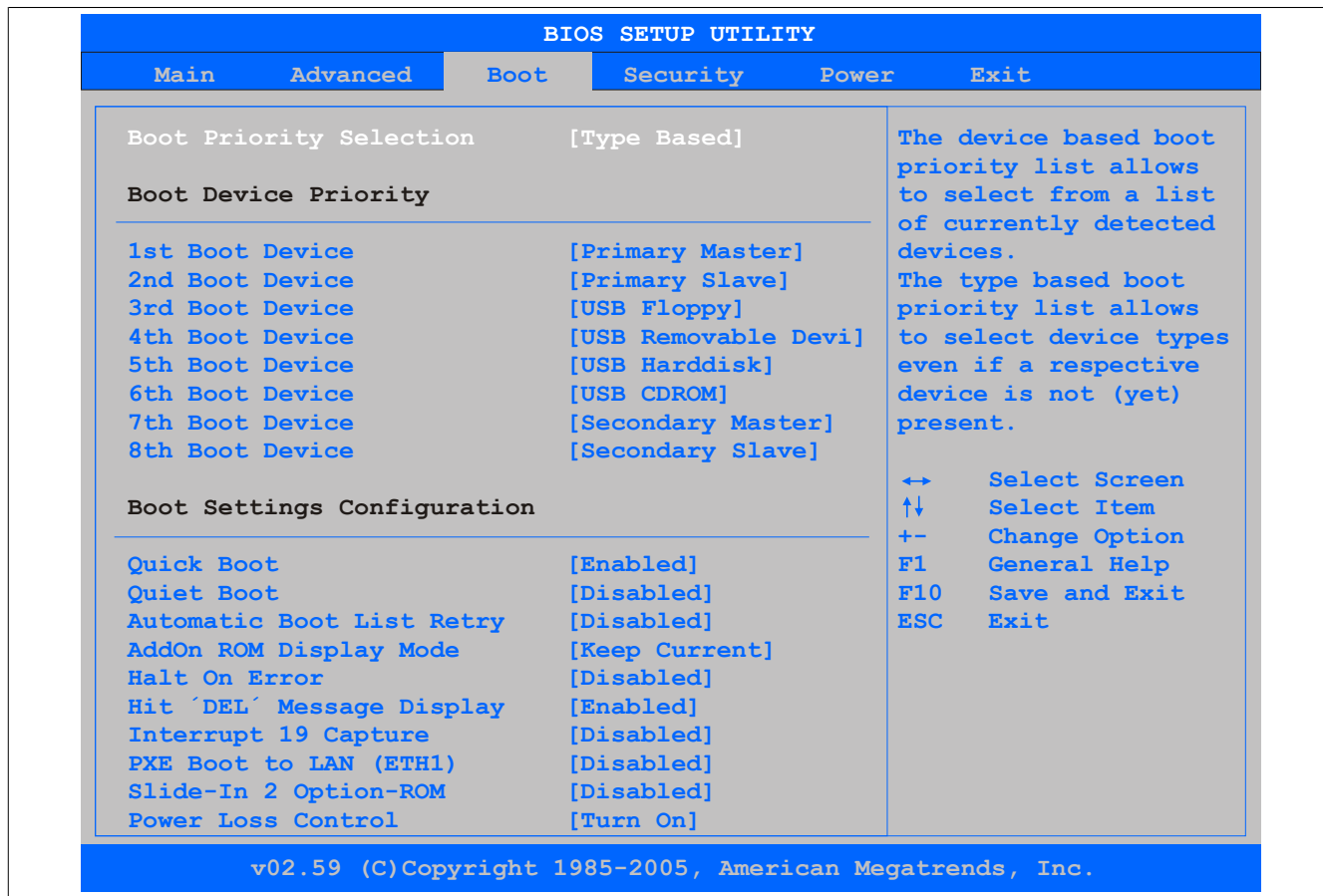


Figure 136: 945GME Boot Menu

BIOS setting	Description	Configuration options	Effect
Boot priority selection	Option for determining the method for how drives should be booted	Device based	Only lists devices that are recognized by the system. The order of devices in this list can be changed.  <b>Information:</b> 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.  <b>Information:</b> It is only possible to use either "Device based" or "Type based". Using both together is not permitted.

Table 209: 945GME Boot Menu (Setting options)

BIOS setting	Description	Configuration options	Effect
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			
Quick Boot	This function reduces the boot time by skipping some POST procedures.	Enabled	Enables this function
		Disabled	Disables this function
Quiet Boot	Determines if POST message or OEM logo (default = black background) is displayed.	Enabled	OEM logo display instead of POST message.
		Disabled	POST message display.
Automatic Boot List Retry	With this option, the operating system attempts to automatically restart following startup failure.	Enabled	Enables this function
		Disabled	Disables this function
Add-On ROM Display Mode	Sets the display mode for the ROM (during the booting procedure).	Force BIOS	An additional BIOS part can be displayed.
		Keep current	BIOS information is displayed.
Halt On Error	This option sets whether the system should pause the Power On Self Test (POST) when it encounters an error.	Enabled	The system pauses. The system pauses every time an error is encountered.
		Disabled	The system does not pause. All errors are ignored.
Hit 'DEL' Message Display	Settings can be made here for the "Hit 'DEL' Message" display.  <b>Information:</b>  When quiet boot is activated the message is not displayed.	Enabled	The message is displayed.
		Disabled	The message is not displayed.
Interrupt 19 Capture	This function can be used to incorporate the BIOS interrupt.	Enabled	Enables this function
		Disabled	Disables this function
PXE boot to LAN (ETH1)	Enables/disables the function to boot from LAN (ETH1).	Enabled	Enables this function
		Disabled	Disables this function
Slide-in 2 Optional ROM	Activation/deactivation of an optional ROM for a slide-in 2 drive.	Enabled	Enables this function
		Disabled	Disables this function
Power loss control	Specifies whether the system should be on/off following power loss	Remain off	Remains off.
		Turn on	Powers on.
		Last state	Enables the previous state

Table 209: 945GME Boot Menu (Setting options)

## 1.6 Security

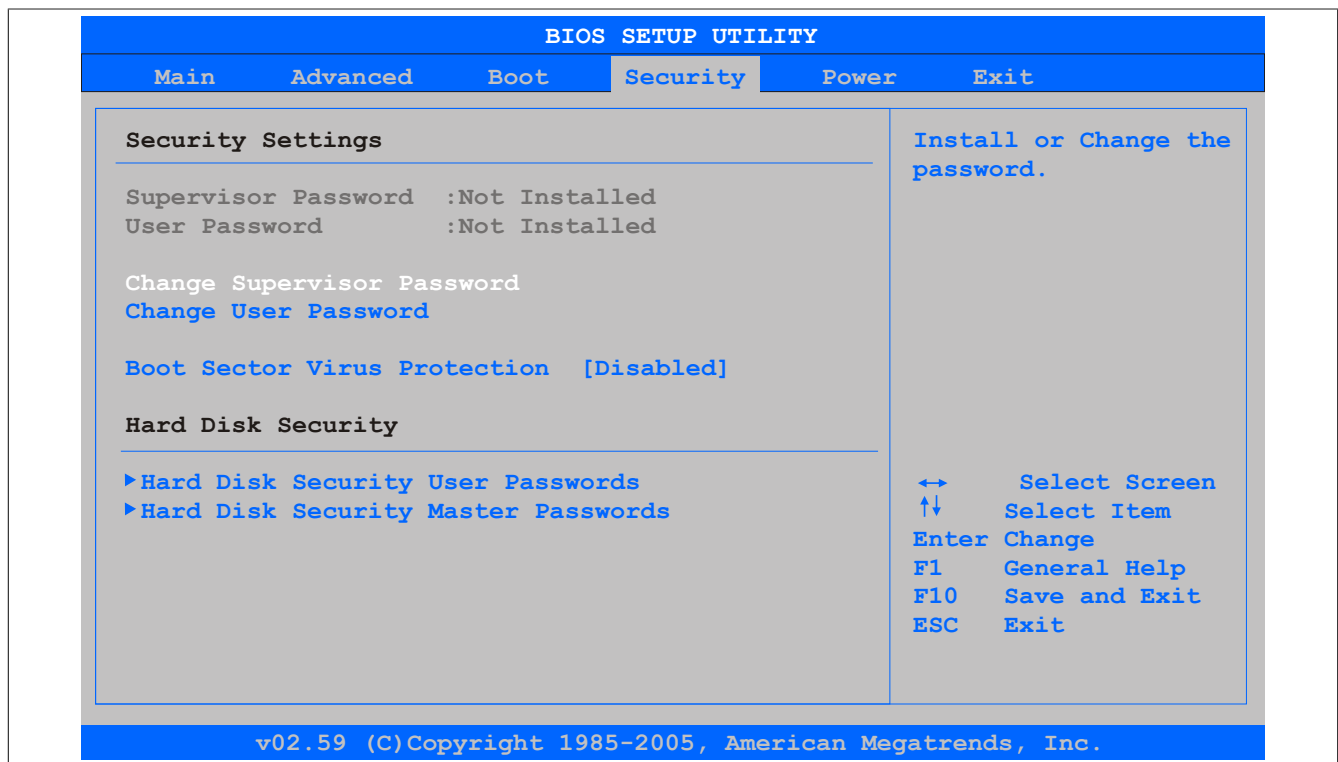


Figure 137: 945GME Security Menu

BIOS setting	Description	Configuration options	Effect
Supervisor Password	Displays whether or not a supervisor password has been set.	None	-
User Password	Displays whether or not a user password has been set.	None	-
Change Supervisor Password	To enter/change a supervisor password. A supervisor password is necessary to edit all BIOS settings.	Enter	Password entry
Change User Password	To enter/change a user password. A user password allows the user to edit only certain BIOS settings.	Enter	Password entry
Boot Sector Virus Protection	With this option, a warning is issued when the boot sector is accessed through a program or virus.  <b>Information:</b>  With this option, only the boot sector is protected, not the entire hard drive.	Enabled	Enables this function
		Disabled	Disables this function
Hard Disk Security User Passwords	The hard disk security user password can be created here.	Enter	Opens the submenu See "Hard Disk Security User Password" on page 264
Hard Disk Security Master Passwords	The hard disk security master password can be created here.	Enter	Opens the submenu See "Hard Disk Security Master Password" on page 265

Table 210: 945GME Security Menu (Setting options)

### 1.6.1 Hard Disk Security User Password

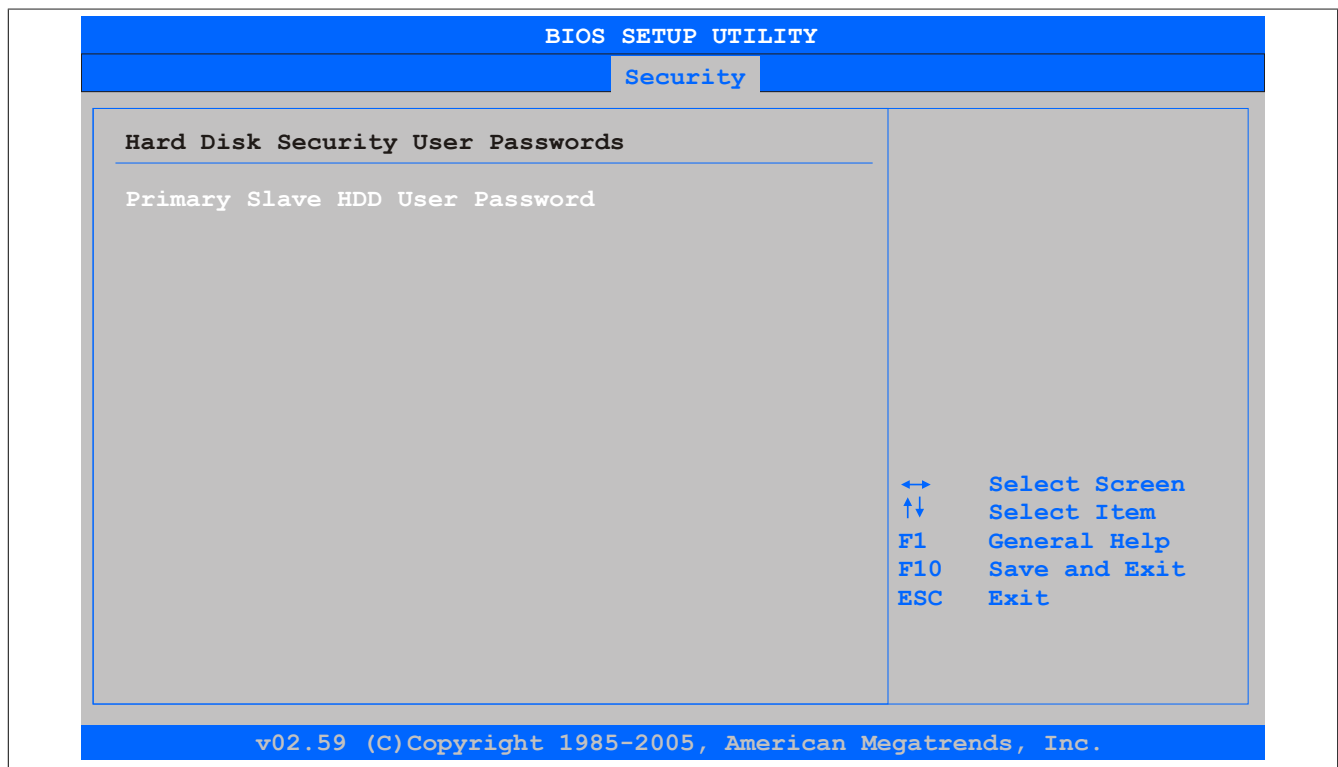


Figure 138: 945GME Hard Disk Security User Password

BIOS setting	Description	Configuration options	Effect
Primary slave HDD user password	This function makes it possible to use the user password to change or configure each hard drive without having to reboot the device. A user password allows the user to edit only certain BIOS settings.	Enter	Password entry

Table 211: 945GME Hard Disk Security User Password

## 1.6.2 Hard Disk Security Master Password

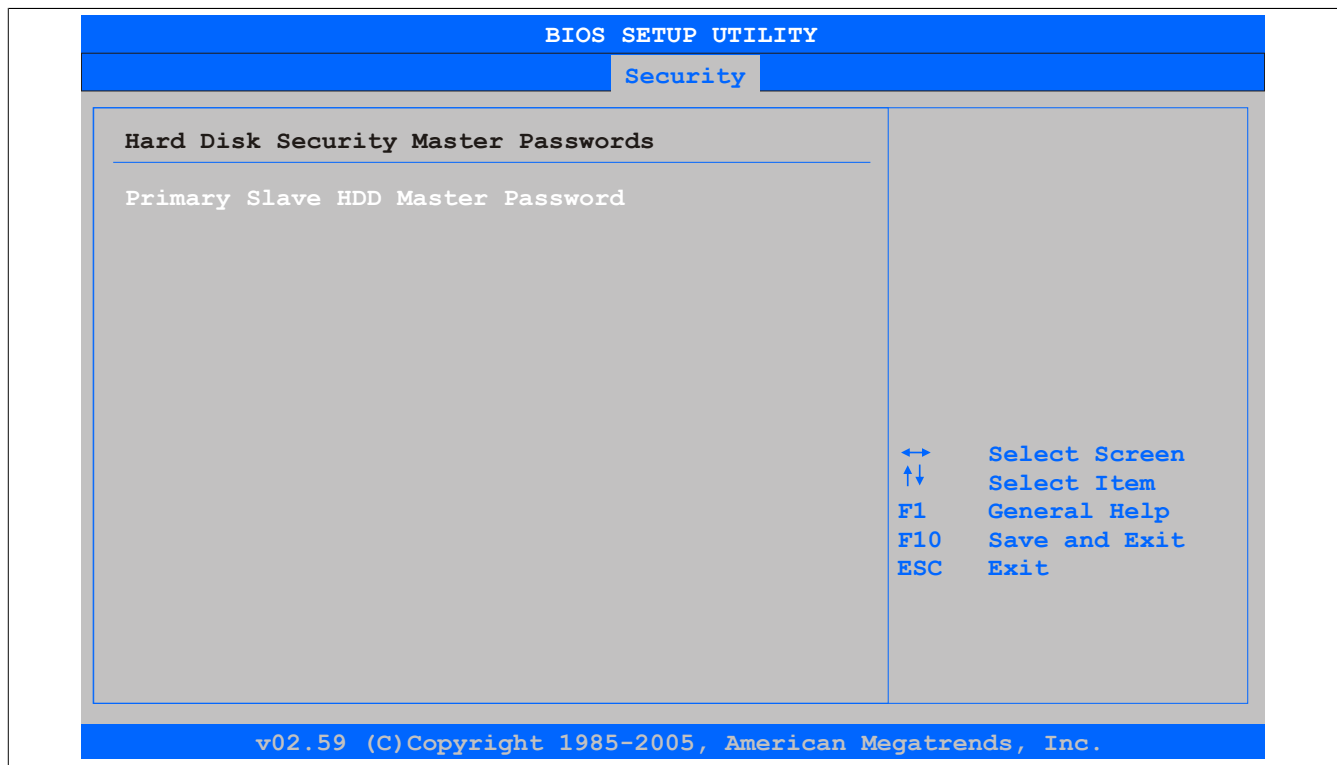


Figure 139: 945GME Hard Disk Security Master Password

BIOS setting	Description	Configuration options	Effect
Primary Slave HDD Master Password	This function makes it possible to use the user password to change or configure each hard drive without having to reboot the device.	Enter	Password entry

Table 212: 945GME Hard Disk Security Master Password

## 1.7 Power

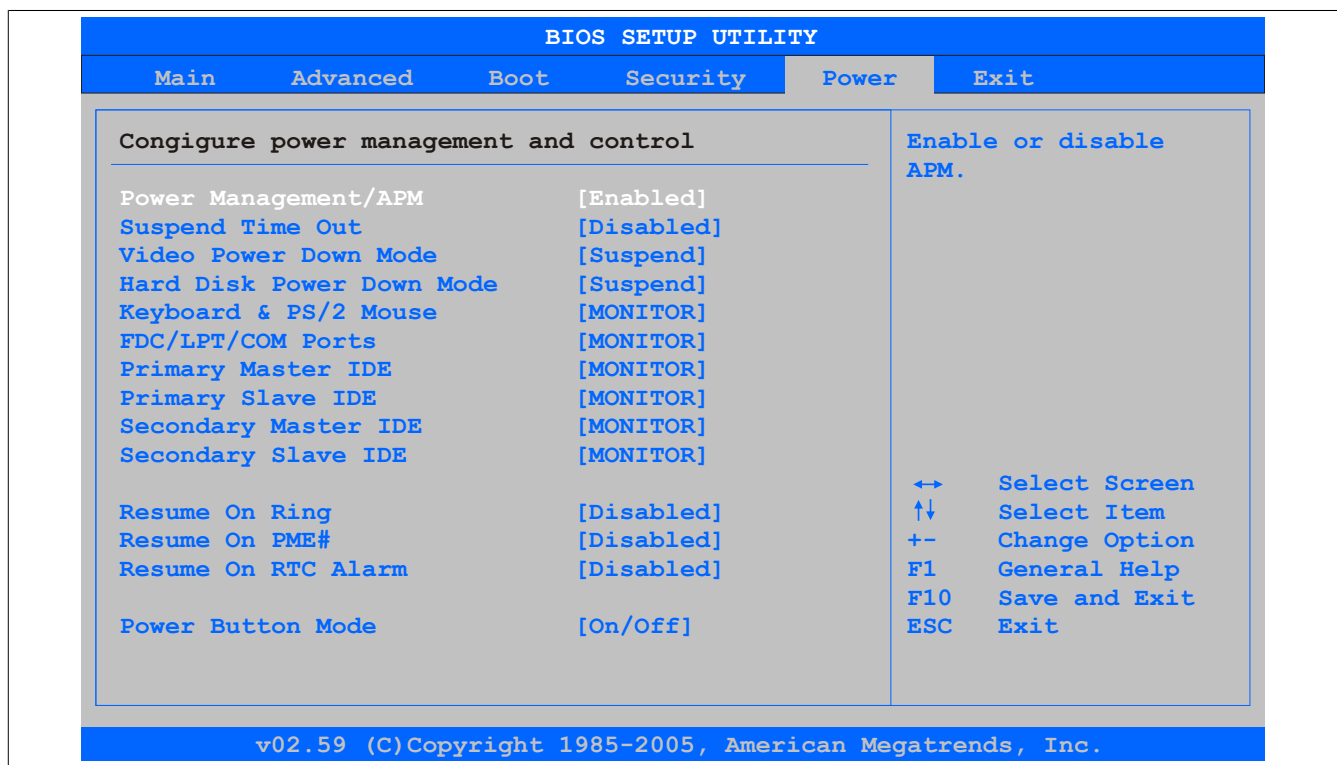


Figure 140: 945GME Power Menu

BIOS setting	Description	Configuration options	Effect
Power Management/APM	This option switches the APM function on or off. This is an advanced plug & play and power management functionality.	Enabled	Enables this function
		Disabled	Disables this function
Suspend Time Out	Using this option, you can configure how long the system stays inactive (all components but the CPU are shut off, if possible) before entering suspend mode.	1 min, 2 min, 4 min, 8 min, 10 min, 20 min 30 min, 40 min, 50 min, 60 min;	Value set manually.
		Disabled	Disables this function
Video Power Down Mode	This option allows you to set the energy saving mode for the monitor.	Disabled	Do not switch off the monitor.
		Standby	Monitor goes to standby mode.
		Suspend	Monitor goes to suspend mode.
Hard Disk Power Down Mode	This option allows you to set the energy saving mode for the hard drive.	Disabled	Do not switch off the monitor.
		Standby	Monitor goes to standby mode.
		Suspend	Monitor goes to suspend mode.
Keyboard & PS/2 Mouse	The monitoring of activities during power saving mode is determined here.	MONITOR	Keyboard or PS/2 mouse activities return the system to its normal state from a particular energy saving mode.
		IGNORE	Activities are ignored.
FDC/LPT/COM ports	The monitoring of activities during power saving mode is determined here.	MONITOR	Activity on the parallel port, the serial 1&2 port, or the floppy port returns the system to its normal state from an energy saving mode.
		IGNORE	Activities are ignored.
Primary Master IDE	The monitoring of activities during power saving mode is determined here.	MONITOR	Activities in the IRQ of specific connections or devices return the system to its normal state from power saving mode.
		IGNORE	Activities are ignored.
Primary Slave IDE	The monitoring of activities during power saving mode is determined here.	MONITOR	Activities in the IRQ of specific connections or devices return the system to its normal state from power saving mode.
		IGNORE	Activities are ignored.
Secondary Master IDE	The monitoring of activities during power saving mode is determined here.	MONITOR	Activities in the IRQ of specific connections or devices return the system to its normal state from power saving mode.
		IGNORE	Activities are ignored.
Secondary Slave IDE	The monitoring of activities during power saving mode is determined here.	MONITOR	Activities in the IRQ of specific connections or devices return the system to its normal state from power saving mode.
		IGNORE	Activities are ignored.
Resume On Ring	When the modem receives an incoming call, the PC is brought out of power saving mode.	Enabled	Enables this function
		Disabled	Disables this function
Resume on PME#	With this option, you can switch the PME wakeup function on or off.	Enabled	Enables this function
		Disabled	Disables this function
Resume On RTC Alarm	With this option, you can activate the alarm and enter the date and time for the system start.	Enabled	Enables this function
		Disabled	Disables this function
Power Button Mode	This function determines the function of the power button.	On/Off	Power button switches on/off.
		Suspend	Suppresses the function.

Table 213: 945GME Power Menu (Setting options)

## 1.8 Exit

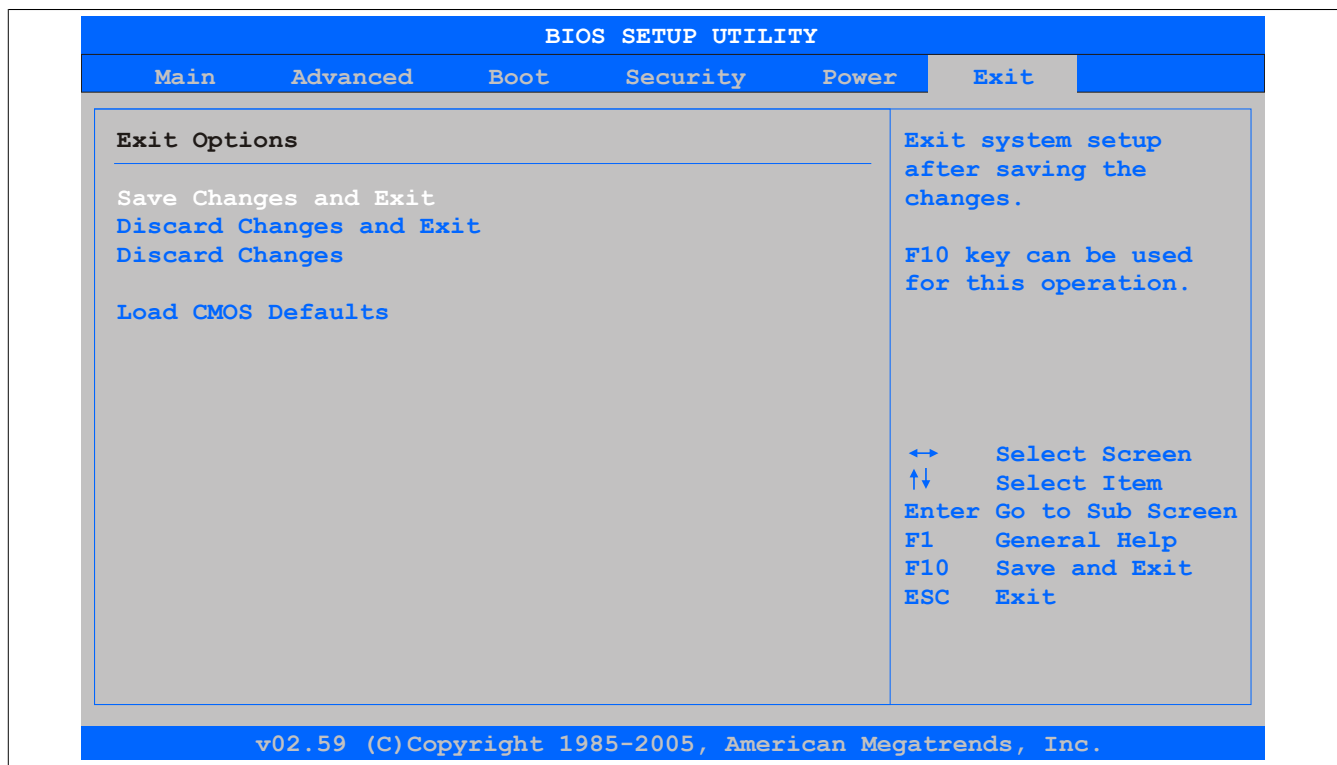


Figure 141: 945GME Exit Menu

BIOS setting	Description	Configuration options	Effect
Save changes and exit	Selecting this option closes BIOS Setup. Any changes made are saved to CMOS after confirmation, and the system is rebooted.	OK / Cancel	
Discard changes and exit	Selecting this option closes BIOS Setup without saving any changes made. The 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 item loads the CMOS default values, which are defined by the DIP switch settings. These settings are loaded for all BIOS configurations.	OK / Cancel	

Table 214: 855GME (XTX) Exit Menu (Setting options)

## 1.9 BIOS default settings

The various positions of the CMOS profile hex switch can be used to load pre-defined BIOS profile settings.

### Information:

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

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

Profile number	Optimized for	Switch position	Note
Profile 0	Reserved	0	
Profile 1	System unit 5PC810.SX01-00 / 5PC810.SX02-00 / 5PC810.SX03-00	1	The default settings for this profile can be found in the APC810 user's manual. This can be downloaded for free from the B&R homepage.
Profile 2	System unit 5PC810.SX05-00	2	
Profile 3	System unit 5PC820.SX01-00/ 5PC820.SX01-01	3	The default settings for this profile can be found in the APC820 User's Manual. This can be downloaded for free from the B&R homepage.
Profile 4	Reserved	4	
Profile 5	System unit 5PC820.1505-00 / 5PC820.1906-00	5	The default settings for this profile can be found in the PPC800 user's manual. This can be downloaded for free from the B&R homepage.

Table 215: 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 216: 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 217: 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 218: 945GME Advanced - PCI configuration profile setting overview



Setting / Option	Profile 0	Profile 1	Profile 2	My setting
<b>PCI IRQ Resource Exclusion</b>				
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	
<b>PCI Interrupt Routing</b>				
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 218: 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 219: 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 220: 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.	Default	Default	Default	
C2 Config.	Disabled	Disabled	Disabled	
C3 Config.	Disabled	Disabled	Disabled	
C4 Config.	Disabled	Disabled	Disabled	

Table 221: 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 222: 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 223: 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 224: 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 Time Out (Sec)	35	35	35	
ATA(Pi) 80-Pin Cable Detection	Host & device	Host & device	Host & device	
<b>Primary IDE Master</b>				
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	
<b>Primary IDE slave</b>				
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	
<b>Secondary IDE Master</b>				
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	
<b>Secondary IDE slave</b>				
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 225: 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 226: 945GME Advanced - USB configuration profile setting overview

### 1.9.2.11 Keyboard/mouse configuration

Setting / Option	Profile 0	Profile 1	Profile 2	My setting
Boot-up Num-lock	On	On	On	
Typematic rate	Fast	Fast	Fast	

Table 227: 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 228: 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 229: 945GME Advanced - CPU board monitor profile setting overview

### 1.9.2.14 Main Board/Panel Features

Setting / Option	Profile 0	Profile 1	Profile 2	My setting
<b>Panel Control</b>				
Select panel number	-	-	-	
Version	-	-	-	
Brightness	100%	100%	100%	
Temperature	-	-	-	
Fan speed	-	-	-	
Keys/LEDs	-	-	-	
<b>Baseboard Monitor</b>				
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	-	-	-	
<b>Legacy Devices</b>				
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 230: 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 231: 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 232: 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 233: 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 beeping codes.

Beeping code	Description	Necessary User Action
1x short	Memory refresh failed.	Load BIOS defaults. In the event that the error persists, send industrial PC to B&R for testing.
2x short	Parity error: POST error (error in one of the hardware testing procedures)	Check the placement of the inserted card. In the event that the error persists, send industrial PC to B&R for testing.
3x short	Base 64 Kb memory failure: Basic memory defect, RAM error within the initial 64 Kb.	Send industrial PC to B&R for checking.
4x short	Timer not operational: System timer.	Send industrial PC to B&R for checking.
5x short	Processor error: Processor defect.	Send industrial PC to B&R for checking.
6x short	8042 gate A20 failure: Keyboard controller defect (block 8042/ A20 gate). Processor cannot switch to protected mode.	Send industrial PC to B&R for checking.
7x short	Processor exception interrupt error: Virtual mode exception error (CPU generated an interrupt error).	Send industrial PC to B&R for checking.
8x short	Display memory read/write error: Video memory not accessible; graphic card defect or not built in (no fatal error).	Check inserted graphic card position and eventually exchange. In the event that the error persists, send industrial PC to B&R for testing.
9x short	ROM-checksum error: ROM-BIOS-checksum incorrect, EPROM, EEPROM or Flash-ROM component defect, BIOS defect or incorrectly updated.	Send industrial PC to B&R for checking.
10x short	CMOS shutdown register read/write error: CMOS cannot be read/written.	Send industrial PC to B&R for checking.
11x short	Cache Error / external Cache bad: L2 - Cache on the mainboard is defected.	Send industrial PC to B&R for checking.

Table 234: BIOS post code messages BIOS 945GME

## 1.11 Distribution of resources

### 1.11.1 RAM address assignment

RAM address	Address in hexadecimal	Resource
(TOM - 192 kB) – TOM <sup>1)</sup>	N.A.	ACPI reclaim, MPS and NVS area <sup>2)</sup>
(TOM - 8 MB - 192 kB) – (TOM - 192 kB)	N.A.	VGA frame buffer <sup>3)</sup>
1024 kB – (TOM - 8 MB - 192 kB)	100000h - N.A.	Extended memory
869kB – 1024 kB	0E0000h - 0FFFFFFh	Runtime BIOS
832kB – 869 kB	0D0000h - 0DFFFFh	Upper memory
640kB – 832 kB	0A0000h - 0CFFFFh	Video memory and BIOS
639kB – 640 kB	09FC00h - 09FFFFh	Extended BIOS data
0 – 639 kB	000000h - 09FC00h	Conventional memory

Table 235: 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 <sup>1)</sup>
4100h - 417Fh	MTCX
FF00h - FF07h	IDE bus master register

Table 236: I/O address assignment

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

### 1.11.3 Interrupt assignments in PIC mode

IRQ	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	NMI	NONE
System timer	•																	
Keyboard		•																
IRQ cascade			•															
COM1 (Serial port A)				○	•	○	○	○			○	○	○					
COM2 (Serial port B)				•	○	○	○	○			○	○	○					
ACPI <sup>1)</sup>										•								
Real-time clock									•									
Coprocessor (FPU)														•				
Primary IDE channel															•			
Secondary IDE channel																•		
B&R	COM3 (COM C)			○	○	○	○	○			○	○	○					•
	COM4 (COM D)			○	○	○	○	○			○	○	○					•
	COM5 (COM E)			○	○	○	○	○			○	○	○					•
	CAN			○	○	○	○	○			○	○	○				○	•

Table 237: 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 <sup>1)</sup>									•																	
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 <sup>2)</sup>																•										
PIRQ B <sup>3)</sup>																	•									
PIRQ C <sup>4)</sup>																		•								
PIRQ D <sup>5)</sup>																			•							
PIRQ E <sup>6)</sup>																				•						
PIRQ F <sup>7)</sup>																					•					
PIRQ G <sup>8)</sup>																						•				
PIRQ H <sup>9)</sup>																							•			

Table 238: 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



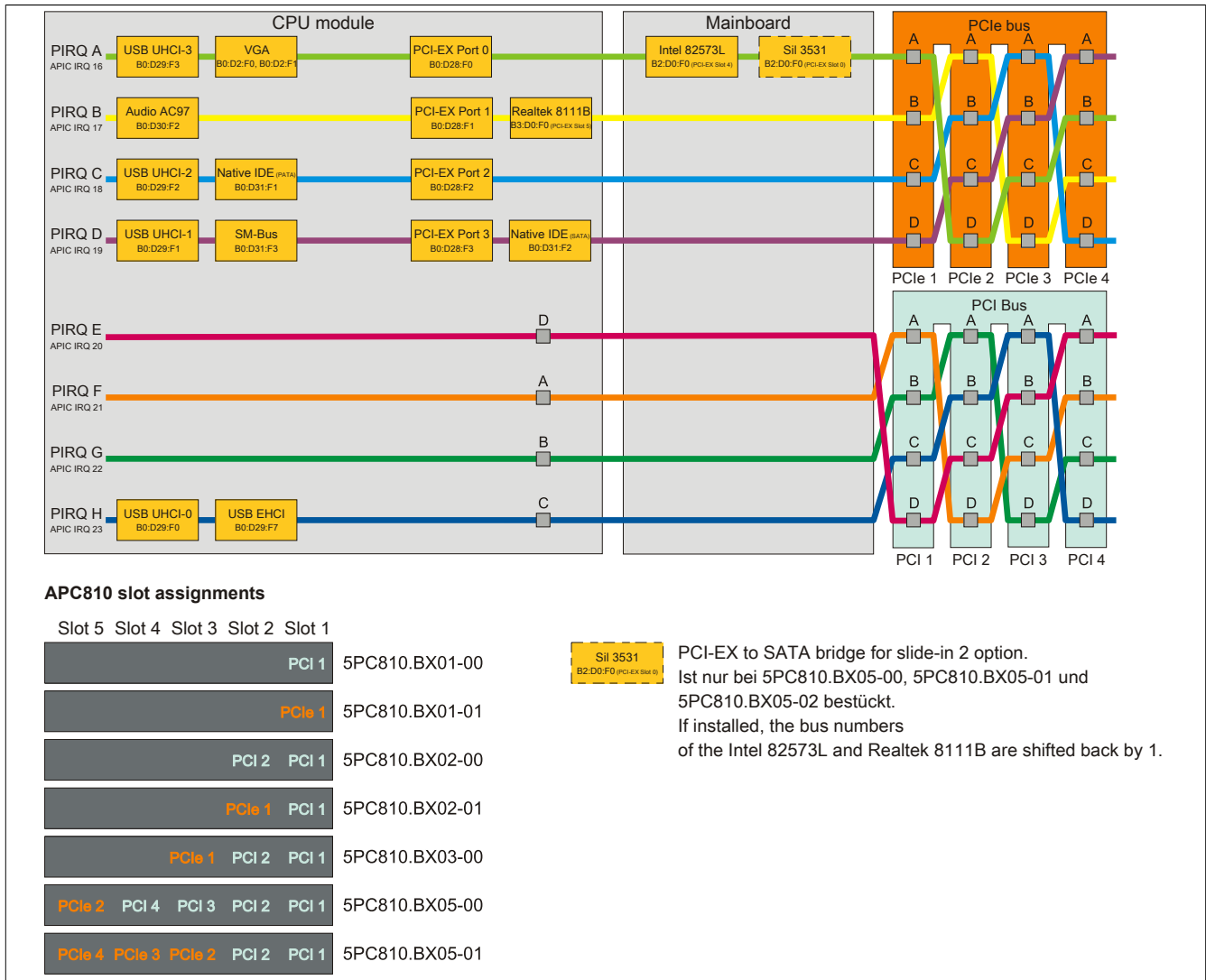


Figure 142: PCI and PCIe routing with activated APIC CPU board 945GME (COM Express) for BIOS Version ≤ 1.12

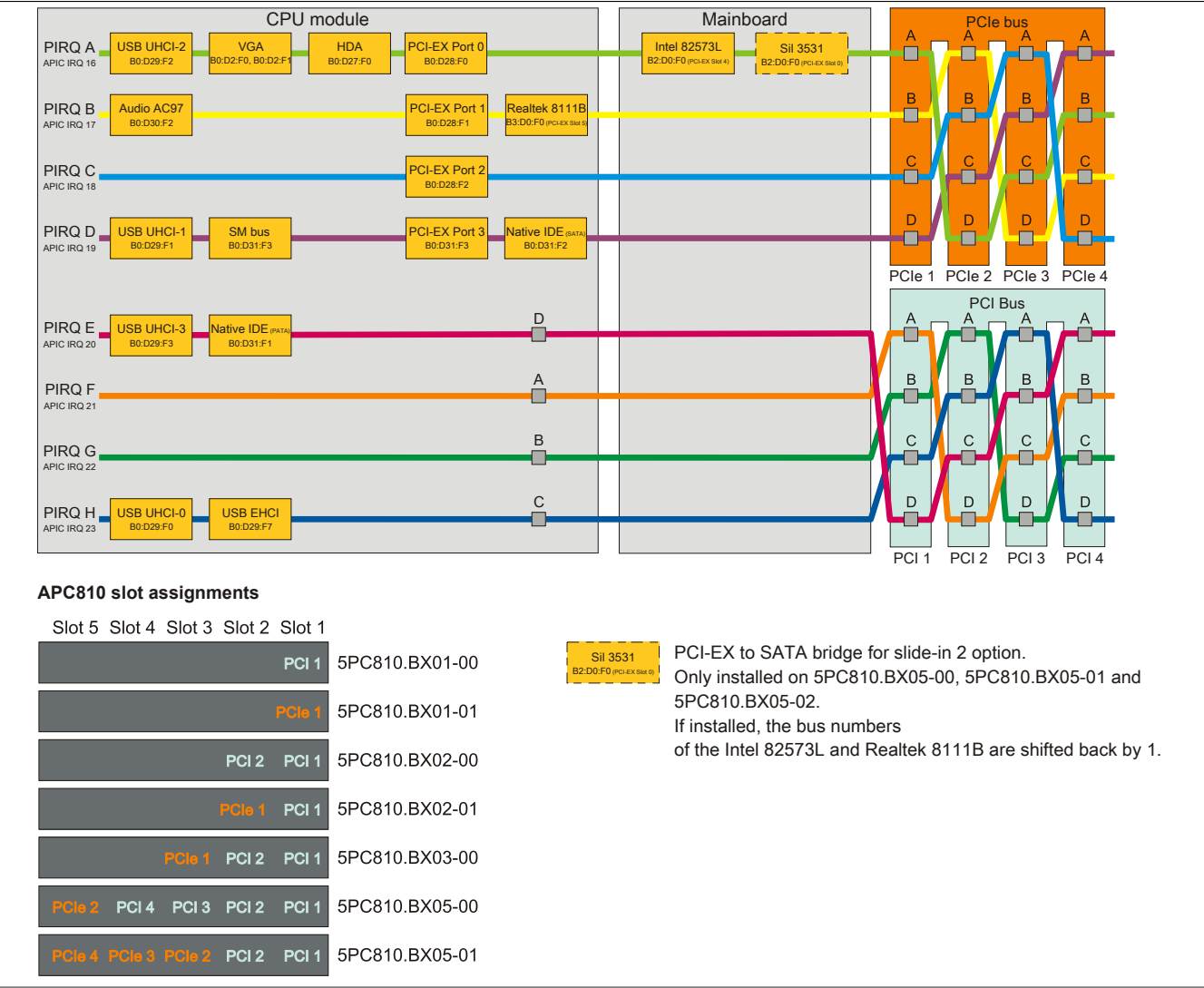


Figure 143: PCI and PCIe routing with activated APIC CPU board 945GME (COM Express) for BIOS Version ≥ 1.14 (5PC810.BX0x-0x bus units)

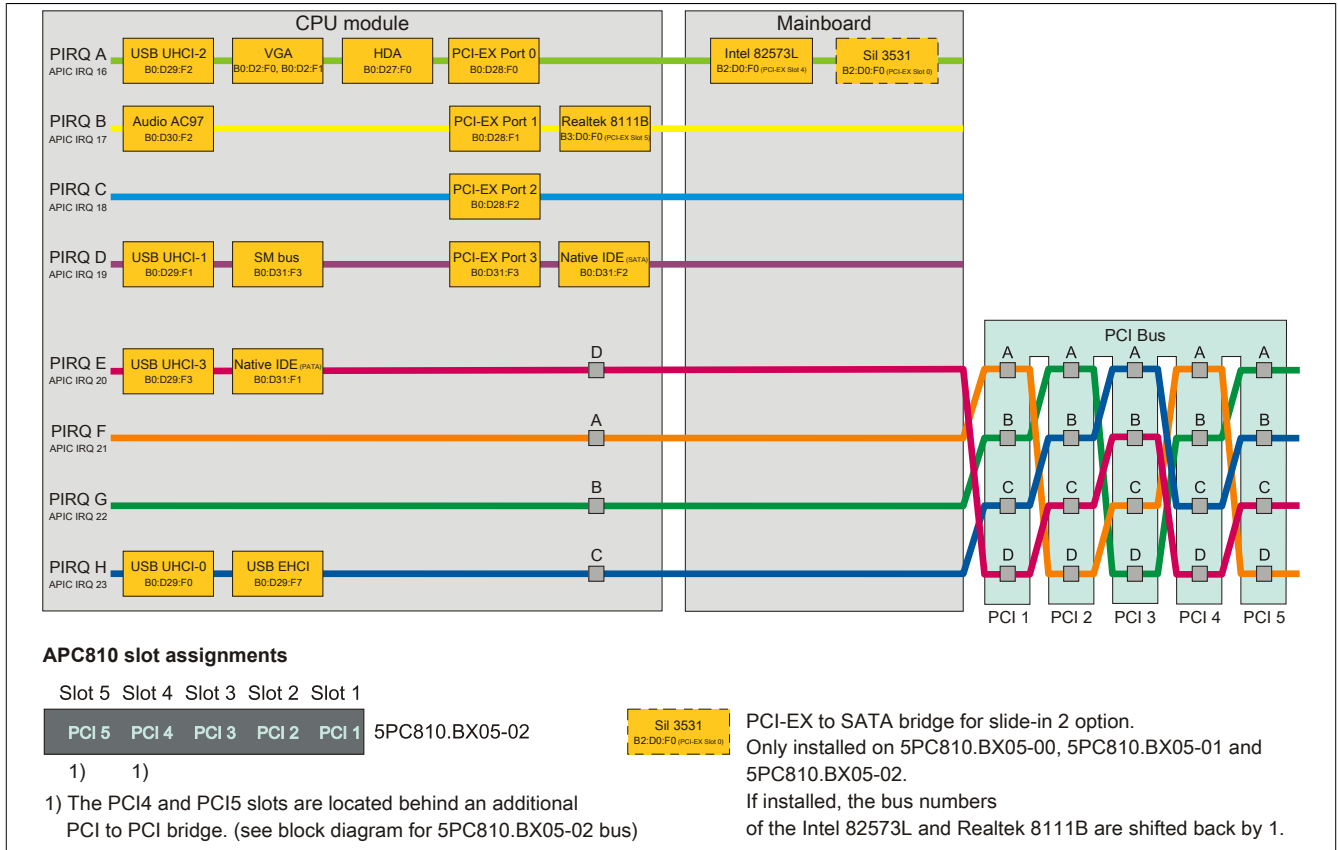


Figure 144: PCI and PCIe routing with activated APIC CPU boards 945GME (COM Express) for BIOS Version ≥ 1.14 (bus unit 5PC810.BX05-02)

## 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](http://www.br-automation.com)).

### 2.1 BIOS upgrade

Upgrade may be necessary in order to accomplish the following:

- Updating implemented functions or adding newly implemented functions or components to BIOS Setup (information about changes can be found in the Readme file for the BIOS upgrade).

#### 2.1.1 Important information

### Information:

**Customized BIOS settings are deleted when upgrading BIOS.**

Before starting an upgrade, it helps to determine the various software versions.

##### 2.1.1.1 Which BIOS version and firmware are already installed on the 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 <Del>.
- From the BIOS main menu "Advanced", select "Main board/panel features".

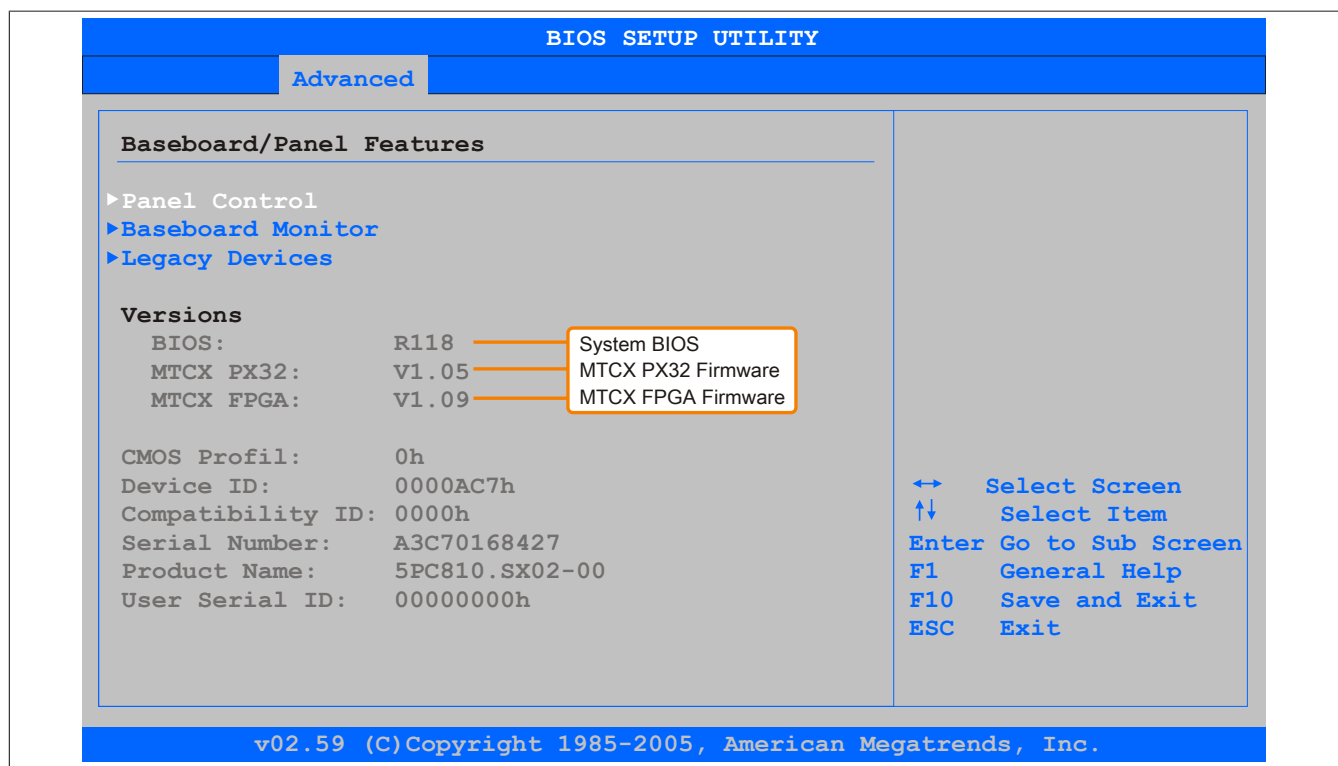


Figure 145: Software version

##### 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 <Del>.
- From the BIOS main menu "Advanced", select "Main board/panel features" and then "Panel control".

## Information:

The version can only be displayed when an Automation Panel with an AP Link SDL transmitter (5AC801.SDL0-00) is connected.

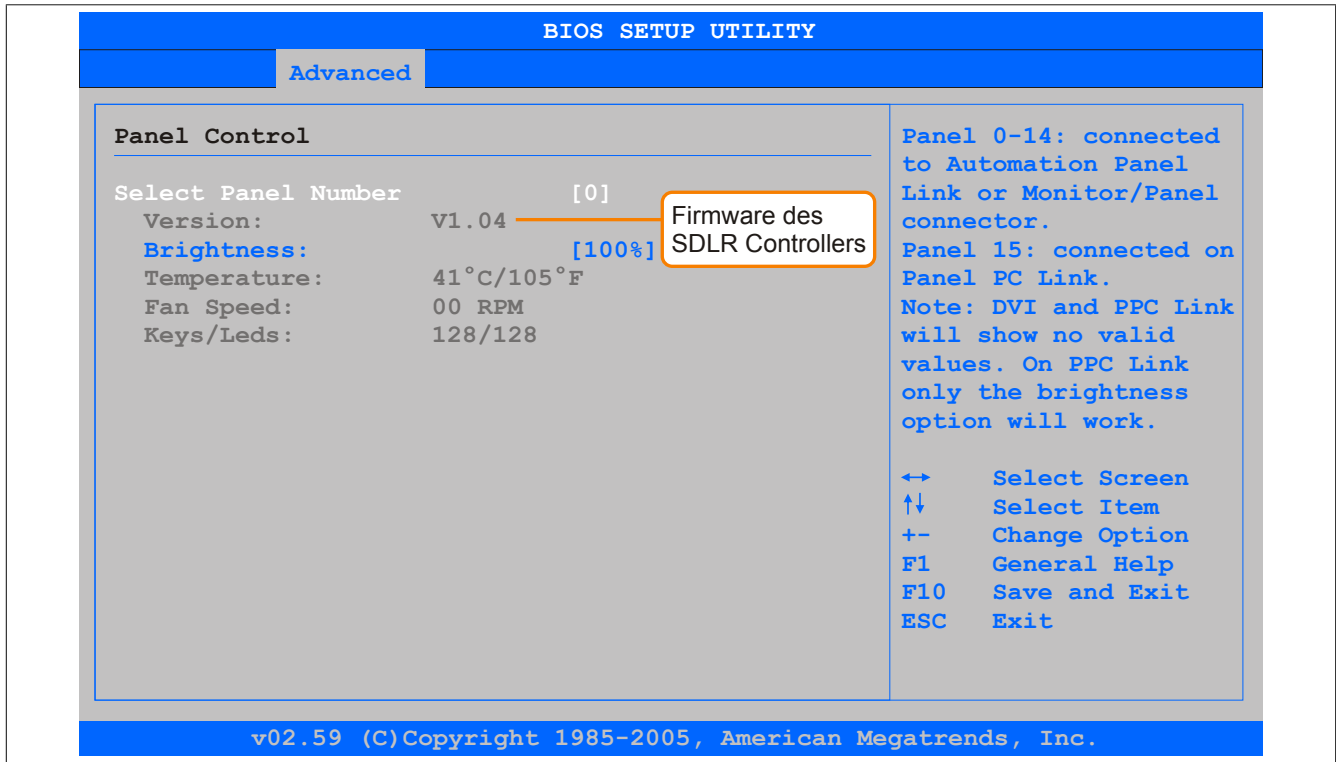


Figure 146: Firmware version of the AP Link SDL transmitter

### 2.1.2 Procedure with MS-DOS

1. Download the .zip file from the B&R website ([www.br-automation.com](http://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 285.

Information on creating a USB flash drive for a B&R upgrade can be found on page 287.

Information on creating a CompactFlash card for a B&R upgrade can be found on page 288.

3. Copy the contents of the .zip file to the bootable media. If the B&R upgrade was already added when creating the bootable media with the B&R Embedded OS Installer, then this step is not necessary.
4. Connect the bootable media to the B&R device and reboot.
5. The following boot menu will be shown after startup:

```
1. Upgrade AMI BIOS for B945
2. Exit
```

#### Concerning item 1:

BIOS is automatically upgraded (default after 5 seconds).

#### Concerning item 2:

Returns to the shell (MS-DOS).

**Information:**

**If you do not press a button within 5 seconds, then step 1 "Upgrade AMI BIOS for B945" is automatically carried out and the industrial PC is automatically updated.**

6. The system must be rebooted after a successful upgrade.
7. Reboot and press <Del> to enter the BIOS Setup screen and load the setup defaults, then select "Save changes and exit".

## 2.2 Firmware upgrade

The "Firmware upgrade (MTCX, SDLT, SDLR, UPS)" software makes it possible to update the firmware for multiple controllers (MTCX, SDLT, SDLR, UPSI) according to the structure of the APC810 system.

The latest firmware upgrade can be directly downloaded from the download area of the B&R website ([www.br-automation.com](http://www.br-automation.com)).

### 2.2.1 Procedure

To carry out a firmware upgrade, the following steps should be taken:

1. Download the .zip file from the B&R website ([www.br-automation.com](http://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 285.**

**Information on creating a USB flash drive for a B&R upgrade can be found on page 287.**

**Information on creating a CompactFlash card for a B&R upgrade can be found on page 288.**

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

```

#### Concerning item 1:

Automatically upgrade PX32 and FPGA for MTCX (default after 5 seconds).

#### Concerning item 2:

The FPGA of the SDLT controller on the AP Link slot is automatically updated.

#### Concerning item 3:

Submenu 1 is opened for upgrading the SDLR controller on the Monitor/Panel plug.

#### 3.1 Upgrade SDLR on AP 0 (AP800/AP900)

The SDLR controller is automatically updated on Automation Panel 0.

**3.2 Upgrade SDLR on AP 1 (AP800/AP900)**

The SDLR controller is automatically updated on Automation Panel 1.

**3.3 Upgrade SDLR on AP 2 (AP800/AP900)**

The SDLR controller is automatically updated on Automation Panel 2.

**3.4 Upgrade SDLR on AP 3 (AP800/AP900)**

The SDLR controller is automatically updated on Automation Panel 3.

**3.5 Upgrade all SDLR (AP800/AP900)**

All SDLR controllers are automatically updated on all Automation Panels on the Monitor/Panel (default after 5 sec).

**3.6 Return to Main Menu**

Returns to the main menu

**Concerning item 4:**

Submenu 2 is opened for upgrading the SDLR controller on the AP Link slot.

**4.1 Upgrade SDLR on AP 8 (AP800/AP900)**

The SDLR controller is automatically updated on Automation Panel 8.

**4.2 Upgrade SDLR on AP 9 (AP800/AP900)**

The SDLR controller is automatically updated on Automation Panel 9.

**4.3 Upgrade SDLR on AP 10 (AP800/AP900)**

The SDLR controller is automatically updated on Automation Panel 10.

**4.4 Upgrade SDLR on AP 11 (AP800/AP900)**

The SDLR controller is automatically updated on Automation Panel 11.

**4.5 Upgrade all SDLR (AP800/AP900)**

All SDLR controllers are automatically updated on all Automation Panels on the AP Link slot (by default, after 5 sec).

**4.6 Return to Main Menu**

Returns to the main menu

**Concerning item 5:**

Submenu 3 for the add-on UPS firmware and upgrade and the battery settings upgrade is opened.

**5.1 Upgrade Add-on UPS Firmware (5AC600.UPSI-00)**

The firmware for the add-on UPSI is updated.

**5.2 Upgrade Battery Settings (5AC600.UPSB-00)**

The battery settings for 5AC600.UPSB-00 are automatically updated.

**5.3 Return to Main Menu**

Returns to the main menu

**Concerning item 6:**

Returns to the shell (MS-DOS).

**Information:**

**The system must be powered off and 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 lower than or equal to V00.10 can no longer be combined with Automation Panel Link transceivers (5DLSDL.1000-01) or Automation Panel Link receivers (5DLSDL.1000-00) with a Firmware higher than or equal to V01.04. Daisy Chain mode is not possible with such a combination.
- If a UPS (e.g. 5AC600.UPSI-00) + battery unit (e.g. 5AC600.UPSB-00) is connected to the system and operable, then after an upgrade of the MTCX or SDLT you must either disconnect the battery or push the Power button (to put the system in Standby mode), before executing the required power off/on. If not, the firmware upgrade will not work because the UPS buffers the system.
- The function Legacy Mouse Support and Keyboard Controller Reset is only provided with the combination of MTCX PX32 V00.12 and MTCX FPGA V00.09 (included in 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".

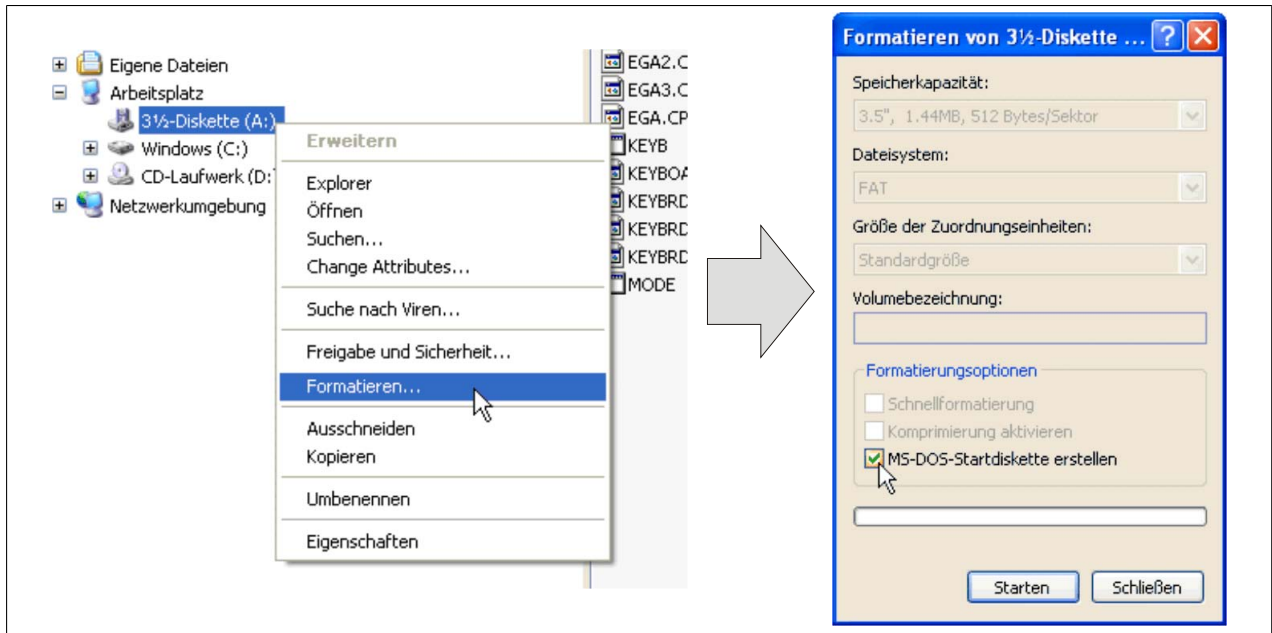


Figure 147: Creating a bootable diskette in Windows XP - Step 1

4. Select the **"Create an MS-DOS startup disk"** option, click on **"Start"** and acknowledge the warning message with "OK".

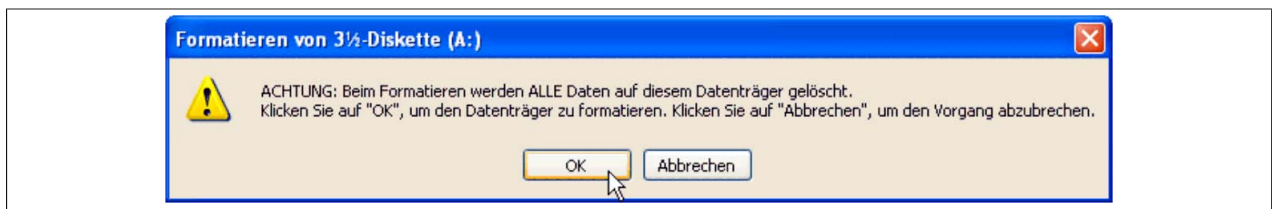


Figure 148: Creating a bootable diskette in Windows XP - Step 2



Figure 149: 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 150: Creating a bootable diskette in Windows XP - Step 4

Name	Größe	Typ	Geändert am
AUTOEXEC	1 KB	Stapelverarbeitungsdatei für MS-DOS	04.10.2004 15:14
COMMAND	91 KB	Anwendung für MS-DOS	08.06.2000 17:00
CONFIG	1 KB	Systemdatei	04.10.2004 15:14
DISPLAY	17 KB	Systemdatei	08.06.2000 17:00
EGA2.CPI	58 KB	CPI-Datei	08.06.2000 17:00
EGA3.CPI	58 KB	CPI-Datei	08.06.2000 17:00
EGA.CPI	58 KB	CPI-Datei	08.06.2000 17:00
IO	114 KB	Systemdatei	15.05.2001 18:57
KEYB	22 KB	Anwendung für MS-DOS	08.06.2000 17:00
KEYBOARD	34 KB	Systemdatei	08.06.2000 17:00
KEYBRD2	32 KB	Systemdatei	08.06.2000 17:00
KEYBRD3	31 KB	Systemdatei	08.06.2000 17:00
KEYBRD4	13 KB	Systemdatei	08.06.2000 17:00
MODE	29 KB	Anwendung für MS-DOS	08.06.2000 17:00
MSDOS	1 KB	Systemdatei	07.04.2001 13:40

Figure 151: 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](http://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.

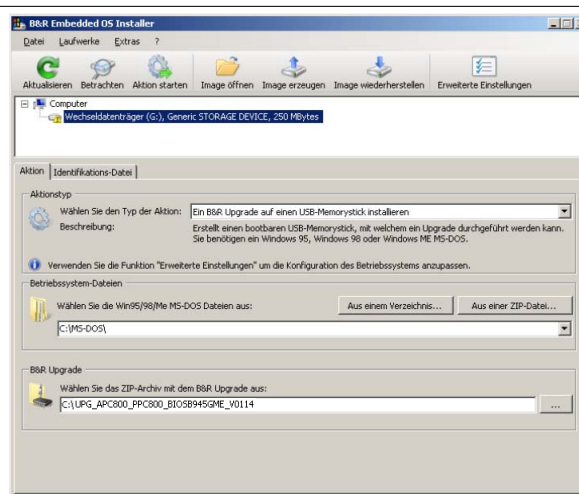


Figure 152: Creating a USB flash drive for B&R upgrade files

### 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 285. 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](http://www.br-automation.com)).

### 2.5.1 Requirements

The following peripherals are required for creating a bootable CompactFlash card:

- CompactFlash card
- B&R Industrial PC
- USB media drive
- B&R Embedded OS Installer (V3.10 or higher)

### 2.5.2 Procedure

1. Insert the CompactFlash card in the CF slot on the industrial PC.
2. If the drive list is not refreshed automatically, the list can be updated using the command **Drives > Refresh**.
3. Select the desired CompactFlash card from the drive list.
4. Change to the **Action** tab and select **Install a B&R Update to a CompactFlash card** as the type of action.
5. Enter the path to the MS-DOS operating system files. If the files are part of a .zip archive, then click on the button **From .zip file**. If the files are stored in a directory on the hard drive, then click on the button **From folder**.
6. In the **B&R upgrade** text box, it is also possible to enter the path to the .zip file for the B&R upgrade disk and select the file.
7. Click on the **Start action** button in the toolbar.

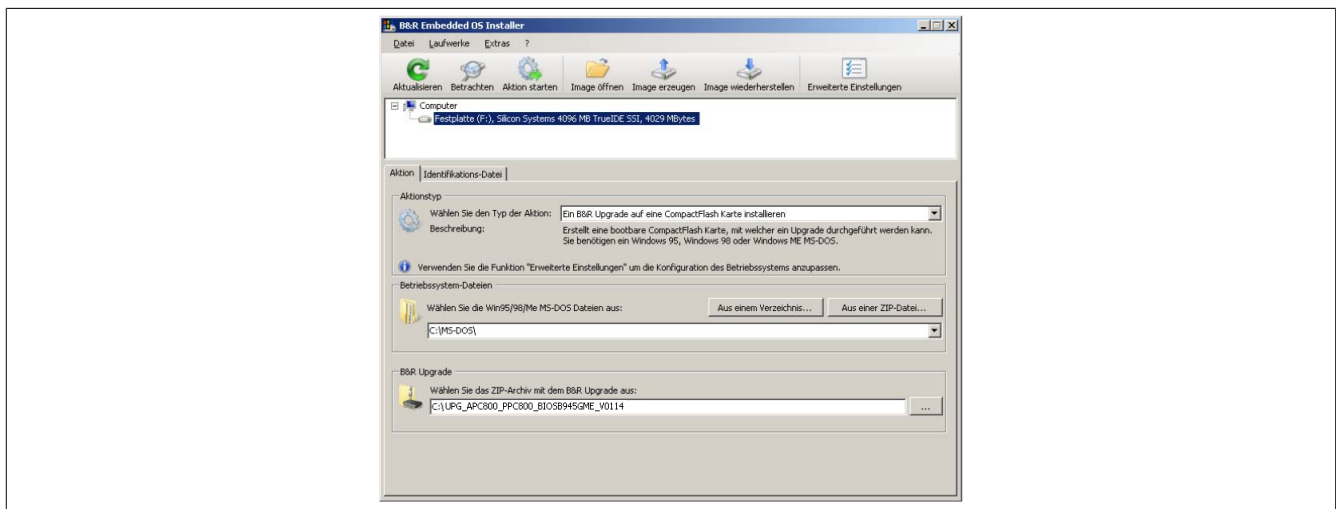


Figure 153: Creating a CompactFlash card for B&R upgrade files

### 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 285. 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
	<b>MS-DOS</b>	
9S0000.01-010	OEM Microsoft MS-DOS 6.22, German Floppy disks, only available with a new PC.	 <b>DOS622 English</b> Disk 1- Setup <b>Recovery Disk</b> Only allowed to be used for backup or archiving purposes for B&R automation devices! www.br-automation.com ©1983-2000 Microsoft Corporation. All rights reserved.
9S0000.01-020	OEM Microsoft MS-DOS 6.22, English Floppy disks, only available with a new PC.	

Table 239: 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 - no support
- USB 2.0 - only USB 1.1 rates can be achieved.
- A second graphics line (and therefore Extended Desktop mode) also cannot be used.
- A few "ACPI control" BIOS functions cannot be used.

### 3.3 Resolutions and color depths

The following table shows the tested resolutions and color depths on the Monitor / Panel connector with 945GME CPU boards.

Resolutions for DVI	Color depth		
	8-bit	16-bit	24-bit
640 x 480	✓	✓	✓
800 x 600	✓	✓	✓
1024 x 768	✓	✓	✓
1280 x 1024	✓	✓	✓

Table 240: 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 241: Tested resolutions and color depths for RGB signals

## 4 Windows XP Professional

### 4.1 Order data


Model number	Short description	Figure
	<b>Windows XP Professional</b>	
5SWWXP.0600-ENG	Microsoft OEM Windows XP Professional Service Pack 3, CD, English. Only available with a B&R device.	
5SWWXP.0600-GER	Microsoft OEM Windows XP Professional Service Pack 3, CD, German. Only available with a device.	
5SWWXP.0600-MUL	Microsoft OEM Windows XP Professional Service Pack 3, CD, multilanguage. Only available with a B&R device.	
5SWWXP.0500-ENG	Microsoft OEM Windows XP Professional Service Pack 2c, CD, English. Only available with a B&R device.	
5SWWXP.0500-GER	Microsoft OEM Windows XP Professional Service Pack 2c, CD, German. Only available with a B&R device.	
5SWWXP.0500-MUL	Microsoft OEM Windows XP Professional Service Pack 2c, CD, multilanguage. Only available with a B&R device.	

Table 242: 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](http://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 5PCI slot model

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 Si3531 SATA driver from the B&R website [www.br-automation.com](http://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](http://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
	<b>Windows 7 Professional/Ultimate</b>	
5SWWI7.1100-GER	Microsoft OEM Windows 7 Professional 32-bit, Service Pack 1, DVD, German. 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.	
5SWWI7.1200-GER	Microsoft OEM Windows 7 Professional 64-bit, Service Pack 1, DVD, German. 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.	
5SWWI7.1300-MUL	Microsoft OEM Windows 7 Ultimate 32-bit, Service Pack 1, DVD, multilanguage. Only available with a new device.	
5SWWI7.1400-MUL	Microsoft OEM Windows 7 Ultimate 64-bit, Service Pack 1, DVD, multilanguage. Only available with a new device.	

Table 243: 5SWWI7.1100-GER, 5SWWI7.1100-ENG, 5SWWI7.1200-GER, 5SWWI7.1200-ENG, 5SWWI7.1300-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
5SWWI7.1100-GER	Professional	APC510 APC511 APC810 APC910 PPC800 PP500	945GME GM45 QM77/HM76 NM10 US15W	SP1	32-bit	German	Optional		1 GB
5SWWI7.1100-ENG	Professional	APC510 APC511 APC810 APC910 PPC800 PP500	945GME GM45 QM77/HM76 NM10 US15W	SP1	32-bit	English	Optional		1 GB
5SWWI7.1200-GER	Professional	APC810 APC910 PPC800	945GME Intel® Core™2 Duo GM45 QM77/HM76	SP1	64-bit	German	Optional		2 GB
5SWWI7.1200-ENG	Professional	APC810 APC910 PPC800	945GME Intel® Core™2 Duo GM45 QM77/HM76	SP1	64-bit	English	Optional		2 GB
5SWWI7.1300-MUL	Ultimate	APC510 APC511 APC810 APC910 PPC800 PP500	945GME GM45 QM77/HM76 NM10 US15W	SP1	32-bit	Multilingual	Optional		1 GB
5SWWI7.1400-MUL	Ultimate	APC810 APC910 PPC800	945GME Intel® Core™2 Duo GM45 QM77/HM76	SP1	64-bit	Multilingual	Optional		2 GB



## 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](http://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 5PCI slot model

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](http://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](http://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
5SWWXP.0426-ENG	Microsoft OEM Windows XP Embedded Feature Pack 2007, English; for APC810 with 945GME chipset; please order CompactFlash separately (minimum 512 MB).	
	<b>Required accessories</b>	
	<b>CompactFlash</b>	
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 244: 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 245: Device functions in Windows XP Embedded with FP2007

## 6.5 Installation

Upon request, Windows XP Embedded can be preinstalled at B&R Austria 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](http://www.br-automation.com)). It is important that Enhanced Write Filter (EWF) is disabled for this.

### 6.6.1 Touch screen driver

The touch screen driver must be manually installed in order to operate Automation Panel 800 or Automation Panel 900 touch screen devices. The driver can be downloaded from the Download area of the B&R website ([www.br-automation.com](http://www.br-automation.com)). Be sure to check whether the "Enhanced Write Filter (EWF)" is enabled.

#### **Information:**

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

## 7 Windows Embedded Standard 2009

### 7.1 General information

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

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

### 7.2 Order data


Model number	Short description	Figure
	<b>Windows Embedded Standard 2009</b>	
5SWWXP.0726-ENG	Microsoft OEM Windows Embedded Standard 2009, English; for APC810 with 945GME chipset; please order CompactFlash separately (minimum 1 GB).	
	<b>Required accessories</b>	
	<b>CompactFlash</b>	
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 246: 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 247: 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 247: Device functions in Windows Embedded Standard 2009

## 7.5 Installation

Upon request, Windows Embedded Standard 2009 can be preinstalled at B&R Austria on a suitable CompactFlash card (min. 1GB). The system is then automatically configured when it is switched on for the first time. This procedure takes approximately 10 minutes, 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](http://www.br-automation.com)). It is important that Enhanced Write Filter (EWF) is disabled for this.

### 7.6.1 Touch screen driver

In order to operate Automation Panel 800 or Automation Panel 900 touch screen devices, you need to either install the touch screen driver manually and update the touch screen interface in the device manager. The driver can be downloaded from the Download area of the B&R website ([www.br-automation.com](http://www.br-automation.com)). Be sure to check whether the Enhanced Write Filter (EWF) is enabled.

### Information:

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

## 8 Windows Embedded Standard 7

### 8.1 General information

The successor to Windows® XP Embedded is Windows® Embedded Standard 7. As with previous versions, this embedded operating system offers full system support for B&R Industrial PCs. In addition to brand new features that are also included in Windows® 7 Professional, Windows® Embedded Standard 7 includes embedded components such as Enhanced Write Filter, File-Based Write Filter, Registry Filter and USB Boot. Windows® Embedded Standard 7 is available in two different versions. The main difference between them has to do with multilingual support. Windows® Embedded Standard 7 is only available in a single language, whereas Windows® Embedded Standard 7 Premium supports the installation of several languages simultaneously.

With Windows® Embedded Standard 7, Microsoft has made substantial improvements in the area of security. The AppLocker program, available in the premium version, can prevent the execution of unknown or potentially undesired applications that are being installed over a network or from drives that are directly connected. A tiered approach allows the differentiation between scripts (.ps1, .bat, .cmd, .vbs and .js), installation files (.msi, .msp) and libraries (.dll, .ocx). AppLocker can also be configured to record undesired activity and display it in the Event Viewer. Windows® Embedded Standard 7 is available in both a 32-bit and 64-bit version.<sup>5)</sup> This ensures that even the most demanding applications have the level of support they need.

### 8.2 Order data


Model number	Short description	Figure
	<b>Windows Embedded Standard 7</b>	
5SWWI7.1526-ENG	Microsoft OEM Windows Embedded Standard 7 32-bit, Service Pack 1, English; for APC810 with 945GME chipset; please order CompactFlash separately (minimum 16 GB).	
5SWWI7.1626-ENG	Microsoft OEM Windows Embedded Standard 7 64-bit, Service Pack 1, English; for APC810 with 945GME chipset; please order CompactFlash separately (minimum 16 GB).	
5SWWI7.1726-MUL	Microsoft OEM Windows Embedded Standard 7 Premium 32-bit, Service Pack 1, Multilanguage; for APC810 with 945GME chipset; please order CompactFlash separately (minimum 16 GB).	
5SWWI7.1826-MUL	Microsoft OEM Windows Embedded Standard 7 Premium 64-bit, Service Pack 1, multilanguage; for APC810 with 945GME chipset; please order CompactFlash separately (minimum 16 GB).	
	<b>Required accessories</b>	
	<b>CompactFlash</b>	
5CFCRD.016G-06	CompactFlash 16 GB B&R (SLC)	
5CFCRD.032G-06	CompactFlash 32 GB B&R (SLC)	
	<b>Optional accessories</b>	
	<b>Windows Embedded Standard 7</b>	
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 248: 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 system	Chipset	Service Pack	Architecture	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 <sup>1)</sup>	1 GB
5SWWI7.1826-MUL	Premium	APC810	945GME Intel® Core™2 Duo	SP1	64-bit	Multilingual	Optional	16 GB <sup>1)</sup>	2 GB

1) The memory space needed for additional language packs is not included in the minimum size specified for the data storage medium.

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

The following list of features shows the most important device functions included in Windows Embedded Standard 7.

Function	Windows Embedded Standard 7	Windows Embedded Standard 7 Premium
Enhanced Write Filter (EWF)	✓	✓
File-Based Write Filter (FBWF)	✓	✓
Administrator accounts	✓	✓
User accounts	Configurable	Configurable
Windows Explorer shell	✓	✓
Registry filter	✓	✓
Internet Explorer 8.0	✓	✓
Internet Information Service (IIS) 7.0	✓	✓
Anti-malware (Windows Defender)	-	✓
Add-ons (Snipping Tool, Sticky Notes)	-	✓
Windows Firewall	✓	✓
.NET Framework 3.5	✓	✓
32-bit and 64-bit	✓	✓
Remote Desktop Protocol 7.0	✓	✓
File Compression Utility	✓	✓
Windows Installer Service	✓	✓
Windows XP Mode	-	-
Media Player 12	✓	✓
DirectX	✓	✓
Multilingual user interface packs in the same image	-	✓
International components and language services	✓	✓
Language pack setup	✓	✓
Windows Update	Configurable	Configurable
Windows PowerShell 2.0	✓	✓
BitLocker	-	✓
AppLocker	-	✓
Tablet PC support	-	✓
Windows Touch	-	✓
Boot from USB flash drive	✓	✓
Accessories	✓	✓
Page file	Configurable	Configurable
Number of fonts	134	134

Table 249: Device functions in Windows Embedded Standard 7

## 8.5 Installation

Upon request, B&R can preinstall Windows Embedded Standard 7 on a suitable desired 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](http://www.br-automation.com)). It is important that Enhanced Write Filter (EWF) is disabled for this.

### 8.6.1 Touch screen driver

A touch screen driver will be installed automatically if a touch controller is detected during the Windows Embedded Standard 7 installation. If a touch controller is not detected during Windows Embedded Standard 7 installation, or if an Automation Panel 800/900 is connected later on, then the touch screen driver needs to be installed manually or the additional touch screen interface must be selected in the touch screen settings in the Windows Control Panel. The driver can be downloaded from the Download area of the B&R website ([www.br-automation.com](http://www.br-automation.com)). It is important that both the Enhanced Write Filter (EWF) and the File Based Write Filter (FBWF) are disabled for this.

#### **Information:**

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



## 9 Windows CE

### 9.1 General information

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

### 9.2 Order data


Model number	Short description	Figure
5SWWCE.0826-ENG	Microsoft OEM Windows CE 6.0 Professional, English; for APC810 with 945GME chipset; please order CompactFlash separately (minimum 128 MB).	
	<b>Required accessories</b>	
	<b>CompactFlash</b>	
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 250: 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](http://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 <sup>1)</sup>
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 <sup>2)</sup> , 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 251: Windows CE 6.0 features

1) The color depth depends on the display used.

2) Use the function "Compress Windows CE Image" in the B&R Embedded OS Installer to reduce the image size.

## 9.5 Requirements

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

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

## 9.6 Installation

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

## 9.7 B&R Embedded OS Installer

The B&R Embedded OS Installer allows you to install existing B&R Windows CE images. The 4 files (NK.BIN, BLDR, LOGOXRES.BMP, and LOGOQVGA.BMP) must be provided 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](http://www.br-automation.com)). Further information is available in the online help for the B&R Embedded OS Installer.

## 10 Automation Runtime

### 10.1 General information

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

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

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

### 10.2 Order data


Model number	Short description	Figure
	<b>Windows-based Runtime</b>	
1A4600.10	B&R Automation Runtime ARwin, incl. License Label and Security Key	
1A4600.10-2	B&R Automation Runtime ARwin, ARNC0	
1A4600.10-3	B&R Automation Runtime ARwin+PVIControls incl. License Label and Security Key	
1A4600.10-4	B&R Automation Runtime ARwin+ARNC0+PVIControls	
1A4601.06	B&R Automation Runtime AREmb, incl. License Label and Security Key	
1A4601.06-2	B&R Automation Runtime AREmb, ARNC0	

Table 252: 1A4600.10, 1A4600.10-2, 1A4600.10-3, 1A4600.10-4, 1A4601.06, 1A4601.06-2 - Order data

### 10.3 Automation Runtime Windows (ARwin)

The system is supported by ARwin with an AS 2.7 / AR 2.xx upgrade.

### 10.4 Automation Runtime Embedded (AREmb)

The system is supported 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.

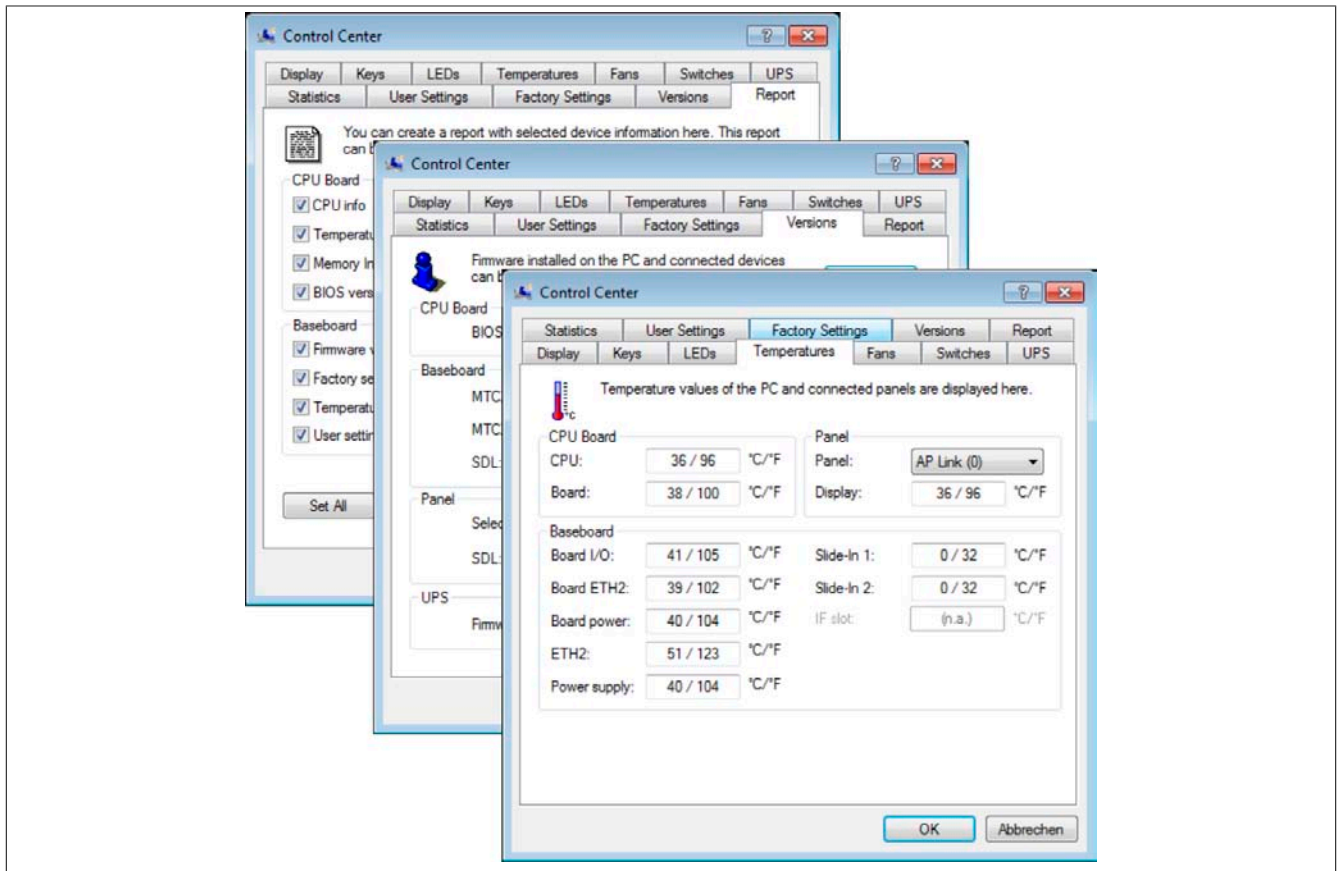


Figure 154: ADI Control Center screenshots - Examples

### Information:

The temperature and voltage values (e.g. CPU temperature, core voltage, battery voltage) displayed in the corresponding ADI window represent uncalibrated values for informational purposes. They cannot be used to draw any conclusions about hardware alarms or error conditions. The hardware components used have automatic diagnostic functions that can be applied in the event of error.

### 11.1 Functions

### Information:

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

- Changing display-specific parameters
- Reading device-specific keys
- Updating the key configuration
- Enabling device-specific LEDs on a membrane keypad
- Reading and calibrating input devices (e.g. key switches, handwheels, joysticks, potentiometers)
- Reading temperatures, fan speeds, statistical data and switch settings
- Read the operating hours (power on hours)
- Reading user and factory settings
- Reading software versions
- Updating and backing up BIOS and firmware
- Creating reports about the current system (support assistance)
- Setting the SDL equalizer value when adjusting SDL cables
- Changing the user serial ID

Supports the following systems:

- Automation PC 510
- Automation PC 511
- Automation PC 620
- Automation PC 810
- Automation PC 820
- Automation PC 910
- Panel PC 300
- Panel PC 700
- Panel PC 725
- Panel PC 800
- Power Panel 100/200
- Power Panel 300/400
- Power Panel 500
- Mobile Panel 40/50
- Mobile Panel 100/200
- Connected Automation Panel 800
- Connected Automation Panel 900

## 11.2 Installation

A detailed description of the Control Center can be found in the integrated online help documentation. The B&R Automation Device Interface (ADI) driver (also contains Control Center) is available in the Downloads section of the B&R website ([www.br-automation.com](http://www.br-automation.com)).

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

### Information:

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

**If a more current ADI driver version exists (see the Downloads section of the B&R website), it can be installed later. It is important that Enhanced Write Filter (EWF) is disabled for this.**

### 11.3 SDL Equalizer settings

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

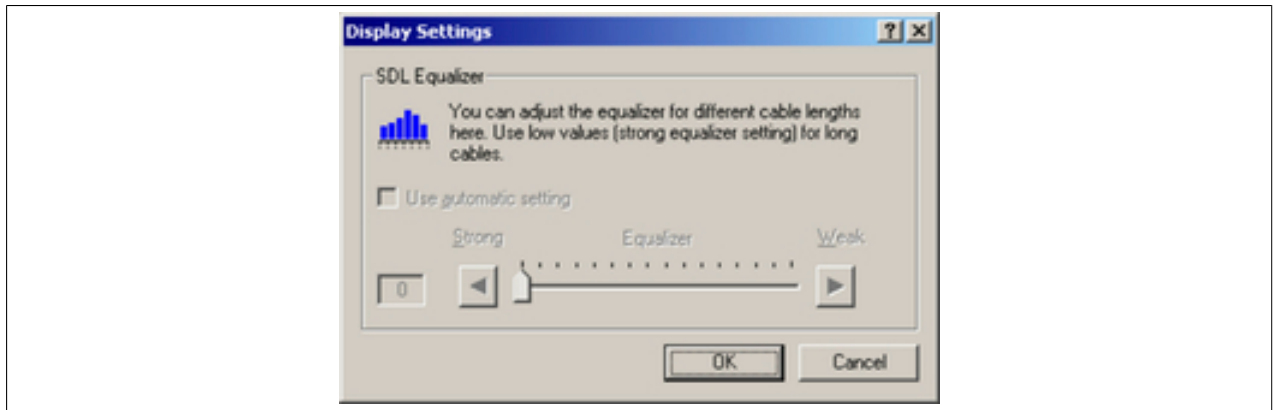


Figure 155: ADI Control Center - SDL equalizer settings

You can change the display's SDL equalizer settings in this dialog box. The equalizer is integrated into Automation Panel devices and adapts the DVI signal to various cable lengths. The equalizer value is automatically calculated based on the cable length. It is possible to set a different equalizer value in order to obtain the best possible display quality (e.g. in case of low-quality cables or poor DVI signal quality).

The value is optimally defined for the cable length when using the "Automatic setting".

The equalizer value can only be changed if the function is supported by Automation Panel 900 (starting with Panel Firmware version 1.04 or higher).

## 11.4 UPS configuration

Here you can view the status values for an optionally installed B&R add-on UPS as well as change, update or save the battery settings for the UPS. You can also configure the system settings for the UPS.

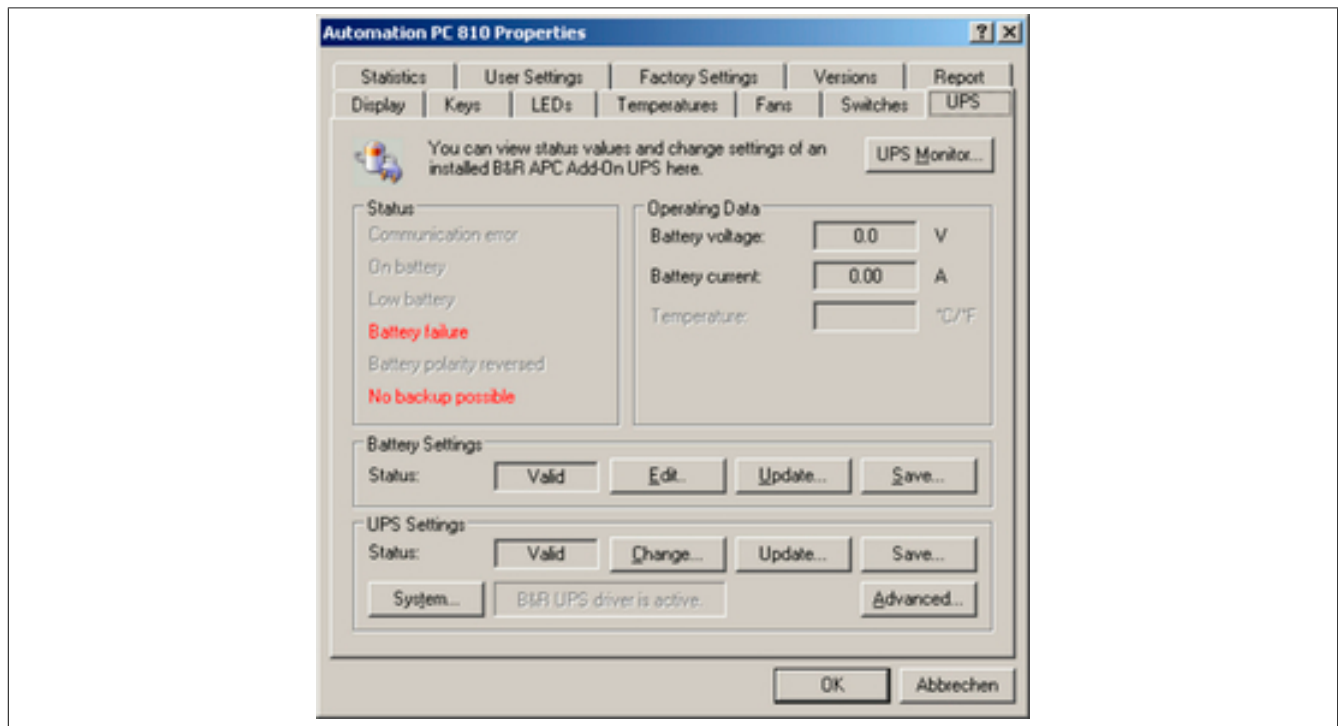


Figure 156: ADI Control Center - UPS settings

### Caution!

The installed UPS must be selected and configured in the Control Panel using the energy options in order for battery operation to be supported.

### Information:

The UPS service is supported starting with B&R Windows Embedded Version 2.10 or higher.

#### 11.4.1 Installing the UPS service for the B&R add-on UPS

1. Open the **Control Center** in the **Control Panel**.
2. Select the **UPS** tab.
3. Under **UPS settings**, click on **System**. This opens the **Power Options** in the Control Panel. (The **Power Options** can also be opened directly from the **Control Panel**.)
4. Go to the **UPS** tab and click **Select...**
5. Choose 'Bernecker + Rainer' as the manufacturer and 'APC Add-on UPS' as the model and then click **Finish**. The value for the COM connection is only required for a serially connected UPS and is ignored by the APC add-on UPS driver.
6. Click on **Apply** to start the UPS service. After a few seconds the UPS status and details are displayed.
7. Click **OK**.

The text field beside **System** (on the **UPS** tab in the **Control Center**) also indicates whether the B&R UPS driver is active.

### Information:

Administrator rights are required in order to change the energy options or display the UPS status.

#### 11.4.2 Displaying the UPS default values

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

The displayed values are updated automatically.

### Information:

The status "reversed battery polarity" is only displayed in UPS firmware Version 1.08 or higher.

In UPS firmware Version 1.07 or smaller, a change between battery operation and normal operation can lead to communication errors.

3. Select UPS monitor to display UPS status changes since the last time the system or UPS driver was started.

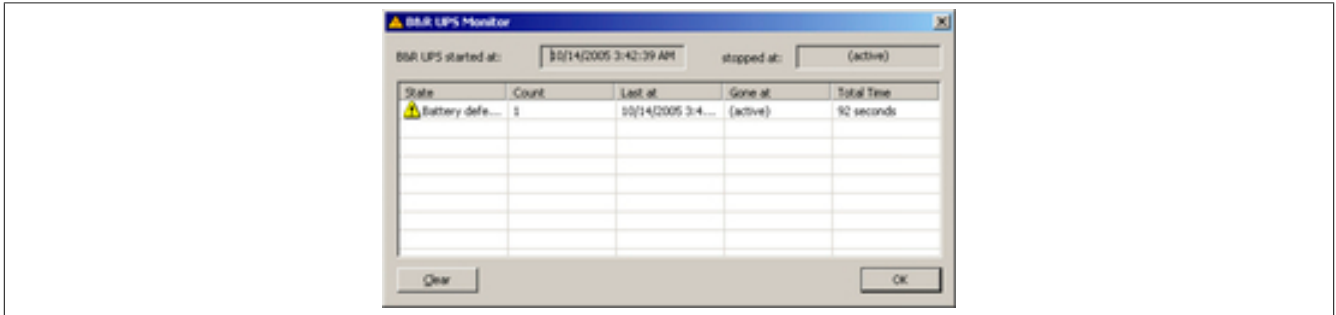


Figure 157: ADI Control Center - UPS monitor

The dialog box is updated automatically when the status changes.

To remove a status from the list, click on **Delete**.

### Information:

The current status of the UPS is also displayed when the UPS service is started in the Windows Control Panel on the UPS page in the energy options.

### Information:

In a German version of Windows XP Professional the battery status is displayed as "low" in the energy options, even if the battery is OK (Windows error). In an English version, three battery status levels are displayed: unknown, OK, replace A low battery status is never displayed.

#### 11.4.3 Changing UPS battery settings

1. Open the **Control Center** in the **Control Panel**.
2. Select the **UPS** tab.
3. Under **Battery settings**, click on **Edit**. This opens the "Open" dialog box.
4. Select and **open** the file containing the battery settings.





Figure 158: ADI Control Center - UPS battery settings

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

Click **OK** to write the changed settings to the file. The battery settings for the UPS can then be updated with this file.

### Information:

To make settings for batteries not from B&R, it is best to make a copy of a file with battery settings from B&R under a new name and make adjust the settings in this file for the battery being used.

Current files with settings for batteries from B&R can be updated using B&R's "Upgrade PPC800 MTCX" software.

### Information:

- The current UPS firmware version 1.10 does not use charge end voltage, deep discharge voltage, lifespan and deep discharge cycles.
- Lifespan is only included in version 2 (and higher) of the UPS battery settings and only valid for B&R UPS batteries at 25°C ambient temperature.
- Deep discharge cycles are only included in version 3 (and higher) of the UPS battery settings and only valid for B&R UPS batteries.

### Information:

If you would like to change the current battery settings on the UPS, they must first be saved in a file.

#### 11.4.4 Updating the UPS battery settings

1. Open the **Control Center** in the **Control Panel**.
2. Select the **UPS** tab.
3. Under **Battery settings**, click on **Update**. Clicking on "Open" opens a dialog box.
4. Select and **open** the file containing the battery settings. The "Download" dialog box is opened.

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

### Information:

- The UPS cannot be operated while updating the battery settings.
- If the transfer is interrupted, then the procedure must be repeated until the battery settings have been updated successfully. Otherwise battery operation will no longer be possible.

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

### Information:

The UPS is automatically restarted after a successful download. This can cause a brief failure in the UPS communication.

#### 11.4.5 Saving the UPS battery settings

1. Open the **Control Center** in the **Control Panel**.
2. Select the **UPS** tab.
3. Under Battery settings, click on **Save**. "Save under" dialog box opened.
4. Enter a file name or select an existing file and click on **Save**.

### Information:

UPS settings can only be saved using UPS firmware version 1.10 and higher.

The transfer can be aborted by clicking on **Cancel** in the Download dialog box.

#### 11.4.6 Configuring UPS system settings

1. Open the **Control Center** in the **Control Panel**.
2. Select the **UPS** tab.
3. Under **UPS settings**, click on **Change**. This opens the following dialog box:

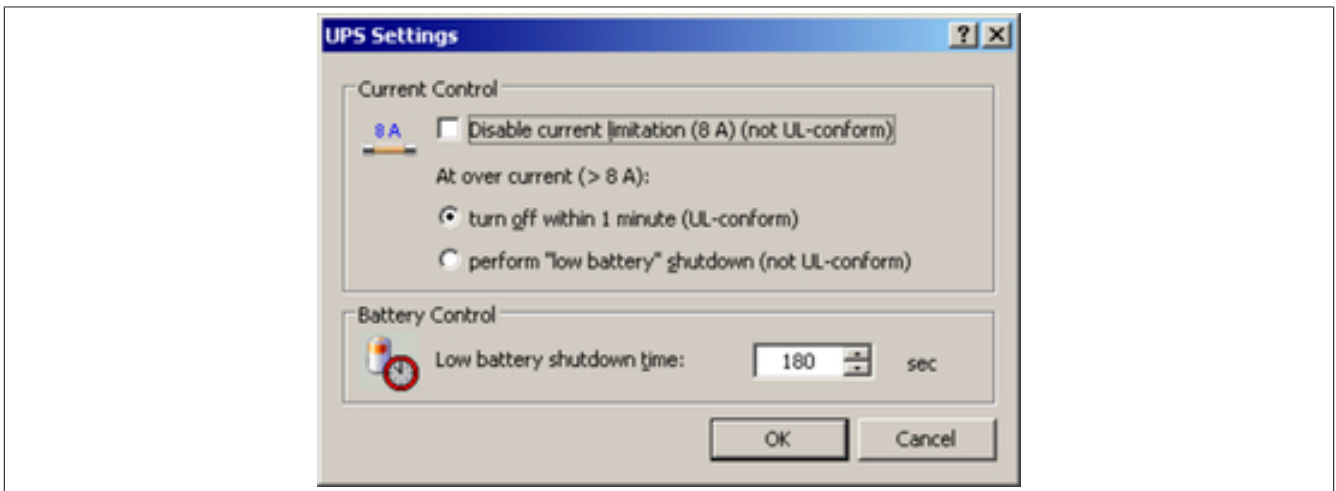


Figure 159: ADI Control Center - UPS settings

Further information regarding the UPD system settings can be found in the Windows help.

### Information:

- UPS settings can only be changed using UPS firmware version 1.10 and higher. If there are no changed settings on the UPS, then the factory or default settings are used.
- The UPS is automatically restarted after UPS settings have been changed. This can cause a brief disruption in communication with the UPS.
- Administrator rights are required in order to change the energy options or display the UPS status.

#### 11.4.6.1 Disabling 8 A current limitation

##### Information:

It is not UL compliant to switch off the 8 A current limitation on devices during battery operation!

"Low Battery" shutdown caused by an overcurrent > 8 A on devices during battery operation is not UL compliant!

Select the checkbox **Disable current limitation (8 A)**.

If current limitation is enabled (checkbox deselected), then the UPS uses battery operation to check whether the UPS battery is discharged with 8 A for longer than 16 seconds. If so, then an overcurrent alarm is sent to the PC.

##### Information:

**Current limitation is only supported with UPS firmware version 1.10 and higher.**

Enabling one of the two following options determines how the UPS should perform when an overcurrent alarm occurs:

If **Turn-off within 1 minute** is selected, then the UPS will turn-off within one when an overcurrent alarm occurs.

##### Warning!

**The operating system will not be properly shut down if an overcurrent alarm occurs!**

If **Perform "low battery" shutdown** is selected, then the UPS will also signal a "Low battery alarm" in addition to the overcurrent alarm and will turn off after the defined **Low battery shutdown time**. This will allow the operating system to shut down properly when UPS service is enabled.

#### 11.4.6.2 Changing the shutdown time of the UPS when the battery is low

Enter the **"Low Battery" shutdown time** in seconds. This is the amount of time that the UPS will wait before shutting off the power supply when the battery level is low.

This prevents the UPS battery from becoming too discharged if the Windows UPS service is not enabled and the UPS is therefore not turned off by the operating system.

If the UPS service is enabled, then the UPS will be turned off by the operating system when the battery level is low, based on the Windows UPS service **Shutdown time** ( see "Changing additional UPS settings" on page 311). The **Low Battery shutdown time** will then be ignored.

##### Information:

- The low battery shutdown time must be set to at least 60 seconds, so that the operating system has enough time to send the shutdown command to the UPS when the battery level is low (normally occurs after approximately 30 seconds).
- The low battery shutdown time can only be set in UPS firmware version 1.10 and later. UPS firmware version 1.08 always uses a turn off delay time of 180 seconds. UPS firmware versions earlier than 1.08 do not shut down automatically when the battery level is low.

#### 11.4.7 Changing additional UPS settings

1. Open the **Control Center** in the **Control Panel**.
2. Select the **UPS** tab.
3. Under **UPS settings**, click on **Advanced**. This opens the following dialog box:

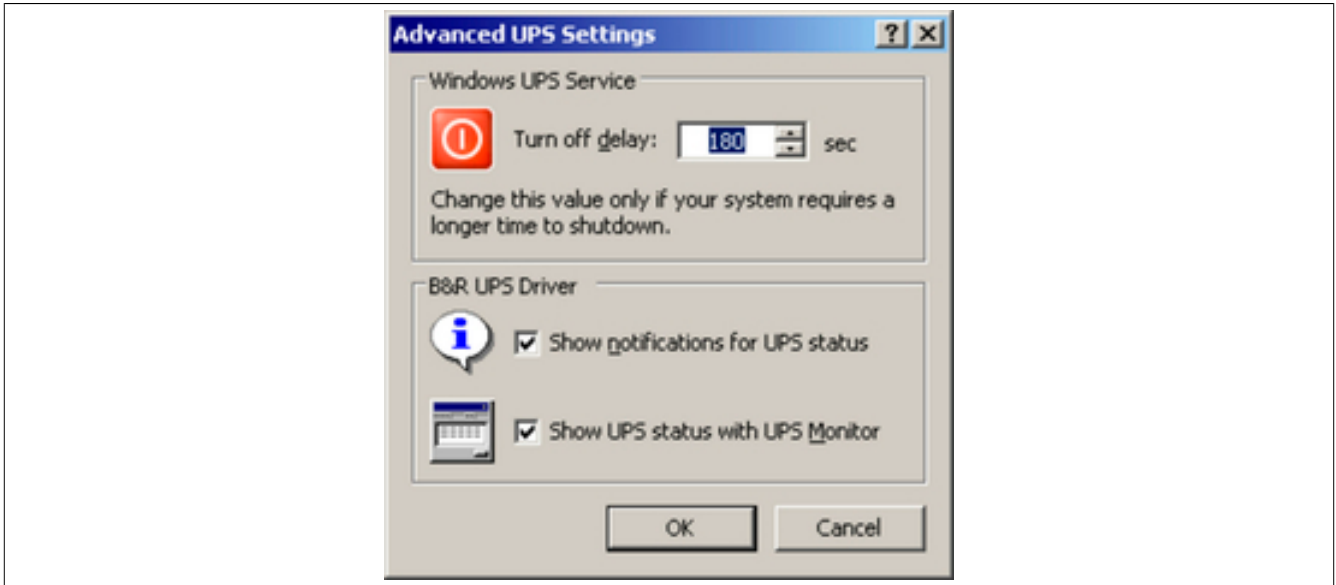


Figure 160: ADI Control Center - Advanced UPS settings

### Information:

Administer rights are required in order to display this dialog box.

#### 11.4.7.1 Changing the UPS shutdown time

Under **Windows UPS service** you can enter the **shutdown time** in seconds. This is the length of time that the UPS waits before switching off the power supply. When a critical alarm occurs (e.g. at low battery level), the Windows UPS service will send a shutdown command with the turn off delay time to the UPS and will shut down the system.

### Information:

This time is evaluated by the Windows UPS Service, but can not be set in the UPS system settings of the energy options. This value should only be changed if the system requires longer than the default setting of 180 seconds to shut down.

### Caution!

The time entered must be longer than the time required to shut down the operating system.

#### 11.4.7.2 Activate UPS messages

Under **B&R UPS driver**, activate the checkbox **UPS status messages**. Any changes to the UPS status will then trigger a message from the B&R UPS driver.

### Information:

Shutting down the system is only reported by the Windows UPS Service. The UPS Service also sends other messages if they are activated in the UPS system settings energy options. These messages are only displayed when the Windows Alerter (Messenger)<sup>6)</sup> is active and the PC is connected to a network. Additionally, some conditions of the B&R add-on UPS are not detected by the Windows UPS Service, and therefore do not trigger messages (e.g. when there are no battery settings on the UPS). The Windows services can be found by opening the Control Panel and selecting "Services" from the Administrative Tools.

If the checkbox **Display UPS status with UPS monitor** is also activated, a new message is not displayed for every change, but only a general message and request for you to start the B&R UPS monitor. As long as the UPS monitor is active, no new messages are displayed.

### Information:

Regardless of these options, all changes to the UPS status are logged in Windows event protocol (under "Application").

6) The Windows Alerter is supported starting with B&R Windows Embedded Version 2.20 or higher.

## 11.4.8 Procedure following power failure

### 11.4.8.1 Overcurrent Shutdown

If an overcurrent > 8 A is present during battery operation for a duration of 16 seconds, the overcurrent shutdown is executed. A turn-off time of one minute is available to the system.

If the supply is regenerated during this time, then the shut down process is aborted.

#### **Information:**

**The overcurrent shutdown has the highest priority.**

### 11.4.8.2 Low Battery Shutdown

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

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

### 11.4.8.3 Standard Shutdown

The standard shutdown is effective when the UPS service is active, the turn-off time is 3 minutes by default.

If the supply voltage returns during the turn-off time, then the shutdown procedure will be stopped.

If the supply voltage returns during the shutdown process, then the shutdown timer will run until the B&R industrial PC enters standby mode and will then reboot the system.

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

This software can be used to access B&R Automation Device Interface (ADI) functions directly from Windows applications created in one of the following development environments:

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

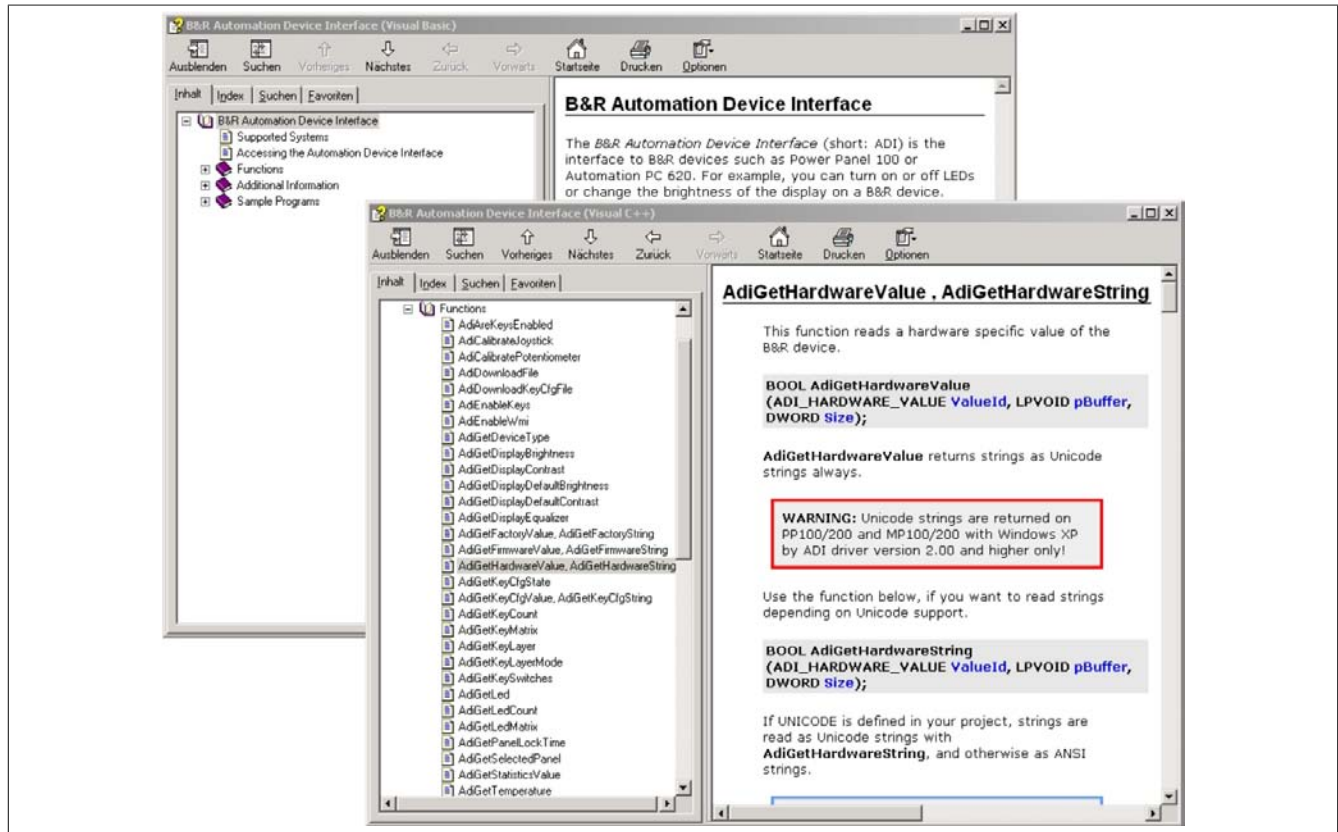


Figure 161: ADI Development Kit screenshots (version 3.40)

### Features:

- One Microsoft Visual Basic module with ADI function declarations
- Header files and import libraries for Microsoft Visual C++
- Help files for Visual Basic and Visual C++
- Sample projects for Visual Basic and Visual C++
- ADI DLL (for application testing if no ADI driver is installed)

### Supports the following systems (version 3.40 and higher):

- Automation PC 510
- Automation PC 511
- Automation PC 620
- Automation PC 810
- Automation PC 820
- Automation PC 910
- Panel PC 300
- Panel PC 700
- Panel PC 800
- Power Panel 100/200
- Power Panel 300/400
- Power Panel 500
- Mobile Panel 40/50

- Mobile Panel 100/200

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

A detailed description of how to use ADI functions can be found in the online help documentation.

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

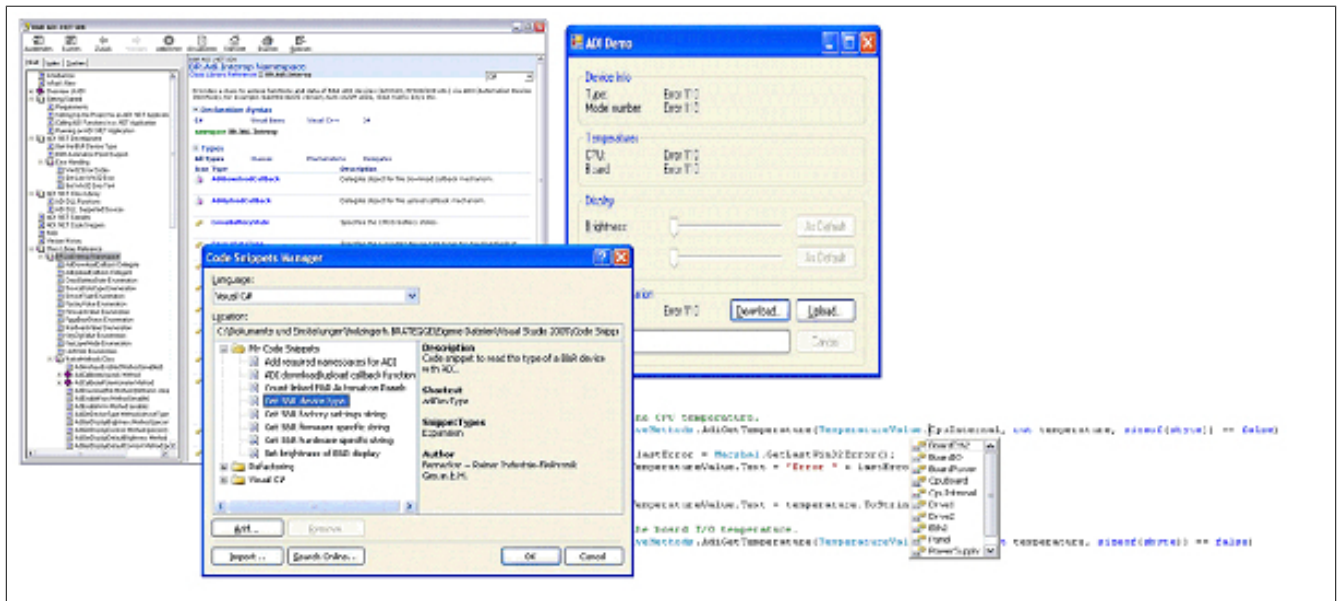


Figure 162: ADI .NET SDK screenshots (version 1.80)

Features (version 1.80 and higher)

- ADI .NET class library
- Help files in HTML Help 1.0 format (.chm file) and MS Help 2.0 format (.HxS file). (Help documentation is in English)
- Sample projects and code snippets for Visual Basic, Visual C++ and Visual C#
- ADI DLL (for application testing if no ADI driver is installed)

Supports the following systems (version 1.80 and higher):

- Automation PC 510
- Automation PC 511
- Automation PC 620
- Automation PC 810
- Automation PC 820
- Automation PC 910
- Panel PC 300
- Panel PC 700
- Panel PC 800
- Power Panel 100/200
- Power Panel 300/400
- Power Panel 500
- Mobile Panel 40/50
- Mobile Panel 100/200



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

A detailed description of how to use ADI functions can be found in the online help documentation.

The ADI .NET SDK is available in the Downloads section of the B&R website ([www.br-automation.com](http://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.

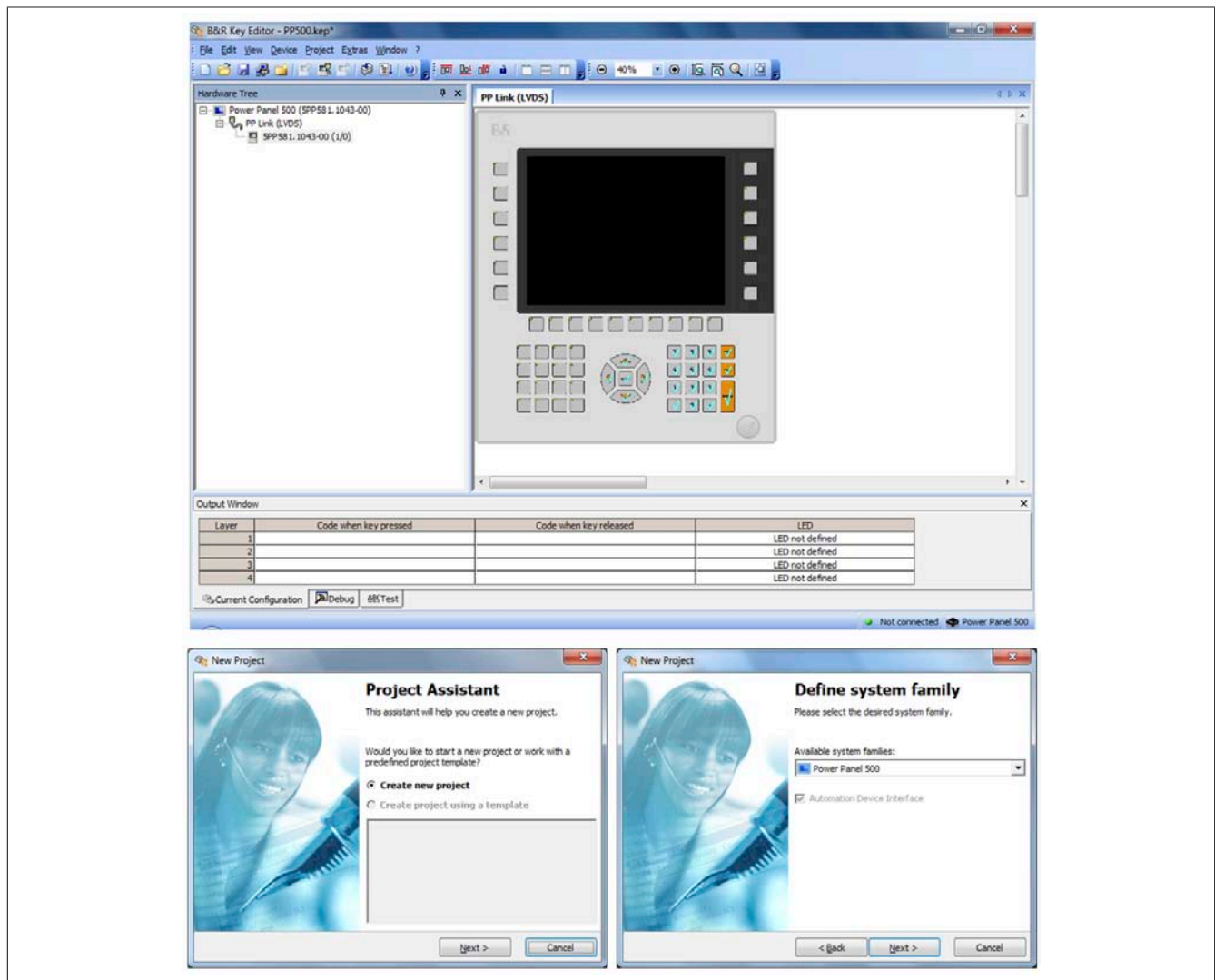


Figure 163: Screenshots of the B&R Key Editor V3.30

### Features:

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

Supports the following systems (version 3.30):

- Automation PC 510
- Automation PC 511
- Automation PC 620
- Automation PC 810
- Automation PC 820
- Automation PC 910
- Automation Panel 800
- Automation Panel 830
- Automation Panel 900

- IPC2000, IPC2001, IPC2002
- IPC5000, IPC5600
- IPC5000C, IPC5600C
- Mobile Panel 40/50
- Mobile Panel 100/200
- Panel PC 300
- Panel PC 700
- Panel PC 800
- Power Panel 100/200
- Power Panel 300/400
- Power Panel 500

A detailed guide for configuring keys and LEDs can be found in the B&R Key Editor's online help documentation. The B&R Key Editor is available at no cost in the Downloads section of the B&R website ([www.br-automation.com](http://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

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### 1 Standards and guidelines

#### 1.1 CE mark



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 standard - Immunity to disturbances in the industrial sector
EN 61000-6-4:2007	Electromagnetic compatibility (EMC) - part 6-4: Generic standards; General emission standard for industrial environments

#### 1.3 Low-voltage directive

These devices meet 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	Machine safety - electrical equipment on machines - Part 1: General requirements

## 2 Certifications

### Danger!

**A fully assembled device can only receive certification if ALL of the individual components it includes have the applicable certifications. If an individual component is being used that DOES NOT have an applicable certification, then the fully assembled device will NOT RECEIVE certification.**

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

Unless otherwise specified, the following certifications apply:

### 2.1 UL certification



Products with this label have been certified by Underwriters Laboratories and are listed as "Industrial Control Equipment". This mark is valid for the USA and Canada and simplifies the certification of your machines and systems in these areas.

Underwriters Laboratories (UL) in accordance with the UL508 standard - 17th Edition  
Canadian (CSA) standard in accordance with C22.2 No. 142-M1987

### 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. The 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 the 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 being accidentally started. Defective devices must be exchanged 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 suitability for Class I, Division 2!**

**Explosion hazard - Plugs must not be disconnected while voltage is applied or only disconnected when in non-hazardous areas.**

### **Warning!**

**Only non-transmitting USB devices are permitted according to the operating manual!**

### Conformity test and certification

Devices marked "Ex" conform to the guidelines 2004/108/EG and 94/9/EWG, 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" correspond to the requirements of 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](http://www.br-automation.com) or from 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 affects devices that are protected from weather. EMC 1 defines the line and radiation 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 or PCI Express depending on the 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 sockets for SO-DIMM DDR2 modules (max. total of 3 GB), Realtek Ethernet Controller RTL8111B.	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 system unit 5PC810.SX01-00	D0
5PC810.FA02-01	APC810 fan kit for system unit 5PC810.SX02-00 starting with revision 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 slide-in SATA drive.	D0
5AC801.DVRS-00	DVD-R/RW DVD+R/RW slide-in SATA drive.	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 hard disk (slide-in compact); 24/7 hard disk with extended temperature range. Note: Please see 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 drive.	E0
5AC801.SSDI-01	60 GB slide-in compact SATA SSD (MLC).	C0
5AC801.SSDI-02	180 GB slide-in compact SATA SSD (MLC).	C0
5AC801.SSDI-03	60 GB slide-in compact SATA SSD (MLC).	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	24 VDC supply voltage plug, 3-pin female, 3.31 mm <sup>2</sup> screw clamp, protected against vibration by the screw flange	D0
0TB103.91	24 VDC supply voltage plug, 3-pin female, 3.31 mm <sup>2</sup> cage clamp, protected against vibration by the screw flange	D0
5CFCRD.0064-03	CompactFlash 64 MB Western Digital (SLC)	E0
5CFCRD.0128-03	CompactFlash 128 MB Western Digital (SLC)	E0

Table 253: Revision of individual components with GL certification

Model number	Description	GL beginning with rev.
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	Adapter DVI (plug) to CRT (socket). For connecting a standard monitor to a DVI-I interface.	C0

Table 253: 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
	
 	
<b>Germanischer Lloyd</b> 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 164: 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 fully assembled device when operated with other individual components. When operating the fully assembled device, the specifications for the individual components must be adhered to.

All components listed in this manual have been subjected to extensive system and compatibility testing and are approved for use. B&R can make no guarantee regarding the functionality of non-approved accessories.

### 1 Replacement CMOS batteries

#### 1.1 0AC201.91 / 4A0006.00-000

##### 1.1.1 General information

This lithium battery is needed to back BIOS CMOS data and the real-time clock (RTC).

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

##### 1.1.2 Order data


Model number	Short description	Figure
	<b>Batteries</b>	
0AC201.91	Lithium batteries 4 pieces, 3 V / 950 mAh button cell Hereby we declare that the Lithium cells contained in this shipment qualify as „partly regulated“. Handle with care. If the package is damaged, inspect cells, repack intact cells and protect cells against short circuits. For emergency information, call RENATA SA at + 41 61 319 28 27	
4A0006.00-000	Lithium battery, 3 V / 950 mAh, button cell	

Table 254: 0AC201.91, 4A0006.00-000 - Order data

##### 1.1.3 Technical data

#### Warning!

The battery must be replaced by a Type CR2477N Renata battery only. The use of another battery may present a risk of fire or explosion.

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

#### Information:

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

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

Table 255: 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 255: 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
	<b>Terminal blocks</b>	
0TB103.9	Connector, 24 VDC, 3-pin female, screw clamps 3.31 mm <sup>2</sup> , protected against vibration by the screw flange	
0TB103.91	Connector, 24 VDC, 3-pin female, cage clamps 3.31 mm <sup>2</sup> , protected against vibration by the screw flange	

Table 256: 0TB103.9, 0TB103.91 - Order data

#### 2.1.3 Technical data

##### Information:

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

Product ID	0TB103.9		0TB103.91	
General information				
Certification	Yes Yes Yes			
CE				
cULus				
GL				
Terminal block				
Note	Protected against vibration by the screw flange Rated values according to UL			
Number of pins	3 (female)			
Type of terminal clamp	Screw clamps		Cage clamps <sup>2)</sup>	
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 <sup>1)</sup>	10 A / contact			
Contact resistance	≤ 5 mΩ			

Table 257: 0TB103.9, 0TB103.91 - Technical data

1) The limit data for each I/O module must be taken into consideration.

2) The terminal block in the cage clamp design cannot be strung together.

## 3 Replacement fan

### 3.1 General information

#### Information:

The fan filters are subject to wear, and should be checked with appropriate frequency to determine whether the air flow provides sufficient cooling. An exchange or cleaning of the filter kit is appropriate at that time.

### 3.2 Order data


Model number	Short description	Figure
	<b>Accessories</b>	
5AC801.FA01-00	Fan filter for APC810 5 pcs. (spare part), for 5PC810.SX01-00.	
5AC801.FA02-00	Fan filter for APC810 5 pcs. (spare part), for 5PC810.SX02-00.	
5AC801.FA03-00	Fan filter for APC810 5 pcs. (spare part), for 5PC810.SX03-00.	
5AC801.FA05-00	Fan filter for APC810 5 pcs. (spare part), for 5PC810.SX05-00.	

Table 258: 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	Adapter DVI (male) to CRT (female). For connecting a standard monitor to a DVI-I interface.	

Table 259: 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. To make this possible, the following is very important:

- Flash technology used
- Efficient algorithm for maximizing the lifespan
- Good mechanisms for detecting and fixing errors in the flash memory

#### 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 lifespan that is 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 lifespan of a CompactFlash card. There are three different algorithms:

- No wear leveling
- Dynamic wear leveling
- Static wear leveling

The basic idea behind wear leveling is to distribute data over a broad area of blocks or cells on the data carrier so that the same areas don't have to be cleared and reprogrammed over and over again.

##### 5.2.2.1 No wear leveling

The earliest CompactFlash cards didn't have an algorithm for maximizing the lifespan. The lifespan of a CompactFlash card was determined only by the guaranteed lifespan of the flash blocks.

##### 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 data carrier is 80% full with files, then only 20% can be used for wear leveling.

The lifespan of the CompactFlash card is therefore dependent on the amount of unused flash blocks.

##### 5.2.2.3 Static wear leveling

Static wear leveling also monitors which data is rarely changed. From time to time, the controller then moves this data to blocks that have already been frequently programmed in order to prevent further wear on those cells.

#### 5.2.3 ECC error correction

Bit errors can be caused by inactivity or when a certain cell is operated. Error Correction Coding (ECC) implemented via hardware or software can detect and correct many errors of this type.

#### 5.2.4 S.M.A.R.T. support

Self-Monitoring, Analysis and Reporting Technology (S.M.A.R.T. for short) is an industry standard for mass storage devices that has been introduced to monitor important parameters and quickly detect imminent failures. Critical performance and calibration data is monitored and stored in order to help predict the probability of errors.

### **5.2.5 Maximum reliability**

CompactFlash cards used by B&R use SLC flash blocks and static wear leveling together with a powerful ECC algorithm to provide maximum reliability.



### 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 the different boot times.

see "Known problems / issues" on page 346

##### Information:

The 5CFCRD.xxxx-06 CompactFlash cards are supported on B&R devices with WinCE version  $\geq 6.0$  or higher.

#### 5.3.2 Order data


Model number	Short description	Figure
	<b>CompactFlash</b>	
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 260: 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, mass memory may also be damaged. To prevent damage and loss of data, the use of a UPS device is recommended.

##### Information:

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

Product ID	5CFCRD. 0512-06	5CFCRD. 1024-06	5CFCRD. 2048-06	5CFCRD. 4096-06	5CFCRD. 8192-06	5CFCRD. 016G-06	5CFCRD. 032G-06
<b>General information</b>							
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 261: 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 <sup>1)</sup>	50 TB	100 TB	200 TB	400 TB	800 TB	1600 TB	3200 TB
Results for 5 years <sup>1)</sup>	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 <sup>2)</sup>	Yes <sup>2)</sup>
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 5x (JEDEC JESD22, B110 method) 30 g, 11 ms 1x (IEC 68-2-27)						
Storage	1.5 kg peak, 0-5 ms 5x (JEDEC JESD22, B110 method) 30 g, 11 ms 1x (IEC 68-2-27)						
Transport	1.5 kg peak, 0-5 ms 5x (JEDEC JESD22, B110 method) 30 g, 11 ms 1x (IEC 68-2-27)						
Altitude							
Operation	Max. 4,572 m						
Mechanical characteristics							
Dimensions							
Width	42.8 ±0.10 mm						
Length	36.4 ±0.15 mm						
Height	3.3 ±0.10 mm						
Weight	10 g						

Table 261: 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
Recommendations							
Specified standard							
CE (CE)	Yes						
UL 508 (cULus)	LISTED 14F2 BR						
UL HazLoc Cl I Div 2 (cULus)	-	-	-	-	-	LISTED 2P61 ABCD BR	-
ATEX Zone 22 (EX)	-	-	-	-	-	II 3D tc IIIA T85 0-55°C BR	-
GL (GL)	Cat. C EMC 1						
Recommendations							
Specified standard							
CE (CE)	Yes						
UL 508 (cULus)	LISTED 14F2 BR						
UL HazLoc Cl I Div 2 (cULus)	-	-	-	-	-	LISTED 2P61 ABCD BR	-
ATEX Zone 22 (EX)	-	-	-	-	-	II 3D tc IIIA T85 0-55°C BR	-
GL (GL)	Cat. C EMC 1						

Table 261: 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 B&R Embedded OS installer.

### 5.3.4 Temperature humidity diagram

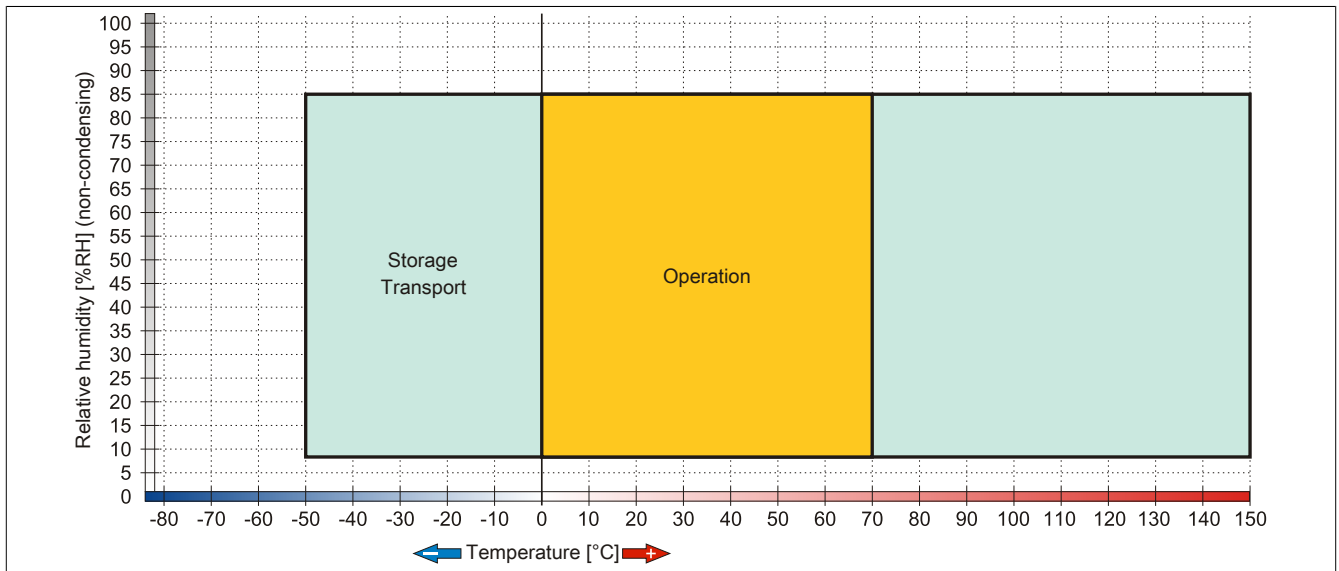


Figure 165: 5CFCRD.xxxx-06 - Temperature humidity diagram for CompactFlash cards

### 5.3.5 Dimensions

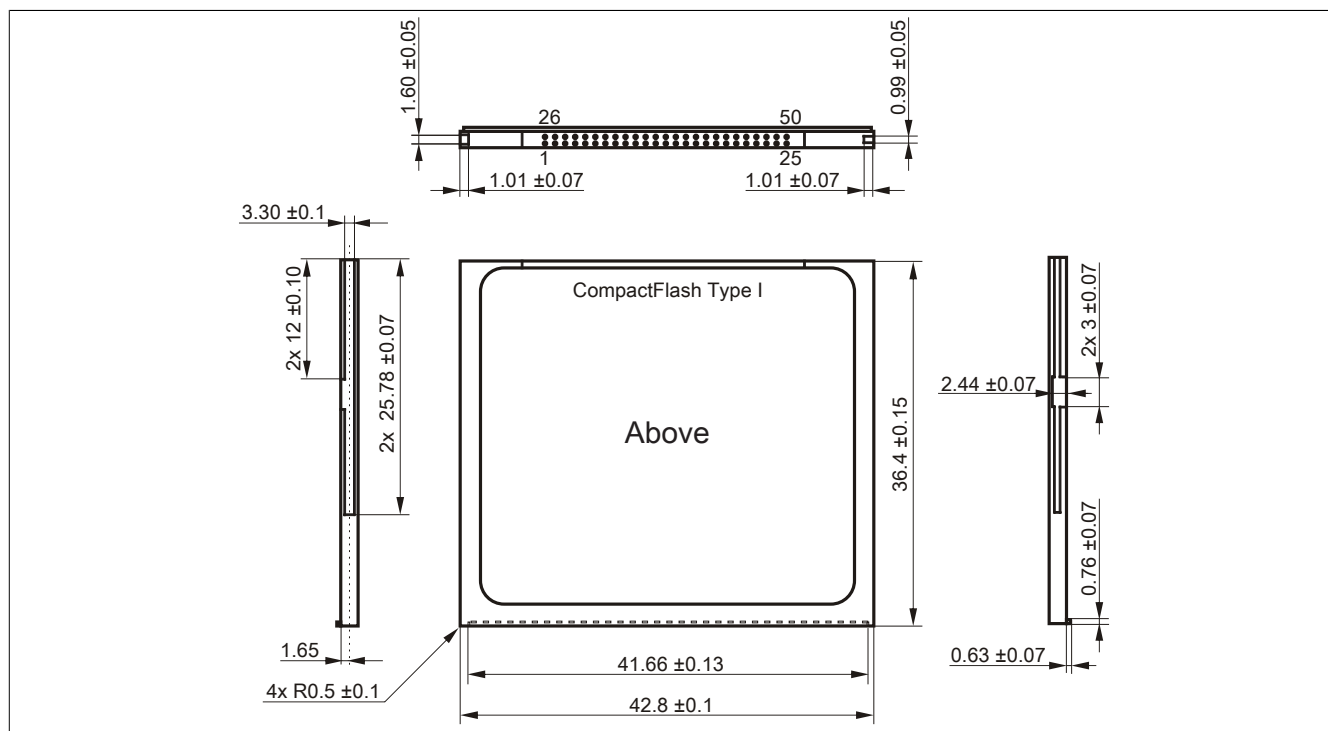


Figure 166: Dimensions - CompactFlash card Type I

### 5.3.6 Benchmark

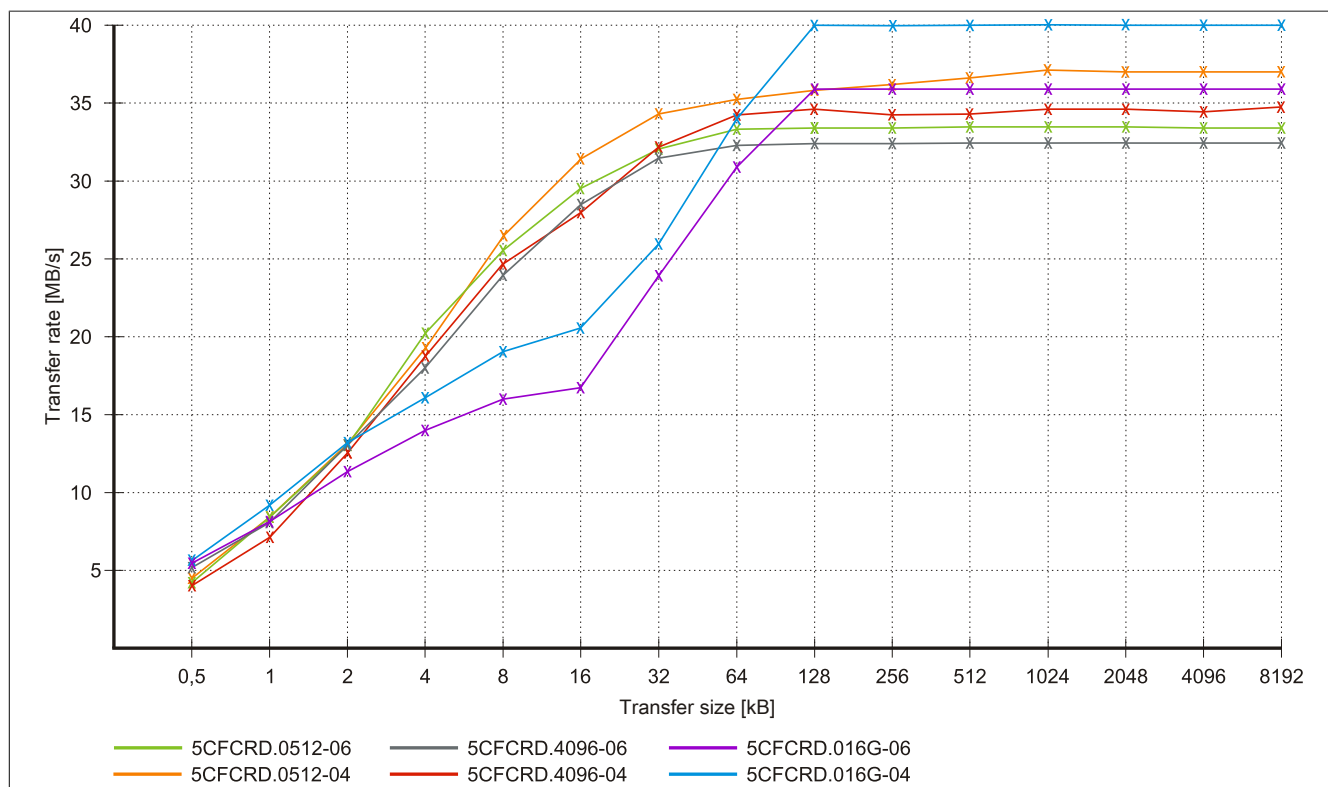


Figure 167: ATTO Disk Benchmark v2.34 comparison when reading - 5CFCRD.xxxx-04 with 5CFCRD.xxxx-06

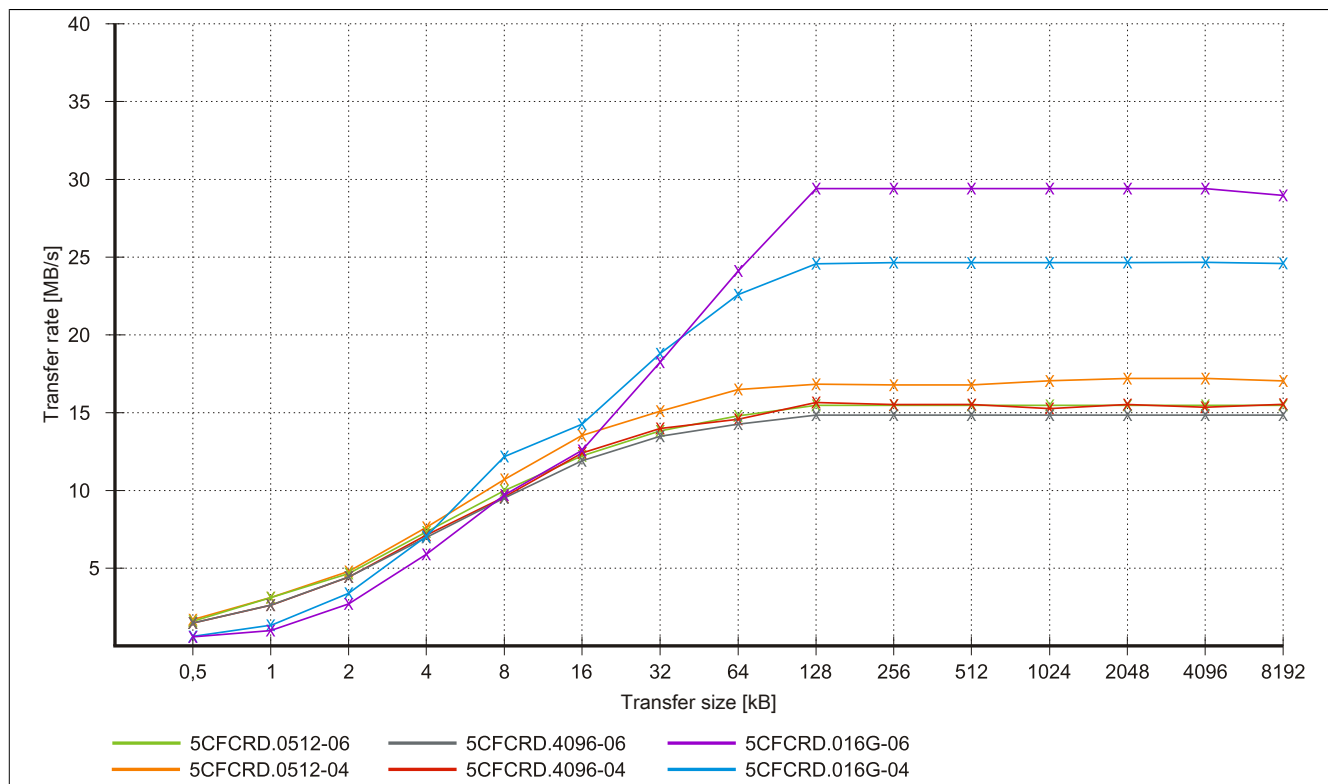


Figure 168: ATTO Disk Benchmark v2.34 comparison when writing - 5CFCRD.xxxx-04 with 5CFCRD.xxxx-06

## 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 the different boot times.

see "Known problems / issues" on page 346

#### Information:

The 5CFCRD.xxxx-04 CompactFlash cards are supported on B&R devices with WinCE version  $\geq 6.0$  or higher.

### 5.4.2 Order data


Model number	Short description	Figure
	<b>CompactFlash</b>	
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 262: 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, mass memory may also be damaged. To prevent damage and loss of data, the use of a UPS device is recommended.

#### Information:

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

Product ID	5CFCRD.0512-04	5CFCRD.1024-04	5CFCRD.2048-04	5CFCRD.4096-04	5CFCRD.8192-04	5CFCRD.016G-04
General information						
Capacity	512 MB	1 GB	2 GB	4 GB	8 GB	16 GB
Data retention	10 years					
Data reliability	< 1 unrecoverable error in 10 <sup>14</sup> 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) <sup>1)</sup>	35 MB/s (240X) <sup>1)</sup>	35 MB/s (240X) <sup>1)</sup>	33 MB/s (220X) <sup>1)</sup>	27 MB/s (180X) <sup>1)</sup>	36 MB/s (240X) <sup>1)</sup>
Maximum	37 MB/s (260X) <sup>1)</sup>	37 MB/s (260X) <sup>1)</sup>	37 MB/s (260X) <sup>1)</sup>	34 MB/s (226X) <sup>1)</sup>	28 MB/s (186X) <sup>1)</sup>	37 MB/s (247X) <sup>1)</sup>

Table 263: 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 <sup>2)</sup>	50 TB	100 TB	200 TB	400 TB	800 TB	1600 TB
Results for 5 years <sup>2)</sup>	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 <sup>3)</sup>	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 <sup>4)</sup>
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 5x (JEDEC JESD22, B110 method) 30 g, 11 ms 1x (IEC 68-2-27)					
Storage	1.5 kg peak, 0-5 ms 5x (JEDEC JESD22, B110 method) 30 g, 11 ms 1x (IEC 68-2-27)					
Transport	1.5 kg peak, 0-5 ms 5x (JEDEC JESD22, B110 method) 30 g, 11 ms 1x (IEC 68-2-27)					
Altitude						
Operation	Max. 4,572 m					
Mechanical characteristics						
Dimensions						
Width	42.8 ±0.10 mm					
Length	36.4 ±0.15 mm					
Height	3.3 ±0.10 mm					
Weight	10 g					

Table 263: 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
Recommendations						
Specified standard						
CE (CE)	Yes					
UL 508 (cULus)	LISTED 14F2 BR					
GL (GL)	Cat. C EMC 1					
Recommendations						
Specified standard						
CE (CE)	Yes					
UL 508 (cULus)	LISTED 14F2 BR					
GL (GL)	Cat. C EMC 1					

Table 263: 5CFCRD.0512-04, 5CFCRD.1024-04, 5CFCRD.2048-04, 5CFCRD.4096-04, 5CFCRD.8192-04, 5CFCRD.016G-04 - Technical data

- 1) Speed specification with 1X = 150 Kb/s. All specifications refer to the Samsung Flash chips, CompactFlash cards in UDMA mode 4, 30 ns cycle time in True-IDE mode with sequential write/read test.
- 2) Endurance of B&R CFs (with linear written block size  $\geq 128$  Kb)
- 3) Depending on the average file size.
- 4) Not supported by B&R Embedded OS installer.

#### 5.4.4 Temperature humidity diagram

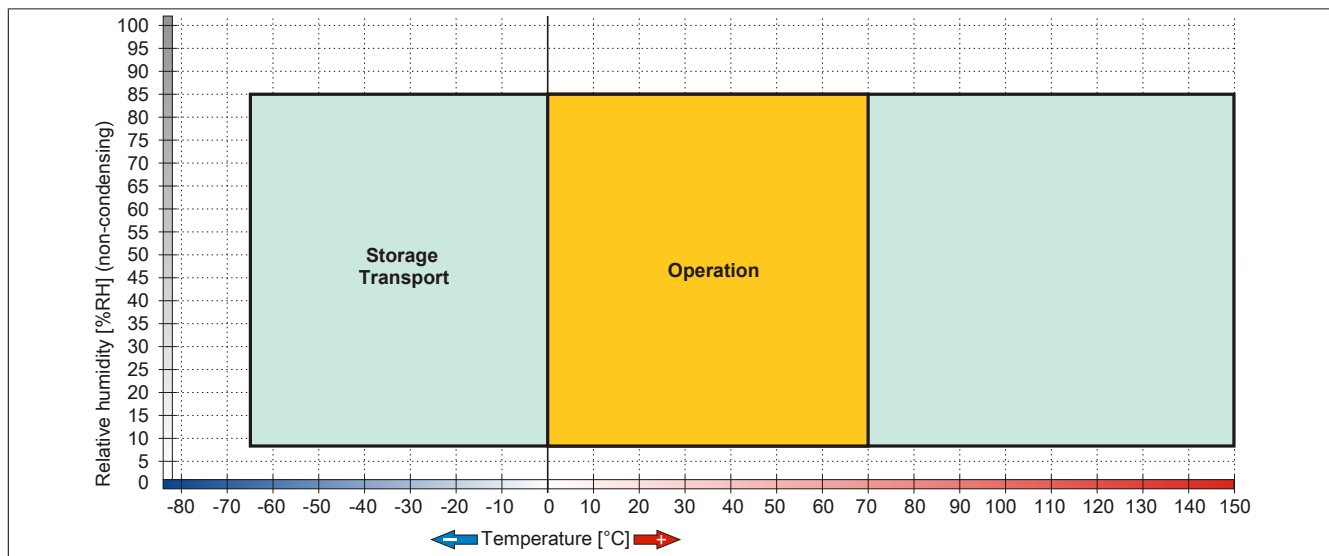


Figure 169: 5CFCRD.xxxx-04 CompactFlash cards - Temperature humidity diagram



### 5.4.5 Dimensions

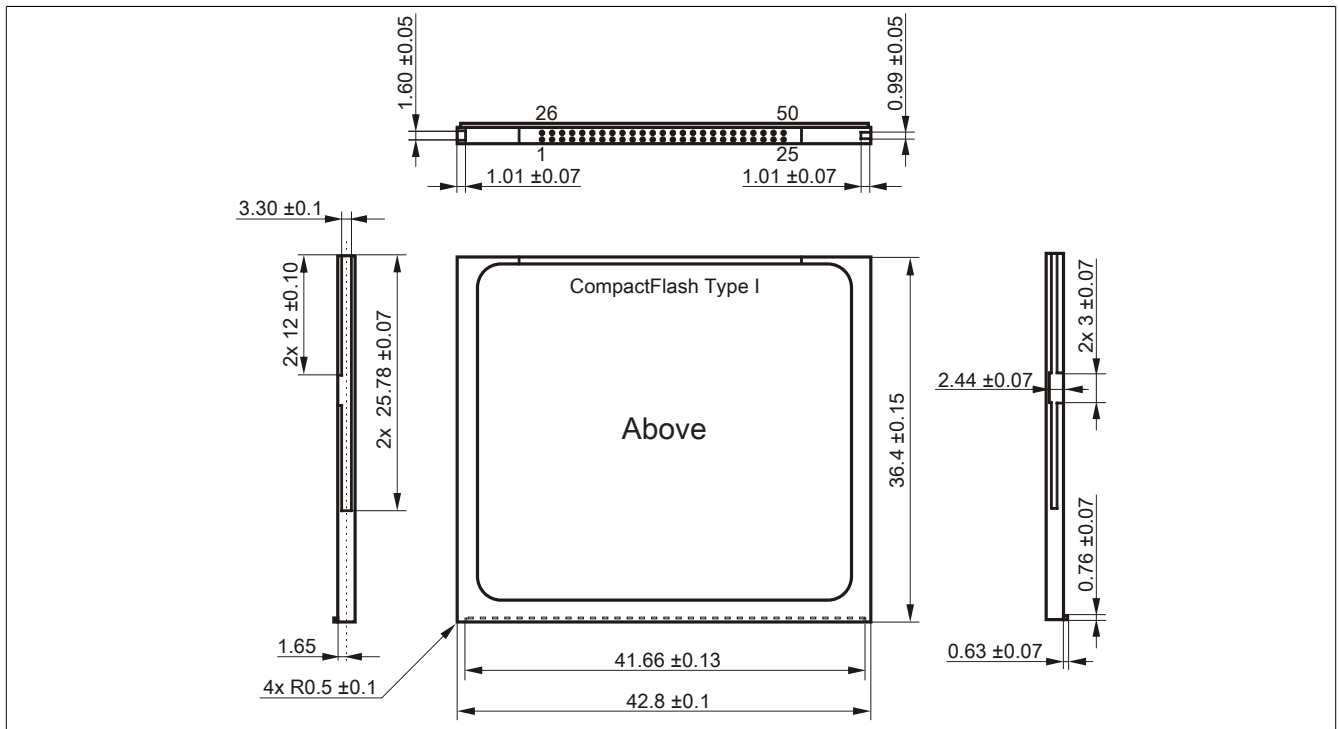


Figure 170: Dimensions - CompactFlash card Type I

### 5.4.6 Benchmark

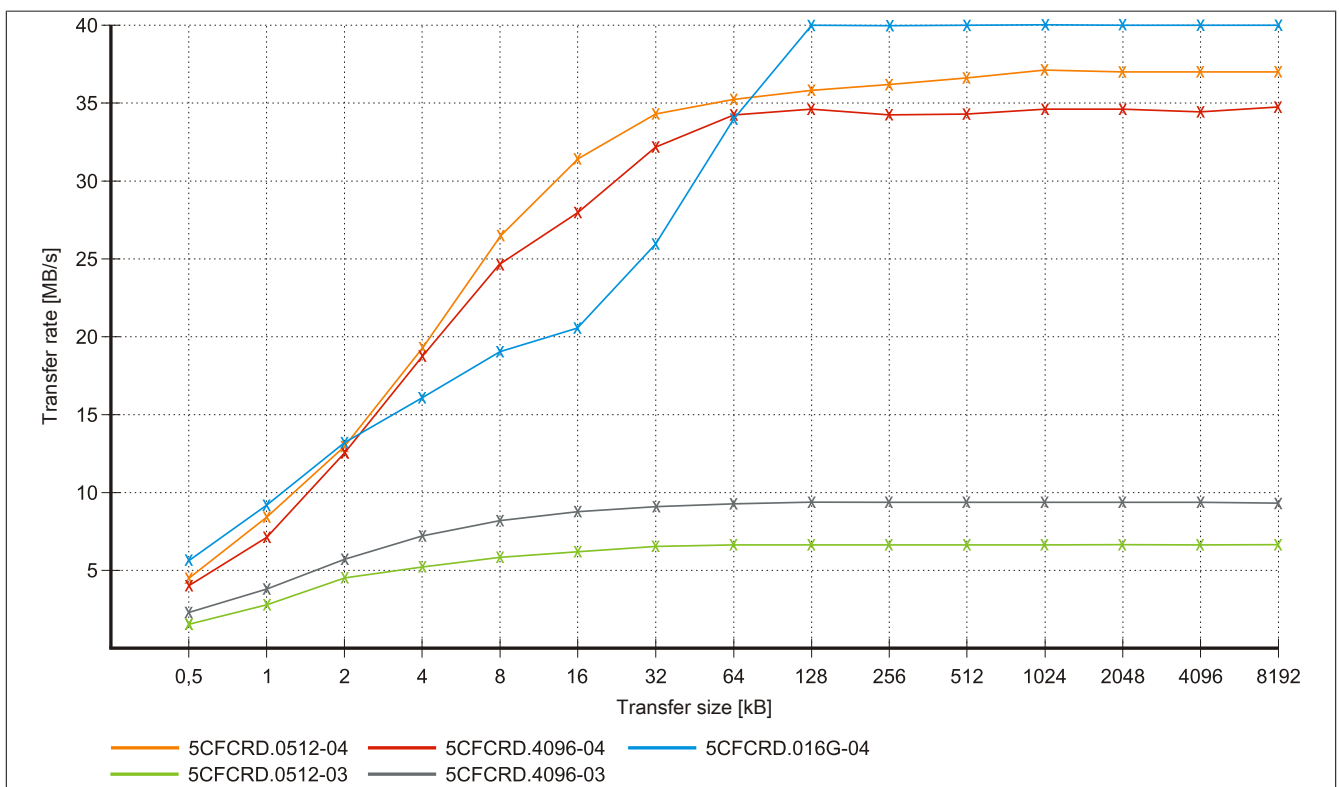


Figure 171: ATTO Disk Benchmark v2.34 comparison when reading - 5CFCRD.xxxx-03 with 5CFCRD.xxxx-04

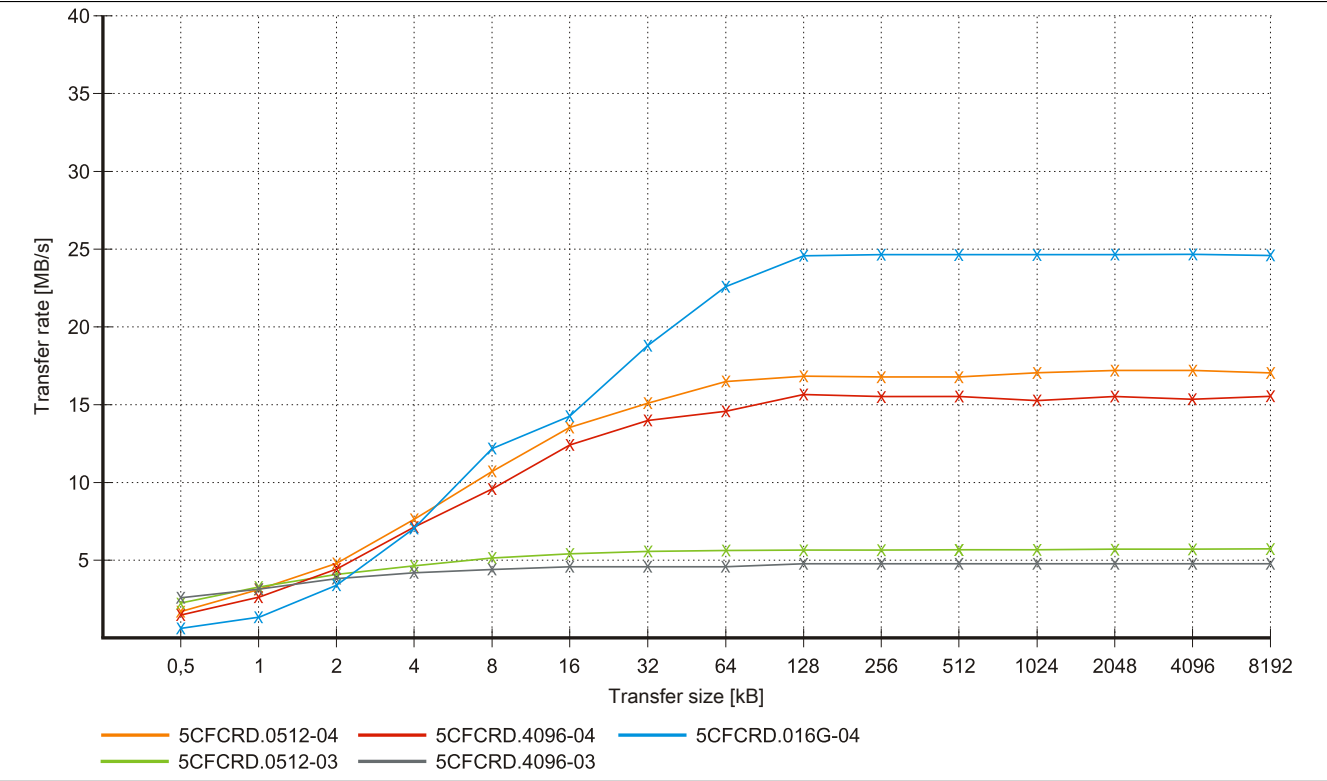


Figure 172: ATTO Disk Benchmark v2.34 comparison when writing - 5CFCRD.xxxx-03 with 5CFCRD.xxxx-04

## 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 the different boot times.

see "Known problems / issues" on page 346

#### Information:

On Windows CE 5.0 devices, 5CFCRD.xxxx-03 CompactFlash cards up to 1GB are supported.

#### Information:

On CompactFlash cards 5CFCRD.xxxx-03, only the sticker and the description have changed. The technical data has not been changed.

### 5.5.2 Order data


Model number	Short description	Figure
	<b>CompactFlash</b>	
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 264: 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 fully assembled device. The data specifications for the fully assembled device take precedence over those of individual components.

Product ID	5CFCRD.0064-03	5CFCRD.0128-03	5CFCRD.0256-03	5CFCRD.0512-03	5CFCRD.1024-03	5CFCRD.2048-03	5CFCRD.4096-03	5CFCRD.8192-03
<b>General information</b>								
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 <sup>14</sup> bit read accesses							
Lifetime monitoring	Yes							
MTBF	> 4,000,000 hours (at 25°C)							

Table 265: 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 Yes Yes							
CE								
cULus								
GL								
Endurance								
Clear/Write cycles	> 2000000							
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 No No 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. 24,383 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							
Recommendations								
Specified standard	Yes LISTED 14F2 BR Cat. C EMC 1							
CE (CE)								
UL 508 (cULus)								
GL (GL)								
Recommendations								
Specified standard	Yes LISTED 14F2 BR Cat. C EMC 1							
CE (CE)								
UL 508 (cULus)								
GL (GL)								

Table 265: 5CFCRD.0064-03, 5CFCRD.0128-03, 5CFCRD.0256-03, 5CFCRD.0512-03, 5CFCRD.1024-03, 5CFCRD.2048-03, 5CFCRD.4096-03, 5CFCRD.8192-03 - Technical data

1) Not supported by B&R Embedded OS installer.

5.5.4 Temperature humidity diagram

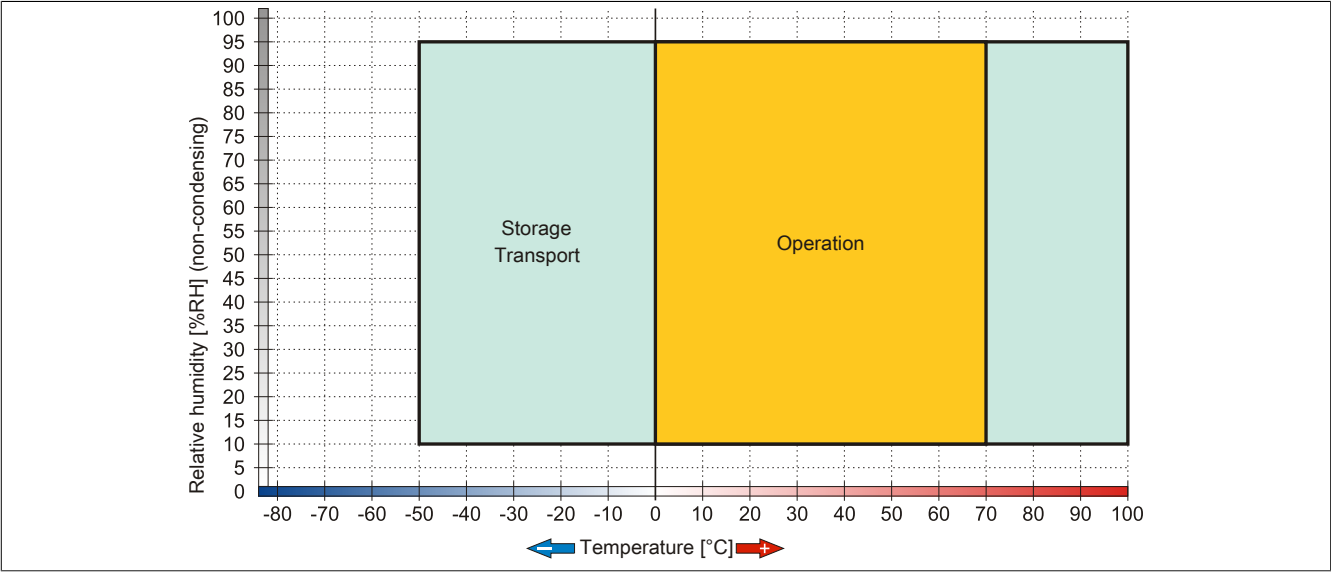


Figure 173: 5CFCRD.xxxx-03 - Temperature humidity diagram for CompactFlash cards

5.5.5 Dimensions

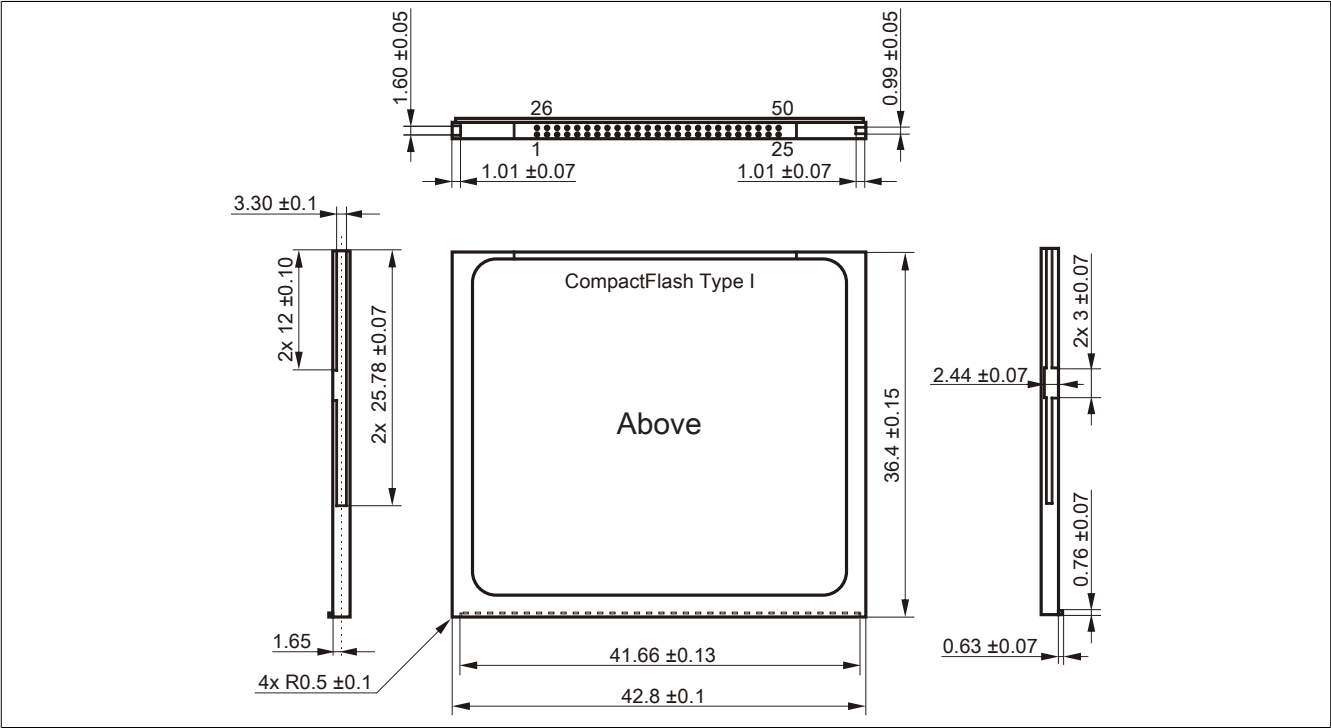


Figure 174: Dimensions - CompactFlash card Type I

## 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 in Automation PCs and Panel PCs. This can result in one of the two cards not being detected during system startup. This is caused by varying startup speeds. CompactFlash cards with older technology require significantly more time during system startup than CompactFlash cards with newer technology. This behavior occurs near the limits of the time frame provided for startup. This can occur because the startup time for the CompactFlash cards fluctuates due to the variance of the components being used. Depending on the CompactFlash cards being used, this error may occur never, sometimes or always.

## 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 the 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
	<b>USB accessories</b>	
5MD900.USB2-01	USB 2.0 Drives DVD-R/RW DVD+R/RW, FDD, CompactFlash slot (type II), USB connector (type A on front side, type B on back side); 24 VDC; (0TB103.9 screw clamp or 0TB103.91 cage clamp must be ordered separately).	
	<b>Required accessories</b>	
	<b>Other</b>	
5SWUTI.0000-00	OEM Nero CD-RW Software, only available with a CD writer.	
	<b>Terminal blocks</b>	
0TB103.9	Connector, 24 VDC, 3-pin female, screw clamps 3.31 mm², protected against vibration by the screw flange	
0TB103.91	Connector, 24 VDC, 3-pin female, cage clamps 3.31 mm², protected against vibration by the screw flange	
	<b>USB accessories</b>	
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.	
	<b>USB cable</b>	
5CAUSB.0018-00	USB 2.0 connecting cable type A - type B, 1.8 m.	
5CAUSB.0050-00	USB 2.0 connecting cable type A - type B, 5 m.	

Table 266: 5MD900.USB2-01 - Order data

#### 6.1.3 Interfaces

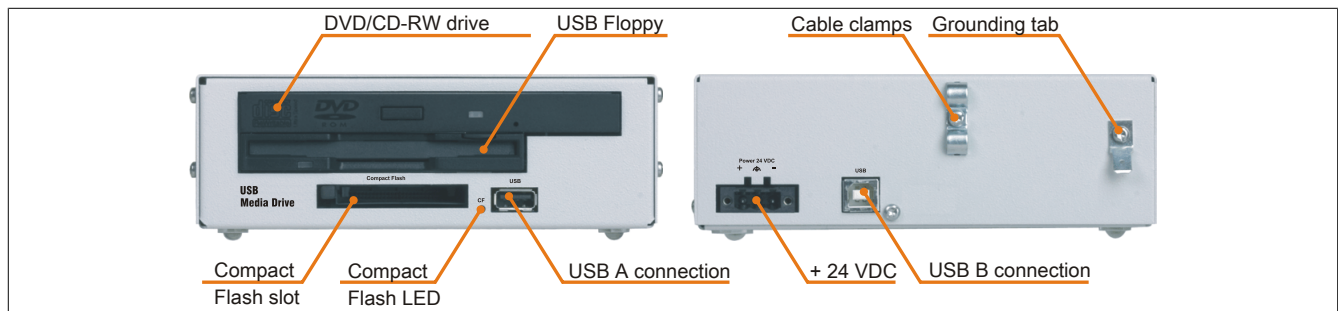


Figure 175: 5MD900.USB2-01 - Interfaces

#### 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 entire device. For the entire device in which this individual component is used, refer to the data given specifically for the entire device.

Product ID	5MD900.USB2-01
General information	
Max. cable length	5m (not including hub)
Certification	
CE	Yes
cULus	Yes
Interfaces	
CompactFlash slot 1	
Type	Type I
Connection	IDE/ATAPI
Activity LED	Signals read or write access to an inserted CompactFlash card
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 (double layer), DVD+RW
Laser class	Class 1 laser
Service life	60000 POH (Power-On Hours)
Interface	IDE (ATAPI)
Startup time	
CD	Max. 14 seconds (0 rpm to read access)
DVD	Max. 15 seconds (0 rpm to read access)
Access time	
CD	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 (double layer), DVD+RW
Writable media	
CD	CD-R, CD-RW
DVD	DVD-R/RW, DVD-RAM (4.7 GB), DVD+R/RW, DVD+R (double layer)
Read speed	
CD	24x
DVD	8x
Write speed	
CD-R	10 to 24x
CD-RW	10 to 24x
DVD+R	3.3 - 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, over-write, 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	30,000 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	IP65 front side (only with optional front cover), IP20 back side
Environmental conditions	
Temperature <sup>1)</sup>	
Operation	5 to 45°C
Storage	-20 to 60°C
Transport	-40 to 60°C

Table 267: 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 <sup>2</sup> 0-peak)
Storage	10 to 100 Hz: 2 g (19.6 m/s <sup>2</sup> 0-peak)
Transport	10 to 100 Hz: 2 g (19.6 m/s <sup>2</sup> 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)
Recommendations	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
Recommendations	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR

Table 267: 5MD900.USB2-01 - Technical data

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

### 6.1.5 Dimensions

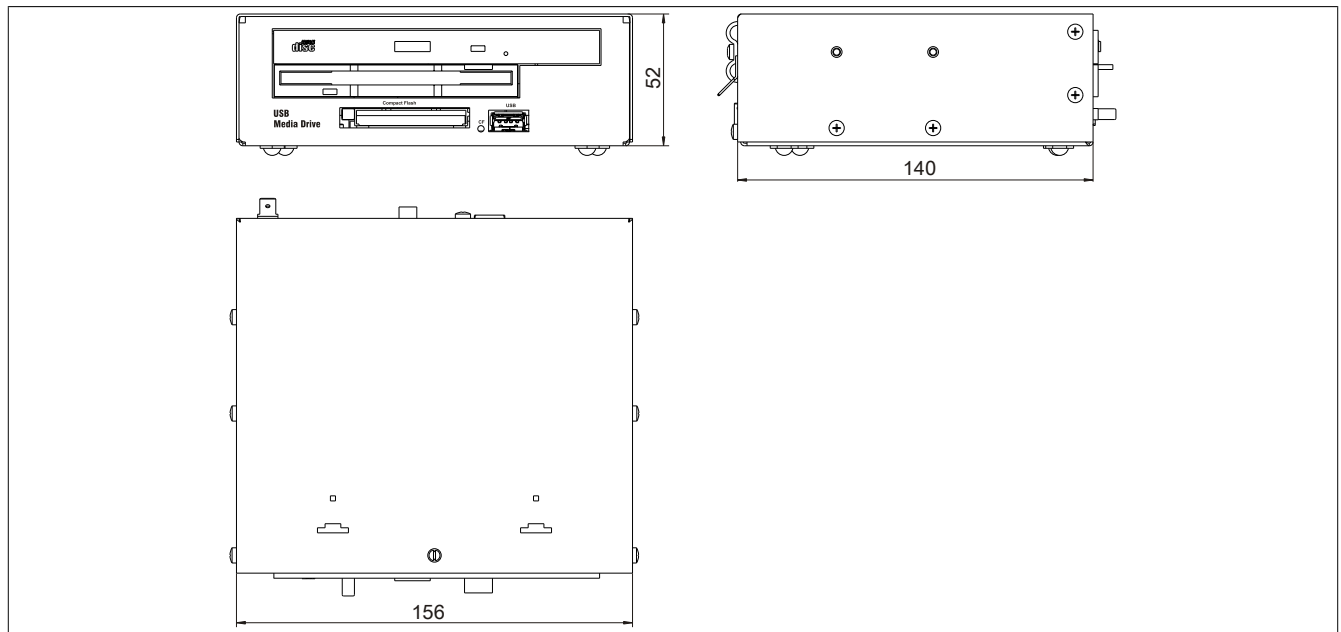


Figure 176: 5MD900.USB2-01 - Dimensions

6.1.6 Dimensions with front cover

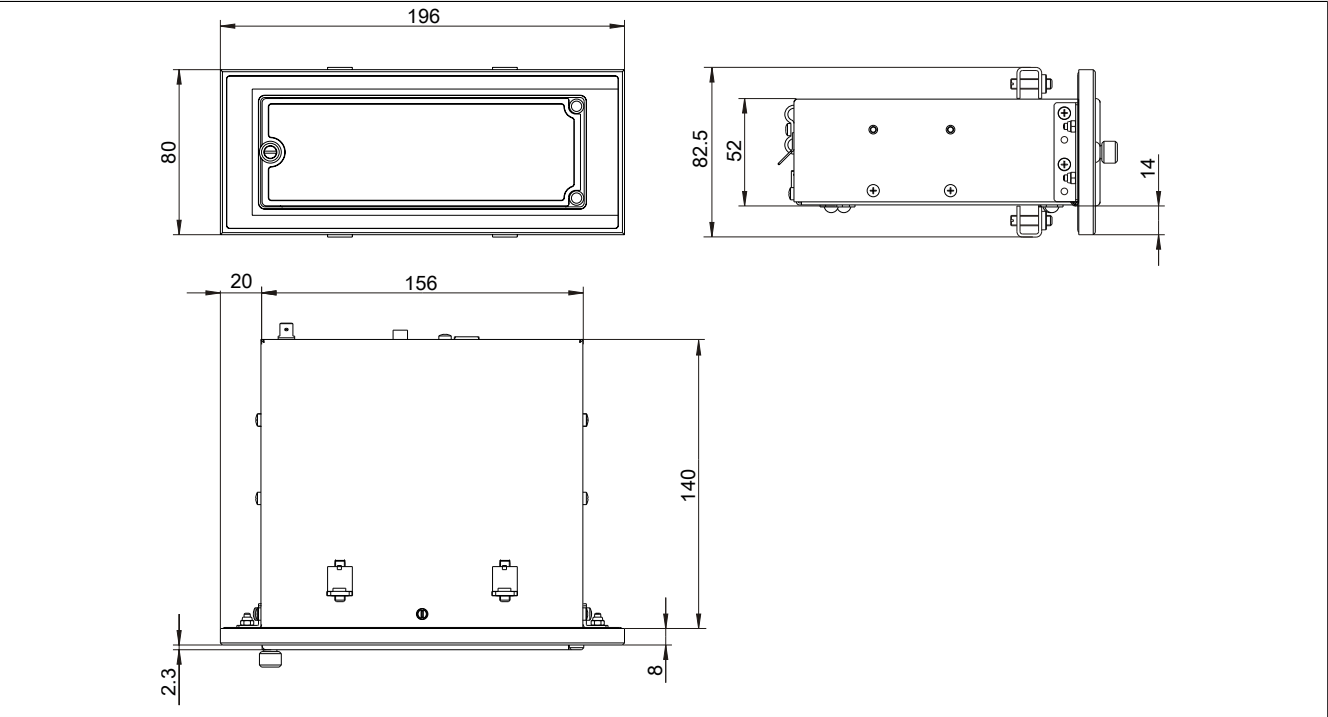


Figure 177: Dimensions - USB media drive with front cover

6.1.7 Cutout installation

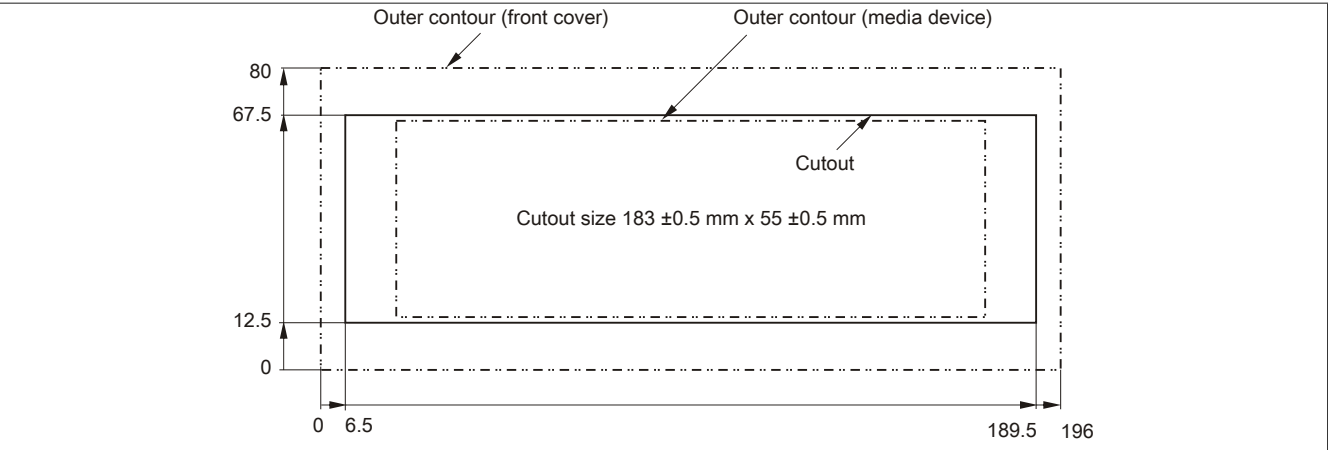


Figure 178: Installation cutout - USB media drive with front cover

6.1.8 Contents of delivery

Quantity	Component
1	USB media drive
2	Mounting rail brackets

Table 268: 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.

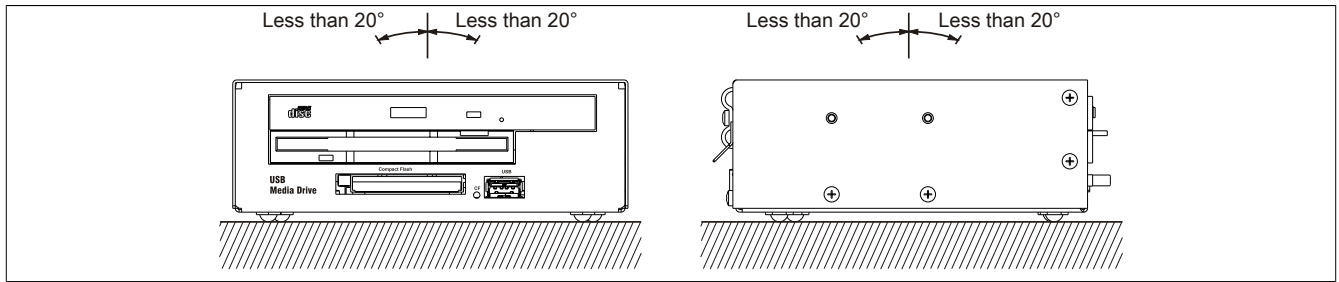


Figure 179: 5MD900.USB2-01 - Mounting orientation

## 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 the USB port on the B&R Industrial PC.

- Desktop or rack-mounted operation (mounting rail brackets)
- Integrated DVD-R/RW DVD+R/RW drive
- Integrated IDE/ATAPI CompactFlash slot (hot pluggable)
- Integrated USB 2.0 connection
- +24 VDC supply (back)
- USB 2.0 connection (back)
- Optional front cover

### 6.2.2 Order data


Model number	Short description	<div>Figure</div> 
	<b>USB accessories</b>	
5MD900.USB2-02	USB 2.0 DVD-R/RW DVD+R/RW drive, CompactFlash slot (Type II), USB connector (Type A on front, Type B on back), 24 VDC, please order 0TB103.9 screw clamp or 0TB103.91 cage clamp separately	
	<b>Required accessories</b>	
	<b>Other</b>	
5SWUT1.0000-00	OEM Nero CD-RW Software, only available with a CD writer.	
	<b>Terminal blocks</b>	
0TB103.9	Connector, 24 VDC, 3-pin female, screw clamps 3.31 mm², protected against vibration by the screw flange	
0TB103.91	Connector, 24 VDC, 3-pin female, cage clamps 3.31 mm², protected against vibration by the screw flange	
	<b>USB cable</b>	
5CAUSB.0018-00	USB 2.0 connecting cable type A - type B, 1.8 m.	
5CAUSB.0050-00	USB 2.0 connecting cable type A - type B, 5 m.	

Table 269: 5MD900.USB2-02 - Order data

### 6.2.3 Interfaces

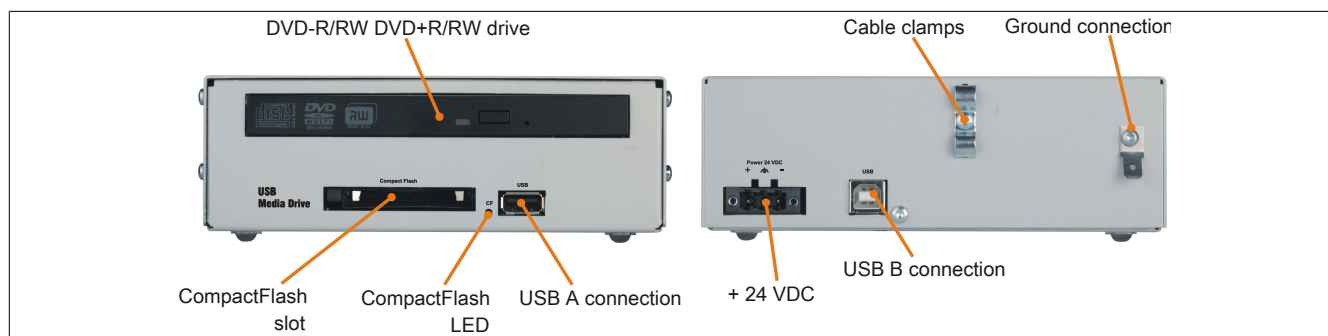


Figure 180: 5MD900.USB2-02 - Interfaces

### 6.2.4 Technical data

Product ID	5MD900.USB2-02
<b>General information</b>	
Max. cable length	5m (not including hub)
Certification	
CE	Yes
cULus	Yes
<b>Interfaces</b>	
CompactFlash slot 1	
Type	Type I
Connection	IDE/ATAPI
Activity LED	Signals read or write access to an inserted CompactFlash card

Table 270: 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 (double layer), DVD+RW
Laser class	Class 1 laser
Service life	60000 POH (Power-On Hours)
Interface	IDE (ATAPI)
Startup time	
CD	Max. 14 seconds (0 rpm to read access)
DVD	Max. 15 seconds (0 rpm to read access)
Access time	
CD	Typ. 140 ms (24x)
DVD	Typ. 150 ms (8x)
Readable media	
CD	CD/CD-ROM (12 cm, 8 cm), CD-R, CD-RW
DVD	DVD-ROM, DVD-R, DVD-RW, DVD-RAM, DVD+R, DVD+R (double layer), DVD+RW
Writable media	
CD	CD-R, CD-RW
DVD	DVD-R/RW, DVD-RAM (4.7 GB), DVD+R/RW, DVD+R (double layer)
Read speed	
CD	24x
DVD	8x
Write speed	
CD-R	10 to 24x
CD-RW	10 to 24x
DVD+R	3.3 to 8x
DVD+R (dual layer)	2.4 to 4x
DVD+RW	3.3 to 8x
DVD-R	2 to 6x
DVD-R (dual layer)	2 to 4x
DVD-RAM	3 to 5x
DVD-RW	2 to 6x
Write methods	
CD	Disk at once, session at once, packet write, track at once
DVD	Disk at once, incremental, over-write, sequential
Electrical characteristics	
Nominal voltage	24 VDC $\pm 25\%$
Operating conditions	
Protection in accordance with EN 60529	IP65 front side (only with optional front cover), IP20 back side
Environmental conditions	
Temperature <sup>1)</sup>	
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 <sup>2</sup> 0-peak)
Storage	10 to 100 Hz: 2 g (19.6 m/s <sup>2</sup> 0-peak)
Transport	10 to 100 Hz: 2 g (19.6 m/s <sup>2</sup> 0-peak)
Shock	
Operation	5 g, 11 ms
Storage	60 g, 11 ms
Transport	60 g, 11 ms
Altitude	
Operation	Max. 3000 m

Table 270: 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)
Recommendations	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
Recommendations	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR

Table 270: 5MD900.USB2-02 - Technical data

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

## 6.2.5 Dimensions

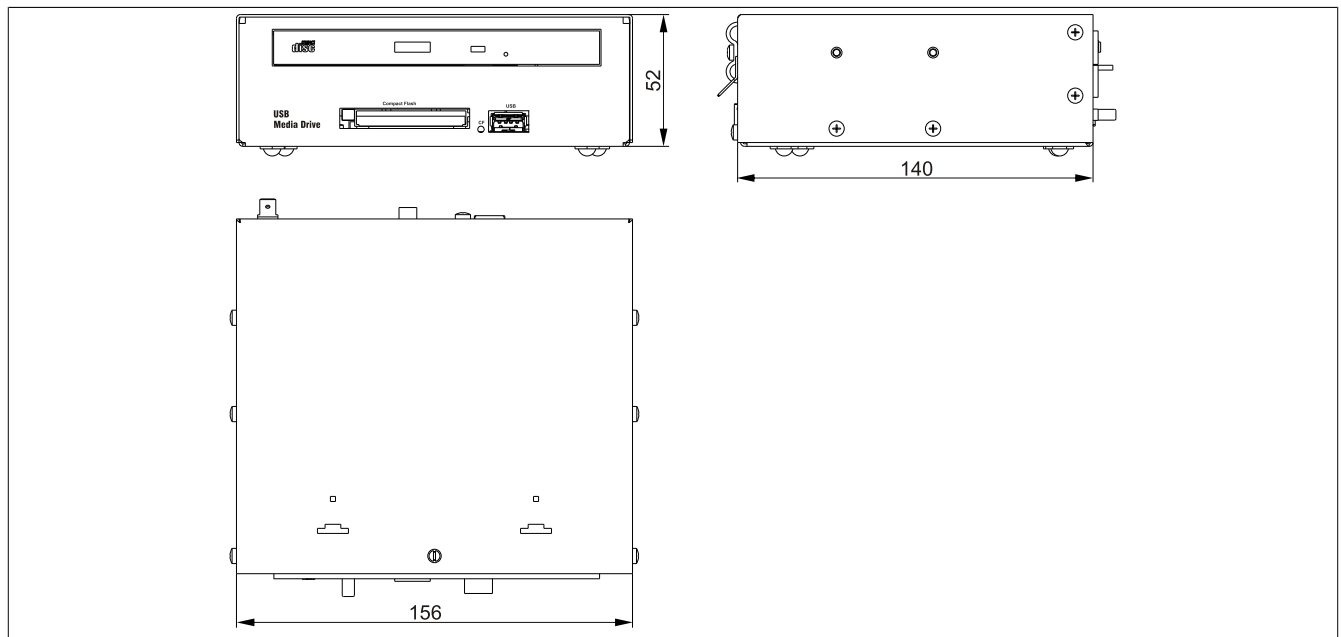


Figure 181: 5MD900.USB2-02 - Dimensions

### 6.2.6 Dimensions with front cover

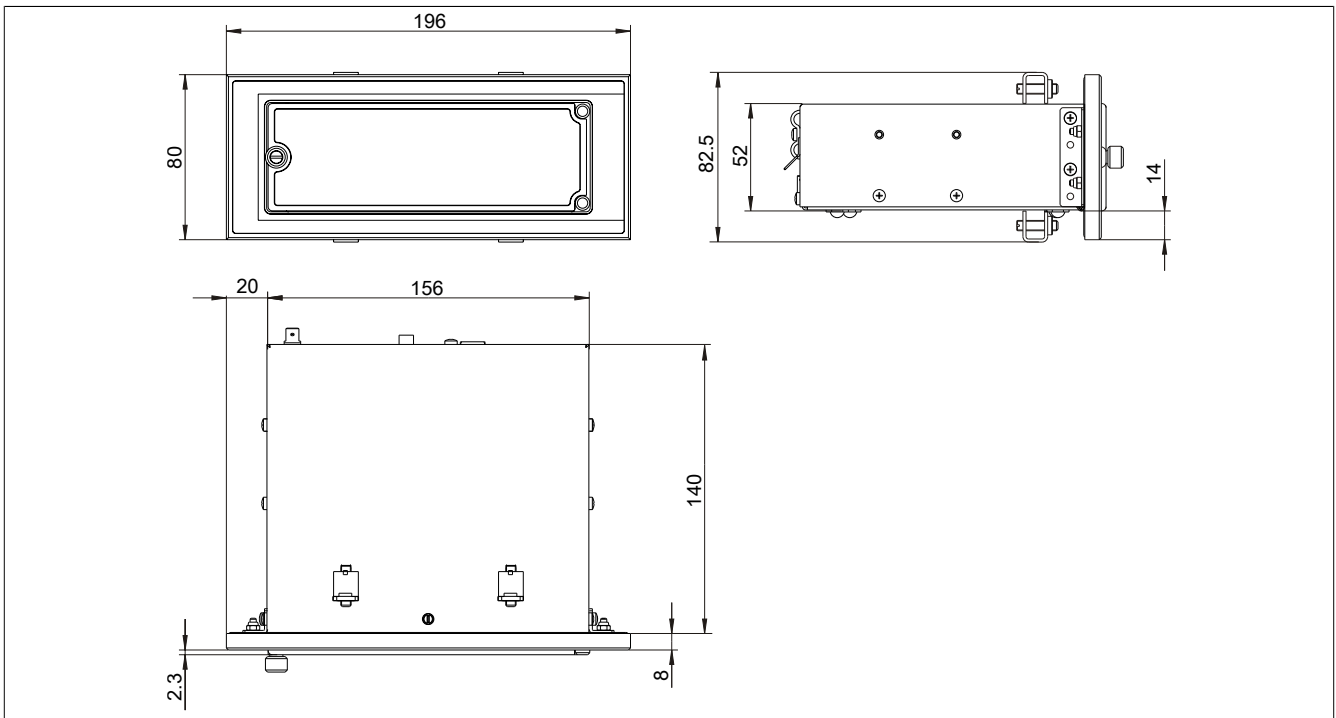


Figure 182: Dimensions - USB media drive with front cover

### 6.2.7 Cutout installation

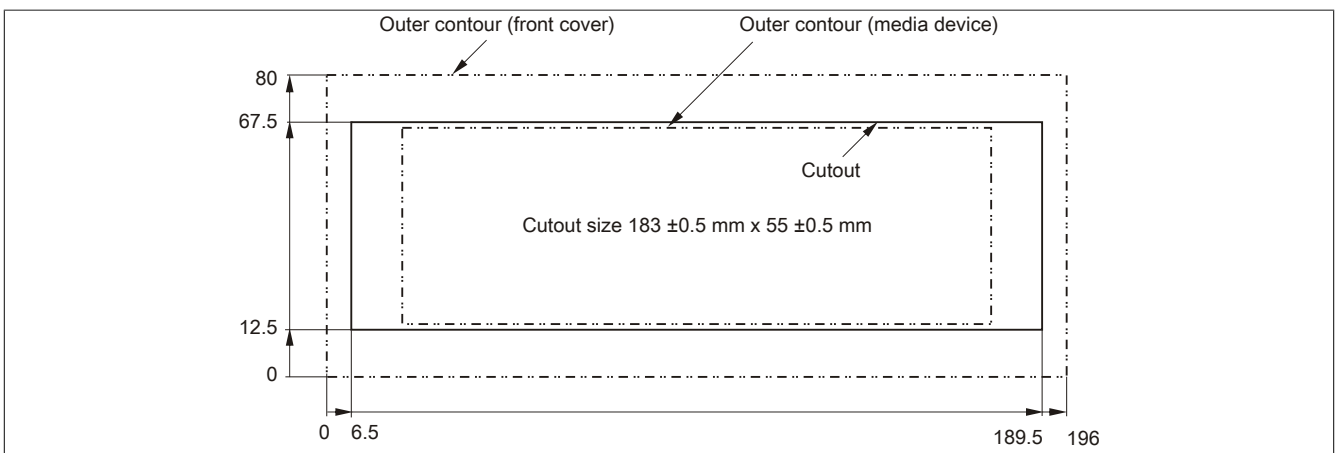


Figure 183: Installation cutout - USB media drive with front cover

### 6.2.8 Contents of delivery

Quantity	Component
1	USB media drive
2	Mounting rail brackets

Table 271: 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

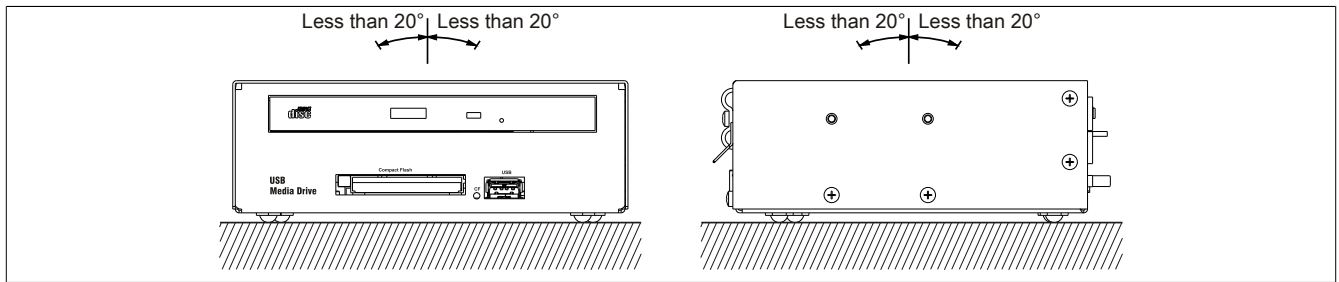


Figure 184: 5MD900.USB2-02 - Mounting orientation



## 6.3 5A5003.03

### 6.3.1 General information

This front cover can also be mounted on the front of the USB media drive (model number 5MD900.USB2-00, 5MD900.USB2-01 or 5MD900.USB2-02) to protect the interface.

### 6.3.2 Order data

Model number	Short description	Figure
	<b>USB accessories</b>	
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 272: 5A5003.03 - Order data

### 6.3.3 Technical data

Product ID	5A5003.03
<b>General information</b>	
Certification	
CE	Yes
cULus	Yes
<b>Mechanical characteristics</b>	
Front	
Panel membrane	
Light background	Similar to Pantone 427CV
Dimensions	
Width	196 mm
Height	80 mm
Depth	8 mm
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR

Table 273: 5A5003.03 - Technical data

### 6.3.4 Dimensions

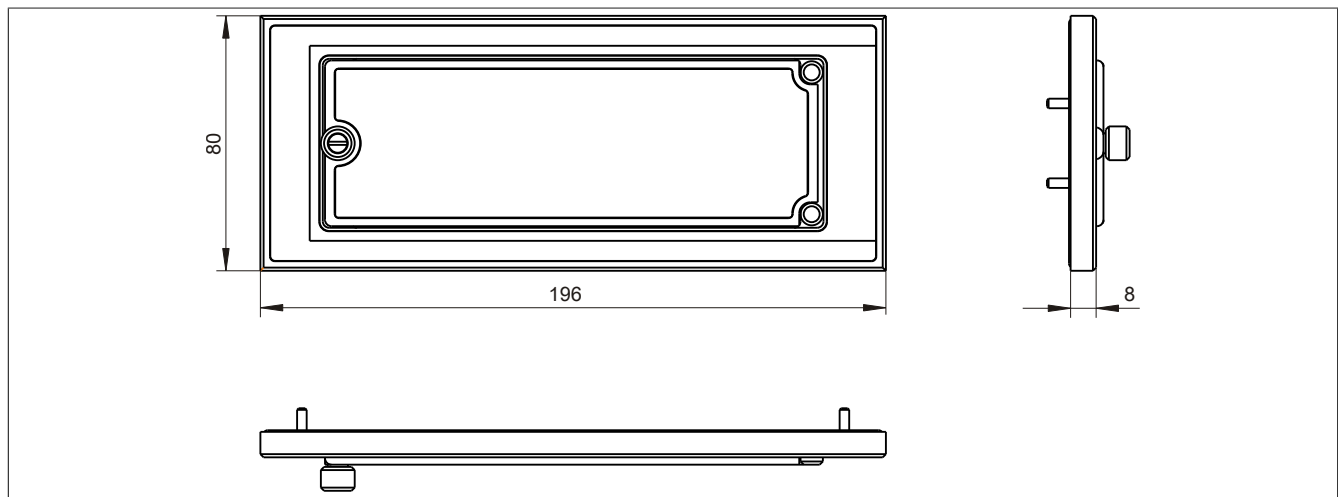


Figure 185: 5A5003.03 - Dimensions

### 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 274: 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.

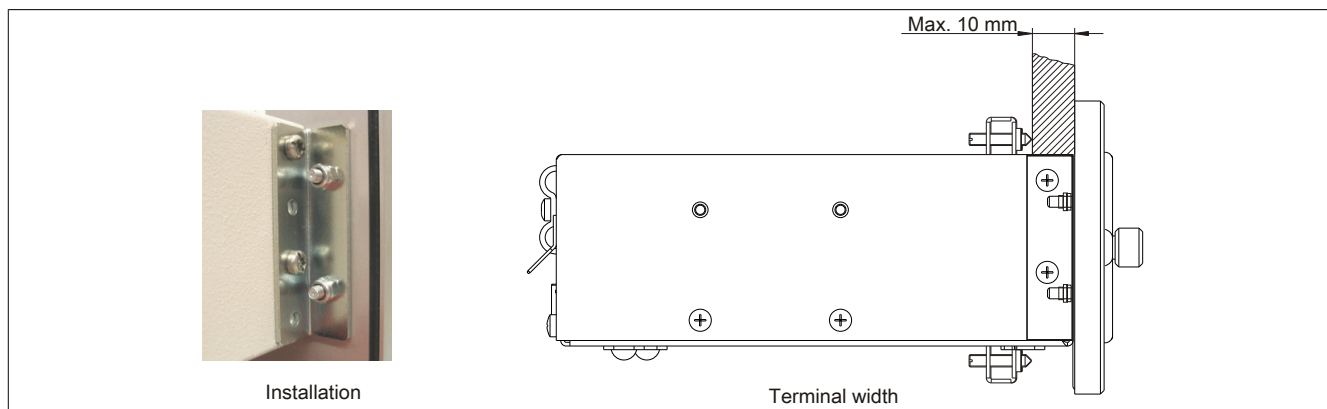


Figure 186: Front cover mounting and installation depth

#### 6.3.6.1 Cutout installation

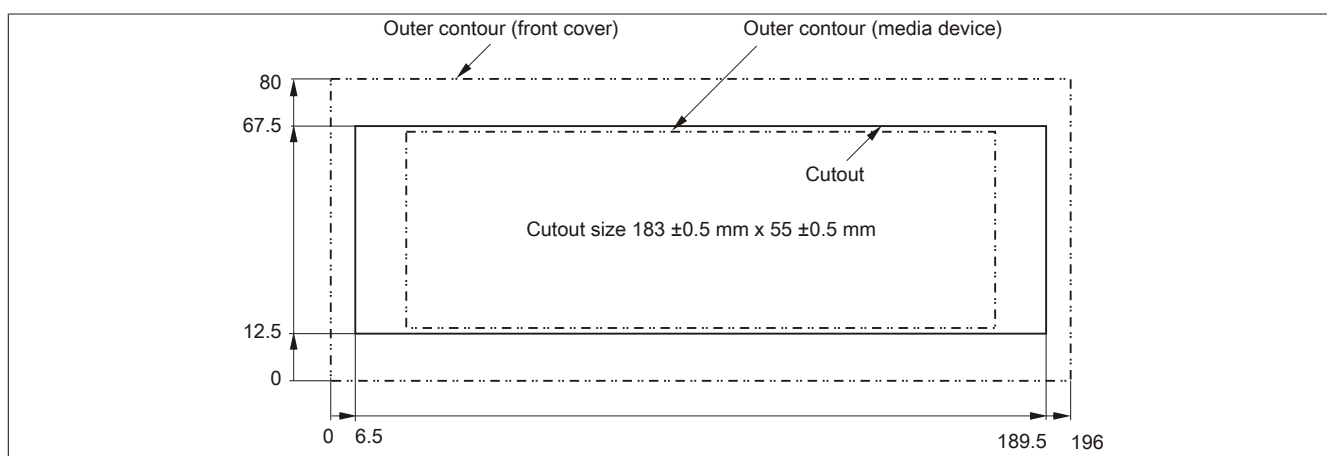


Figure 187: Installation cutout - USB media drive with front cover

## 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. Only USB flash drives from the memory specialists SanDisk are used.

#### Information:

Due to the vast quantity of USB flash drives available on the market as well as their short product life cycle, we reserve the right to supply alternative products at any time. The following measures may therefore be necessary in order to boot from these flash drives as well:

- The flash drive must be reformatted or in some cases even repartitioned (set active partition).
- The flash drive must be the first bootable device in the BIOS boot order; alternatively, the IDE controllers can be disabled in BIOS. This can be avoided in most cases if a "fdisk /mbr" command is also executed on the USB flash drive.

#### 7.1.2 Order data

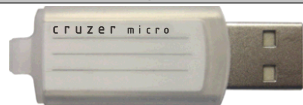
Model number	Short description	Figure
	<b>USB accessories</b>	
5MMUSB.2048-00	USB 2.0 Memory Stick, 2048 MB	

Table 275: 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 fully assembled device. The data specifications for the fully assembled device take precedence over those of individual components.

Product ID	5MMUSB.2048-00
<b>General information</b>	
Data retention	10 years
LEDs	1 LED (green) <sup>1)</sup>
MTBF	100,000 hours (at 25 °C)
Type	USB 1.1, USB 2.0
Maintenance	None
Certification CE	Yes
<b>Interfaces</b>	
USB	
Type	USB 1.1, USB 2.0
Connection	To each USB type A interface
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s)
Sequential reading	Max. 8.7 MB/s
Sequential writing	Max. 1.7 MB/s
<b>Support</b>	
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
<b>Electrical characteristics</b>	
Power consumption	650 µA sleep mode, 150 mA read/write

Table 276: 5MMUSB.2048-00 - Technical data

Product ID	5MMUSB.2048-00
<b>Environmental conditions</b>	
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 <sup>2</sup> 0-peak), oscillation rate 1/minute
Storage	10 to 500 Hz: 2 g (19.6 m/s <sup>2</sup> 0-peak), oscillation rate 1/minute
Transport	10 to 500 Hz: 2 g (19.6 m/s <sup>2</sup> 0-peak), oscillation rate 1/minute
Shock	
Operation	Max. 40 g (392 m/s <sup>2</sup> 0-peak) and 11 ms length
Storage	Max. 80 g (784 m/s <sup>2</sup> 0-peak) and 11 ms length
Transport	Max. 80 g (784 m/s <sup>2</sup> 0-peak) and 11 ms length
Altitude	
Operation	Max. 3048 m
Storage	Max. 12192 m
Transport	Max. 12192 m
<b>Mechanical characteristics</b>	
Dimensions	
Width	19 mm
Length	52.2 mm
Height	7.9 mm
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes

Table 276: 5MMUSB.2048-00 - Technical data

- 1) Signals data transfer (send and receive).

#### 7.1.4 Temperature humidity diagram

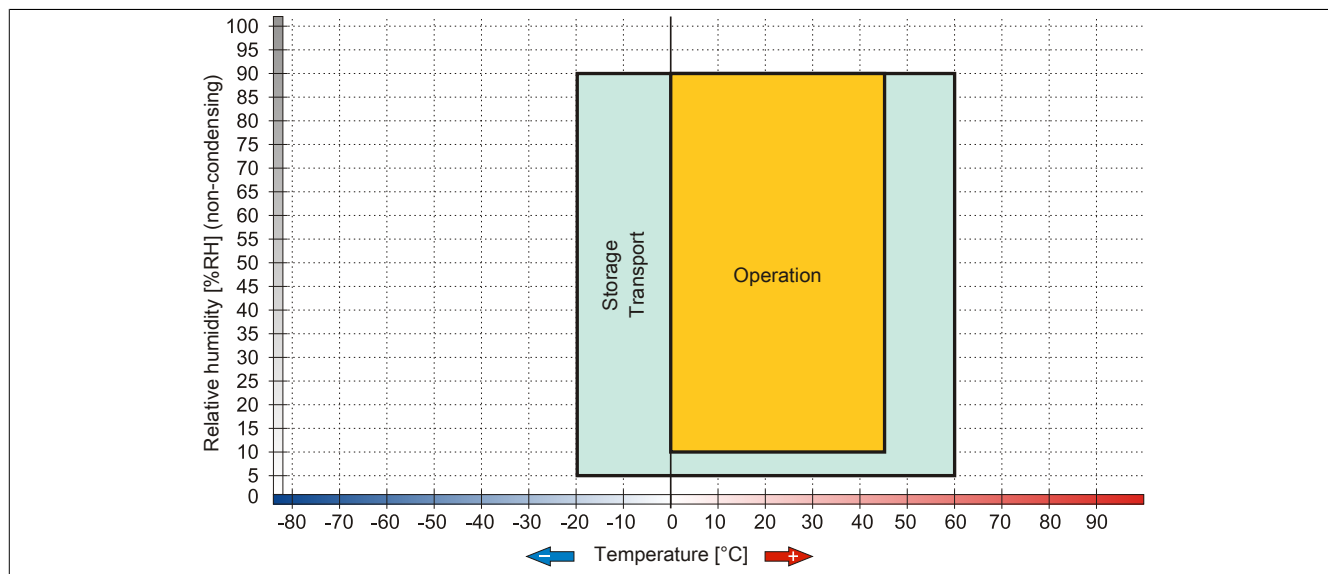


Figure 188: 5MMUSB.2048-00 - Temperature humidity diagram

## 7.2 5MMUSB.2048-01

### 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.
- USB 1.1, USB 2.0
  - High transfer rate
  - High data storage
  - Ambient temperature during operation: 0 to 70°C

### 7.2.2 Order data


Model number	Short description	Figure
	<b>USB accessories</b>	
5MMUSB.2048-01	USB 2.0 flash drive, 2048 MB, B&R	

Table 277: 5MMUSB.2048-01 - Order data

### 7.2.3 Technical data

Product ID	5MMUSB.2048-01
<b>General information</b>	
Data retention	>10 years
LEDs	1 LED (green) <sup>1)</sup>
MTBF	>3,000,000 hours
Type	USB 1.1, USB 2.0
Maintenance	None
Certification	
CE	Yes
<b>Interfaces</b>	
USB	
Type	USB 1.1, USB 2.0
Connection	To each USB type A interface
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s)
Sequential reading	Max. 31 MB/s
Sequential writing	Max. 30 MB/s
<b>Support</b>	
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
<b>Electrical characteristics</b>	
Power consumption	Max. 500 µA sleep mode, max. 120 mA read/write
<b>Environmental conditions</b>	
Temperature	
Operation	0 to 70°C
Storage	-50 to 100°C
Transport	-50 to 100°C

Table 278: 5MMUSB.2048-01 - Technical data

Product ID	5MMUSB.2048-01
Relative humidity	
Operation	85%, non-condensing
Storage	85%, non-condensing
Transport	85%, non-condensing
Vibration	
Operation	20 to 2000 Hz: 20 g (peak)
Storage	20 to 2000 Hz: 20 g (peak)
Transport	20 to 2000 Hz: 20 g (peak)
Shock	
Operation	max. 1500g (peak)
Storage	max. 1500g (peak)
Transport	max. 1500g (peak)
Altitude	
Operation	Max. 3048 m
Storage	Max. 12192 m
Transport	Max. 12192 m
<b>Mechanical characteristics</b>	
Dimensions	
Width	17.97 mm
Length	67.85 mm
Height	8.35 mm
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes

Table 278: 5MMUSB.2048-01 - Technical data

- 1) Signals data transfer (send and receive).

## 7.2.4 Temperature humidity diagram

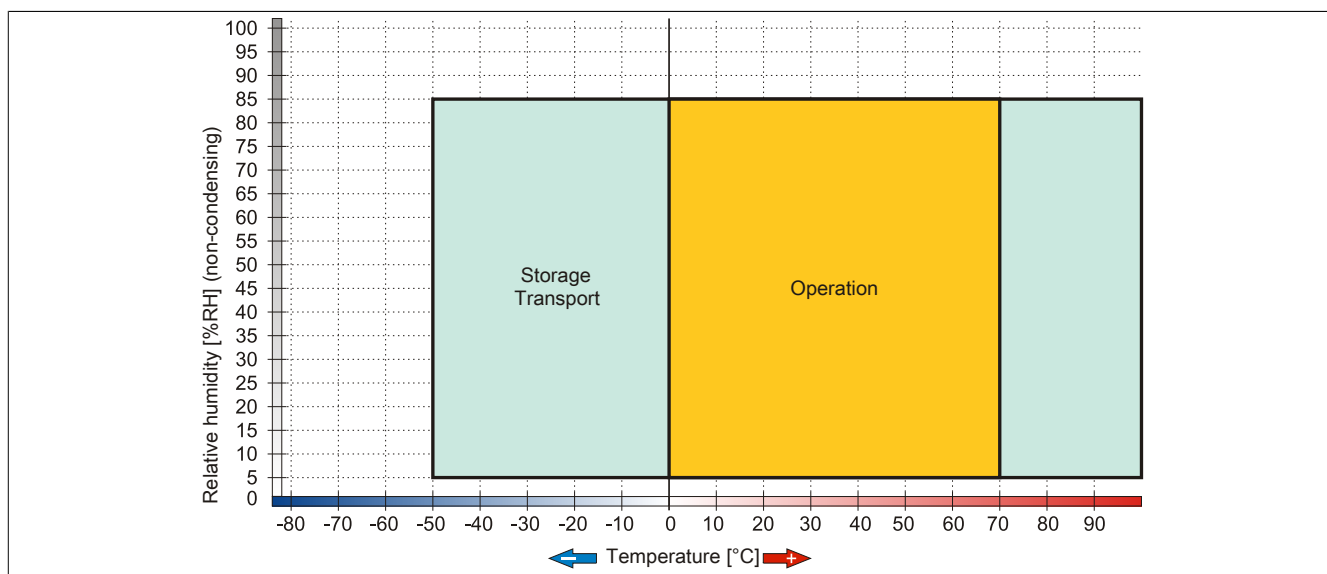


Figure 189: 5MMUSB.2048-01 - Temperature humidity diagram

## 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](http://www.br-automation.com)).

At the time of its creation, the content of the DVD is identical to the files found in the download area of the B&R homepage (under Service – “Material Related Downloads”).

#### 8.1.2 Order data


Model number	Short description	Figure
5SWHMI.0000-00	<b>Other</b> HMI Drivers & Utilities DVD	

Table 279: 5SWHMI.0000-00 - Order data

#### 8.1.3 Contents (V2.10)

##### BIOS upgrades for the products

- Automation PC 620 / Panel PC 700 CPU Board 815E and 855GME BIOS
- Automation PC 620 / Panel PC 700 CPU Board X855GME BIOS
- Automation PC 620 / Panel PC 700 CPU Board 945GME N270 BIOS
- Automation PC 680
- Automation PC 810 / Automation PC 820 / Panel PC 800 B945GME BIOS
- Automation PC 810 / Panel PC 800 945GME N270 CPU Board BIOS
- Automation PC 810 / Panel PC 800 GM45 CPU Board BIOS
- Provit 2000 product family - IPC2000/2001/2002
- Provit 5000 product family - IPC5000/5600/5000C/5600C
- Power Panel 100 BIOS devices
- Mobile Panel 100 BIOS devices
- Power Panel 100 / Mobile Panel 100 user boot logo
- Power Panel 100 / Mobile Panel 100 REMHOST utility
- Power Panel 300/400 BIOS devices
- Power Panel 300/400 BIOS user boot logo
- Panel PC 310

##### Drivers for the devices

- Automation Device Interface (ADI)
- Audio
- Chipset
- CD-ROM
- LS120
- Graphics
- Network

- PCI / SATA RAID controller
- Touch screen
- Touchpad
- Interface board

**Firmware upgrades**

- Automation PC 620 / Panel PC 700 (MTCX, SDLR, SDLT)
- Automation PC 810 (MTCX, SDLR, SDLT)
- Automation PC 820 (MTCX, SDLR, SDLT)
- Mobile Panel 100 (SMCX)
- Panel PC 300 (MTCX)
- Power Panel 100 (aPCI)
- Power Panel 300/400 (aPCI)
- Power Panel 300/400 (MTCX)
- Panel PC 800 (MTCX, SDLR, SDLT)
- UPS firmware

**Utilities / Tools**

- B&R Embedded OS Installer
- Windows CE Tools
- User boot logo conversion program
- SATA RAID Installation Utility
- Automation Device Interface (ADI)
- CompactFlash lifespan calculator (Silicon Systems)
- Miscellaneous
- MTC utilities
- Key editor
- MTC & Mkey utilities
- Mkey utilities
- UPS configuration software
- ICU ISA configuration
- Intel PCI NIC boot ROM
- Diagnostics programs

**Windows**

- Windows CE 6.0
- Windows CE 5.0
- Windows CE 4.2
- Windows CE 4.1
- Windows CE Tools
- Windows Embedded Standard 2009
- Thin client
- Windows NT Embedded
- Windows XP Embedded
- VNC viewer

**MCAD templates for**

- Industrial PCs
- Visualization and operating devices
- Legend strip templates
- Custom designs



**ECAD templates for**

- Industrial PCs
- Automation PCs
- Automation Panel 900
- Panels (Power Panel)

**Documentation for**

- Automation PC 620
- Automation PC 680
- Automation PC 810
- Automation PC 820
- Automation Panel 800
- Automation Panel 900
- Panel PC 310
- Panel PC 700
- Panel PC 725
- Panel PC 800
- Power Panel 15/21/35/41
- Power Panel 100/200
- Power Panel 300/400
- Mobile Panel 40/50
- Mobile Panel 100/200
- Mobile Panel connection box
- Provit 2000
- Provit 3030
- Provit 4000
- Provit 5000
- Provit Benchmark
- Provit Mkey
- Windows CE 5.0 Help
- Windows CE 6.0 Help
- Windows NT Embedded application guide
- Windows XP Embedded application guide
- Uninterruptible power supply
- Implementation guides
- B&R Hilscher fieldbus cards (CANopen, DeviceNet, PROFIBUS, PROFINET)

**Service tools**

- Acrobat Reader 5.0.5 (freeware in German, English, and French)
- Power Archiver 6.0 (freeware in German, English, and French)
- Internet Explorer 5.0 (German and English)
- Internet Explorer 6.0 (German and English)

## 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. This prevents the possibility of inconsistent data (only functions if the UPS is already configured and the driver is activated).

### Information:

- **The panel/monitor is not buffered by the UPS and will shut off when the power fails.**
- **More detailed information about uninterruptible power supplies can be found in the user's manual for the external UPS. This can be downloaded from the B&R website.**

Because the charging circuit is integrated in the housing of the B&R Industrial PC, installation has been simplified to merely attaching the connection cable to the battery unit mounted next to the PC.

Special emphasis was placed on ease of maintenance when the battery unit was designed. Batteries are easily accessible from the front and can be switched in just a few moments when servicing.

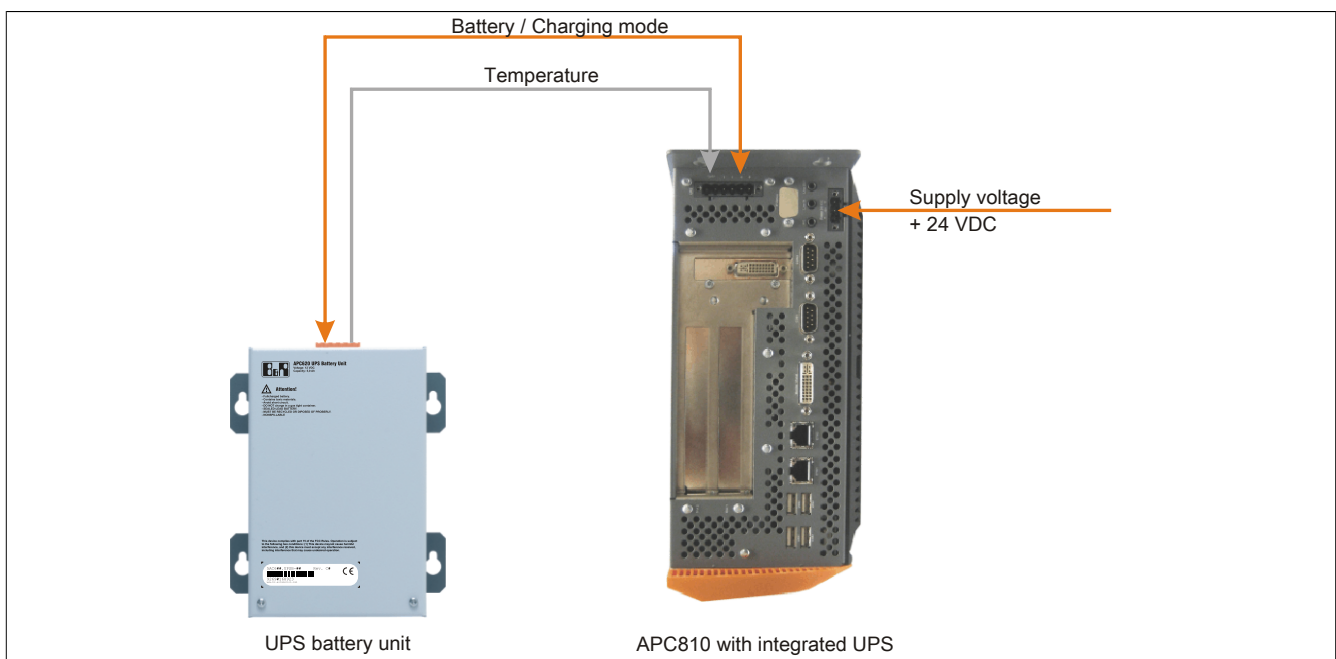


Figure 190: UPS principle

### 9.1 Features

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

### 9.2 Requirements

- An appropriate system unit.
- Add-on UPS module 5AC600.UPSI-00
- Battery unit 5AC600.UPSB-00
- UPS connection cable 0.5 m (5CAUPS.0005-00) or 3 m (5CAUPS.0030-00)
- For info regarding configuration of the B&R UPS using the ADI Control Center.

### 9.3 5AC600.UPSI-00

#### 9.3.1 General information

The add-on UPS module can easily be installed in an appropriate system unit (List of required revisions: see section 9.2 "Requirements" on page 366).

#### 9.3.2 Order data


Model number	Short description	Figure
	<b>Uninterruptible power supplies</b>	
5AC600.UPSI-00	UPS module for APC620, APC810, PPC800; for system units 5PC600.SX01-00 (from Rev. H0), 5PC600.SX02-00 (from Rev. G0), 5PC600.SX02-01 (from Rev. H0), 5PC600.SX05-00 (from Rev. F0), 5PC600.SX05-01 (from Rev. F0), 5PC600.SF03-00 (from Rev. A0), 5PC810.SX*, 5PC820.1505-00, 5PC820.1906-00. Cable (5CAUPS.0005-00 or 5CAUPS.0030-00) and battery unit (5AC600.UPSB-00) have to be ordered separately.	
	<b>Required accessories</b>	
	<b>Uninterruptible power supplies</b>	
5AC600.UPSB-00	Battery unit 5Ah; for APC620, APC800 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 280: 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 fully assembled device. The data specifications for the fully assembled device take precedence over those of individual components.

Product ID	5AC600.UPSI-00
<b>General information</b>	
Certification	
CE	Yes
cULus	Yes
GL	Yes
<b>Electrical characteristics</b>	
Power consumption	Max. 7.5 watts
Power failure bypass	max. 20 min bei 150 W Last
Deep discharge protection	Yes, at 10 V on the battery unit
Short circuit protection	No
<b>Battery charging data</b>	
Charging current	Max. 0.5 A
Switching threshold	
Battery operation	13 V
Mains operation	15 V
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
GL (GL)	Cat. C EMC 1
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
GL (GL)	Cat. C EMC 1

Table 281: 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 / Service".

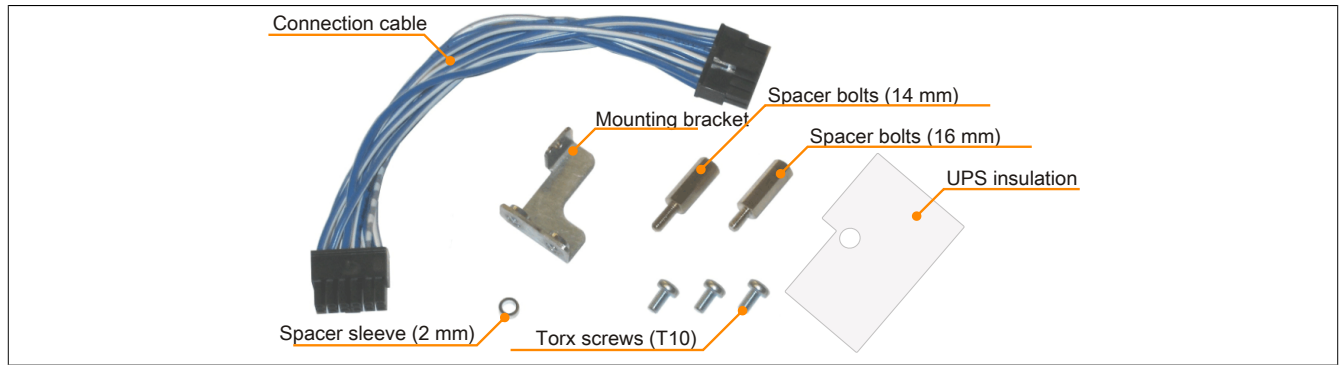


Figure 191: 5AC600.UPS-I-00 Add-on UPS module – Installation materials

## 9.4 5AC600.UPSB-00

### 9.4.1 General information

The battery unit has a limited lifespan and should be replaced regularly (after the specified service life at the latest).

### 9.4.2 Order data


Model number	Short description	Figure
	<b>Uninterruptible power supplies</b>	
5AC600.UPSB-00	Battery unit 5Ah; for APC620, APC800 or PPC800 UPS.	

Table 282: 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 fully assembled device. The data specifications for the fully assembled device take precedence over those of individual components.

Product ID	5AC600.UPSB-00	
Revision	D0	E0
General information		
Battery	Energys Cyclon 12 V 5 Ah (6 connected in series) 10 years <sup>1)</sup> 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 <sup>2)</sup>	No <sup>3)</sup>	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		
Mechanical characteristics		
Dimensions	104 mm <sup>4)</sup> 170.5 mm 87.5 mm	
Width		
Length		
Height		
Weight	Approx. 3200 g	

Table 283: 5AC600.UPSB-00, 5AC600.UPSB-00 - Technical data

Product ID	5AC600.UPSB-00
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
GL (GL)	Cat. C EMC 1
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
GL (GL)	Cat. C EMC 1

Table 283: 5AC600.UPSB-00, 5AC600.UPSB-00 - Technical data

- 1) At 25 °C (up to 80 % battery capacity)
- 2) 25 A fuse. Replacement fuses can be ordered separately whenever needed.
- 3) The fuse can be installed later in revisions up to and including D0. More information can be found in the "Maintenance / Service" chapter of the APC810 and PPC800 user's manuals.
- 4) Dimensions without mounting clips

#### 9.4.4 Temperature life span diagram up to 20% battery capacity.

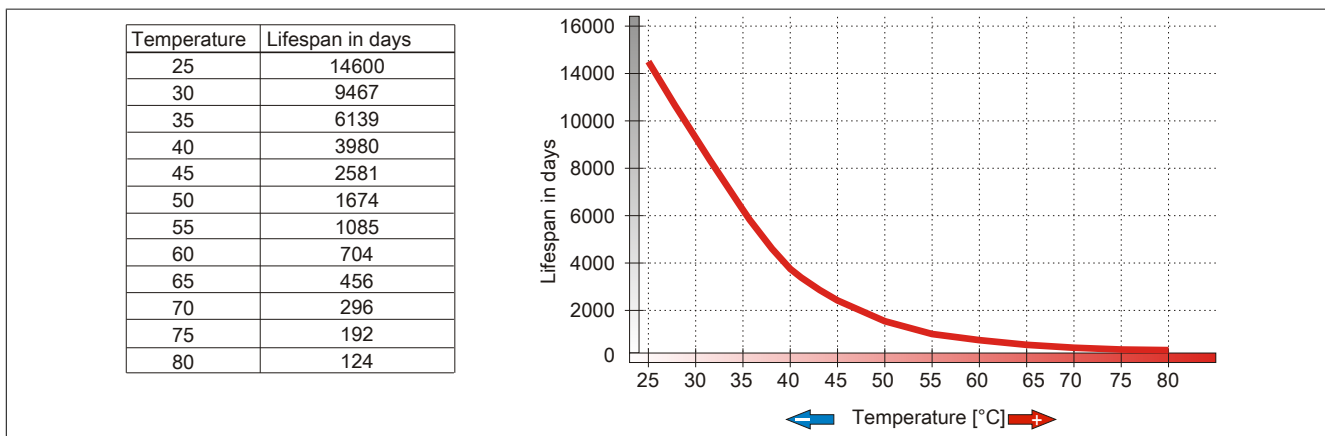


Figure 192: Temperature life span diagram

#### 9.4.5 Deep discharge cycles

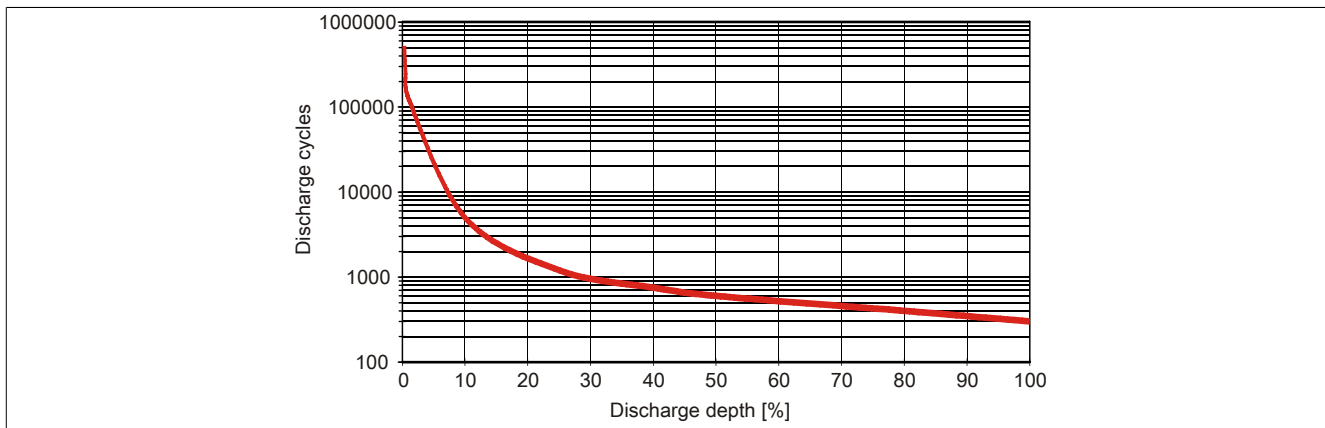


Figure 193: Deep discharge cycles

### 9.4.6 Dimensions

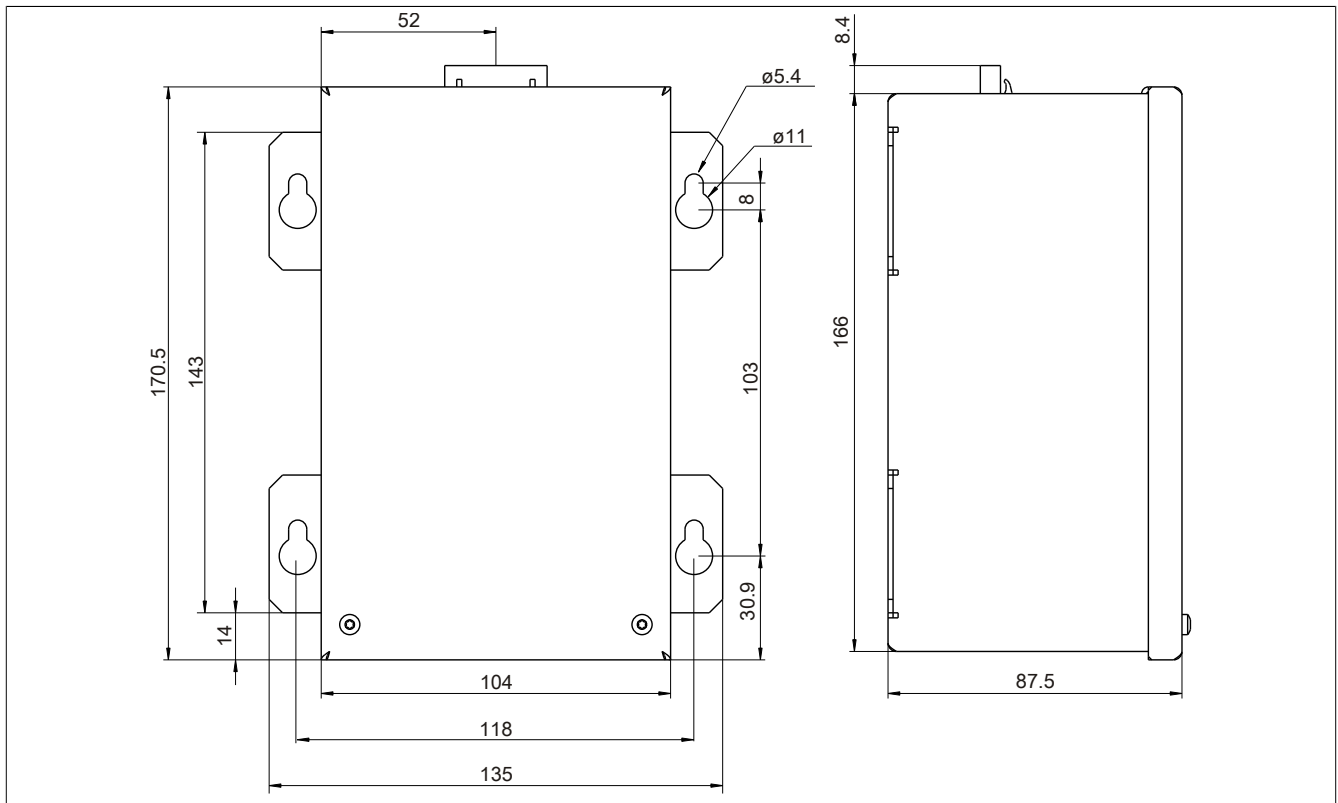


Figure 194: 5PC600.UPSB-00 - Dimensions

### 9.4.7 Drilling template

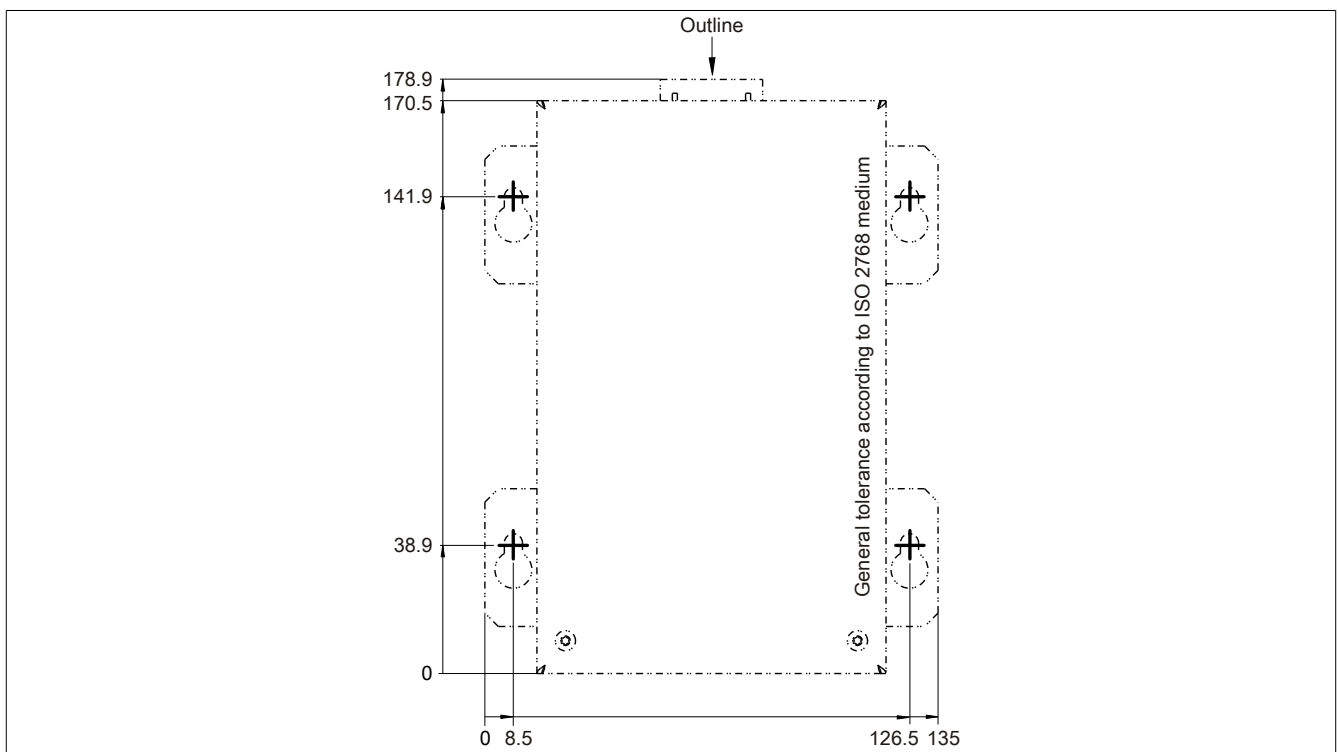


Figure 195: 5PC600.UPSB-00 - Drilling template

### 9.4.8 Mounting 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
	<b>Uninterruptible power supplies</b>	
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: 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 fully assembled device. The data specifications for the fully assembled device take precedence over those of individual components.

Product ID	5CAUPS.0005-00	5CAUPS.0030-00
General information		
Certification		
CE	Yes	
cULus	Yes	
GL	Yes	
Cable structure		
Wire cross section	2x 0.5 mm <sup>2</sup> (AWG 20) 4x 2.5 mm <sup>2</sup> (AWG 13)	
Conductor resistance	At 0.5 mm <sup>2</sup> max. 39 Ω/km At 2.5 mm <sup>2</sup> max. 7.98 Ω/km	
Outer sheathing		
Material	Thermoplastic PVC-based material	
Color	Window gray (similar to RAL 7040)	
Connector		
Type	6-pin plug with clamping yoke / 6-pin multipoint socket with clamping yoke	
Electrical characteristics		
Operating voltage	Max. 300 V	
Peak operating voltage	Typically 12 VDC / max. 15 VDC	
Test voltage		
Wire/Wire	1500 V	
Current load	10 A at 20°C	
Environmental conditions		
Temperature		
Moving	-5 to 80°C	
Static	-30 to 80°C	
Mechanical characteristics		
Dimensions		
Length	0.5 m	3 m
Diameter	8.5 mm ±0.2 mm	
Flex radius		
Moving	10x wire cross-section	
Fixed installation	5x wire cross-section	
Weight	Approx. 100 g	Approx. 470 g
Recommendations		
Specified standard		
CE (CE)	Yes	
UL 508 (cULus)	LISTED 14F2 BR	
GL (GL)	Cat. C EMC 1	
Recommendations		
Specified standard		
CE (CE)	Yes	
UL 508 (cULus)	LISTED 14F2 BR	
GL (GL)	Cat. C EMC 1	

Table 285: 5CAUPS.0005-00, 5CAUPS.0030-00 - Technical data



9.6 5AC600.UPSF-00

9.6.1 General information

The UPS fuse kit is intended to add a fuse for the battery unit 5AC600.UPSB-00.

Information about installing the 5AC600.UPSF-00 fuse kit can be found in the "Installing the UPS fuse kit on the battery unit" on page 427 section.

Information:

The 5AC600.UPSF-00 UPS fuse kit is only needed for battery units up to and including revision D0. A 25 A fuse is integrated on the connector circuit board beginning with revision E0.

9.6.2 Order data


Model number	Short description	Figure
	Uninterruptible power supplies	
5AC600.UPSF-00	USV Sicherungs Kit für Batterieeinheit 5AC600.UPSB-00 bis Revision D0.	

Table 286: 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	USV Sicherung, 5 Stück	

Table 287: 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 fulfill requirements regarding line-conducted disturbances in supply lines in accordance with the 2003 edition of GL (Germanischer Lloyd) EMC1.

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 Mains filter	

Table 288: 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 fully assembled device. The data specifications for the fully assembled device 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 <sup>2</sup>
Flexible	0.2 to 1.5 mm <sup>2</sup>
Inflexible	0.2 to 2.5 mm <sup>2</sup>
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
Recommendations	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
GL (GL)	Cat. C EMC 1
Recommendations	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
GL (GL)	Cat. C EMC 1

Table 289: 5AC804.MFLT-00 - Technical data

### 10.1.4 Dimensions

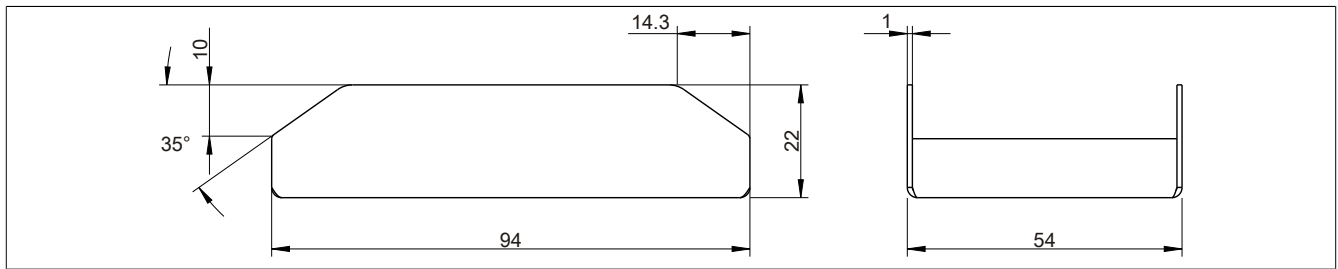


Figure 196: 5AC804.MFLT-00 - Dimensions

### 10.1.5 Drilling template

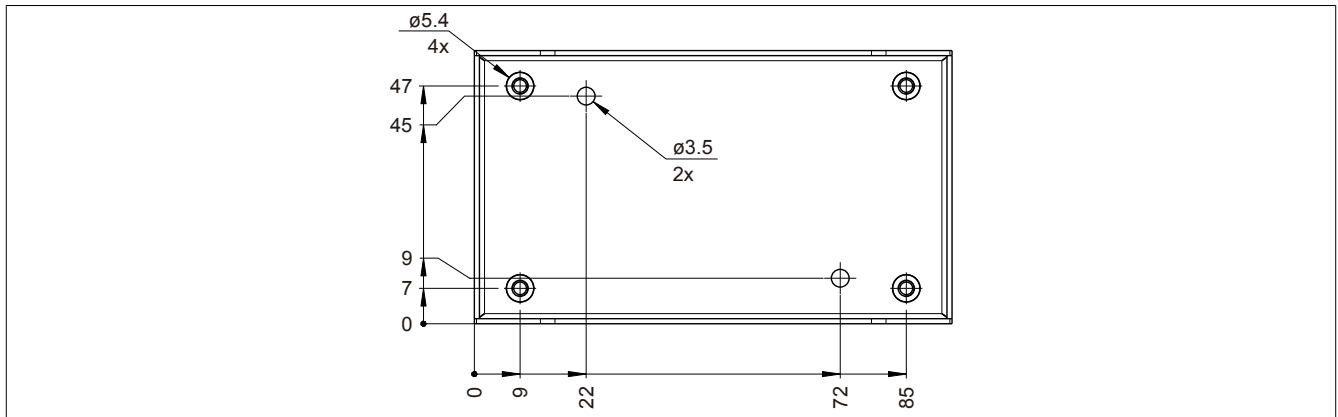


Figure 197: 5AC804.MFLT-00 - Drilling template

### 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.

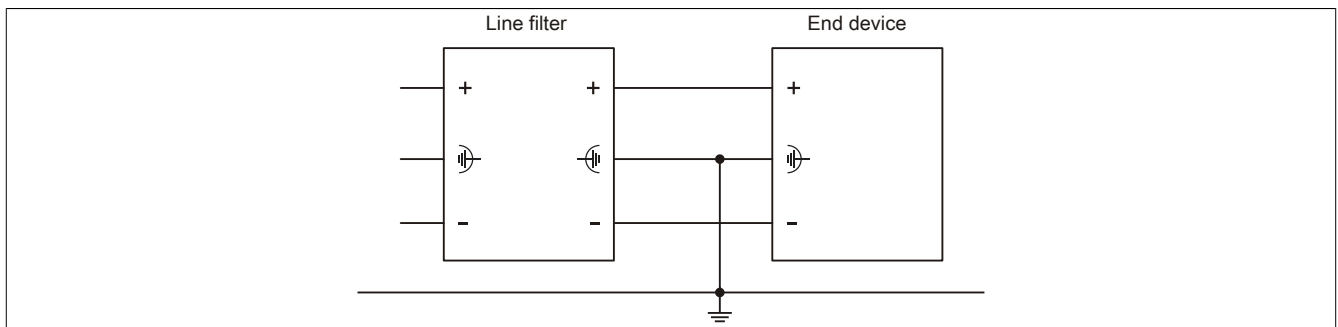


Figure 198: Connection example

11 PCI Insert cards

11.1 5ACPCI.ETH1-01

11.1.1 General information

The universal (3.3 V and 5 V) half-size PCI Ethernet card has a 10/100 Mbit/s network connection and can be inserted in a 16-bit PCI slot and operated as an additional network interface.

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



Figure 199: Order data - PCI Ethernet Card 10/100

11.1.2 Order data

Model number	Short description	Figure
<b>Accessories</b>		
5ACPCI.ETH1-01	PCI Ethernet card 1x 10/100	

Table 290: 5ACPCI.ETH1-01 - Order data

11.1.3 Technical data

Product ID	5ACPCI.ETH1-01
<b>General information</b>	
B&R ID code	\$A58A
Diagnostics	
Data transfer	Yes, using status LED
Certification	
CE	Yes
cULus	Yes
GL	Yes

Table 291: 5ACPCI.ETH1-01 - Technical data

Product ID	5ACPCI.ETH1-01
<b>Interfaces</b>	
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)
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
GL (GL)	Cat. C EMC 1
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
GL (GL)	Cat. C EMC 1

Table 291: 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 entire device. For the entire device in which this individual component is used, refer to the data given specifically for the entire device.

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

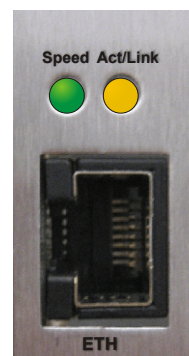


Table 292: 5ACPCI.ETH1-01 - Technical data

### 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](http://www.br-automation.com)).

#### Information:

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

### 11.1.5 Dimensions

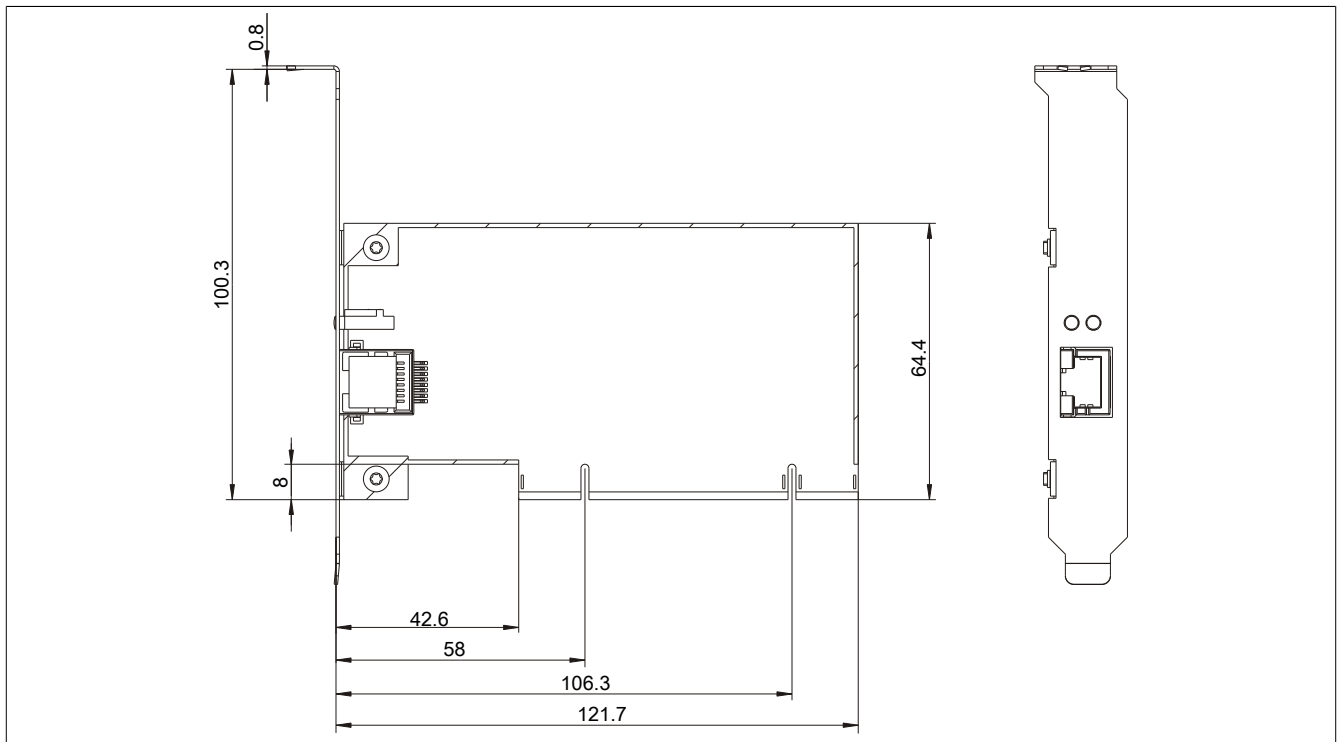


Figure 200: 5ACPCI.ETH1-01 - Dimensions

11.2 5ACPCI.ETH3-01

11.2.1 General information

The universal (3.3 V and 5 V) half-size PCI Ethernet card has three 10/100 Mbit/s network connections and can be inserted in a 16-bit PCI slot and operated as an additional network interface.

- PCI Ethernet card
- 3 network connections (10/100 Mbit/s)



Figure 201: 5ACPCI.ETH3-01 - PCI Ethernet card 10/100

11.2.2 Order data


Model number	Short description	Figure
<b>Accessories</b>		
5ACPCI.ETH3-01	PCI Ethernet card 3x 10/100	

Table 293: 5ACPCI.ETH3-01 - Order data

11.2.3 Technical data

Product ID	5ACPCI.ETH3-01
<b>General information</b>	
B&R ID code	\$A58B
Diagnostics Data transfer	Yes, using status LED
Certification CE cULus GL	Yes Yes Yes

Table 294: 5ACPCI.ETH3-01 - Technical data

Product ID	5ACPCI.ETH3-01
<b>Interfaces</b>	
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)
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
GL (GL)	Cat. C EMC 1
<b>Recommendations</b>	
Specified standard	
CE (CE)	Yes
UL 508 (cULus)	LISTED 14F2 BR
GL (GL)	Cat. C EMC 1

Table 294: 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 entire device. For the entire device in which this individual component is used, refer to the data given specifically for the entire device.

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

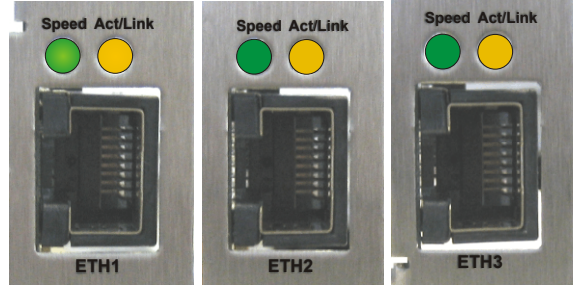


Table 295: 5ACPCI.ETH3-01 - Technical data

### 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](http://www.br-automation.com)).

#### Information:

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



### 11.2.5 Dimensions

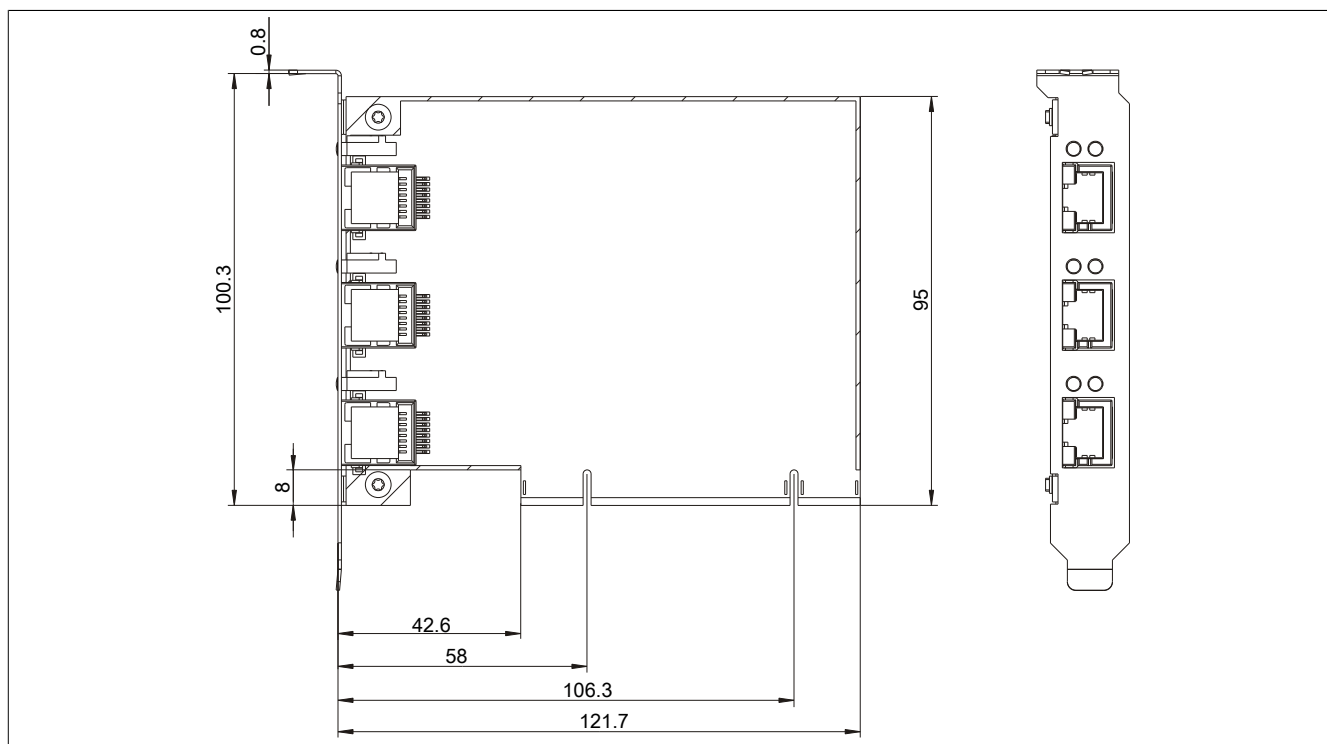


Figure 202: 5ACPCI.ETH3-01 - Dimensions

## 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 to be used for 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
	<b>DVI cable</b>	
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 296: 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 Cu mesh, optical coverage > 86%		
Outer sheathing			
Material	PVC		
Color	Beige		
Labeling	AWM STYLE 20276 80°C 30V VW1 DVI DIGITAL SINGLE LINK DER AN		
Connector			
Type	2x DVI-D (18+1), male		
Connection cycles	100		
Electrical characteristics			
Conductor resistance	Max. 237 Ω/km		
Insulation resistance	Min. 100 MΩ/km		
Mechanical characteristics			
Dimensions			
Length	1.8 m ±50 mm	5 m ±80 mm	10 m ±100 mm
Diameter	Max. 8.5 mm		
Flex radius	≥ 5x cable diameter (plug - ferrite magnet and ferrite magnet - ferrite magnet)		
Weight	Approx. 260 g	Approx. 460 g	Approx. 790 g
Recommendations			
Specified standard			
CE (CE)	Yes		
UL 508 (cULus)	LISTED 14F2 BR		
GL (GL)	Cat. C EMC 1		
Recommendations			
Specified standard			
CE (CE)	Yes		
UL 508 (cULus)	LISTED 14F2 BR		
GL (GL)	Cat. C EMC 1		

Table 297: 5CADVI.0018-00, 5CADVI.0050-00, 5CADVI.0100-00 - Technical data

12.1.1.4 Flex radius specifications

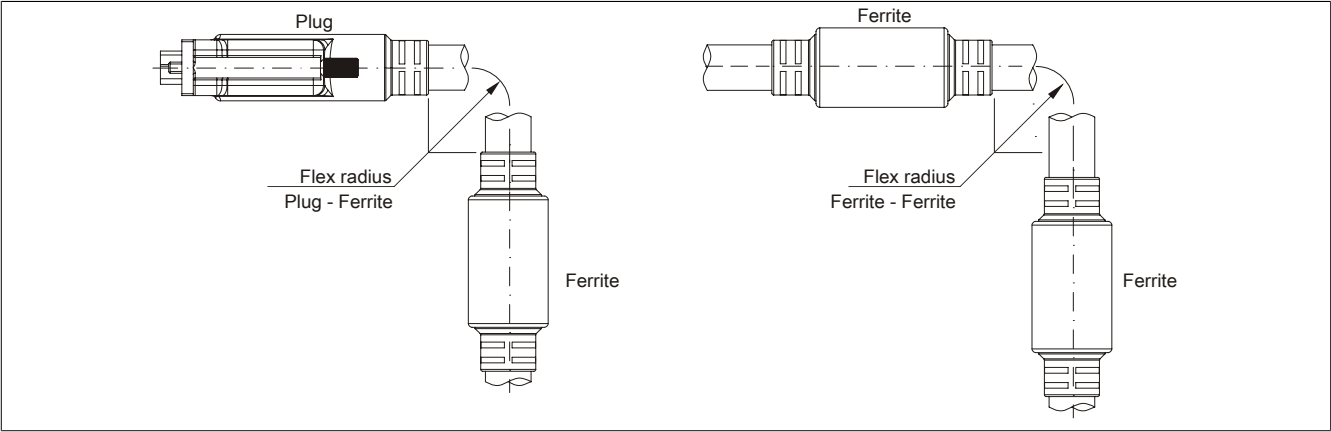


Figure 203: Flex radius specifications

12.1.1.5 Dimensions

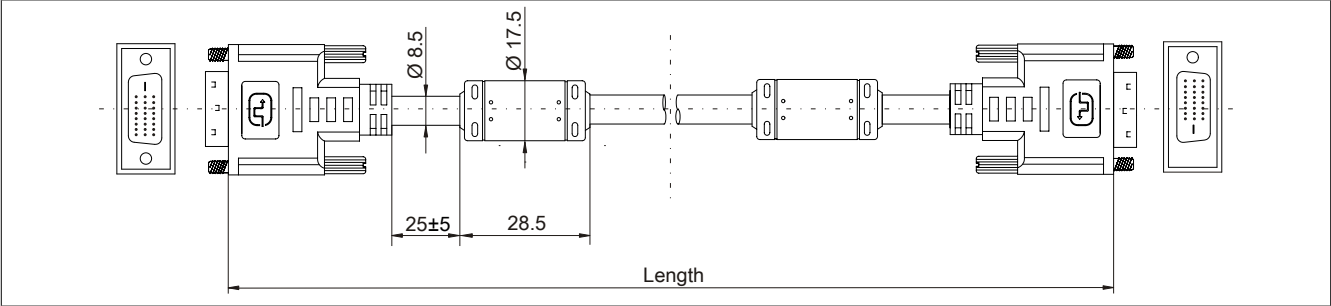


Figure 204: 5CADVI.0xxx-00 - Dimensions

## 12.1.1.6 Cable specifications

**Warning!**

If you choose to build a suitable cable yourself, it should be wired according to these specifications.

If a self-built cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly.

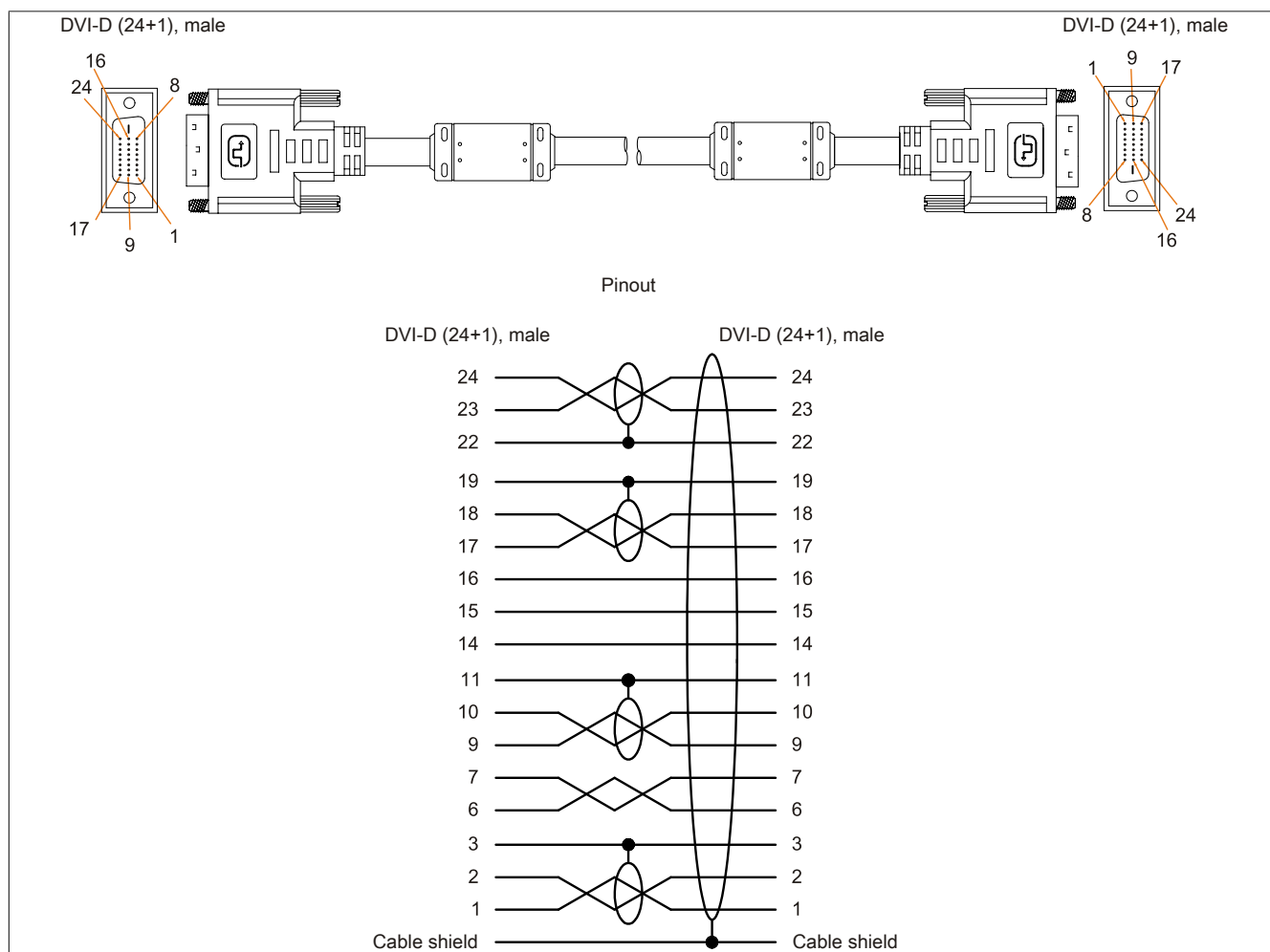


Figure 205: 5CADVI.0xxx-00 - Pinout

## 12.2 SDL cables

### 12.2.1 5CASDL.0xxx-00

#### 12.2.1.1 General information

5CASDL.0xxx-00 SDL cables are designed to be used for inflexible applications. Use of the SDL flex cable 5CASDL.0xxx-03 is 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
	<b>SDL cables</b>	
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 298: 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 Yes Yes						
CE							
cULus							
GL							
Cable structure							
Wire cross section	AWG 28		AWG 24				
Shield	Individual cable pairs and entire cable						
Cable shielding	Tinned Cu mesh, optical coverage > 85%						
Outer sheathing	PVC Black E74020-C (UL) AWM STYLE 20176 80°C 30V VW-1 DVI DIGITAL LINK						
Material							
Color							
Labeling							
Connector							
Type	2x DVI-D (24+1), male						
Connection cycles	100						
Contacts	Gold plated						
Mechanical protection	Metal cover with crimped stress relief						
Electrical 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 (plug - ferrite magnet and ferrite magnet - ferrite magnet)						
Flexibility	Limited flexibility; valid for ferrite magnet - ferrite magnet (tested 100 cycles with 5x cable diameter, 20 cycles / minute)						
Weight	Approx. 300 g	Approx. 580 g	Approx. 1500 g	Approx. 2250 g	Approx. 2880 g	Approx. 4800 g	Approx. 5520 g
Recommendations							
Specified standard	Yes LISTED 14F2 BR Cat. C EMC 1						
CE (CE)							
UL 508 (cULus)							
GL (GL)							

Table 299: 5CASDL.0018-00, 5CASDL.0050-00, 5CASDL.0100-00, 5CASDL.0150-00, 5CASDL.0200-00, 5CASDL.0250-00, 5CASDL.0300-00 - 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
<b>Recommendations</b>							
Specified standard	Yes						
CE (CE)	LISTED 14F2 BR						
UL 508 (cULus)	Cat. C EMC 1						
GL (GL)							

Table 299: 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

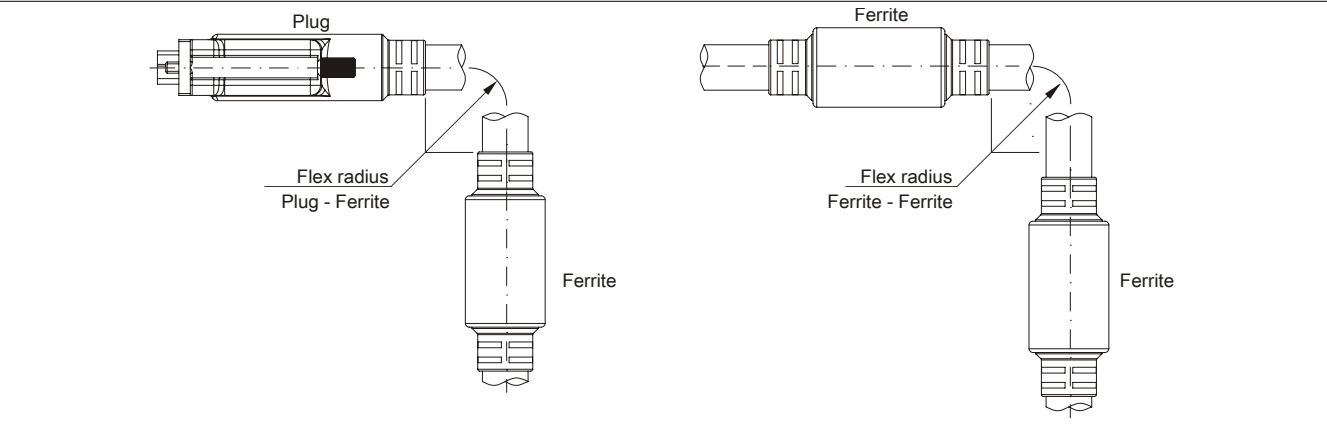


Figure 206: Flex radius specifications

12.2.1.5 Dimensions

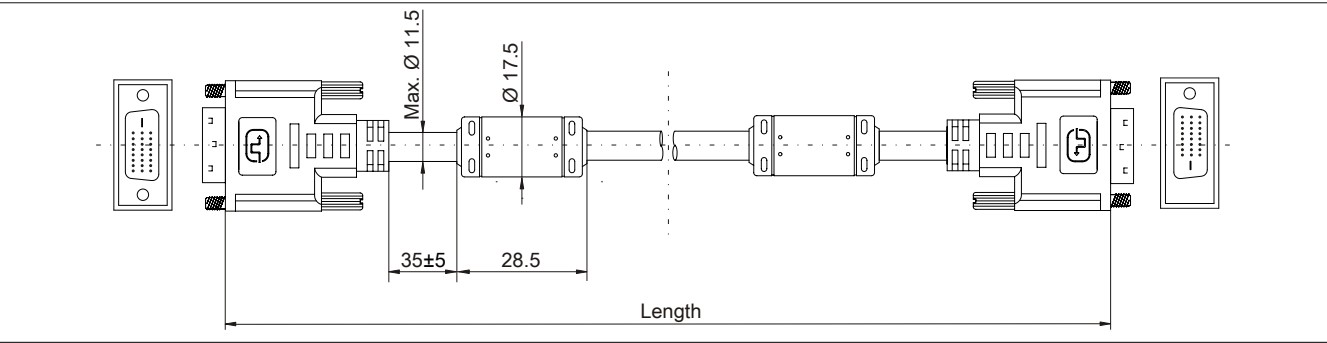


Figure 207: 5CASDL.0xxx-00- Dimensions

12.2.1.6 Cable specifications

Warning!

If you choose to build a suitable cable yourself, it should be wired according to these specifications. If a self-built cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly.

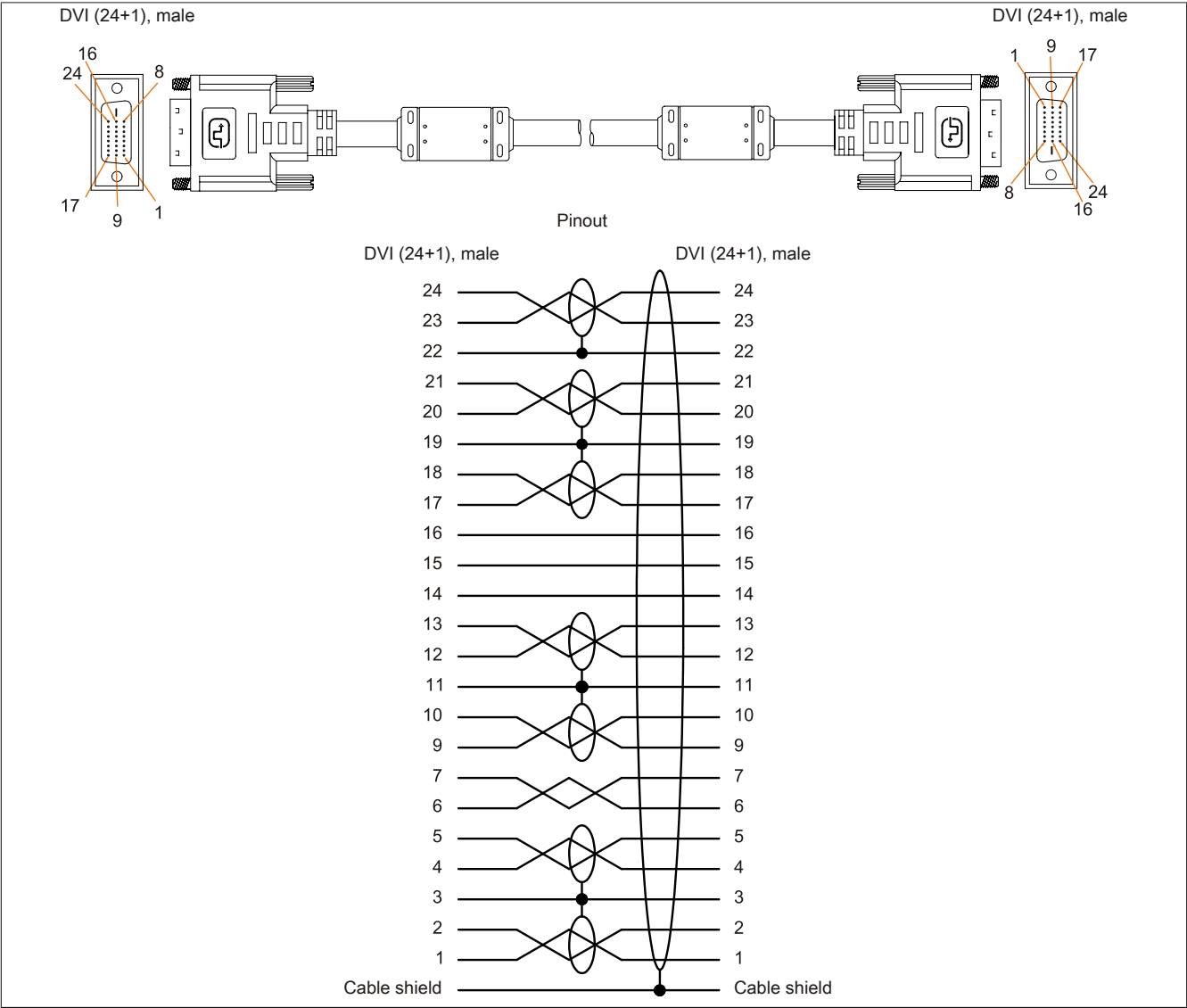


Figure 208: 5CASDL.0xxx-00- Pinout

## 12.3 SDL cables with 45° connector

### 12.3.1 5CASDL.0xxx-01

#### 12.3.1.1 General information

5CASDL.0xxx-01 SDL cables with 45° plugs are designed for a fixed layout.

### Caution!

Power must be turned off before plugging in and unplugging cables.

#### 12.3.1.2 Order data


Model number	Short description	Figure
	<b>SDL cable - 45° connector</b>	
5CASDL.0018-01	SDL cable; 45° connector, 1.8 m.	
5CASDL.0050-01	SDL cable; 45° connector, 5 m.	
5CASDL.0100-01	SDL cable; 45° connector, 10 m.	
5CASDL.0150-01	SDL cable; 45° connector, 15 m.	

Table 300: 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 Cu mesh, optical coverage > 85%			
Outer sheathing	PVC Black			
Material				
Color				
Connector				
Type	2x DVI-D (24+1), male			
Connection cycles	100			
Contacts	Gold plated			
Mechanical protection	Metal cover with crimped stress relief			
Electrical 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 (plug - ferrite magnet and ferrite magnet - ferrite magnet)			
Fixed installation				
Flexibility	Limited flexibility; valid for ferrite magnet - ferrite magnet (tested 100 cycles with 5x cable diameter, 20 cycles / minute)			
Weight	Approx. 300 g	Approx. 590 g	Approx. 2800 g	Approx. 2860 g
Recommendations				
Specified standard	Yes LISTED 14F2 BR Cat. C EMC 1			
CE (CE)				
UL 508 (cULus)				
GL (GL)				
Recommendations				
Specified standard	Yes LISTED 14F2 BR Cat. C EMC 1			
CE (CE)				
UL 508 (cULus)				
GL (GL)				

Table 301: 5CASDL.0018-01, 5CASDL.0050-01, 5CASDL.0100-01, 5CASDL.0150-01 - Technical data



12.3.1.4 Flex radius specifications

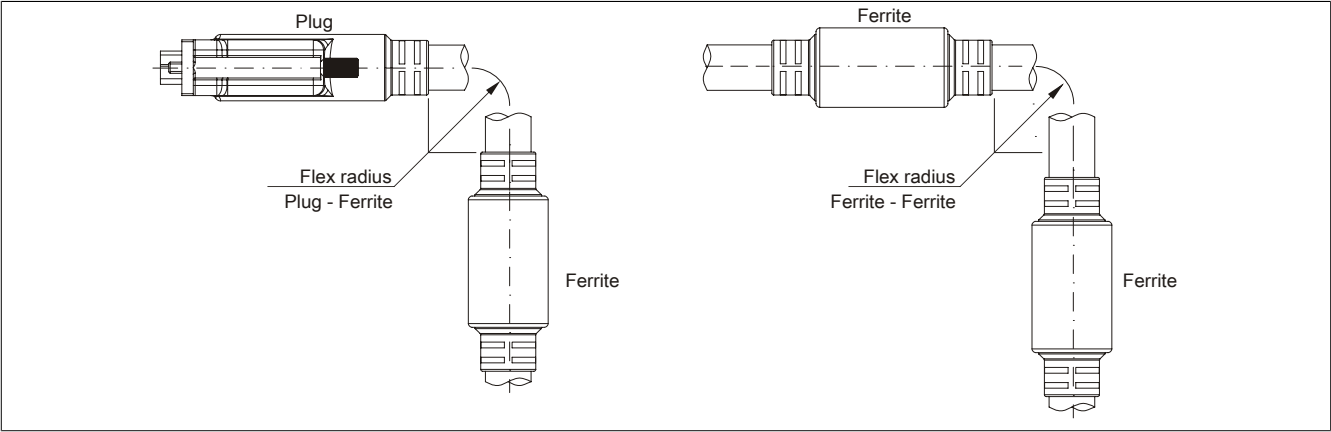


Figure 209: Flex radius specifications

12.3.1.5 Dimensions

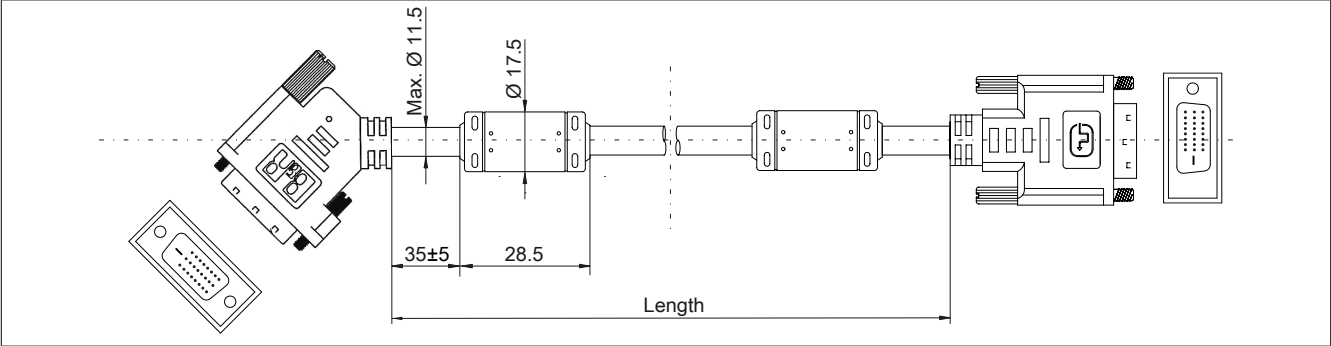


Figure 210: 5CASDL.0xxx-01 - Dimensions

## 12.3.1.6 Cable specifications

**Warning!**

If you choose to build a suitable cable yourself, it should be wired according to these specifications. If a self-built cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly.

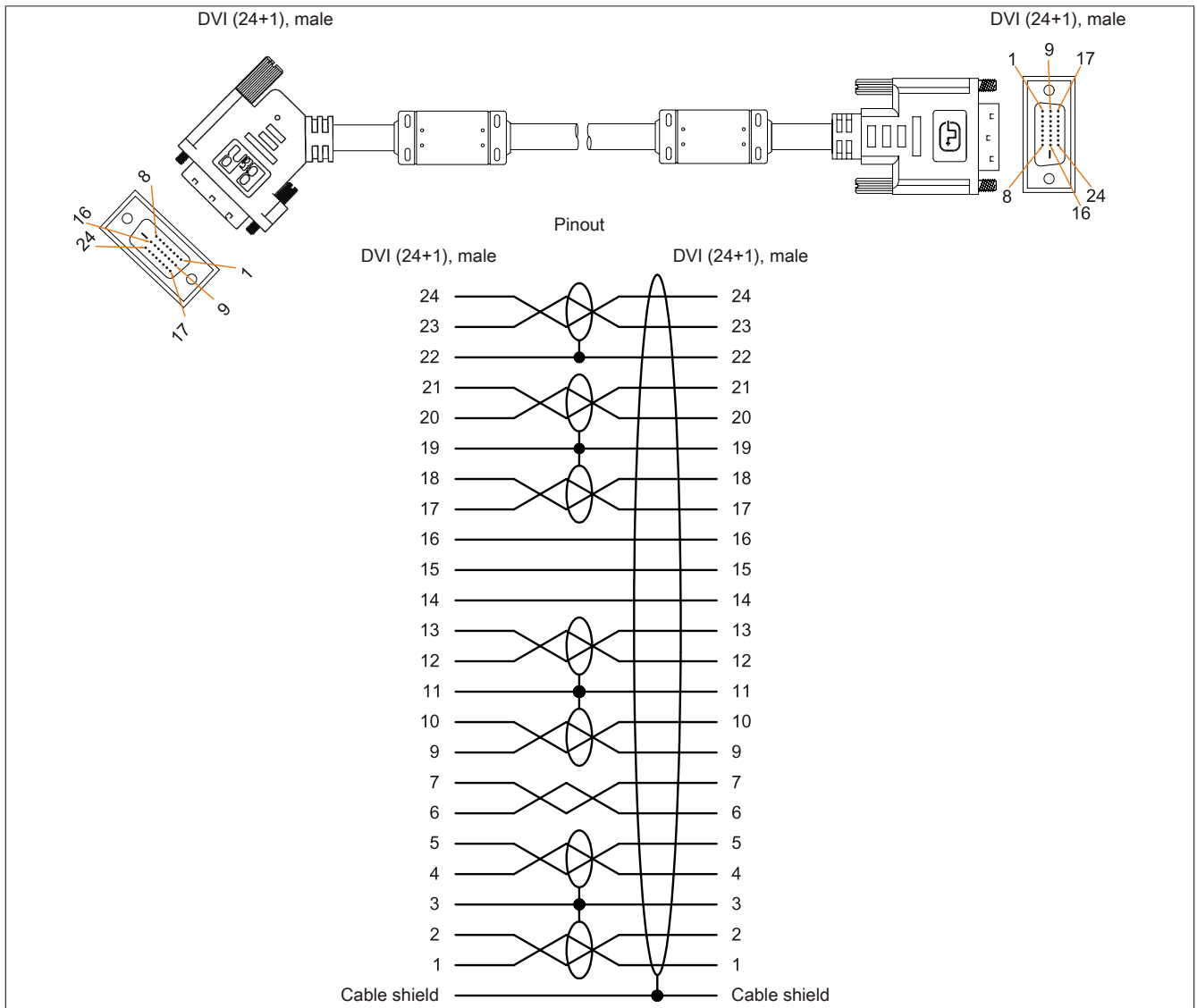


Figure 211: 5CASDL.0xxx-01 - Pinout

## 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. swing 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
	<b>SDL flex cable</b>	
5CASDL.0018-03	SDL Cable flex, 1.8 m.	
5CASDL.0050-03	SDL cable flex, 5 m.	
5CASDL.0100-03	SDL cable flex, 10 m.	
5CASDL.0150-03	SDL cable flex, 15 m.	
5CASDL.0200-03	SDL cable flex, 20 m.	
5CASDL.0250-03	SDL cable flex, 25 m.	
5CASDL.0300-03	SDL cable flex, 30 m.	

Table 302: 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	Free of halogen and silicon						
Shield	Individual cable pairs and entire cable						
Cable shielding	Aluminum foil clad + tinned copper mesh						
Outer sheathing	Special TMPU - semi gloss Black (B&R) SDL Cable (UL) AWM 20236 80°C 30V E 63216						
Material							
Color							
Labeling							
Connector							
Type	2x DVI-D (24+1), male						
Connection cycles	Min. 200						
Contacts	Gold plated						
Mechanical protection	Metal cover with crimped stress relief						
Electrical characteristics							
Operating voltage	≤ 30 V						
Test voltage	1 kV						
Wire/Wire							
Wire/Shield	0.5 kV						
Wave impedance	100 ±10 Ω						
Conductor resistance	≤95 Ω/km ≤145 Ω/km						
AWG 24							
AWG 26							
Insulation resistance	> 200 MΩ/km						
Operating conditions							
Approbation	UL AWM 20236 80 °C 30 V						
Flame resistant	In accordance with UL758 (cable vertical flame test)						
Oil and hydrolysis resistance	According to VDE 0282-10						

Table 303: 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							
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 (from plug - ferrite magnet) ≥ 10x cable diameter (from ferrite magnet - ferrite magnet) ≥ 15x cable diameter (from ferrite magnet - ferrite magnet)						
Fixed installation							
Flexible installation							
Flexibility	Flexible; valid for ferrite magnet - ferrite magnet (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							
Recommendations							
Specified standard	Yes LISTED 14F2 BR Cat. C EMC 1						
CE (CE)							
UL 508 (cULus)							
GL (GL)							
Recommendations							
Specified standard	Yes LISTED 14F2 BR Cat. C EMC 1						
CE (CE)							
UL 508 (cULus)							
GL (GL)							

Table 303: 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

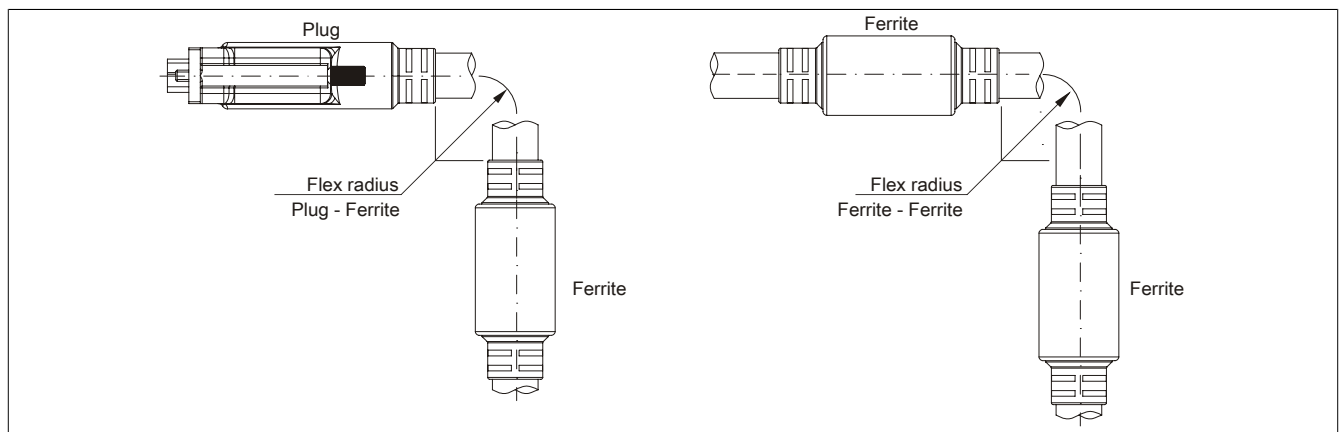


Figure 212: Flex radius specifications

12.4.1.5 Dimensions

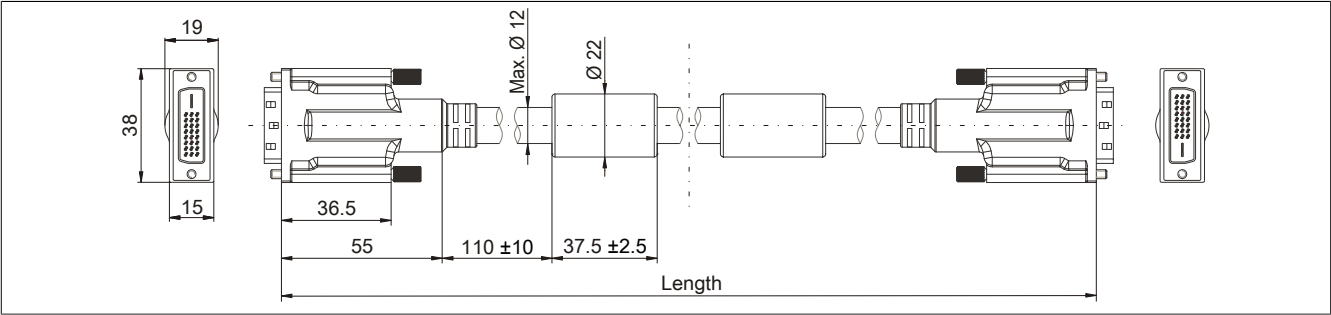


Figure 213: 5CASDL.0xxx-03 - Dimensions

12.4.1.6 Structure

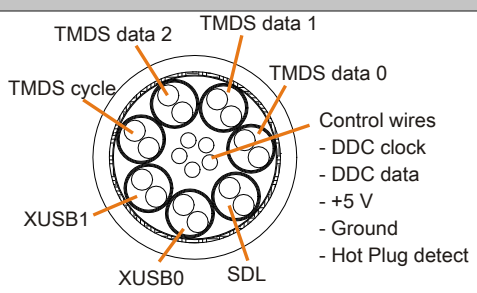
Element	Assignment	Cross section	
DVI	TMDS data 0	26 AWG	
	TMDS data 1	26 AWG	
	TMDS data 2	26 AWG	
	TMDS cycle	26 AWG	
USB	XUSB0	26 AWG	
	XUSB1	26 AWG	
Data	SDL	26 AWG	
	DDC cycle	24 AWG	
Control wires	DDC data	24 AWG	
	+5 V	24 AWG	
	Mass	24 AWG	
	Hot plug detect	24 AWG	

Table 304: 5CASDL.0xxx-03 SDL flex cables - Structure

12.4.1.7 Cable specifications

Warning!

If you choose to build a suitable cable yourself, it should be wired according to these specifications. If a self-built cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly.

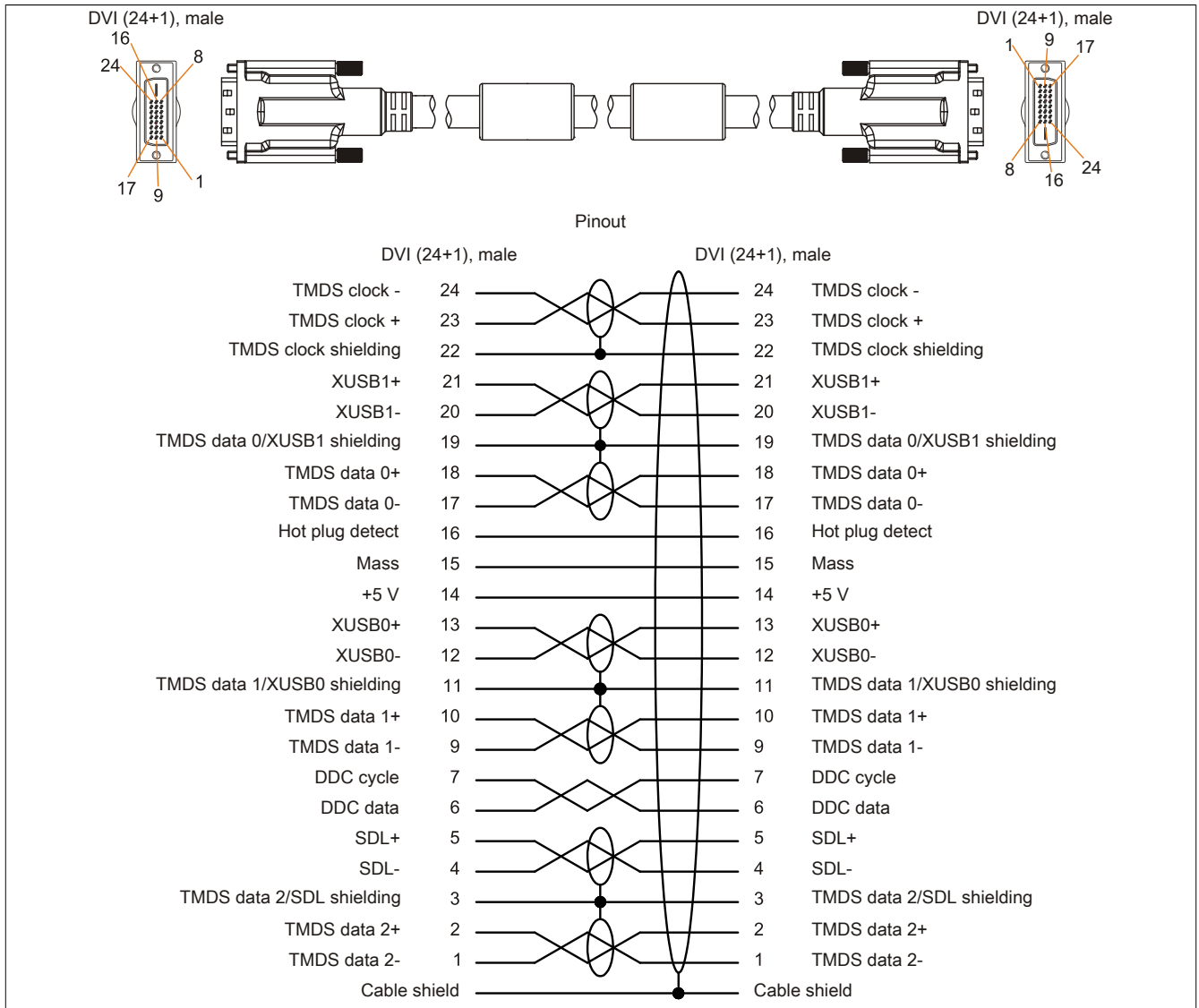


Figure 214: 5CASDL.0xxx-03- Pinout

## 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. swing arm systems).

### Caution!

Power must be turned off before plugging in and unplugging cables.

#### 12.5.1.2 Order data

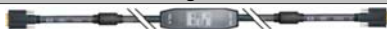
Model number	Short description	Figure
	<b>SDL flex cable</b>	
5CASDL.0300-13	SDL cable flex with extender, 30 m.	
5CASDL.0400-13	SDL cable flex with extender, 40 m.	
5CASDL.0430-13	SDL Cable flex with extender, 43 m.	

Table 305: 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	Free of halogen and silicon		
Shield	Individual cable pairs and entire cable		
Cable shielding	Aluminum foil clad + tinned copper mesh		
Outer sheathing			
Material	Special TMPU - semi gloss		
Color	Black		
Labeling	(B&R) SDL cable (UL) AWM 20236 80°C 30V E63216		
Connector			
Type	2x DVI-D (24+1), male		
Connection cycles	Min. 200		
Contacts	Gold plated		
Mechanical protection	Metal cover with crimped stress relief		
Electrical characteristics			
Operating voltage	≤ 30 V		
Test voltage			
Wire/Wire	1 kV		
Wire/Shield	0.5 kV		
Wave impedance	100 ±10 Ω		
Conductor resistance			
AWG 24	≤95 Ω/km		
AWG 26	≤145 Ω/km		
Insulation resistance	> 200 MΩ/km		
Operating conditions			
Approbation	UL AWM 20236 80 °C 30 V		
Flame resistant	In accordance with UL758 (cable vertical flame test)		
Oil and hydrolysis resistance	According to VDE 0282-10		
Environmental conditions			
Temperature			
Storage	-20 to 60°C		
Moving	-5 to 60°C		
Fixed installation	-20 to 60°C		

Table 306: 5CASDL.0300-13, 5CASDL.0400-13, 5CASDL.0430-13 - Technical data

Product ID	5CASDL.0300-13		5CASDL.0400-13	5CASDL.0430-13
Mechanical characteristics				
Dimensions				
Length	30 m ±280 mm		40 m ±380 mm	43 m ±410 mm
Diameter			Max. 12 mm	
Extender box				
Width			35 mm	
Length			125 mm	
Height			18.5 mm	
Flex radius				
Fixed installation	≥ 6x cable diameter (from plug - ferrite magnet)			
	≥ 10x cable diameter (from ferrite magnet - ferrite magnet)			
Flexible installation	≥ 15x cable diameter (from ferrite magnet - ferrite magnet)			
Flexibility	Flexible; valid for ferrite magnet - ferrite magnet (tested 300,000 cycles with 15x cable diameter, 4800 cycles / hour)			
Drag chain data				
Flex cycles	300,000			
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			
Recommendations				
Specified standard				
CE (CE)	Yes			
UL 508 (cULus)	LISTED 14F2 BR			
GL (GL)	Cat. C EMC 1			
Recommendations				
Specified standard				
CE (CE)	Yes			
UL 508 (cULus)	LISTED 14F2 BR			
GL (GL)	Cat. C EMC 1			

Table 306: 5CASDL.0300-13, 5CASDL.0400-13, 5CASDL.0430-13 - Technical data

### 12.5.1.4 Flex radius specifications

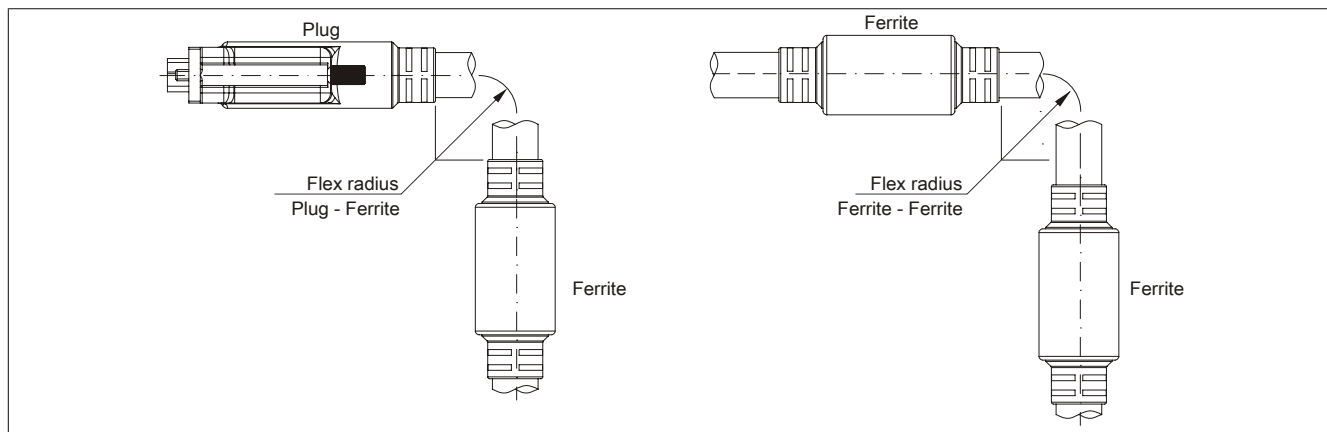


Figure 215: Flex radius specifications

### 12.5.1.5 Dimensions

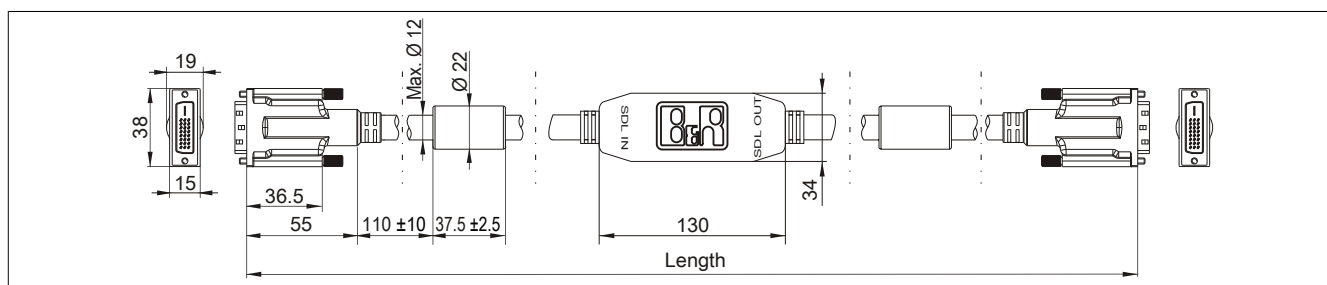


Figure 216: 5CASDL.0xx0-13- Dimensions



12.5.1.6 Cable specifications

Warning!

If you choose to build a suitable cable yourself, it should be wired according to these specifications.  
If a self-built cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly.

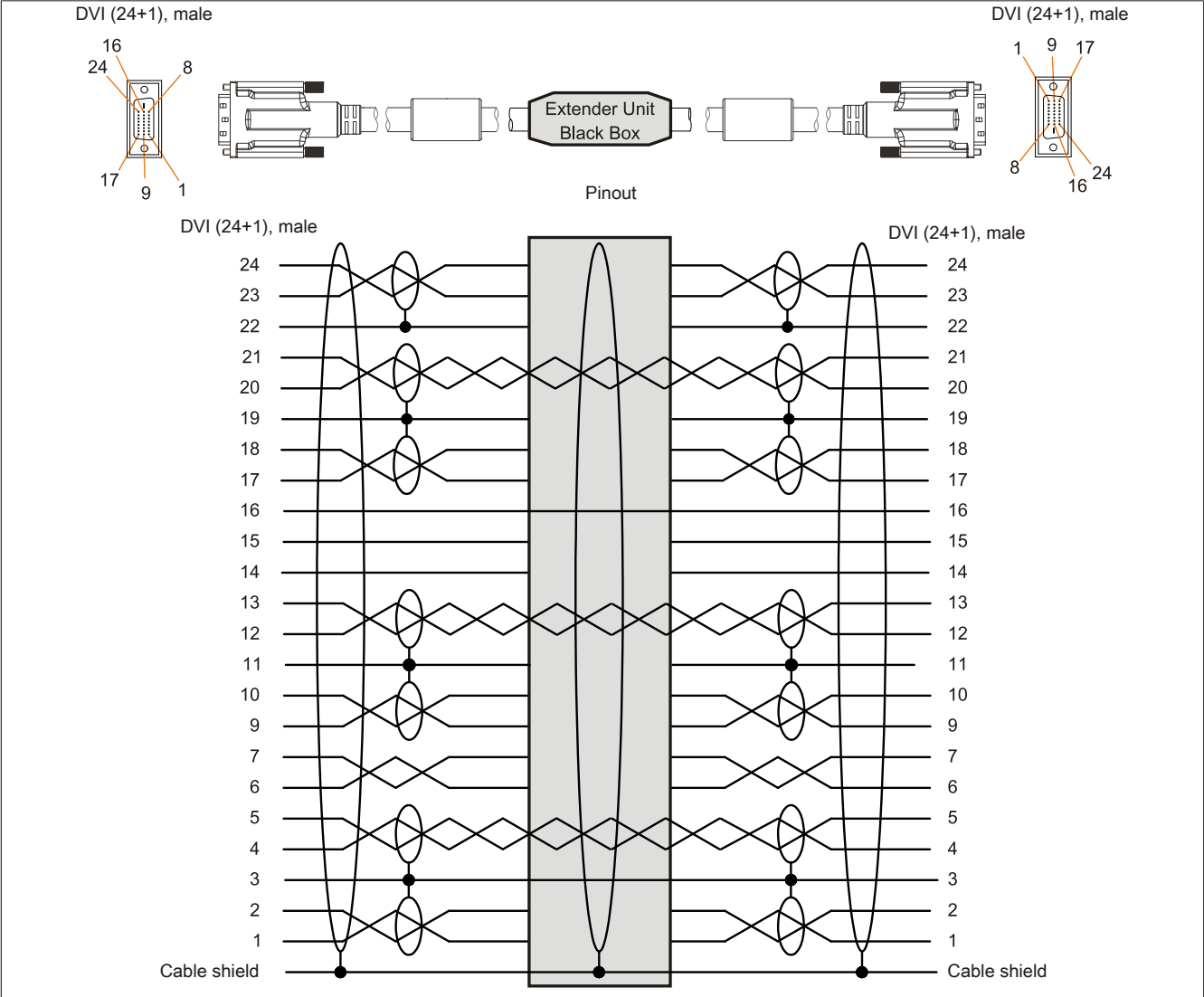


Figure 217: 5CASDL.0xx0-13 - Pinout

### 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 signal direction is indicated on the extender for this purpose.

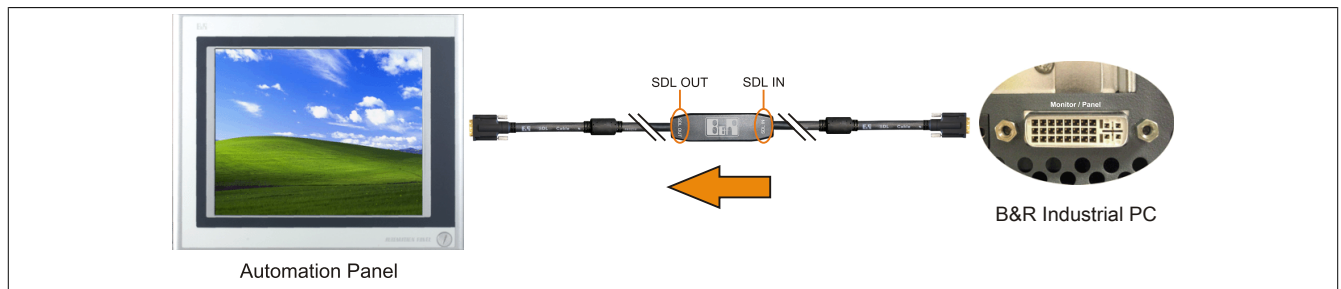


Figure 218: Example of the signal direction for an SDL flex cable with extender

## 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
	<b>USB cable</b>	
5CAUSB.0018-00	USB 2.0 connecting cable type A - type B, 1.8 m.	
5CAUSB.0050-00	USB 2.0 connecting cable type A - type B, 5 m.	

Table 307: 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	
Recommendations		
Specified standard		
CE (CE)	Yes	
UL 508 (cULus)	LISTED 14F2 BR	
Recommendations		
Specified standard		
CE (CE)	Yes	
UL 508 (cULus)	LISTED 14F2 BR	

Table 308: 5CAUSB.0018-00, 5CAUSB.0050-00 - Technical data

#### 12.6.1.4 Cable specifications

### Warning!

If you choose to build a suitable cable yourself, it should be wired according to these specifications.

If a self-built cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly.

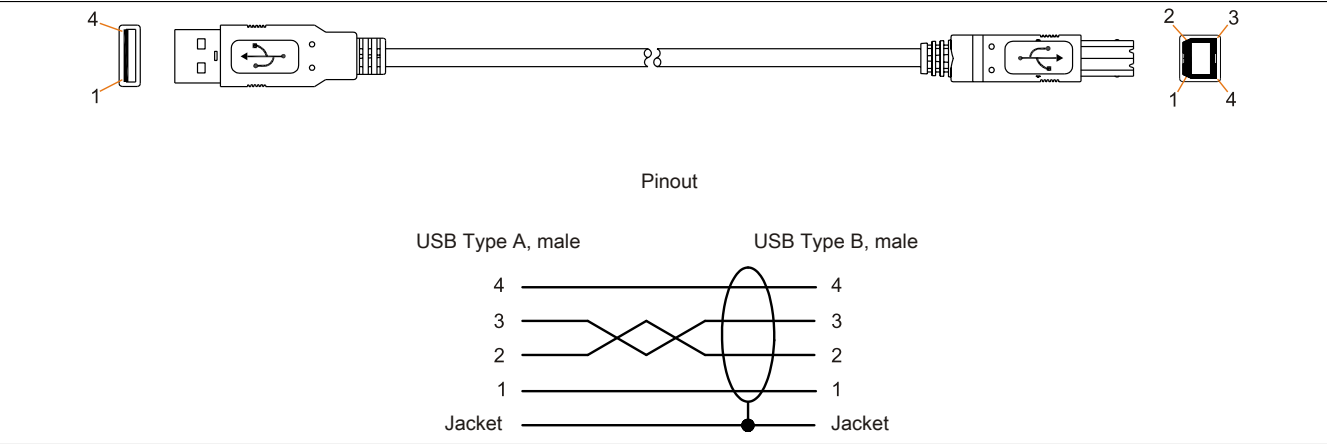


Figure 219: 5CAUSB.00xx-00 USB cables - Pinout

## 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
	<b>RS232 cable</b>	
9A0014.02	RS232 extension cable for remote operating of a display unit with touch screen, 1.8 m.	
9A0014.05	RS232 extension cable for remote operating of a display unit with touch screen, 5 m.	
9A0014.10	RS232 extension cable for remote operating of a display unit with touch screen, 10 m.	

Table 309: 9A0014.02, 9A0014.05, 9A0014.10 - Order data

#### 12.7.1.3 Technical data

Product ID	9A0014.02	9A0014.05	9A0014.10
<b>General information</b>			
Certification CE		Yes	
<b>Cable structure</b>			
Wire cross section		AWG 26	
Shield		Entire cable	
Outer sheathing Color		Beige	
<b>Connector</b>			
Type		9-pin DSUB socket, male / female	
<b>Mechanical characteristics</b>			
Dimensions			
Length	1.8 m ±50 mm	5 m ±80 mm	10 m ±100 mm
Diameter		Max. 5 mm	
Flex radius		Min. 70 mm	
<b>Recommendations</b>			
Specified standard CE (CE)		Yes	
<b>Recommendations</b>			
Specified standard CE (CE)		Yes	

Table 310: 9A0014.02, 9A0014.05, 9A0014.10 - Technical data

12.7.1.4 Cable specifications

Warning!

If you choose to build a suitable cable yourself, it should be wired according to these specifications. If a self-built cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly.

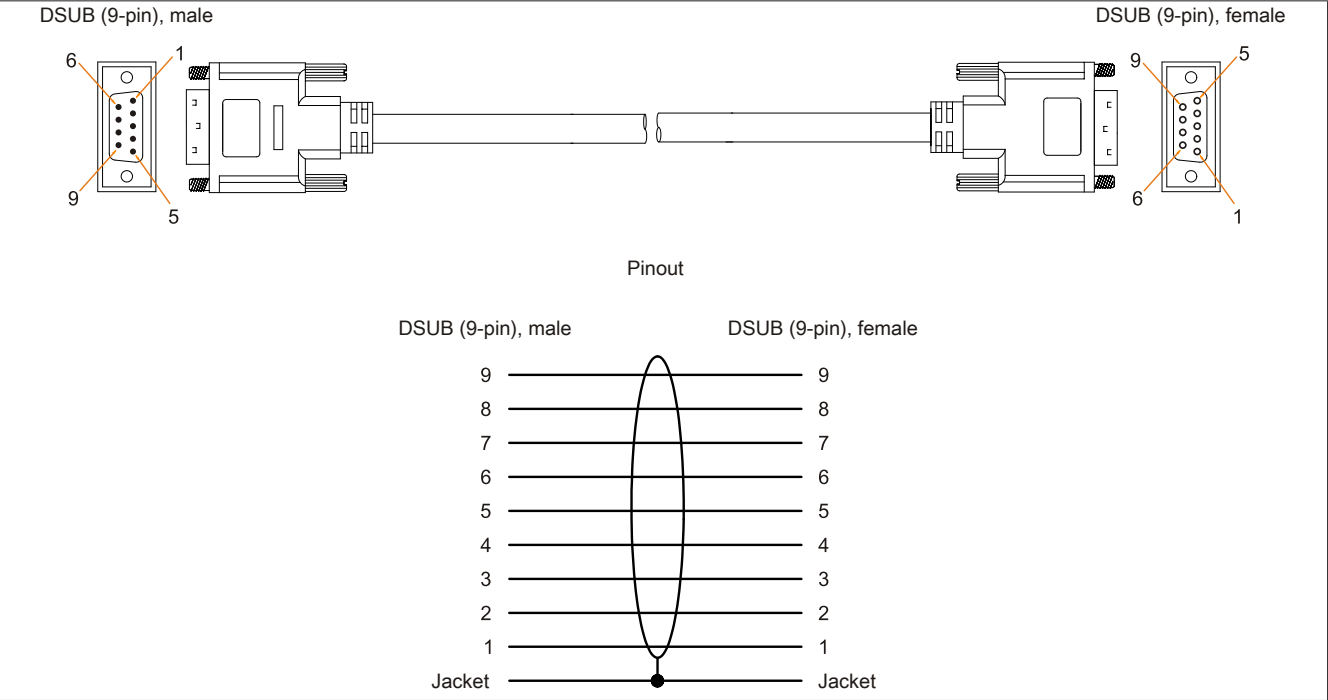


Figure 220: 9A0014.xx - RS232 cable pinout

## 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 supply special PCI cards. It is connected to the mainboard. For requirements and procedures, see "Connecting an external device to the mainboard" on page 439.

### Caution!

Power must be turned off before plugging in and unplugging cables.

#### 12.8.1.2 Order data


Model number	Short description	Figure
5CAMSC.0001-00	Internal power supply cable	

Table 311: 5CAMSC.0001-00 - Order data

#### 12.8.1.3 Technical data

Product ID	5CAMSC.0001-00
<b>General information</b>	
Certification CE	Yes
<b>Cable structure</b>	
Wire cross section	AWG 22
<b>Connector</b>	
Type	1x 4-pin male disk drive power plug, 1x 4-pin female plug housing
<b>Mechanical characteristics</b>	
Dimensions Length	100 mm ±5 mm
Flexibility	Flexible
<b>Recommendations</b>	
Specified standard CE (CE)	Yes
<b>Recommendations</b>	
Specified standard CE (CE)	Yes

Table 312: 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, we offer the possibility to mount a compartment to the APC810 in which a replacement HDD can be stored.

For more information about installing the HDD replacement disk tray, see chapter Maintenance / Service.

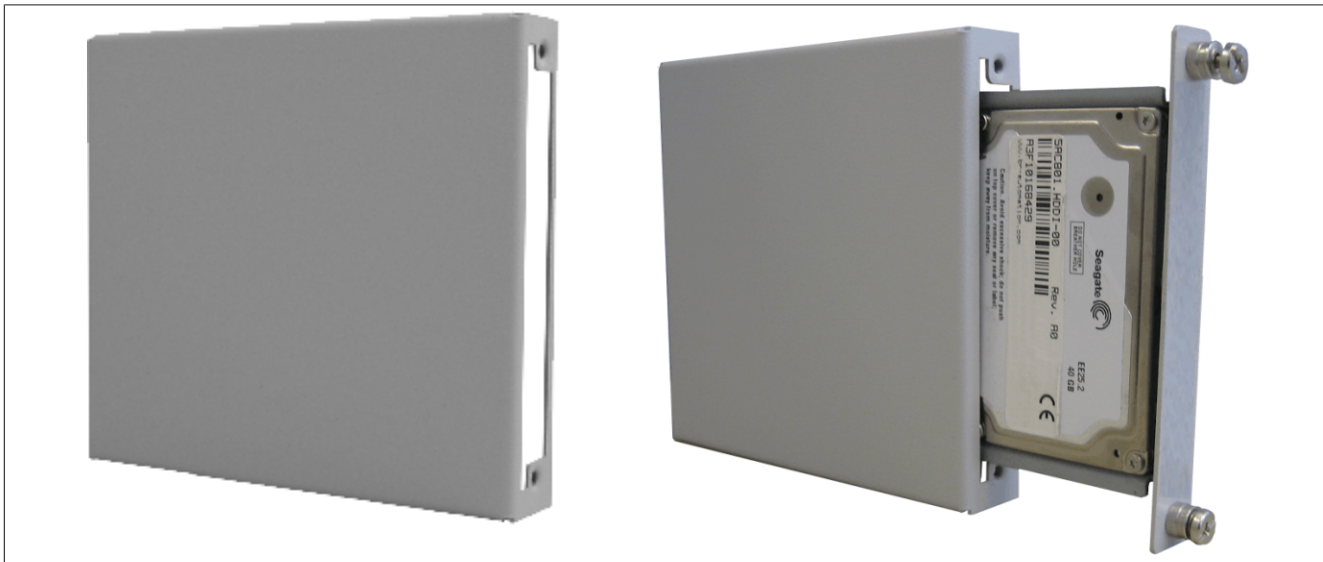


Figure 221: HDD replacement disk tray - 5AC801.FRAM-00

#### 13.1.2 Order data


Model number	Short description	Figure
	<b>Accessories</b>	
5AC801.FRAM-00	APC810 SATA Hard Disk Replacement Tray	

Table 313: 5AC801.FRAM-00 - Order data

#### 13.1.3 Technical data

Product ID	5AC801.FRAM-00
<b>General information</b>	
Certification CE	Yes
<b>Mechanical characteristics</b>	
Dimensions	
Width	106 mm
Height	101 mm
Depth	18 mm
<b>Recommendations</b>	
Specified standard CE (CE)	Yes
<b>Recommendations</b>	
Specified standard CE (CE)	Yes

Table 314: 5AC801.FRAM-00 - Technical data



### 13.1.4 Dimensions

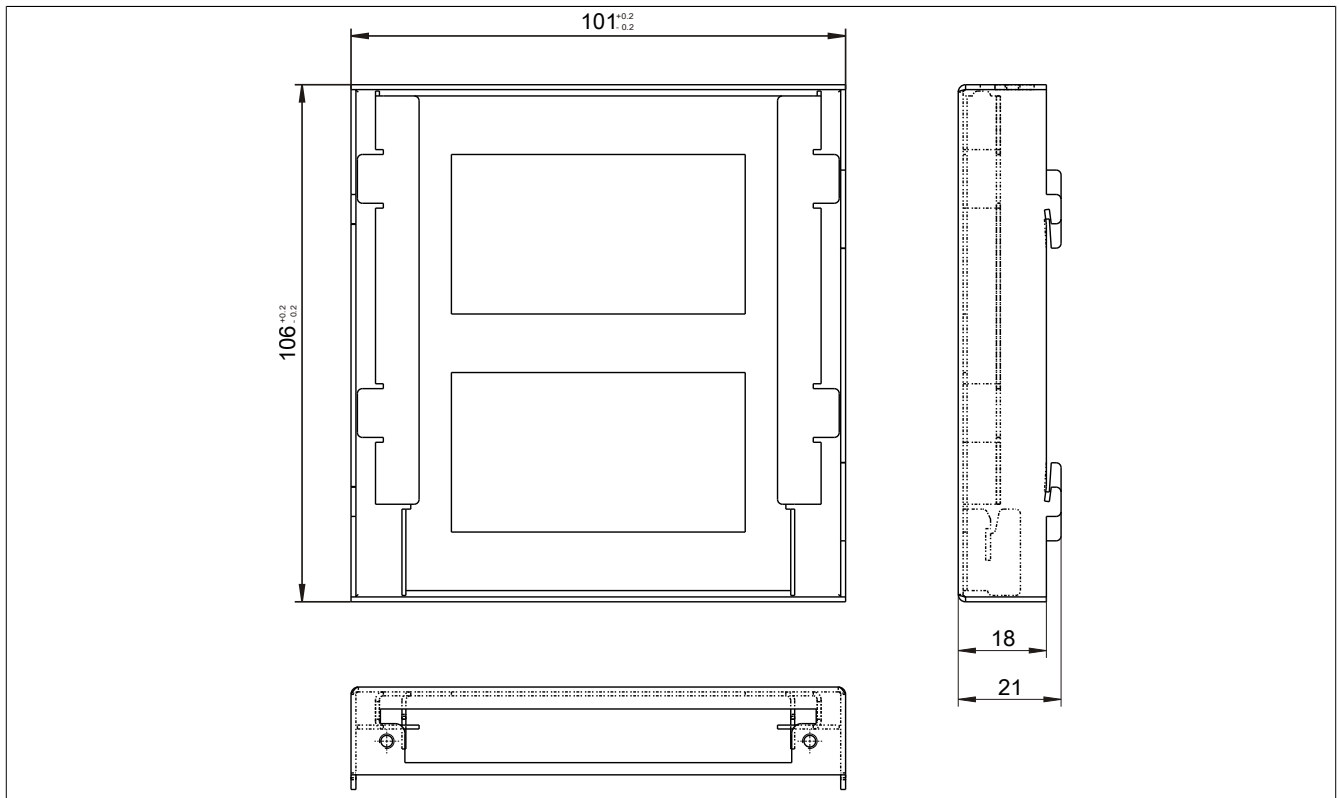


Figure 222: 5AC801.FRAM-00 - Dimensions

## Chapter 7 • Maintenance / Service

This chapter describes service/maintenance work that can be carried out by a qualified end user.

### 1 Changing the battery

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

#### Information:

- The product design allows the battery to be changed with the B&R device switched either on or off. In some countries, safety regulations do not allow batteries to be changed while the module is switched on.
- Any BIOS settings that have been made will remain when the battery is changed with the power turned off (stored in non-volatile EEPROM). The date and time must be reset later because this data is lost when the battery is changed.
- The battery should only be changed by qualified personnel.

#### Warning!

The battery must be replaced by a Type CR2477N Renata battery only. The use of another battery may present a risk of fire or explosion.

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

The following replacement lithium batteries are available: 4A0006.00-000 (1 pc.) and 0AC201.91 (4 pcs.).

#### 1.1 Battery status evaluation

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

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

Table 315: 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.

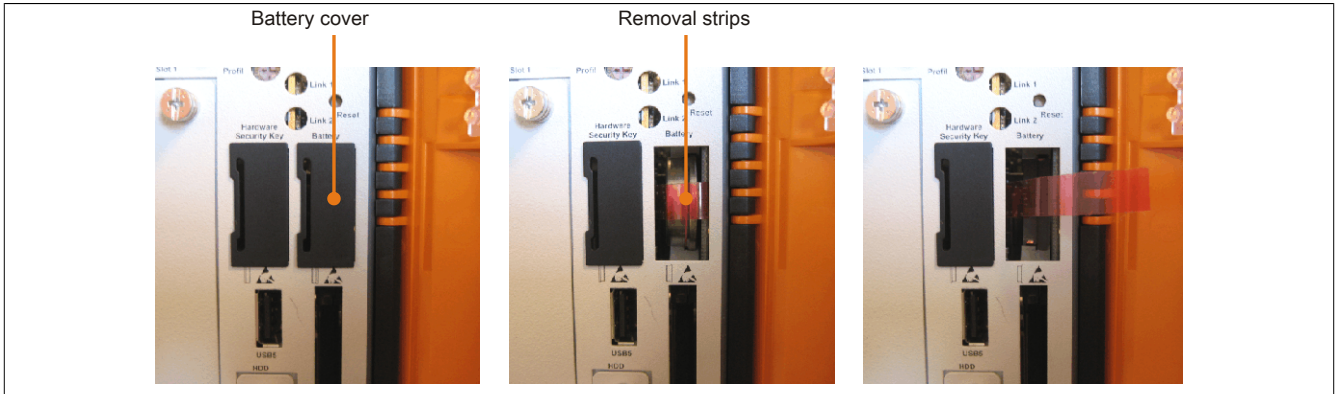


Figure 223: Remove battery

- The battery should not be held by its edges. Insulated tweezers may also be used to insert the battery.

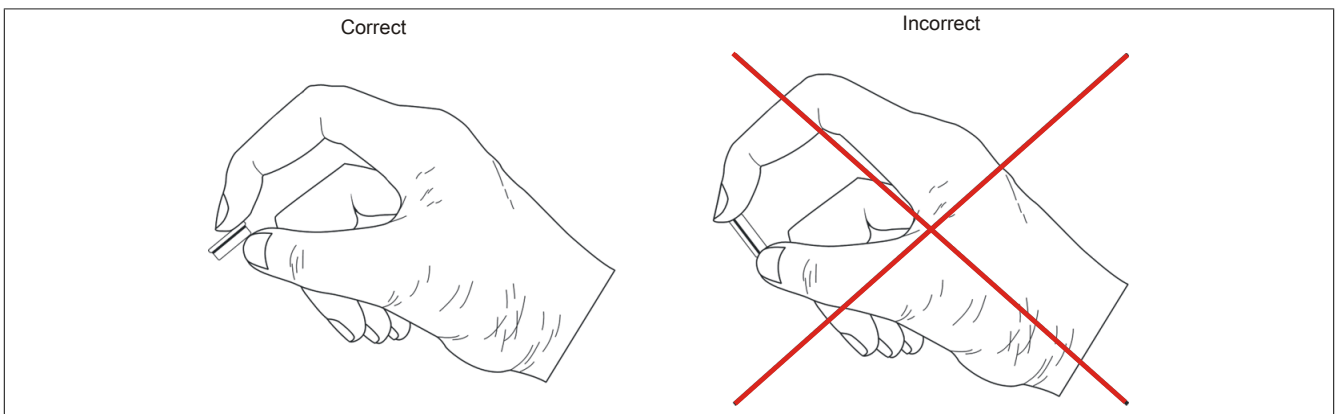


Figure 224: Battery handling

- Insert the new battery with the correct polarity.

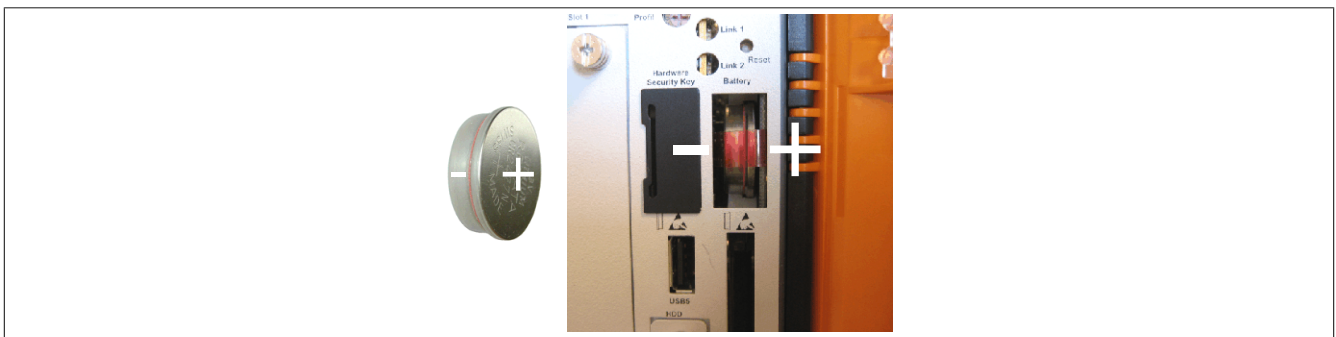


Figure 225: Battery polarity

- To make the next battery change easier, be sure the removal strip is in place when inserting the battery.
- Reconnect the power supply to the B&R Industrial PC (plug in the power cable).
- Reset the date and time in BIOS.

## Warning!

**Lithium batteries are considered hazardous waste. Used batteries should be disposed of in accordance with applicable local regulations.**

## 2 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.

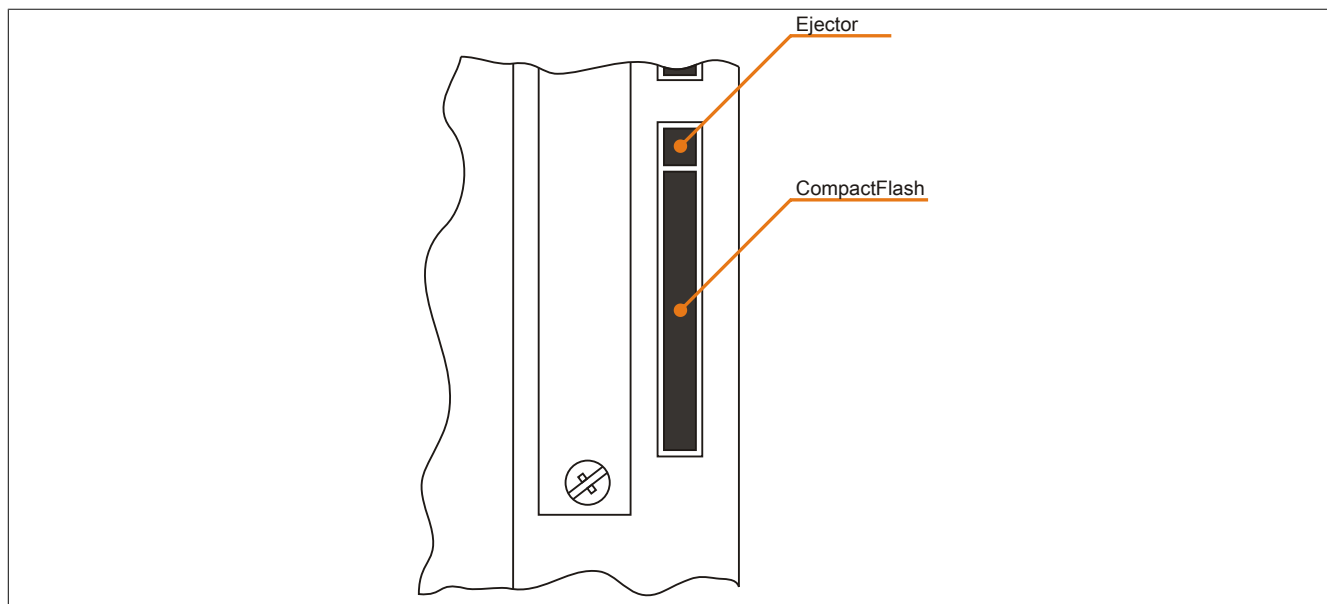


Figure 226: CompactFlash + ejector (sample photo)

### 3 Installing / exchanging a slide-in compact drive

#### Information:

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

#### 3.1 Procedure

1. Loosen and remove the two ¼ turn screws on the protective cover / slide-in compact drive.



Figure 227: Loosening the ¼ turn screws

2. Insert the compact SATA drive and tighten the ¼ turn screws.



Figure 228: Inserting the compact SATA drive

## 4 Installing / exchanging a slide-in drive

Slide-in drives can be installed and exchanged 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 ¼ turn screws.

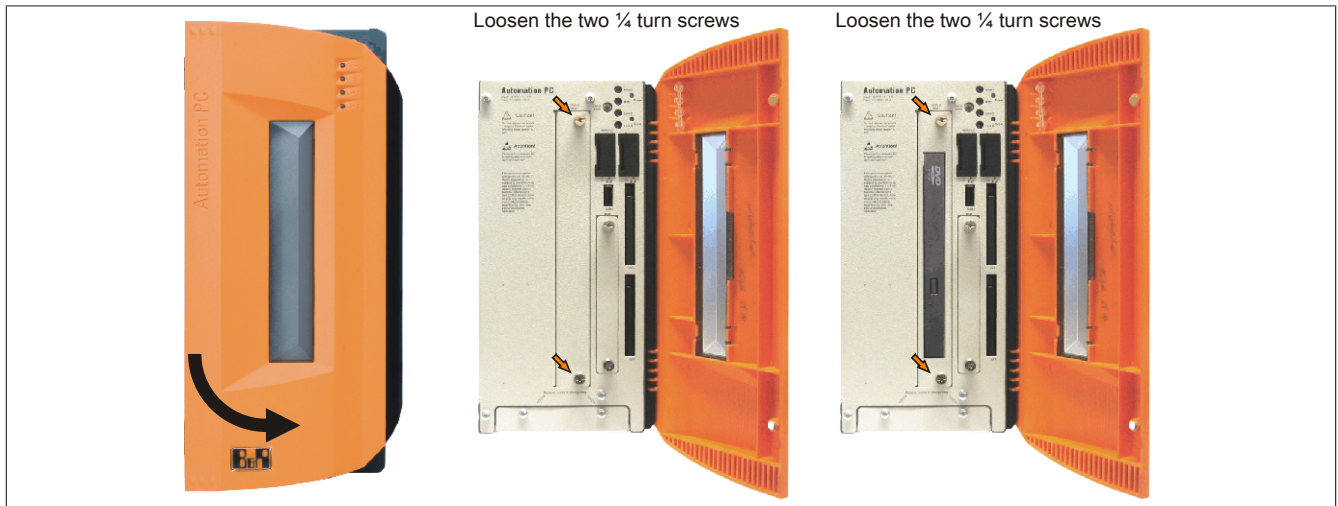


Figure 229: Loosening the ¼ turn screws

4. Insert the slide-in drive and tighten with the two ¼ turn screws.

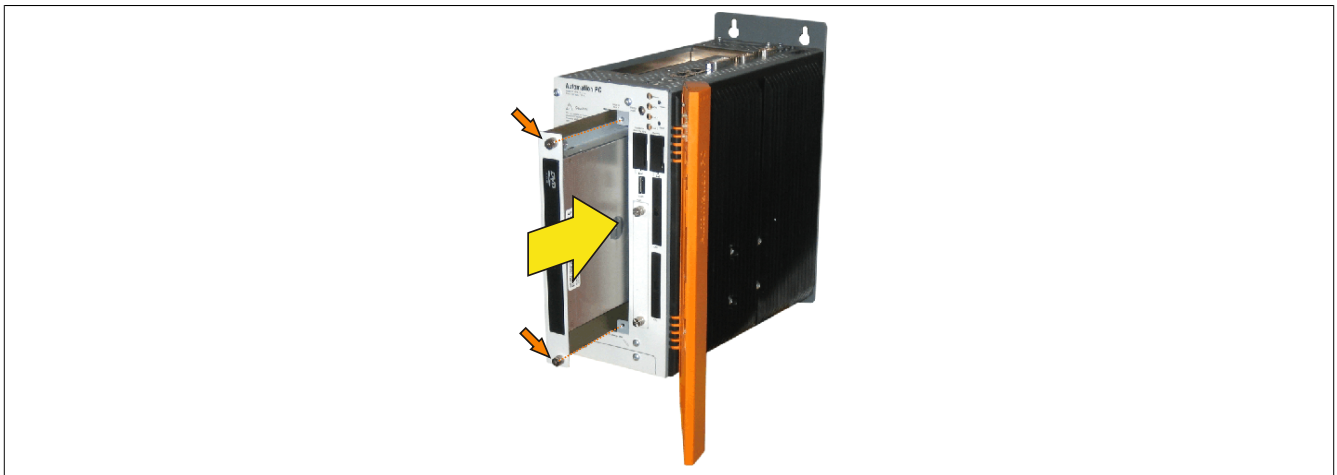


Figure 230: Installing the slide-in drive

## 5 Installing a slide-in compact adapter

Slide-in compact adapters can be installed and exchanged 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 ¼ turn screws.

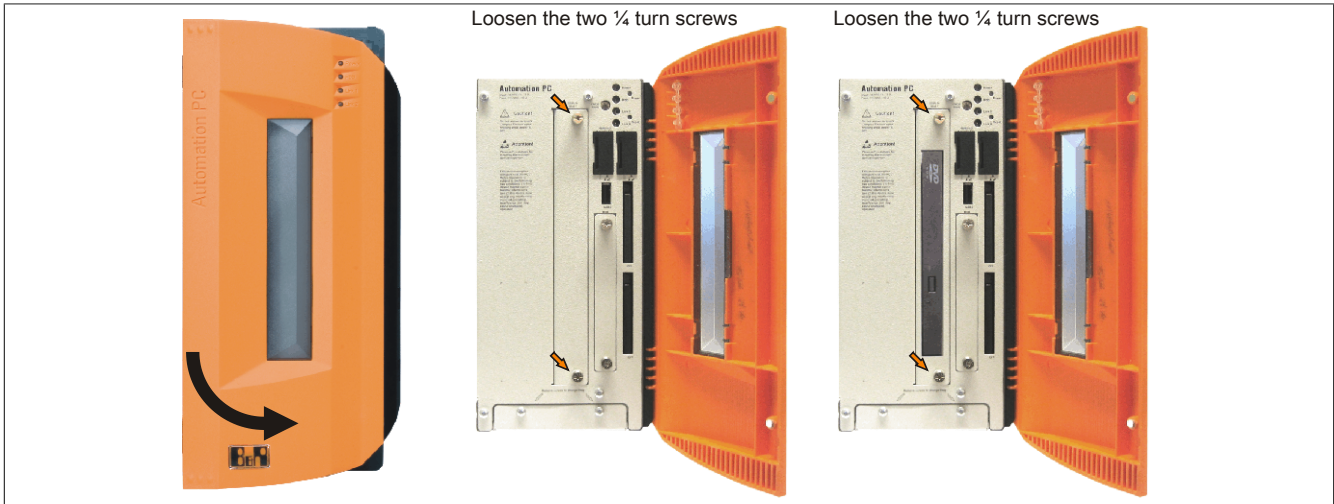


Figure 231: Loosening the ¼ turn screws

4. Insert the slide-in compact adapter and tighten the two ¼ turn screws.

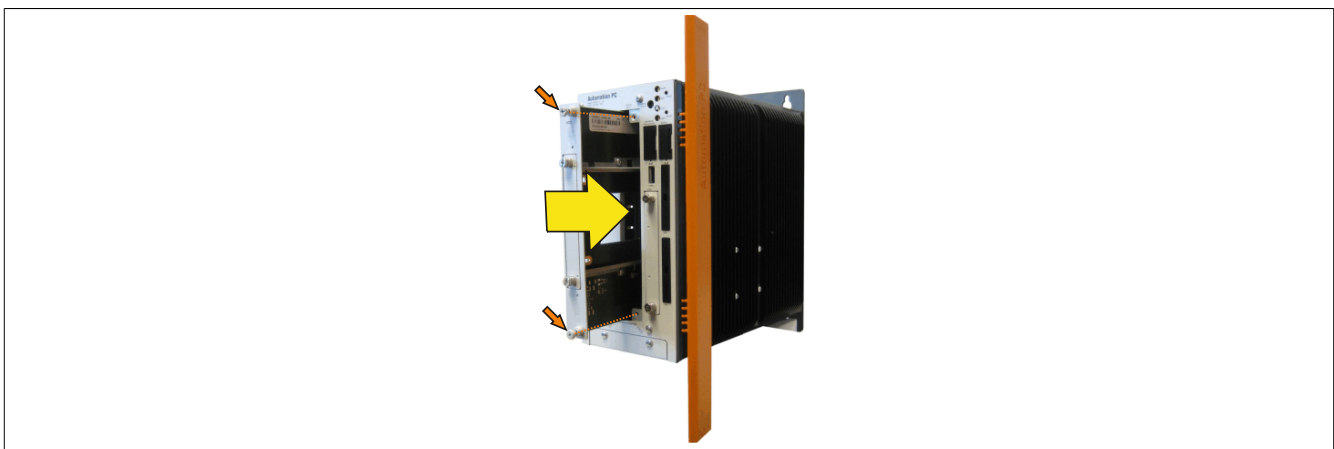


Figure 232: Installing the slide-in compact adapter

5. Once the adapter has been installed, the slide-in compact drive can be inserted.

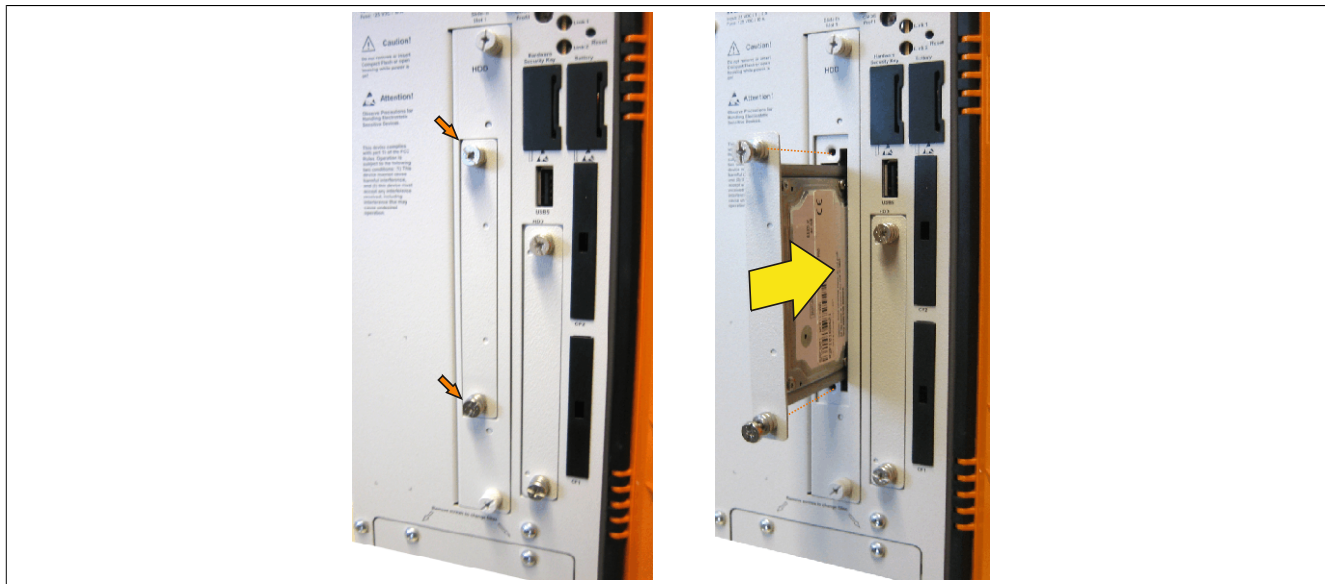


Figure 233: Inserting the slide-in compact drive



## 6 Installing / exchanging the fan kit

### 6.1 Procedure

1. Remove fan kit cover. Loosen Torx (T10) screws and slide cover forward.

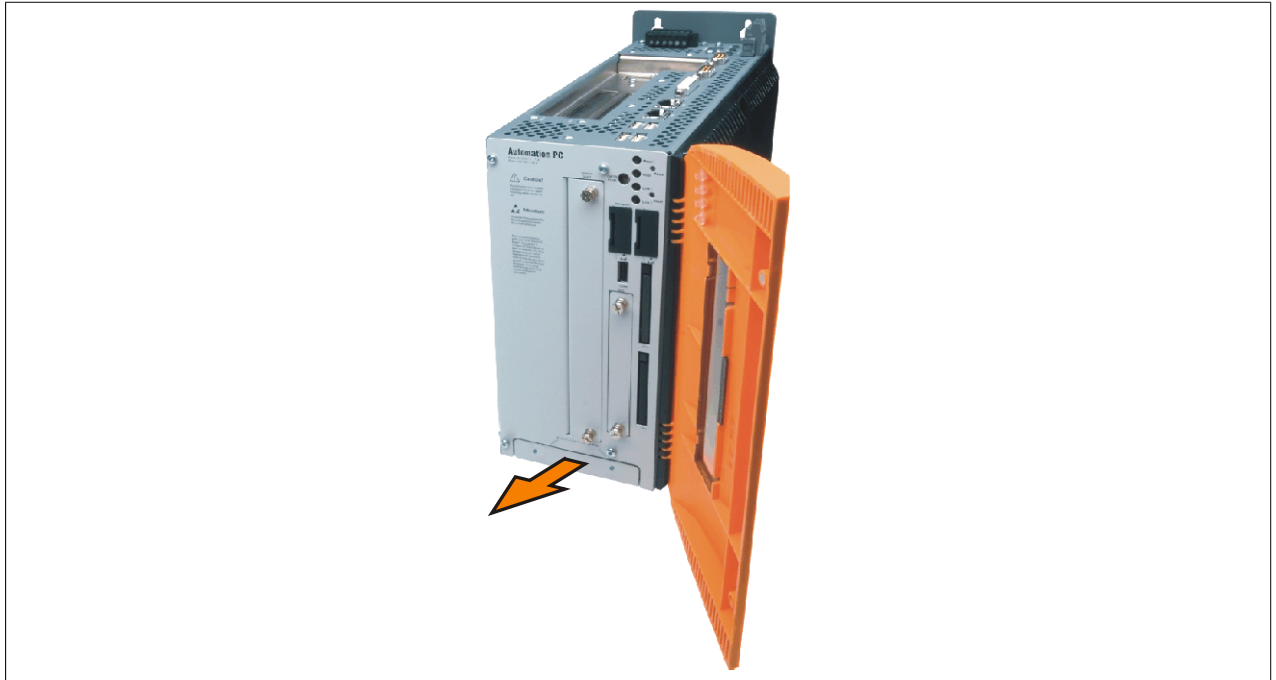


Figure 234: Remove fan kit insert

2. Insert the frame - Mount the contact board side to the sliding contacts on the system unit and fasten using the ¼ turn screws.

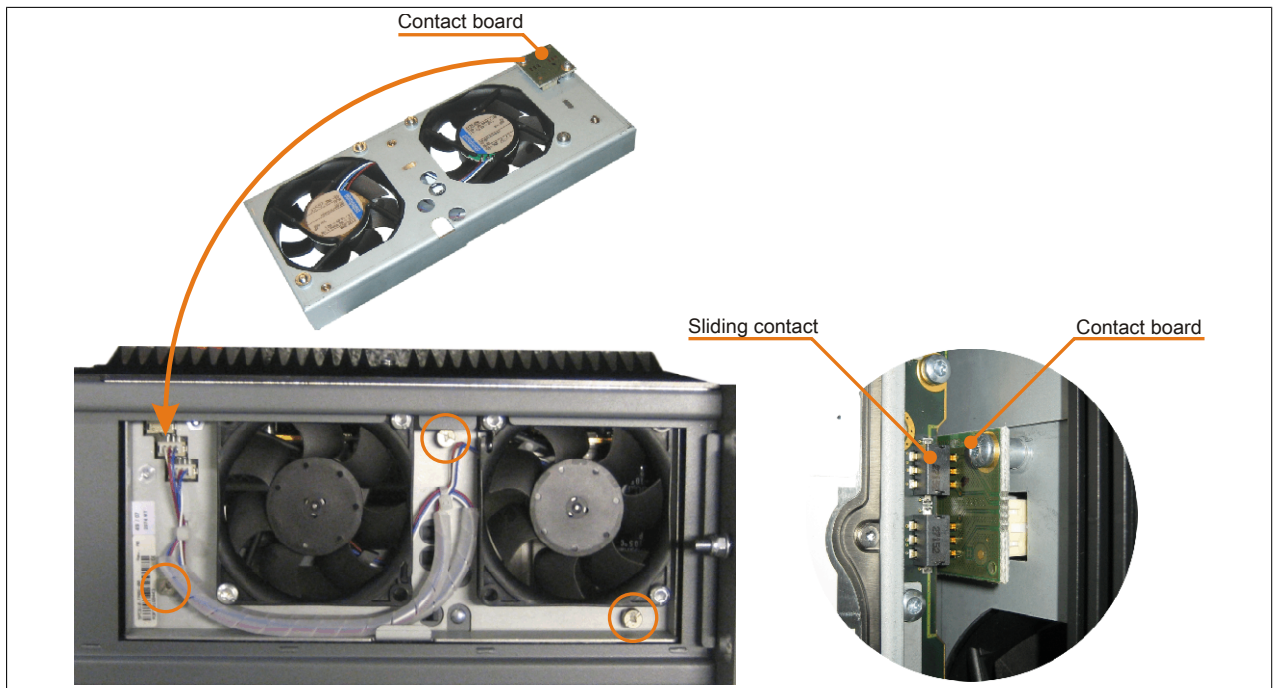


Figure 235: Inserting and fastening the fan kit

3. Place the dust filter in the fan kit cover and secure with the filter clasp.

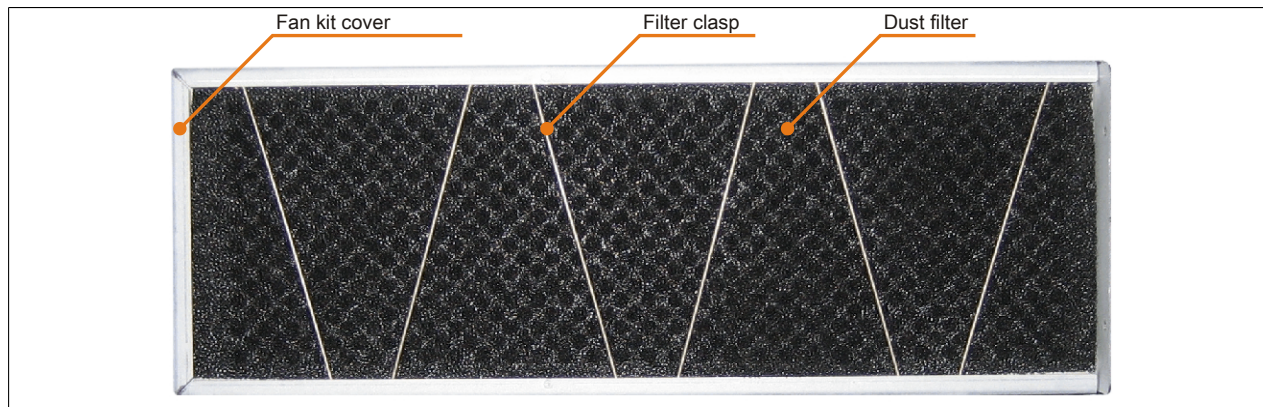


Figure 236: Securing the dust filter with the filter clasp

4. Place the fan kit cover in the housing and fasten using the Torx screws removed earlier.

### Information:

**Regular control of the dust filter depending on area of use and degree of dirtiness.**  
**Installation is the same as for all APC810 devices.**

## 7 Installing the UPS module

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

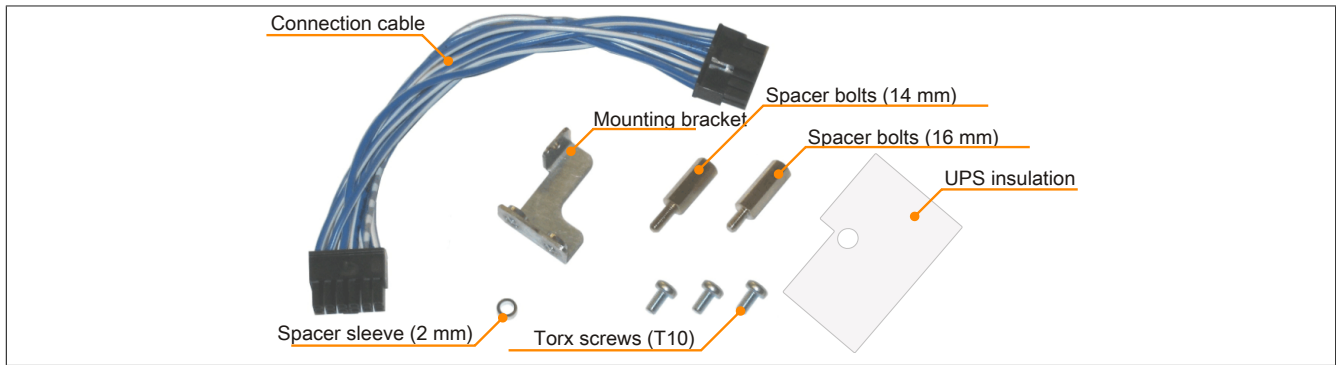


Figure 237: 5AC600.UPSI-00 Add-on UPS module – Installation materials

Installation may vary depending the system unit type (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 APC810 1 card slot

1. Remove the side cover (see "Mounting the side cover" on page 429).
2. Remove UPS module cover by removing the 2 marked Torx screws (T10).



Figure 238: Removing the UPS module cover

3. Screw in spacing bolt and spacing ring on the main board (using M5 hex socket screwdriver).

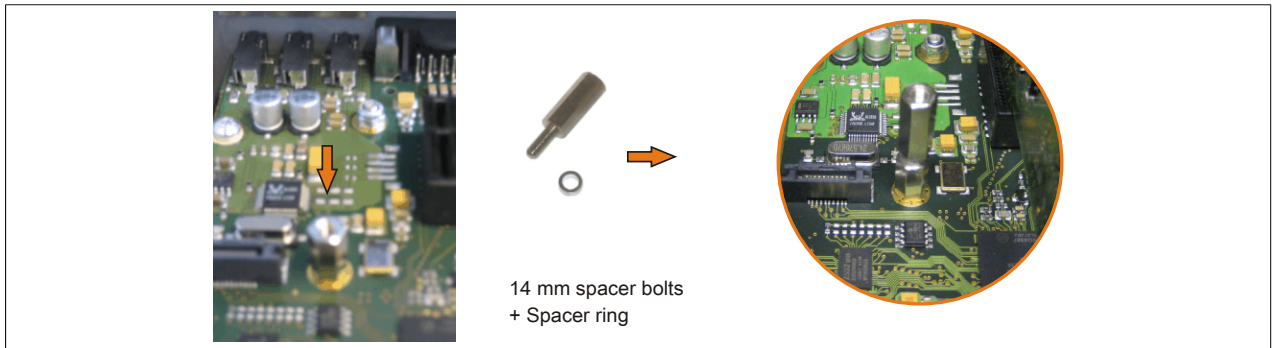


Figure 239: Screw in spacing bolt and spacing ring

4. Install the UPS module using 2 Torx screws (T10) on the housing and 1 Torx screw (T10) on the main board (spacing bolt). Use the previously removed Torx screws from the mounting materials.

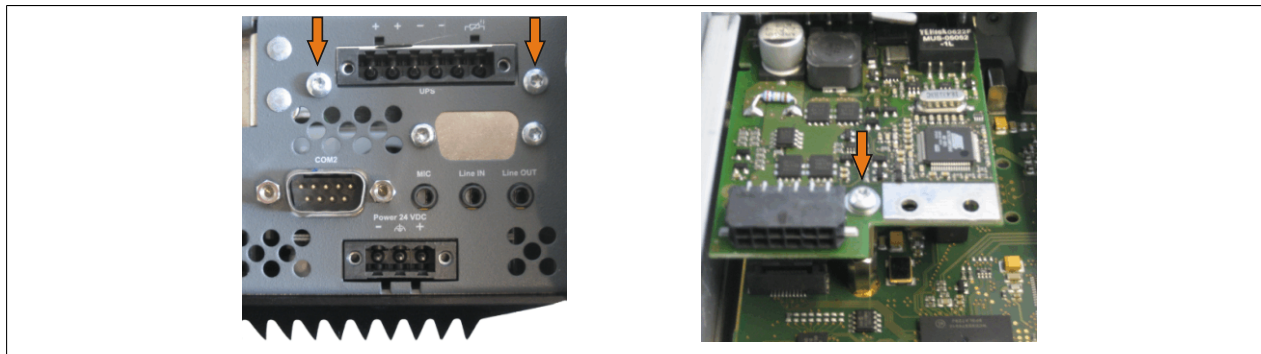


Figure 240: Installing the UPS module

5. Plug in the connection cable (see marked socket).

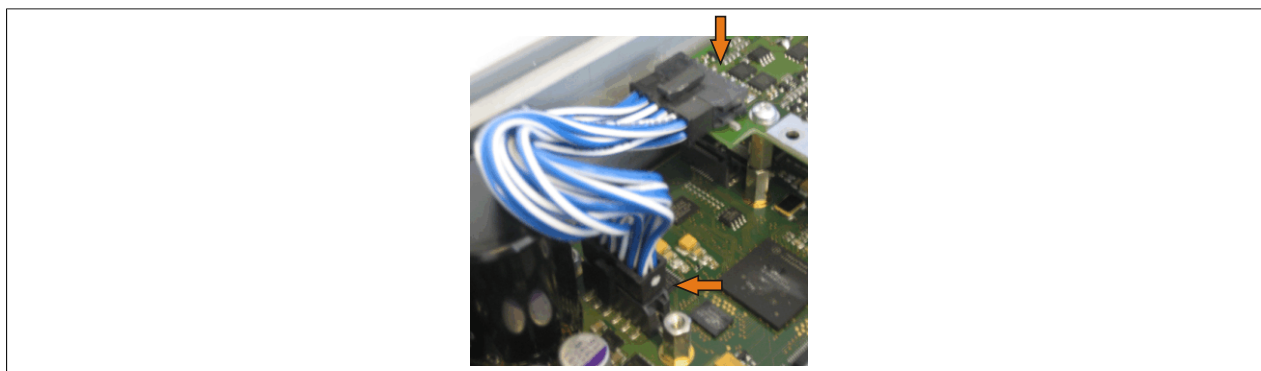


Figure 241: Plugging in the connection cable

## Information:

When connecting the cable, make sure that the connector locks into place.

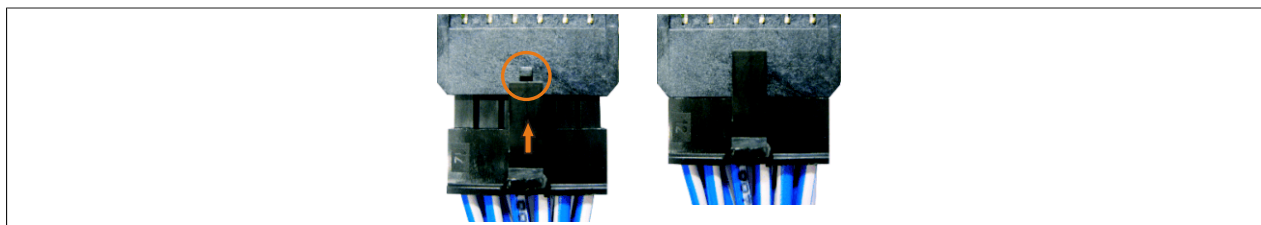


Figure 242: Connector locking mechanism

6. Attach the side cover.



### 7.1.2 APC810 2 and 3 card slot

1. Remove the side cover (see "Mounting the side cover" on page 429).
2. Remove UPS module cover by removing the 2 marked Torx screws (T10).

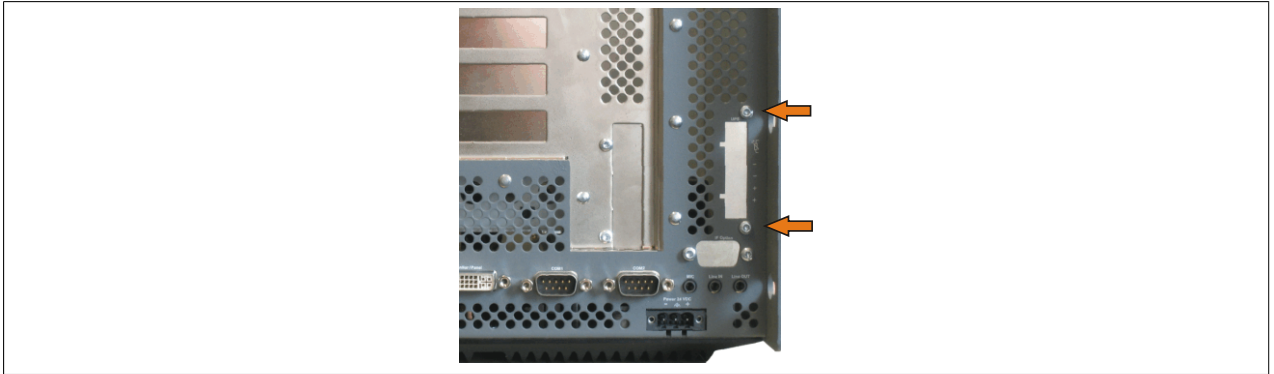


Figure 243: Removing the UPS module cover

3. Screw in spacing bolt and spacing ring on the main board (using M5 hex socket screwdriver).

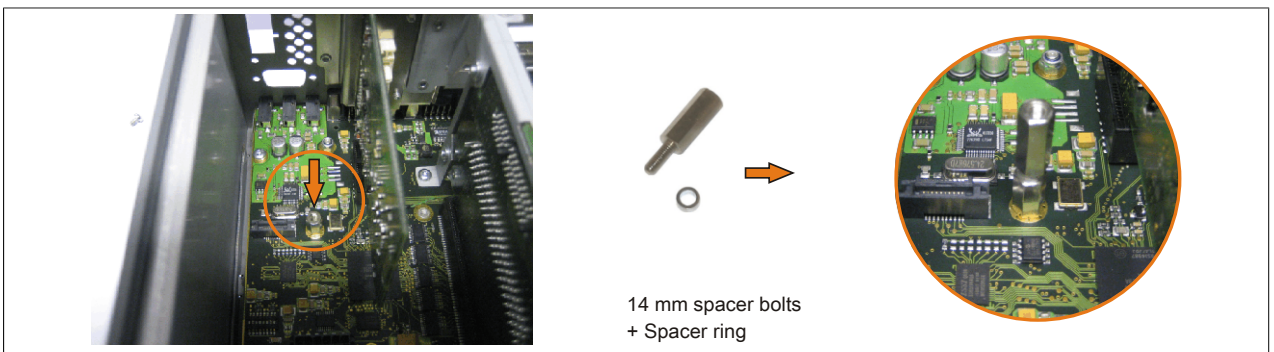


Figure 244: Screw in spacing bolt and spacing ring

4. Install mounting bracket on UPS module using 2 Torx screws (T10).

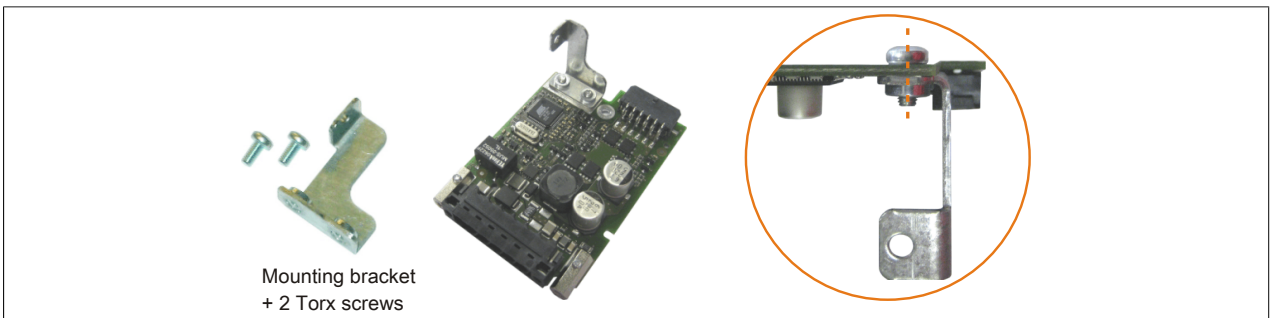


Figure 245: Install mounting bracket

5. Install the UPS module using 2 Torx screws (T10) on the housing and 1 Torx screw (T10) on the main board (spacing bolt). Use the previously removed Torx screws from the mounting materials.

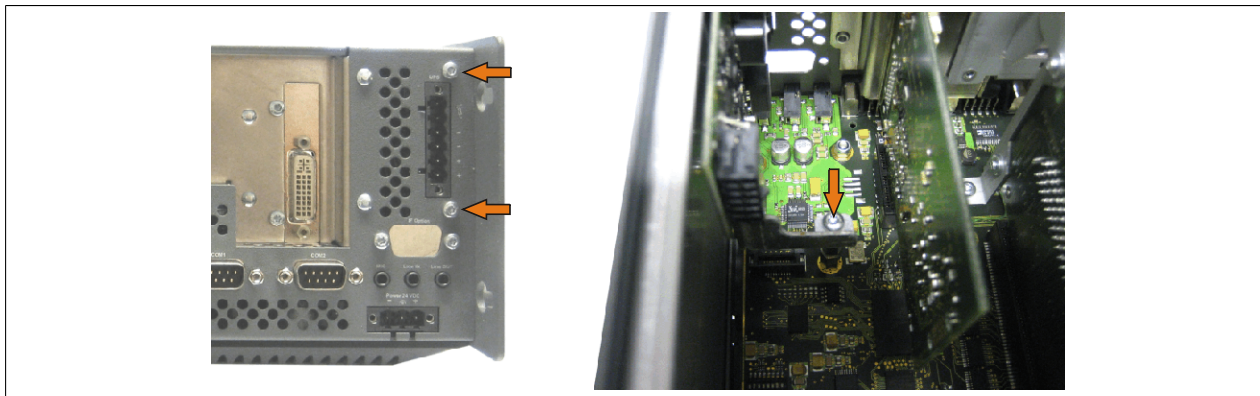


Figure 246: Installing the UPS module

6. Plug in the connection cable (see marked socket).

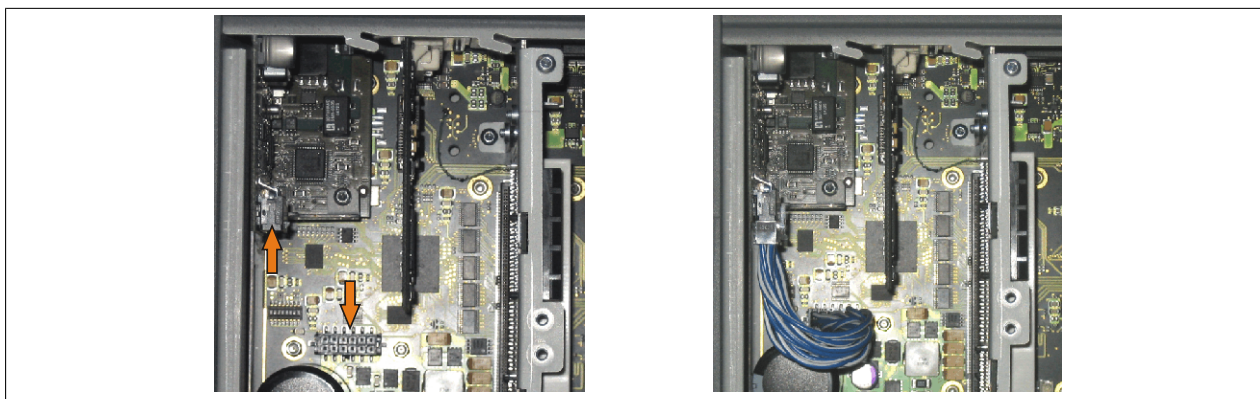


Figure 247: Plugging in the connection cable

### Information:

When connecting the cable, make sure that the connector locks into place.

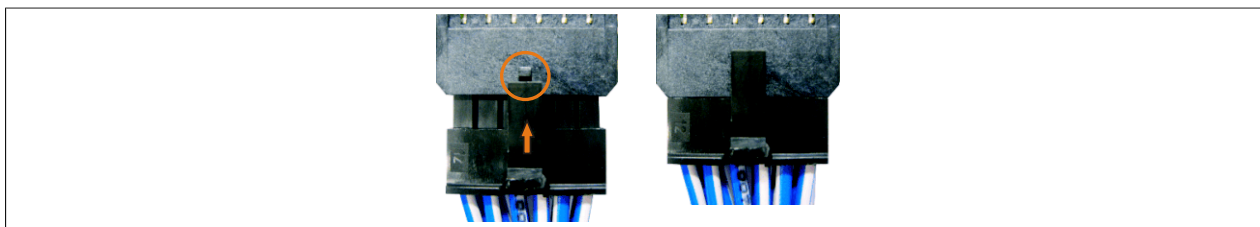


Figure 248: Connector locking mechanism

7. Attach the side cover.

### 7.1.3 APC810 5 card slot

1. Remove side cover (see "Mounting the side cover" on page 429).
2. Remove UPS module cover by removing the 2 marked Torx screws (T10).

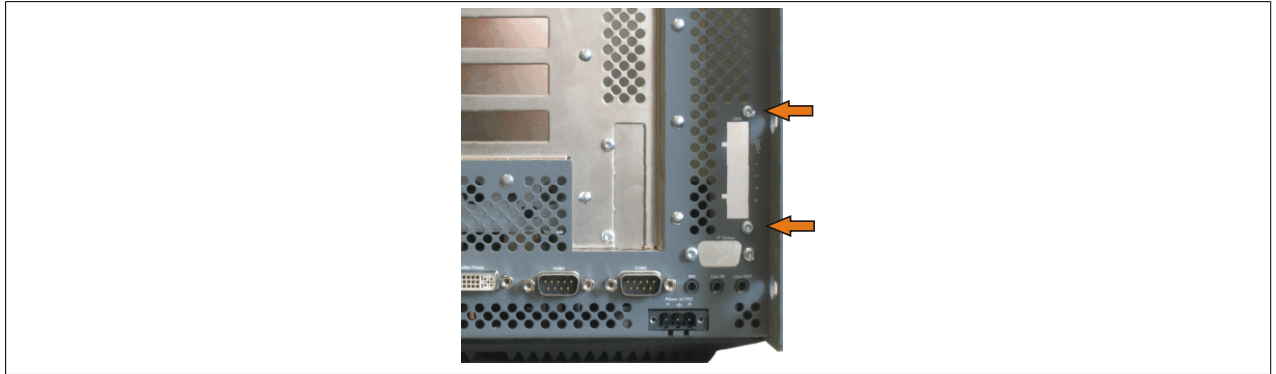


Figure 249: Removing the UPS module cover

3. Screw in spacing bolt and spacing ring (using M5 hex socket screwdriver).

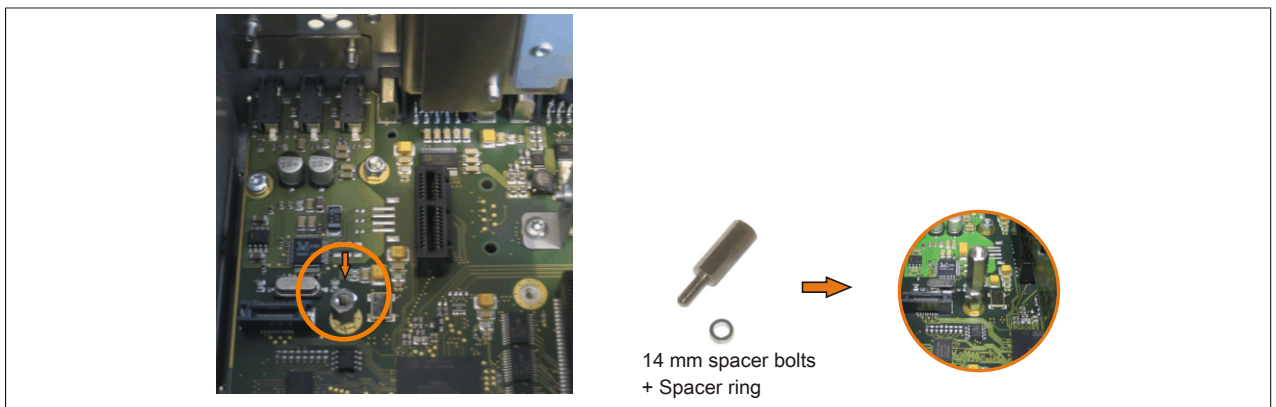


Figure 250: Screw in spacing bolt and spacing ring

4. Install mounting bracket on UPS module using 2 Torx screws (T10).

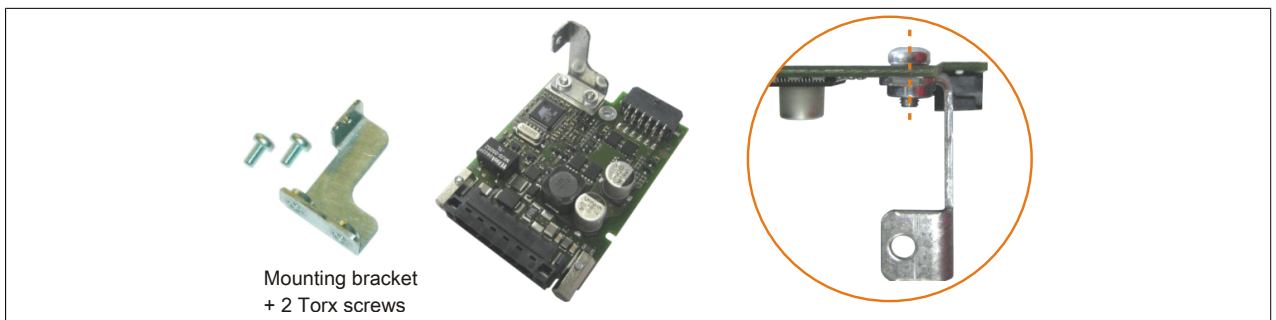


Figure 251: Install mounting bracket

5. Install the UPS module using 2 Torx screws (T10) on the housing and 1 Torx screw (T10) on the main board (spacing bolt). Use the previously removed Torx screws from the mounting materials.

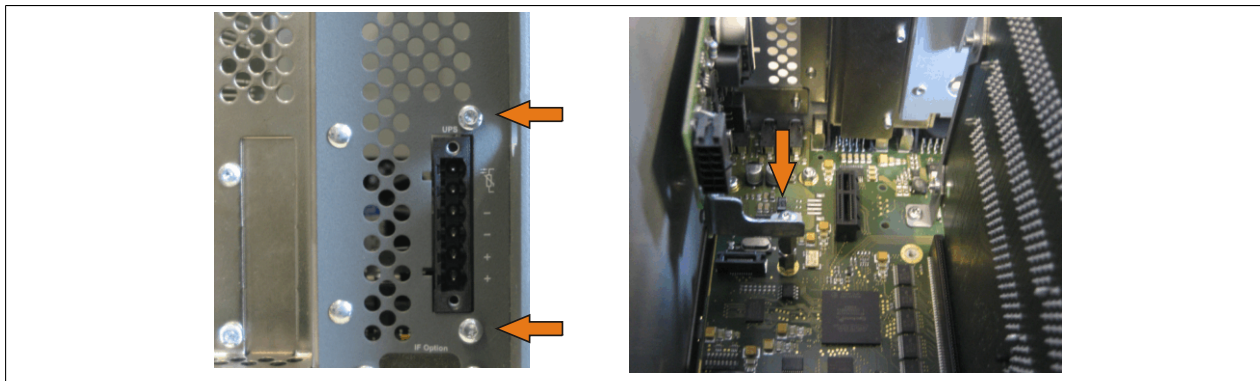


Figure 252: Installing the UPS module

6. Attach connection cable (see marked socket).

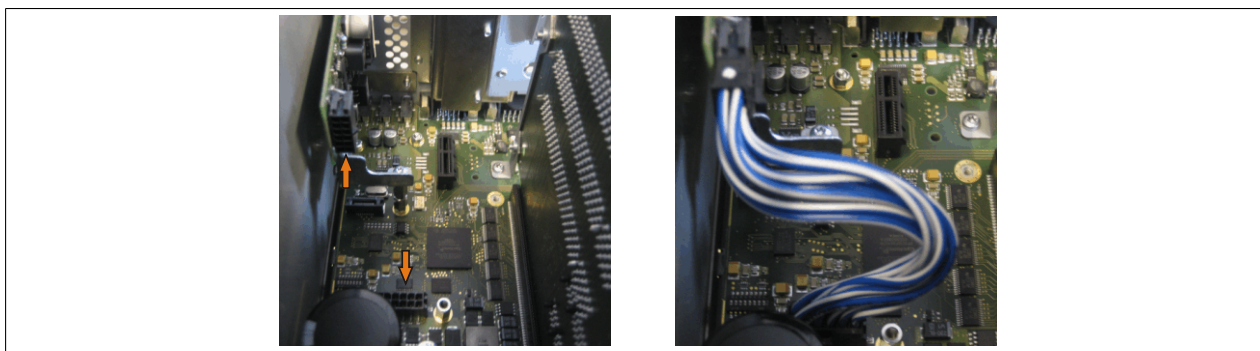


Figure 253: Plugging in the connection cable

### Information:

When connecting the cable, make sure that the connector locks into place.

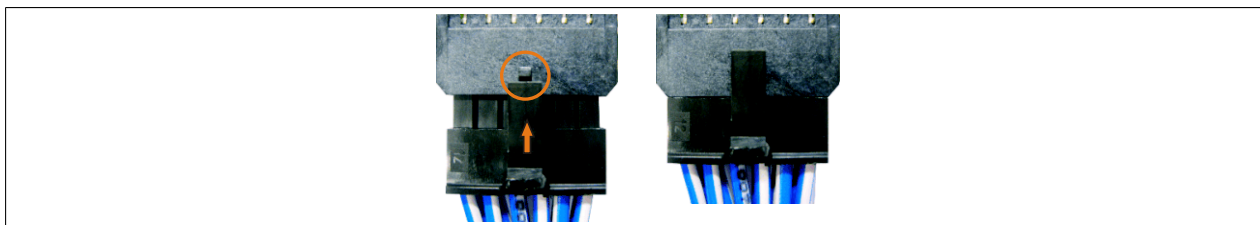


Figure 254: Connector locking mechanism

7. Attach the side cover



## 7.2 Installation with installed add-on interface module

### 7.2.1 APC810 1 card slot

1. Remove the side cover (see "Mounting the side cover" on page 429).
2. Remove UPS module cover by removing the 2 marked Torx screws (T10).

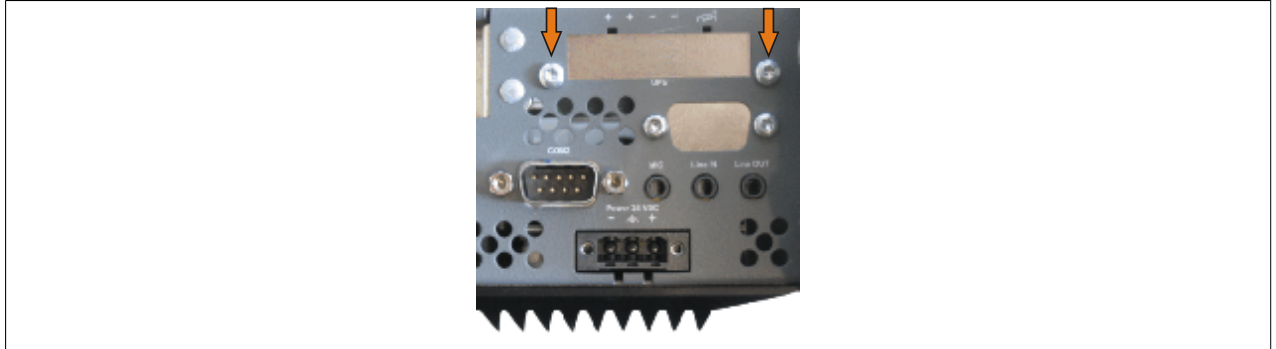


Figure 255: Removing the UPS module cover

3. Screw in spacing bolt (using M5 hex socket screwdriver).

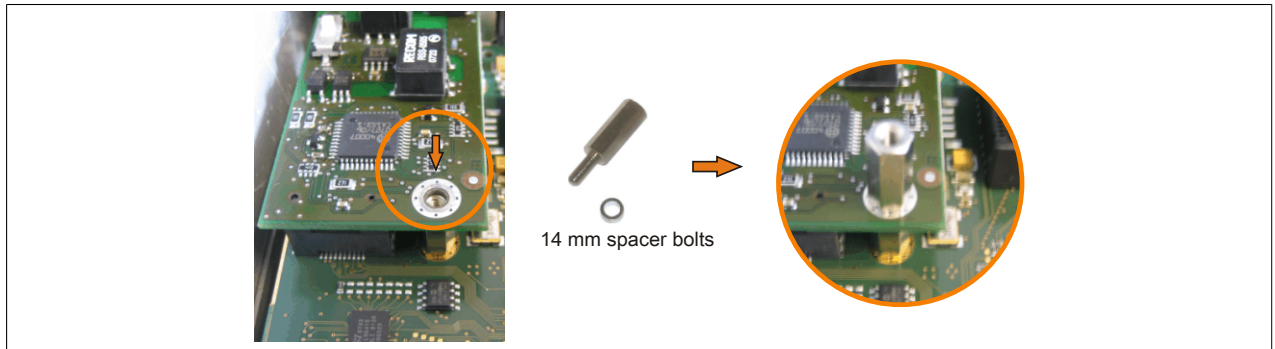


Figure 256: Screw in spacing bolt

4. Install the UPS module using 3 Torx screws (T10). Use the previously removed Torx screws and one Torx screw from the mounting materials.

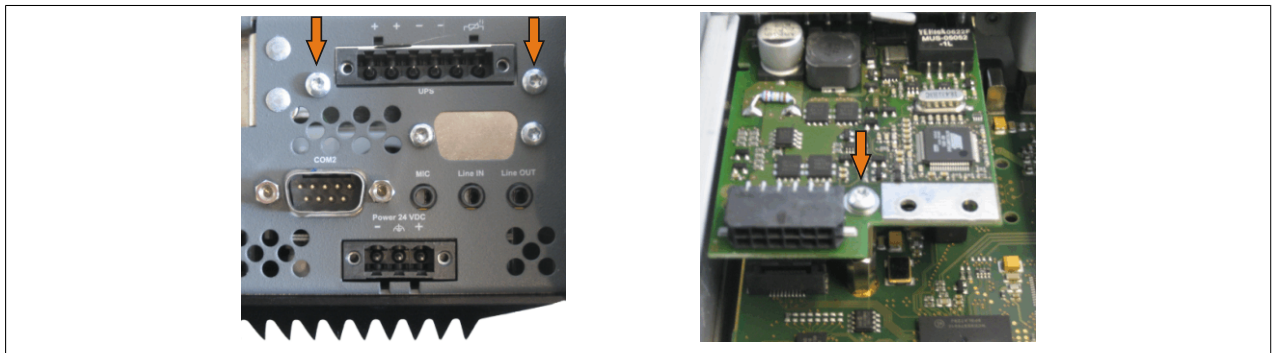


Figure 257: Installing the UPS module

5. Plug in the connection cable (see marked socket).

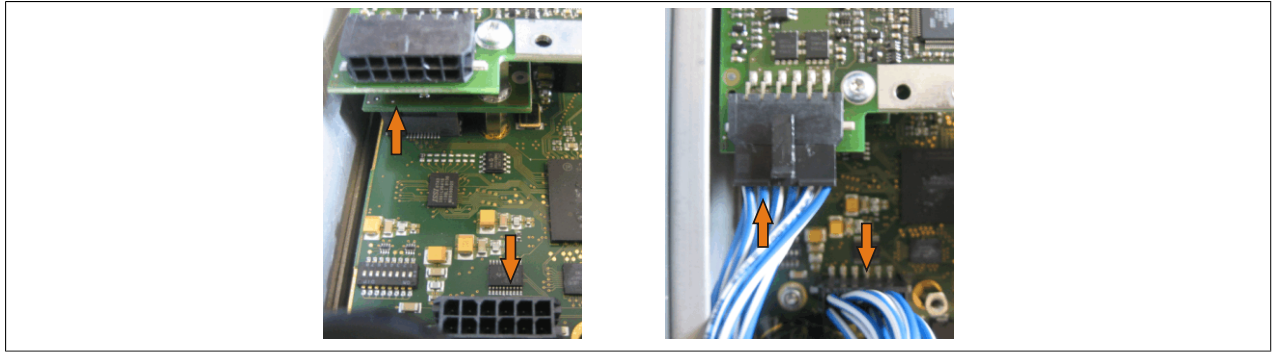


Figure 258: Plugging in the connection cable

### Information:

When connecting the cable, make sure that the connector locks into place.

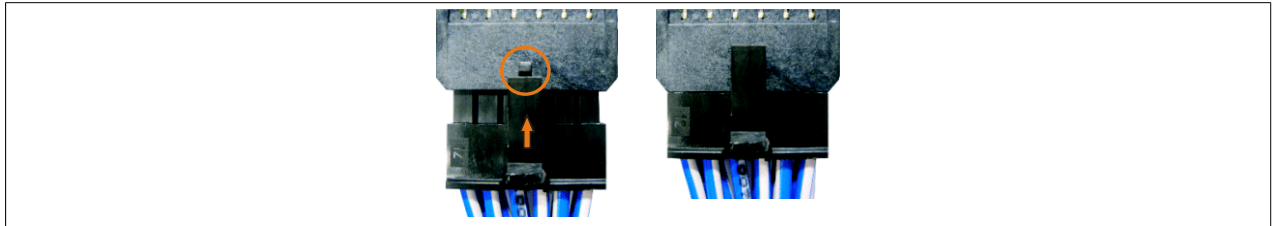


Figure 259: Connector locking mechanism

6. Attach cover plate and side cover.

### 7.2.2 APC810 2 and 3 card slot

1. Remove the side cover (see "Mounting the side cover" on page 429).
2. Remove UPS module cover by removing the 2 marked Torx screws (T10).

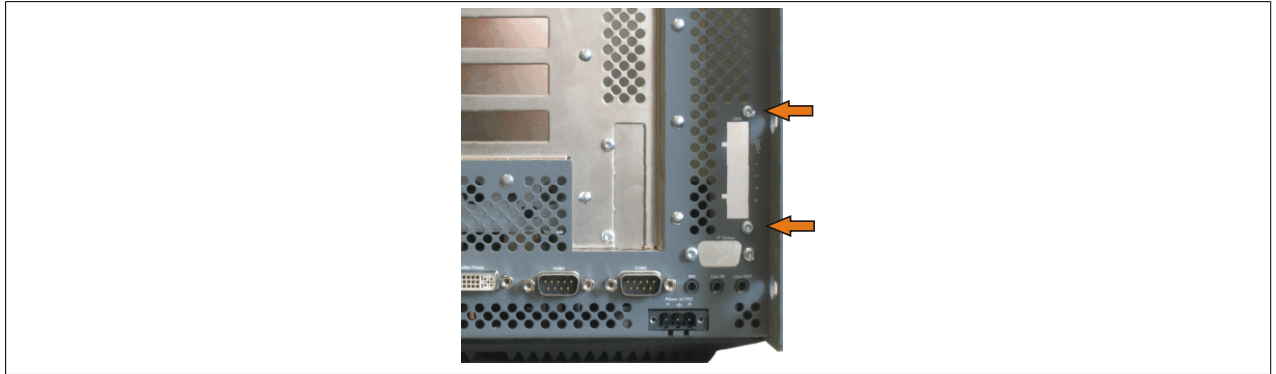


Figure 260: Removing the UPS module cover

3. Screw in spacing bolt (using M5 hex socket screwdriver).

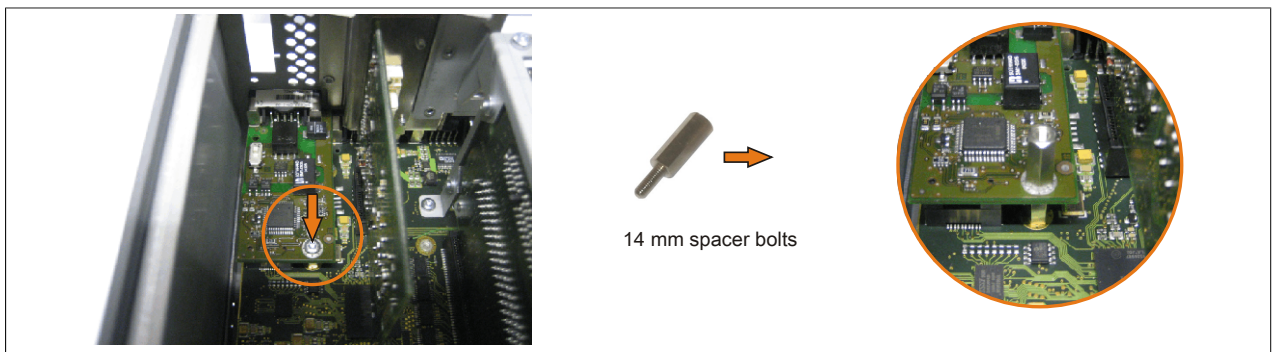


Figure 261: Screw in spacing bolt

4. Install mounting bracket on UPS module using 2 Torx screws (T10).

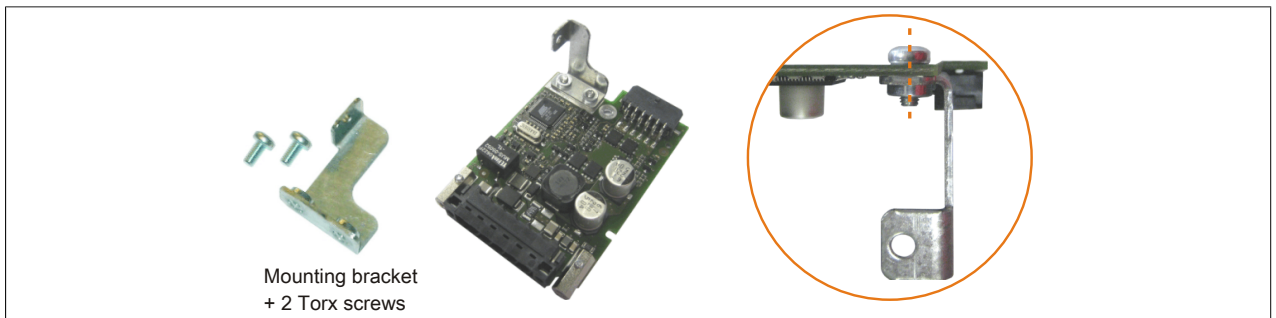


Figure 262: Install mounting bracket

5. Install the UPS module using 3 Torx screws (T10). Use the previously removed Torx screws and one Torx screw from the mounting materials.

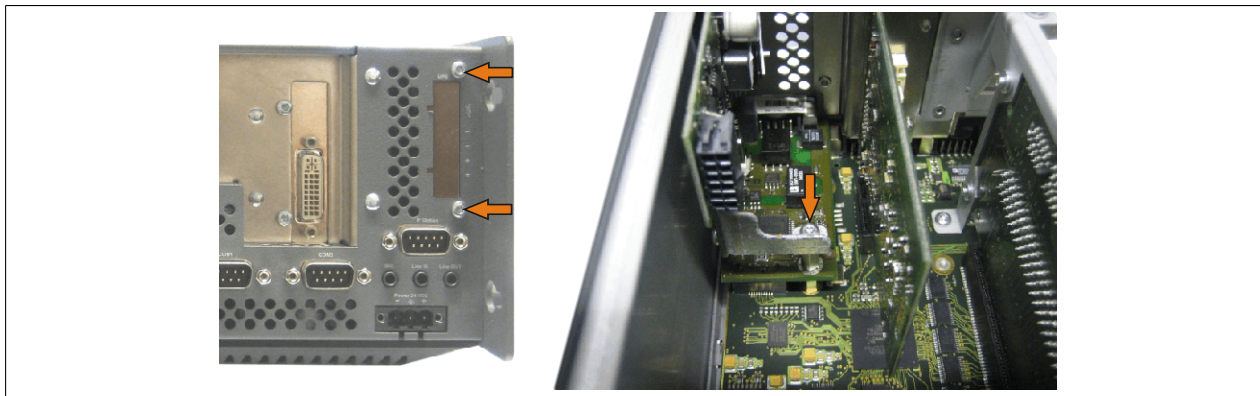


Figure 263: Installing the UPS module

6. Plug in the connection cable (see marked socket).

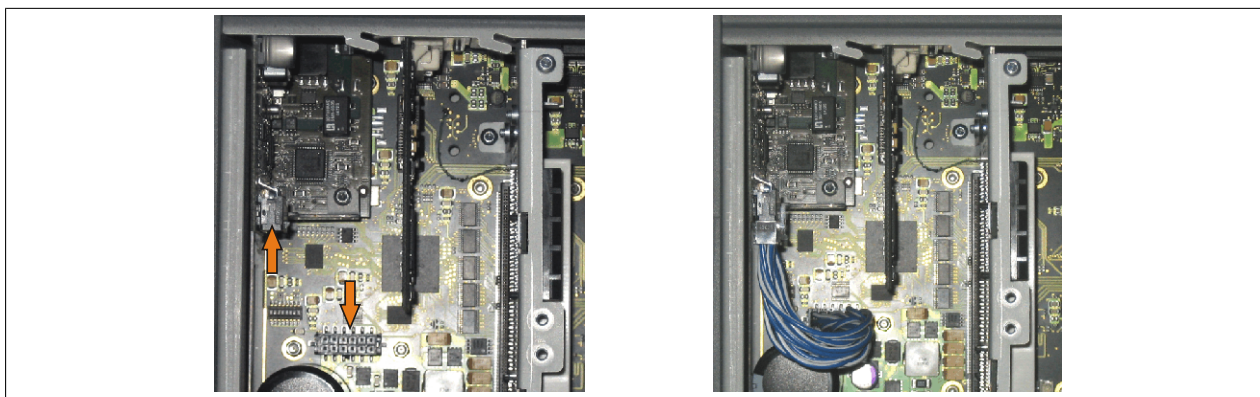


Figure 264: Plugging in the connection cable

### Information:

When connecting the cable, make sure that the connector locks into place.

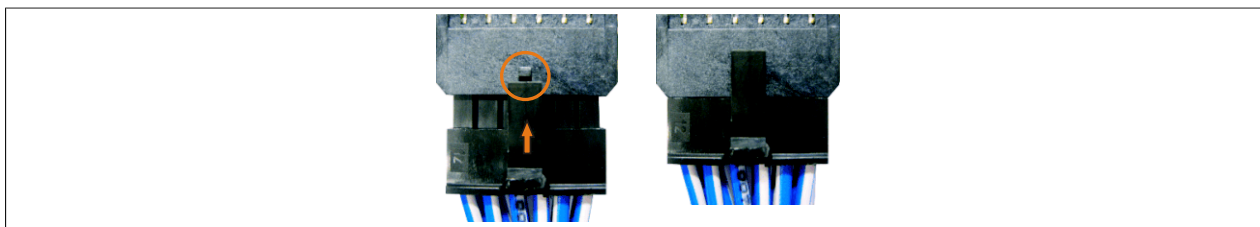


Figure 265: Connector locking mechanism

7. Attach cover plate and side cover.



### 7.2.3 APC810 5 card slot

1. Remove the side cover (see "Mounting the side cover" on page 429).
2. Remove UPS module cover by removing the 2 marked Torx screws (T10).

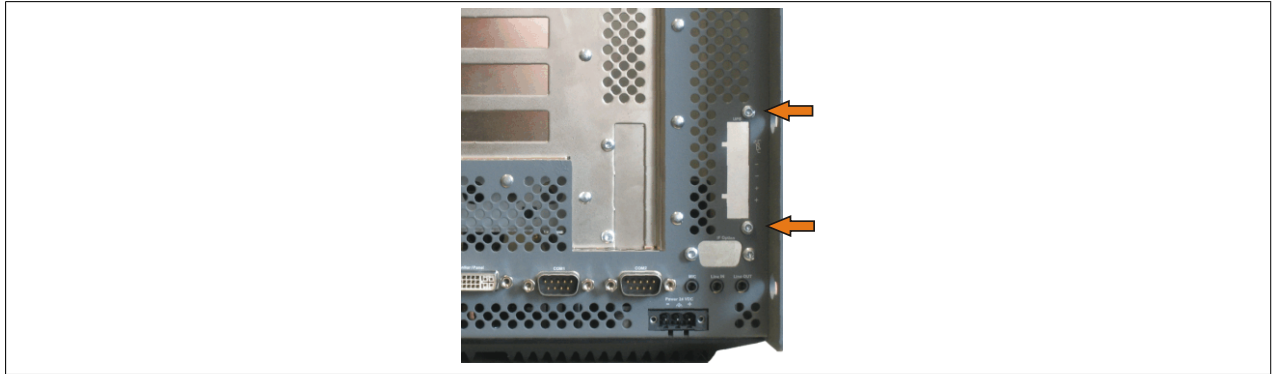


Figure 266: Removing the UPS module cover

3. Screw in spacing bolt (using M5 hex socket screwdriver).

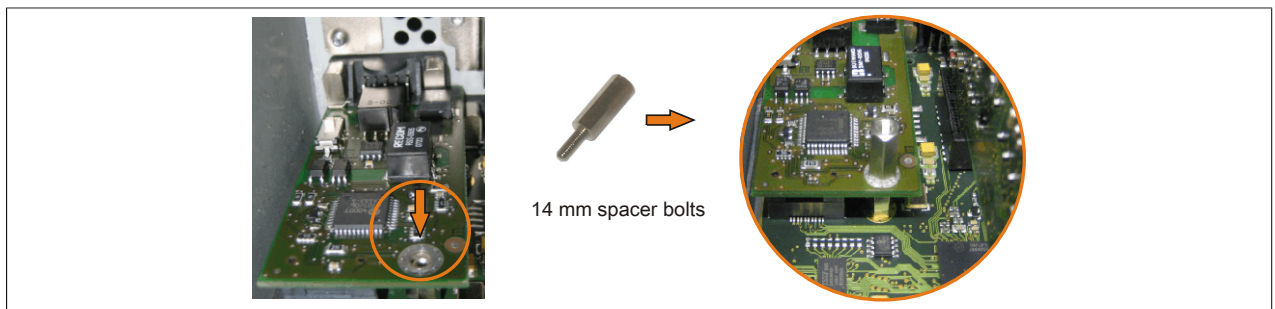


Figure 267: Screw in spacing bolt

4. Install mounting bracket on UPS module using 2 Torx screws (T10).

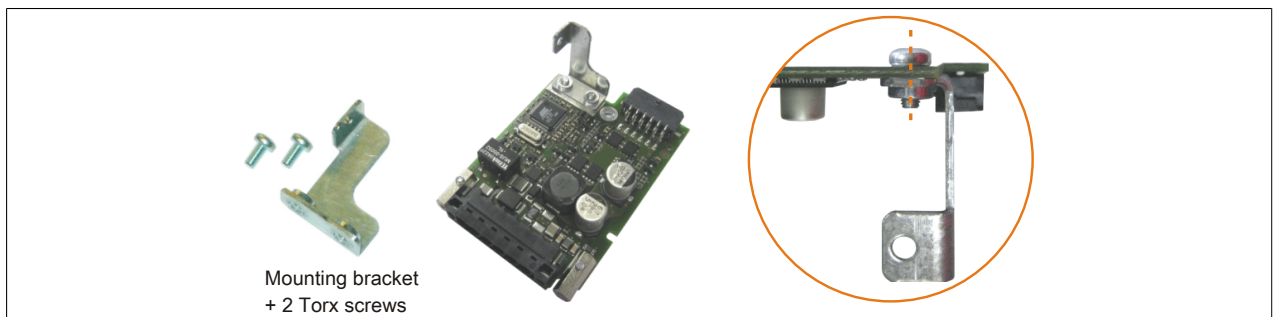


Figure 268: Install mounting bracket

5. Install the UPS module using 3 Torx screws (T10). Use the previously removed Torx screws and one Torx screw from the mounting materials.

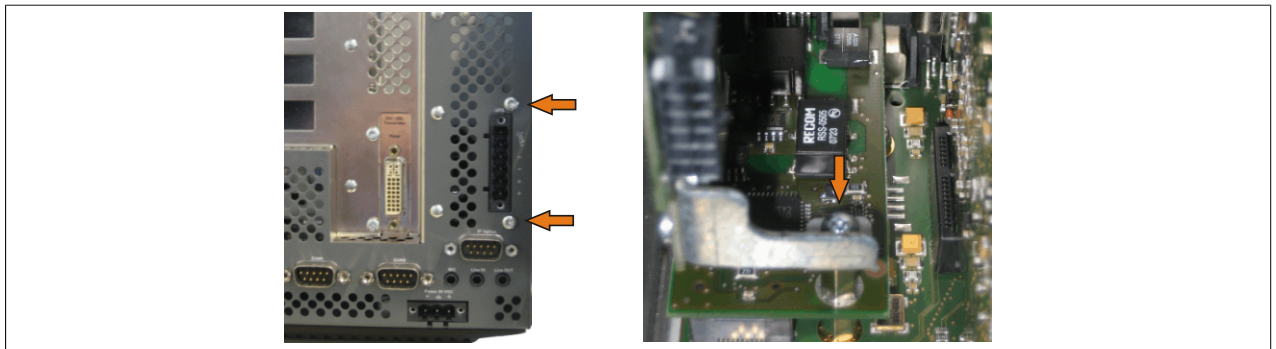


Figure 269: Installing the UPS module

6. Plug in the connection cable (see marked socket).

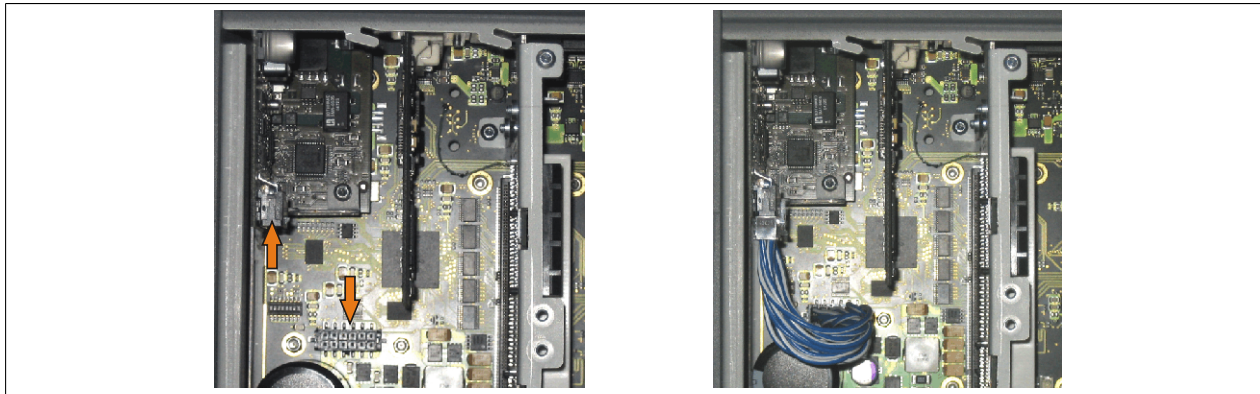


Figure 270: Plugging in the connection cable

### Information:

When connecting the cable, make sure that the connector locks into place.

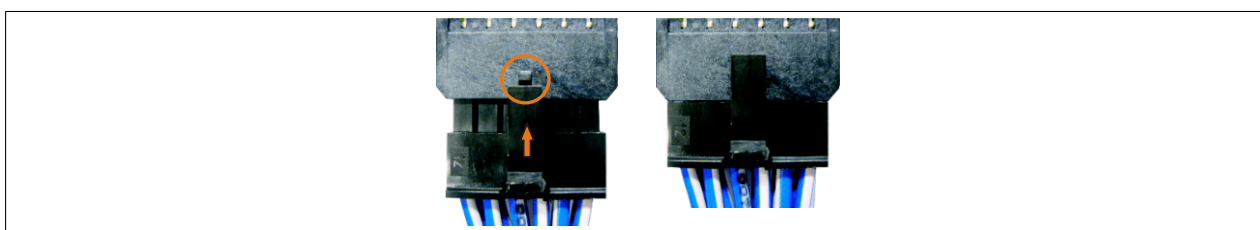


Figure 271: Connector locking mechanism

7. Attach 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 272: Removing the cover for the battery unit

3. To install the fuse, the red cable must be disconnected from the battery circuit board.



Figure 273: 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).

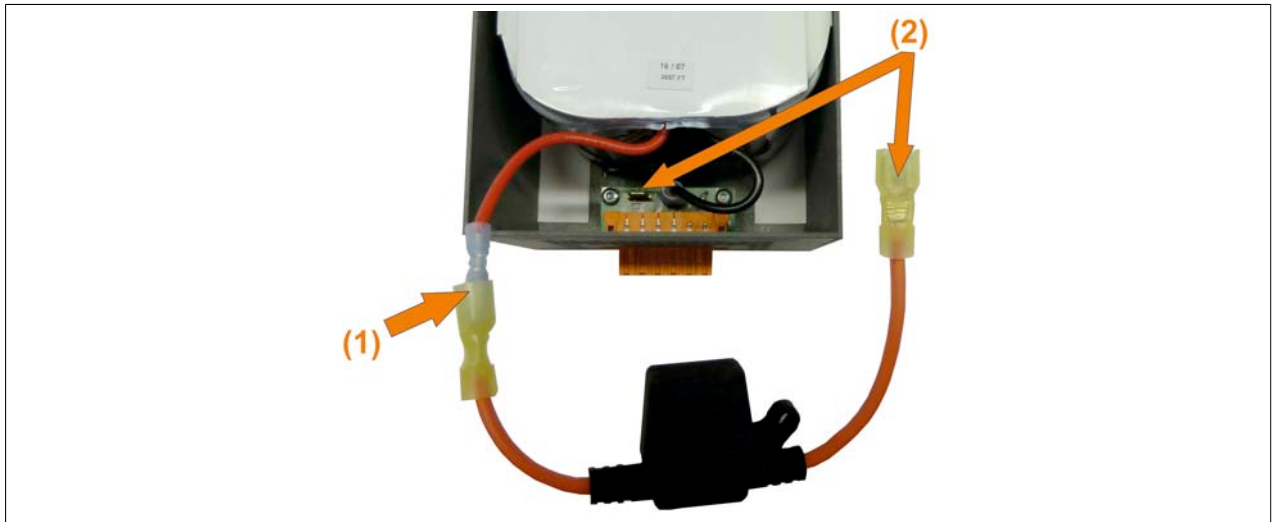


Figure 274: Connecting the fuse

5. The fuse can then be secured in the battery unit.



Figure 275: 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 Mounting the side cover

The side cover can be easily removed by loosening the Torx (T10) screws. The number of Torx screws can vary depending on the system.

### 9.1 APC810 with 1 card slot

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 be removed.
4. After the screws have been removed, the side cover can be removed by sliding it toward the front.



Figure 276: Mounting the side cover - APC810 with 1 card slot

### 9.2 APC810 with 2 and 3 card slot

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 be removed.
4. After the screws have been removed, the side cover can be removed by sliding it toward the front.



Figure 277: Mounting the side cover - APC810 with 2 card slot

### 9.3 APC810 with 5 card slot

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 be removed.
4. After the screws have been removed, the side cover can be removed by sliding it toward the front.

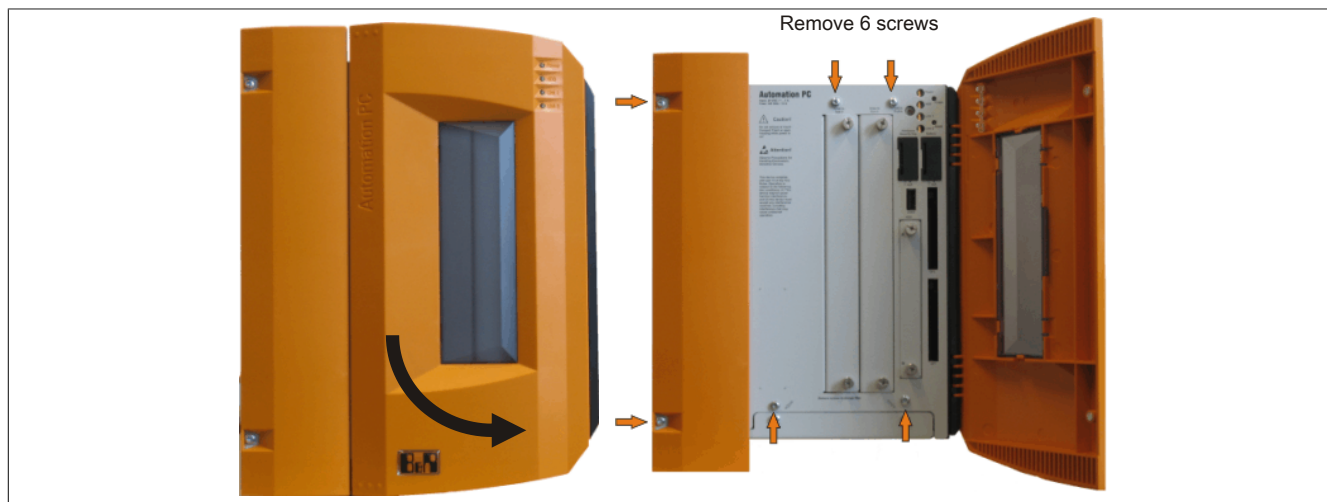


Figure 278: Mounting the side cover - APC810 with 5 card slot

## 10 AP Link installation

### 10.1 Procedure

1. Remove the side cover (see "Mounting the side cover" on page 429).
2. Remove AP Link module cover by removing the 2 marked Torx screws (T10).

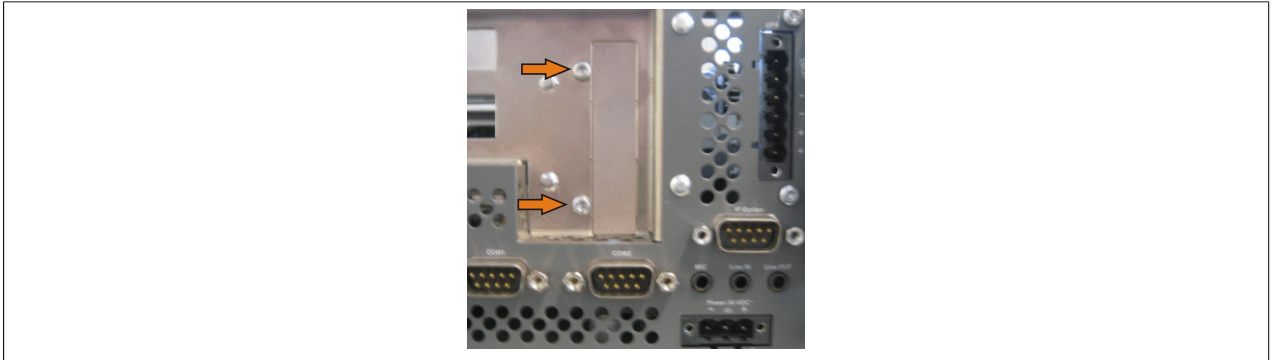


Figure 279: Remove AP Link module cover

3. Insert the AP Link card in 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 mounting materials.

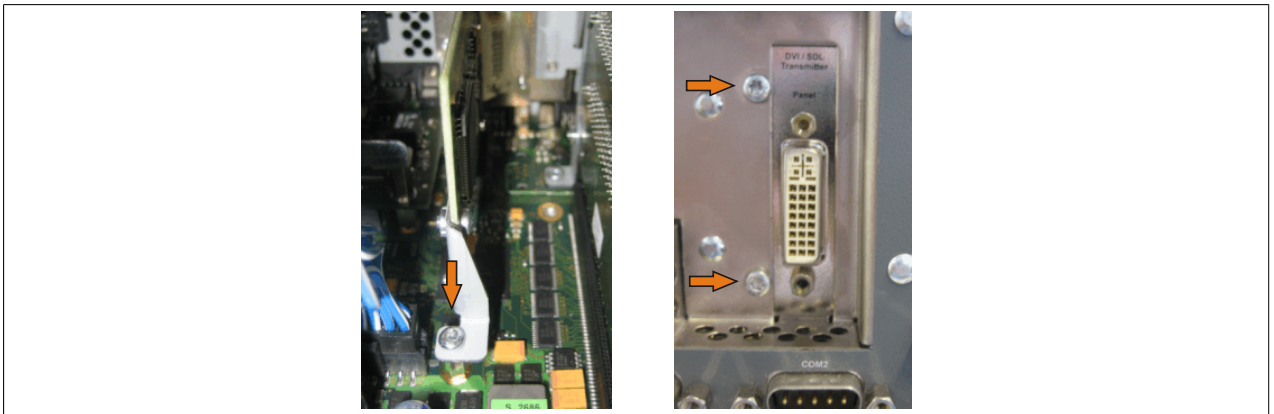


Figure 280: Install AP Link module

5. Attach cover plate and side cover.

## 11 Exchanging a PCI SATA RAID hard disk in a RAID 1 system

In the example, the assumption is made that the secondary hard disk (HDD1) is defective in a RAID 1 configuration. In such a case, the defective hard disk can be replaced by the replacement drive SATA hard disk.

Model number - PCI SATA RAID controller	Model number of required replacement SATA HDD	Note
5ACPCI.RAIC-01	5ACPCI.RAIC-02	60 GB hard disk
5ACPCI.RAIC-03	5ACPCI.RAIC-04	160 GB hard disk
5ACPCI.RAIC-05	5MMHDD.0250-00	250 GB hard disk
5ACPCI.RAIC-06	5MMHDD.0500-00	500 GB hard disk

Table 316: Overview of required replacement SATA HDD for PCI SATA HDD RAID controller

A size 10 Torx screwdriver is needed for exchanging 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 mounting screws (M3x5).

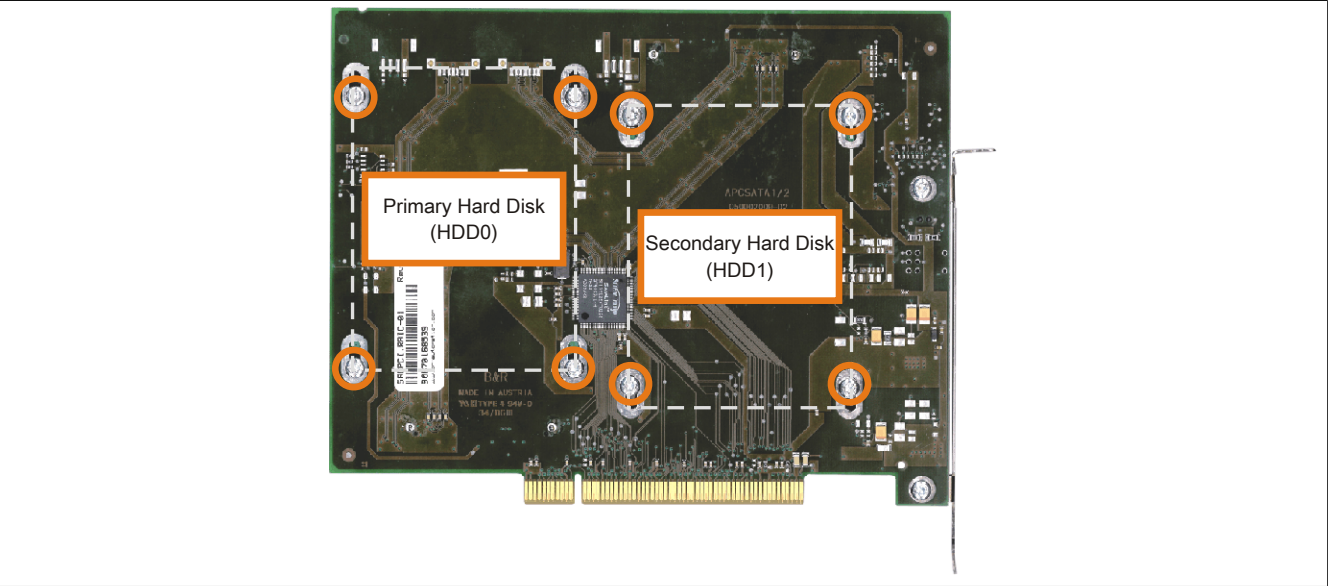


Figure 281: Screw layout on the back side of the SATA RAID controller 5ACPCI.RAIC-03

6. On the front side, slide the hard disk down and away (Figure 282: Hard disk exchange - left image).
7. Insert the new hard disk carefully into the connector (Figure 282: Hard disk exchange - right image), being careful to only touch it on the front, and not on the top.

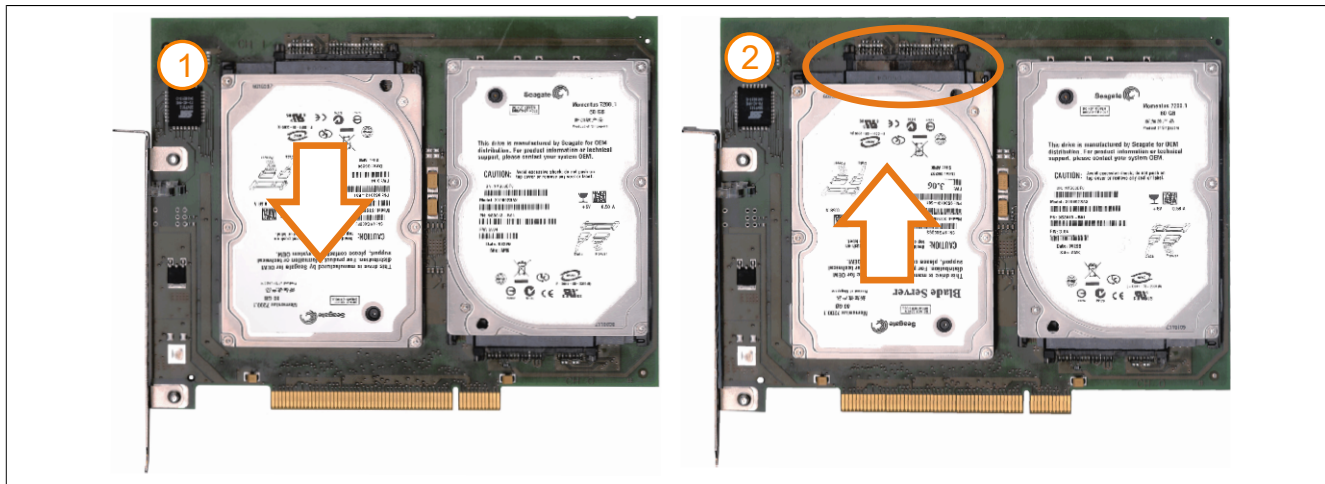


Figure 282: Hard disk exchange

8. Re-secure the hard disk using the 4 fastening screws (M3x5) used earlier.
9. Reassemble device in the reverse order.
10. An error message is output by the RAID BIOS after starting the system "RAID1 set is in Rebuild status. The rebuild will continue after boot sequence is complete".
11. A rebuild can be performed immediately in SATA RAID BIOS, or the rebuild is performed after the PC is booted - see "Rebuild mirrored set" on page 229.



## 12 Installing the HDD replacement disk tray

### 12.1 Procedure

1. Remove the side cover (see "Mounting the side cover" on page 429).
2. Insert the replacement HDD in the replacement disk tray and fasten using the ¼ turn screws.

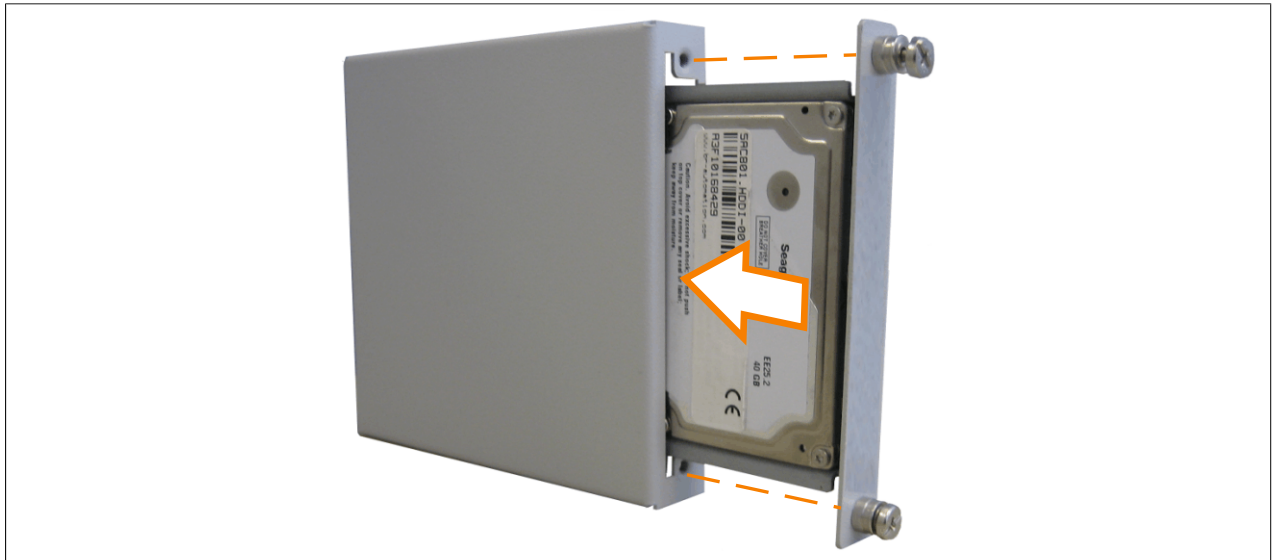


Figure 283: Installing the replacement hard disk in the replacement disk tray

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).

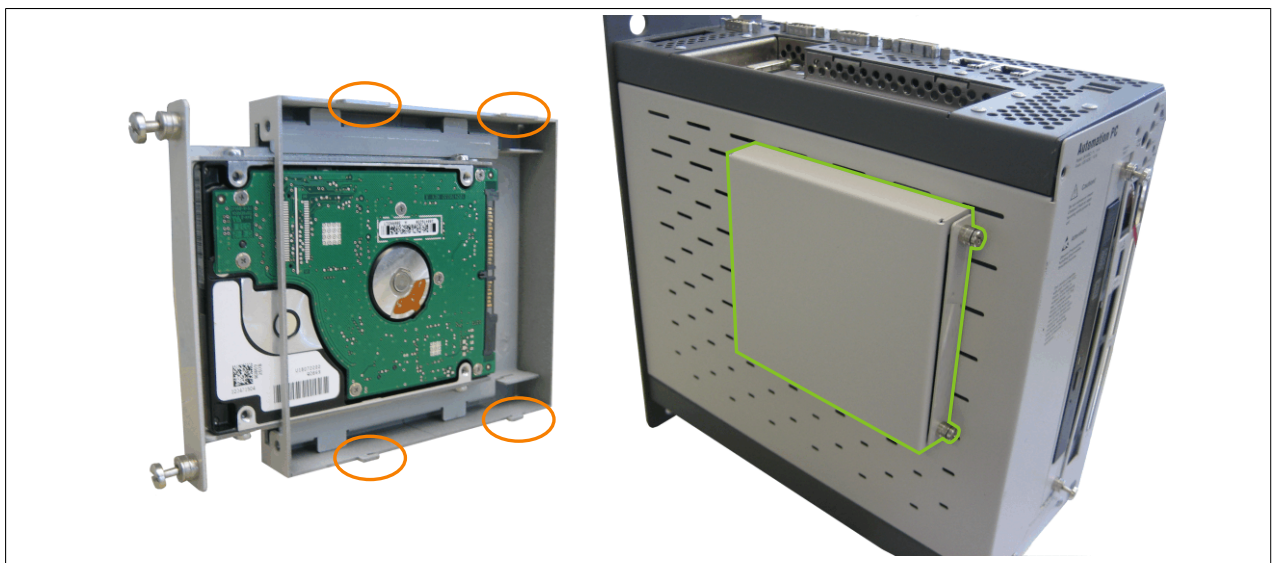


Figure 284: Installing the replacement disk tray in the APC810

5. Attach the side cover.

## 13 Installing the ready relay /2 in the add-on UPS slot

### 13.1 Procedure

1. Remove side cover (see section 9 "Mounting the side cover" on page 429).
2. Remove UPS module cover or mounted UPS by loosening the 2 marked Torx screws (T10).

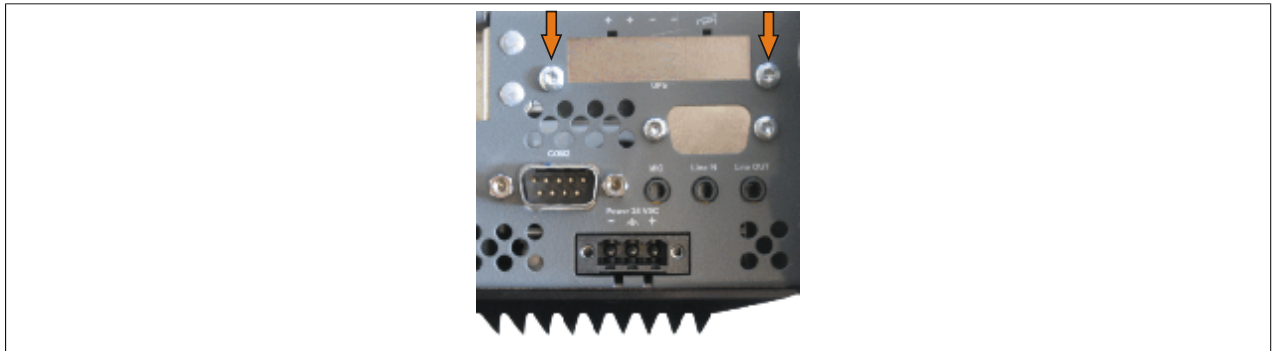


Figure 285: Removing the UPS module cover

3. Attach spacing bolt and spacing ring (if not already mounted from the UPS) on the main board (using size 5 hex screwdriver). The spacing bolt with a length of 14 mm must be used for APC810 system units 5PC810.SX01-00, 5PC810.SX02-00 and 5PC810.SX03-00. The spacing bolt with a length of 16 must be used for the system unit 5PC810.SX05-00.

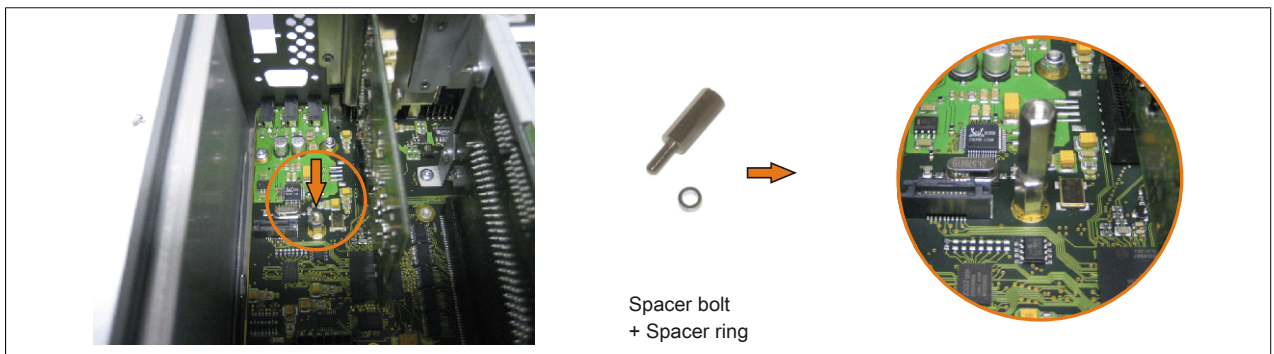


Figure 286: Screw in spacing bolt and spacing ring

4. Ready relay with 2 Torx screws (T6) and the mounting bracket on the housing and 1 Torx screw (T6) on the main board (spacing bolt).

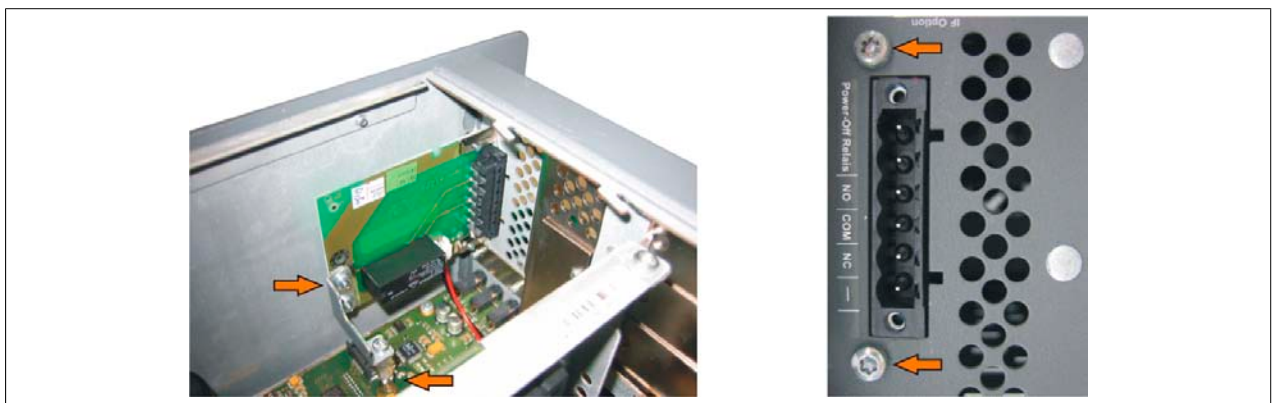


Figure 287: Installing the ready relay

5. Plugging in the connection cable

#### Information:

When connecting the internal supply voltage cable, make sure that the connector locking mechanism is engaged.

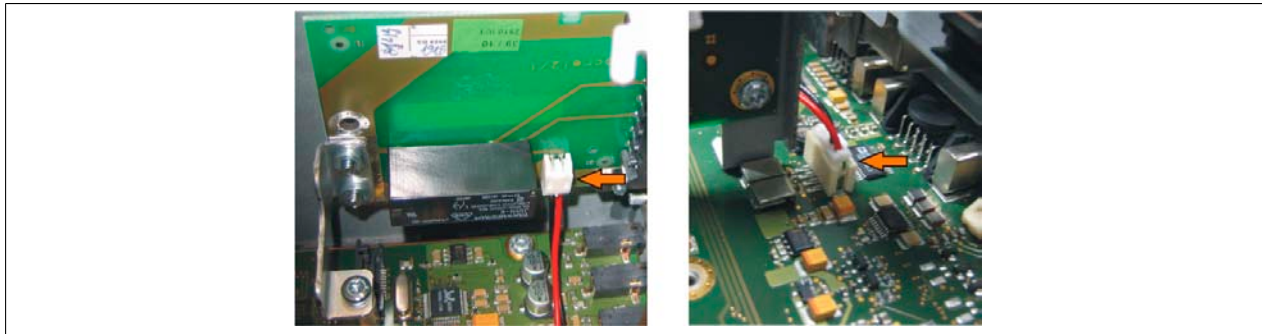


Figure 288: Plugging in the connection cable

6. Attach the side cover



# Appendix A

## 1 Maintenance Controller Extended (MTCX)

The MTCX controller (FPGA processor) is located on the main board (part of every system unit) of the APC810 device.

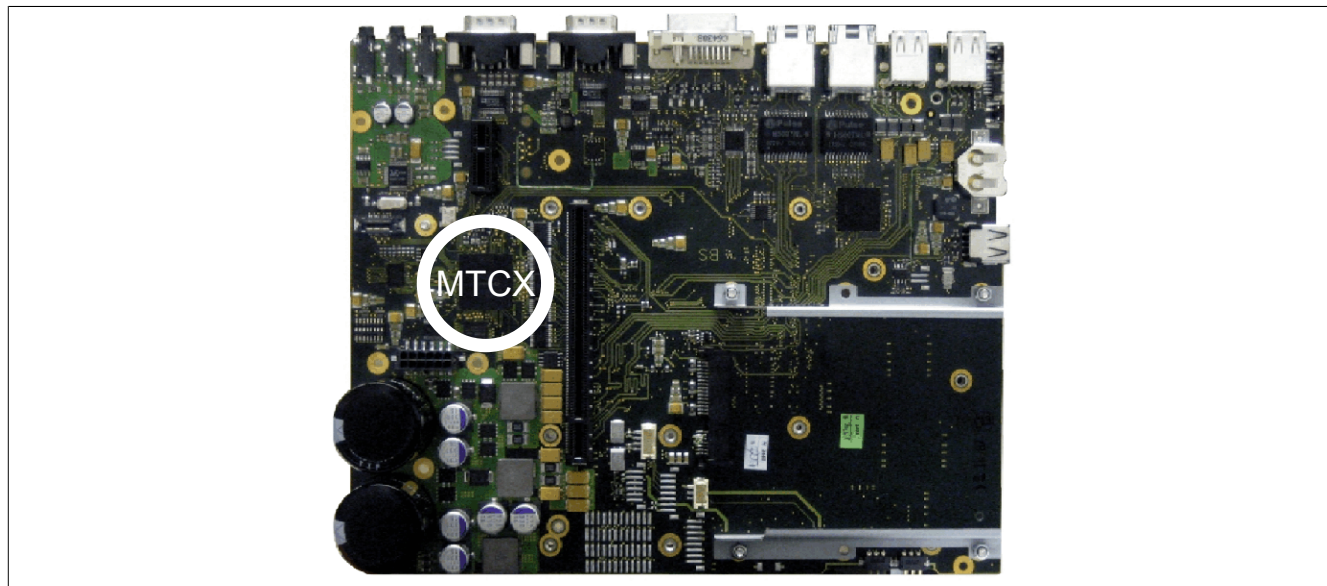


Figure 289: MTCX controller location

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

- Power on (power OK sequencing) and power fail logic
- Watchdog handling (NMI and reset handling)
- Temperature monitoring (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 a connected B&R display
- Statistical data recording (Power cycles - records every switch-on, power on and fan hour; every full hour is counted, i.e. no increase at 50 minutes)
- SDL data transfer (display, matrix keyboard, touch screen, service data, USB)
- Status LEDs (Power, HDD, Link 1, Link 2)

Extended MTCX functions are available by upgrading firmware <sup>7)</sup>. The version can be read in BIOS (menu item "advanced" - baseboard/panel features) or in approved Microsoft Windows operating systems, using B&R Control Center.

### 1.1 Temperature monitoring - Fan control

The MTCX constantly monitors the temperature using temperature sensors (see "Temperature sensor locations" on page 38), which directly determine how the fan is controlled. The RPM depends on the temperature measured. The limit values depend on the MTCX firmware version being used.

<sup>7)</sup> Available in the Downloads section of the B&R website ([www.br-automation.com](http://www.br-automation.com)).

Sensor range	Start-up 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 317: Temperature limits of the fan (MTCX PX32 V0.06).

Once the start-up temperature is reached, the device is started at the minimum fan speed. The maximum fan speed is reached at a start-up temperature of 16°C. The fan speed in this area is controlled depending on the temperature.

For example, slide-in 1/2:  $44^{\circ}\text{C} + 16^{\circ}\text{C} = 60^{\circ}\text{C}$  --> 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 plug on the mainboard allows +5 VDC and +12 VDC to be branched off in order to supply special PCI cards, for example.

This voltage can be accessed using the "5CAMSC.0001-00" on page 403. The plug is located close to the bus unit(s) and can be attached to it with a cable tie (see arrow in image). In order to reach the connector, the side cover (see "Mounting the side cover" on page 429) of the APC810 as well as any slide-in drives and PCI insert cards must be removed.

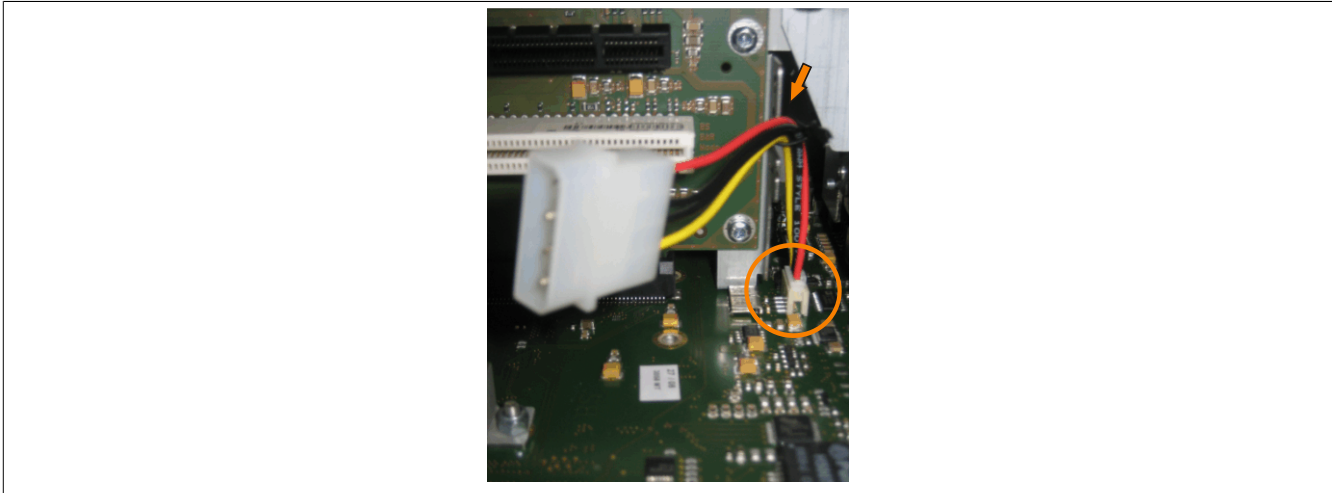


Figure 290: Connector location for external devices


Connector for the external devices			
Pin	Assignment	Power	4-pin connector, male 
1	+12 VDC	Max. 10 watts	
2	GND		
3	GND	Max. 5 watts	
4	+5 VDC		

Table 318: Pinout - Connector on main board

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